



# **JOURNAL OF THE CARIBBEAN COLLEGE OF SURGEONS**

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# Official Journal of the Caribbean College of Surgeons

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# COVER DESIGN

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**Cover: Journal of the Caribbean College of Surgeons**

Cameron Wilkinson, Omair Janhua, Shruti Patel



**JOURNAL OF THE CARIBBEAN  
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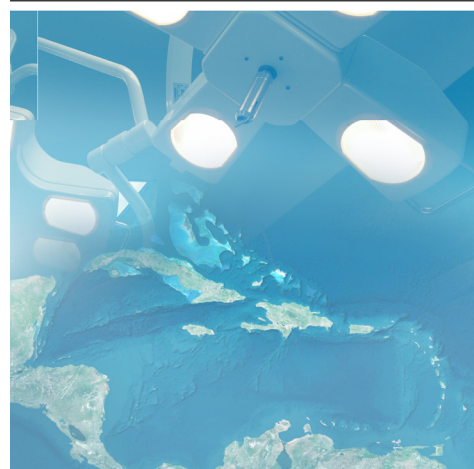
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The cover design for the Journal of the Caribbean College of Surgeons depicts a satellite image of the Caribbean region taken from space. The image shows the tranquil beauty of the region on the background of the aqua blue Caribbean Sea.

Although, the Caribbean is relatively small, it casts a large footprint that can be seen far and wide.

The cover also shows the surgical main and satellite lights that we use on a daily basis to illuminate the work that surgeons do. The emblem of the Caribbean College of Surgeons is featured in the top left hand corner, bringing together the qualities of the Caribbean and the work of the surgeons.

The cover was designed by our President, Dr. Cameron Wilkinson, and medical students from the Windsor Medical School.



# PRESIDENT'S

# MESSAGE



## **Introducing the Journal of the Caribbean College of Surgeons**

Cameron Wilkinson

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#### **Dr. Cameron Wilkinson, FACS**

President of the Caribbean College of Surgeons

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**I**t is with a great sense of pride that I write to congratulate all who contributed to this first publication of the Journal of the Caribbean College of Surgeons. I specifically want to commend Dr. Shamir Cawich, the Vice President of College and chair of the Continuing Medical Education and Publication Committees for his outstanding work in making this effort a reality. To the readers of this Journal, I thank you for subscribing and assure you that your appetite for surgical knowledge will be satiated.

The Caribbean College of Surgeons was established in 2003. One of its primary objectives is to “provide opportunities through which surgical experiences and scientific research for all surgical specialties may be presented to their peers and the international community.” I am very happy to see that we are fulfilling this and other goals set out fourteen years ago.

During this time the baton was passed from four past presidents to myself. We have made significant progress uniting surgeons across the Caribbean and the wider diaspora ensuring that we remain on the cutting edge of surgical education and technology. I look forward to continuing on this path of success.

I take this opportunity to invite all to our 16th annual scientific conference that will be held in St. Kitts in the West Indies from June 14th to 16th, 2018. I also look forward to more scientific papers coming out of this conference to make our next journal publication an even greater success.

Best regards,

*Cameron Wilkinson*

President, Caribbean College of Surgeons

# Surgery in the Caribbean: Charging Forward in the 21st Century

Shamir O Cawich

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**I**t is with great pride that the Caribbean College of Surgeons presents the first regular issue of the Journal of the Caribbean College of Surgeons (J.C.C.S.). One mandate of the College is to provide opportunities through which surgical experiences and scientific research can be shared between practitioners across the Caribbean. Publishing the JCCS is an additional step toward achieving this goal.

Certainly, there are many medical journals across the globe documenting medical data, outlining clinical guidelines and detailing surgical techniques. However, many authors have demonstrated that numerous differences exist between clinical practices in Developed Countries and the resource-poor, often underfunded Caribbean healthcare environments<sup>1,2,3</sup>. Therefore, the information may not be easily transferrable to the Caribbean environment. This is one way that we foresee the JCCS serving practitioners in the region.


Secondly, we must acknowledge that our patient population differs significantly from other populations. This was beautifully demonstrated Dr. Arthur Cecil Cyrus in his book<sup>4</sup>, “A Clinical and Pathological Atlas: The Records of a Surgeon in St. Vincent.” This work details a 40-year collection of pathologic specimens collected from Caribbean patients that Cecil encountered and treated<sup>5</sup>. Additional authors have demonstrated other differences in surgical anatomy and disease pathology in Caribbean populations<sup>6,7,8,9</sup>.

Thirdly, many authors have found ways to offer surgical care while maintaining high standards of care, despite many obstacles to healthcare delivery<sup>10,11,12</sup>. There has also been a wealth of innovation from Caribbean surgeons who have developed new techniques or modified existing techniques specifically to suit Caribbean surgical practice<sup>13-21</sup>. Through the JCCS, these authors can share their experiences so that there is no need to re-invent the wheel.

While there are many international medical journals dedicated to the practice of surgery, there are no publications that are specifically dedicated to the practice of surgery in the Caribbean health care environment. This is the audience that the JCCS wishes to serve.

It is clear that the Caribbean has been a rich source of knowledge, experience and data. We now look forward to the JCCS making a true and meaningful impact in surgical practice for the Caribbean.

We must take the opportunity now to thank our contributors who have spent many hours preparing manuscripts for publication. The contribution from our peer reviewers must also be recognized. They have given their unwavering support, invaluable time and expertise to this venture. Their collective have contributed to advancing knowledge as a step to growth in surgical practice for the Caribbean.





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## CORRESPONDENCE

### **Introduction of the Journal of the Caribbean College of Surgeons**

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#### ***Dear Editor,***

*We wish to extend our congratulations on the establishment of the Journal of Caribbean College of Surgeons (JCCS). The Journal, hopefully, will be a source of high-quality research papers and articles that highlight best clinical practice, geared toward the medical fraternity in the Caribbean.*

*The Caribbean Association of Orthopaedic Surgeons was borne out of the desire of orthopaedic surgeons in Jamaica, Trinidad and Tobago, Barbados, St. Lucia, St. Vincent, Antigua, Guyana and the U.S. Virgin Islands, to develop closer links with each other; to become more aware of the challenges which confront each of us in our respective islands, and to offer technical support to our colleagues who work in environments with limited resources.*

*The Caribbean Association of Orthopaedic Surgeons was launched in 2007. Since then, annual scientific meetings have been held on the first weekend of October in different member countries. In 2010, the Association was incorporated under the Companies Act in Jamaica as a Limited Liability Company, Limited by Guarantee. In 2014, the Association was registered as a Charitable, Not-For-Profit Organization.*



## **The main objectives of the Association are:**

1. The promotion of high quality care for all the peoples of the Caribbean through the advancement of the science, art and practice of orthopaedic surgery.
2. The development, encouragement and advancement of continuing medical education and research in Orthopaedics for the public benefit.
3. The Association should foster and maintain links with the Caribbean diaspora and provide expert consultation on formation of policies that impact on trauma and orthopaedic needs of our Caribbean Community.

## **The impact of the Caribbean Association of Orthopaedic Surgeons has manifest in a number of ways:**

1. A forum at which residents have continued to develop the art and confidence of presenting their research projects
2. A source of Continuing Medical Education within the Caribbean
3. Links have been formed and maintained between Orthopaedic surgeons in the English-speaking Caribbean, and these have resulted in the easy exchange of ideas; discussions of challenging and interesting cases, and the implementation of technical support.
4. As a result of collaboration, research papers have been published in International peer-reviewed journals.
5. A successful combined meeting was held with the J Robert Gladden Orthopaedic Society from the USA in 2012.
6. The Caribbean Association of Orthopaedic Surgeons has been recognized as a member of the international orthopaedic community by the American Academy of Orthopaedic Surgeons since 2010. As a result of this association, the incumbent president of the Caribbean Association of Orthopaedic Surgeons is invited to the Annual International Meeting of the American Academy of Orthopaedic Surgeons as a representative of the Caribbean Orthopaedic Community.

As the Caribbean Association of Orthopaedic Surgeons looks to the future, a priority must be continued stimulation and fostering of focused Caribbean research with a dynamic global perspective. Everything begins with research; the treatment of tomorrow depends on the research of today. The varied and interesting musculoskeletal pathology in the Caribbean makes our region a rich source for research.

It is our hope that the aforementioned can become a reality by the members of our Association collaborating on research projects which can then be submitted to the JCCS.

In concluding, we should be mindful of the words of Henry Ford, the American industrialist, “Coming together is a beginning, keeping together is progress, working together is success.” We have the ability to shape and craft our future and define it as proud Caribbean professionals.

Please contact us at [tcossecretary1@gmail.com](mailto:tcossecretary1@gmail.com) for further information or if you would like to join the Caribbean Association of Orthopaedic Surgeons.

## Laparoscopic Hellers' Myotomy for Achalasia: Is it Feasible in a Low-Volume and Low-Resource Centre?

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## ABSTRACT

**Background:** Laparoscopic Heller's Myotomy, a procedure first described in 1992, has been the gold standard in the treatment of achalasia for many years. The aim of this retrospective study was to compare the results of Laparoscopic Hellers' myotomy in a low-volume centre with outcomes of high volume centres.

**Methods:** A retrospective analysis of five patients with stage II / III achalasia were enrolled in this study. They underwent Laparoscopic Hellers' Myotomy and partial Dor fundoplication for severe achalasia after previous endoscopic pneumatic dilatations between the years 2013 and 2015. Diagnostic work-up was performed using gastroscopy and barium swallow. Manometry was not performed because it was not available in our centre.

**Results:** All five patients had significant symptom relief, with a reduction in Eckardt score from 7.6+/-1.6 preoperatively to 1.2+/-0.8 postoperatively. A distal oesophageal perforation occurred in 2 patients, both identified and repaired during the operation. There was no mortality and no postoperative leak reported. One patient was treated with a prolonged course of proton pump inhibitors for gastro-oesophageal reflux.

**Conclusion:** There are good outcomes after Laparoscopic Hellers' myotomy for Achalasia, despite being performed in a low volume and low resource centre. Perforation rates are higher than expected, but the management is very effective when it does occur.

## INTRODUCTION

Achalasia is a primary esophageal motor disorder with impaired relaxation of the lower esophageal sphincter and absent esophageal peristalsis <sup>1</sup>. Although its etiology is often unknown, the pathological changes seen are myenteric inflammation, loss of ganglion cells and fibrosis of myenteric nerves. There is also a reduction in nitric oxide and vasoactive intestinal peptide. These changes have been suggested to be related to an auto-immune reaction <sup>2</sup>.

Symptoms such as dysphagia, regurgitation, chest pain (due to gastroesophageal reflux or lactate production from bacterial fermentation) and weight loss may occur. These symptoms are included in the Eckardt Scoring List <sup>3</sup> (Table 1) that assigns points based on the frequency and severity of symptoms.

There are many staging tools, such as the Vantrappen Classification<sup>5</sup> that only uses dysphagia to evaluate the clinical outcomes or the Adams's Classification <sup>6</sup> that combines clinical and radiologic findings to stratify achalasia. However, the Eckardt Scoring List has been the most used staging tool: An Eckardt Score of 0-1 is considered to be clinical Stage 0 disease, a score of 2-3 corresponds to Stage I, a score of 4-6 corresponds to Stage II and a score >6 to clinical Stage III disease. Patients are considered to be in remission when they have stages 0-I disease. On the other hand, clinical stages II-III represent failure of treatment <sup>4</sup>.

In this study, we sought to document the changes in Eckardt Scores after laparoscopic Heller's Myotomy (LHM) in patients with achalasia. We also sought to document the clinical outcomes after this procedure in a low-volume and resource-poor setting in Curacao. This is an island in the Dutch Caribbean with a population of only 150,000 persons.



Table 1: Eckardt Scoring List				
Score	Weight loss	Dysphagia	Chest Pain	Regurgitation
0	None	None	None	None
1	<5 kg	Occasional	Occasional	Occasional
2	5>10 kg	Daily	Daily	Daily
3	>10 kg	Each Meal	Each Meal	Each Meal

## METHODS

We retrospectively analysed clinical data from all patients who underwent surgical treatment for achalasia between November 1, 2013 and August 1, 2015 at the Sint Elisabeth Hospital in Willemstad, Curacao (Dutch Caribbean). Permission to complete this study was granted by the relevant institutional review board.

In this facility, all diagnoses were made by barium esophagogram and esophago-gastroscopy. Manometric evaluation was not performed because it was not available in this low-resource setting.

In this study, the primary outcome evaluated was symptom relief according to Eckardt's score. Therefore, all patients were interviewed prior to operation to determine their Eckardt's scores. All patients were reviewed in the outpatient clinic at 2, 6, 12 and 18 weeks after operation. At each outpatient review, the patients were interviewed to determine Eckardt's scores. The patients were also contacted by telephone for an interview about late symptomatology.

Secondary outcomes for this study included operative details. Therefore, the patients' hospital records were retrieved and the following data were extracted: patient demographics, operative details, blood loss, duration of operation, duration of hospitalization, mucosal perforation and surgical site infections.

## RESULTS

Five patients had (LHM) during the study period. The operations were all performed by a single surgeon who performed over 300 general laparoscopic procedures per year. These patients had three to six pneumatic dilatations prior to surgery. There were no reports of botulin toxin treatment.

All patients were treated with a (LHM) and partial Dor-fundoplication. We used electrocautery to perform a myotomy that commenced 2cm distal to the gastro-esophageal junction and extended 6 cm onto the proximal esophagus. An esophagogram was routinely performed on the first postoperative day to exclude leaks. Once the patients tolerated oral fluids, they were discharged from hospital.

In the event of a mucosal perforation, a sutured repair was performed using 4-0 PDS absorbable sutures. The repair was tested using methylene blue instilled via a nasogastric tube. A Dor (anterior) fundoplication was then performed using four 2-0 non-absorbable, prolene sutures. In these cases, the esophagogram was delayed for one week and the patients were given parenteral nutrition for this period.

The primary outcome measured was achalasia-related symptom relief using the Eckardt scoring system, outlined in Table 2. There was a reduction in Eckardt Scores from 7.6 +/- 1.6 before operation to 1.2 +/- 0.8 postoperatively.

Table 2: Peri-Operative Eckardt scores										
#	Pre-Operative Period					Post-Operative Period				
	Weight loss	Dysphagia	Chest Pain	Regurgitation	Total Score	Weight loss	Dysphagia	Chest Pain	Regurgitation	Total
1	2	2	2	1	7	0	1	0	1	2
2	3	3	0	3	9	0	1	0	1	2
3	2	3	0	2	7	0	0	0	0	0
4	3	3	1	2	9	0	0	1	0	1
5	1	3	0	2	6	1	0	0	1	2
					<b>7.6</b>					<b>1.2</b>

The operations were completed after a median operating time of 76 minutes and were accompanied by a median blood loss of <100 millilitres. There were intra-operative complications in 2/5 patients.

Two iatrogenic mucosal perforations were detected by direct inspection of the dissection site. These patients had immediate operative repair, without event. They were treated with total parenteral nutrition for seven days, after which a barium contrast study confirmed the absence of continued leaks. These patients were then commenced on oral intake. There were no other intra-operative complications recorded.

There were no surgical site infections, post-operative leaks or deaths recorded. The mean length of hospital stay was 2.3 days in patients without a perforation and 9 days in patients with perforations.

One patient presented with complaints of gastroesophageal reflux three weeks after surgery. These complaints resolved with proton pump inhibition therapy.

## DISCUSSION

This study was undertaken in a small Caribbean country with a population of 150,000 persons. The operations were performed at low volume in a health care environment that was resource poor.

The guidelines published by the American College of Gastroenterology strongly recommend that patients should undergo motility testing before a diagnosis of achalasia can be confirmed<sup>9</sup>. Krill et al<sup>10</sup> also pointed out that manometry could be used to classify achalasia in different subtypes that have implications on clinical outcomes. We were not able to adhere to these guidelines, because manometry was unavailable. In fact, the diagnoses were made upon finding the typical widened esophagus and 'bird's beak' appearance on contrast esophagram and after high-resolution endoscopy to exclude pseudo-achalasia (gastric tumour with compression effect)<sup>7</sup>.

Few authors have reported similar experiences. Vela et al<sup>8</sup> suggested that the diagnoses could be reasonably made if the patient has suggestive symptoms coupled with the typical bird-beak esophagram. Over a 16 year period, Nau et al<sup>18</sup> evaluated 206 patients who had achalasia diagnosed with only contrast radiography / endoscopy. When 157 patients went on to have esophageal motility testing for confirmation, there was correlation between the investigations in all patients. This might suggest that manometry is unnecessary to make the diagnosis of Achalasia in the radiographic, endoscopic and clinically clear cases.

In our study all patients had underwent pneumatic dilation before surgery. Although Rohof et al<sup>14</sup> reported better success rates when patients with type 2 achalasia were treated with pneumatic dilatation (53/53 successful cases) compared to (LHM) (57/61 successful cases), the outcomes were similar in types 1 and 3 achalasia. They also mentioned the studies of Kilic<sup>15</sup> and Salvador<sup>16</sup> where (LHM) had the same or better outcomes than pneumatic dilation in all three subtypes.

In our study, 100% of patients experienced improvement in achalasia-related symptoms, evidenced by a reduction in Eckardt Scores from 7.6 +/- 1.6 to 1.2 +/- 0.8 after (LHM). The secondary outcomes were also acceptable in our setting. These findings are in keeping with previous outcome data from a low volume centre in the Caribbean<sup>22</sup>. Dan et al<sup>22</sup> documented 94% patient satisfaction and symptomatic improvement in 71.2% when 16 patients underwent (LHM) in Trinidad and Tobago.

Gastro-oesophageal reflux may occur after surgical treatment. The SAGES guidelines document that reflux is seen in 8.8-14.9% of patients treated with laparoscopic Heller's myotomy and partial fundoplication in high volume centres<sup>7</sup>. In our study, 20% of patients experienced reflux symptoms after surgery, but all experienced improvement with proton pump inhibition therapy.

Oesophageal perforation is a recognized complication of surgical treatment. Many authorities document perforation rates after (LHM) that range from 7.8% to 28% in large series exceeding 50 patients<sup>7,19,20,21</sup>. Perforations tend to be commoner in patients who had pre-operative pneumatic dilatations<sup>7</sup>, botulinum toxin injections<sup>7</sup> and those who had operations performed in low volume centres<sup>19</sup>. For this reason, Lynch et al<sup>19</sup> recommended that surgical treatment of achalasia should be reserved for high volume centres. We note that the 40% perforation rate in our series was high. But in our setting, the international recommendations were not practical because patients would have to travel abroad to have access to a high volume centre where the cost of treatment was prohibitive. Furthermore, all perforations in our setting were recognized and appropriately treated, with good outcomes.



Perforations are commoner in patients who had pre-operative pneumatic dilatations and botulinum toxin injections <sup>7,16</sup>. This is believed to be due to reactionary inflammation with fibrosis after the sub-mucosal space is violated. In our study, all patients had pre-operative pneumatic dilatations – that could have contributed to the high perforation rates in our setting. Perhaps earlier referrals by the gastroenterologists after one or two dilatations, as suggested by Krill et al <sup>10</sup>, could have resulted in reduced perforations.

There are many treatment options available for patients with achalasia. Medical treatment includes the use of muscle relaxants, calcium channel blockers and long acting nitrates <sup>8</sup>. Botulin toxin injections, pneumatic dilatations and Heller's myotomy are reported to be more effective than medical therapy <sup>8</sup>. Some patients with a sigmoid oesophagus may require oesophagectomy <sup>8</sup>. Per-Oral Endoscopic Myotomy (POEM) of the circular muscles has become popular <sup>16</sup> since it was accepted as a therapeutic option for achalasia in 2008 <sup>13</sup>. There are also differences in therapeutic algorithms between the European and American continents. For example, a myotomy is the preferred treatment in the United States for young males below 40 years of age who are good candidates for invasive intervention <sup>9</sup>. This is because (LHM) is a safe procedure, even in the elderly <sup>11,12</sup>. However, 2-3 pneumatic dilatations before myotomy is preferred in Europe <sup>10</sup>. At the very minimum, we believe that a multidisciplinary approach to achalasia treatment in our setting is warranted.

## STUDY LIMITATIONS

Our study only had five patients enrolled in three years. Therefore, our results cannot be extrapolated to draw definitive conclusions.

## CONCLUSION

Our study suggests that there are good outcomes after Laparoscopic Hellers' myotomy for achalasia, despite being performed in a low volume and low resource centre. Perforation rates are higher than expected in our setting, but the management is very effective when it does occur. However, more data are needed to confirm this.

In this setting, a multidisciplinary approach to achalasia management should be implemented. Pre-operative manometry might be unnecessary to confirm the diagnosis of achalasia if there is good quality clinical, radiographic and endoscopic data.

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## Sick Systems in Need of Care – an Urgent Referral

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## INTRODUCTION

A key function of the Caribbean College of Surgeons is to sensitize readers to issues affecting clinical practice. A case is presented to explore the function of referral systems.

## REPORT OF A CASE

A 60-year-old woman attended a general practitioner complaining of malaise, anorexia and weight loss. She was diagnosed as being anaemic (Hb 10 g/dl). Six months later she attended the doctor with an additional complaint of abdominal pain. An ultrasound was ordered and it showed a heterogeneous abdominal mass; further evaluation with contrast-enhanced CT was advised as soon as possible and was requested. The patient was advised the radiologist would be consulted and that she would be called to be given a date for the scan to be done.

Three months after the patient had complained of her abdominal pain the patient made another visit to the doctor who wrote a referral letter and addressed it to the 'On-call general surgery consultant'. The letter contained the results of blood tests showing elevated cancer screening levels and a note that a CT scan had been ordered. The records department gave an appointment for 4 months later.

One month before the scheduled outpatient appointment, the patient presented at the emergency department with worsening abdominal pain, shortness of breath and palpitations. The patient said she had lost 40 lbs. in weight and had a palpable abdominal mass, which was shown on a CT scan ordered in the emergency department to be invading the adjacent abdominal wall. She was admitted and underwent an urgent exploratory operation where multiple peritoneal deposits were also found. Her postoperative course was complicated by organ failure and she died a few days after her operation. When the hospital notes were reviewed for the surgery department audit, there was an outpatient clinic entry stating, "Not heard when called".

## DISCUSSION

The reader should consider the following issues to discuss:

### • *The early diagnosis of cancer*

The treatment and possibility of curing a cancer depends in most instances on making an early diagnosis. This can either be done by screening programmes where appropriate, or by the physician recognizing the early symptoms of disease and carrying out the appropriate diagnostic measures<sup>1-2</sup>. Since there are no cancers that are normally treated by a primary care physician, it is appropriate to ask what role should the primary care physician play in the diagnosis of cancers, or whether the specialist physicians undertake that responsibility<sup>3</sup>. Unless the organization of the system of care restricts direct access to specialist care, it is appropriate that both primary care physicians and specialists should be involved in the early diagnosis of cancers, and that there must be suitably responsive mechanisms for the investigation and referral of a patient into the specialist care systems.

*In the report given the patient has presented to the primary care physician with symptoms that should lead to suspicion of a cancer diagnosis somewhere. No details of a physical examination are given, but given the patient's age and the symptoms given, the patient should have been screened for a bowel cancer, an ovarian cancer, as well as breast cancer. In addition, the opportunity could have been taken to screen for general metabolic disease and via a chest x-ray for metastatic disease. It appears that the primary care physician has incorrectly attributed the symptoms to a mild anaemia and the patient had accepted this reassurance until new and more troublesome symptoms arose six months later.*

### • *The role of the primary care physician in investigating patients*

A patient on attending a doctor would expect a diagnosis to be made, and where specialist treatment is required to be referred at the earliest possible opportunity. In order to make a diagnosis, the primary care physicians should be expected to have sufficient knowledge to initiate the correct diagnostic procedures, but should not see themselves as responsible for initiating any additional investigations that may be required by the specialist physician for the treatment required<sup>4</sup>.

The initiation by the primary care physician of investigations that are required by the specialist physician for treatment purposes are often repeated when there has been a waiting time for the specialist appointment. This can clearly be at a cost to the patient both in terms of radiation exposure, any risks of the procedure, and the cost to the patient or to the system of care whether it be a public or a private service. Thus it is appropriate that a primary care physician should order diagnostic/screening investigations such as mammograms or colonoscopy, but should refrain from ordering staging investigations such as MRI's or CT scans unless they are done in consultation with the treating specialist. This however does not negate the wider role the primary care physician should play in the management of patients with cancer<sup>5</sup>.

In the report given the primary care physician involved missed the opportunity of screening for common cancers at the initial consultation and an inappropriate assessment was made. On the second consultation, the investigations ordered were for the detection of advanced disease and indeed they indicated as much. The results and the patient's complaint should have precipitated an urgent referral, what followed instead was a request for a staging investigation and a letter of referral through a non-urgent routing that resulted in a four months routine appointment.

### • *The urgent referral*

Catastrophic urgencies are dealt with in emergency departments and are prioritized there along with less catastrophic cases, in a triaging system<sup>6</sup>. The less catastrophic urgency may be subject to delays in emergency departments that may vary from hours up to a day<sup>7</sup>. This type of delay in emergency departments is exhausting for the patient and their relatives, but will not be usually as long as obtaining an appointment in a specialist clinic.



## • *Ethical and legal responsibilities in delayed care*

Obtaining an appointment in a specialist clinic depends on the system in place and is usually quicker to obtain in private rather than in public systems, where appointments may vary from weeks to many months<sup>8</sup>. Therefore, systems have to be devised, particularly in public systems, to enable urgent referrals to be made to specialist clinics<sup>9</sup>. Most systems of appointment depend on non-professional staff that are asked to deal with letters or phone calls from physicians or their assistants. Such staff usually have no special training or guidance as to when an urgent appointment should be given and inevitably depend on some direct guidance from the specialist concerned. It is therefore most appropriate that urgent requests be handled by some direct communication between the referring physician and the treating specialist. The most direct means of achieving this is via telephone contact and to a much lesser extent be email communication. Both of these means have their own difficulties, with telephone communication depending on the efficiency of the telephone system in public and specialist institutions, as well as the availability of both the referring physician and that of the specialist being referred to. Where the telephone systems result in frustration, letters delivered via the patient are often used. When letters are used for urgent appointments, there should be some prominent display of the URGENT nature of the request, and the narrative should reflect why the referring physician considers the matter urgent. The letter should be couched in such terms that the lay appointment staff might either agree with the judgment of urgency, or decide to seek guidance from the specialist physician.

Referral systems and particularly those dealing with urgencies should be subject to periodic audit and review and be modified as necessary<sup>10</sup>. This should avoid patients falling through the cracks, and when treatment outcomes are not satisfactory to be able to avoid an indefensible legal claim<sup>11</sup>.

In the report given the only evidence of urgency given is addressing the letter to 'the on-call general surgeon'. There is no indication that the records staff seeks the advice of the 'on-call general surgeon' or discerns that the information contained in the letter requires an urgent appointment. It can only be considered as ironic that the records staff do not recognize that the patient has been admitted and died, and records that the patient did not keep the outpatients appointment by the notation 'Not heard when called'.

An enquiry of the surgical department revealed that there was a ten-year old guideline that the 'on-call' surgical staff should be responsible for reviewing any letters for urgent appointments and direct the records staff as to when the appointment should be given. However, the current senior resident surgical staff and the records department said they were unaware of any such written directive.

Professional staff carry both ethical and legal responsibility for breaches in the standard of care of the patient that result in avoidable harm<sup>12</sup>. The administration of a clinic or an institution also carries legal responsibility for the role of their staff in breaches in the care of patients that result in compensable harm<sup>13</sup>.

Delays in care may be brought about by the failure of staff to follow established guidelines for appointments and procedures; by the failure to maintain equipment leaving it unavailable in a timely manner; and the lack of or availability of written procedural guidelines for dealing with urgent referrals<sup>14</sup>.

Delays in care can also be brought about by a failure to diagnose a patient's condition, but such delays can only carry legal responsibility when such failure can be demonstrated to have been negligent. Such negligent care may be brought about by an inadequate history and examination, by a lack of investigation or follow-up when it was warranted<sup>15</sup>.

In the report given, it is clear that the primary care physician carried some legal responsibility for a breach in the measures undertaken to come to a diagnosis on the symptoms given at the first presentation a year before the patient was finally admitted. The delay was further compounded by not seeking an urgent appointment via the telephone when there was little doubt about the diagnosis.

Although the primary care physician could be criticized for seeking what is a specialist investigation before referral, there is the stark liability of a radiology department that fails to give an appointment for 6-months, but is capable of doing the same investigation as an emergency. This administrative negligence in the radiology department is mirrored by any sense of urgency in the records department dealing with appointments. The surgical department cannot be faulted for their response to this patient, but should accept that their system for dealing with urgent matters was unknown even within their own department, and could have contributed to the failure that occurred at the primary care physician level and in the records department for making appointments.

### • *The responsibility of patients in referral systems*

It is clearly in a patient/guardian's interest to get involved in the care they receive and to consent to whatever is recommended to them. Therefore, when referrals are being made for investigation and/or care the patient /guardian must clearly understand what is expected or required of them. This knowledge/understanding must be imparted by the physician and feedback sought to ensure that the patient/guardian has obtained the right knowledge. In imparting this information the physician must bear in mind that what is being advocated is likely to be unfamiliar to the patient/guardian and may be confusing to them. It is therefore appropriate for the physician to reinforce any instructions, and even to ask the patient/guardian to report back to them if they experience any difficulty.

Some patients faced with serious illness may go into a state of denial and may not follow instructions or faced with a delay in service assume that the condition was not as serious as they were led to believe <sup>16</sup>. Patients may also be intimidated by the bureaucratic systems they face and may accept appointments that are much later than they were assured was necessary or available.

The other responsibility that the patient/guardian has is to seek a second opinion when they are not satisfied or are in doubt. Physicians should make their patients aware of their right to second opinions or referrals for care and to facilitate such by providing all of the necessary information available <sup>17</sup>.

In the report given, a referral was made for a CT scan and the patient was told that they would be called for an appointment. That call did not come for a further six months, and apparently no further enquiry was made by either the patient or the physician two months later when it is said that an urgent referral was made. It is not clear how urgent the investigation or referral was instilled in the patient, for four months was accepted for the referral when the patient was clearly symptomatic and a diagnosis of cancer had been made.

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## INTRODUCTION

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Inguinal hernia repair is the most common general surgical operation performed worldwide. Internationally 20 million groin hernia repairs are performed each year <sup>1,2</sup>. Annually, more than 750,000 inguinal hernia repairs are done in the United States, and more than 80,000 in the UK <sup>1,3,4</sup>. With this large number of procedures, small changes in practice patterns can have huge socioeconomic implications <sup>1</sup>.

There are no data available on the clinical outcomes after open hernia repairs in Guyana. Therefore, we performed this study to determine the clinical outcomes after open inguinal herniorrhaphy at a district hospital in Guyana and compared these outcomes to those from high volume centres as published in the medical literature.

## METHODS

The local institutional review board granted permission to carry out a retrospective audit of the outcomes inguinal hernias repairs at the New Amsterdam Hospital in Guyana from June 1, 2012 to May 31, 2014. This is a district hospital in which inguinal hernia repairs are routinely performed.

We reviewed the Operating Theatre register to identify all elective and emergency inguinal hernia repairs performed in adult males over the study period. The hospital records for these patients were retrieved and analyzed in detail. The following details were extracted: patient demographics, intra-operative findings, repair technique, peri-operative details and in-hospital complications. These data were collected in standardized data collection forms.

We also retrieved contact details for each patient from hospital records. An investigator performed telephone interviews using these contact details. Patients were excluded if they did not consent to telephone interviews or could not be reached for whatever reason. The following data were collected during telephone interviews: presence of inguinodynia (chronic pain or discomfort lasting greater than three months post operation), surgical site infections, recurrence and any other long-term complications. During these telephone interviews, all patients were invited back to the surgical clinic for re-examination to exclude recurrence and/or the presence of complications.

All data collected were entered into Microsoft Excel spreadsheet and the data was analyzed using SPSS 19.

## ORIGINAL RESEARCH CONTRIBUTION

### OUTCOMES OF INGUINAL HERNIA REPAIRS AT A DISTRICT HOSPITAL IN GUYANA

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## RESULTS:

Over the study period, there were 112 inguinal hernia repairs performed in adult males. All repairs were performed by surgeons who completed post-graduate training at the University of Guyana. Three patients had no contact details recorded, two had incorrect details listed and a further two had emigrated from Guyana. These seven patients were excluded from the analysis. Four more patients were excluded from further analysis because they died within two years from problems unrelated to the inguinal hernia repair: suicide (1), myocardial infarction (2) and stroke (1).

Therefore, the final study population comprised 109 adult males with inguinal hernia repairs for whom complete data were available. The mean patient age was 49 (range 18-83) years. There were 96 (95%) unilateral inguinal hernia repairs and 5 (5%) bilateral repairs performed. These patients had a mean duration of follow up of 33.7 (range 21.0-44.5) months post hernia repair.

Ten (9.9%) patients required emergent hernia repairs for strangulation. Four of these patients required bowel resection, 2 with primary anastomosis, one with a diverting stoma and one with primary repair at a second look laparotomy for questionable viability at the index operation.

Elective hernia repairs were performed in 91 (90.1%) patients. Only 1 (1%) elective repair was performed as an ambulatory operation. In the remaining patients, 86 (96%) were discharged within 24 hours and 4 (4%) were discharged on the second post-operative day.

Table 1 compares the incidence of early complications (within 2 weeks of operation) and chronic complications (>2 weeks) in patients with elective and emergency repairs.

<b>Table 1: A Comparison of Complications in Patients After Inguinal Hernia Repair</b>			
<b>Complication</b>	<b>Elective Repair</b>	<b>Emergency Repair</b>	<b>All</b>
Intraoperative complications	0	0	0
<b>Early Complications</b>			
Acute pain	14/91 (15.4%)	2/10 (20%)	16 (15.8%)
Urinary retention	4/91 (4.4%)	0	4 (4%)
Scrotal Haematoma	1 (1.2%)	0	1 (1%)
Paralytic ileus	0	2 (20%)	2 (2%)
Superficial Surgical Site Infection	8 (8.8%)	0	8 (7.9%)
Deep Surgical Site Infections	0	0	0
Deaths	0	0	0
<b>Chronic Complications</b>			
Seroma	0	0	0
Inguinodynia	22 (24.2%)	0	22 (21.8%)
Cord / Testicular haematoma	0	0	0
Ischaemic orchitis	0	0	0
Testicular atrophy	0	0	0
Dysejaculation	0	0	0
Hydrocoele	0	0	0
Mesh Complication	0	0	0
Osteitis Pubis	0	0	0

The hernia repairs were performed using general anaesthesia (69%), regional anesthesia (24%) and sedation (7%). When the repair type was evaluated, 28 (27.7%) patients had suture repair using a Moloney Darn technique. A mesh repair was performed in 73 (72.3%) patients, including all 13 patients with recurrences. Table 2 compares the outcomes in patients according to repair techniques.

<b>Table 2: Analysis of Complications According to Hernia Repair Technique</b>			
<b>Complication</b>	<b>Mesh Repair</b>	<b>Moloney Darn Suture repair</b>	<b>All</b>
Intraoperative complication	0	0	0
<b>Early Complications</b>			
Urinary retention	2/73 (2.7%)	2/28 (7.1%)	4/101 (4%)
Scrotal Haematoma	1/73 (1.4%)	0	1/101 (1%)
Paralytic ileus	0	2/28 (7.1%)	2/101 (2%)
<b>Chronic Complications</b>			
Seroma	0	0	0
Recurrence	1/73 (1.3%)	0	1/101 (1%)
Surgical Site Infection	5/73 (6.8%)	3/28 (10.7%)	8/101 (7.9%)
Inguinodynia	14/73 (19.2%)	8/28 (28.6%)	22/101 (21.8%)
Cord or Testicular	0	0	0
Mesh Complications	0	0	0
Osteitis Pubis	0	0	0

The long-term outcomes evaluated were time to return to normal activity and recurrence. There was 1 (1%) recurrence in this study group in a patient who had an elective mesh repair. The recurrence developed 2 years after the index operation.

The mean time for patients to return to normal activity was 9.5 (Range 2-28) weeks post-surgery. This was significantly longer for patients who had emergent repairs (Mean 12.4+/-4.8 weeks) compared to those who had elective repairs (mean 9.2+/-3.2 weeks) [t-test = -2.827, p = 0.006, 95% CI -5.5 to -0.96]. The mean time to return to normal activity was also significantly longer [t value = 2.8; p = 0.007; 95% CI 0.6 to 3.6] in patients who had suture repair (11+/-3.4 weeks) compared to mesh repair (Mean 8.9+/-3.4 weeks).

Inguinodynia occurred in 21.8% (22) of our patients. These patients had mild to moderate pain (mean pain score 3.7/10; range 3-6). The mean time to return to normal activity (9.5 weeks; range 3-16) in this group was similar to the overall study population. The mean pain score in patients with inguinodynia was not statistically different between the suture repair group (Mean 3.7+/-0.71 SD) and the mesh repair group (Mean 3.7+/-0.95 SD). (t test = -0.069, p = 0.946, 95% CI -0.803 to 0.752).

Despite antibiotic prophylaxis, eight patients (7.9%) who had elective repairs developed a superficial surgical site infection. No deep surgical site infections were recorded. There was no statistically significant difference between surgical site infections in patients who had mesh repairs vs suture repairs (6.8% vs 10.7; p 0.52). The patients were managed with antibiotics and analgesics, together with open drainage. No mesh had to be removed.

## DISCUSSION

Guyana is the second-poorest country in the Western Hemisphere. The Government of Guyana provides its residents with state-funded free health care at a basic level. This may explain the high proportion (28%) of Maloney darn repairs, where non-absorbable sutures are used to form a latticework at the posterior wall of the inguinal canal to provide a tension free repair<sup>5</sup>.

This study was carried out at New Amsterdam Hospital - a resource poor, district hospital in a tropical, agricultural area close to Suriname. The hospital provides surgical services to a population of approximately 159,000 persons<sup>11</sup>. All the surgeons at this hospital completed a postgraduate diploma in General Surgery (equivalent to UK Specialist Trainee year 4-5).

The New Amsterdam Hospital qualifies only as a low volume centre, with 112 inguinal hernia repairs recorded over two years. Low volume units are generally expected to have higher rates of complications and recurrences<sup>4,12,13</sup>. The reported recurrence rates 3-5 years after inguinal herniorrhaphy range from 5-19% in low volume units compared to <1% at specialized, high volume centres<sup>4,12,13</sup>.

Despite being a low-volume facility, the recurrence rate was only 1% at 34 months at the New Amsterdam Hospital. This compares well with the results from specialized, high-volume centres (Table 3). In our study, there was no statistical difference in recurrence rates between mesh repairs and suture repairs (1.4% vs 0). This finding was similar to that reported from specialized, high-volume centres<sup>7,8,15</sup> as outlined in Table 3. We do acknowledge, however that there is the need for long-term follow up, since approximately 50% of inguinal hernia recurrences present after 3-5 years<sup>5,9</sup> and up to 20% of recurrences may not be apparent for 15 years<sup>5,9</sup>.

<b>TABLE 3: A Comparison of Recurrence after Mesh versus Suture Hernia Repair</b>				
<b>Study citation</b>	<b>Mean duration of follow up in months</b>	<b>Overall Recurrence</b>	<b>Recurrence after Mesh Repair</b>	<b>Recurrence after Suture Repair</b>
Koukourou et al <sup>15</sup>	12	3.8%	3.7%	3.9%
Kaynak et al <sup>7</sup>	33	1%	1.1%	1%
Zeybek et al <sup>8</sup>	56	0.3%	0.6%	0%
<b>Algu et al</b>	<b>33.7</b>	<b>1%</b>	<b>1.4%</b>	<b>0%</b>

Non-specialist centres also have a higher incidence of inguinodynia<sup>4,13,14</sup>. In our study, 21.8% of patients experienced inguinodynia after hernia repair. This was near the upper limit of the accepted range of 6-23% published in medical literature<sup>5,10</sup> (Table 4).

We have already noted that 28% of our patients had inguinal hernia repairs using a modified Moloney darn technique. This seemingly high proportion of suture repairs exists because we practice in a resource-poor environment where mesh was simply not routinely available. Although the recurrence rates were similar, there was a significantly greater incidence of inguinodynia after sutured versus mesh repairs (32.1% vs 17.8%). Moreover, 12.9% of the patients experienced moderate pain, with visual analogue pain scores ranging from 4 to 6/10. Therefore, this seems to be supportive of mesh repairs in our setting, had mesh been routinely available.

<b>Table 4: Incidence of Inguinodynia after Mesh and Sutured Inguinal Hernia Repairs</b>			
<b>Study</b>	<b>Overall Incidence of Inguinodynia</b>	<b>Inguinodynia after Mesh Repair</b>	<b>Inguinodynia after Suture Repair</b>
Menakuru et al <sup>4</sup>	6.2%		
Bay-Nielson et al <sup>2</sup>	23.6%	24.8%	21.9% (Shouldice) 23% (Marcy)
<b>Algu et al</b>	<b>21.8%</b>	<b>17.8%</b>	<b>32.1%</b>

Inguinal hernia repairs are considered clean operations that usually carry infection rates from 1-2%<sup>1</sup>. Therefore, the incidence of surgical site infections in this setting (7.9%) was greater than expected. We could not determine the reason for this, but we postulated that there was a contribution from Operating Theater structural problems (for example, we observed a leaking ceiling, malfunctioning autoclave leaving some trays moist, and a broken door to one of the two operating rooms). One other possible contributor was the absence of monitoring of rotating medical officers serving as surgical assistants when they scrubbed, gowned and gloved.

In our setting, there was a lower incidence of surgical site infections when antibiotic prophylaxis was administered (5.1% vs 18.2%). This finding was also unexpected. A recent meta-analysis reported in insignificant difference in surgical site infections in patients receiving prophylactic antibiotics (1.38% vs 2.89%) compared to those without antibiotics<sup>6</sup>. Again, we could not determine the reason for this difference due to the study design, but we did note that the recommended second-generation cephalosporins were not routinely available in our resource poor setting, possibly accounting for the high incidence of infections.

Koukourou et al<sup>15</sup> reported that the mean time to return to normal activity after inguinal hernia repair was 5.13 weeks, regardless of the use of mesh or suture repair<sup>15</sup>. In our study population, the mean time to return to normal activity was 9.5 weeks, and it was earlier for the mesh repair group (8.9 vs 11 weeks). The study design did not allow us to determine the cause for this difference, but we believe this may have been partially due to benefits such as workplace/insurance compensation and socioeconomic reasons.



## STUDY LIMITATIONS

Due to the nature of this study, we could not assess whether the patients had pain prior to their herniorrhaphy. That would have helped to cement the diagnosis of inguinodynia. Additionally, we could not assess the use of long-term postoperative analgesic use.

The mean follow-up time for this study was 33.7 months. In our setting long-term follow-up is challenging, given the high rate of emigration, challenging geography and institutional data management limitations.

## CONCLUSIONS

In this low-volume, resource-poor setting, the inguinal hernia recurrence rates (1%) are acceptable. There is, however, room for improvement in the incidence of inguinodynia (21.8%) and surgical site infections (7.9%) in this setting.

To the best of our knowledge, this is the first audit of inguinal hernia repairs from Guyana. This should act as a stimulus to develop surveillance and audit systems in this nation to ultimately improve clinical standards.

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### Access Platforms for Single Incision Laparoscopic Surgery with Straight Instruments

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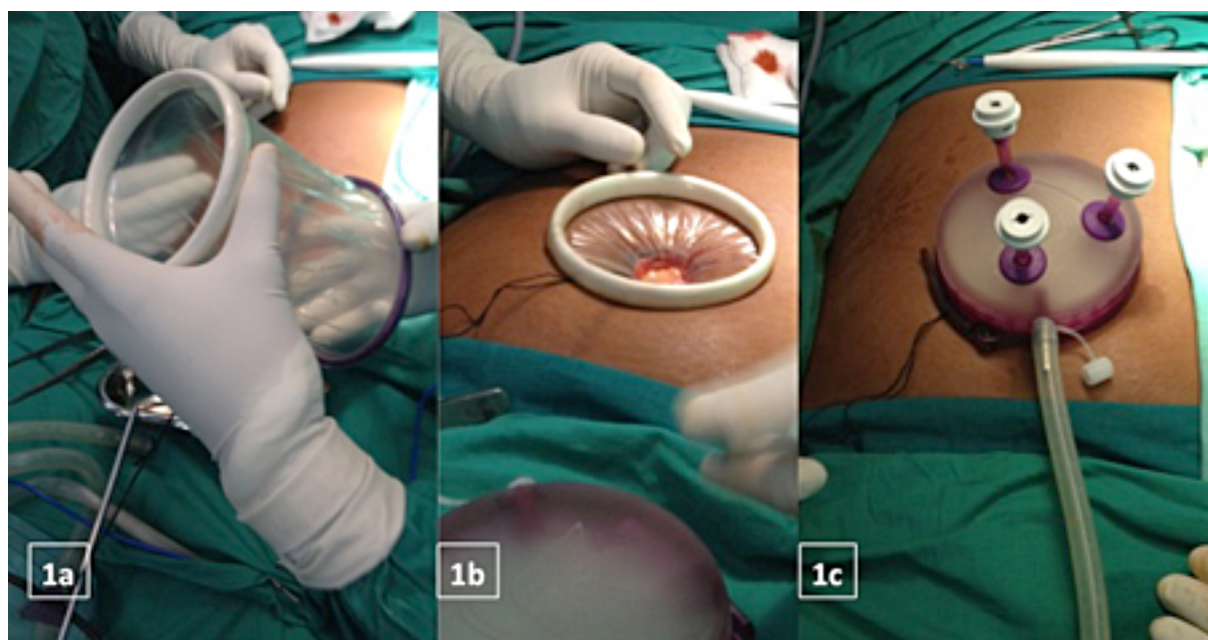
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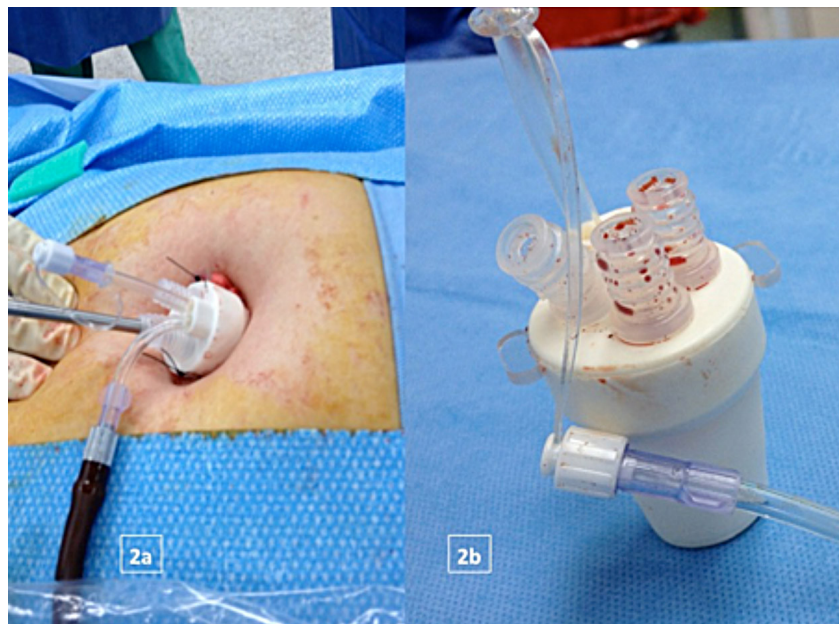
Dear Sir,

We would like to share our experience performing single incision laparoscopic surgery (SILS) in low resource environments in the Caribbean, where specialized access ports and/or curved instruments were not available for SILS. Our first SILS operation was an elective cholecystectomy performed on March 6, 2009<sup>1</sup> using donated Gelpoint Access Platforms® (Applied Medical Inc, Rancho Santa Margarita, CA, USA). We found that this access platform provided good versatility by maintaining a good seal while allowing variable port placement to suit the operative findings (Figure 1).



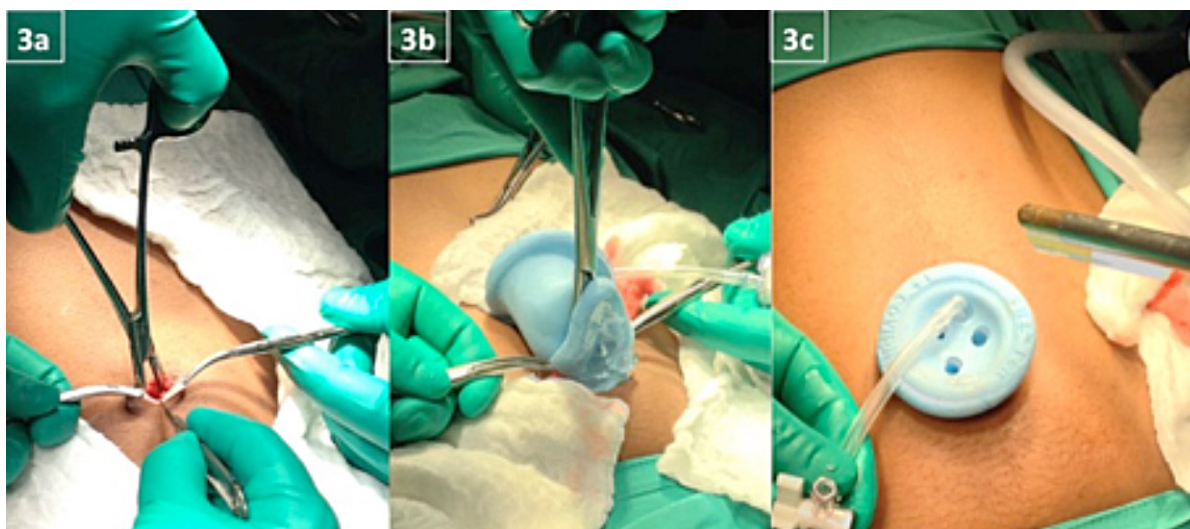
**Figure 1:** Intra-operative photograph demonstrating the technique used to set up the Gelpoint Access Platform®: (a) introduction of wound protector component, (b) placement of wound protector and (c) coupling of access platform.

However, we were not able to renew our stocks of Gelpoint Access Platforms (Applied Medical Inc, Rancho Santa Margarita, CA, USA) after donated supplies were depleted. Therefore, we began to experiment with different types of accesses <sup>2</sup>. Initially we imported low-cost generic access platforms purchased online (Figure 2), but found these to be delicate. They often needed to be changed, requiring the use of multiple platforms for a single case. Therefore, we did not find them cost-effective in our hands.



**Figure 2:** Intra-operative photographs demonstrating the Unno port: (a) platform introduced via an umbilical incision, (b) changed platform prior to case completion due to structural changes.

We then utilized the SILS® ports (Covidien Inc, Norwalk, CT, USA) <sup>3</sup> which provided a reasonable compromise between cost and efficacy (Figure 3). But ultimately we found the cost to import these platforms prohibitive in this resource-poor setting. Due to cost constraints, we eventually adopted a technique using three trans-fascial ports placed in an umbilical incision <sup>4</sup>.



**Figure 3:** Intra-operative photographs demonstrating the insertion of the SILS port: (a) incision at the umbilicus, (b) hemostats used to guide the port into the incision and (c) the peritoneal rim has been fully inserted and the SILS port sits flush on the anterior abdominal wall.



Oruc and Ugurlu<sup>5</sup> published an article detailing a comparable technique for SILS cholecystectomy. They described raising skin flaps in a 3cm skin incision placed 4cm supero-lateral to the umbilicus<sup>5</sup>. Three 5mm Versaport® ports (Covidien Inc., Norwalk, CT, USA) were placed within the skin incisions. They gave two reasons for placing the incision at this point: (1) to prevent instrument clashing and (2) bring the instruments in-line with the gallbladder's projection.

Our technique was similar to that described by Oruc and Ugurlu<sup>5</sup>, with two exceptions. Oruc and Ugurlu<sup>5</sup> placed their incision 4cm supero-lateral to the umbilicus to bring the instruments in line with the gallbladder's projection. In our technique, we placed the incision in the umbilicus. We believe this provided easier entry to the abdomen, considering that patients who require cholecystectomy in the Caribbean have a mean body mass index of 30.9+/-2.8 (mean +/-SD)<sup>6</sup>. In addition, the aesthetic outcome is unquestionably better when the incision is placed within the umbilicus.

The technique detailed by Oruc and Ugurlu<sup>5</sup> was still fraught with restricted instrument movement due to clashes between the port platforms. Even when we moved our incision to the umbilicus, we were still troubled by instrument clashes. We noticed that the clashes occurred at the platform of the ports. The natural progression was to omit the ports and pass the instruments directly across the fascia (Figure 4). This was the second difference between our technique and the technique described by Oruc and Ugurlu<sup>5</sup>.

We used a technique where a 10mm port was placed at the umbilical incision. The most commonly used instrument was passed directly across the fascia without the use of a 5mm port. The second instrument was passed beside the 10mm visual port, all of which were encircled in a purse string suture (Figure 4). Without the port platforms, there were fewer instrument collisions making the technique easier.



**Figure 4:** Intra-operative photograph demonstrating the new technique where a conventional 10mm port is placed into the umbilical incision. The working instruments are passed directly across the fascia, omitting ports altogether and overcoming port clashing.



## CONCLUSION

In conclusion, the Caribbean laparoscopic revolution is still in progress <sup>6</sup>. Due to the unique working environment, Caribbean surgeons have to be innovative to continue practicing minimally invasive surgery. This is one example of a new hybrid technique that is well suited for surgical practice in the Caribbean.

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## ORIGINAL RESEARCH CONTRIBUTION

### A Prospective Study of Surgical Site infection after Inguinal Hernia Repair

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## ABSTRACT

**Background:** Surgical Site Infection rates for clean surgeries can serve as a good predictor of surgical performance. The incidence of these infections must be monitored and controlled because they may lead to significant financial burden, increased duration of hospital stay, increased readmission rates, antibiotic use and potential surgical re-intervention.

**Methods:** This study adopted a prospective cohort design to determine the incidence of surgical site infections after elective inguinal hernia repair at the Georgetown Public Hospital Corporation. Data was collected between May 1, 2016 and Aug 28, 2016. Patients were examined in the outpatient clinic on the seventh post-operative day and interviewed by telephone on post-operative days 14, 21 and 30. At each of these occasions, the Southampton scoring system was used to determine if the subjects had developed a surgical site infection.

**Results:** There were 3 (8%) surgical site infections recorded in this population after elective inguinal hernia repairs. We could find no statistical relationship between the existence of pre-morbid chronic diseases and surgical site infections.

**Conclusions:** The 8% incidence of surgical site infections in these elective operations is higher than expected. However, we were not able to determine factors that could predict infections. This study should be undertaken on a larger scale to be adequately powered to determine modifiable risk factors for surgical site infections. Future research on this topic should aim to assess both pre, intra and post-operative factors that may affect the development of surgical site infections.

## INTRODUCTION

Infections that occur in a wound created during an invasive surgical procedure are generally referred to as surgical site infections. These infections occur within 30 days of the procedure or within one year if an implant is left in place. SSIs are one of the most important causes of healthcare-associated infections and pose a significant economic burden on the health care system<sup>1,2</sup>.

SSI related costs accumulate through increased length of hospitalization, ambulatory nursing visits for wound care, pharmacy costs for antibiotics, increased outpatient and emergency room visits, diagnostic laboratory studies, reoperation rates, and physician expenses<sup>3</sup>. There are also indirect costs, due to loss of productivity, patient dissatisfaction, litigation and reduced quality of life.

We carried out this prospective cohort study to determine the incidence of SSI after elective inguinal hernioplasty at a tertiary referral hospital in Guyana.

## METHODS

Approval to carry out this study was attained from the institutional review board. All patients who had undergone elective inguinal hernioplasty at the Georgetown Public Hospital Corporation from May 1, 2016 and August 28, 2016 were potential participants for this study.

The Operating Theatre register was reviewed to identify all the patients who had elective inguinal hernioplasty during the study period. The patients' hospital records were retrieved and the following information was recorded: patient demographics, contact details and details of the operation performed. The patients were then contacted to seek consent to participate in the study.

We applied the following exclusion criteria: patients who had emergency inguinal hernioplasties, patients who had repair of a complicated inguinal hernia (eg strangulated herniae), those who were taking immunosuppressive drugs (eg steroids or chemotherapeutic agents) and those with co-existent premorbid conditions that may impact infection rates.

Once the patients consented to participate in the study, they were examined at their surgical outpatient clinic visit. The operative site was examined and the surgical wound was scored using the Southampton Scoring Criteria.

Using the Southampton Scoring System, we defined an infected wound as one with a score greater than or equal to 4. This included wounds with pus at one point only <2cm (score 4a), wounds with pus along the wound for more than 2cm and deep or severe wound infections with or without tissue breakdown and/or a haematoma requiring aspiration (score 5).

Each patient was then contacted by telephone at day 14, 21 and 30 post-operation for a follow-up telephone interview. A standardized questionnaire was used for data collection.

The data collected, codified and entered into a SPSS database for analysis. On an average, a total of 4-5 inguinal hernia repairs are done each week at the GPHC. Therefore, using this estimate in the statistical calculator, EpiTools, a sample size of 40 participants was calculated, using a confidence interval of 0.95 and an assumed level of significance of  $\leq 0.05$ .

## RESULTS

Elective inguinal hernia repairs performed in 47 males at a mean age of 47 years. Nine patients were excluded because they either refused consent, could not be contacted or did not return for follow up. The remaining 38 patients were analyzed for this study.

The majority of patients were healthy, with 32 (84%) having no chronic medical illnesses, 31 (82%) being non-smokers and all having an ASA score <2. Six (16%) patients had a co-existent chronic medical illness (diabetes mellitus, hypertension and/or renal failure).

Using the Southampton Scoring System, 37/38 (97%) of patients had scores <4 at post-operative day 7; 35 (92%) had scores <4 at post-operative day 14; 35 (92%) at day 21.

There were 3 (8%) patients who developed surgical site infections during follow-up, corresponding to Southampton Scores of 4 or 5. Of these, 2 had pre-morbid chronic diseases (hypertension and diabetes) for which they were receiving treatment and well controlled. There was no significant relationship between chronic disease and surgical site infections.

Two of these patients had superficial surgical site infections. They were treated with antibiotics on an outpatient basis. One patient had a deep infection that required incision and drainage and antibiotic therapy without mesh explantation.

## DISCUSSION

The wound classification developed by the National Academy of Sciences distinguishes four risk levels that range from clean wounds involving a sterile body site to dirty wounds involving a heavily contaminated site.<sup>4</sup> The acceptable infection rates for clean, clean-contaminated and contaminated surgeries are <1%, 3% and 5% respectively.<sup>4</sup> Infection rates that supersede these established values should be investigated and controlled<sup>3,4,5,6</sup>.

The incidence of SSIs after clean operations can be used as an indicator of surgical performance. Therefore, SSI surveillance and feedback of appropriate data to surgeons is an important strategy in reducing SSI incidence<sup>7,8</sup>. Currently, there is no available data at the GPHC. Therefore this study is important to evaluate existing performance and to compare to international standards.

We chose to evaluate SSI incidence after inguinal hernia repairs because this was the commonest clean operation performed electively in the GPHC. Two types of hernia repairs were included: Inguinal herniorrhaphy uses sutures to repair the posterior wall and inguinal hernioplasty that uses synthetic mesh to achieve a tension free repair. Although the SSI risk is higher with the use of prosthetic mesh, Bratzler et al<sup>7</sup> recommended that pre-operative intravenous antibiotics should be used to reduce SSIs in both procedures.

A large volume of research has evaluated the role of antibiotic prophylaxis in inguinal hernia repair. Yin et al<sup>9</sup> published a meta-analysis of<sup>9</sup> controlled randomized trials comparing open inguinal hernioplasty with or without antibiotic prophylaxis. There were significantly lower SSIs in the patients who received antibiotic prophylaxis (2.4% vs 4.2%; Odds ratio 0.61; 95% CI 0.4-0.9). Similar results were seen in the updated 2012 Cochrane systematic review that evaluated a total of 7843 patients in 17 randomized controlled trials comparing antibiotic prophylaxis for elective open inguinal hernia repair<sup>10</sup>. There were reduced SSIs when antibiotic prophylaxis was used in mesh hernioplasty (2.4% vs 4.2%) and in herniorrhaphy (3.5% vs 4.9%).

The incidence of SSI in this population was greater than the accepted rates in international literature that range from <1% to 2.8%<sup>5,10</sup>. Falgas et al<sup>11</sup> reported mesh infection rates as high as 8% - comparable to that in our series. But, these were all deep infections while 66% of our cases were superficial SSIs.

There are many recognized risk factors to develop SSIs<sup>10,11,12,13</sup>: malnutrition, metabolic disease (diabetes), immunosuppression (cancer, AIDS, steroids, chemotherapy), foreign body material, poor surgical technique, advanced age and smoking. We could not find a statistically significant relationship with any of the risk factors we evaluated: patient age, ASA score, smoking, co-morbid chronic diseases, use of mesh or antibiotic prophylaxis. But our sample size was small and may not have been sufficiently powered to detect subtle differences.

We acknowledge that this study has several limitations. The sample size has already been mentioned, but the short study duration is another limitation to recognize. There are also other risk factors that could have been evaluated, including sterility of the operating room, skin preparation, operative techniques and post-operative wound care.

## CONCLUSION

The 8% incidence of surgical site infections after elective inguinal hernia repair in this facility exceeds the internationally accepted incidence. We could find no significant contributor to this high incidence of SSI. However, we recognize that there were many limitations to this study, including a small sample size and short research period. Therefore future research is required to properly elucidate evaluate the contributory factors such as operating room sterility, operative techniques, antibiotic usage and post-operative wound care.

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## Hazards of Mammography - Time to Re-Think?

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### ABSTRACT

**Background:** The practice of mammographic screening for breast cancer has become entrenched in many countries. But, there is a growing body of literature provoking questions about its continued validity.

**Methods:** We describe two cases where diagnostic errors due to mammography resulted in delayed treatment.

**Conclusion:** We believe that clinicians should reconsider their current practice of mammographic screening for breast cancer, recognizing its diagnostic limitations. The potential of harm from false positive findings and a lack of reduction in mortality should stimulate us to re-think our approach to breast cancer screening.

### BACKGROUND

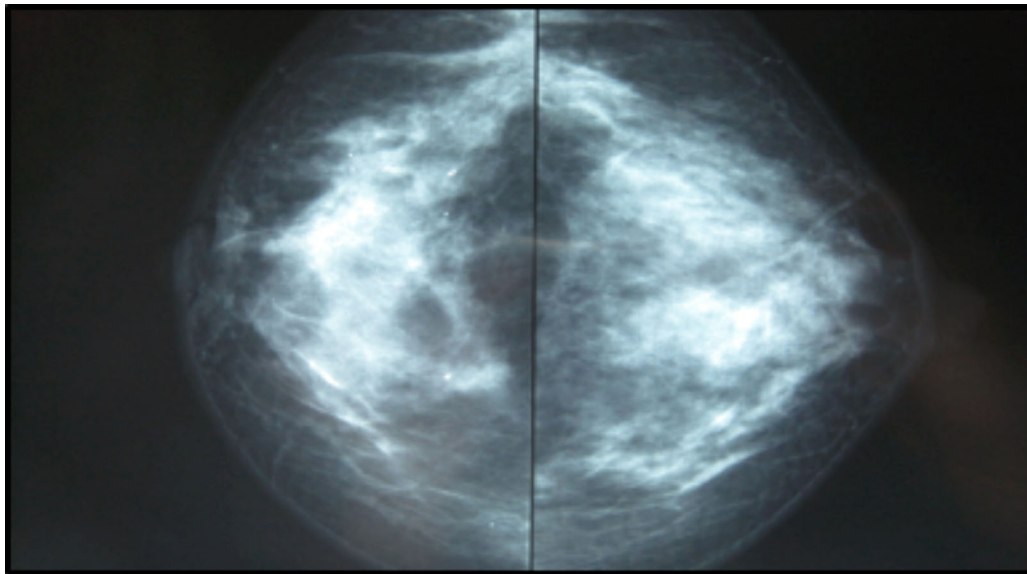
Breast cancer is the commonest malignancy in women the world over. The practice of mammographic screening, first introduced some 50 to 60 years ago for the detection of breast cancer, has become entrenched in many countries. With the passage of time, however, there have been demographic changes as well as therapeutic advances which have altered the course, progression and pattern of disease. Thus, a growing body of literature has provoked questions as to the continued validity of mammographic screening.

We have had several cases where diagnostic errors due to mammography resulted in delayed treatment. We describe 2 such cases encountered recently.

#### CASE 1:

A 46 year-old otherwise healthy female noticed a right breast lump three years prior to presentation. Her mammogram and ultrasound were reported as normal. Her family practitioner reassured her that her tests were normal. The lump persisted and she had repeat mammogram one year later. This was reported to be normal (Figure 1). She noticed nipple inversion two years after the first mammogram (Figure 2). A repeat ultrasound was again reported as normal. Three years after first presentation she the first reported abnormal ultrasound (Figure 3).

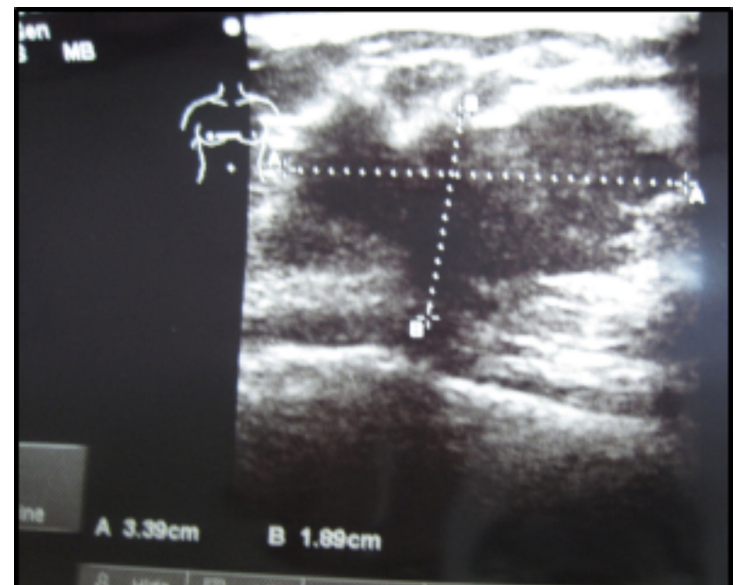
On examination, there was a 6cm, hard irregular mass in the right upper outer quadrant with tethering to skin and pectoralis major, nipple inversion and axillary lymphadenopathy. A core biopsy confirmed the presence of invasive ductal carcinoma.



**Figure 1:** Mammographic films one year after clinical presentation



**Figure 2:** Nipple inversion appeared two years after the initial clinical presentation.



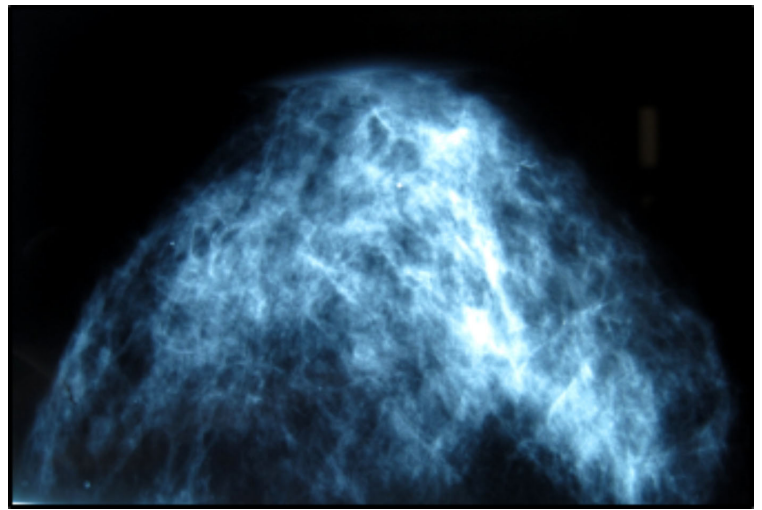
**Figure 3:** Sonographic abnormality appears three years after first clinical presentation

## CASE 2:

A 55 year old female presented with a lump in the right breast for two weeks. She had a left mastectomy five years prior to this presentation and had normal annual mammograms since her mastectomy, the last being 10 months prior to presentation. On examination, she had a 5cm subareolar mass in the right breast with cutaneous oedema, erythema, peau d'orange and axillary lymphadenopathy (Figure 4). She had a circumareolar scar from removal of a fibroadenoma at age 15. A mammogram on this presentation was reported to be normal (Figure 5). Core biopsy demonstrated the presence of invasive ductal carcinoma.



**Figure 4:** Obvious skin changes are visible, with cutaneous oedema, erythema, peau d'orange. There is also a circum-areolar excision biopsy scar present.



**Figure 5:** A mammogram done on the same patient reported above. This was signed out as a normal mammogram.

## Discussion

Our cases highlight that there appears to be an over-reliance on mammography in the investigation of breast lumps, in addition to the current increasing skepticism over its validity as a screening tool. A negative screening mammogram may lead to complacency among patients and physicians<sup>1</sup>.

Although mammography has been one of the most thoroughly researched and implemented screening tools for breast cancer, it is remarkable that after over 50 years of use, its value is still being questioned<sup>2</sup>. The most compelling argument against its continued use is that the paucity of data to consistently demonstrate that mammography screening programs have positively improved outcomes in patients with breast cancer. Even in large studies such as the Canadian National Breast Cancer screening program, assessing almost 90,000 patients over 13 years, mammographic screening failed to show any benefit<sup>4</sup>. In France and Switzerland where mammographic screening has long been practised, recent expert committees have ruled, unequivocally, against routine screening by mammography<sup>1,3</sup>. One of the major issues arising from these reviews has been the potential harm over benefit from over-investigation of false positive findings as well as a lack of reduction in mortality. Having undertaken similar reviews themselves, Switzerland in 2013 and France in 2017 have moved towards selective screening of high-risk populations only, and away from universal screening<sup>1,3</sup>.

Taking into consideration the many other limitations relevant to the developing world, the challenges of universal mammography programs are even more significant and even less likely to be cost-effective<sup>5</sup>. Thus, in the third world setting, implementing a universal screening program will require vast technical resources such as equipment and equipment maintenance. In addition, already limited manpower will be further stretched.

In addition to these limitations, it has been reported that the incidence of breast cancer is higher among younger women in the West Indies (peak incidence <55 years) compared with the USA, where incidence rises with age up to 75 years<sup>6</sup>. Most routine screening programs target women over the age of 50, thus potentially missing patients who develop breast cancer at a younger age. Furthermore, the younger breast is more radio-dense and less amenable to mammographic evaluation. Thus, if the intention is to lower the screening age, mammography would be of limited value as the enhanced breast densities make the interpretation even more unreliable.

Lastly, there is a clear mismatch between the widely-accepted practice of universal mammographic screening for breast cancer and its impact on outcome. Robles et al<sup>7</sup> indicated that most breast cancer screening policies are not justified by available scientific evidence. Moreover, as seen, by relatively high mortality: incidence ratios, breast cancer cases are not being adequately managed in many Latin American Countries<sup>7</sup>. Before further developing screening programs, it is critical to evaluate the feasibility of designing and implementing appropriate treatment guidelines and providing wide access to diagnostic and treatment services to effectively improve the outcome of patients<sup>7</sup>.

## CONCLUSION

In conclusion, the time has come that clinicians reconsider their current practice of mammographic screening for breast cancer. Moreover, we must recognize its diagnostic limitation. Factors such as a changing demographic and earlier age of incidence of breast cancer result in cases being missed by existing screening practice. The heavy reliance on mammography, the potential of harm over benefit from over-investigation of false positive findings as well as no reduction in mortality all favour the move to rethinking our approach to breast cancer screening.

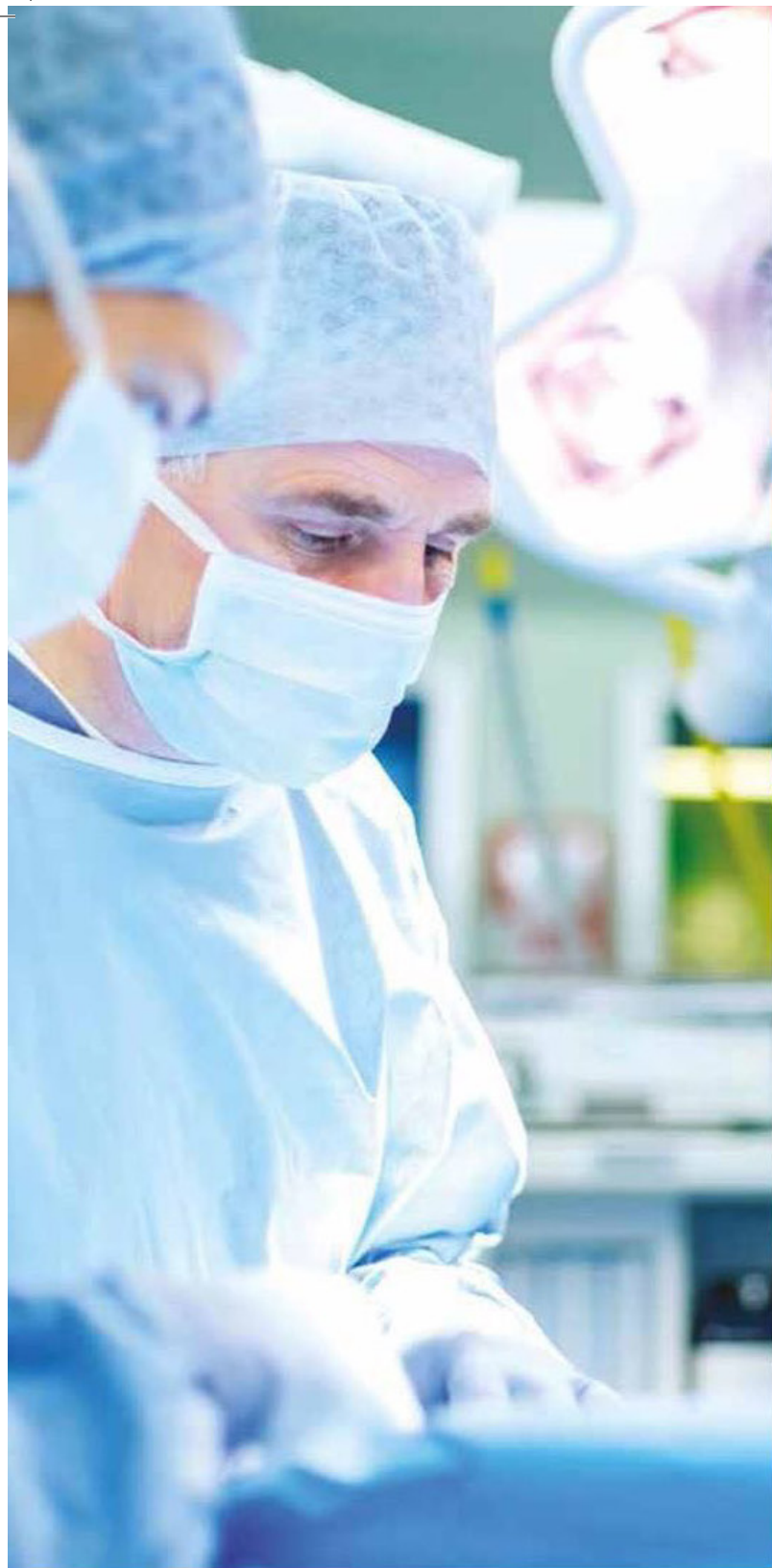
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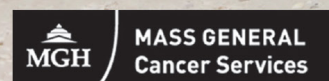


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