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- Short and medium term glycaemic control after pancreatico-duodenectomy
- Defending medical negligence claims: a surgeon’s guide
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Lanka Hospitals surgical model expands to international standards

Lanka Hospitals, the multi award winning internationally accredited hospital located in the heart of Colombo is fortified with the most technologically advanced equipment and a well-respected bevy of consultants and medical staff with international exposure and experience. With its recent quality additions; Medical Travel Quality Association Certification (MTQUA), and the Joint Commission International (JCI -USA) Lanka Hospitals is duly bestowed with the epithet 'The most accredited hospital in Sri Lanka'. The MTQUA and JCIA are International tokens that symbolize its continuous quality, sustained delivery of maximum patient safety and superior care.

Holding true to its international standards, Lanka Hospitals through the years has amassed a wealth of technical expertise, and resources in relation to surgical care, complimenting with its tertiary care facilities; so that patients can undergo all medical procedures under one roof.

Lanka Hospitals is one of the few healthcare providers in Sri Lanka to undertake surgical care for patients of all ages from pediatric to geriatric. The hospital specializes in procedures from conventional to minimal invasive and offers all major surgical spectrums from Neurosurgical (spinal and brain) Orthopedic (TKR, Hip replacements, acute poly trauma), general and GE surgery (Laparotomies, liver resections, thymectomies, wheeplas, APRs) to Pediatric, Oncology surgeries, Cardiac, ENT, OMF and Cosmetic.

The 27-bed surgical ward established on the 8th floor of the hospital has shown a tremendous growth since it's commissioning a few years ago and is currently being patronized by eminent surgeons in their fields of specialty. The dedicated surgical ward is facilitated by a 4-bed High Dependency Unit (HDU).

All Operating theaters have been consistently upgraded with modern cutting edge technology and instrumentation to facilitate the surgeons and for the safety of the patients. With Lanka Hospitals focusing on Day Care surgeries, emergency mini theatre of the hospital is being upgraded to suit a broader spectrum of surgeries.

Lanka Hospitals surgical care, on par with international quality standards is complete with some of the latest technological additions since 2013/2014.

- 2 high end laparoscopic systems: Karl Storz and the latest Olympus systems. Since this upgrade, the hospital has seen a 100% growth in laparoscopic surgeries.
- Urology: Laser system has been upgraded to 30 Watt, while the Olympus Resectoscope is being upgraded to the latest edition.
- Neurology: the hospital possesses Sri Lanka's first Neuro navigation system with 3DC arm for precision and efficiency. Since the introduction of this system, there has been a 250% increase in brain surgeries and no post-operative neurosurgical mortalities in Lanka Hospitals.
- Neurology: Procurement of latest Budde Halo Neuro Retractor system for ease of performance and precision. Lanka Hospitals is also the only private hospital in the country that has a 6-member strong mix of visiting and resident consultant neuro surgeons to attend to neuro surgeries around the clock within the premises.
- the latest self-retaining abdominal retractor systems.
- the latest ultra sound scan with intra operative probes for liver surgeries.
· ultrasonic dissector system.
· Oncology/ Women's Wellness Centre/ Gynaecology – The Sentinel node Gamma Probe minimizes the post-operative complications of breast surgery and some Gynaecological surgeries by preventing unnecessary removal of unaffected lymph nodes.
· ENT – The KTP Laser or the Solid State Laser used mainly for ENT and some Gynecological procedures that reduced bleeding and operating time and makes surgeries more effective.

GE Center: Lanka Hospitals performs liver surgeries every month and the commissioning of the Gastroenterology Center of Excellence saw the establishment of a dedicated GE facility with multiple subspecialties. The GE Center of Lanka Hospitals encompasses diagnostic and therapeutic procedures under one single facility and is unprecedented in its technology and expertise with additions such as

· Endoscopic Ultrasonic Scan (EUS)
· Endo Bronchial Ultra Sound (EBUS)
· facilities to perform procedures such as Endoscopic Retrograde Cholangio Pancreatography (ERCP) in the same facility without shifting to Operation theaters
· PH Manometry with impendence studies

Surgeon resources at Lanka Hospitals are one of the best in the country, largely due to the unique mix of resident as well as visiting surgeons. Lanka Hospitals portfolio of 'best in class' surgeons and consultants places it as the undisputed choice for surgical care amongst patients. Surgical staff is trained and transformed to be the best surgical care team in the country. Specialized training is given for all levels of care providers with a view to enhance expertise in specialist pre and postoperative care.
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Heart Centre (Secretary): 077 3497519

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- Echocardiography/TOE
- Exercise Stress Test
- Holter Monitoring
- Exercise Stress Echo
- Ambulatory BP Monitoring
- Dobutamine Stress Echo
- Myocardial Perfusion Scan (SPECT)

Other Procedures
- Coronary angiogram
- Cardiac catheterization
- Angioplasty
- Stent placements
- Device closure
- Valvuloplasty
- Septal myectomy
- Septal ablation
- Beating heart surgery
- Video-assisted thoracoscopic
- Re-do Coronary artery bypass graft
- Chest wall resection and sleeve resection for cancer
- Placement of pacemakers and implantable cardiac defibrillators
- Coronary total revascularization
- Aortic dissection surgeries
- Valve/arterial switch procedures
- ASD/ASD/PDA repairs
- Total repair/BT shunt
- Lung cancer surgery
- Valve replacements
The Norm, **Validated.**

Lanka Hospitals achieves another first in Sri Lanka by becoming the first hospital to be certified by the prestigious Medical Tourism Quality Alliance (MTQUA), the de facto international medical tourism certification.

Following an extensive evaluation process, Lanka Hospitals was bestowed with this certification which exemplifies Lanka Hospitals’ commitment to upholding international standards of quality and safety.

With the newly acquired MTQUA Certification, Lanka Hospitals has joined the ranks of an elite circle of internationally renowned hospitals.

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**The Lanka Hospitals Corporation PLC (PQ180)**

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Tel: +94 (011) 553 0000, +94 (011) 543 0000

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The pattern of KRAS mutations in metastatic colorectal cancer: a retrospective study from Sri Lanka.
The Sri Lanka Journal of Surgery 2016; 34 (3) : OP 47
The authors names should be corrected as:
Nirmala D. Sirisena, Kemal Deen, Dayupathi E.N. Mandawala, Herath M.P. Herath, Vajira H.W. Dissanayake

The authors names should be corrected as:
M R A Nihaj 1 , V Koculen 1 , K C Ratnatunga 1 , N Harivallavan 2 , B D Gamage 2
1 University Surgical Unit, Colombo South Teaching Hospital, Sri Lanka
2 Department of Surgery, University of Sri Jayawardenapura, Sri Lanka
Clinicopathological profile of malignancies treated in a urology unit over a period of five years

K. Sutharshan¹, B. Balagobi¹, S. Gajasinghe¹, S. Sasikumar¹, A. Weligamage¹, M. Ishak¹, H. Maddumage², A.M. Abeygunasekera¹
1 Department of Urology, Colombo South Teaching Hospital, Dehiwala, Sri Lanka
2 Department of Pathology, Colombo South Teaching Hospital, Dehiwala, Sri Lanka

Key words: Urological carcinoma; Sri Lanka; asia; prostate; bladder; kidney

Abstract

Objective
To identify the clinico-pathological profile of urological malignancies treated in the urology unit of a tertiary care hospital in Sri Lanka.

Materials and methods
Data related to all newly diagnosed and histologically confirmed malignancies in a urology unit of a tertiary care hospital in Sri Lanka were recorded prospectively over a period of five years from 1st January 2011 to 31st December 2015.

Results
There were 386 prostate cancers, 193 bladder tumours, 173 renal tumours, 13 upper urinary tract carcinomas, eight penile cancers, seven testicular malignancies, one urethral carcinoma and two urachal carcinomas during the study period. Gleason score of 8 or more prostate cancers were seen in 164 (42.5%) patients. Metastases were present in 59.8% of patients with prostate cancer. Muscle invasive urothelial cancers constituted 31.4% patients with bladder carcinoma. Primary carcinoma-in-situ of the bladder was seen in only one patient. Average age at diagnosis of renal cell carcinoma was 56.9 years with a male to female ratio of 3.5:1.

Conclusion
Renal cancers in Sri Lanka occur at an earlier age than the developed countries. They are diagnosed at an early stage similar to the developed world in contrast to the late diagnosis of prostate and bladder malignancies in Sri Lanka. Most prostate cancers are high grade with a Gleason score of 8 or more. Primary carcinoma-in-situ of bladder is extremely rare in Sri Lanka.

Introduction
Total health expenditure as a share of GDP in Sri Lanka is around 3.5% [1]. Twenty six Urological surgeons serve the country's population of 20 million. With universal health care and a robust public health network across the country, Sri Lanka has made noteworthy achievements in health outcomes compared to other developing countries [2]. With the changes in the socioeconomic parameters of the Sri Lankan society non communicable diseases have become the major health challenge of the new millennium. Malignancies make a significant portion of the non-communicable diseases worldwide as well as in Sri Lanka [3].

Different countries have populations of varying ethnicities with potentially different genetic makeup. In addition to genetic differences, the pattern of cancers differs according to different socio-cultural factors inherent to the index population. In the absence of a comprehensive national cancer registry, data maintained at individual units or at institutional level are useful to identify epidemiological and demographic patterns. Our aim of the study was to identify the clinico-pathological profile of urological malignancies treated in the urology unit of a tertiary care hospital in Sri Lanka.

Materials and methods
A cancer registry was maintained prospectively at the urology unit of Colombo South Teaching Hospital. Data related to all newly diagnosed malignancies were recorded prospectively. The data were updated as the patients’ follow up continued in the clinic. The data belonging to patients over a period of five years from 1st January 2011 to 31st December 2015 were analysed.

Histopathological evaluation was done according to the World Health Organisation (WHO) and International Society of Urological Pathology (ISUP) classification 2004 [4]. All patients included in the study had their diagnosis confirmed by histopathological evaluation. Tumour staging was done using the TNM classification of the Union for International Cancer Control 2009 [5]. Approval for the study was obtained from the Ethics Review Committee of the Institute.
<table>
<thead>
<tr>
<th>Organ</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>386</td>
</tr>
<tr>
<td>Bladder</td>
<td>193</td>
</tr>
<tr>
<td>Renal</td>
<td>173</td>
</tr>
<tr>
<td>Upper tract urothelial</td>
<td>13</td>
</tr>
<tr>
<td>Penile</td>
<td>8</td>
</tr>
<tr>
<td>Testicular</td>
<td>7</td>
</tr>
<tr>
<td>Urethral</td>
<td>1</td>
</tr>
<tr>
<td>Urachal</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>783</td>
</tr>
</tbody>
</table>

**Table 1.** Distribution of tumours according the site of origin

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age (years)</td>
<td>70.8</td>
</tr>
<tr>
<td>PSA level (ng/ml)</td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td>25 (6.5)</td>
</tr>
<tr>
<td>11-20</td>
<td>60 (15.5)</td>
</tr>
<tr>
<td>21-50</td>
<td>68 (17.6)</td>
</tr>
<tr>
<td>51-100</td>
<td>66 (17.1)</td>
</tr>
<tr>
<td>&gt;100</td>
<td>149 (38.6)</td>
</tr>
<tr>
<td>Data not available</td>
<td>18 (4.7)</td>
</tr>
<tr>
<td>Mode of diagnosis</td>
<td></td>
</tr>
<tr>
<td>TRUS biopsy</td>
<td>223 (57.8)</td>
</tr>
<tr>
<td>Trans-rectal biopsy</td>
<td>93 (24.1)</td>
</tr>
<tr>
<td>TURP chips</td>
<td>70 (18.1)</td>
</tr>
<tr>
<td>Gleason sum score</td>
<td></td>
</tr>
<tr>
<td>=6</td>
<td>68 (17.6)</td>
</tr>
<tr>
<td>7</td>
<td>137 (35.5)</td>
</tr>
<tr>
<td>=8</td>
<td>164 (42.5)</td>
</tr>
<tr>
<td>Data not available</td>
<td>17 (4.4)</td>
</tr>
<tr>
<td>Stage of disease</td>
<td></td>
</tr>
<tr>
<td>Localised</td>
<td>69 (17.9)</td>
</tr>
<tr>
<td>Locally advanced</td>
<td>86 (22.3)</td>
</tr>
<tr>
<td>Metastatic</td>
<td>231 (59.8)</td>
</tr>
<tr>
<td>Main modality of therapy</td>
<td></td>
</tr>
<tr>
<td>Radical prostatectomy</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>Radical Radiotherapy</td>
<td>59 (15.3)</td>
</tr>
<tr>
<td>Androgen Deprivation Therapy</td>
<td>299 (77.4)</td>
</tr>
<tr>
<td>Surveillance</td>
<td>23 (6.0)</td>
</tr>
<tr>
<td>Total</td>
<td>386 (100)</td>
</tr>
</tbody>
</table>

**Table 2.** Characteristics of patients with prostate carcinoma

<table>
<thead>
<tr>
<th>Tumour type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urothelial tumours (n=172)</strong></td>
<td></td>
</tr>
<tr>
<td>Infiltrating urothelial carcinoma</td>
<td>133</td>
</tr>
<tr>
<td>With squamous differentiation</td>
<td>14</td>
</tr>
<tr>
<td>With glandular differentiation</td>
<td>2</td>
</tr>
<tr>
<td>Micropapillary</td>
<td>1</td>
</tr>
<tr>
<td>Clear cell variant</td>
<td>1</td>
</tr>
<tr>
<td>Plasmacytoid</td>
<td>1</td>
</tr>
<tr>
<td>Non-invasive urothelial neoplasms (n=20)</td>
<td></td>
</tr>
<tr>
<td>Urothelial carcinoma-in- situ</td>
<td>1</td>
</tr>
<tr>
<td>Non-invasive papillary urothelial carcinoma, low grade</td>
<td>17</td>
</tr>
<tr>
<td>Non-invasive papillary urothelial neoplasm of low malignant potential</td>
<td>2</td>
</tr>
<tr>
<td><strong>Squamous neoplasms (n=14)</strong></td>
<td></td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>14</td>
</tr>
<tr>
<td><strong>Glandular neoplasms (n=5)</strong></td>
<td></td>
</tr>
<tr>
<td>Adenocarcinoma (Enteric type)</td>
<td>5</td>
</tr>
<tr>
<td><strong>Mesenchymal tumours (n=1)</strong></td>
<td></td>
</tr>
<tr>
<td>Leiomyosarcoma</td>
<td>1</td>
</tr>
<tr>
<td><strong>Haematopoietic and lymphoid tumours (n=1)</strong></td>
<td></td>
</tr>
<tr>
<td>Lymphoma (large B cell)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>193</td>
</tr>
</tbody>
</table>

**Table 3.** Histopathological types of bladder tumours
Results

Table 1 shows the number of malignancies in different organs of the urinary tract. Prostate cancers were the commonest (n=386) followed by bladder (n=193) and renal (n=173) tumours. There were 386 prostate cancers. The characteristics and primary modality of treatment of prostate cancers are given in table 2. The average age at diagnosis of prostate carcinoma was 70.8 years. Only 12 (3%) patients had screening detected prostate cancer. One hundred and sixty four (42.5%) patients had Gleason score 8 or more cancers. Two hundred and thirty one (59.8%) patients had evidence of metastases at the time of diagnosis. Out of the 299 patients who required androgen deprivation therapy, 282 (94.3%) patients opted to have surgical orchidectomy.

There were 193 patients with bladder tumors during the five-year period. Average age at diagnosis was 65 years with a male to female ratio of 4.2:1. Histological types of bladder tumours are given in table 3. Infiltrating urothelial carcinoma was seen in 133 patients. There was only one primary carcinomain-situ found among the bladder tumours. There were 14 (7.3%) patients with squamous cell carcinoma and five (2.6%) with adenocarcinoma of the bladder. In addition to the above primary malignant neoplasms in the bladder, five patients had metastatic deposits in the bladder during the five year study period. Their primary malignancies were breast carcinoma, papillary renal cell carcinoma - type II, ovarian carcinoma, carcinoma of the stomach and melanoma of the skin. One patient had an inflammatory myofibroblastic tumour of the bladder. The pathological evaluation of the bladder cancers revealed that 47.7% (82/172) were high grade and 31.4% (54/172) were muscle invasive (Table 4).

There were 173 renal tumours (Table 5) out of which, 164 were renal cell carcinomas. The male to female ratio of RCC was 3.5:1. The average age at diagnosis of renal cell carcinoma was 56.9 years. The commonest (81%) renal tumour was clear cell renal cell carcinoma (Table 5). There were 25 papillary renal cell carcinomas. Most (70%) patients had radical nephrectomy as the primary mode of treatment for renal tumours (Table 6).

Partial nephrectomy was possible in 42 (24.3%) patients. Facilities for radiofrequency ablation is available at the institute and three patients including one with von Hippel-Lindau disease were treated with radiofrequency ablation. Table 6 shows the pathological stage of the renal cell carcinomas. Pathological staging of renal cell carcinomas which underwent surgery are given in table 7. Twenty (13%) patients with renal cell carcinoma had metastases at the time of diagnosis.

Upper tract urothelial tumours were seen in 13 patients during the five year study period. All of them were urothelial carcinomas. Ten (76.9%) of them were men. Average age of patients with upper tract urothelial carcinoma was 69.7 years. Eight of them had high grade urothelial carcinoma, while five had low grade disease. Pathological stage was pT1 in six cases and pT3 in seven patients. Twelve of them underwent nephroureterectomy and one had segmental resection of the lower ureter with Boari flap reconstruction as he had a single functioning kidney.

There were eight penile cancers with an average age at diagnosis of 59.8 years. Seven had squamous cell carcinoma while one had a basaloid cell carcinoma. Five of the squamous cell carcinomas were well differentiated while two were moderately differentiated. Pathological stage was pT1 in five, pT2 in two and pT3 in one. Three patients had N1 stage disease and one patient had N2 stage lymph nodes. Mode of surgery included total penectomy in two, partial penectomy in five and glansectomy in one.

There were seven testicular malignancies. The histological types included classic seminoma in three, mixed germ cell tumour in two, choriocarcinoma in one and non-Hodgkins lymphoma in one. When the patient with lymphoma was excluded (who was 79 years old) the average age of patients with testicular malignancies was 31.5 years. The pathological stage was pT1 in five and pT2 in one. Three of them had N1 stage disease and one patient had N2 stage lymph nodes. Mode of surgery included total penectomy in two, partial penectomy in five and glansectomy in one.

The patient with primary urethral carcinoma had total penectomy and the histology was a squamous cell carcinoma. One male (age 51 years) and one female (age 47 years) patient had urachal carcinomas. Both had partial cystectomy with excision of urachal ligament and umbilicus and pelvic lymphadenectomy.

The histology revealed mucinous type and enteric type of adenocarcinoma in the two patients respectively.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>pT1</td>
<td></td>
</tr>
<tr>
<td>Low grade</td>
<td>17</td>
</tr>
<tr>
<td>High grade</td>
<td>2</td>
</tr>
<tr>
<td>pT2</td>
<td></td>
</tr>
<tr>
<td>Low grade</td>
<td>62</td>
</tr>
<tr>
<td>High grade</td>
<td>32</td>
</tr>
<tr>
<td>≥ pT3</td>
<td></td>
</tr>
<tr>
<td>Low grade</td>
<td>6</td>
</tr>
<tr>
<td>High grade</td>
<td>48</td>
</tr>
<tr>
<td>Uncertain</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>172</td>
</tr>
</tbody>
</table>
### Renal cell tumours

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oncocytoma</td>
<td>5</td>
<td>(2.9)</td>
</tr>
<tr>
<td>Clear cell renal cell carcinoma</td>
<td>132</td>
<td>(76.3)</td>
</tr>
<tr>
<td>Multilocular clear cell renal cell carcinoma</td>
<td>2</td>
<td>(1.1)</td>
</tr>
<tr>
<td>Papillary renal cell carcinoma type 1</td>
<td>8</td>
<td>(4.6)</td>
</tr>
<tr>
<td>Papillary renal cell carcinoma type 2</td>
<td>17</td>
<td>(9.8)</td>
</tr>
<tr>
<td>Chromophobe renal cell carcinoma</td>
<td>3</td>
<td>(1.7)</td>
</tr>
<tr>
<td>Xp11 translocation renal cell carcinoma</td>
<td>1</td>
<td>(0.5)</td>
</tr>
<tr>
<td>Renal cell carcinoma unclassified</td>
<td>1</td>
<td>(0.5)</td>
</tr>
</tbody>
</table>

### Nephroblastic tumours

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephroblastoma (adult Wilms tumour)</td>
<td>2</td>
<td>(1.1)</td>
</tr>
</tbody>
</table>

### Mesenchymal tumours

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiomyolipoma (atypical)</td>
<td>1</td>
<td>(0.5)</td>
</tr>
<tr>
<td>Solitary fibrous tumour</td>
<td>1</td>
<td>(0.5)</td>
</tr>
</tbody>
</table>

**Table 5.** Histopathological types of renal tumours

### Pathological stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1a</td>
<td>44</td>
<td>(28.6)</td>
</tr>
<tr>
<td>T1b</td>
<td>35</td>
<td>(22.7)</td>
</tr>
<tr>
<td>T2</td>
<td>36</td>
<td>(23.4)</td>
</tr>
<tr>
<td>T3</td>
<td>36</td>
<td>(23.4)</td>
</tr>
<tr>
<td>T4</td>
<td>3</td>
<td>(1.9)</td>
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<tr>
<td>N0</td>
<td>148</td>
<td>(96.1)</td>
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<tr>
<td>N1</td>
<td>1</td>
<td>(0.6)</td>
</tr>
<tr>
<td>N2</td>
<td>5</td>
<td>(3.3)</td>
</tr>
<tr>
<td>Metastatic</td>
<td>20</td>
<td>(13.0)</td>
</tr>
</tbody>
</table>

**Table 7.** Pathological stage of renal cell carcinomas after surgery (n = 154)

### Discussion

The latest data available from National Cancer Registry of Sri Lanka is for year 2007. According to that, there have been 391 cases of prostate, 151 cases of bladder and 106 cases of renal cancers for the whole country in 2007 [3]. The total number of prostate, bladder and renal cancers in our study cohort over five years exceeds the above reported figures. Hence our study results can be considered as representative enough of urological cancers of the country in most aspects.

The commonest urological cancer treated in the unit was prostate carcinoma. According to the National Cancer Registry of Sri Lanka prostate carcinoma is the 9th most common cancer in Sri Lankan men [3]. In Asia prostate carcinoma is the sixth most frequent cancer in men [6]. Most prostate cancers (59.8%) in Sri Lanka still presents at the metastatic age similar to other South Asian countries and Indonesia [6,7]. Only 3% were screening detected.

There is no screening programme for prostate cancer in Sri Lanka. A small number of patients get their serum PSA checked during annual medical checkups done by their employers. They constituted the small number of screening detected cancers in our study cohort. A large proportion (42.5%) of patients with prostate cancer had a Gleason score of 8 or more.

When compared with other Asian countries this pattern is similar to that found in China, Hong Kong and Taiwan [6]. Whether this is due to the late presentation or due to an unknown risk factor is debatable [8]. Only 17.6% were
Gleason 6 cancers. Active surveillance is done very rarely due to technical problems like poor compliance and commitment to rigorous follow-up.

Surgical orchidectomy is the mostly used (94.3%) form of androgen deprivation therapy which could be considered an attractive option in developing countries with large rural communities [8]. Most patients with organ confined disease in our study preferred radical radiotherapy over radical prostatectomy.

Urothelial tumours constituted 89% of bladder malignancies. Muscle invasive tumours were seen in 31.4% indicating delayed presentations or de novo aggressive disease. Although this is higher than the proportion in the western world, is much less than the 74.1% in China [9]. A higher incidence of squamous cell carcinoma (7.3%) compared to the western world and some other Asian countries is evident in this study.

The proportion of squamous cell carcinoma in China is around 1.9% [9]. Whether this is related to environmental risk factors that operate in Sri Lanka is unclear [10]. Primary carcinoma-in-situ of the bladder is almost unheard of in Sri Lanka. This is so in other south Asian countries like India too [11,12].

However in China, carcinoma-in-situ of the bladder is seen in 2.4% of urothelial carcinomas [9]. Although the exact reason is unknown it could be due to the high prevalence of BCG vaccination in Sri Lanka. Intravesical BCG is well known to be effective in treatment of primary carcinoma in situ of the bladder. In 1929 Raymond Pearl reported a lower frequency of cancer in patients with tuberculosis [13]. He also showed that cancer survivors had a higher incidence of healed tuberculosis than those who succumbed to malignancy. In late 1950s it was shown that mice infected with BCG were better able to resist inoculation with cancer cells [14].

In 1969 Coe and Feldman observed a strong delayed hypersensitivity type reaction to BCG in guinea pig bladder [15]. These observations lead Morales to try intravesical BCG to prevent tumour recurrences of bladder cancer [16]. Hence it is reasonable to postulate that widespread BCG vaccination may be a potential reason for the rarity of primary carcinoma in situ in Asia. In Sri Lanka BCG vaccination is mandatory at birth and coverage is more than 90% of the population for most vaccines [2].

Unlike prostate and bladder cancers, renal cancers of our study have been diagnosed at a relatively early stage similar to developed nations [17]. This may be due to the widespread availability of abdominal ultrasonography facilities in the country. However the average age at diagnosis of renal cell carcinoma is much lower than in the developed countries of Asia and Europe [15,16]. In Japan it is 63.9 years and in Sweden it is 67 years [17,18]. The average age at diagnosis of renal cell carcinoma in our study is similar to that of neighbouring India [19]. Some postulate whether comparatively poor nutritional status of younger population in developing countries could be responsible for this difference [19]. The distribution of histological types of renal cell carcinoma in Sri Lanka is similar to the rest of the world [17,18].

Upper tract urothelial cancers are uncommon and accounts for 5% of urothelial malignancies [20]. In our study cohort upper urinary tract urothelial carcinoma occurred at a ratio of 1:10.2, when compared with urothelial carcinomas of the bladder which is similar to worldwide data.

Most of the upper tract urothelial cancers of Sri Lanka are of high grade (61.6%) and are diagnosed at an advanced stage (54% were pT3 stage). However the percentages are similar to those of developed countries in Asia. In Japan 60% of UTUCs are high grade and 49% are pT3 stage [21]. Even the average age at diagnosis (69.7 in our study and 70 years in Japan) and male to female ratio (76.9% and 72% men in our study and Japan respectively) of upper urinary tract urothelial carcinoma are similar to that of our study [21]. The small number of cases of testicular and penile malignancies in this study is due to the fact that such tumours are managed by general surgeons in the country. Hence referral of such patients to urology units is minimal.

The main limitation of this study is that it is confined to a single urology unit with a specific drainage population which may not be representative of the whole population of Sri Lanka. However National cancer registry of Sri Lanka is based only on basic data collected from patients registered at oncology units of the country. Therefore robust data related to urological cancers in Sri Lanka are sparse. Furthermore publication of Cancer Registry data is delayed by many years. Hence under the circumstances, data and inferences of our study would be useful for health planners and researchers.

Conclusion

Characteristics of urological cancers appear to vary among Asian countries. Renal cancers in Sri Lanka occur at an earlier age than the developed countries. They are diagnosed at an early stage similar to the developed world in contrast to the late diagnosis of prostate and bladder malignancies in Sri Lanka. Most prostate cancers are high grade with a Gleason score of 8 or more. Primary carcinoma-in-situ of bladder is extremely rare in Sri Lanka.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.
References
2. World Health Statistics 2014, World Health Organization
Identify the trends of post-operative haemoglobin level change and risk factors for blood transfusions in surgically managed neck of femur fractures

Colombo South Teaching Hospital, Kalubowila, Sri Lanka.

Key words: Fracture neck of femur; peri-operative blood transfusion; post-operative anaemia

Abstract

Introduction

Neck of femur fracture (NOFF) is a major public health issue and there is a hidden blood loss during the surgery for the NOFF.

Objectives

To identify the trend of post-op anaemia and risk factors for blood transfusions in surgically managed Neck of femur fractures (NOFF).

Materials and methods

A prospective cohort analysis of 69 surgically managed NOFF patients was done for a period of 4 months. Age, sex, comorbidities, delay of admission, delay of surgery, type of fracture, level of the surgeon and diet of the patient were considered as risk factors for blood transfusions (BT). Pre-op and post-op day 1 and 3 Haemoglobin (Hb) and Haematocrit (Hct) values were assessed.

Results

Out of 69 patients who underwent surgery for NOFF, 28.9% (n=20) received blood transfusions at some point of their management. Among non-transfused patients a significant decrease in Hb in post-op day 1 (mean drop =1.06 [95% CI = (0.807, 1.317) (P < 0.05) and further significant drop from post-op day 1 to 3 (mean drop = 0.77 [95% CI = (0.556, 0.984) (P < 0.05) was noted. In Hct a similar pattern noted recording a 2.93 [95% CI = (2.131, 3.722) (P < 0.05)] mean drop in post-op day 1 and a mean drop of 2.20 [95% CI = (1.411, 2.992) (P < 0.05) from post-op day 1 to 3. Except for the fracture type (p = 0.02) none of the other factors as, age of the patient (p = 0.93), delay of admission (p = 0.09), delay of surgery (p = 0.16), blood group (p = 0.34), level of the surgeon who performed the surgery (p = 0.51), dietary pattern (p = 0.27) the comorbidities (p=0.5, 1.0, 1.0) had any significant impact for transfusion.

Conclusion

Hb level continues to drop even on post-operative day 3. Post-op Hb drop is partly due to haemodilution and extra capsular fractures has a higher risk of blood transfusion than intracapsular NOFF.

Introduction

Neck of femur fracture (NOFF) is a major public health issue due to an ever increasing ageing population. Its incidence has increased significantly over the past few decades [1].

Actual blood loss related to NOFF surgery is six times more than that observed during the surgical procedure [2]. Reasons for such a hidden blood loss may be the trauma itself leading to a pre-operative blood loss, which may not be reflected in the pre-operative Haemoglobin (Hb) and Haematocrit (Hct) level. Continuous haemorrhage after surgery due to inadequate haemostasis and prolonged bleeding due to medication with anticoagulant effect or other sources of bleeding such as gastro-intestinal tract may add to the overall blood loss [2]. As a result blood transfusions are relatively common among neck of femur fracture patients to prevent post-operative anaemia which will lead to poor tissue healing and impair early mobilization of the patient. According to a study conducted in United States, out of 90000 blood transfusions, 5.2% were for NOFF patients [3].

Objective of our study was to observe the post-operative change in Hb level up to post-operative day 3 and to determining the possible risk factors for peri-operative blood transfusions in NOFF patients.

Materials and methods

A prospective analysis of patients who underwent surgery for NOFF was done for a period of 4 months from 01st of May 2015 till 31st of August 2015. Patients managed conservatively, old fractures (more than 2 weeks), fractures with any type of intervention e.g. native treatments and
suspected pathological fracture were excluded from the study. Patients on Aspirin or Clopidogrel were off of drugs for 5 days and if the clotting profile was normal underwent surgery.

According to our unit policy we performed surgery for NOFF as soon as the patient is ready for surgery, preferably with in first 5 days from admission.

Intra-capsular fractures were treated with bipolar or unipolar hemiarthroplasty or cannulated screw fixation based on the age and fracture pattern and none of the patients underwent total hip arthroplasty. Extra-capsular fractures were managed with Dynamic Hip Screw (DHS) or Dynamic Condylar Screw (DCS) based on the fracture personality since we had no facilities to perform proximal femoral nailing or locking plate for extra-capsular fractures. None of the patients had drains after surgery. Pre-operative and post-operative day 1 and 3 Haemoglobin (Hb) and Haematocrit (Hct) values of all patients and post transfusional Hb & Hct values of patients were documented.

Age, sex, delay of admission (> 48 hours from injury), delay of surgery (> 5 days from admission), type of fracture (extra or intra capsular), diet of the patient, level of the surgeon (Senior house Officer, Senior Registrar, Consultant) and comorbidities were considered as risk factors for blood transfusions. The level of significance was set at p < 0.05. Data analyses were performed using Paired T-test and chi square test with SPSS version 10.1 software.

**Results**

Sixty nine consecutive patients underwent surgery for fracture NOFF with in the given period out of which 28.9% (n = 20) received blood transfusions at some point of their management. When consider non-transfused patients a significant decrease in Hb at post-op day 1 (mean drop = 1.06 [95% CI = (0.807, 1.317)] (p < 0.05) and further significant drop from post-op day 1 to 3 (mean drop = 0.77 [95% CI = (0.556, 0.984)]) (p < 0.05).

Hct also followed a similar pattern recording a significant drop at post-op day one [mean drop = 2.93 [95% CI = (2.131, 3.722)] (p < 0.05) and further significant drop from post-op day 1 to 3 [mean drop = 2.20 [95% CI = (1.411, 2.992)] (p < 0.05). (Table 01)

Mean age of both patients with and without transfusions were 69 (SD = 8.6) and 69 (SD = 29.5) respectively. Except for the fracture type (p = 0.03) none of the other factors including, age of the patient (p = 0.93), delay of admission (p = 0.09), delay of surgery (p = 0.16), blood group (p = 0.34), level of the surgeon who performed the surgery (p = 0.52), dietary pattern (p = 0.27) nor the comorbidities like diabetes (p = 0.56), hypertension (p = 1), ischemic heart disease (p = 1) or other diseases (malignancy, bronchial asthma, chronic kidney disease) (p = 0.83) of the patient had been a significant risk factor for transfusion. It was the extra capsular fractures (26%, n = 18) in contrast to intra-capsular fractures (2.9%, n = 2) which had a higher risk of blood transfusions. (p-value 0.03) (Table 02).

**Discussion**

Hb value to decide on blood transfusion for in NOFF is controversial. A retrospective study of 8,787 hip fracture patients, aged ≥ 60 years, found that perioperative transfusion had no effect on mortality in patients with haemoglobin levels ≥ 8 g/dl [4, 5].

But some other studies have suggested that patients with known cardiac disease may benefit from transfusion at higher haemoglobin levels [6,7,8]. According to our unit policy all NOFF patients with a Hb less than 9g/dl at any point of their management received blood transfusions until the Hb is over 9g/dl.

Nearly every one out of four NOFF patients required blood transfusions at some point of their surgical management [2]. When observing the natural Hb and Hct change during the surgical management of patients who did not receive transfusions, clearly both Hb and Hct had statistically significant drops at post-operative day 1 in comparison to pre-operative values indicating that the Hb drop in post-operative day 1 is partly due to haemodilution in intra operative period on top of the blood loss during surgery.

Similar significant drop was evident in both Hb and Hct at post-operative day 3 in comparison to post-operative day 1 values. Probable reason for this further drop is due to continuous bleeding to the operative region until complete haemostasis is achieved with physiological haemodilution takes place in plasma volume expansion. In 1973 in an animal study Carey et al demonstrated in Twenty - four hours after haemorrhage, the most significant change was a reduction in hematocrit and whole blood viscosity [9].

It is the usual procedure to perform Hb levels on post-operative day 1 and there after patient will be discharged on post-operative day 3 after surgical wound inspection as early supported discharge is recommended by many evidence based guidelines [5, 10]. According to our finding it is important to do Hb levels on post op day 3 prior to discharge since the Hb level will drop even after post- op day 1. In a similar study Foss et al emphasized the value of frequent measurements of the levels of haemoglobin in order to avoid prolonged post-operative anaemia [2].

Similar to our findings Sagar et al also agreed that risk of blood transfusion had no association with age, delay to operation or duration of surgery [11] but in another study of 249 cases, patients aged 80 years and above as a group
<table>
<thead>
<tr>
<th>Patients without Blood Transfusion</th>
<th>Patients with Blood Transfusion</th>
<th>p-value</th>
</tr>
</thead>
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<tr>
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<td>69.55 ( SD = 8.6)</td>
</tr>
<tr>
<td>Mean Age</td>
<td>69.15 ( SD = 29.5)</td>
<td>69.55 ( SD = 8.6)</td>
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<tr>
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<td>69.55 ( SD = 8.6)</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>69.15 ( SD = 29.5)</td>
<td>69.55 ( SD = 8.6)</td>
</tr>
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<tr>
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<td>Fracture Type</td>
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<tr>
<td>Diet</td>
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<tr>
<td>Comorbidities</td>
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<tr>
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</tr>
<tr>
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<td>Other(+)</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 1 Risk factors for blood transfusions in surgical management of NOFF (SHO - Senior house officer, SR - Senior registrar, DM - Diabetes mellitus, HTN - Hypertension, IHD - Ischemic heart disease)

<table>
<thead>
<tr>
<th>Table 2. Significance of post-operative change in Hb and Hct levels. (Comparison of pre op with post op day 1 value, Post op day 1 with Post Op day 3 value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean drop of Hb and Hct</td>
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<tr>
<td>Pre op Hb - Post op Day 1 Hb</td>
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<tr>
<td>Post op Day 1Hb - Post op Day 3 Hb</td>
</tr>
<tr>
<td>Pre op Hct - Post op Day 1 Hct</td>
</tr>
<tr>
<td>Post op Day 1Hct - Post op Day 3 Hct</td>
</tr>
</tbody>
</table>

were transfused significantly more blood than those aged less than 80 years [1].

NOFF are generally divided into two main groups. Those above the insertion of the capsule of the hip joint are termed intracapsular NOFF. Those below the insertion are extracapsular NOFF. Out of these two main types of neck of femur fractures, the extracapsular fractures were more prone for peri-operative blood transfusions than intracapsular fractures and many other studies have demonstrated the similar finding [1, 2, 11].

As the name denotes intracapsular fractures occur within the capsule where the capsule will prevent excessive bleeding from the fracture by forming an intracapsular haematoma, thus the personality of fracture itself will cause less peri fracture bleeding than extracapsular fractures. Similarly surgery for intracapsular fracture was either cannulated screw fixation with minimal soft tissue dissection or a hemiarthroplasty where the femoral head is replaced with an artificial metal head with lateral approach to the hip. In the latter the implant itself will act as a barrier for the medullary canal bleeding.

In contrast, extra-capsular fractures will have considerable risk of peri fracture bleeding as there is no barrier to restrict the expansion of hematoma as in intracapsular fractures. Also certain fracture subtypes e.g. Fractures with subtrochanteric extension or reverse oblique fractures are known to cause significant haemorrhage at the fracture site. Irrespective of the type (DHS / DCS) of implant surgery for extracapsular fractures will need significant soft tissue dissection and bone drilling for plate fixation. As the thigh is a region with relatively large compartments, post-surgical bleeding will be significant and concealed inside the tissue planes.

**Conclusion**

Post-operative Hb level should be reassessed on day 3 prior to discharge since the level continues to drop even on day 3. Post-op low Hb level is partly due to haemodilution by intraoperative intravenous fluids and subsequent intravascular volume expansion as evident by significant drop in Hct. Extra capsular fractures has a higher risk of blood transfusion than intracapsular FNOF.

**Acknowledgement**

The authors would like to thank Mrs. WWM Abeysekera PhD (Stat) MSc(App.Stat) BSc(Stat) Latrobe University, Melbourne, Australia for the invaluable support in statistical advice and analysis. To all the patients and their families, Medical officers and the Staff of the Orthopaedic unit of Colombo South Teaching Hospital.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

**References**


Short and medium term glycaemic control after pancreaticoduodenectomy

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2 National Cancer Hospital, Maharagama Sri Lanka.

Abstract

Introduction
Perioperative outcomes of pancreaticoduodenectomy (PD) have improved over the years. Glycaemic control in long-term survivors is a matter of concern.

Materials and methods
48 surviving patients of 66 patients who underwent Whipple surgery from 2011 to 2015 were evaluated. Patients with recurrences, who had chemotherapy within three months and patients who had not completed a minimum six months follow-up were excluded. 25 patients were selected. Patients’ demographic data, HbA1c level, fasting blood sugar level, physical activity index and waist to hip ratio were calculated. Volume of the pancreatic specimen was calculated. Non diabetics underwent oral glucose tolerance test (OGTT).

Results
There were 6 (24%) pre-existing diabetics, 3 new onset diabetics and two patients with impaired glucose tolerance (20%). Median preoperative BMI, body fat distribution, calculated median pancreatic volumes resected or underlying pancreatic pathology did not differ in diabetic and non-diabetic groups. In non-diabetics, HbA1c level or two hour OGTT did not associate with age, preoperative BMI, waist to hip ratio and resected pancreatic volumes.

Conclusion
Significant proportion of patients develop diabetes immediately after PD. Reliable prediction of this group pre-operatively is difficult due to many interacting, confounding factors. They need close monitoring in immediate perioperative period.

Key words: Pancreatoduodenectomy; diabetes mellitus

Introduction
Pancreatoduodenectomy (PD) is an aggressive treatment option for pathologies confined to the periamillary and pancreatic head region. Operative mortality after such surgery has decreased dramatically, rendering more long term survivors than in the past [1]. However, factors such as post-operative quality of life and post-PD glycaemic control remains matters of concern in the long-term survivors.

Pancreas is a mixed gland with both endocrine and exocrine components. PD reduces the volume of its beta-cells, thus lowering the threshold for pancreatogenic diabetes [2]. In addition, underlying chronic pancreatitis (CP), hyperlipidaemia, hypertension, increased BMI, fat distribution in the body, nutrition and physical activity are other confounding factors well known to increase insulin resistance and these may have a synergistic effect on post-PD diabetes [3]. In contrast, a few studies have shown to improve insulin resistance after PD [4].

There is limited data on post-PD glycaemic control and fluctuation in patients who survive the initial phase of treatment. Hence this study was focused on the changes in post - PD glycaemic control in the short and medium term, and to evaluate factors contributing to increased insulin resistance postoperatively in a cohort of patients who completed a minimum of six months follow-up after surgery.

Materials and methods
A cross-sectional analysis of 48 surviving patients who underwent PD from March 2011 to March 2015, at the North Colombo Teaching Hospital Faculty of Medicine, Ragama, Sri Lanka was performed to assess their glycaemic status. The patients who had i) post-operative pancreas related complications, ii) chemotherapy within three months after PD, iii) patients with recurrence and iv) patients who has not completed a minimum of six months follow-up were excluded.

In total 25 patients (55 years (range 18 - 77), 12 (48%) females and 13 (52%) males) who fulfilled the criteria with a median follow up period of 17 months (range 6 - 42) month at the cross-sectional analytical point...
were chosen. All patients included in the study consented to participate and the study was approved by the institutional Ethics Review Committee.

All patients underwent standard Whipple surgical procedure. Reconstruction was done using a single jejunal loop with initial end to side pancreatico-jejunostomy followed by hepatico-jejunostomy. Posterior gastro-jejunostomy was then created 70 cm from the hepatico-jejunostomy through the transverse mesocolon. After completion the anastomosis was taken to the infracolic compartment.

There were six patients who were known pre-PD diabetics and they remained as diabetics during the postoperative surveillance period. New onset diabetes was detected in five (20%) patients in the immediate postoperative period. All diagnosed diabetics were referred to the endocrinologist for optimal glycaemic control.

All study participants demonstrated good study compliance throughout the evaluation period. At a median period of 17 months, all 25 patients were subjected to fasting blood sugar (FBS) and glycosylated haemoglobin levels (HbA1C) assessments to evaluate whether the glycaemic status had deteriorated, improved or remained static.

The patients who were not known to have diabetes underwent oral glucose tolerance test (OGTT) and impaired glucose tolerance (IGT) status was diagnosed according to World Health Organization diagnostic criteria.

In all patients' basic information, hypoglycemic medication requirement, body mass index (BMI), waist to hip ratio (W/H) and physical activity index (PAI) were recorded. Post-surgical physical activity was assessed using the 'General practice physical activity questionnaire' published by department of health, England [5]. Histopathology details were also recorded and pancreatic volume resected was quantified using the dimensions (length, width and height) of the resected specimen.

New onset diabetes and non-diabetics were compared retrospectively on the possible predictors for the development of diabetes in the immediate postoperative period. Preoperative BMI, age, waist to hip ratios, pancreatic volumes resected and the physical activity index were considered as covariates.

Post-PD Non diabetic groups at the median time of 17 months follow up were also evaluated on preoperative BMI, W/H and resected pancreatic volumes to predict progression to poor glycaemic status.

Chi-square test and the Mann-Whitney U test were used to compare variables where appropriate. Spearman's rank-order correlation with SPSS 22.0 version. P value of < 0.05 was considered as statistically significant.

Results

The study cohort comprised 12 (48%) females and 13 (52%) males with a median age of 55 years (range 18-77) and a BMI of 20.92 kg/m2 (range18.2, 29.4). The median preoperative BMI was 20.92 kg/m2 (range18.2, 29.4). Out of 25 patients 7 (28%) had pancreatic neoplasms, 11 (44%) had peri-ampullary neoplasms, 4 (16%) had distal cholangio carcinoma and 3 (12%) had chronic pancreatitis. Median follow-up of the group was 17 months (range, 6 - 42)(Table 1).

Six patients (24%) who were pre diabetics and three patients who were new onset diabetics remained as diabetics and their hypoglycemic medication requirements remained static from the time of discharge till the time of assessment. Out of nineteen patients who were non diabetics preoperatively, three (15.8%) progressed to develop diabetes and two developed IGT according to WHO criteria.

The non-diabetics (non-DM) were compared with new onset diabetics and IGT patients. There was no difference in demographic data between the two groups. Median

<table>
<thead>
<tr>
<th></th>
<th>Non diabetics (n = 14)</th>
<th>Post - operative diabetic and IGT (n = 5)</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>44 (Q1 = 36, Q3 = 70)</td>
<td>56 (Q1 = 50, Q3 = 72)</td>
<td>0.551*</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>6/8</td>
<td>¼</td>
<td>0.263*</td>
</tr>
<tr>
<td>Pre-operative BMI</td>
<td>21.33 (Q1 = 13.89, Q3 = 31.87)</td>
<td>18.6 (Q1 = 16.9, Q3 = 22.51)</td>
<td>0.129*</td>
</tr>
<tr>
<td>Waist to hip ratio</td>
<td>0.95 (Q1= 0.89, Q3 = 1.4)</td>
<td>1.02 (Q1 = 0.78, Q3 = 1.12)</td>
<td>0.228*</td>
</tr>
<tr>
<td>Physical activity index</td>
<td>2 (Q1 = 2, Q3 = 3)</td>
<td>2 (Q1 = 1, Q3 = 2)</td>
<td>0.172*</td>
</tr>
<tr>
<td>Pancreatic volume resected (mean/cm3)</td>
<td>72 (Q1 = 18, Q3 = 4 - 128)</td>
<td>120 (Q1 = 25, Q3 = 1045)</td>
<td>1.000*</td>
</tr>
<tr>
<td>Indication for PD</td>
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</tr>
<tr>
<td>· Pancreatic carcinoma</td>
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<td>0.331*</td>
</tr>
<tr>
<td>· Peri-ampullary and distal cholangio carcinoma</td>
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Table 1. Predictors of immediate post-PD DM *Chi square test *Mann-Whitney U test
Figure 1. Correlation of HbA1C levels with a) Age b) preoperative BMI c) waist/hip ratio and d) pancreatic volume resected in immediate post-PD non diabetic group.

Figure 2. Correlation of OGTT levels at 2 hours with a) Age b) preoperative BMI c) waist/hip ratio and d) pancreatic volume resected in immediate post-PD non diabetic group.
preoperative BMI was 22.9 and 19.8 kg/m2 (P = 0.129) in post-PD non-DM and DM groups, respectively. There was no significant difference in body fat distribution, calculated median pancreatic volumes resected (P = 1.000) or underlying pathology (P = 0.331) for which PD was performed between the two groups (Table 1).

Eighty four percent (16/19, excluding IGT) patients remained as non-diabetics. In these patients HbA1c and two hour OGTT was compared with the potential risk factors to develop diabetes. There was no correlation of HbA1c level or two hour OGTT with age, preoperative BMI, waist to hip ratio and resected pancreatic volumes in the post-PD non-diabetic group (Figure 1 and 2).

Linear regression analysis was performed on OGTT and HbA1c levels separately using patient age, resected pancreatic volume, BMI, age and the waist to hip ratio as covariates. The models did not show a significant association with the factors (OGTT; p value=0.435, HbA1c; p value = 0.624) and the individual variables did not show a significant association.

Discussion

After a median of 17 month follow-up, eleven patients who had diabetes (6 preoperatively and 5 new onset) had their hypoglycemic medication requirements static during the postoperative surveillance. Three patients had IGT. None of the factors evaluated predicted progression to diabetes or degree of glycaemic control.

Pancreatectomy-duodenectomy is known to affect glycaemic control in two ways. New onset diabetes is documented in up to 50% of the cases [6-8]. On the contrary, improvement of glycaemic control in a small percentage in previously known diabetics is also documented by others [4,9,10]. However, collectively, all of these studies have a common setback as they have evaluated PD and distal pancreatectomy together as a single group [7,11,12]. To the author's knowledge, at least two groups, have investigated the outcomes after the immediate perioperative period [13,14]. Nevertheless, we are of the opinion that the foregoing studies have intrinsic deficits.

First, assessing glycaemic control after PD and distal pancreatectomy as a single group is not rational due to the differences that occur in the normal physiology after PD due to unequal distribution of the beta cells in the pancreas. Second, immediate perioperative period is associated with a number of risk factors pre operatively for patient preparation and long-term follow-up. In the current study those who developed post-surgical diabetes and the remaining counterparts did not show a major difference in possible risk factors that harbinger a future diabetic status. In previous data looking at long-term results after PD, You et al [7] evaluated a sample of 55 patients with long term follow-up period of 60 months and assessed a number of risk factors for diabetes including the pancreatic volume.

They concluded that none of the factors including pancreatic volume predicted development of diabetes. While the studies of You et al [7] concur with our findings it should be borne in mind that our diabetic sub-group was relatively small and a larger group of patients are required to arrive at definitive conclusions.

In another study by Hirata et al [11] pre-operative HbA1c level was significantly higher in patients who developed immediate post-operative diabetes and yet again confirmatory data are needed to ascertain the validity of this finding.

In our cohort, 11/25 (44%) were diabetics by the time they were discharged. After this initial peak there were no new onset diabetics at 17 months of follow-up. In the remaining group and non diabetics, there was no correlation with the OGTT values and the HbA1c levels with the evaluated potential risk factors. Even though our sample is relatively small as it is a highly selective sample this seems to be an interesting finding worthy of further exploration.

As seen in our study, a significant proportion of patients develop diabetes in the immediate perioperative period after PD. The current study as well as other have clearly indicated the difficulty in predicting this potential group of patients with a diabetic risk is probably difficult due the many interacting factors. Once the initial risk group is taken off others seem to be stable as far as the glycaemic control is concerned.

Longer term follow up studies may however yield more definitive data. In one long term study by Ishikawa et al [15] evaluated a similar selected small group of 51 patients, over a period of 7 years.

They concluded that patients with normal OGTT remained
normoglycemic throughout, and those with impaired OGTT ran a higher risk of developing diabetes in the initial period after surgery [15]. However, after this initial period they did not progress to develop diabetes.

In conclusion, significant proportion of patients develop diabetes in the short and medium term after PD. Reliable prediction of this group pre-operatively is difficult due to many interacting, confounding factors. Clearly these patients need to be closely monitored and managed during the short and medium term postoperative period to ascertain their diabetic risk.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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President and the members of the council of the College of Surgeons of Sri Lanka, family members of Dr. R.L Spittel, my most respected teachers, colleagues, friends, ladies and gentlemen.

First, I wish to thank the president and the council of the College of Surgeons for giving me the opportunity to deliver the Dr. R.L Spittel oration for the year 2016. I consider it a great honour and a privilege bestowed upon me to honour a great Sri Lankan surgeon of yesteryear.

Dr. Richard Lionel Spittel FRCS, CMG, CBE was born in 1881 in Tangalle. He graduated from Colombo Medical Faculty with MBBS in 1905. Subsequently he moved to England where he completed fellowship of the Royal College of Surgeons of England in 1909. Dr. Spittel returned to Sri Lanka the following year to assume duties as the 3rd Surgeon at General Hospital, Colombo.

Dr. Spittel was a pioneering Surgeon. He performed wonders in an era when medical facilities in Ceylon were rather primitive and speed as well as accuracy were essential prerequisites for a good surgeon. Dr. Spttel was the first to perform a skin graft in Sri Lanka and was the first to perform a blood transfusion using his own blood.

Dr. Spittel was a surgeon with many skills. Apart from being a scholar and a teacher, he was a naturalist and a great writer. Dr. Spittel had an innate love towards anthropology and jungles of Ceylon and its native inhabitants, the Veddahs. He was one of the foremost personalities to recognize the need to record the customs of Veddahs.

Over a period of four decades Dr. Spittel published many books on historical aspects of Sri Lanka and Veddahs. Some of the well-known books include Wild Ceylon (1924) Savage Sanctuary (1941) Vanished Trails (1950) Where the White Sambhur Roams (1951) and Wild White Boy (1958).

Dr. Spittel died in 1969. His life was beautifully summarized in the obituary notice published in the British Medical journal the same year. I quote "though steeped in western culture, [he] went off the beaten tracks of clubs and tennis courts into the wilderness where Ceylonese customs, traditions, arts and crafts were studied and revealed to the world" I unquote.

What Dr. Spittel strived for during his lifetime is reminiscent of the topic I have selected for my oration today. Similar to Dr. Spittel's exploration of Ceylonese wilderness, during my oration today, I will try to emphasise the need to explore the epidemiology and outcomes of breast cancer in our country, to identify how it differs from the west in order to understand how we can improve outcomes for women with breast cancer.

Breast cancer is the commonest cancer among women in this world. The world incidence of breast cancer (i.e. the number of women diagnosed with breast cancer) is nearly three times the next in the list, colorectal cancer. It is also the biggest cancer killer among women. Sri Lanka is no different. According to WHO estimates approximately 4000 Sri Lankan women are diagnosed with breast cancer and almost a third of this number succumb to breast cancer each year [1].

The highest incidences of breast cancer are observed in developed countries including the USA, England, Australia and New Zealand. Comparatively in developing countries like Sri Lanka breast cancer incidence has been much lower. According to WHO estimates, in developed countries breast cancer incidence has steadily increased from 1970s to turn of the millennium. Since then it has plateaued and over last 5 to 10 years has been declining gradually. In contrast, rates of breast cancer in developing countries including Sri Lanka are still rising steadily.

More striking are the differences in patterns of death from breast cancer in developed and developing countries. Even while the incidence of breast cancer was increasing, breast cancer mortality was declining steadily in the developed world. In contrast, in developing countries mortality rates have been increasing steadily in parallel with incidence, thereby narrowing the mortality gap between developed and developing countries. At the current rate, within the next decade we are likely to surpass the mortality rates of...
from diagnosis through treatment was performed. Some of the more important findings that originated out of the analyses are discussed below.

Figure 1  Time trends in delay in adjuvant chemotherapy longer than 60 days (Panel A) and adjuvant radiation therapy longer than 90 days (Panel B) for invasive breast cancer in Waikato, New Zealand 1999–2012

Timeliness in providing surgical care and adjuvant therapy and how these have changed over the study period found that timeliness in providing care has improved significantly over the study period. However, for some women namely ethnic minority Maori women and women of lower socioeconomic groups continue to experience longer delays to undergo surgery and to receive adjuvant chemotherapy [4, 5]. Although adjuvant endocrine therapy for breast cancer is a highly effective mode of treatment, it is well known that many women do not take these medications as prescribed for over 40% women had not completed the five year course of endocrine medication while a quarter had stopped it before the end of the first year [6].

Impacts of breast cancer screening on breast cancer outcomes and, how disparities in screening contributes to poor outcomes among Maori, rural and women of poor socioeconomic backgrounds were also studied [7]. Figure 2 shows the impact of socioeconomic status on 10 years breast cancer survival. There were major differences in

Figure 2  Ten-year breast cancer specific survival rates by socioeconomic deprivation based on Kaplan-Meier survival curves  (Dep 1-2 – Least deprived, Dep 9-10 – Most deprived) for screening age women in Waikato, New Zealand 1999-2012
developed countries.

There are many reasons for worsening mortality rates in developing countries. First, in this part of the world many breast cancers are diagnosed late. In comparison, in developed countries a majority of cancers are diagnosed early; either when they are very small palpable lumps or are impalpable as seen with mammographic screen detected cancers.

Quality, timeliness and accessibility of cancer treatment have also been contributory to this disparity. In resource limited countries like Sri Lanka, patients have to wait for a longer time to receive cancer treatment and sometimes effective latest cancer treatments might not be freely available due to cost. Furthermore, resources are not equally distributed among all regions or hospitals in our country. This obviously would lead to a sub-optimal cancer care and thereby outcome disparities by geography, socioeconomic status or ethnicity.

According to data published by the National Cancer Control Programme (NCCP) of Sri Lanka, 2401 female breast cancers have been recorded in Sri Lanka in 2010, which is lower than the GLOBOCAN estimate for the same year [1, 2]. Of those, over a third have been diagnosed at an advanced stage. Furthermore, for about 40% of breast cancers, staging data are unavailable. At least some of these unstaged cancers could be advanced at diagnosis where women would not undergo surgery and hence the actual proportion of advanced cancers are likely to be even greater.

Based on above information it is evident that there are many areas of breast cancer care that are quite obscure. For instance, there is limited data on incidence and stage at diagnosis of breast cancer in Sri Lanka. Further, we have hardly any data on how breast cancers are diagnosed, treated or followed up in Sri Lanka or their outcomes. As such, we know very little on possible disparities in cancer care by geography, ethnicity or socioeconomic status. It is important that we understand these areas in order to plan and implement measures to improve cancer outcomes in our country. Not only that, without such data we will not know how effective the measures that we implement, nor their cost effectiveness.

In the next segment of my talk, I will discuss the findings from a doctoral research project I carried out in New Zealand at the University of Auckland, where breast cancer outcomes and reasons for outcome disparities in New Zealand (NZ) were studied.

New Zealand is a country with a total population of 4.5 million. The majority about two thirds are of European origin and others are almost equally distributed among Indigenous Maori, Pacific Islanders and Asians. The health system is primarily a publicly funded although there is a thriving private sector much like Sri Lanka. They have one of the best health information systems in the world. Through a national health index (NHI) number which is unique to each individual, life time health data for each individual could be linked with many other national health and non-health related data sets.

Breast cancer is a major public health problem in NZ. They have the 9th highest breast cancer incidence rate in the world. Further, mortality rate from breast cancer is 20% higher than neighbouring Australia which is a cause for great concern. There were some reports indicating major disparities in breast cancer outcomes by geography, socioeconomic status and geography in NZ. For instance, according to NZ National Cancer Registry (NZCR) data, Maori have a 60% higher breast cancer mortality rate than the European population and a similar though less pronounced disparity is seen between women of low and high socioeconomic groups.

Before this research project was started, there were many unanswered questions. First, why are NZ women having poor outcomes overall, and why are there so many disparities, for instance by ethnicity, geography or socioeconomic status. Secondly, what is the quantitative contribution of these factors towards breast cancer outcome disparities and finally what actions are needed to overcome these issues were also not known.

To answer these questions, a comprehensive set of data covering the full breast cancer care pathway from a population based cohort of women with breast cancer was needed. This was done through one of the four regional breast cancer registries that are functioning in New Zealand. The selected Waikato Brest Cancer Registry (WBCR) was the most comprehensive out of four regional registries. This region included a total population of approximately 400,000 which included a mix of different ethnic, socioeconomic and geographic regions.

The WBCR established in 1999 included data for all breast cancers in the region from 1999 and included over 3000 cases. A major effort was required to get the data up to the quality that was required for proposed analyses. For many cases, this required accessing the original patient records, hard or soft copies to fill in the blanks and to confirm the accuracy of data. At the end, with much difficulty a dataset was prepared that included all breast cancers diagnosed within this region over a period of 15 years.

The first analysis that was done was to compare this dataset with the national registry, the NZCR. This study found that national registry was 99% complete for registrations, but further details, for example cancer staging were missing or inaccurate for a significant proportion of women [3]. A comprehensive analysis of the dataset to identify the quality of breast cancer care and timeliness in providing such care
survival for breast cancer by socioeconomic groups for symptomatic cancer which was over 15%, but no differences were observed for screen detected cancer. This further highlighted the importance of screening as a possible tool which could be utilized to reduce cancer disparities among populations.

Ethnic differences in breast cancer biology was also studied, which has been a major topic of interest in the USA. However unlike in the USA, no major or significant differences in either tumour aggressiveness or expression of tumour receptors were observed in New Zealand [8].

Finally, this dataset was used to model how different disparities are brought about and how much each of these factors are contributing towards the observed disparities [9]. It was noted that almost all the disparities were due to modifiable factors. It was evident that, if equal quality of healthcare is provided all women have the potential to achieve equal and optimum cancer outcomes, which currently are experienced only by the rich, urban European populations.

These study findings were brought to the attention of stakeholders involved with breast cancer care to improve the quality of breast cancer care and to reduce disparities. First, the NZ Ministry of Health introduced several initiatives to improve the quality and timeliness of care which were highlighted in this study. One important area was the recruitment of specialized cancer care nurses to help women navigate the complex cancer care pathway. On the research front, these findings attracted much needed research funds to trial new strategies to improve breast cancer outcomes and to reduce disparities. Currently our research team is involved with two major interventional studies with funding from the NZ Health Research Council to identify the most effective ways to improve breast cancer outcomes and to reduce disparities.

In the next segment I will discuss how a similar breast cancer registry established locally could potentially help us accomplish the same in our country.

Establishing a registry is not expected to be an easy task. Many challenges are recognized which range from data source identification, collection of data from identified sources, funding, trained man power and maintaining confidentiality of collected data. Some of these are more relevant to the local context. For instance, as we do not have proper medical record keeping systems nor electronic records and hence data retrieval will be a major issue. Novel and innovative strategies will have to be identified and implemented in order to overcome these issues.

For example, it may be possible to obtain help from the different professional colleges of relevant specialities who are involved with the management of breast cancer in the country. Through these college members it will be possible to identify and implement ways to ensure a steady process for identification of patients and collection of cancer data.

In addition, Ministry of Health, NCCP, hospitals where breast cancers are treated, Well Woman and related clinics manned by Medical Officers of Health, Public Health Sisters and Midwives could also be potential resources to obtain breast cancer data. Will have to be included in this process to ensure the long term functioning of the registry. Funding for functioning and long-term sustenance of the registry would be an important issue that will have to be addressed.

During the last year since my return to Sri Lanka we have done the ground work to identify challenges in establishing a registry in the local setup and to find ways to overcome these challenges. Prospective data identification and collection protocols have established and a database in Microsoft access format has been created to enter breast cancer data. However, a lot more work is needed before these data collection processes and can become fully functional.

Breast cancer is already a major public health problem in Sri Lanka and is likely to get worse in the future. We need to implement actions in many fronts to tackle this problem effectively in order to minimize the burden of breast cancer in our country. While improving and upgrading the quality of diagnostic, cancer treatment and pathology services remain the priority areas to improve breast cancer outcomes, a breast cancer registry would provide invaluable information on the effectiveness of these interventions. Many challenges are expected but we are hopeful that we can overcome these challenges with perseverance and by working together with other stakeholders to make it a reality.

The work I have presented here would not have been a possibility without the support of many people. I have named a few here and apologize for not thanking others individually. First I want to thank my supervisors at the University of Auckland Prof. Ross Lawrenson and A/Prof Ian Campbell for guiding me and for motivating me to complete my doctoral project successfully in a timely manner.

I also wish to thank Prof. Nandadeva Samarasekera, my mentor and head of the department for pursuing me to read for a PhD from the day I was recruited to the department. My colleagues at department of surgery have always been a great strength and their continuous support and motivation have been a great help. I also wish to thank my parents and in-laws for their continuous support. Last but not least, my wife Sumudu for being a caring wife and helping me throughout while herself was busy with her work.

Thank you ladies and gentlemen for your kind attention and have a pleasant evening.
All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

References


Defending medical negligence claims: a surgeon's guide (part I)

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Introduction

No one would disagree that defending a medical negligence claim is not a desirable option for any medical practitioner. However, surgeons appear to be particularly vulnerable to this predicament. According to the conclusions of a WHO study published in 2008, of the 234 million surgeries that were taking place every year globally, 3-16% of surgeries conducted in developed countries resulted in unnecessary complications with nearly 8% leading to death and the death rate in major surgeries conducted in developing countries was nearly 10% [1]. Findings of a cross-sectional descriptive study of complaints of medical negligence received and investigated by the Healthcare Excellence Unit of the Ministry of Healthcare and Nutrition during 2008 and 2009 concluded that the majority of complaints are related to specialties involved with surgical operations [2]. On the other side of the world, in the USA, which has a reputation for high rates of medical malpractice claims, the extent to which surgical errors dominate the medical negligence landscape was captured thus after a twenty-year study of national malpractice claims [3]:

...Johns Hopkins patient safety researchers estimate that a surgeon in the United States leaves a foreign object such as a sponge or a towel inside a patient's body after an operation 39 times a week, performs the wrong procedure on a patient 20 times a week and operates on the wrong bodysite 20 times a week.

...They identified 9,744 paid malpractice judgments and claims over those 20 years, with payments totaling $1.3 billion. Death occurred in 6.6 percent of patients, permanent injury in 32.9 percent and temporary injury in 59.2 percent.

In this cross-global context, it would be useful for surgeons practising in Sri Lanka to have some insight into defending medical negligence claims. First of all, not every surgical error will result in an injury. Secondly, not every error which causes an injury would come to the knowledge of the patient. Thirdly, not every patient who becomes aware that an injury has been caused by an error will make a claim against the surgeon [4]. However, the few surgical errors which reach the stage of such a claim being made can result in medical negligence litigation and necessarily call for the defendant surgeon to construct a defence.

Before exploring the avenues available for formulating a legal defence in a medical negligence lawsuit, it is necessary to recall the basic ingredients which need to be proved by a claimant in such a lawsuit: (a) that the defendant doctor and/or hospital owed a duty of care to the claimant; (b) that such duty of care was breached; (c) that such breach caused an injury; and (d) that such injury resulted in loss to the claimant. If all of these ingredients are found to be present in an incident of surgical error, liability for medical negligence is most likely to ensue. Since the last ingredient involves proof of facts purely within the domain of the claimant, it is not relevant to surgical practice itself. Therefore, this paper examines some key factors upon which a surgeon facing medical negligence litigation can develop his defence and avoid liability for negligence by either challenging proof of or offering defences against the other three ingredients.

Avenues to defend

1) Absence of a duty of care

As the ingredients of a medical negligence lawsuit indicate, a threshold fact that must be proven is that the doctor owed a duty of care to the claimant. If a doctor is able to successfully challenge that fact, the lawsuit would fail without going as far as delving into expert opinions on the medical care that was provided. The law certainly does not recognize a duty to rescue; and, in this sense, no doctor owes a duty of care to voluntarily offer medical services to a stranger who is not already his patient. However, consider a surgeon who plays the role of a Good Samaritan and assists in a situation

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of emergency. Having had no expectation of remuneration and acted in good faith, should he fear that he would be sued for a surgical error which occurs in that situation? The short answer is no. Although some jurisdictions have civil liability legislation which expressly protects persons, including doctors, who offer assistance in emergencies [5], in the absence of similar statutory provisions in Sri Lanka, it can still be argued that, as long as a doctor plays the role of a Good Samaritan, he owes no duty of care in his professional capacity to the person he is assisting.

However, once the professional doctor-patient relationship is established, a legal duty of care commences and a surgeon who undertakes operating a patient will owe that duty to the patient. In some exceptional cases, a doctor may also owe a duty of care to third parties who are not merely bereaved relatives making a claim on injuries suffered as a result of a patient's death. For instance, in Froggatt v. Chesterfield and North Derbyshire Royal NHS Trust [6] the claimant was not the patient. The claimants were the husband and son of the patient who had been subjected to an unnecessary mastectomy, after negligent misdiagnosis of breast cancer. The injuries suffered by both claimants were of a psychiatric nature: the husband, for having developed an adjustment disorder, following the profound and lasting shock of seeing his wife undressed for the first time after surgery, and the son, for undergoing moderate PTSD upon his mother repeating to him the negligent advice that she had cancer and was likely to die. The psychiatric injuries here were caused by an incident of misdiagnosis, but had the mastectomy been a result of surgical error, the surgeon could have equally been held liable for the said injuries. Though it may seem that this case is at the extreme end of the spectrum of duty of care, it is important to be aware of such judicial trends, at least in order to know of one's extent of duty and how even a minor surgical error can have snowballing repercussions in medical negligence litigation.

In McFarlane v. Tayside Health Board [7] too the claimant was not the patient himself, but the wife of a patient who had undergone a vasectomy operation. The patient had been negligently informed that his sperm counts were negative and, thus, he and his wife no longer required contraception. When the claimant gave birth to their fifth child and sued the surgeon for pain and suffering and the inconvenience of pregnancy and childbirth, the House of Lords in a majority decision held that she was entitled to such damages. Though it may seem that this case is at the extreme end of the spectrum of duty of care, it is important to be aware of such judicial trends, at least in order to know of one's extent of duty and how even a minor surgical error can have snowballing repercussions in medical negligence litigation.

In Goodwill v. BPAS [8], the claimant was not the wife of the patient who had undergone failed vasectomy, nor was she his partner at the time of the surgery and, thus the defendants did not have any knowledge of her. Therefore, this type of scenario allows for a doctor to defend his case by arguing that the claimant has failed to establish a proximate relationship between them and thereby contend that he did not owe any duty of care.

2) Adherence to the acceptable standard of care

A surgical error would amount to a breach of the duty of care, i.e. medical negligence, only if it falls outside the acceptable standard of medical care. The test adopted in law in order to determine the acceptable standard was settled by two seminal decisions of the Courts of England:

Bolam v. Friern Hospital Management Committee [9]

The test is the standard of the ordinary skilled man exercising and professing to have that special skill...

Bolitoh v. City and Hackney HA [10]

“In my view, the court is not bound to hold that the defendant doctor escapes liability for negligent treatment or diagnosis just because he leads evidence from a number of medical experts who are genuinely of opinion that the defendant's treatment or diagnosis accorded with sound medical evidence.

In the vast majority of cases the fact that distinguished experts in the field are of a particular opinion will demonstrate the reasonableness of that opinion. In particular, where there are questions of assessment of the relative risks and benefits adopting a particular medical practice, a reasonable view necessarily presupposes that the relative risks and benefits have been weighed by the experts in forming that opinion. But if, in a rare case, it can be demonstrated that the professional opinion is not capable of withstandng logical analysis, the judge is entitled to hold that the body of opinion is not reasonable or responsible” (Lord Browne-Wilkinson).

The Supreme Court judgment in Sri Lanka's most famous medical negligence lawsuit to date, Prof. Priyani Soyza v. Rienzie Arsecularatne [11] relied upon the Bolam test as modified by the Bolitoh principle. If this test was to be applied to a surgical event, a court would come to a finding that a surgical error amounting to medical negligence had occurred only if the particular procedure followed was not supported.
by a body of professional opinion which is capable of withstanding logical analysis. In other words, ever since the decision in Bolitho, courts are expected to be less deferential to medical opinion and, as such, a surgeon should be able to present expert evidence which is defensible to succeed in a medical negligence lawsuit. Thus, in Reynolds v. North Tyneside Health Authority [12], failure to conduct an immediate vaginal examination of the pregnant mother on her admission to hospital and which led to asphyxia of the child, resulting in cerebral palsy, was found to be negligence on this basis: “If there was a contrary body of opinion that would not have concluded VE[s] when the foetal head was 3/5 palpable(without complications), then this was one of those rare cases where the Court could and should conclude that such body of opinion was unreasonable, irresponsible, illogical and indefensible.” It was similarly decided in Marriott v. West Midlands RHA [13] that evidence given by expert witnesses on behalf of the defendant GP did not withstand the test of logic. However, it is still very rarely that courts would question expert medical opinion, particularly as research in Sri Lanka has revealed [4]. This leaves local surgeons some consolation that a defence built upon peer acceptance of the standard would still suffice.

On the other hand, one way to minimize expert medical opinion being questioned by court is to have in place best practice guidelines and ensure compliance with them. Thus, if a surgeon is able to prove that he complies with current clinical guidelines, it offers him the best defence that the standard of surgical care had passed the test of Bolam as modified by Bolitho. For instance, in Richards v. Swansea NHS Trust [6], court took the view that the hospital owed a duty of care to deliver the child by emergency caesarean within 30 minutes, noting that that this was the approach in the NSCSAR and the NICE/RCOG Caesarean section guideline. Furthermore, in wrongful pregnancy cases such as Walkin v. South Manchester Health Authority [14], where court was of the view that an unwanted pregnancy, whether as a result of negligent advice or negligent surgery, was a personal injury in the sense of an “impairment”, a view confirmed by the House of Lords in the McFarlane case (discussed above). In this latter type of cases, it is recommended that there be full and frank disclosure of risks associated with male and female sterilization in compliance with evidence-based clinical guidelines issued by the Royal College of Obstetricians and Gynaecologists. Of course, not every surgeon who deviates from clinical guidelines will be found negligent in every case, but the importance of adherence to guidelines as a defence (and even more so, as a mechanism to prevent surgical error) is worth noting.

On another note in relation to what constitutes the acceptable standard of care, it may appear unfair that the same standard of care exercised by senior experienced doctors should be expected from junior doctors. So is it a defence to say that a surgeon is on his first day at the job and, therefore, cannot be held to the same standard of care as that of a senior consultant surgeon? The law sees otherwise. Because the test adopted to determine the acceptable standard of care is ultimately an objective one based on the reasonable doctor, inexperience is not a defence and, rightly so. For, healthcare service standards should not be inconsistent with patients exposed to fluctuating levels of care. Accordingly, in Wilsher v. Essex Area Health Authority [15], Glidewell LJ observed thus:

In my view, the law requires the trainee or learner to be judged by the same standard as his more experienced colleagues. If it did not, inexperience would frequently be urged as a defence to an action for professional negligence.

3) Resource limitations

In light of the fact that inexperience is not a defence, a question arises as to whether the law recognizes any factors which excuse a deviation from the acceptable standard of care. For instance, particularly in a country with limited resources such as Sri Lanka, there may be numerous occasions where unavailability of sufficient resources stands in the way of adopting the best surgical procedures. While it has been said that “the standard of care expected will depend on the situation...[T]his is an important consideration in relation to the situation in Sri Lanka considering the under staffed status of our government and private hospitals and the lack of facilities...[16”], research has found that counsel defending Government medical practitioners acknowledge this reality:

...doctors do not deserve special deference, but resources and external factors beyond their control affect their practice and may be reasonable justifications, so each incident must be treated on a case-by-case basis...

...in all my cases, I was convinced that the doctor had done everything possible with the limited resources we have...

...99% of the cases are genuine misadventures...very honourable doctors who regret the mishap which is because of lack of resources...for example, doctors have to seek the assistance of labourers when nurses are not available...there is mal-distribution of resources and it is unfair to send doctors to poorly equipped areas...[4]

It appears that some courts have been slow to accept the defence of scarce resources where institutional liability is concerned. In Bull v. Devon [17], where the mother of new born twins sued the hospital because the system’s failure to urgently summon an obstetrician and the delayed labour resulted in one of the infants being severely disabled, the defence was that, in view of the available resources, the delay could not have been avoided. Similarly, in Brooks v. Home Office [18], a prisoner who had been under a high-risk
pregnancy claimed that a delay in seeking specialist advice led to the stillbirth of one of the twins she was carrying. In both cases, the courts held that lack of resources was not an acceptable defence for the failure to provide a minimum standard of care.

However, in Garcia v. St. Mary’s NHS Trust [19], court took a slightly different view and held that a 30-minute delay in calling a cardio-thoracic registrar to attend to a patient who had suffered unconsciousness following cardiac surgery was not negligence because the duty that the National Health Service owed to the claimant-patient co-existed with the duty owed to other patients. Similarly, the following opinion of a Canadian court demonstrates that the acceptable standard of care may be determined against what a particular community can reasonably expect of a hospital in that community, given realities including resource availability:

\[T\]o suggest that the defendant...[h]ospital might be reasonably expected by the community to staff its emergency department with physicians qualified as expert in the management of critically ill patients does not meet the standard of reality, nor does it meet the reasonably expected community standard. The non-availability of trained and experienced personnel, to say nothing of the problems of collateral resource allocation, simply makes this standard unrealistic, albeit desirable [20].

Although in all of the above cases, courts were primarily concerned with negligence by institutions rather than individuals, there is no legal impediment which prevents an individual surgeon facing a medical negligence lawsuit to raise insufficient resources as a defence and attribute to the hospital direct liability for negligence. Of course, a counter argument can also be made that, if a surgeon is aware of insufficient resources, he may still have been negligent by not referring the patient to a better-equipped facility.

4) Deflection of direct liability to the hospital

Speaking of resource limitations and direct liability of hospitals, there can be other shortcomings within the system which could absolve individual doctors, including surgeons. Studies in which the causes of surgical error, including wrong-site surgery, have been researched reveal that defects in the system contribute significantly to these errors. In a study in the USA, 82% of the claims under review were found to have been caused by system factors [21]. Such factors can include communication breakdowns, lack of supervision, lack of institutional controls/formal system to verify the correct site of surgery, lack of a checklist to make sure every check was performed, exclusion of certain surgical team members, reliance solely on the surgeon for determining the correct surgical site, unusual time pressures (e.g., unplanned emergencies or large volume of procedures), pressures to reduce preoperative preparation time, procedures requiring unusual equipment or patient positioning, team competency and credentialing, availability of information, organizational culture, orientation and training, inadequate or incompetent staffing, environmental safety/security and continuum of care [21,22]. Research in Sri Lanka has also revealed that system errors dominate the medical negligence landscape [2].

In this systemic backdrop, one criticism is that “it is morally unacceptable to pin blame solely on individuals, and artificial to isolate them from their wider working environments and culture [23].” As a former Chief Medical Officer of the UK NHS pointed out:

Factors such as the adequacy of training programmes, mechanisms for competence assessment and supervision, protocols for drug administration, checking and fail-safe procedures to prevent the wrong drug dosage (or route of administration)...are all features of the organization, not the individual. If mishaps are to be avoided in the future, accountability for mistakes and lapses in standards of care will have to be viewed as systems failures as well as poor performance on the part of an individual[24].

Furthermore, it has been said that human errors may very well be “organisational accidents”, in which event, a hospital can be considered to be directly responsible for adverse medical events caused by its work environment, team/staffing, management decisions and organisational processes (e.g. work time directives, facilities/equipment provided and service delivery models) [25].

Considering the wide array of causes of surgical errors and the larger system within which individual doctors function, there may be medical negligence cases where the facts allow total/partial blame to be placed on the system and a surgeon can defend himself by shifting the responsibility to the hospital or healthcare administration authority. For instance, if a surgical error was caused by faulty equipment, this being a circumstance beyond the knowledge and control of the surgeon himself, there is no question that the hospital should directly bear responsibility and, accordingly, the defence of the individual surgeon should stand. Thus, if a surgeon can prove that a system failure materially contributed to the error, there is a likelihood of deflecting or mitigating liability for medical negligence. In a previous paper I have analysed decisions of courts in several jurisdictions where hospitals have been held directly responsible for medical negligence, as well as legislation which provides for direct liability of hospitals, and I have argued that system errors should be given more attention in the Sri Lankan healthcare context [4].

For example, in Dabare v. Director, Castle Street Maternity Hospital and others [26], a local case where the District Court found medical negligence, but the matter was settled in appeal, the plaintiff was an infant who was alleged to have
The observations of Mustill LJ in the Wilsher case suggest that such departures may not amount to negligence:

An emergency may overburden resources and, if an individual is forced by circumstances to do too many things at once, the fact that he does one of them incorrectly should not lightly be taken as negligence.

Even in the Garcia case, the judge considered a hypothetical situation in an emergency room and noted that, though a specialist may be present on site, he would not be exclusively available for the claimant patient as he might be engaged with another medical emergency. Furthermore, “since what is expected of doctors is 'reasonable care', it is appropriate to take into account the situation in which the doctor is administering treatment. It would, for example, not be reasonable to expect a doctor who has been called out to the site of a train crash to provide the level of care that would be available in a well-equipped intensive care unit.” In fact, this should ideally be the basis of justification even for a defence built upon resource limitations.

6) Judgment error not amounting to negligence

If a surgeon can establish that an adverse medical incident occurred as a result of a judgment error, he may not be liable for medical negligence. In the Canadian Supreme Court case of Wilson v. Swanson [20], a surgeon operated on the patient after a preliminary diagnosis that indicated a cancerous growth in the stomach. During the surgery, he removed more of the organs of the patient, believing that the growth was benign, even though it would have been revealed that the growth was cancerous, even though it would have been revealed that the growth was benign, had he conducted a more conclusive diagnosis. However, court distinguished between an error in judgment and negligence on this basis:

An error in judgment has long been distinguished from an act of unskillfulness or carelessness or due to lack of knowledge. Although universally accepted procedures must be followed, they furnish little or no assistance in resolving such a predicament as faced the surgeon here. In such a situation a decision must be made without delay based on limited known and unknown factors; and the honest and intelligent exercise of judgment has long been recognized as satisfying the professional obligation.

Therefore, if a surgeon is able to prove that the injury was a result of an error in judgment, it could serve as a defence.

The views expressed in this article are the author's own and do not necessarily represent or reflect the views of the Attorney General's Department.

( To be continued in next issue )
All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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26. Dabare v. Director, Castle Street Maternity Hospital and others. Colombo District Court Case No.31294/MR, decided on 23rd October 2009 (unreported).


Sepsis and septic shock: can we win the battle against this hidden crisis?

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Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka

**Key words:** Sepsis; blood cultures; measure

**Introduction**

Sepsis is a global burden. Septic shock is a serious condition and a common reason for admission to the intensive care unit. A prospective cohort study done in patients admitted to intensive care units in 16 Asian countries found that mortality from sepsis induced organ dysfunction was found to be 44.5%. This is an indicator of the magnitude of the problem. Despite advances in technology sepsis remains a costly and often a fatal condition with increased mortality.

The initial definition of sepsis was introduced in 1991 at a consensus conference of experts and was later revisited in 2001. Early this year a third international consensus revised the definition of sepsis and septic shock which has been coined sepsis-3”. The basis of the new definition is a greater understanding of the pathophysiology of microcirculatory dysfunction associated with sepsis and septic shock, with the aim of assisting clinicians to recognize this life threatening syndrome early.

**Re-defining Sepsis and Septic Shock (Sepsis-3)**

Sepsis (2001) was defined as suspected or documented evidence of infection in the presence of disturbances in any of the following five variables, namely general status, haemodynamic, inflammatory, organ perfusion and tissue perfusion. This was subsequently replaced by its new definition in February 2016. However, these variables may still be useful to the clinician to suspect a patient with sepsis, as it indicates the possibility of ongoing inflammation and organ dysfunction.

Sepsis was re-defined in 2016 as a life threatening organ dysfunction due to a dysregulated host response to infection. Organ dysfunction is defined as an increase (an acute change of 2 points or greater) in the sequential organ failure assessment (SOFA) score (Table 1) [1].

Septic shock is a subset of sepsis with a high mortality. It has been defined as fluid unresponsiveness, hypotension, elevated serum lactate levels > 2mmol/L (>18mg/dl) and the need for vasopressors to maintain a mean arterial pressure of 65mmHg or greater [1].

Absent from the 2016 definition is the term “severe sepsis”, as mortality rates from sepsis alone can be 10% or more making this condition already severe [1].

**q-SOFA: let us not disregard this index**

The consensus document has also introduced a bedside index termed as quick SOFA (Table 2) comprising of three variables to enable clinicians to identify patients with suspected infection who are been treated outside critical care units and likely to develop complications of sepsis [1].

In the presence of more than 2 variables, the patient is considered to be at risk of sepsis. q-SOFA can be useful in a resource limited setting as it does not require advanced monitoring and it is not labour intensive. This index can be used to “track and trigger”, similar to the early warning score. It is important to note that q-SOFA per se is not a test for sepsis and is subjective, which can be a limiting factor in defining patients with sepsis.

**Management bundles: What do the guidelines say?**

The Surviving Sepsis Campaign (SSC) guideline is an international effort to promote awareness, improve patient care and outcome following sepsis [2].

Early recognition and timely intervention together with the implementation of the “3 hour resuscitation bundle” and the “6 hour septic shock management bundle” can improve patient outcome [2]. A bundle is a selected set of elements of care for a group of interventions distilled from evidence-based practice, and when implemented together, within a specified time frame, have an effect on outcome beyond that of an individual element/s.

It is important to remind ourselves that this is only a guide, and even though it has become a standard of care, some aspects of patient care in these guidelines have been...
questioned by many, and is under scrutiny.

Clinicians must bear in mind that the haemodynamic profile of each patient presenting with sepsis/septic shock may be different and therapeutic intervention/s need to be tailored and modified based on these changes [3].

3 hour resuscitation bundle

The following steps must be completed within the first 3 hours from the time of presentation of a patient to the emergency department with suspected sepsis [4].

1. Measure lactate levels
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg of crystalloids for hypotension or lactate > 4mmol/L

Lactate in sepsis

An elevated level of lactate in patients with sepsis indicates disease severity. It has been postulated that elevated lactate levels are mostly due to activation of the stress response and release of norepinephrine and is not merely due to anaerobic metabolism [5]. Failure of blood lactate levels to decline in response to treatment indicates a poorer outcome.

Blood cultures (other sites as appropriate) and antibiotics: hit them early and hit them hard

Cultures must be obtained prior to commencing antibiotic therapy, provided that there is no significant delay (> 45 minutes) in the start of antimicrobials (grade 1C) [2]. It is imperative to obtain blood cultures from two different sites within minutes of each other and to aerobic and anaerobic blood culture bottles. If an invasive device has been in situ for > 48 hours at least one sample must be obtained through the line in situ and other concurrently from a peripheral site. Early and appropriate antibiotic therapy must be instituted within the first hour of recognition of septic shock (grade 1B). Appropriate antibiotic should target the most likely pathogen based on the site of infection. It has been found that for each hours delay in administering antibiotics in septic shock, mortality increases by 7.6% [6].

Response to treatment must be re-assessed after 48 - 72 hours and de-escalate therapy as appropriate. A decline in serum biomarkers such as procalcitonin may help clinicians in decision making regarding de-escalation of antimicrobial treatment.

<table>
<thead>
<tr>
<th>Table 1 Sequential (Sepsis-Related) Organ Failure Assessment Score*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Respiration</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Coagulation</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Liver</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Central nervous system</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Renal</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Urine output, ml/d</td>
</tr>
</tbody>
</table>

Abbreviations: FiO2, fraction of inspired oxygen; MAP, mean arterial pressure; PaO2, partial pressure of oxygen.

Table 1  Sequential Organ Failure Assessment Score (SOFA): Reproduced from http://www.jamasepsis.com

Fluid resuscitation: a challenging task

The guideline recommends an initial fluid bolus of crystalloids such as 0.9% normal saline 30ml/kg as the initial fluid of choice in the resuscitation of severe sepsis and septic shock (grade 1B). Further incremental boluses can be considered until there is improvement in haemodynamic parameters (grade 1C) [2]. If excessive volumes of crystalloids are needed albumin can be considered during resuscitation. The exact volume and concentration of albumin has not been clearly elucidated.

Hydroxyethyl starch should not be used as resuscitation fluid when managing septic patients as acute kidney injury requiring renal replacement therapy has been observed in patients receiving high molecular weight starch solutions [2].

Hypo-perfusion in septic shock is multifactorial. Venous and arterial dilatation, intravascular volume depletion and sepsis induced myocardial dysfunction with ventricular dilatation and a reduced ejection fraction can cause hypo-perfusion to vital organs. This clearly indicates that vigilant monitoring is required during fluid resuscitation and it is important to appreciate that fluids alone will not help achieve the desired targets [7].

The release of inflammatory mediators in sepsis, results in increased capillary leakage and damage to the endothelial glycocalyx thereby predisposing to fluid overload. Insufficient fluid replacement will result in inadequate tissue perfusion [7].

Therefore administering the right amount of the right type of fluid to the right patient is of paramount importance. Haemodynamic profile of each patient should be dynamically monitored [3]. The clinician needs to be cautious when administering fluids to the elderly with limited cardiac reserves and to patients with sepsis induced myocarditis. Therefore the bolus dose of 30ml/kg of crystalloid does not “fit them all”.

6 hour septic shock management bundle

According to the surviving sepsis campaign guideline 6 hour bundle (updated in 2015), the following steps must be undertaken within the stipulated time frame.

Vaspressors must be commenced for hypotension that is unresponsive to fluids to target a mean arterial pressure (MAP) of 65mmHg or greater and in the event of persistent hypotension despite fluids with an initial serum lactate level of more than 4 mmol/L. In such situations the volume status must be re-assessed and lactate levels must be re-measured [2].

Assessment of volume status and tissue perfusion can be accomplished by repeated focused examination of vital signs or by employing any two of the following measures within 6 hours of presentation [2].

- Measure central venous pressure (CVP)
- Measure central venous oxygen saturation (ScvO₂)
- Bedside cardiovascular ultrasound (to assess IVC diameter, left ventricular function and anterior lung examination to detect volume overload)
- Dynamic assessment of fluid responsiveness with passive leg raising or fluid challenge test

The six hour management bundle was revised following the publication of results of three randomized controlled trials ProCESS, ARISE and ProMISE. These trials failed to demonstrate superiority of use of a central venous catheter to monitor CVP and ScvO₂ in patients who had received timely antibiotics and appropriate fluid resuscitation compared with controls [8,9,10]. Based on these three trials it does not mandate central lines as a part of an early resuscitation strategy.

CVP indicates pressure in the right heart and does not reflect intravascular volume nor does it predict fluid responsiveness. Therefore it is evident that it has minimal or no role in resuscitating a septic patient [3, 11].

It is important to appreciate that hypovolaemia may not be the only indication for IVC collapsibility with inspiration on ultrasound imaging, as other factors such as intra-abdominal pressure and variables such as venous return can also contribute to changes in IVC diameter. Therefore fluid responsiveness with the aid of IVC diameter per se may not be the best option.

Functional haemodynamic monitoring would be the ideal to determine the response to a fluid challenge and should ideally be done using a bedside echocardiogram. Not all patients in septic shock will be fluid responsive. Patients with sepsis induced cardiomyopathy might be a high risk group, therefore giving fluids will not be the best option in this vulnerable patient population [12]. Therefore it is logical to use invasive

<table>
<thead>
<tr>
<th>Variable</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>mental status</td>
<td>altered</td>
</tr>
<tr>
<td>systolic blood pressure</td>
<td>&lt; 100 mmHg</td>
</tr>
<tr>
<td>respiratory rate</td>
<td>&gt;22 breaths per minute</td>
</tr>
</tbody>
</table>

Table 2 q-SOFA Score

Variable
Finding
mental status altered
systolic blood pressure < 100 mmHg
respiratory rate >22 breaths per minute

The six hour septic shock management bundle
cardiac monitoring and tailor the resuscitation strategy to achieve the desired haemodynamic goals.

Vaspressors and inotropes in septic shock

Norepinephrine is considered to be the vasopressor of choice in septic shock. Decision to commence norepinephrine should be made early as norepinephrine constricts both arteries and veins thereby increasing the preload and counteracting the vasodilated state induced by sepsis.

Evidence suggests that early restoration of blood pressure within the auto-regulatory values with the use of norepinephrine is mandated in the presence of sepsis induced acute kidney injury (AKI) [12]. Addition of vasopressin (0.03 U/minute) is advocated in the existing guidelines with the intent of decreasing the norepinephrine dose or increasing the MAP, but it should never be administered as the sole agent.

Epinephrine can be added or substituted for norepinephrine when needed [2].

Use of dopamine to counteract the vasodilation induced by sepsis and low dose regimes in AKI cannot be recommended [12]. Dopamine may be used in patient with low heart rates and who are at reduced risk of developing arrhythmias (grade 2C) [2]. Dobutamine can be added to the existing regime in the presence of myocardial dysfunction or in the presence of ongoing tissue hypo-perfusion.

Management beyond the initial moments

It is evident that patients with septic shock will require intensive care treatment as monitoring vital signs and parameters become vital.

Source identification and eradication is imperative. Use of low dose steroids (200mg of hydrocortisone over 24 hours) have been recommended in the current guidelines when septic shock is refractory to treatment and the inotrope requirements are high [2]. However there is no convincing data to state that steroids improve mortality [13].

Acceptable haemoglobin levels in adult septic patients in the absence of ischaemic coronary artery disease, acute haemorrhage and severe hypoxaemia is 7-9g/dl. Platelets should be transfused when the counts are 10,000/mm² in the absence of apparent bleeding and a count of 50,000/mm² is required for surgical and invasive procedures. Fresh frozen plasma should not be transfused to treat laboratory reports in the absence of obvious bleeding.

ICU care bundles such as prophylaxis for deep vein thrombosis either by pharmacological or non-pharmacological methods, stress ulcer prophylaxis for the high risk patient, preferably with proton pump inhibitors should be commenced. Sepsis induced ARDS requires lung protective ventilation with low tidal volume ventilation. Blood glucose values should be kept below 180mg/dl but tight glycaemic control is not advocated. Early initiation of feeding is recommended in the critically ill septic patient.

Conclusion

Diagnosis of sepsis and septic shock is primarily clinical. Prompt diagnosis entails a detailed history and physical examination to identify the potential source of infection. Restoring adequate circulation, early antibiotic therapy, source identification and supportive care are essential for a successful outcome.

Clear guidance for recognition of early warning signs of sepsis, interventions and escalation must be in place in every medical institution as early recognition and timely interventions can save lives.

Acknowledgements

I am grateful to Professor Anuja Abayadeera for critically analysing the intellectual content and for the advice given.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

References


A new pedicled periosteal flap for alveolar bone graft surgery: a technical note

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Key words: Mucoperiosteal flap; periosteum; alveolar

Abstract

Achieving a good bone volume is an important aspect of secondary alveolar bone grafting in patients with alveolar clefts. Wound breakdown is a major cause of bone graft exposure and graft failure. We describe a new technique using a pedicled periosteal flap to achieve a double layered wound closure during secondary alveolar bone graft surgery. We report the first use on a unilateral alveolar cleft. Good wound healing and bone volumes were noted on 6 months review. Bone formation by the grafted periosteum was expected in addition to wound protection.

Introduction

Secondary alveolar bone grafting (SABG) remains the most popular method in treatment of alveolar clefts. Nevertheless, complications at the primary surgical site such as wound dehiscence, premature breakdown of sutures, exposure of the grafted cancellous bone and infection can cause graft failure [1]. In these cases, second surgery is usually more complicated due to scar tissue, infection and poor compliance by patients. The new surgical technique described attempts to use a periosteal flap to achieve a good wound closure during SABG surgery.

Surgical technique

Conventional surgical techniques were used to dissect the oro-nasal fistula, expose the bony alveolar cleft and close the nasal and the palatal flaps. A crevicular incision was placed along the teeth of the distal segment up to the posterior end of the upper first molar tooth. A vertical release incision was placed at the distal end of the upper first molar tooth to open the mucoperiosteal flap. Subperiosteal dissection was extended posteriorly up to the vertical incision and superiorly to the infraorbital foramen.

An anteriorly based periosteal finger flap was harvested from underneath the raised mucoperiosteal flap taking care not to button hole (Figure 1a and Ib). The harvested periosteal flap was rotated forward and placed over the grafted cancellous bone, with the periosteum side facing down. The flap was secured with vicryl sutures to the medial and palatal sides (Figure 2). Finally, the overlying mucoperiosteal flap of the distal segment was advanced medially and sutured to the proximal and the palatal flaps. Good wound healing was noted one week postoperatively.

Discussion

In SABG surgery, the suture line of the proximal and distal mucoperiosteal flaps fall over the grafted bone of the cleft. This line forms a weak area and a potential site for wound breakdown. The new periosteal flap offers an additional layer of tissue above the grafted cancellous bone and beneath the suture line of the gingival mucoperiosteal flaps.

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DOI: http://10.4038/sljs.v34i4.8319

The flap can be made to extend over to the palatal aspect to cover the three point contact of tissues from buccal and the palatal sides. This three point contact area of tissues is a site of wound breakdown. The flap provides a double layered closure over the grafted bone.

Though a periosteum is already present beneath the proximal and distal mucoperiosteal sites, the authors believe that the periosteum at the suture line may not work effectively due to trauma from tissue handling and from the sutures themselves. Therefore, apart from offering a physical barrier, the periosteum of the flap continue forming bone, thus contributing to the graft site.

Skoog in 1965, used the periosteum over the anterior maxilla in the treatment of a patient with a primary cleft palate [2]. He noted a well formed bone ridge at the surgical site which proved bone formation. Free tibial periosteal grafts formed bone in the maxilla when performed in animal models [3]. Therefore, we believe the periosteal flap will continue to form bone over the grafted cancellous bone, thus contributing to the volume at the cleft defect in accordance with above evidence.

The new technique is an addition to the accepted surgical technique and causes slightly more postoperative oedema. However, when compared with benefit of preventing wound breakdown and the need for second surgery, this flap may be a useful adjunct in SABG, especially bilateral alveolar clefts. We hope to evaluate the new flap on bilateral alveolar clefts as a case series leading to a clinical trial. The results will help to evaluate the benefits and complications of this technique in SABG surgery.

Consent for surgery and photographs were obtained from the patient and his parents.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

References
2. Skoog TO. The use of periosteal flaps in the repair of clefts of the primary palate. Cleft Palate J 1965; 2(332):1

Figure 2. Intraoperative view: Periosteal flap was sutured to the medial and the palatal sides covering the grafted bone. The periosteal side of the flap was placed facing the bone graft.
Significance of peritoneal cytology in patients with gastric cancer: a mono institutional experience with 50 patients

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Keywords: Prognostic; gastric cancer; peritoneal; cytology

Introduction

The incidence of gastric cancer is different in different parts of the world. The incidence of gastric cancer is high in certain Southeast Asian countries namely Japan, China and South Korea [1]. However the incidence of gastric cancer in India is low as compared to global gastric cancer incidence [1].

Presentation is often delayed and leads to poor outcome with surgery alone. The most common site of locoregional failure is peritoneum. The Japanese Classification of Gastric Carcinoma (JCGC) has suggested the inclusion of peritoneal washing cytology as part of staging for gastric cancer and patients with positive (Intraperitoneal free cancer cells) IPFCC have been considered as Stage IV disease [2].

Positive peritoneal washing cytology has also been adopted by the American Joint Committee on Cancer (AJCC) staging system (7th edition) in which positive cytology denotes M1 disease. Earlier studies have shown that patients with radiologically resectable disease but positive peritoneal cytology tend to have early disease recurrence and poor survival despite of R0 resection [4].

Patients with positive cytology often have dismal survival rates. Numerous studies have been done which confirms peritoneal cytology as an independent negative prognostic marker. Most of the data comes from the Western or Japanese literature. However no Indian study has been done on this respect. The present study aims to find out the role of peritoneal cytology in predicting prognosis in patients with gastric cancer.

Material and methods

The study was a prospective observational study and included 50 patients. The study duration was 1.5 years (from June 2012 to October 2014). The study included all operable histologically proven gastric cancer cases. All patients who were found to have definitive organ metastasis on preoperative imaging were excluded from the study.

Study technique

All 50 patients underwent exploratory laparotomy via long midline incision. On opening the abdomen, 500 ml sterile normal saline was instilled into the peritoneal cavity which was manually dispersed by shaking the abdomen. The primary tumour was not touched.

A washing sample (100 ml) was aspirated from the peritoneal cavity. The specimen was immediately carried to the department of pathology, where sample was centrifuged to make smears which were fixed and stained with PAP (Papanicolau) stain and the slides examined under light microscope.

Peritoneal cytology was considered positive when malignant cancer cells were found in the smears. Medical records of each patient were then reviewed in detail and relevant clinical and pathological information were obtained. The patients were then followed for recurrence of disease and mortality either in our follow up clinic or by telephonic conversation. Associations between cytology status (CY) and clinicopathological variables and effect of cytology status on overall survival was evaluated.

Study tools

Pre structured questionnaire, preoperative staging investigations, pathology reports, cytology result.

Data analysis

Detailed history and examination and all relevant results were recorded using pre structured data sheet, the final pathology and cytology results were obtained and patient were followed up for an average of 15 months. All these data was entered into a Microsoft soft excel sheet and a master chart was prepared. This was used for making tables and diagrams to represent the data. Statistical correlation was done and tests of significance was calculated. Statistical analysis was done using statistical software R, version 2.13.0.
Results and analysis

The average age of the patients was 51.76 years with age range being 25 to 75 years. 82% of the patients were males while 18% were females ratio. 56% of the patients had a rural background (Table 1). Based on occupation 24% were agricultural workers, 18% were daily wage workers (like manual labourers) while rest 58% could not be put into a specific group but were classified as “others” for convenience.

Table 1. Showing the demographic and clinicopathological data of the study population.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>20-39</td>
<td>6 (12)</td>
</tr>
<tr>
<td>40-59</td>
<td>33 (66)</td>
</tr>
<tr>
<td>60-79</td>
<td>11 (22)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41 (82)</td>
</tr>
<tr>
<td>Female</td>
<td>9 (18)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Agricultural workers</td>
<td>12 (24)</td>
</tr>
<tr>
<td>Daily wage earners</td>
<td>9 (18)</td>
</tr>
<tr>
<td>others</td>
<td>29 (58)</td>
</tr>
<tr>
<td>Type of living</td>
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</tr>
<tr>
<td>Rural</td>
<td>28 (56)</td>
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<tr>
<td>Urban</td>
<td>22 (44)</td>
</tr>
<tr>
<td>A</td>
<td>7 (25)</td>
</tr>
<tr>
<td>B</td>
<td>10 (35.7)</td>
</tr>
<tr>
<td>AB</td>
<td>4 (14.28)</td>
</tr>
<tr>
<td>O</td>
<td>7 (25)</td>
</tr>
<tr>
<td>Unknown</td>
<td>22</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36 (72)</td>
</tr>
<tr>
<td>No</td>
<td>14 (28)</td>
</tr>
</tbody>
</table>

Table 2 shows weight loss was the most common symptom followed by dyspepsia and abdominal pain. According to Table 3 pyloric antrum was the commonest site of tumour and most common type of lesion was ulceroproliferative type (50%). 18 patients had poorly differentiated adenocarcinomas while only 3 had well differentiated carcinoma. Indeterminate type was the commonest histological subtype.

There were 20 patients in stage 1, 12 in stage 2, 13 in stage 3 and 5 had stage 4 disease.

The study sample was divided into two groups based on cytology results.

1. peritoneal cytology positive(CY1 tumours)
2. peritoneal cytology negative(CY0 tumours)

The association between demographic, clinicopathological variables and CY status was evaluated and presented in Table 4. For the age category, p-value was calculated using independent sample t-test (2 tailed). All other p-values were calculated using chi-square test of significance. Out of 50 patients included in the study, 27 (54%) had positive cytology while the rest 23 (46%) had negative cytology.

Table 2. Showing the symptoms and signs of the study sample

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>72</td>
</tr>
<tr>
<td>Dyspepsia</td>
<td>70</td>
</tr>
<tr>
<td>Generalized weakness/fatigue</td>
<td>66</td>
</tr>
<tr>
<td>Pain abdomen</td>
<td>60</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>56</td>
</tr>
<tr>
<td>Postprandial abdominal fullness</td>
<td>40</td>
</tr>
<tr>
<td>Malena</td>
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</tr>
<tr>
<td>Hematemesis</td>
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</tr>
<tr>
<td>Signs</td>
<td></td>
</tr>
<tr>
<td>Lump Abdomen</td>
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<td>Epigastric tenderness</td>
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### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Percentage %</th>
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<td><strong>Location of the tumour</strong></td>
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<tr>
<td>Body</td>
<td>16</td>
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<tr>
<td>Fundus</td>
<td>12</td>
</tr>
<tr>
<td>Antrum</td>
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</tr>
<tr>
<td><strong>Morphological type of tumour</strong></td>
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<tr>
<td>Ulcerative</td>
<td>26</td>
</tr>
<tr>
<td>Ulceroproliferative</td>
<td>50</td>
</tr>
<tr>
<td>Others</td>
<td>24</td>
</tr>
<tr>
<td><strong>Histological grade of the tumour (adenocarcinomas)</strong></td>
<td></td>
</tr>
<tr>
<td>Well differentiated</td>
<td>6</td>
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<tr>
<td>Moderately Differentiated</td>
<td>16</td>
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<td>Poorly Differentiated</td>
<td>36</td>
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<tr>
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<td>42</td>
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<tr>
<td><strong>Type of lesions based on Laurens Classification</strong></td>
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</tr>
<tr>
<td>Intestinal</td>
<td>16</td>
</tr>
<tr>
<td>Diffuse</td>
<td>32</td>
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<tr>
<td>Indeterminate</td>
<td>52</td>
</tr>
<tr>
<td><strong>Stage of the tumour (AJCC)</strong></td>
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</tr>
<tr>
<td>Stage 1</td>
<td>40</td>
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<tr>
<td>Stage 2</td>
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</tr>
<tr>
<td>Stage 3</td>
<td>26</td>
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<tr>
<td>Stage 4</td>
<td>10</td>
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<tr>
<td><strong>Surgery</strong></td>
<td></td>
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<tr>
<td>Resectable</td>
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<tr>
<td>Unresectable</td>
<td>16</td>
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Table 3 Showing the pathological parameters of the study sample

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<thead>
<tr>
<th>Category</th>
<th>CY0 [n = 23]</th>
<th>CY1 [n = 27]</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td>0.866</td>
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<tr>
<td>Sex</td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>18 (43.90)</td>
<td>23 (56.10)</td>
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<tr>
<td>Female</td>
<td>5 (55.56)</td>
<td>4 (44.44)</td>
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</tr>
<tr>
<td>Surgery</td>
<td></td>
<td></td>
<td>0.038</td>
</tr>
<tr>
<td>Resection</td>
<td>22 (52.38)</td>
<td>20 (47.62)</td>
<td></td>
</tr>
<tr>
<td>No resection</td>
<td>1 (12.50)</td>
<td>7 (87.50)</td>
<td></td>
</tr>
<tr>
<td><strong>Tumor category</strong></td>
<td></td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td>T1</td>
<td>3 (60)</td>
<td>2 (40)</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>16 (76.19)</td>
<td>5 (23.81)</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>2 (14.29)</td>
<td>12 (85.71)</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>2 (28.57)</td>
<td>5 (71.43)</td>
<td></td>
</tr>
<tr>
<td>Tx</td>
<td>0 (0)</td>
<td>3 (100)</td>
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</tr>
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<td><strong>Node category</strong></td>
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</tr>
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<td>N0</td>
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<td></td>
</tr>
<tr>
<td>N1</td>
<td>5 (29.41)</td>
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</tr>
<tr>
<td><strong>Differentiation</strong></td>
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<td></td>
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</tr>
<tr>
<td>Well</td>
<td>1 (33.33)</td>
<td>2 (66.67)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>5 (62.50)</td>
<td>3 (37.50)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>8 (44.44)</td>
<td>10 (55.56)</td>
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<tr>
<td>NOS</td>
<td>9 (42.86)</td>
<td>12 (57.14)</td>
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<tr>
<td><strong>Morphological Types</strong></td>
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<td></td>
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<td>Ulcerative</td>
<td>5 (38.46)</td>
<td>8 (61.54)</td>
<td></td>
</tr>
<tr>
<td>Ulceroproliferative</td>
<td>9 (36)</td>
<td>16 (64)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>9 (75)</td>
<td>3 (25)</td>
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<tr>
<td><strong>Lauren Classification</strong></td>
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<tr>
<td>Intestinal</td>
<td>5 (62.50)</td>
<td>3 (37.50)</td>
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</tr>
<tr>
<td>Diffuse</td>
<td>8 (50)</td>
<td>8 (50)</td>
<td></td>
</tr>
<tr>
<td>Indeterminate</td>
<td>10 (38.46)</td>
<td>16 (61.54)</td>
<td></td>
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<tr>
<td><strong>Chemotherapy</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Yes</td>
<td>14 (46.67)</td>
<td>16 (53.33)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>9 (45)</td>
<td>11 (55)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Showing association of demographic and clinicopathologic factors with cytology findings. CY0 = Cytology negative, CY1 = Cytology positive, *p-value was calculated using independent sample t-test (2-tailed). All other p-values were calculated using chi-square test of significance. Values in the parenthesis indicate row percentage.
There were 42 patients in the resectable category while 8 patients were unresectable. Among the individuals in whom the tumour was surgically resectable, cytology was negative in 52.38% cases. Whereas 87.50% of the surgically unresectable cases had peritoneal cytology positive.

In other words among the individuals with negative peritoneal cytology, tumour was significantly (0.038) more likely to be resectable. In case of tumour category significant association exists between peritoneal cytology and tumour category (0.002). However no statistically significant association was found between peritoneal cytology finding and node category (p = 0.124), differentiation of the tumour (p = 0.760), morphological type (p = 0.068) or Lauren classification (p = 0.455).

Overall survival for the groups are depicted in Fig 1 (Kaplan Meir survival curve). Individuals with negative cytology did not fall below the 0.5 probability of dying (or recurrence) within the observation period so median survival could not be calculated for those with negative cytology.

For individuals with positive cytology, median survival is 10 months. Implying that, there is 50% probability for individuals with positive peritoneal cytology at the time of the diagnosis to die or develop recurrence within 10 months. Log-rank test showed that this difference in the probability of the survival is statistically significant (p = 0.000695 or p < 0.05). Cox proportional hazard model was used to identify prognostic factors in the sample, the results of which are shown in Table 5. Bold values in the table are the one showing the significant findings.

Values in the parenthesis indicate the 95% confidence interval for the calculated hazard ratio. If a patient died or the tumour recurred, it was considered as a bad outcome. Probability of having a bad outcome was not statistically significantly associated with age and sex in the univariable analysis. It was significantly associated with clinical tumour category, clinical node category and peritoneal cytology findings.

Compared to N0, Nx had almost 10 fold higher probability of having the bad outcome. Compared to T1, T4 and Tx had almost 12 and 150 fold higher probability of having the bad outcome.

However the number of patients in both of this group were very small. Compared to negative peritoneal cytology, individuals with positive peritoneal cytology had 5 times higher risk of having the bad outcome.

Ideally, the independent variables of a multivariable model should not have any association among themselves. As peritoneal cytology had association with clinical tumour category, peritoneal cytology was not included in the final multivariable model. In the multivariable model, only clinical tumour category remained significantly associated with bad outcome. Clinical node category lost its significance after adjusting for other factors. After adjusting for other factors, T4 and Tx, only, remained significant. Individuals with T4 and Tx tumour stage had almost 21 and 235 times higher probability of having the bad outcome. The high value of the confidence intervals are because of the small sample size.

**Discussion**

The epidemiological profile of our study sample in terms of age, sex, residence, presenting symptoms, tumour type, tumour site, histology were almost comparable to the findings of previous Indian investigators [1,12].

Although the use of newer imaging modalities has greatly improved the locoregional staging of gastric cancer, the rate of preoperative detection of peritoneal dissemination continues to be dismal. According to previous studies presently available radiological imaging has poor sensitivity in picking peritoneal metastases [1].

The best method for diagnosis of peritoneal dissemination is still thorough exploratory laparotomy or laparoscopy. Brito et al [5] included 72 patients of gastric adenocarcinomas, with peritoneal lavage cytology positive in 11.1% cases. Whereas Mezhir [6] et al studied 1241 patients and showed 23% positive cytology. Lee et al [7] in his study of 1072 patients showed 16% positive cytology. Bhatti et al [8] from Pakistan showed in their retrospective studies of 149 patients, 40% rate of positive peritoneal cytology obtained using laparoscopy. Unlike all these studies the rate positive peritoneal cytology was very high in our study (54%). We could not find any Indian study to correlate our results. Most of the above investigators used 200 ml of normal saline for peritoneal washing.

However we used 500 ml of normal saline in each case for convenience as retrieval of adequate (100 ml) of specimens with only 200 ml was practically difficult. Median overall survival was 20 months for cytology positive patients in Lee et al group.

According to Chuwa [8] et al patients with positive cytology showed a mean survival of 27 months while in the Mezhir group it was 1.3 years for the cytology positive group. In our study series median survival was only 10 months for the cytology positive group which is quite low as compared to previous studies.

Many studies have found a link between progression of tumour through the muscle layer, lymph node metastasis and angiolymphatic invasion with the presence of malignant cells in the peritoneal cavity [9,10,11]. However unlike the above studies our analysis showed that positive cytology was significantly associated with the T (depth of tumour invasion) stage and resectability status of the tumors. This may be
<table>
<thead>
<tr>
<th>Category</th>
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<th>Multivariable analysis</th>
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</thead>
<tbody>
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<td>Hazard ratio</td>
<td>P-value</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;60 years</td>
<td>1.00 (Reference)</td>
<td>1.00 (Reference)</td>
</tr>
<tr>
<td>≥60 years</td>
<td>0.73 (0.27,2.00)</td>
<td>0.54</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.00 (Reference)</td>
<td>1.00 (Reference)</td>
</tr>
<tr>
<td>Male</td>
<td>1.66 (0.49,5.63)</td>
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<td>T1</td>
<td>1.00 (Reference)</td>
<td>1.00 (Reference)</td>
</tr>
<tr>
<td>T2</td>
<td>1.11 (0.13,3.53)</td>
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<td>T3</td>
<td>2.33 (0.28,3.32)</td>
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<td>T4</td>
<td>2.27 (1.46, 3.54)</td>
<td><strong>0.02</strong></td>
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<td>Tx</td>
<td>2.69(1.18, 3.14)</td>
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<tr>
<td>Positive</td>
<td>1.44 (1.03,2.11)</td>
<td><strong>0.001</strong></td>
</tr>
</tbody>
</table>

Table 5  Cox proportional hazard analysis of prognostic factors
References


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CASE REPORTS

Venous and lymphatic vascular hamartoma of the recto sigmoid:
a rare case of paediatric per-rectal bleeding

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Lady Ridgeway Hospital for Children, Colombo, Sri Lanka.

Keywords: Hamartoma; vascular lesions; rectal bleeding

Introduction

Hamartoma is a benign tumour like malformation that manifest during normal tissue development. The size of the hamartoma increases in relation to the growth of the body volume and it is unlikely to involute [1]. Vascular hamartoma includes haemangioma, lymphangioma and arterio - venous malformation.

Vascular lesions of the Gastro intestinal tract, although an infrequent occurrence [2], should be investigated. The clinical triad of painless rectal bleeding, phleboliths on imaging and cutaneous lesions points towards a diagnosis of a vascular lesion [3]. Based on histopathological analysis which showed a venous and lymphatic hamartoma, the presented case is a rareness in the literature [4].

Case report

An 8 year old girl was admitted with haematochezia and tenesmus not associated with loose stools or mucus diarrhoea. She had previously been investigated at one year but no diagnosis was made. The symptoms too had resolved spontaneously from three years of age until this presentation.

She was severely anaemic with a haemoglobin of 5.7 g/dl with fresh bleeding per rectum with a normal coagulation profile and inflammatory markers. An urgent Lower GI endoscopy revealed a distinctly inflamed rectal wall extending from the anal verge until the recto sigmoid junction. A trial of oral steroids and steroid enema (Enterofoam®) was commenced due to the strong clinical suspicion of an Inflammatory Bowel Disease (IBD).

Subsequently, Magnetic Resonance Imaging (MRI) revealed a vascular malformation in the rectal wall extending from S4 level to the anal canal and extending into the ischio-rectal fossa. An urgent abdominal Contrast Enhanced Computed Tomography (CECT) was done next which also demonstrated several coarse calcifications (phleboliths). Following the radiological ‘suggestion of vascular malformation a Digital Subtraction Angiography (DSA) was performed. However no definitive arterio-venous malformation was seen. Despite a negative DSA, an on-going life threatening haemorrhage was taken into account at a Multi-Disciplinary meeting and an urgent laparoscopic pull through surgery was planned.

The surgery showed dilated venous plexus around the rectum with dilated veins in the sub-serosa of the rectum. Histology revealed a lymphatic and vascular sub-mucosal hamartoma.

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DOI: http://10.4038/sljs.v34i4.8321

Figure 1.  CT scan reveals significantly thickened recto-sigmoid wall with phleboliths (star)

Figure 2.  Blood containing sinuses with prominent lymphatics and proliferating vessels with intramural thrombi in the sub mucosa.
In our patient the Magnetic Resonance Imaging (MRI) scan revealed a vascular malformation in the rectal wall and computed Tomography (CT) further supported the diagnosis by the presence of trans-mural enhancing bowel wall thickening with the presence of characteristic phleboliths. Magnetic Resonance Imaging (MRI) findings is more useful for the diagnosis of rectal vascular lesions. However due to diagnostic dilemma and persistent bleeding, we had to perform Contrast Enhanced Computed Tomography (CECT) for this patient. Endo rectal ultrasound with Doppler flow studies is another imaging modality which may have been useful in diagnosing if paediatric probes are available.

Following strong clinical and radiological evidence we proceeded to mesenteric angiography for diagnosis and treatment. However the negative angiography result may be either due to the presence of thrombosis or slow flow venous lesions.

Management of paediatric rectal bleeding warrants for urgent resuscitation. In a pure haemangioma, steroids have been proven to be successful but many GI haemangioma consist of partial vascular malformations. This explains the cessation of rectal bleeding following rectal steroid enema initially but which recurred due to the vascular hamartoma of venous and lymphatic origin.

Endoscopic resections are used for more proximal and smaller lesions. In this case a laparoscopic sphincter saving pull-through surgery was chosen because of the severity of haematochaezia and failed DSA. Therefore in most cases the final diagnosis is established through surgery and histopathology.

The patient remains asymptomatic at the time of writing.

Conclusion

Vascular lesions must be considered when evaluating paediatric GI bleeding. Diagnosis can be made by thorough clinical history taking, imaging by experience radiologist, and supportive endoscopy. Precise use of terminology should be emphasized with reference to the latest guidelines and classifications. Surgery continues to play a key role in the definitive care and minimally invasive techniques are used to manage recurrences.

References
Key Points:

- Vascular hamatoma in rectum is a rare cause for paediatric per rectal bleeding however it can lead to life threatening bleeding if not treated.
- Diagnosis of hamatoma is difficult due to lack of experience and resource materials.
- Focus radiological assessment by an experience radiologist is pivotal and multidisciplinary surgical approach is essential.
Atypical lipomatous tumour of the round ligament – report of a rare case with review of literature

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2 Department of Obstetrics & Gynecology, ESI-PGIMSR (Manicktala), Kolkata, India
3 Department of Pathology, College of Medicine & JNM Hospital, Kalyani, India

Keywords: Atypical; lipomatous; tumour; round ligament; well differentiated; liposarcoma

Case report

28 year old Asian female from Eastern India, presented with a swelling in the left groin of two months duration. A globular swelling of 10 cm x 7 cm with soft to firm consistency was found in the left inguinal region. The swelling was irreducible and cough impulse test was equivocal.

It was misdiagnosed as irreducible inguinal hernia and elective hernioplasty was planned. Preoperative investigations were unremarkable. On exposure of the inguinal canal, a lobulated greyish white nodular mass attached to the round ligament was found. And there was no hernia sac. The mass along with the round ligament was excised up to the deep ring. The histopathology revealed it as an atypical lipomatous tumour. Patient is currently without any evidence of recurrence at three years follow up.

Literature review and discussion

Atypical lipomatous tumours (ALT) are low grade liposarcomas with propensity to local recurrence, but potential to dedifferentiate to higher grades [1]. In practice the term “well differentiated liposarcoma” is used for neoplasms occurring in locations where wide resection margins cannot be achieved easily e.g. abdomen, retroperitoneum. In contrast the term “atypical lipomatous tumor” is used for subcutaneous, subfascial, intramuscular tumours of extremities or trunk where wide margins can be achieved.

ALTs usually arise in deep soft tissue of the thigh retroperitoneum, mediastinum, paratesticular area and in the subcutaneous tissue. Liposarcomas of spermatic cord present as paratesticular masses with a reported incidence of three to seven percent [2]. These tumours are morphologically either adipocytic, sclerosing, inflammatory or spindle cell subtype.

Benign mesenchymal tumours originating from the round ligament are usually located intra abdominally [3]. However, a search of literature did not reveal any reported case of ALT arising in the inguinal region.

The peak incidence is between the fifth and seventh decade, although cases have been reported in younger age groups. These tumours usually present as deep seated, slow growing, painless masses that can attain large sizes. As in our case ALTs occurring in the inguinal or paratesticular region can be mistaken for irreducible or incarcerated inguinal hernias [4].

In a suspected case, ultrasound of the groin is usually the first imaging investigation. Typically these appear hyperechoic with well-defined margins. Features suggesting malignant variant with dedifferentiation include age (> 60 years), size (> 10 cm), male gender, presence of thick septa (> 2 mm), presence of nodular, globular and non-adipose masses like areas with decreased percentage of fat [5]. These features are more readily appreciated on CT or MRI. Septal enhancement on contrast MRI may differentiate between well differentiated liposarcomas and simple lipomas. In a study including 126 patients, MRI was found to have a 100% sensitivity, 83% specificity, 84% accuracy and 38% positive predictive value in identifying liposarcomas. MRI was also 100% specific in diagnosis of simple lipoma [6]. Thus we recommend MRI in all cases of suspected lipomatous groin masses.

For ALT of the spermatic cord, en bloc removal of the tumour with negative margins by inguinal orchidectomy is recommended. No further therapeutic advantage is obtained by inguinal or retroperitoneal lymph node dissection owing to the low metastatic potential of ALTs.

There is no role of adjuvant radiotherapy or chemotherapy at present. However, radiotherapy may be recommended in case of positive margins, recurrences or aggressive histology [7]. Prognosis of ALTs is good owing to low risk of metastasis. However, these tumours can dedifferentiate to higher grade tumours. Dedifferentiation is defined as, abrupt transition in the primary tumour or recurrence to a nonlipogenic sarcoma. It is seen in up to 10% of cases. The dedifferentiated variety has less favourable prognosis with a local recurrence rate of
41%, metastasis in 17% and 5 years disease specific mortality of 28% [8].

In our case although it was initially misdiagnosed as an irreducible hernia, intraoperative finding of a tumour with atypical appearance and heterogenous composition, prompted an en bloc resection with the round ligament up to the deep ring as a precautionary step. This turned out to be the correct decision postoperatively.

Therefore, in case of an unusual lipomatous groin mass it is important to maintain a high index of suspicion for a possible liposarcoma. In such a situation care must be taken to resect the mass completely to negative margins. Failure to do that may result in a recurrence of the tumour.

Dedifferentiation can only be determined from histopathology and postoperatively. It may prompt the surgeon to consider further resectional procedure or radiotherapy and thereby significantly increases morbidity for the patient.

Figure 1. Specimen – Gross morphology – showing lobulated soft to firm mass

Figure 2. Specimen – Cut section – showing yellowish areas of fat interspersed with nodules whitish fibrous tissue and other soft tissue elements

Microsections show lipoma like cells in lobular pattern separated by thick fibrous septa. (100x magnification, H&E stain)

Microsections show malignant cells in sheets, they are round cells having vacuolated cytoplasm with irregular hyperchromatic nucleus. (400x magnification, H&E stain)

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5. Kransdorf MJ, Bancroft LW, Peterson JJ, Murphey MD, Foster
Atypical lipomatous tumours are well differentiated liposarcomas and not a benign entity, with propensity for local recurrence and potential to dedifferentiate to higher grades over time.

Majority of such tumours in groin occur in males as paratesticular masses but can also occur in females in inguinal region as seen in this rare case.

MRI is the most useful investigation to differentiate these tumours from simple lipomas which are benign.

Surgical resection to negative margins is adequate treatment, radiotherapy is required for positive margins or unfavourable histology to prevent local recurrence or metastasis.

Key Points:

- Atypical lipomatous tumours are well differentiated liposarcomas and not a benign entity, with propensity for local recurrence and potential to dedifferentiate to higher grades over time.

- Majority of such tumours in groin occur in males as paratesticular masses but can also occur in females in inguinal region as seen in this rare case.

- MRI is the most useful investigation to differentiate these tumours from simple lipomas which are benign.

- Surgical resection to negative margins is adequate treatment, radiotherapy is required for positive margins or unfavourable histology to prevent local recurrence or metastasis.
The first simultaneous pancreas kidney transplantation in Sri Lanka

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Teaching Hospital Anuradhapura, Sri Lanka

Keywords: Simultaneous pancreas kidney transplant; renal transplantation; pancreas transplantation; renal failure

Introduction

Diabetes Mellitus (DM) is a common disease in Sri Lanka with a prevalence of 10.3% in individuals of more than 20 years of age [1]. Although, most of these patients can be managed with oral hypoglycaemics and insulin (both type 1 and 2) in about 15% of patients this becomes difficult [2]. When renal failure develops in these patients Simultaneous Pancreatic Kidney Transplantation (SPK) becomes an option. Such transplantation has not been done in Sri Lanka before. The aim of this article is to report the first successful SPK in Sri Lanka which is also the first dual organ transplantation in this country.

Case report

A 47 year old male patient with type 2 DM and End Stage Renal Failure (ESRF) was prepared for SPK. his blood sugar control was erratic despite being on high doses of insulin (30 units and 40 units of mixtard (30/70) insulin) with usual blood sugar levels between 250 mg/dl to 300mg/dl and 3 admissions with hypoglycaemia in last 3 months. The patient was diagnosed of having renal failure for last 6 months and was on twice a week haemodialysis for 3 months. He was on a deceased donor waiting list for renal transplantation at The Teaching Hospital Anuradhapura, Sri Lanka.

A 41 year old brain dead compatible donor became available. Pancreas was retrieved with coeliac axis, superior mesenteric artery, portal vein and duodenal stump. The left kidney was also harvested for transplantation. HTK (Histidine Ketoglutarate Tryptophan) solution was used for cold perfusion and preservation. Iliac artery “Y” graft was taken from the donor. The coeliac axis and superior mesenteric stumps were connected using the “Y” graft.

A Midline laparotomy was made on recipient. Pancreatic vessels were anastomosed to external iliac vessels on the right side. Duodenal stump was anastomosed to terminal ileum forming an enteric drainage (Figure 1). Renal vessels were anastomosed to left external iliac vessels and ureter was anastomosed to bladder over 5F double “J” stent.

The blood sugar level became normal from post op day2 and he did not require insulin after that. The patient developed a retro-pancreatic haematoma which was evacuated on day 5. He was discharged home on day 15 with Tacrolimus, Mycophenolate Mofetil (MMF) and prednisolone as anti-rejection medications.

At present 2 months after SPK patient is well with the fasting blood sugar range of 97 to 130 mg/dl and serum creatinine of 84 to 130 µmol/l.

Discussion and conclusions

Pancreatic transplant was first performed in 1966 (3). Since then the surgical techniques and immunosuppression have evolved gradually. Because SPK improves the quality of life (4), reduces the progression and complications of DM (4) as well as improving overall survival more than those patients undergoing renal transplantation alone (5), at present SPK remains an established treatment for patients with uncontrolled DM and end stage diabetic nephropathy. DM is found in approximately 10.3% of population in Sri Lanka (1) and 10 to 20% of diabetic patients develop ESRF. Initially SPK was performed in patients with type 1 DM, but current studies have found similar benefits and patient and graft survival in patients with both types 1 and 2 DM (6). Therefore SPK should be considered in selected patients with DM and ESRF. Also establishing a countrywide deceased donor programme will facilitate achieving the above goal.

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**Key Points:**

- Simultaneous Pancreas and Kidney transplantation should be considered as an option in patients with renal failure and Diabetes Mellitus, especially when there are other complications of Diabetes Mellitus are developing and the blood sugar control becomes difficult.

- A deceased donor program should be established in Sri Lanka to make such transplants possible.
Recurrence of arsenic-induced cancers over 20 years: a surgeon's nightmare!

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Department of Surgical Oncology, National cancer Institute, India.

Keywords: Arsenic; squamous cell carcinoma; arsenicosis; hyperkeratosis; drinking water

Introduction
Arsenic poisoning is a common community health problem plaguing India as well as many other countries worldwide. In India, West Bengal, Bihar, Chhattisgarh, Jharkhand, Assam and Manipur has been the worst sufferers. The ill effects of arsenic is well known to the medical community which primarily can be categorized into nonmalignant and malignant manifestations. The former category includes a wide range of symptoms ranging from generalized weakness, anaemia, fatigue to neurotoxicity, hepatotoxicity or chronic gastrointestinal diseases. Out of all malignancies skin cancer is the commonest and deserves attention. These cancers are often multiple, indolent and often occur after a median latency of two decades. Given their tendency to recur even after wide resection and predilection to affect multiple body parts at the same time, re-resection becomes challenging and cosmetically demanding. Treatment of such patients may require multiple surgical interventions and require close surveillance to detect internal cancers, local recurrences or new primaries at the earliest.

Case report
A 52 years gentleman, a part time worker by profession initially developed an episode of fever, generalized fatigue, cough and cold in the year 2000. He visited several general physicians over the next one year and was treated conservatively for his complaints. In May 2001 he developed nodular swellings over palms and soles of his foot along with multiple hypopigmented spots over chest (Fig.1, 2&3). He consulted a dermatologist who diagnosed him with arsenic induced skin lesions.

A sample of the tube well and well water he used to consume was tested and the arsenic content was found to be 0.2280 mg/litre and 0.1050 mg/litre respectively (normal permissible level-0.05mg/litre). The arsenic content of his hairs and nail was 0.51 micrograms/gram and 0.61 micrograms/gram. Biopsy of the skin lesions initially revealed acrokeratosis verruciformis. He was asked to follow up at close intervals. However he defaulted in follow up. In December 2012 he presented to us with an ulcerated nodular palm lesion.

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The reasons for this enigma still remains unexplained.

The two most important cutaneous markers of chronic arsenicosis are pigmentation and keratosis. The characteristic pigmentation of arsenic poisoning is popularly known as “rain drop” pigmentation which occurs due to presence of multiple roundish hypopigmented macules dispersed against a dark hyperpigmented background.

Pigmentation sometimes may effect mucous membranes like the buccal mucosa or the under surface of tongue. Melanosis, leukoderma or leukomelanosis are other rarer patterns of pigmentation found in arsenicosis. Arsenical hyperkeratosis chiefly occurs on palms and plantar aspect of feet. These lesions may have a nodular or horny appearance.

According to Yeh, these lesions can be classified into two types: type A (benign) and type B (malignant). Our case had type B lesions. The appearance of these skin manifestations do not have a fixed latency period which vary usually from 6 months to 3 years. Chronic arsenicosis may also present with anaemia, generalized weakness, peripheral neuropathy, interstitial lung disease and peripheral vascular disease. Hence routine hemogram, liver function test, renal function test, stool examination and radiological chest X ray and ECG must be done in all cases. Other investigations like colour doppler of limbs, chest computed tomography (CT) scan, nerve conduction velocity may be required as per the presentation.

The level of arsenic in urine (>50 mg/L) and its concentration in hair (>1mg/kg) and nail (1.08mg/kg) further corroborates the diagnosis of arsenic toxicity. The IARC (International Agency For Research On Cancer) considers arsenic as a carcinogen which is responsible for causing skin, bladder and lung cancer. The exact mode of arsenic carcinogenesis is still unknown. However it is hypothesized that methylation of inorganic arsenic turns on its carcinogenic potential by modulating gene transcriptions as well as via epigenetic mechanism.

However many questions still remain unanswered even today. The natural history of arsenicosis is not known to us. Likewise the course of various arsenic induced malignancies remains elusive. The exact characteristics of the various type of skin cancers from the surgical perspective has never been studied before. Consequently we do not have established treatment guidelines and follow up protocol for management of such cancers.

Some case reports states that Arsenic induced Lung and Bladder cancers may be treated as per protocol of general malignancy and may yield similar long term results. However in the era of evidence based medicine such extrapolation would be incorrect. Our case shows that wide local excision which is otherwise the standard treatment for SCC with may

Biopsy from the lesion was reported as well differentiated squamous cell carcinoma (SCC). He underwent below elbow amputation on January 2013. Histopathology showed presence of infiltrating grade 2 SCC. He was discharged and was on intermittent follow up. In 2015 he again presented with a recurrent ulceroproliferative lesion of size (5cm x 6 cm) at the amputated elbow stump.

He underwent disarticulation of left humerus from the left shoulder joint in December 2015. The HPE was grade 3 infiltrating SCC. The resection margins were free. However the shoulder joint was involved and contained sarcomatous elements. The case was discussed in multidisciplinary tumour board and in view of aggressive recurrent disease a decision for forequarter amputation was taken. He was reoperated in February 2016.

The report was high grade squamous cell carcinoma with sarcomatous changes. All margins were free. He was on regular follow up. In April, 2016 he was found to have ulcerative nodular lesion in the palmar aspect of his right little finger. Biopsy was suggestive of moderately differentiated SCC. Wide excision of the lesion was done. The pathology report showed grade 2 squamous cell carcinoma, with negative margins. His family members including his wife and son has been educated about the signs, symptoms of arsenic poisoning and has been kept under follow up.

**Discussion and conclusions**

Arsenic toxicity is an environmental health hazard prevalent worldwide and in India too. Chronic arsenic toxicity or arsenicosis chiefly occurs when inorganic arsenic contaminates drinking water.

Symptoms are often nonspecific and insidious in onset. However it is interesting to note that few studies in the past has shown that even when all members of a family has been exposed to arsenic toxicity, few of them actually gets affected. The reasons for this enigma still remains unexplained.

Figure 3. Showing multiple palmar hyperkeratotic nodules-an important cutaneous hallmark of chronic arsenic toxicity
not always yield negative margins when used for arsenic induced carcinomas. The patient underwent repeated wide local excisions of the multiple skin cancers over a span of ten years.

All the tumours were large ulceroproliferative infiltrating and intermediate to high grade type of SCC and the resected margins in most of them were positive for unknown reasons. One of the specimens showed sarcomatous change which indicates malignant degeneration can occur in the lesions over years. It was a difficult clinical scenario where we had to operate on the same patient on several of his body parts within a short period of two years. Multiple counselling sessions were required to convince him to undergo surgery and motivate him to remain in follow up. Though the surgeries were debilitating, the patient did not have local recurrence at most of the operated sites.

Moreover he did not develop any internal malignancy or any metastasis during this two decades of follow up. The cutaneous lesions remained stable over the follow up period and the patient never had any systemic manifestations of the disease. He had no risk factors like sun exposure, smoking or occupational exposure all of which have been described as predisposing factors10. Such patients need regular follow up and intensive surveillance throughout their lifetime for detection of new cancers.

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Key Points:
- Diagnosis of arsenic induced malignancies needs strong clinical suspicion and consideration of the historical background of the case.
- Treatment of arsenic induced squamous cell carcinomas with wide local excision can yield good long term results.
- Patient should be closely followed up and diagnosis of arsenic toxicity should prompt screening of family members too.
- Follow up should be life long as the patients may develop a second malignancy in the long run.
Does preoperative breast MRI significantly impact on initial surgical procedure and re-operation rates in patients with screen-detected invasive lobular carcinoma (ILC)?


Objective
To investigate whether magnetic resonance imaging (MRI) changes the management of patients with screen-detected invasive lobular carcinoma (ILC).

Methods
A retrospective, controlled, single-centre analysis of 138 cases of screen-detected ILC was performed. All patients were assessed by a single multidisciplinary team as to whether preoperative MRI altered the initial management decision or reduced re-operation rates.

Results
Forty-three percent of patients had preoperative MRI. MRI guided surgical management in 40.7% patients. Primary mastectomy rates were not significantly different between the MRI and non-MRI groups (32% and 30% respectively, p=0.71). The MRI group had a lower secondary surgery rate (6.8% versus 15.2%); however, the results did not reach statistical significance, and there were no unnecessary mastectomies.

Conclusions
MRI can be used appropriately to guide primary surgery in screen-detected ILC cases and affects the initial management decision in 40.7% of patients. It does not significantly affect the overall mastectomy rate or re-operation rates, but reduces the likelihood of the latter. As a result of this review, the authors' local policy for the use of MRI in screen-detected ILC has been modified. For patients undergoing mastectomy for ILC, MRI is no longer performed routinely to search for contralateral malignancy as this has no proven added benefit.

Commentary
Udari Liyanage
Senior Lecturer and Specialist in Radiology,
Faculty of Medicine, University of Colombo, Sri Lanka.

MRI has higher sensitivity for detecting breast malignancy when compared to mammography or ultrasound.

Preoperative use of MRI is directed at assessment of local disease particularly when there is discrepancy between imaging findings and clinical findings and to look for additional malignant lesions in the same side breast or in the contralateral breast. This is believed to guide decision making at initial surgery and to reduce re-operation rates including re-excision and mastectomy -conversion.

While pre operative MRI is not indicated routinely for all invasive breast malignancy, its use in ILC is recognized by many guidelines and consensus groups because of the increased tendency of ILC for multifocal and bilateral disease.

This study reports that although MRI found additional lesions, affected the initial surgical decision in 40.7% and reduced the likely hood of re- surgery rates; there was no significant influence on the overall mastectomy rate or re-operation rate. The study has led to modifications in local protocol for preoperative MR imaging of patients with ILC at the author's center. This may reduce the burden of imaging, increased biopsy rates for benign lesions and undue waiting time for surgery. However, it is important to note that this is in contrast to the current recommendations.

Cost-Effectiveness of New Surgical Treatments for Hemorrhoidal Disease - A Multicentre Randomized Controlled Trial Comparing Transanal Doppler-Guided Hemorrhoidal Artery Ligation With Mucopexy and Circular Stapled Hemorrhoidopexy

Objective
To compare Doppler-guided hemorrhoidal artery ligation (DGHAL) with circular stapled hemorrhoidopexy (SH) in the treatment of grade II/III hemorrhoidal disease (HD).

Background
DGHAL is a treatment option for symptomatic HD; existing studies report limited risk and satisfactory outcomes. DGHAL has never before been compared with SH in a large-scale multi-institutional randomized clinical trial.

Methods
Three hundred ninety-three grade II/III HD patients recruited in 22 centers from 2010 to 2013 were randomized to DGHAL (n = 197) or SH (n = 196). The primary endpoint was operative-related morbidity at 3 months (D.90) based on the...
Clavien-Dindo surgical complications grading. Total cost, cost-effectiveness, and clinical outcome were assessed at 1 year.

Results

At D.90, operative-related adverse events occurred after DGHAL and SH, respectively, in 47 (24%) and 50 (26%) patients (P = 0.70). DGHAL resulted in longer mean operating time (44±16 vs 30±14 min; P < 0.001), less pain (postoperative and at 2 wks visual analogic scale: 2.2 vs 2.8; 1.3 vs 1.9; P = 0.03; P = 0.013) and shorter sick leave (12.3 vs 14.8 d; P = 0.045). At 1 year, DGHAL led to more residual grade III HD (15% vs 5%) and a higher reoperation rate (8% vs 4%). Patient satisfaction was >90% for both procedures. Total cost at 1 year was greater for DGHAL [€2806 (€2670; 2967) vs €2538 (€2386; 2737)]. The D.90, incremental cost-effectiveness ratio (ICER) was €7192 per averted complication. At 1 year DGHAL strategy was dominated.

Conclusions

DGHAL and SH are viable options in grade II/III HD with no significant difference in operative-related risk. Although resulting in less postoperative pain and shorter sick leave, DGHAL was more expensive, took longer, and provided a possible inferior anatomical correction suggesting an increased risk of recurrence.

Commentary

Jayaindra Fernando
Consultant General Surgeon,
Lanka Hospital PLC, Colombo, Sri Lanka.

SH is associated with less pain and a faster recovery when compared with traditional hemorrhoidectomy. In spite of the cost of the disposable device, it can be cost-effective. DGHAL based on a different principal seem to be more appealing. Literature comparing the two methods are sparse and RCTs nonexistent.

This study not only fills that void in terms of comparative morbidity of the two procedures but adds the extra dimension of cost benefit.

Surgical units in Sri Lanka wishing to convert to a newer surgical method for heamorrhoidal disease would benefit by this article. However the cost effectiveness has to be calculated for the local setting, which may be different to France where this study was done.

Factors to be considered in this calculation are morbidity of both procedures, local cost of the disposable device, availability or the investment cost of the Doppler scanner, in patient bed cost, income status of the patient and loss of income of in patient stay. Deriving this answer could be an attractive challenge for a surgeon—health economist team.

A detailed spatial analysis on contrasting cancer incidence patterns in thyroid and lung cancer in Toronto women

Patrick Brown, Hedy Jiang, Shereen Ezzat and Anna M. Sawka.

BMC Public Health
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2016:950
doi: 10.1186/s12889-016-3634-4

Objective

Thyroid cancer has been rapidly rising in incidence in Canada; however, in contrast, lung cancer appears to be decreasing in incidence in Canadian men and stable in women. Moreover, disease-related mortality risk is generally very low in TC but high in LC. We performed a geographic spatial analysis in metropolitan Toronto, Canada to determine if there is regional variability of respective risks of thyroid cancer (TC) and lung cancer (LC), among women. Women were of particular interest for this study, given their known predilection for thyroid cancer.

Methods

The postal codes of all females with TC or LC, residing in metropolitan Toronto from 2004 to 2008, were geocoded to point locations according to 2006 Canadian Census data. The data were analysed using a log-Gaussian Cox Process, where the intensity of age-adjusted cancer cases was modelled as a log-linear combination of the population at risk, explanatory variables (race, immigration, and median household income), and a residual spatially varying random effect. For each respective malignancy, statistical models were fit to make quantify the relationship between cancer incidence and explanatory variables.

Results

We included 2230 women with TC and 2412 with LC. The distribution of TC and LC cases contrasted inversely among Toronto neighbourhoods with the highest TC incidence in the Northeast and the highest LC incidence in the Southeast. A higher proportion of Asian ethnicity was associated with higher regional risk of TC and lower risk of LC. A higher proportion of recent immigrants was associated with increased LC and lower TC risk, whereas median household income and proportions of African ethnicity were not significantly associated with risk of either cancer, after adjustment for other socio-demographic variables.

Conclusions

We observed contrasting regional distributions of female TC and LC cases in Toronto. The differences were partly attributed to ethnic composition variability and the proportion of recent immigrants, but substantial unexplained residual variation of incidence patterns of these malignancies exists, suggesting that more individual-level research is needed to
explain the regional variability of incidence of these malignancies.


Commentary
Dileepa Ediriweera
Lecturer in Medical Informatics,
Faculty of Medicine, University of Kelaniya, Sri Lanka.

This is an interesting study done to evaluate the geographic variation of cancer incidence. Study showed cancer incidence is associated with ethnicity composition and the proportion of recent migrants but not with the median household income level in a given area. Usually disease modelling is done with individual characteristics such as demographics, disease related history, physical and biochemical parameters rather than considering social and natural environmental variables. Such approach will not only lose important geographic variation data with respect to disease occurrence but also it is possible that geographic variation can be reflected falsely on other variables.

Disease mapping is now emerging as a new discipline called geomedicine where social and natural environmental variables are considered as explanatory variables in addition to individual characteristics in modelling diseases like cancer. Model based geostatistics is a widely used approach in modelling diseases with respect to geography where general statistical principals are applied in modelling and inferencing geostatistical problems.

The risk of internal hernia or volvulus after laparoscopic colorectal surgery: a systematic review.
Toh JW et al.
Colorectal Disease 2016 Dec 1; 18(12):1133-41.

Objectives
To determine the incidence of internal hernias after laparoscopic colorectal surgery and evaluate the risk factors and strategies in the management of this serious complication.

Methods
Two databases (MEDLINE from 1946 and Embase from 1949) were searched to mid-September 2015. The search terms included volvulus or internal hernia and laparoscopic colorectal surgery or colorectal surgery or anterior resection or laparoscopic colectomy. We found 49 and 124 articles on MEDLINE and Embase, respectively, an additional 15 articles were found on reviewing the references. After removal of duplicates, 176 abstracts were reviewed, with 33 full texts reviewed and 15 eligible for qualitative synthesis.

Results
The incidence of internal hernia after laparoscopic colorectal surgery is low (0.65%). Thirty-one patients were identified. Five cases were from two prospective studies (5/648, 0.8%), 20 cases were from seven retrospective studies (20/3165, 0.6%) and six patients were from case reports. Of the 31 identified cases, 21 were associated with left-sided resection, four with right sided resection, two with transverse colectomy, one with a subtotal colectomy and in three cases the operation was not specified. The majority of cases (64.3%) were associated with a restorative left sided resection. Nearly all cases occurred within 4 months of surgery. All patients required re-operation and reduction of the internal hernia and 35.7% of cases required a bowel resection. In 52.2% of cases, the mesenteric defect was closed at the second operation and 52.6% of cases were successfully managed laparoscopically. There were three deaths (0.08%).

Conclusions
Mesenteric hernias are a rare but important complication of laparoscopic colorectal surgery. The evidence does not support routine closure for all cases, but selective closure of the mesenteric defect during left-sided restorative procedures in high-risk patients at the initial surgery may be considered.

Commentary
Wasantha Wijenayake,
Senior Lecturer in Surgery,
General Sir John Kotelawala Defence University,
Ratmalana.

This article emphasizes the known low incidence of internal hernias following laparoscopic colorectal surgery. Therefore it is not necessary to change the present practice of laparoscopic colorectal surgery to close the mesenteric space in each and every patient. Considering the very low incident (0.65%) and mortality (0.08%) of internal hernias following laparoscopic colorectal surgery it is of doubtful value even to carry out closure of mesenteric space on selected patients as suggested in the article as this may prolong the surgery time. In addition it is not clear by this article which criteria to be considered as high risk for internal hernia in laparoscopy group.

It would have been of much value if the authors had compared the incidence of internal hernia between open colorectal surgeries and laparoscopic surgeries as most probably they had gathered the relevant data according to the search terms used for article selection from data bases.
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