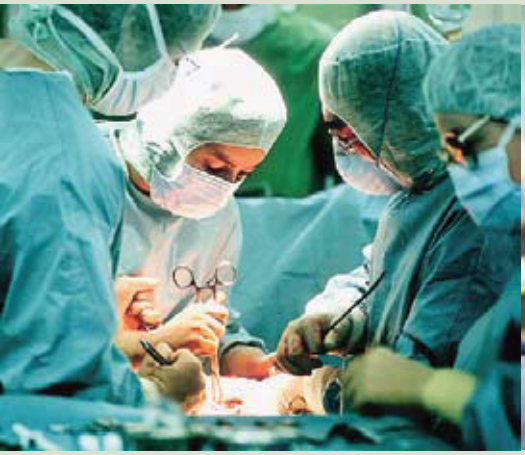
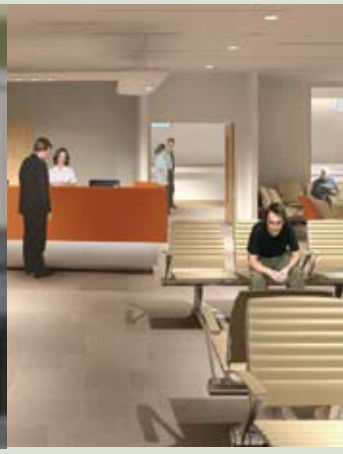
AMBULATORY SURGERY

International Journal covering Surgery, Anaesthesiology, Nursing and Management Issues in Day Surgery



The Official Clinical Journal of the
INTERNATIONAL ASSOCIATION
FOR AMBULATORY SURGERY

VOLUME 18.1 JULY 2012

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Editorial

Doug McWhinnie, Surgical Editor-in-Chief

As I write this editorial, the rain in England continues to fall, providing the wettest early summer since official records began in 1910!

With the Olympic Games in London, I'm sure all the competing teams are prepared for the 'English' summer and I wish every athlete the best of fortune in their individual sport. The last time the Games were held in London was in 1948 – the so-called 'austerity games', rationing was still a way of daily life only three years after the end of WW2.

A feature of this edition of the Journal is a proverbial hernia feast, featuring three papers on inguinal hernia repair. Interestingly, in 1948, the average length of stay for inguinal hernia repair was two weeks in bed with a rather high rate of venous thrombo-embolism! Two of the papers feature interesting studies on self-adhering inguinal hernia mesh, providing a shorter operating time than conventional Lichtenstein repair while maintaining low levels of complications. the third paper attempts to estimate the cost of different techniques for hernia repair, whether open or laparoscopic and demonstrates that all techniques are cost effective – provided they are performed on a day case basis.

But this edition is not all about surgery and surgical technique. It gives us pleasure to acknowledge the Indian Day Surgery Association as a full member of the IAAS and to offer us a brief history of that association, founded in only 2003. Indeed India too, has come a long way since 1948 and I would expect the Indian Association to develop into a day surgery powerhouse as their population endorses the quality care offered by ambulatory surgery.

Our fifth paper features a performance measurement study of colonoscopy featuring important outcome measures such as pre and post colonoscopy patient wait and the success of bowel prep in a study featuring large numbers of patients. It is reassuring that quality patient care is now at the top of the day surgery agenda!

Finally, we feature a 'one-off' case report of a patient with gigantism undergoing a total dental extraction as a day case. The report explains the anaesthetic technique used on this 7 foot 9 inch patient (2.36 metres) and the need for a specially adapted operating table. If anyone is in any doubt as to the height of such patients, may I invite you to watch the Olympic Basketball Tournament.

Happy viewing!

Colonoscopy performance measurement study

N. Kuznets

Abstract

Aim: Examine ambulatory colonoscopy performance.

Methods: Participating organizations provided organizational, process, and follow-up patient data via surveys over six months.

Results: 98% of cases had adequate bowel preparation. 95% of organizations included all recommended pre-sterilization/ high level disinfection [HLD] processes. Less than 85% followed all sterilant fluid testing steps. Median pre-procedure time (check-in to "scope in") was 62 minutes. Median post-procedure time ("scope out" to discharge criteria met) was 40 minutes. 3% of cases were complicated/non-routine; 1.8% involved hypotension/hypoxia. 98% of patients would have another colonoscopy.

Discussion: Opportunities include decreasing procedure time variation and complying with sterilant testing guidelines.

Keywords: Colonoscopy, Ambulatory surgery center, Bowel preparation, Colonoscope processing, Procedure time, Complications, Non-routine cases, Hypotension, Hypoxia, Patient outcomes.

Author's address: N. Kuznets, AAAHC Institute for Quality Improvement, Skokie, IL, 60076, USA
Tel: +847 853 6079 *Fax:* +847 853 6118 *E-mail:* nkuznets@aaahc.org

Introduction

Colorectal cancer is the second leading cause of death due to cancer in the United States. [1] Colonoscopy is a sensitive method to detect colorectal neoplasia and prevent deaths from colon cancer. [2, 3] In 2006, of the almost 6.25 million colonoscopy procedures performed in the United States (US) in the ambulatory setting, approximately two thirds (almost 3.7 million) were performed in freestanding facilities. [4]

Among the issues studied was adequacy of bowel preparation. Recent reviews indicate that detection of polyps greater than 5 mm polyp size threshold would identify over 95% of subjects with advanced adenomas. [5] Inability to complete colonoscopies or identify polyps greater than 5 mm in size because of poor bowel preparation can lead to procedure cancellation or shorter follow up times. This not only raises the direct costs, but also increases the risk to patients. [6, 7, 8]

Colonoscope processing was also examined in this study. Colonoscope processing has been the subject of clinical practice guidelines from national professional societies and the United States government. [9, 10] Proper colonoscope processing is critical to prevention of healthcare associated infections and has been a persistent patient safety issue. Published estimated direct costs of failed colonoscope processing are based on healthcare-acquired infections (HAIs), with surgical site infection (SSI) and CDI (clostridium difficile) being most appropriate for colonoscopy-associated infections. The US Centers for Disease Control and Prevention reports low estimates of cost of SSIs of $10, 433 per infection in 2005 dollars and high estimates at $25,546 in 2002 dollars. For CDI the low estimate is $5,042 and the high is $7,179, in 2003 dollars. [11] In 2006, Nelson and Muscarella reported that "in the absence of defective equipment, every reported case of nosocomial infection associated with a contaminated GI endoscope has been linked to a specific breech or violation of at least one of several requisite reprocessing steps." [12] In their 2008 review of the literature, Seoane-Vazquez and Rodriguez-Monguio concluded that "although the risk of endoscopy-related infection is very low, continued efforts are needed to ensure that quality is maintained during endoscope reprocessing to reduce the incidence of endoscopy-related infections." [13] In 2009, the US Office of the Inspector General (OIG) of the Department of Veteran Affairs (VA) investigation of failures in endoscope processing at three facilities (2 involving colonoscope processing) uncovered several issues associated with endoscope processing. "Issue 1" was the "absence of colonoscope model-specific reprocessing SOPs (standard operating procedures) and/or competence records." Estimated VA colonoscope reprocessing compliance with competence was approximately 1 of 2 (50.2%) across VHA (Veterans Health Administration) colonoscope reprocessing units and compliance with SOPs was 77.9%; compliance with both was 47.4%. [14]

"Procedure times" were also studied. Procedure times may be indicative of not just efficiency but also safety and patient satisfaction. The pre-procedure or "wait" time can be associated with patient satisfaction. The post-procedure or "discharge time" (the patient meets discharge criteria—not when the patient's ride arrived) may signify over-medication during the procedure.

Data were also collected on intra-procedure complication rates. Certain published complication rates for colonoscopy are not high (for example: bowel perforation occurs in 1 in 1400 for overall colonoscopies and 1 in 1000 for therapeutic colonoscopies), while other rates, such as hypotension and hypoxia, have been acknowledged for a couple of decades and can reach or exceed 15%. [15, 16]

One of the measures of patient outcomes used in the study was patients' willingness to have another colonoscopy, if their physician recommended one. Because of the ability to detect colorectal cancer at early stages and prevent increased morbidity and mortality, it is important that patients are willing to have colonoscopies, as recommended in clinical practice guidelines. Despite some negative public perceptions about the nature of the procedure, recent literature shows high patient satisfaction. [17]

Methods

Participant Recruitment

The AAAHC Institute for Quality Improvement solicited, via mail and electronic mail (email), participation from the Accreditation Association for Ambulatory Health Care (AAAHC) accredited organizations, those who had participated in previous AAAHC

Institute colonoscopy studies, members of the American Gastroenterological Association (AGA), as well as the wider population through the AAAHC Institute website (www.aaahciqi.org). Seventy-six organizations voluntarily registered for the study. Sixty-five organizations (representing more than 255, 104 colonscopies annually) supplied data. Annual colonscopy volume ranged from 80 to 12,600. Almost four fifths (78%) of the participating organizations were single specialty centers; the rest were multi-specialty centers.

Data Collection

Data were collected, via standardized survey instruments, and entered in secure online internet surveys, from January through June 2010. All cases were collected during the same six-month period to avoid issues with "historical" factors such as changing prices and technology. Participating organizations completed a "General Information" survey, describing their organization and its practices, as well as "Procedure Specific" surveys, which included documentation of patient attributes (ASA classification [18] and indication for the procedure), specific procedures' processes of care, and patient outcomes, via a telephone follow-up survey with patients 72 hours post-procedure. Organizations were asked to complete surveys for at least 15 to 25 cases. [19] Cases matching the procedure codes were assigned by a manager, so that the organization submitted a sampling of procedures to form a composite profile of the practice. If organizations had more than one endoscopist, they were encouraged to use data from two or more of their endoscopists. To avoid retrospective chart reviews, and obtain the most complete and accurate data, all documentation of processes of care were completed concurrently (in real time).

Data Review

A total of 1991 completed colonoscopy surveys were entered online and reviewed for accuracy and completeness. Each case was reviewed in detail to ensure that the responses accurately represented a potential profile for the procedure identified. Cases that appeared to include inconsistent data or outliers, or that had a small number of missing values, were checked with participating organizations to maximize completeness and consistency. The 61 complicated or non-routine cases which were submitted were not included in analyses because they might skew results; however, these procedures are described in the Results section below. A total of 1930 submitted surveys were used for aggregate (grouped) analyses. In the benchmark (comparison) procedure time analyses, for which a minimum 15 cases per organizations was required by the AAAHC Institute, 1863 cases from 60 organizations were used. [19]

Patient Attributes

For 99% (1910/1930) of the cases, ASA classifications were assigned; 91% of patients were classified ASA 1 or 2. [18] All cases had indications for the procedure listed – many had multiple indications listed. The most frequently listed indication for the procedure was "preventive screening" (37%). Unexplained GI bleeding (hematochezia, non-upper GI source melena, fecal occult blood) and patient history of neoplastic polyp/treatable cancer were the second and third most frequently listed indications for the procedure.

Results

Results described here are part of a more extensive report. [20]

Adequacy of Bowel Preparation

The primary types of bowel preparation (used in 100 or more cases), were (in order of frequency): PEG (polyethylene glycol) solutions, Miralax, Moviprep, Dulcolax or Bisacodyl, and magnesium citrate. For 98% of cases (all but 26), bowel preparation was considered to be adequate. For the 26 cases with inadequate bowel preparation, 20 had a shorter recommended follow-up period and 6 had no change in follow-up. Four cases, which were cancelled due to poor bowel preparation, were included in the non-routine, complicated cases and not included in other analyses for this report.

Colonoscope Processing Prior to High Level Disinfection / Sterilization

For 61 (95%) of the 64 responding organizations, scope reprocessing includes all of the following clinical practice guideline recommended processes, prior to sterilization or high level disinfection (HLD) (numbers after each process indicate the number of organizations reporting that they employed that particular process): leak testing (63); cleaning with an enzyme cleaner that is compatible with the scope (62); flushing and brushing all channels and ports (62): cleaning all external surfaces and accessories (64); and cleaning residue/debris until no more debris appears on cleaning brushes (64).

Colonoscope Sterilant Testing and Replacement

Testing the liquid sterilant/high-level disinfectant to ensure minimal effective concentration of the active ingredient is also recommended by clinical practice guidelines. 53 (or 54 – please see the last line of this paragraph) of the 64 (83% or 84%) responding organizations indicated that they comply with all of the following recommended steps (numbers after each process indicate the number of organizations reporting that they employed that particular process): test at least every day of use (26) and(6)/or test prior to each cycle/use (32); use the manufacturer's recommended chemical indicator (55); document the results of testing (58); discard the solution if the chemical indicator shows the concentration is less than the manufacturer's minimum effective concentration (58); and discard the solution if it is beyond the manufacturer's recommended shelf or use- life (57). The last recommendation is from the Centers for Disease Control and Prevention (CDC) 2008 guidelines but is not addressed in the latest revisions to multi-society guidelines.

Pre-Procedure Time

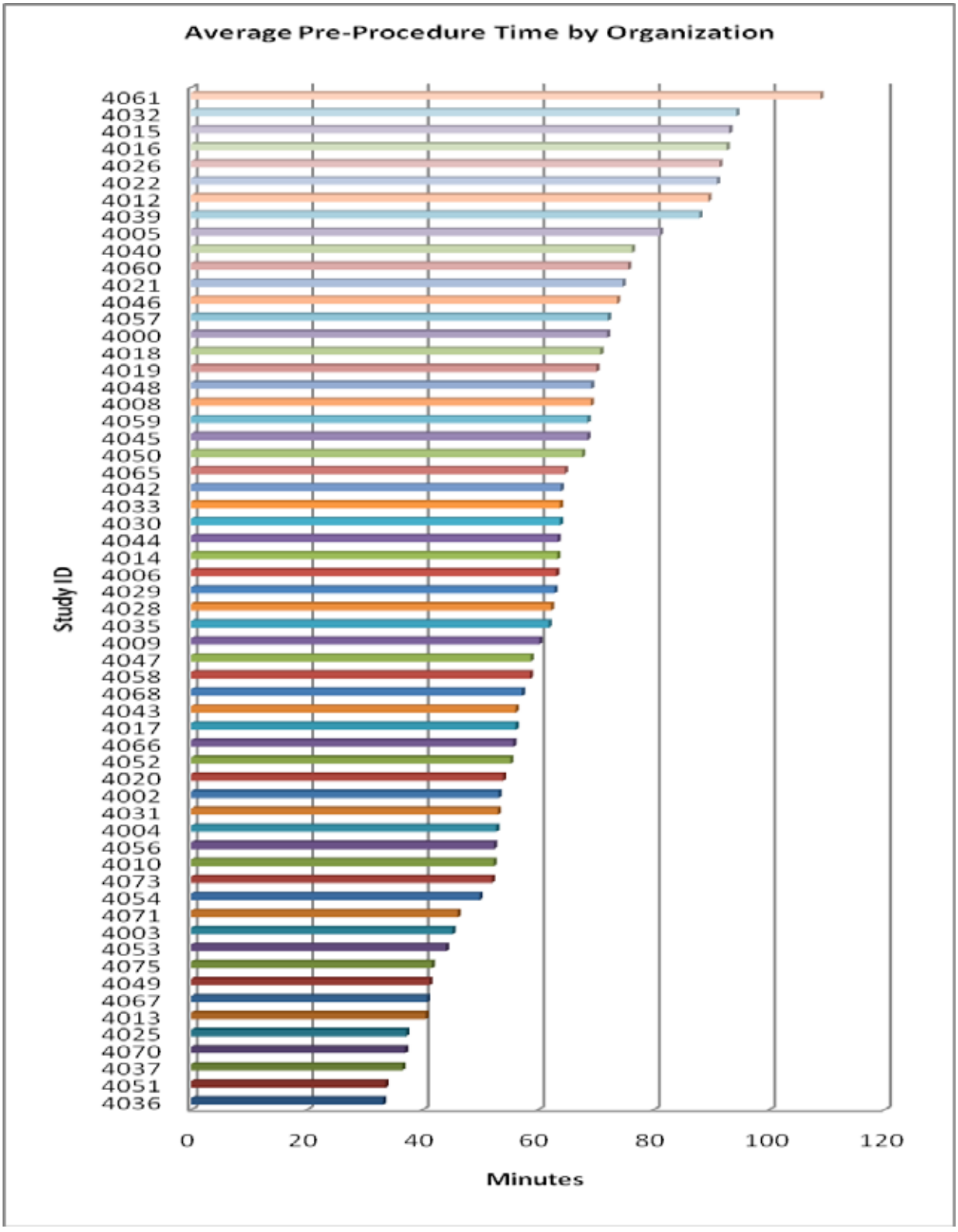
Pre-procedure time was defined as the time from the patient's checking into the facility to the time the procedure began (the scope is inserted). The median pre-procedure time overall was 62 minutes; the range was from 33 to 109 minutes. Please refer to Figure 1.

The time between when the patient has arrived at the procedure room and when the procedure starts is included in the "pre-procedure" time because some organizations may be shifting the wait time from the patient waiting area to the procedure room itself. If the wait in the waiting area is short, but the wait in the procedure room is long, patient satisfaction may suffer and facility times (and associated cost to the organization) will remain higher.

Pre-procedure time may be influenced by how early or late patients arrive. Patients who arrive very early may contribute to a longer average pre-procedure time, and those who arrive very close to the procedure time, or who are "moved up" in the schedule because of a cancellation, may decrease the average pre-procedure time.

At Organization 4036, which has the shortest average pre-procedure time:

- Patients come into the office to be worked up (i.e., medication list is obtained, medical history, etc.) prior to procedure day.
- Staff works together to turn rooms around for the next patient.
- Front desk staff communicates with endoscopy personnel with walkie talkies to let them know as soon as a chart is up and they may have the patient. There is an assigned "traffic director" each day to keep the flow going and make sure patients are brought back as soon as possible.



- Organization 4051 has the second shortest pre-procedure time. In addition to an efficient team, they attribute this to:
- Greeting the patient and their driver as soon as they arrive and check in.
- The nurse bringing the patient back to the admission area. This time is one half hour before the procedure is to begin.
- A "calming team" getting the patient changed, documents signed, intravenous lines started, procedure explained, etc.
- Two or more staff members helping to get the procedure room ready to expedite staying on time as scheduled.

At Organization 4037, which has the third shortest average pre-procedure time:

Nurses give patients courtesy calls prior to their procedures to remind them of their arrival time, review their history, and allow patients to express any concerns.

- The center instructs patient to arrive 30 minutes prior to their appointment to allow for intake and any patient delays.

- They have a computerized charting system that follows the patient from their primary physician visit to discharge from procedure. The system allows nurses and doctors to easily access patient information, make appropriate changes, and document the procedure.
- Patients' consents and concerns are reviewed and signed at the pre-procedure visit. The nurse only needs to address new concerns and questions prior to procedure.
- Their physicians are scheduled in blocks of time to allow minimal delays between physician schedules.
- If the pre-post-procedure nurse is available, she transports the patient to and from the pre-post-procedure area. Their technician assists the nurse with room turnover.

Discharge Time

Discharge time is defined as the time the procedure finishes (the scope is out) to the time the patient meets discharge criteria. The overall median discharge time was 40 minutes, with a range of 20 to 81 minutes. Please refer to Figure 2. Please note that the definition of discharge time used for this study is from the time the procedure finishes to the time the patient is ready for discharge – not to the time the patient's ride has arrived.

In addition to contributing to overall facility time (and the associated cost to the organization), longer discharge times may be indicative of inappropriate choices or levels of anesthesia for the patient, discharge criteria that are too strict, or staff not checking patients against discharge criteria frequently enough. Discharge times may also be longer if discharge instructions are being reviewed with patients/family for the first time or have not been provided in written form.

With the shortest average discharge time, at Organization 4039:

- The medicating nurse administers an initial intravenous sedation dose and titrates accordingly for patient comfort and moderate sedation until the cecum is visualized. Once the cecum is reached, no further sedation medication is routinely administered, unless ordered otherwise by physician.
- Immediately following procedure, the patient is taken to the recovery area by the medicating nurse and post-operative nurse.
- The post-procedure nurse then continuously uses verbal stimuli to wake the patient from sedation.
- The family is brought to the bedside to assist.
- The post-procedure nurse and post-procedure patient ratio is a one to one; this allows continuous bedside assistance (i.e. water, vitals, etc.).
- If no spontaneous flatus is present within an average of the first 10 minutes or so and/or the patient has discomfort or cramping, the post-operative nurse may place a rectal tube to assist with the removal of air.

Organization 4071 attributes its relatively low average discharge times to having an anesthesiologist onsite who delivers sedation. The majority of patients receive Propofol, for a quick onset and a very short half life. This helps the gastroenterologist facilitate the procedure due to additional relaxation of the colon and the patient recovers faster, with less nausea and vomiting, allowing the organization to discharge the patient earlier.

With the third lowest discharge time, Organization 4066, believes this is due to teamwork and:

- Physicians speaking after every procedure to family and ordering discharge in a timely manner.
- Excellent sedation management and delivery skills of the nurse.
- Having discharge nurses experienced in recognizing the signs and symptoms of sedation medications.
-

Intra-Procedure Complications / Non-Routine Procedures

Four cases which were cancelled due to poor bowel prep were included in the non-routine, complicated cases and not included in other analyses for this report. 57 other cases were listed as complicated or non-routine. The three most frequent descriptions were:

- Hypotension (21 – 2 with hypoxia)
- Hypoxia (12)
- Extended recovery (11 – 1 with hypoxia, 3 with nausea, and 3 with retained gas)

Please note that oxygen was used in 83% of cases submitted (1603/1930). Most frequently mentioned reasons for oxygen use were:

- Routine or standard protocol (as a prophylactic, routinely, for all patients, with anesthesia or sedation, as policy, etc…) (1098).
- Maintenance of appropriate blood oxygen saturation/blood oxygen de-saturation was experienced (246).

Additionally, participating organizations were monitoring most patients for hypotension and hypoxia:

In nearly 100% (1,918) of cases, participants indicated that blood pressure was monitored.

- A pulse oximeter was used in 99% (1,903) of cases.

Another Colonoscopy

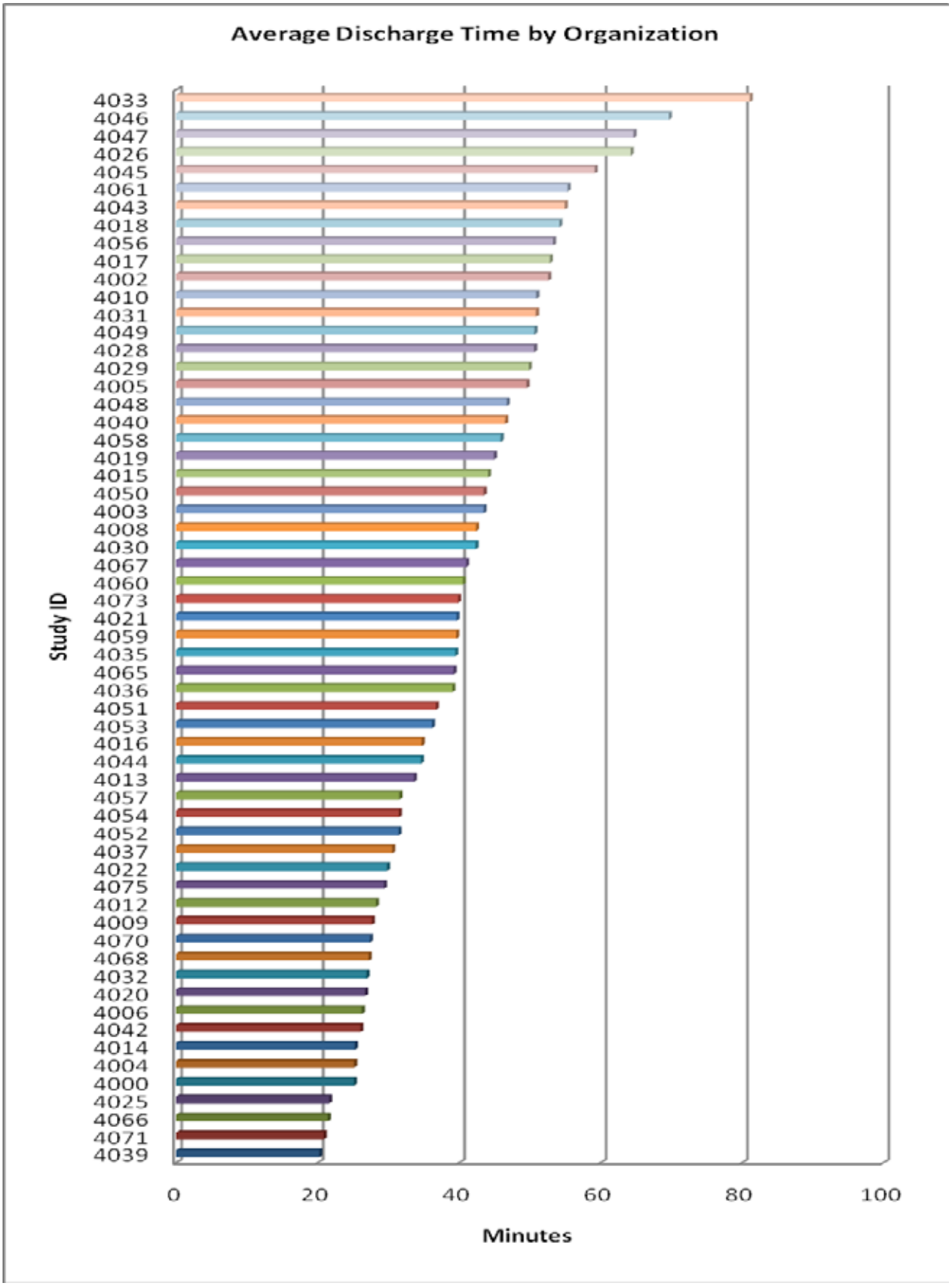
Within 72 hours of their colonoscopies, approximately 74% (1,419) of patients were contacted to obtain information about the outcomes of their procedures. In addition to several other questions, patients were asked: "If recommended by your physician, would you have another colonoscopy in the future?" "If 'no,' why?"

All but 5 patients answered this question. Of those who answered, 98% (all but 34) said they would do so. For those who would not have another colonoscopy, their reasons were:

- Bowel preparation (14)
- Past recommended age for colonoscopy (13)
- No reason (2)
- "Once was enough" and "don't want to do again" (2)
- Pain (2)
- "No need" (1)

Discussion

Adequacy of bowel preparation (98%) and compliance with recommended processes used to prepare colonoscopes for high level disinfection or sterilization (95%) is high. Also, patients' willingness to have the procedure again, if recommended by their physicians is very high (98%).



Monitoring blood pressure and blood oxygen saturation is almost uniform (nearly 100% and 99% respectively). Most of the "complicated" cases were those where patients experienced hypotension and/or hypoxia. Oxygen appears to be used in the majority of cases (83%); it is possible that a higher level of "routine" oxygen administration might lower the number of cases with hypoxia. [21, 22]

Areas with clear opportunities for improvement are sterilant testing/replacement and procedure times. Less than 85% compliance rates for sterilant or high level disinfectant fluid testing and replacement indicates the opportunity for additional education and improved performance. In addition, as Figures 1 and 2 show, there is great variation in average pre-procedure and discharge time by organization. Those organizations with the shortest times offer many

suggestions for decreasing these times, including common themes. Themes include preparing before the patient arrives and enough staffing to keep the patient moving through to the procedure room, as well as to use of sedation that allows the patient to be recovering when going into the PACU and attentive PACU staff.

Acknowledgements

The AAAHC Institute Board of Directors would like to acknowledge the following participants in the AAAHC Institute Colonoscopy Work Group for their generosity in giving their valuable time and assistance in conducting this study: Deborah Jinks, RN, CPHQ; Edward Bentley, MD; Dianna Burns, CGRN; Frank J. Chapman, MBA; Lawrence M. Kim, MD; Deborah P. Robin, MSN, RN, CHCQM; Sam JW Romeo, MD, MBA; Michael A. Safdi, MD; and, Scott Tenner, MD, MPH.

References

1. US Preventive Services Task Force. Screening for colorectal cancer: recommendation statement. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2008. AHRQ publication no. 08-05124-EF-3. Available at http://www.ahrq.gov/clinic/uspstf08/colocancer/colors.htm .
2. Pickhardt PJ, Hassan C, Halligan S, Marmo R. Colorectal Cancer: CT Colonography and Colonoscopy for Detection--Systematic Review and Meta-Analysis. ***Radiology*** 2011 (e-published ahead of printing).
3. Zauber AG. Cost effectiveness of colonoscopy. ***Gastrointest Endosc Clin N Am***; 2010; **20**:751–770.
4. Centers for Disease Control and Prevention. National Survey of Ambulatory Surgery. 2006. Calculated from sums of weighted values of cases from Procedure Code 1 = 45.22, 45.23, 45.24, 45.25, 45.28, 45.42, or 45.43 for freestanding facilities versus freestanding and hospital-based facilities: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/NSAS/.
5. Hassan C, et al. Systematic review: distribution of advanced neoplasia according to polyp size at screening colonoscopy. ***Aliment Pharmacol Ther*** 2010; **31**:210–217.
6. Rex DK, Imperiale TF, Latinovich DR, Bratcher LL. Impact of bowel preparation on efficiency and cost of colonoscopy. ***Am J Gastroenterol*** 2002; **97**:1696–1700.
7. Harewood GC, Sharma VK, de Garmo P. Impact of colonoscopy preparation quality on detection of suspected colonic neoplasia. ***Gastrointest Endosc*** 2003; **58**:76–79.
8. Froelich F, Wietlisbach V, Gonvers JJ, et al. Impact of colonic cleansing on quality and diagnostic yield of colonoscopy: the European Panel of Appropriateness of Gastrointestinal Endoscopy European Multicenter Study. ***Gastrointest Endosc*** 2005;**61**:378–384.
9. American Society for Gastrointestinal Endoscopy. Multi-society guidelines for reprocessing flexible gastrointestinal endoscopes. ***Gastrointest Endosc*** 2003; **58**:1–8.
10. Rutala WA, Weber DJ. Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. Atlanta, GA: Centers for Disease Control and Prevention. 2008. Please visit the National Guideline Clearinghouse® (www.guidelines.gov) for additional guidelines on this subject.
11. Scott RD. The Direct Medical Costs of Healthcare-Associated in U.S. Hospitals and the Benefits of Prevention. Atlanta, GA: Centers for Disease Control and Prevention 2009. http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf
12. Nelson DB, Muscarella LF. Current issues in endoscope reprocessing and infection control during gastrointestinal endoscopy. ***World J Gastroenterol*** 2006; **12**:3953–3964.
13. Seoane-Vazquez E, Rodriguez-Monguio R. Endoscope-related infection: relic of the past? ***Curr Opin Infect Dis*** 2008;**21**:362–3666.
14. Department of Veteran Affairs, Office of the Inspector General. Health Care Inspection: Use and Reprocessing of Flexible Fiberoptic Endoscopes at VA Medical Facilities. Washington, DC. June 16, 2009. Report Number 09-01784-146.
15. Panteris V, Haringsma J, Kuipers EJ. Colonoscopy perforation rate, mechanisms and outcome: from diagnostic to therapeutic colonoscopy. ***Endoscopy*** 2009; **41**:941–951.
16. Lancaster JF, Gotley D, Bartolo DC, Leaper DJ. Hypoxia and hypotension during endoscopy and colonoscopy. ***Aust N Z J Surg*** 1990; **60**:271–273.
17. Chartier L, Arthurs E, Sewitch MJ. Patient satisfaction with colonoscopy: a literature review and pilot study. ***Can J Gastroenterol*** 2009; **23**:203–209.
18. For American Society of Anesthesiologists (ASA) ASA 1: patients are healthy; ASA 2: patients have mild disease such as arthritis, asthma, diabetes, and hypertension; ASA 3: patients have more severe disease such as angina, coronary artery disease, insulin dependent diabetes, moderate COPD; ASA 4: patients have severe systemic disease that is a constant threat to life.
19. However, analyses indicate that 25 to 35 cases for the same procedure/diagnosis should provide a statistically accurate picture of a physician's practice regarding that procedure/diagnosis. This assumes organizations' patients are statistically independent, which is unlikely (Landon BE, Normand ST, Blumenthal D, Daley J. Physician Clinical Performance Assessment: Prospects and Barriers. ***JAMA*** 2003; **290**:1183–1189), so even larger samples would be necessary for statistical accuracy. Instead, organizations participating in AAAHC Institute studies are asked to review their performance from year to year to develop a composite of their performance.
20. AAAHC Institute for Quality Improvement. Colonoscopy January-June 2010. Skokie, IL: AAAHC Institute for Quality Improvement. 2010.
21. Rozario L, Sloper D, Sheridan MJ. Supplemental oxygen during moderate sedation and the occurrence of clinically significant desaturation during endoscopic procedures. ***Gastroenterol Nurs*** 2008;**31**:281–285.
22. Jaffe PE, Fennerty MB, Sampliner RE, Hixson LJ. Preventing hypoxemia during colonoscopy. A randomized controlled trial of supplemental oxygen. ***J Clin Gastroenterol*** 1992;**14**:114–116.

The financial considerations of inguinal hernia surgery: does the surgical approach matter?

S Kreckler, D McWhinnie*, H Khaira**, I Jackson****

Abstract

Introduction Clinical differences between open and laparoscopic inguinal hernia repair and between Local and General anaesthetic are minimal in the majority of cases. This study aims to provide direct cost comparison data between the different approaches to facilitate a better understanding of the relative costs of providing inguinal hernia repair via different surgical approaches. This will facilitate a better understanding of the cost implications of running a comprehensive hernia service.

Methods Six UK reference centres provided mean index costs for Laparoscopic Trans abdominal preperitoneal repair (TAPP), Laparoscopic Transabdominal Extraperitoneal (TEP), open repair with General Anaesthetic (GA) and open repair with Local Anaesthetic (LA). Daycase versus overnight stay were also considered. Relative costs of the different approaches were calculated and a sensitivity analysis undertaken.

Results

The least expensive option was open repair under LA as a day case. Requirement of a GA increased the cost by approximately 75%. Laparoscopic TEP repair was the most expensive option costing 2.5 times as much as open repair under LA. The average cost of an overnight bed was €332 (€181–€543), however there was considerable variation, as there was for Mesh and endoscopic equipment which ranged from 25–100% of list price depending on local procurement contracts.

Discussion Data from UK and Swedish registries suggest that there is capacity for increasing the proportion of inguinal hernias repaired under local anaesthetic. If remuneration is fixed (as it is in the UK), then service provision should be planned across the whole service to maximise LA daycase throughput, thus generating surplus income which may be directed to covering the cost of more expensive procedures where clinically indicated.

This article has been adapted for an international audience from one previously published in the UK.

Author's addresses: *Department of Surgery, Milton Keynes NHS Foundation Trust, Milton Keynes, MK6 5LD, UK.
**Good Hope Hospital, Heart of England NHS Foundation Trust, Sutton Coldfield, West Midlands, B75 7RR, UK.
***York Teaching Hospital NHS Foundation Trust, York, YO31 8HE, UK

Introduction

There have been many studies over the years comparing laparoscopic and open repair in terms of immediate cost and clinical outcomes [1,2]. These studies generally conclude that the clinical differences are minimal but that costs are generally higher for laparoscopic surgery. Nevertheless, there are situations when a laparoscopic approach is clearly of benefit (bilateral hernia or re-do surgery for example) which are correspondingly advocated in clinical guidelines [3]. Similarly there are instances when repair under a Local Anaesthetic (LA) is clearly clinically preferable to a General anaesthetic (GA). In the UK, current data indicates that of the 75,000 hernia repairs performed annually in the UK, 17% are performed laparoscopically and around 5% as an open repair under LA [4], therefore around three quarters are performed as an open repair under GA. This suggests that whilst there are sub-groups of patients for whom one surgical approach is clinically more appropriate than another, for the majority of patients, the approach makes little clinical difference.

With tightening health resources in austere times, should more consideration be given to the cost of provision than simply the clinical justifications when deciding which approach to take? This study aims to provide the data to enable meaningful consideration of this question by evaluating the comparative costs of providing inguinal hernia repair via different surgical approaches. An appreciation of these relative costs will facilitate a better understanding of the cost implications of running a comprehensive hernia service.

Methods

Six reference centres in the UK provided mean index costs for four different approaches to inguinal hernia repair. From these figures, the average costs for Laparoscopic Trans abdominal preperitoneal repair (TAPP), Laparoscopic Transabdominal Extraperitoneal (TEP), open repair with General Anaesthetic (GA) and open repair with Local Anaesthetic (LA) were calculated. In addition, centres provided an estimate of the cost of an overnight surgical bed.

To avoid over complication of the analysis, variation in operating time was not taken into consideration. For calculation purposes, it was assumed that 60 minutes of staff time would be required for all procedures including the anaesthetic. General hospital overheads have been excluded but are likely account for about 5% of remuneration.

During the data analysis, it soon became apparent that differences in staff costs and standard kit costs were negligible. The main cost differences between centres were due to variation in mesh costs and the variable use of endoscopic devices (staplers / balloon dissectors). Consequently, the average cost across the six centres of staffing and equipping a theatre for each given procedure was calculated and fixed so as to simplify the cost calculation. The variable costs of Mesh and endoscopic devices were analysed in their raw form. Therefore, the cost calculation used was:

Total Cost = Fixed Costs + Variable Costs + Overnight Stay

(A currency conversion rate for GBP to Euros of 1.207 has been used)

Table 1 Completed costing sheet example.

Inguinal Hernia - General Anaesthetic - Hospital A		
Pay / Non Pay	**Details**	**Cost (€)**
Pay	1 x ODP (60 mins)	24.14
	2 x Scrub - nurse & assistant (60 mins)	48.28
	1 x Circulating Nurse (60 mins)	24.14
	1 x Anaesthetist (60 mins)	90.53
	1 x Consultant Surgeon (60 mins)	90.53
Pay Sub-Total		277.62
Non Pay	20ml 5mg/ml Chirocaine	20.28
	Propofol, opioid analgesia, enflurane or sevoflurane	130.83
	General Basic Set	44.83
	Low Fluid Drape	5.81
	Hand held Diathermy (HCP-01 skintact)	1.74
	Smoke evacuation tubing (E3590 Valleylab)	6.84
	Light handle	1.29
	1 Pack of 10 x 7.5 swabs	0.42
	20ml Syringe	0.05
	Green Needle	0.01
	Discarder pad	0.41
	Suction tube	0.84
	Scalpel	0.76
	3/0 Monocryl (3207 Ethicon)	3.37
	0 and 2/0 Polysorb Suture	1.34
	Medium Mepore dressing	0.08
	Ultrapro hernia system mesh (Ethicon) or Flat Ultrapro Mesh	138.03
Non Pay Sub-Total		356.93
Grand Total		634.54

Results

The cheapest option was open repair under LA as a day case. Requirement of a GA increased the cost by approximately 75%. Laparoscopic TEP repair was the most expensive option costing 2.5 times as much as open repair under LA when performed as a day case. The average cost of an overnight bed was €332, however there was considerable variation (€181 – €543). If an overnight stay is required, the relative cost ratios are less. (Table 2)

The variation in cost of Mesh and endoscopic equipment ranged from 25–100% of list price depending on local procurement contracts. A sensitivity analysis was performed to evaluate the range of different centre costs taking into account the variation in overnight stay and equipment costs. This is illustrated in Figure 1.

Discussion

This current study has calculated a relative comparison cost index between the various approaches to inguinal hernia repair. It also suggests benchmark costings for the different approaches calculated from UK data. Whilst there is likely to be some variation in absolute costs between countries, it is likely that the relative cost ratios between surgical approaches will be of similar proportions. LA repair is the most cost effective approach to hernia repair as it obviates the need for an anaesthetist and the associated drugs which accounts for around 40% of the cost of open repair under GA. Laparoscopic repair is the most expensive option due to the additional disposable equipment required, this is in agreement with other studies [5–7].

Of course, affordability of the different approaches cannot be decided without knowing the remuneration package for each procedure, which will be country dependant. In the UK, there has been a recent move to the "Best Practice Tariffs" model which pays a fixed remuneration tariff regardless of the method of hernia repair" [8,9]. Under such a fixed payment structure, provision should be weighted towards LA repair where possible to maximise surplus income. This surplus can then be directed to providing more expensive procedures to those patients in whom it is clinically indicated. Similarly, there is an increasing weight of evidence in favour of the daycase model for inguinal hernia repair on the basis of better patient experience,

Table 2 Average costings and relative ratios.

	Average cost of procedure (€)	Relative cost ratio	Average cost of procedure including overnight stay (€332)	Relative cost ratio
LA Open	335.62	1	667.54	1
GA Open	587.62	1.75	919.54	1.38
TAP	799.47	2.38	1,131.39	1.69
TEPP	843.28	2.51	1,175.21	1.76

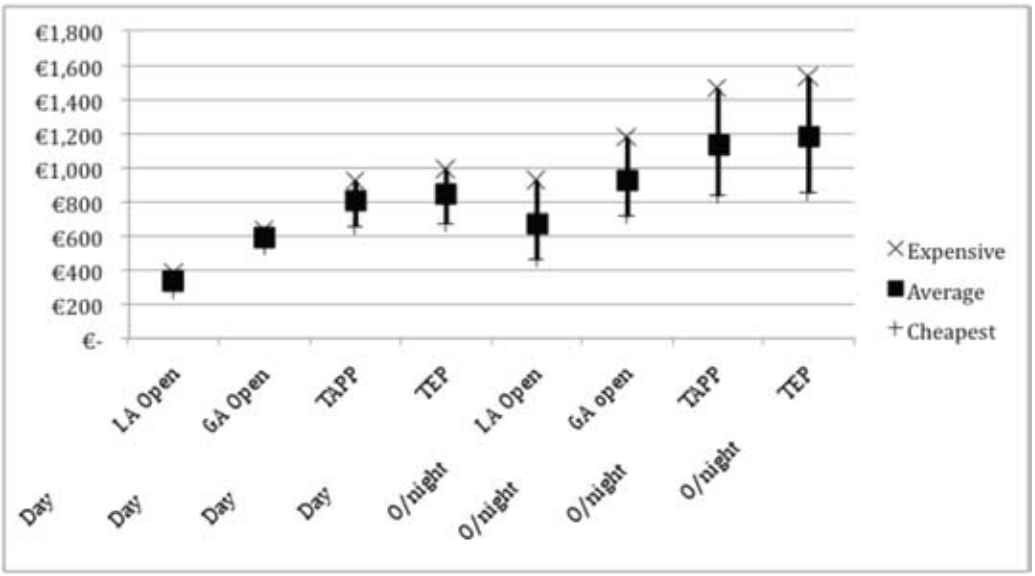


Figure 2 Sensitivity analysis of potential range of costs by procedure type.

improved cost effectiveness and equivalent clinical outcomes [10]. In the UK, the Best Practice Tariffs payment structure incentivises daycase surgery by paying a €360 lower tariff for an overnight stay [11]. The hospital will also incur the cost of providing the overnight bed for which there is no further remuneration.

The simple calculation used in this study (Total Cost = Fixed Costs + Variable Costs + Overnight Stay) can be used by hospitals to identify unnecessary expense in the system based on local protocols. For example, the cost of laparoscopic surgery could be reduced by adopting novel techniques to safely perform the same procedure without the requirement for expensive disposables [12], driving down the associated "variable costs" component of the calculation. Thus the exact cost of surgery can only really be evaluated at a local level according to local expertise available and the procurement contracts in place. However, within these limitations, this study provides the best estimate currently available of the cost of providing hernia services on a case-by-case basis, and in particular the relative cost differentials of the various options.

Other weaknesses of this study are in the assumptions that were necessarily made and the consequent impact on the precision of cost calculations. We have assumed that all cases take the same amount of time. It is unhelpful when planning a service to think in terms of minutes per case, it is however useful to think in terms of how many procedures can be undertaken on a given list. It may be that on a half-day list three open repairs could be performed versus only two laparoscopic ones. This would of course have a considerable impact on cost calculations. We have not attempted to include this in the calculation as it introduces too much variability. Similarly we have assumed that a consultant surgeon and anaesthetist will undertake the list; hernia lists are often run by middle grade surgeons and anaesthetists with lower pay rates. Even within the Consultant grade there is considerable variation in pay levels.

Assuming that daycase repair under LA is the most cost-effective approach to inguinal hernia repair, how much capacity is there for increasing the number of LA procedures? Published data from the Swedish Hernia Register suggests that 16% of inguinal hernias are performed under LA in that country [13]. Information from NICE suggest that around 5% are performed under LA in the UK [4]. Similarly 8% were performed as laparoscopic operations in Sweden versus 17% in the UK. This would suggest that around 75% of hernia repairs are performed as open procedures under GA (or regional block) in both countries. Given that there are relatively more contraindications to GA than LA, predominantly on anaesthetic grounds, and that there are numerous studies reporting equivocal safety and satisfaction rates for LA hernia surgery [14–16] it does not seem that this discrepancy can be explained on clinical grounds alone. Arguably there appears to be significant capacity to increase the proportion of cases performed under LA with consequent cost benefits.

In inguinal hernia surgery there is no one-size-fits-all solution. Not all patients are clinically suitable for daycase surgery, and some patients will be better suited to laparoscopic repair. It is therefore the responsibility of providers to plan delivery across a whole service rather than on an individual case basis. Overnight stays and laparoscopic surgery can be accommodated by offsetting these higher costs against more cost effective open daycase procedures under LA. Beyond the case-by-case cost calculation, service planners will also need to take account of other variables such as unanticipated overnight admissions, and readmissions. Hospital overheads should also be taken into account.

The findings of this study suggest that a cost-effective hernia

programme requires maximum day surgery throughput with use of LA where possible. Quality care, however, requires a clinician overview to allocate the appropriate patient to the appropriate technique. It is important that all those involved in service planning and delivery understand the local remuneration structure and the cost implications of differing surgical techniques. Surgeons and managers can then work together to organise services to maximise returns by careful list booking and workforce planning. This will enable clinicians to provide more expensive services to those patients who need them whilst maintaining solvency in these increasingly austere times.

References

1. Memon MA, Cooper NJ, Memon B, Memon MI, Abrams KR. Meta-analysis of randomized clinical trials comparing open and laparoscopic inguinal hernia repair. ***Br J Surg*** 2003; **90**: 1479–92.
2. McCormack K, Scott NW, Go PM, Ross S, Grant AM. Laparoscopic techniques versus open techniques for inguinal hernia repair. Cochrane Database Syst Rev 2003; CD001785.
3. National Institute for Clinical Excellence (NICE). Laparoscopic surgery for inguinal hernia repair; ***Technology Appraisal*** 83. 2004. www.nice.org.uk.
4. National Institute for Clinical Excellence (NICE). NICE implementation uptake report: Laparoscopic surgery for inguinal hernia repair. 2010. www.nice.org.uk.
5. Hynes DM et al. Cost effectiveness of laparoscopic versus open mesh hernia operation: results of a Department of Veterans Affairs randomized clinical trial. ***J Am Coll Surg*** 2006; **203**: 447–57.
6. Anadol ZA, Ersoy E, Taneri F, Tekin E. Outcome and cost comparison of laparoscopic transabdominal preperitoneal hernia repair versus Open Lichtenstein technique. ***J Laparoendosc Adv Surg Tech A*** 2004; **14**: 159–63.
7. Papachristou EA, Mitselou MF, Finokaliotis ND. Surgical outcome and hospital cost analyses of laparoscopic and open tension-free hernia repair. ***Hernia*** 2002; **6**: 68-72.
8. Department of Health. Payment by Results Guidance for 2011–12. www.dh.gov.uk . 2011.
9. Department of Health. Equity and excellence: Liberating the NHS. www.dh.gov.uk . 2011.
10. British Association of Day Surgery. ***BADS Directory of Procedures*** 3rd Edition. 2009.
11. Howard D et al. Incentivising day-case Laparoscopic Cholecystectomy. ***Journal of One-Day Surgery*** 2011; **21**: 4–7.
12. Basu S, Chandran S, Somers SS, Toh SK. Cost-effective laparoscopic TEP inguinal hernia repair: the Portsmouth technique. ***Hernia*** 2005; **9**: 363–7.
13. Nilsson H, Stylianidis G, Haapamaki M, Nilsson E, Nordin P. Mortality after groin hernia surgery. ***Ann Surg*** 2007; **245**: 656–60.
14. Callesen T, Bech K, Kehlet H. Feasibility of local infiltration anaesthesia for recurrent groin hernia repair. ***Eur J Surg*** 2001; **167**: 851–4.
15. Callesen T, Bech K, Kehlet H. One-thousand consecutive inguinal hernia repairs under unmonitored local anesthesia. ***Anesth Analg*** 2001; **93**: 1373–6, table.
16. Nordin P, Hernell H, Unosson M, Gunnarsson U, Nilsson E. Type of anaesthesia and patient acceptance in groin hernia repair: a multicentre randomised trial. ***Hernia*** 2004; **8**: 220–5.

Hernioplasty in One-Day Surgery: result of 228 self-adhesive prosthesis

A. Goulart, M. Delgado‡, M.C. Antunes‡, J. Braga dos Anjos§*

Abstract

Aim: To evaluate the outcomes of inguinal hernia repair with ProGrip® mesh in same-day surgery

Methods: Follow-up data was collected at 24 hours and 30 days after surgery.

Results: In one year, 228 patients underwent surgical repair of unilateral inguinal hernia. At 24 hours after surgery, 50.64% of patients reported some degree of pain and 66.3% were able to move around the house with few limitations. Thirty days after surgery, 94.39% of patients had returned to their routine activities.

Conclusions: The use of the ProGrip® mesh is associated with low post-operative pain and rapid recovery.

Keywords: Inguinal hernia repair; day case; ambulatory surgery.

Author's addresses: *Resident of General Surgery at Hospital of Braga ‡Attendant of General Surgery at Hospital of Braga § Senior Attendant of General Surgery at Hospital of Braga, Department of General Surgery, Hospital de Braga, Portugal).

Corresponding author: André Goulart *Tel:* (00351)915300875 *E-mail:* goulart_andre@hotmail.com

Introduction

Surgery for inguinal herniae was first attributed to Erasistratus of Keos in the third century. In those days, surgery was based on techniques which often led to genital mutilation1 with unconvincing outcomes. In 1884, Edoardo Bassini described the first herniorrhaphy technique with satisfactory results (recurrence of 2.3% in surgeries performed by Bassini vs 3.2–10% for surgeries performed in other surgical centers) [1, 2] and, subsequently, other similar techniques appeared: Halsted II, Ferguson, Andrews and McVay.2 In 1952, Shouldice, Obney and Ryan described a different technique for hernia repair, thus reducing the recurrence rate associated with Bassini's method of (0.7% -1.7% in clinics vs 1.7-15% for overall practice). [1, 2]

The introduction of prosthesis for surgical repair of inguinal hernias was first performed by Usher in 1958.[3] However, it was Lichtenstein who, in 1986, applied the tension-free concept for inguinal hernia surgery, describing a technique that would reduce the recurrence rate associated with the tension of the herniorrhaphy suture.[1] In subsequent years, other hernioplasty techniques emerged using various types of prosthesis and/or other approaches in the groin. Despite the development of other techniques, the Lichtenstein hernioplasty remains the method of choice in the anterior approach of inguinal hernias.[4]

In 2007, the ProGrip® system was introduced (Covidien, Trévoux, France), consisting of a monofilament polyester semi-absorbable and monofilament absorbable polylactic acid which adheres to the tissues of the floor of the inguinal canal without fixing points.[3]

Currently, the goldstandard treatment for unilateral inguinal non-recurrent hernia in the adult is an open surgery approach, performed under local anesthesia as a day case.[3]

The introduction of synthetic prosthesis in inguinal hernia surgery created the new problem of chronic pain syndrome after hernioplasty (presence of pain that persists more than 3 months).[5] A systematic review from 2008, which included studies of postoperative pain, showed that the incidence of this syndrome is very variable (0-53%). An explanation for this discrepancy is the lack of validity and accuracy of scales used to assess postoperative pain.[6] The pathophysiology of this syndrome is controversial, but appears to be due to stiffness in the groin by the use of heavy meshes, injury of the inguinal nerves during surgery and inguinal nerve irritation by scar tissue.[5]

In the few published series of the use of self-adhesive prosthesis, numbers are small (between 24 and 70) but showa promising trend that these prostheses have a beneficial effect on postoperative pain and decrease the operative time (average total surgical time between 18–51 minutes) without increasing the rate of surgical complications and relapses.[5, 7,8]

In this study, the authors aimed to evaluate the surgical outcomes (operative time, functional recovery of patients, chronic pain and recurrence of the hernia) of inguinal hernia repair with the use of self-adhesive ProGrip® prosthesis in day surgery.

Methods

A prospective observational study of patients undergoing inguinal hernia repair with ProGrip® mesh in one day surgery was conducted at Hospital de Braga between January 1 and December 31, 2010.

Patients were selected for one day surgery using the criteria set by the Department of Ambulatory Surgery at the Hospital de Braga:

a. Being older than 5 years
b. Being accompanied by a responsible adult, who can be with the patient from discharge from the hospital until at least 24 hours after surgery
c. Having transportation provided
d. Having a phone / mobile to contact the Ambulatory Surgery Unit if necessary
e. Having adequate logistical conditions at home

f. No more than 60 minutes time between the patient's home and Hospital de Braga

g. Expected duration of the intervention less than 120 minutes

The inclusion criteria for this study were:

a. Patients undergoing unilateral hernioplasty with self-adhesive ProGrip® mesh

b. Surgery performed by the group responsible for Ambulatory Surgery in the Department of General Surgery, Hospital de Braga

Patients were evaluated preoperatively by the surgeon, the anesthesiologist and nurse of the Ambulatory Surgery Unit. Each patient was provided with written pre and post operative instructions regarding their day case admission.

After each operation, the Ambulatory Surgery Group collected the relevant data which was entered into a database, using the software Microsoft Office Excel®.

Patients were contacted by telephone by the Nurse of the Department of Ambulatory Surgery at 24 hours and 30 days after surgery, and a questionnaire, inquiring about pain or other complications, and evaluating the degree of functional recovery was completed. All patients were also recalled for a postoperative consultation with the operating surgeon between 30 and 60 days post-surgery.

Surgical Procedure

Most patients underwent surgery under local anesthesia (10ml of lidocaine 2% and 10ml of ropivacaine 7.5% infiltrated 1 to 2 cm medial to anterior superior iliac spine, above the pubic tubercle and along the route of surgical incision) with sedation controlled by the anesthesiologist. However, some patients were operated under general anesthesia. Although controversial, the literature recommends the use of antibiotic prophylaxis, [9] so all patients received prophylactic cefazolin 2gr, before the incision.

The surgery was performed according to the method of Lichtenstein, with care not to injure the ilio-inguinal and ilio-hypogastric nerves. In patients where a weakness of Transversalis Fascia was observed, a placating continuous suture of absorbable polyglactin was inserted (usually Vicryl® 2/0). The ProGrip® mesh was placed on the public tubercle and then around the spermatic cord followed by refashioning of the external oblique aponeurosis .

Outcome and statistical analysis

The data used in this study was taken from the database of the Group of Ambulatory Surgery recorded on the day of operation, from the telephone questionnaires at 24 and 30 days postoperatively and the records of the postoperative surgical consultation.

Results

Two hundred and forty-seven patients underwent surgical repair of unilateral inguinal hernia by the Ambulatory Surgery Group of the Department of General Surgery between January 1 to December 31, 2010 at the Hospital de Braga. Of these patients, 228 underwent hernioplasty with ProGrip® mesh (Covidien, Trévoux, France), seven hernioplasty with 3-D® mesh (Ethicon, Auneau, France), two hernioplasty according to Lichtenstein's original method with polypropylene Premilene® Mesh (B. Braun Melsungen AG, Melsungen, Germany), three inguinal prosthesis Premilene® Mesh Plug (B. Braun Melsungen AG, Melsungen, Germany), two hernioplasty with Adhesix® mesh (Cousin Biotech, Wervicq-Sud France) and five to inguinal hernia repair (by Marcy technique).

Demographic characteristics of 228 patients included in this study are presented in Table 1 and results of inguinal hernioplasty are presented in Table 2.

Table 1 Demographic data.

No. patients (no. hernioplasty)	**228**
Age (years), average	54.47 (min 17, max 83)
Sex - Male vs Female	197 vs 31
Weight (kilograms), average	73.3 (min 42; max 110)
Height (meters), average	1.68 (min 1.35; max 1.90)
Body mass index (kg/m^2), average	26.02 (min 18.18; max 37.11)
ASA	
ASA I (No.; %)	118 (51.75%)
ASAII (No.; %)	106 (46.49%)
ASAIII (No.; %)	4 (1.75%)

Clinical indicators on the day of the surgery

On average, surgical time (time between the start of disinfection of the surgical area and the completion of wound closure) was 32 minutes and 49 seconds (minimum of 11 minutes and maximum 68 minutes).

Despite being a condition that, a priori, does not justify overnight stay, 8 patients (3.51%) required overnight stay at the Ambulatory Surgery Unit, being discharged in less than 24 hours. This group of patients had a higher mean of age than the overall average (mean 70 years) and higher operative risk (ASA I 37.5%, ASA II 50.0%, ASA III 12.5%). No patient required further medical or surgical approaches, and only stayed overnight by recommendation of the pre-operative surgical and/or anesthetic consultation. Only one patient required non-scheduled overnight stay because he developed transient paraesthesia in the left leg. There were no readmissions after surgery.

Clinical indicators after the first 24 hours

One of the main clinical indicators after the first postoperative day was the patient's comments in the first 24 hours. In our study, just over half of patients (50.64%) reported complications by telephone interview: all reported pain in the surgical incision and 2% also reported nausea/vomiting.

With regard to analgesia, almost 87% required administration of prescribed medication but 97% stated that it was enough to control symptoms. Only one patient (0.76%) needed additional medication.

The degree of functional activity 24 hours after surgery was as follows: most patients (66.23%) reported being able to move around the house with some limitations, whereas only 3.89% of patients admitted to an inability to perform any activities at all.

Clinical indicators at 30 days

The percentage of patients with complications observed at the postoperative consultation with the surgeon was 18.18%; these consisted of the minor complications of persistent pain on the surgical incision after 30 days (9.09%), seroma/surgical wound infection (4.55%), pricking sensation in the surgical incision which persisted after 30 days (2.73%) and wound hematoma (1.82%).

In the survey made by phone after the first month after surgery, 83% of patients reported having required analgesic medication for

Table 2 Results of one day surgery.

Surgery	Results of 228 patients(100%)
Surgeon - Specialist vs resident	96 vs 132
Surgery time (minutes)	32m49s (min 11m; max 68m)
Overnight stay on the Ambulatory Surgery Unit	3.51%
Surgical risk assessment	
POSSUM - expected morbidity	11.23%
POSSUM - expected mortality	2.04%
Surgical APGAR	8.34 (min 5; max 10)
24 hours	Results of 154 surveys (67.5%)
Complications 24 hours after surgery	50.64%
- Pain in surgical incision	- 50.64%
- Nausea/vomiting	- 1.95%
Analgesia required	89.61%
Grade of functional activity	
Cannot do anything	3.89%
Only personal hygiene	7.79%
Moves around the house, with limitations	66.23%
Moves around the house, without limitations	9.74%
No functional limitation	12.34%
30 days	Results of 110 surveys (48.2%)
Complications of surgery (during the first 30 days)	18.18%
- Pricking sensation in the surgical incision to 30 days	2.73%
- Pain on surgical incision at 30 days	9.09%
- Haematoma	1.82%
- Seroma/Infection	4.55%
Chronic pain (> 3 months)	7.27%
Recurrence	2.73%
Required analgesic medication	82.57%
- During how many days, average	5.65 (min 1; max 15)
Required to use Health Services	6.37%
- Unplanned hospitalization	0.91%
Resumed normal activities of daily living at 30 days	94.39%
Number of days, average	10.94 (min 1; max 31)

5 to 6 days on average (minimum of 1 day and 15 days). In addition to wound care and suture removal in the Health Centre, and the visit to the hospital for consultation after surgery, 6.37% of patients required use of health services for post-operative complications. Only one patient needed to be hospitalized for extensive hematoma on groin and genitalia that appeared five days after surgery. This patient was on oral anticoagulants and, despite having suspended the drug as indicated by the Department of Immuno-Hematology and careful hemostasis during surgery, a hematoma occurred.

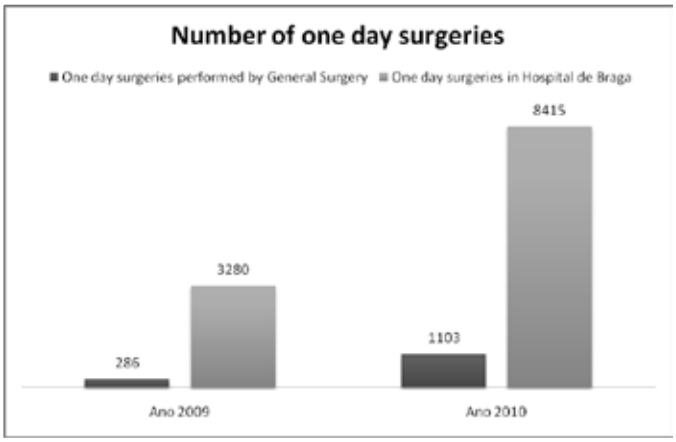
One of the most important indicators in this type of surgery is the ability to resume daily life activities. In relation to this, after one month, 94% of patients reported to have already resumed their normal activities, on average after 11 days (minimum 1 day and up to 31 days).

Two other important indicators in the evaluation of inguinal hernia repair in day surgery are recurrent herniae and chronic pain. Only 2.73% (3 patients) had recurrences, two were inguinal and one patient was female and had a femoral recurrence. In relation to chronic pain, patients who complained of pain at the incision site after one month were contacted again and the percentage of chronic pain was 7.27%. Despite an assessment of the severity of pain not having been conducted, nearly half of patients who reported it complained of pain only in recurrent situations of intense/violent physical efforts.

Discussion

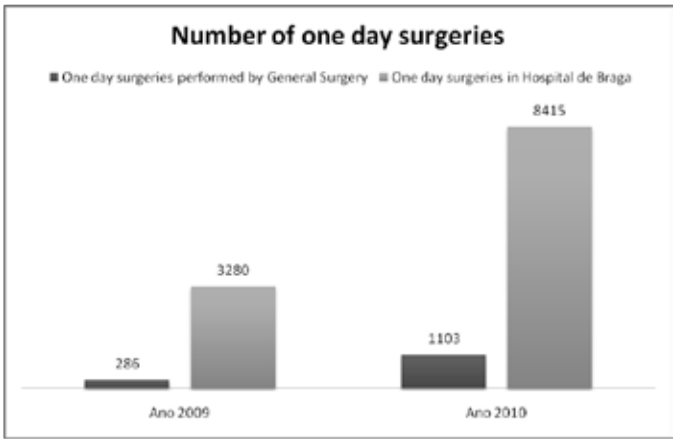
In recent years, ambulatory surgery has rapidly expanded in the Hospital de Braga . The number of procedures performed in outpatients increased 157% between 2009 and 2010 and the number of procedures performed in the general surgery ambulatory unit increased by 286% over the same period of time (Figure 1).

Figure 1



One of the most frequent operations in general surgery in the Ambulatory Surgery Unit is inguinal hernia, accounting for about 30% of surgical interventions. The number inguinal hernia repairs also accompanied the growth of the Ambulatory Surgery Unit, increasing 256% between 2009 and 2010 (Figure 2). Associated with this increase in the number of inguinal hernia repairs in one day surgery is the use of self-adhesive ProGrip® mesh on the Ambulatory Surgery Unit of Hospital de Braga.

Figure 2



The activity of an Ambulatory Surgery Unit can be evaluated by several clinical indicators of the day of surgery, the first day after surgery and postoperative recovery. [10] The results of our study show that use of the ProGrip® mesh allows hernioplasty to be performed in a short time (32m49s, on average), with low levels of pain (only 50.64% had pain in the first 24 hours) and without major limitations in the immediate postoperative period (66.23% of patients moved around house), with low complication (18.18%), chronic pain (7.27%) and recurrence (2.73%) rates and earlier return to normal daily life activities (94% returned the first month, on average 11 days postoperatively).

Although the percentage of patients with postoperative complications may be slightly higher than predicted by POSSUM (18.18% observed vs 11.23% expected), the majority of these complications are considered to be minor. The percentage of haematoma (1.82%) and seroma/infection (4.55%) in our centre is similar to a recently published study regarding hernioplasty with ProGrip® mesh (hematoma 2.2%, seroma/infection 2.2 %).8 This study showed an overall morbidity of 15.4%, not accounting, however, with the rate of persistent pain after 30 days. If we don't count the rate of persistent pain/stinging after 30 days, the rate of postoperative complications in our study would decrease to 6.37%.

The Ambulatory Surgery Unit of Hospital de Braga is involved in the training of General Surgery Residents as can be seen in the main surgeon specialist/resident ratio (96 vs 132, respectively).

The monitoring of patients post-operatively and one month after surgery by the Ambulatory Surgery Team (surgeon and nurse) is essential for early detection of postoperative complications, provides reassurance to the patient in the first 24 hours at home and monitors the quality indicators of the Ambulatory Surgery Unit.

Conclusion

The unilateral inguinal hernia surgery with the ProGrip® mesh in one day surgery is a safe and easily performed technique with low rate of recurrence and chronic pain.

Conflict of Interest:

No conflict of interest.

References

1. McClusky DA, 3rd, Mirilas P, Zoras O, Skandalakis PN, Skandalakis JE. Groin hernia: anatomical and surgical history. ***Arch Surg*** 2006;**141**:1035–42.
2. Matthews RD, Neumayer L. Inguinal hernia in the 21st century: an evidence-based review. ***Curr Probl Surg*** 2008;**45**:261–312.
3. Campanelli G, Canziani M, Frattini F, Cavalli M, Agrusti S. Inguinal hernia: state of the art. ***Int J Surg*** 2008;**6 Suppl 1**:S26–8.
4. Simons MP, Aufenacker T, Bay-Nielsen M, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. ***Hernia*** 2009;**13**:343–403.
5. Kapischke M, Schulze H, Caliebe A. Self-fixating mesh for the Lichtenstein procedure--a prestudy. ***Langenbecks Arch Surg*** 2010;**395**:317–22.
6. van Hanswijck de Jonge P, Lloyd A, Horsfall L, Tan R, O'Dwyer PJ. The measurement of chronic pain and health-related quality of life following inguinal hernia repair: a review of the literature. ***Hernia*** 2008;**12**:561–9.
7. Chastan P. Tension-free open hernia repair using an innovative self-gripping semi-resorbable mesh. ***Hernia*** 2009;**13**:137–42.
8. Bruna Esteban M, Cantos Pallares M, Artigues Sanchez De Rojas E. [Use of adhesive mesh in hernioplasty compared to the conventional technique. Results of a randomised prospective study]. ***Cir Esp*** 2010;**88**:253–8.
9. Terzi C. Antimicrobial prophylaxis in clean surgery with special focus on inguinal hernia repair with mesh. ***Journal of Hospital Infection*** 2006;62:427–36.
10. Bröckelmann J, Bäcker K. Clinical indicators for ambulatory surgery. ***Ambulatory Surgery Journal*** 2010;**16**:34–7.

Postoperative pain and surgical time in Inguinal hernia repair with self-gripping mesh: Experience in ambulatory surgery

JM Suárez-Grau, JA Bellido Luque, JL García Moreno, J Gómez Menchero, I Duran Ferreras, R Moreno Romero, E Ruiz Lupiañez, JF Guadalajara Jurado

Abstract

Aim: To Current best practice in surgery for abdominal wall hernias involves minimal trauma to the tissues using modern low molecular weight mesh to achieve a low incidence of mesh complications such as chronic groin pain or the sensation of an inflexible 'mesh plate'.

Objective: A retrospective audit of inguinal hernia repair with a new self-adhesive mesh (Progrip ®) in patients undergoing ambulatory surgery.

Material and Methods: Fifty patients were randomised to self-adhesive mesh repair or conventional mesh repair between January 2009 and January 2010. All patients were treated as day case procedures. Surgical operating time was compared with other techniques in open inguinal hernia repair in our hernia service.

Results: There were 50 open hernioplasty with plug and mesh technique (Rutkow-Robbins). *Surgery time:* mean 28.6 minutes (range 10-50). Pain scores on a visual analogue scale of 1-10 were low (2.1 postoperatively and 0 at 6 months and one year. Other mesh techniques used had an operating time ranging between 34 and 45 minutes. Physical examination one month after the intervention reported no signs of recurrence, seroma, or infection or all of the patients.

Conclusions: The use of self-adhesive mesh hernioplasty provides an effective technique, with the same complication profile as conventional suture fixation but with a reduced operating time.

Keywords: hernia, self-adhesion, ambulatory surgery.

Author's addresses: *Department of General and Abdominal Surgery., General Hospital of Riotinto., Avda. La esquila, 5. Huelva. 21660 Spain.

Corresponding author: Juan Manuel Suárez Grau, Servicio de Cirugía General. Hospital General Básico de Riotinto, Avda de la esquila, 5 C.P.21660 - Minas de Riotinto. Huelva. Spain. *E-mail:* graugrau@hotmail.com / graugrau@gmail.com

Introduction

Currently techniques for inguinal hernia repair involve the use of prosthetic non-absorbable or partially absorbable mesh and fixation with absorbable or non-absorbable sutures.

Available mesh includes standard polypropylene mesh (polypropylene heavy-normal: 120-100 kD), partially resorbable mesh (lightweight, low molecular weight: <82 kD and usually with large pore), composite mesh (composites) and fully absorbable mesh.

Fixation of mesh now includes absorbable sutures, biological glues and self-fixing systems (Progrip ® Sofradim Parietene ®, Covidien Group, Trévoux, France). These latter techniques do not require suturing and offer a potential reduction in overall operating time. Minimal dissection could also reduce potential damage to the ilio-inguinal nerve, the genital branch of the genito-femoral nerve and the ilio-hypogastric nerve which may reduce the incidence of chronic pain due to nerve damage or chronic inflammation.

Materials and methods

This study was performed at the Department of General and Digestive Surgery of the Riotinto Basic General Hospital (hospital district), serving a population of about 75,000 habitants with a total of 120 beds.

Patients

Fifty patients with unilateral primary inguinal herniae (aged 16-90 years with Gilbert type I and II, type LP1 and LP2 EHS) were randomized to a Rutkow-Robbins repair with absorbable plug (n=25) or to nonabsorbable plug + Progrip ® self-adhesive mesh (n=25) . Randomisation was by alternate allocation of the first patient on the operating list to each study group. The operating surgeon was uninvolved in the technique selected for the patient.

The average age of patients was 55.6 years and included 43 males and 7 females. The mean body mass index (BMI) was 26.8 , range 20-35. Two patients underwent general anaesthesia, 32 spinal anaesthesia and 16 received local anaesthetic infiltration with sedation.

The pre-operative physical activity of patients was assessed as a) Retired: 10 patients, b) Active Living (moderate-high physical activity): 35 patients, c) Sedentary lifestyle (low physical activity): 5 patients.

Patient co-morbidity was:

- Respiratory (n=12)
- Cardiovascular (n=10)
- Digestive (n=2)
- Oncology (n=2)

Monitoring and Measurement postoperative pain

All patients were interviewed regarding preoperative discomfort and again assessed at discharge, at one month and at 6 months post-operatively. Physical examination was also conducted at these intervals to specifically assess for seroma, haematoma or signs of recurrence.

A visual analogue scale (VAS) was employed where 0 was the lowest level (no pain) and 10 the highest.

Finally, one year after surgery patients were interviewed regarding the overall satisfaction with their surgery.

Type of mesh

The mesh utilised in this study was Parietene ® Progrip ® (Sofradim, Group Covidien, Trévoux, France) and is available in three formats. Two of them were of elliptical shape, specially designed to fit the anatomy of the inguinal region, with a self-adhesive flap adjustable around the cord , either left or right. The third variant is a flat plate 15x9 cm. The mesh itself is partially absorbable and of low molecular weight polypropylene monofilament composed of polylactic acid (absorbable).

Attachment of the mesh is by a large number of polylactic acid hooks in a format not unlike 'velcro' mesh to ensure adequate fixation to the tissues (Figure 1).

Figure 1: Self-gripping lightweight mesh Progrip ® for inguinal hernia repair.

Surgical technique

The hernial defect is identified and the sac reduced. Using the Rutkow-Robbins technique, the defect is repaired with a plug of polypropylene or absorbable material (PGA-TMC), fixed with conventional sutures (polypropylene or absorbable to match the plug material), and Progrip ® self-adhesive mesh placed to ensure contact with the surface of the pubis, conjoined tendon and inguinal ligament, without any folding of the mesh. (Figure 2.)

The mean operating time using this technique was compared to a control group using Lichtenstein or PHS / UHS .

Results

The mean operating time in open surgery of inguinal hernia with this new prosthesis was 20.6 minutes (range10–50) .

The mean time to repair the control group ranged between 34 and 45 minutes.(Lichtenstein: mean 44 mins; Rutkow-Robbins: mean 37 mins; PHS/UHS: mean 33 mins). (Figure 3)

No intra-operative nor immediate post-operative complications were recorded. Patients were all discharged the same day.

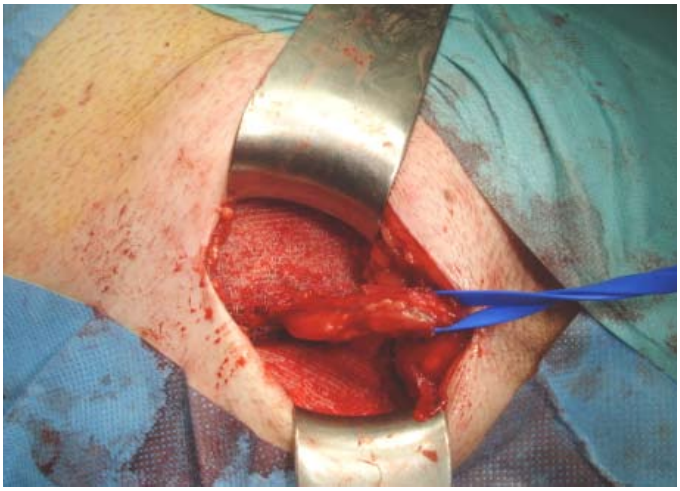


Figure 2: Surgery: inguinal hernioplasty using the self-gripping lightweight mesh.

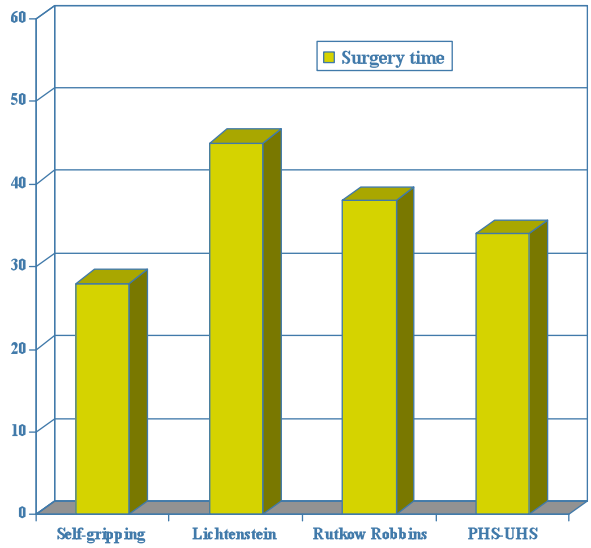


Figure 3:The mean time in inguinal open hernia repair.

Analgesia consisted of intravenous paracetamol and metamizole intravenously if pain or discomfort. Low molecular weight heparin was given to all patients.

At discharge, all patients received a prescription at for postoperative analgesics: Dexketoprofen-trometamol 25 mg orally every 8 hours and Acetaminophen 500 mg orally every 8 hours if excessive pain or discomfort for the first 5 post-operative days.

All patients received thromboprophylaxis with bemiparin (3500UI subcutaneously) for seven days.

All patients were followed-up for 12 months. At physical examination at 6 months and 12 months there was no evidence of recurrence, seroma or infection in any patient.

Postoperative pain at one month, 6 months and one year after surgery was as follows (Figure 4):

- VAS (visual analogue scale for pain assessment): mean and range.
- preoperative VAS: 4.8 (8-0)
- postoperative VAS: 2.1 (5-0)
- VAS 1 month: 0.72 (2-0)
- VAS 6 months: 0
- VAS 1 year: 0

There was no difference when comparing the groups using self-gripping mesh and absorbable plug (25 patients) versus nonabsorbable plug (25 patients). (p=0 with Willcoxon test in SPSS 14.0).

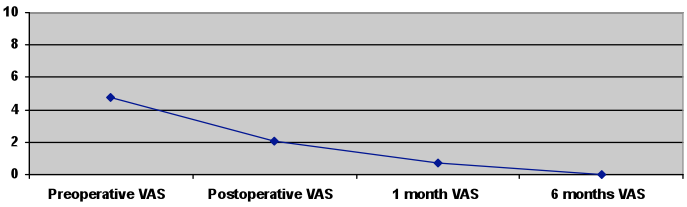


Figure 4: Results of the visual analogical scale (VAS).

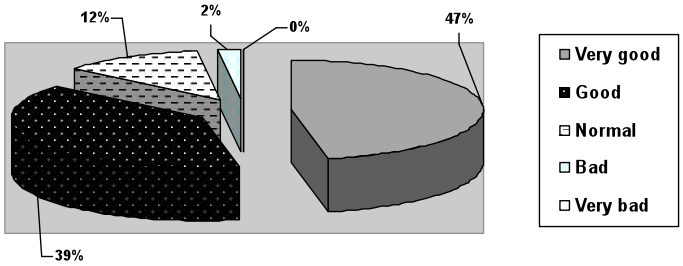


Figure 5: Satisfaction result.

Overall satisfaction with the results: very good (47%) Good (39%) Average (12%) Poor (2%) Very bad (0%). (Figure 5)

Conclusions

Self-adhesive mesh hernioplasty is an effective technique, with a similar profile to conventional mesh repair regarding post operative pain, recurrence at one year and post-operative complications. There does, however appear to be an advantage with self-adhesive mesh regarding a shorter operating time.

Figure 1: Self-gripping lightweight mesh Progrip ® for inguinal hernia repair.

Discussion

Many operative techniques have been used for inguinal hernia repair since Bassini's original technique was published. [1] Today the Lichtenstein repair remains the 'gold standard' [2]. As most inguinal hernia repairs are now performed on a day-case basis, it is essential that any innovation in prosthetic mesh ensures comparative outcomes with accepted techniques.[3,4] . In this context we decided to conduct this study and test our results with this innovative technology.

The plug-and-patch repair is a popular method of herniorrhaphy. It is a quick procedure and is relatively easily learned but there may be significant numbers of patients who experience prolonged pain after this operation. [5] In contrast, self adhesive meshes may be associated with less post-operative pain. Chastan [6] reported a series of 52 patients between 14 and 52 years, who underwent open inguinal hernia repair with this new prosthesis. Preliminary results published describe advantages of this new self-adhesive prosthesis: a significant reduction in operating time to 19 minutes on average, and most importantly, a marked reduction in postoperative pain (1.2-1.3 in postoperative VAS) with the rapid incorporation of patients to their daily activities (5.5 ± 3.6 days) [6].

Bruna's experience would appear to be similar to our own [7] with a significant decrease in operating time and ease of technique. While short term post-operative pain in the first week is low, no longer term results were reported. In our series the results are evaluated in several periods up to one year without chronic pain in any patient.[7] Kapischke [8] reports a similar experience Bruna [7], but with fewer patients in a 6 month follow-up.

With regard to experimental studies in rats, Hollinsky [9] found no differences in integration of material or foreign body reaction. Kolbe did not find any impaired fertility of male rats after placing the mesh in contact with the vas deferens suggesting that the integration of the mesh does not affect the surrounding tissues.[10]

García Ureña reported a multicentric observational study of pain after the use of self-gripping lightweight mesh with a total of 256 patients. The mean operative time was 35.6 min and 76.2% of patients were operated in an ambulatory setting. There were a few postoperative complications: 2 wound infections, 17 seromas, 21 hematomas, 6 orchitis. The incidence of acute pain was 27.3% at week 1 and 7.5% at month 1. The incidence of chronic pain was 3.6% at month 3 and 2.8% at month 6. No recurrences or long-term complications were observed.[11]

References

1. Bassini E. Sulla cura radicale dell'ernia inguinale. ***Arch Soc Ital Chir.*** 1887;4:380–6.
2. Amid PK, Shulman AG, Lichtenstein IL. Open 'tension-free' repair of inguinal hernias: the Lichtenstein technique. ***Eur J Surg.*** 1996;**162**:447–53.
3. Repair of primary inguinal hernia: Lichtenstein versus Shouldice techniques. Prospective randomized study of pain and hospital costs. Porrero JL, Bonachía O, López-Buenadicha A, Sanjuanbenito A, Sánchez-Cabezudo C. ***Cir Esp.*** 2005 Feb;**77(2)**:75–8.
4. National project for the management of clinical processes. Surgical treatment of inguinal hernia. Rodríguez-Cuéllar E, Villeta R, Ruiz P, Alcalde J, Landa JI, Luis Porrero J, Gómez M, Jaurrieta E. ***Cir Esp.*** 2005 Apr;**77(4)**:194–202.
5. LeBlanc KA. Complications associated with the plug-and-patch method of inguinal herniorrhaphy. ***Hernia***. 2001 Sep;**5(3)**:135–8.
6. Tension-free open hernia repair using an innovative self-gripping semi-resorbable mesh. Chastan P. ***Hernia.*** 2009 Apr;**13(2)**:137–42.
7. Use of adhesive mesh in hernioplasty compared to the conventional technique. Results of a randomised prospective study. Bruna Esteban M, Cantos Pallarés M, Artigues Sánchez De Rojas E. ***Cir Esp.*** 2010 Oct;**88(4)**:253–8
8. Self-fixating mesh for the Lichtenstein procedure--a prestudy. Kapischke M, Schulze H, Caliebe A. Langenbecks ***Arch Surg.*** 2010 Apr;**395(4)**:317–22.
9. Comparison of a new self-gripping mesh with other fixation methods for laparoscopic hernia repair in a rat model. Hollinsky C, Kolbe T, Walter I, Joachim A, Sandberg S, Koch T, Rülicke T. ***J Am Coll Surg.*** 2009 Jun;**208(6)**:1107–14.
10. Influence of a new self-gripping hernia mesh on male fertility in a rat model. Kolbe T, Hollinsky C, Walter I, Joachim A, Rülicke T. ***Surg Endosc.*** 2010 Feb;**24(2)**:455–61.
11. García Ureña MÁ, Hidalgo M, Feliu X, Velasco MÁ, Revuelta S, Gutiérrez R, Utrera A, Porrero JL, Marín M, Zaragoza C. Multicentric observational study of pain after the use of a self-gripping lightweight mesh. ***Hernia.*** 2011 Oct;**15(5)**:511–5.

A brief history of The Indian Association of Day Surgery

T. Naresh Row

Founder and President, The Indian Association of Day Surgery.
Editor, Day Surgery Journal of India and One Day Surgery Times.

A group of like minded doctors came together one day and founded The Association. This was the year 2003. The first unofficial meeting was full of enthusiastic surgeons of different speciatilies, each one a stalwart in their field. The Executive Committee was formed from those present, some were invited later, and we had a 33 member team! Constitution was drafted, formalities of registration of the organization were performed after collecting signatures of its first Executive body, and we were officially in existence.

Now, we have elections on the floor of our Annual General Body Meeting, which is held once in two years.

The First Executive Committee was installed in the year 2005, during the proceedings of our 1st National Conference, 'ADSCON 2005'. The tenure decided for the 1st Executive body, was for 5 years. We had many luminary figures from the field of medicine gracing the organization.

Also during the First conference, we released a booklet: 'Protocols of a Day Care Surgery Center', written by me, to act as guidelines for anyone interested in Day Surgery in India.

The first issue of 'Day Surgery Journal of India', of which, I am still the Editor. And a special issue of Bombay Hospital Journal on Day Care Surgery, which I guest edited along with Dr. Begani, were released.

A Special Postal First Day Cover was released to commemorate the occasion.

At this time, we were 110 Life Members.

ADSCON 2006, 2007, 2008, saw us grow steadily. We held all the National Conferences in and around the city of Mumbai, so as to increase awareness and members, for the Association. It was deemed, that, since Mumbai is considered the Mecca of medicine in India, this is the city where the growth of Day Surgery would take off.

During our fourth Annual General Body Meeting (AGM), there was a formation of an Ad hoc Committee, from amongst the Executive body, which has powers, invested by the AGM, to take decisions on day to day running of the Organizations and make policies. This was necessary due to the large size of the executive committee and the fact that we would have AGM once in two years.

Also, we initiated our first Oration, during 'ADSCON 2008'. From this conference onwards, we decided to have biennial conference, so as to enable us to participate in the IAAS Congresses as well.

One Day Surgery Times, a newsletter, which is a month publication, was started by me in the year 2009, to be circulated for General Practitioners and Family physicians, who guide the patients. About 2000 receive this news letter in the city of Mumbai it self.

ADSCON 2010, was held in Nagpur, central India, outside of Mumbai, for the first time. A meeting, which was well attended and well appreciated.

The Indian Association of Day Surgery, became a Full Member of the IAAS, in 2011. We attended our first General Assembly in 2012, in Porto, Portugal. The IAAS, has been a great support to us since 2006. We saw Dr. Dick Du Jong, Dr. Ian Jackson, Dr. Carlo Castoro, Dr. Hugh Bartholomewz and Dr. Gamal Mohammed, participating in our National meets as Invited speakers. We too, were invited to speak in IAAS Congresses since 2007, Amsterdam. This interaction has given us great insight as to how to move forward in the organization of Day Surgery in India.

Present membership consists of 340 Life Members.

We just concluded our 6th National Conference in Hyderabad, in South India.

Apart from these, one of our major achievements is that, we have managed to convince our Insurance companies to accept Day Surgery as a separate category for re-imbursement, without insisting on 24 hours admission, as was mandatory prior to this policy change.

Several Medical as well as, Non-medical organizations have shown keen interest in knowing about Day Surgery, we have presented guest lectures and publications of over 150 in numbers across specialties.

The future course is to include Day surgery as part of Medical school teachings. Create a separate category for registration and accreditation of DSC, which is nonexistent so far. Training for Nurses and Setting up of at least one DSC in each Medical School, and city, with Public or Private Partnership, is a personal ambitious plan. Hopefully, it will be realized in our life time.

To recap, India, with a population of over 1.21billion, and a Govt. spending of just 0.94% of the GDP on health, (one of the lowest in the world); 82% of patients pay out-of-pocket on healthcare expenses, thus, making India a most privatized healthcare system in the world.

News from Denmark

Last week was the week of the yearly national congress for the Danish Surgical Association. This is the highly ranked congress for the "real surgeons" meaning Gastro-, Endocrine-, Mamma, etc surgeons. For the first time we succeeded in having a Day Surgery session lasting 4 hours at this congress, and it was the first time the surgeons have shown interest in this field. It was with a mixture of clinical cases (e.g. reflux surgery and laparoscopic surgery of ventral hernia as day surgery) and more strategic and financial issues.

After our congress last year in Copenhagen the Danish health Regions experienced that the government gave extra millions to development of day treatment possibly because of the positive experience the health minister had from our congress. And even better it has become an issue at the yearly contract between the government and the Danish health regions. It is said in the contract from this year, that it is an obligation for the regions to increase the day surgery activity and at the same time improve quality.

We have worked for many years in the struggle to bring this issue on the official political and surgical agenda, so it is rewarding to observe this has happened eventually.

Claus Toftgaard MD, IAAS Past-President

News from France

France is actively promoting Day Surgery

The public health authorities in France have decided, since 2009, to consider day surgery a national priority. The objective is to reach a level of >50% day surgery by 2016 (38.6% for 2011). In order to achieve this goal, multiple measures have been undertaken:

1. A surveillance system of day surgery levels' in each health establishment has been implemented on a national scale. Public financing of surgical projects is conditioned by the achievement, of the concerned medical centre, of a fixed objective of day surgery levels.
2. Corrective measures: In 2009, a basket of 17 surgical procedures was considered by the social security authorities as obligatory in day surgery. In 2012, the number increased to 38 procedures.
3. Incentive measures: hospital stays for 17 (in 2009) and now 50 (in 2012) surgical procedures are financed identically whether or not they take place in a day surgery context.

Corinne Vons MD, AFCA

News from India

How The Indian Association of Day Surgery is organized

At the General Assembly meeting in Porto, it was interesting to note the Membership fees paid by members of different countries to their National Associations. Well, in India, we do not have yearly membership fees. It is one time payment for life! Therefore, we call it 'Life Memberships', which is €14, for our Association. This means a lifetime issue of all the Journals, Newsletters and periodic correspondence, including the postage cost, to be borne by the Associations. Mind you, at present, our National conferences do not have concessional registration for members, but soon! Trying to change it to yearly payment will see everyone default on their payments. Hopefully, some day, we will be able to increase the fees.

At present, we have 340 Life members. Membership is restricted to Surgeons, Anaesthetist and Dentist. Possible expansion to include DSC and Nurses, Managers and Ayurvedic surgeons, as Associate/Corresponding members in the near future, is being looked into.

We also publish Day Surgery Journal of India, yearly issue; and One Day Surgery Times, a monthly Newsletter, being edited by me.

The Journal is available on **www.daysurgeryindia.org** for everyone to read. Earlier, we had articles from international authors, but, since the past 2 issues of the Journal, articles received are from Indian authors only! This goes to show, the development and data, in Day Surgery, locally.

Newsletter is basically for General Practitioners, Family Physicians and Medical Students, to increase awareness on Day Surgery.

National Conferences are biennial now, alternating with the IAAS Congress, we are trying to organize these meetings in different parts of the country so as to make it possible for more people to attend.

Naresh Row, MD, President of The Indian Association of Day Surgery
Editor, Day Surgery Journal of India & One Day Surgery Times

News from Germany

German Expert Advisory Board Votes for Ambulatory Surgery

The Expert Advisory Board of the Ministry of Health has recommended that ambulatory surgery should be promoted in order to tear down the historical barriers between hospitals and doctor's offices including day clinics. So far hospitals are paid for by a DRG system whereas day clinics are still remunerated at a much lower rate by the payment system called EBM. According to the Advisory Board ambulatory surgery should be part of the newly established area of 'special consultant care' which means care by highly specialized consultants of hospitals and doctor's offices in the fields of surgery, oncology and others. The remuneration for ambulatory surgery should be adjusted so that it does not pay any more for hospitals to hold patients in bed.

Comment: This is a major advance for ambulatory surgery in Germany even if the recommended reform probably will not be started before the next general elections which will take place in the fall of 2013. Nevertheless, the advice of this official Expert Advisory Board cannot easily be denied in the future.

Jost Broekelmann MD, BAO

News from the Netherlands

The 16th Dutch Congress on Ambulatory Surgery

The 16th Dutch congresss (November 2011), 'the digital world of ambulatory surgery' was again successfull with a varied programme and a good attendence.

Topics were

- The luxury of robotic surgery in urological interventions
- Digital anesthesia report with four-color pencil
- Innovation in thorax surgery with VATS Video Assisted Thoracaloscopic Surgery. VATS is also a technological development in surgery in favor of the patient
- With the help of Design Management a product can be made more attractive and can positively affect perception, contribute to the learning process, enlarge the enjoyment and improve the decision-making.
- E-health is a fast growing phenomenon that will be in a short time an indispensable tool for patients to manage their own disease. Especially for the chronic patient who is well knowing his own disease. People are using Social Media for sharing personal experience, knowledge and understanding but also about the performance and service of doctors and hospitals.

The congress was closing with a witty comic speaker on the advancing digitalization in health matters.

The congress was also a farewell to Dr. Hans Kerkkamp as chairman of the Dutch NVDK and the beginning of the new chairman Dr. Andre Wolff (anesthesist) and a new surgeon board member Dr. Marlies Schijven.

Cecile Verhagen, NVDK

Anaesthetising Somalia's Tallest Man

G. Chhabra[1], R. Duggal[2] and Stephen Littler[3]

Abstract

This case report presents what we believe to be the tallest individual in the world to ever undergo day case surgery. This is also the first time sugammadex has been used in someone with gigantism.

Keywords: Colonoscopy, Ambulatory surgery center, Bowel preparation, Colonoscope processing, Procedure time, Complications, Non-routine cases, Hypotension, Hypoxia, Patient outcomes.

Author's addresses: [1] Specialty Registrar, Anaesthetics, Northern Deanery
[2] Specialty Registrar, Anaesthetics, Imperial School, London Deanery [3] Consultant Anaesthetist, Central Middlesex Hospital, Park Royal, London.

E-mail: Stephen.littler@nwlh.nhs.uk

Introduction

Gigantism is a non-specific term that refers to any standing height more than 2 SD above the mean for the persons sex, age and Tanner stage (i.e. Height Z score >+2).[1]

Increased height due to true gigantism is extremely rare, with the total number of reported cases in the hundreds. Correspondingly literature on anaesthesia in patients with gigantism is limited. Acromegaly is more common, occurring at an estimated worldwide annual rate of 2.8-4 cases per million. The major difference between these two conditions is that gigantism is characterised by abnormally high linear growth while the epiphyseal growth plates are open during childhood and acromegaly results from growth hormone excess ensuing after epiphyseal fusion has occurred.

Patients with acromegaly have recognised physical manifestations including airway management, cardiac, gastrointestinal, musculoskeletal and renal problems. [2] The anaesthetic risks for acromegaly are applicable to patients with gigantism.

Case Report

A 35-year-old male, ASA III, of Somalian descent with a confirmed diagnosis of a pituitary micro adenoma, who has to date declined any treatment. At pre-assessment he weighed 204kg and was 7ft 9in (BMI 37.5). He had no previous general anaesthesia. Significant past medical history included thyroid stimulating hormone (TSH) deficiency, partial adrenocortiotrophic (ACTH) deficiency and bitemporal heminopia. The patient was taking no regular medications and had no known allergies. Pre-operative investigations illustrated a mild normocytic anaemia and a negative sickle screen.

Clinical examination was remarkable for coarse facies, an enlarged mandible, widened nose and significant gyanecomastia. Examinations of respiratory and cardiac systems were otherwise unremarkable. Airway assessment showed prognathism, macroglossia and Mallampati A view. He had a good range of neck mobility and normal temporo-mandibular joint mobility. He had poor dentition and was having a total dental extraction.

Preoperative preparation included inviting the patient to the operating room three days in advance of surgery. Attention was focused on preparation of the patient positioning, suitability of the table compared to the patients' weight and height, and anaesthetic equipment.

On the day of surgery, the patient walked into theatre and transferred himself on to a specially reconstructed table (made up of one operating table and three recovery trolleys combined) (see Figure 1). Basic standards of monitoring for a day case procedure were employed. [9]

Figure 1.

A gas induction was performed using sevoflurane 2-8%, 5 litres of oxygen and 5 litres of nitrous oxide. Size 4 guedel was inserted and his airway was easily maintained. Direct laryngoscopy was performed with a No. 5 Macintosh blade followed by 300 micrograms of fentanyl. Glottic opening was easily visualised, Grade I Cormac and Lehane Classification. Rocuronium 100mg (0.5 mg/kg) was given. Intubation of the trachea was achieved with a size 9 reinforced tube under direct visualisation.

Anaesthesia was maintained using desflurane (6–10%) and nitrous oxide (50%) in oxygen. Pressure-controlled ventilation was employed using a Drager Julian ventilator. He was ventilated to normocapnia. Tidal volumes of 900 ml and total minute volume of 11.1 litres per minute were achieved with inspiratory pressures of 19 cm H2O, respiratory rate of 12 breaths per minute, I: E ratio 1:2, and PEEP of 5 cm H_2O.

Other analgesics and anti-inflammatories given were diclofenac 200mg (0.98 mg/kg) buffered in 0.9% saline, paracetamol 2.5g

(12.25 mg/kg) and dexamethasone 20mg (0.09mg/kg). Local anaesthetic dental blocks were also performed by the surgeons.

Total dental extraction was completed in 45 minutes. Neuromuscular block was reversed using sugammadex. Response of train of four monitoring (using a peripheral nerve stimulator over the ulnar nerve) before sugammadex was 1 twitch, and after an initial dose of 500mg of sugammadex (2.4mg/kg) was 4 twitches with no fade after one minute. This is a lower dose than the recommended (4mgkg) however the nerve stimulator already indicated the patient was adequately reversed. The oropharynx was suctioned under direct vision. The patient was extubated in a semi seated position on the operating table where he was also was given postoperative care. Recovery was uneventful and he was discharged home from the operating room after 180 minutes.

Discussion

The anaesthetic care of patients with pituitary disease involves an understanding of the varied presentations and their implications for the patient's perioperative condition and management.

The focus of anaesthetic management was to achieve a smooth induction with maintenance of the airway and to prevent or control any potential haemodynamic instability. In these patients airway features include macroglossia, prognathism with malocclusion and hypertrophy of the laryngeal soft tissue, epiglottis and aryepiglottic folds.[3,4] Systemic features include hypertension, diabetes mellitus,[2] pulmonary dysfunction,[5] cardiomegaly and congestive cardiac failure, resulting from excess growth hormone. The incidence of difficult larygoscopy and intubation in acromegalic patients is higher than in the normal patients.[6]

Risks are also present during the period of extubation. Anticipated complications include coughing, laryngospasm and breath-holding. Death from respiratory causes is three times more common in patients with acromegaly than in the general population and is often the result of upper airway obstruction.[7]

A major problem for the anaesthetist is the overgrowth of airway tissues, which makes patients susceptible to airway obstruction and difficult visualization of the vocal cords by laryngoscopy. Therefore all patients with gigantism should be considered difficult endotracheal intubation candidates. Airway assessment alerts the anaesthetist of the possibility of difficult intubation.

Four grades of airway involvement are described in acromegaly:

1. No significant involvement

2. Nasal and pharyngeal mucosa hypertrophy

3. Glottic involvement including glottic stenosis or vocal cord paresis

4. Combination of grade 2 and 3

For grade 3 & 4 either fiberoptic intubation or tracheostomy may be needed.

The height and weight of patient necessitated special attention to positioning and monitoring. A specially constructed table was used. Monitoring devices were attached prior to induction of anaesthesia and their use continued until the patient had recovered from the effects of anaesthesia. Resuscitation drugs were drawn according to the recommended doses used in clinical practice.

Sugammadex was chosen as the neuromuscular blockade reversal drug. It is a synthetic, modified gamma cyclodextrin and the only available selective relaxant binding agent. The use of sugammadex produces a rapid, predictable offset of neuromuscular blockade from aminosteroid drugs (rocuronium, vecuronium) without the risk of re-curarisation and as such reduces the risk of potential airway complications both during and post-extubation. It has also been suggested that sugammadex is more effective than neostigmine in reversing muscle relaxation caused by neuromuscular blockade during surgery and is relatively safe. [13-15]

Conclusion

Gigantism is a rare clinical finding. The clinical features shared with acromegaly include thickened tissues of the upper airway predisposing to airway obstruction. 8 An increased incidence of death as a direct result7 demands careful preparation to reduce this risk. There is additional challenge to identify equipment of suitable size and strength. Sugammadex was chosen to provide a rapid, predictable and complete offset of neuromuscular blockade to reduce the risk of potential airway complications both during and post-extubation.

References

1. Ferry RJ Jr, Shim M. Gigantism and Acromegaly. eMedicine. 8 July 2010. Available at: http://emedicine.medscape.com/article/925446 – overview. Accessed January 25, 2012.
2. Seidman PA, Kofke WA, Policare R, Young M. Anaesthetic complications of acromegaly. ***Br J Anaesth*** 2000;**84**:179–82.
3. Sharma HH, Kacker SK. The effects of Acromegaly upon the Larynx. ***Indian Journal of Otolaryngology*** 1985;**37(1)**:26–27.
4. Duda I, Grzybowska K, Rudnik A, Skorupa A, Karpel E. Endotracheal intubation in acromegalic patients. ***Anest Int Ter*** 2005;**37(3)**:155–158.
5. Evans CC, Hipkin LJ, Murray GM. Pulmonary function in acromegaly. ***Thorax*** 1977;**32(3)**:322–7.
6. Schmitt H, Buchfelder M, Radespiel-Tröger M, Fahlbusch R. Difficult intibation in acromegalic patients: incidence and predictability, ***Anaesthesiology*** 2000,**93(1)**: 110–4.
7. Murrant NJ & Garland DJ. Respiratory problems in acromegaly. ***Journal of Laryngology and Otology*** 1990;**104**:52–5.
8. Kitahata LM. Airway Difficulties associated with the anaesthesia in acromegaly. ***British Journal of Anaesthesia*** 1971;**43(12)**:1187–1190.
9. Mitchell J. Recommendations for standards of monitoring during anaesthesia and recovery. ***Anaesthesia*** 2001;**56(5)**:488.
10. Cammu G, De Kam PJ, Demeyer I, Decoopman M, Peeters PAM, Smeets JMW, Foubert L. Safety and tolerability of single intravenous doses of sugammadex administered simultaneously with rocuronium or vecuronium in healthy volunteers. ***Br. J. Anaesth.*** 2008;**100(3)**:373–379.
11. F. Paton, M. Paulden, D. Chambers, M. Heirs, S. Duffy, J. M. Hunter, M. Sculpher, and N. Woolacott. Sugammadex compared with neostigmine/glycopyrrolate for routine reversal of neuromuscular block: a systematic review and economic evaluation. ***Br. J. Anaesth.*** 2010;**105(5)**:558–567.
12. Pühringer FK, Gordon M, Demeyer I, Sparr HJ, J. Ingimarsson J, B. Klarin B, van Duijnhoven W, Heeringa M. Sugammadex rapidly reverses moderate rocuronium- or vecuronium-induced neuromuscular block during sevoflurane anaesthesia: a dose–response relationship. ***Br. J. Anaesth.*** 2010;**105(5)**: 610–619.
13. Bevan JC, Collins L, Fowler C, Kahwaji R, Rosen HD, Smith MF, deV Scheepers L, Stephenson CA, Bevan DR. Early and late reversal of rocuronium and vecuronium with neostigmine in adults and children. ***Anesth Analg*** 1999;**89**:333–9.
14. Suresh D, Carter JA, Whitehead JP, Goldhill DR, Flynn PJ. Cardiovascular changes at antagonism of atracurium. Effects of different doses of premixed neostigmine and glycopyrronium in a ratio of 5:1. ***Anaesthesia*** 1991;**46**:877–80.
15. Caldwell JE. Reversal of residual neuromuscular block with neostigmine at one to four hours after a single intubating dose of vecuronium. ***Anesth Analg*** 1995;**80**:1168–74.

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Doug McWhinnie Division of Surgery, Milton Keynes Hospital, Standing Way, Milton Keynes, Buckinghamshire MK6 5LD, UK
Email: dougmcwhinnie@uk2.net

Beverly K. Philip Day Surgery Unit, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA.
Email: bphilip@zeus.bwh.harvard.edu