The Journal of One-Day Surgery

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Perioperative ankle fracture guidelines – a cost effective management strategy

Mini Cholecystectomy: A Day Case Alternative to Laparoscopic Cholecystectomy

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Contents

30 Editorial TIM ROWLANDS

31 President’s Letter ANNA LIPP

33 Perioperative ankle fracture guidelines – a cost effective management strategy
ANDREW KUK, *JAMES WIDNALL, ANGELA CHOW, SHARON FLEWITT, JOHN JENSEN & ANDY MOLLOY

40 Mini Cholecystectomy: A Day Case Alternative to Laparoscopic Cholecystectomy
WILLIAM CARR, ANANTHA MADHAVAN & SIMON WAKEFIELD

44 Pre-Operative Fasting In The Day Surgery Unit: Are We Behind The Timings?
SOPHIE FORSTER LANE, SONIA DAMLE, SOHINI SENGUPTA, CHAN LUONG & SONIA MONGIA

48 The Difficult Airway and Videolaryngoscope use in Day Surgery
RACHEL TIBBLE & LAURA CARRICK

51 Intrathecal hyperbaric 2% prilocaine for day surgery: a prospective, observational study
RAMYA SIRAMAN, ANIL HORMIS & KIM RUSSON

55 Letters

Inside back cover BADS Editorial Information
In the run up to the coming General Election in the UK we see the usual wrangling about the NHS, deficits, funding gaps etc. It is a familiar battleground, to paraphrase at least one political party leader. Day case and short stay surgery is rarely mentioned directly, and doesn’t appear to have the same easy-to-mention timeframes of other NHS targets. How obvious is a day?

We have just about emerged from a winter of unprecedented demand, despite the relative mild conditions. May I ask how your local day case service fared during this time? Not usually one to gamble, but I bet there was a sudden interest in preserving elective, tariff reimbursing activity, in the sudden absence of inpatient beds!

Our society President describes her experiences in observing surgery in primary care; significant room for expansion here. But how do you train and monitor it?

In this edition of the Journal Of One Day Surgery we have a variety of different themes. We have an orthopaedic group looking at cost savings from the implantation of a new ankle fracture management policy [page 33]. Carr et al present useful data from a study of that much-forgotten procedure, the open (mini) cholecystectomy [page 40]. Yes, you can do them as a day case with good selection.

We are often accused of excessively fasting our patients preoperatively. Medico-legal implications aside, we simply don’t have a handle on what everyone truly does elsewhere. Forster Lane et al [page 44] describe their own work. This Editor would welcome as many letters as possible on this topic.

Tibble and Carrick describe the use of videolaryngoscopy in routine day case practice [page 48]. I am aware of courses for this out there and would welcome comment. Staying with anaesthesia there is an early experience paper with intrathecal prilocaine [page 51]. I continue to watch this expanding field with interest; is this the next simple step to expand day case practice? What about chlorprocaine? Watch this space.

Finally it was a pleasure to receive communications on the warming study in JODS 24.4 and I hope you find the comments interesting.

Finally, this is the last journal to go out before the British Association of Day Surgery Annual Scientific Meeting in June 2015. I look forward already to seeing the original abstracts and presentations alongside the features put together by the BADS executive team and hopefully the definitive papers to follow.

TIM ROWLANDS

Reference

When I read the Simon Stevens vision for the NHS in “The NHS 5 year forward view”, published in October last year, I wondered what the implications for day surgery might be. The section which caught my attention was that highlighting the need to address the ever widening gaps in health and well-being, care and quality and funding and efficiency. With regard to funding and efficiency the report stated, “if we fail to match reasonable funding levels with wide-ranging and sometimes controversial system efficiencies, the result will be some combination of worse services, fewer staff, deficits, and restrictions on new treatments”.

Many of you will have heard Laurel Spooner, then president of the Association of Surgeons in Primary Care (ASPC) speak at last year’s BADS ASM on “hospital day unit or community surgical facility?” and I was fortunate to be invited to visit the community surgery facility where she is based to see how services are provided there. One of the procedures offered is carpal tunnel release, a procedure also carried out in the hospital where I am based. It provided an excellent opportunity for me to compare the two services and reflect on the quality and efficiency of the service provided in both settings.

The pathway for patients offered care in either setting starts with their GP appointment and may include non-surgical treatments provided by the GP initially, such as splints or steroid injections. If these fail to improve the condition, as in the majority of cases, they will then need a referral for surgical treatment. If this referral is to secondary care, they will need to attend an outpatient appointment and then usually a wait of a couple of months before a date for surgery is offered. If patients are referred to the service in the community they will be seen at the community surgical facility by a primary care surgeon who specializes in carpal tunnel surgery. If surgery is offered a date for surgery can be chosen by the patient at that appointment, usually within 4 weeks.

On the day of surgery in the community facility, free parking is available immediately outside the door. Patients have individual appointment times do not need to change into a hospital gown for their procedure. A consultation with the operating surgeon to confirm need and suitability for surgery takes place immediately before the procedure in the same room.

The surgeon is assisted in the procedure room by one trained nurse who prepares all the instruments and looks after the patient positioning and comfort during the procedure which takes about 20 minutes. Afterwards a simple dressing (no bandages or sling) is applied and instructions for hand mobilization exercises are explained. The surgeon completes the medical records and any other documentation on the computer. Follow up appointment to include removal of sutures is arranged and mobile phone number for the operating surgeon is given in case of complications or queries. The patient is usually on their way home again within an hour of arrival.

All patients having surgery in our secondary care day unit usually arrive at 12 o’clock for an afternoon operating session and are admitted as a day case patient. This involves a considerable amount of paperwork being completed as standard for every LA patient. All patients change into a gown and await their operating slot. They can walk from the waiting area to the theatre, which is fully equipped with piped gases for general anaesthesia and can accommodate all levels of surgery. The staffing level is usually three, in addition to the surgeon. One member of staff scrubs and assists the surgeon, another observes and chats to the patient, while the third is usually occupied completing all the necessary information on the computer. Once surgery is completed the patient walks back to the ward area where they dress and get ready for discharge. Instructions are given about care of the wound and contact numbers for any queries about complications given by one of the ward nurses. Total time spent at the hospital is between 3 and 6 hours depending on position of procedure on the operating list. Parking maybe difficult to find so patients need to allow plenty of time for this and many find it a stressful part of the visit for treatment.

My impression was that the primary care pathway offered a more efficient service due to considerably fewer staff being involved in a much simpler pathway of care. As a patient I
would value being given a choice of date for surgery, the short waiting time for surgery and short time spent on the day. Possibly only slightly less important would be the free and convenient parking. However I would also want to know about the quality of such a service and I was impressed to be able to see infection rates, referral rates, patient satisfaction scores and friends and family test scores for the clinic, all demonstrating a high quality service.

So this has made me wonder whether we should continue to offer services such as carpal tunnel in secondary care. I know from discussion with my colleagues that any reorganization is controversial but as stated in the NHS 5 year forward plan, we have to tackle the gap between funding and efficiency and my view is that moving appropriate day surgery from secondary care into community services maybe one way forward.

BADS and ASPC are keen to facilitate this development and is setting up a “buddy scheme” between primary care surgeons and surgeons or anaesthetists in day units in secondary care. We hope this will improve understanding of the way in which we both work and enable establishment of partnerships to encourage the development and support of appropriate services in a community setting. If anyone would like to be involved as a buddy please contact me via the bads office on president@bads.co.uk or come and find me at the next BADS ASM in Torquay June 18th and 19th, hope to meet you there.

ANNA LIPP

The Journal of One-day Surgery considers all articles of relevance to day and short-stay surgery. Articles may be in the form of original research, audits, case reports or series, practice development and letters to the editor. Research projects must clearly state that ethics committee approval was sought and that patients gave their consent to be included. Patients must not be identifiable unless their written consent has been obtained.

Articles must be prepared in Microsoft Word or a totally compatible alternative, with double line spacing and wide margins. Submission must be by electronic means (disc or email). Articles must also be accompanied by a letter requesting publication, which should be signed by all authors; a scanned image is acceptable, but if this is not possible, a paper copy may be sent separately. Any source of funding should be declared and authors should also disclose any possible conflict of interest which might be relevant to their article.

The first page should include:

- the title of the article
- list all authors (including their full first names)
- their job titles
- the hospital or unit(s) where the work is from
- current contact postal addresses, email addresses and telephone numbers for the corresponding author and at least one other co-author.

The author should provide three or four keywords describing their article, which should be as informative as possible.

Where appropriate, manuscripts should be divided into the following sections:

- Abstract
- Introduction
- Methods
- Results
- Discussion
- References.

Each section should start on a new page.

Tables and figures (if included) should follow, with each on a separate page. Tables should be formatted as part of the Word file. Please try to avoid sending tables as picture files (tiffs or jpegs). If tables are presented separately as picture files [jpeg or tiff], they should be high resolution - at least 300 dpi.

Figures should also be 300dpi tiffs or jpegs. You can embed figures in the text to show position but please also provide figures separately, as high resolution tiff or jpeg files.

Each table and figure should be accompanied by a legend which should be sufficiently informative as to allow it to be interpreted without reference to the main text.

Photographs Copies of original photographs, as a high resolution jpg or tiff file [at least 300dpi], should be included as a separate enclosure. Please do not only send pictures which are embedded within the text of the manuscript. However, you may include embedded pictures as a guide to positioning.

References should be cited numerically in the order they appear in the text. References should list all authors names. Journal titles should be given in full. Please provide both the first and last page numbers.

All submissions are subject to peer review. Proofs will not normally be sent to authors and reprints are not available.

All items should be sent to The Editor:
Mr Tim Rowlands, Consultant Vascular Surgeon, Royal Derby Hospital, Uttoxeter Road, Derby DE22 3NE
Email Address: editor@bads.co.uk
Introduction

Each year ankle fractures occur in every 100 per 100,000 patients in the United Kingdom and often require surgical intervention. Studies have derived two schools of thought regarding the timing of their management and it remains a contentious issue. Some authors have found a delay of surgical intervention negatively impacts the post-surgical outcome due to increased difficulty attaining accurate reductions. Other authors have found no difference in outcome when comparing ankle fractures operatively fixed either before or after five days post injury. Lloyd et al serve a reminder that the gold standard for management of ankle fractures is in fact surgical stabilisation within eight hours of the original injury, which although ideal is highly ambitious given multiple barriers such as reduced working hours and an ever increasing trauma workload.

The causes of delay in operative management can be split into clinical and logistical. The former includes patient co-morbidities and soft tissue complications. The latter includes lack of surgical theatres, equipment and staff. Consequently, a delay for intervention affects firstly the

Keywords: ankle fracture, home therapy, rehabilitation, cost effective.

Abstract

Introduction: Each year ankle fractures occur in every 100 per 100,000 patients in the United Kingdom and often require surgical intervention. It has been documented that closed, simple ankle fractures should be operated on within eight hours of injury; a feat that is becoming ever more difficult with today’s workload pressures. Those patients not fixed within this time period go on to develop soft tissue swelling and incur a potentially increased length of stay for soft tissue monitoring prior to fixation. To combat this, our department has utilised both a trauma nurse coordinator and departmental guidelines to eradicate any unnecessary admissions and decrease length of stay.

Aims: To assess the impact of both the trauma nurse coordinator and the new guidelines on admission rates and length of stay for this patient population.

Methods: All patients identified with an ankle fracture attending our Accident and Emergency department were assessed via our departmental guidelines. If all criteria were met, they were subsequently discharged home and followed up on an outpatient basis until swelling was of a level to permit surgical fixation. A retrospective case note analysis, from three time periods prior to the implementation of both the trauma nurse and guidelines, produced demographic data, complication rates and length of stay figures. Outcome was measured via length of stay, pre-operative management and observed complications.

Results: 59 patients met the inclusion criteria. There was an even split between the three time periods. The introduction of both the trauma nurse coordinator and departmental guidelines lead to an increase in the number of patients managed as an outpatient preoperatively. We were unable to determine which intervention (the coordinator or the guidelines) had a more significant role (ANOVA p=0.31). Those managed as an outpatient had a significantly shorter length of stay (3.5 to 8.7 days, p<0.05). There was no increase in complications associated with this treatment protocol.

Conclusion: When safe to do so, discharging patients with ankle fractures, who require surgery, from the A&E department until the date of surgery is an acceptable combination of quality care and cost effectiveness. Our estimates show a potential saving of £18,000 per year by adherence to these guidelines.

Authors’ Addresses
ANDREW KUK Orthopaedic SHO, JAMES WIDNALL Orthopaedic SpR, ANGELA CHOW Orthopaedic SHO, SHARON FLEWITT Orthopaedic Trauma Nurse, JOHN JENSEN Orthopaedic Statistician, ANDY MOLLOY Consultant Orthopaedic Surgeon. Department of Trauma and Orthopaedics, University Hospital Aintree NHS Foundation Trust, Liverpool, UK.

Corresponding author: James Widnall, 6 Allangate Road, Liverpool L19 9BZ. Email: j.widnall@doctors.org.uk
patient who may suffer with swelling and blistering of the ankle and secondly the hospital, which will bear the costs of an increased patient length of stay\textsuperscript{6–8}.

Classically, the patient with a fractured ankle who requires surgical intervention, but does not receive it in the desirable eight hour window\textsuperscript{3}, would be admitted onto a ward for several days for leg elevation and soft tissue monitoring. However, a prolonged length of stay for days with only conservative measures is not well tolerated inpatients who may often otherwise be fit and well\textsuperscript{3}.

Our department sought to reduce ankle fracture patients’ length of stay by the introduction of two initiatives. Firstly in 2011, a trauma nurse coordinator was added to the team. The coordinator’s role was to aid in facilitating admissions, liaising with operating theatres and communicating with patients out of hospital pre and post operatively. Secondly in 2012, a new set of guidelines for the management of ankle fractures was introduced. These aided Accident and Emergency (A&E) clinicians in the identification of patients with ankle fractures who, if no exclusion criteria were met, could be discharged home after initial management for outpatient management until definitive surgery (see Figure 1).

**Aims**

The aims of this study were:

1. To determine whether the new ankle fracture guidelines had made an impact on the admission rates of ankle fracture patients and their length of stay in hospital.

2. To determine whether the introduction of the trauma nurse coordinator has made an impact on the admission rates of ankle fracture patients and their length of stay in hospital.

3. To evaluate whether patients with ankle fractures who were discharged pre operatively and managed as outpatients, as per the guidelines, have any difference in complication rates compared to those who were managed as inpatients.

4. To calculate whether the new guidelines have been cost effective when managing patients as outpatients compared to those who were managed as inpatients.

**Methods**

Patients with suspected ankle fractures at our department underwent clinical examination and appropriate radiographic imaging in the A&E department. When an ankle fracture was confirmed radiographically, the fracture was appropriately reduced and held in a plaster of Paris cast. If the guideline criteria were met patients were discharged home and managed as outpatients until surgery. A fracture clinic appointment was organised in the subsequent days from discharge where tentative plans for surgery were scheduled. If the criteria were not met then these patients were admitted and managed as an inpatient with high elevation and soft tissue monitoring. The criteria for satisfactory outpatient perioperative management were;

- Medially fit patient for discharge
- Closed injury, in an acceptable position
- Intact neurovascular limb
- The patient was safe mobilising non weight bearing with crutches/walking aids
- The patient was deemed safe on stairs
- Patient could perform independent activities of daily living
- Home telephone available
- Inside toilet facilities at home
- Compliant patient
- Clinical absence of deep vein thrombosis
- Clinical absence of peripheral neuropathy

A retrospective review of patient case notes was undertaken by using electronic records. This was carried out over three periods: April–July 2010, April–July 2011 and April–July 2012. In 2010 there was neither a trauma nurse coordinator nor the new ankle fracture management guidelines. In 2011 the role of the trauma nurse coordinator was introduced and in 2012 the guidelines were introduced. Searching for “ankle fracture” and “surgery” in the hospital’s clinical coding system identified the appropriate patients for each of these time periods.
The following details for each patient were acquired:

- Demographic details
- Date of fracture
- Whether the patient was discharged home or admitted as an inpatient from the date of the fracture
- Date of re-admission for surgery if a patient was initially discharged home
- Date of operation
- Length of stay (days)
- Days from fracture till operation
- Weber’s ankle fracture classification
- Operation type
- Whether an initial manipulation under anaesthesia (MUA) was required
- Whether deep vein thrombosis (DVT) prophylaxis (a subcutaneous low molecular weight heparin) was given during inpatient stay
- Post operative complications by looking at outpatient follow up (minimum of 6 weeks): Infection, delayed wound healing (more than three weeks), DVT, repeat operation, surgery cancelled and unplanned admission due to complications

Outcome was measured via length of stay, pre operative management and observed complications. On completion of data collection, statistical analysis was performed using Microsoft Excel.

### Results

77 patients were identified who had sustained an “ankle fracture” and “surgery” according to the clinical coding system. On further review of these notes, 18 patients were excluded from the total population due to incomplete notes, conservatively managed injuries or open injuries. Therefore 59 patients were involved with this study. Table 1 describes the demographic data per time period.

The total number of patients was relatively well split with 20, 18 and 21 ankle fractures being fixed in 2010, 2011 and 2012 respectively. There was no statistical difference in gender or laterality between the three cohorts. The average age was 47.7 years.

In 2010, prior to the introduction of the trauma nurse coordinator and ankle fracture management guidelines, 35% of patients were managed as an outpatient pre operatively. This dropped to 16.7% in 2011 with the introduction of a trauma nurse coordinator and rose again to 47.6% in 2012 with the introduction of the guidelines. When looking at the figures pre and post the introduction of the guidelines, 26.3% of ankle fracture patients were managed as outpatients pre and 47.6% post (see Figure 2), which was statistically significant ($\chi^2$ test, $p<0.05$).

#### Table 1 Demographic data.

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>20</td>
<td>18</td>
<td>21</td>
<td>59</td>
</tr>
<tr>
<td>Sex</td>
<td>M: 8 F: 12</td>
<td>M: 8 F: 10</td>
<td>M: 13 F: 8</td>
<td>M: 29 (49.2%) F:30 (50.8%)</td>
</tr>
<tr>
<td>Left / right ankle</td>
<td>L: 9 R: 11</td>
<td>L: 10 R: 8</td>
<td>L: 5 R: 16</td>
<td>L: 24 (40.7%) R: 35 (59.3%)</td>
</tr>
<tr>
<td>Outpatient management</td>
<td>7 (35.0%)</td>
<td>3 (16.7%)</td>
<td>10 (47.6%)</td>
<td>20 (33.9%)</td>
</tr>
<tr>
<td>Inpatient management</td>
<td>13 (65.0%)</td>
<td>15 (83.3%)</td>
<td>11 (52.4%)</td>
<td>39 (66.1%)</td>
</tr>
</tbody>
</table>
The average length of stay in the all those discharged and managed as outpatients preoperatively over the 3 time periods was significantly shorter at 3.5 days compared to 8.7 days in the inpatient group (T-test, p < 0.05), see Figure 3.

Since the introduction of the trauma nurse coordinator, there has been a significantly lower length of stay in ankle fracture patients compared to those in 2010 (T test, p<0.05). However, when determining which initiative has a more significant impact on length of stay (i.e. whether the trauma nurse coordinator or the guidelines had a greater impact) there is no initiative which stands out from the other (ANOVA, p=0.31), see Figure 4.

There was no significant difference in complication rates in the patients who were discharged and managed as outpatients preoperatively and those who were admitted as inpatients (Odds ratio: 0.39, 95% CI 0.05–4.42. Relative risk: 0.42, 95% CI 0.24–17.16). Of the 20 patients who were discharged over the 3 time periods, 1 patient was found to have delayed wound healing at 3 weeks post surgery, giving a complication rate of 5.0%. 4 of the 39 (10.3% complication rate) admitted patients were found with complications such as blistering and ulceration of the skin post operatively (2 patients), poor post operative positioning requiring further corrective surgery (1 patient) and re-manipulation for equinus positioning (1 patient). Neither group suffered any complications from DVTs. Looking at the rate of complications in relation to the number of days from fracture till surgery (Figure 5), there was a near equal spread in distribution.

The finance department at our institution provided an estimate of the cost of an orthopaedic bed per patient per night at £150. Referring back to Figure 5, the average length of stay in 2010 was 6.7 days and since the trauma nurse and new guideline introductions the average length of stay is 4.7 days. This amounts to 2 “bed days” saved per patient since the introduction of these measures. Referring back to figure 2, we can approximate that within a four month period, our department expects to see 20 patients who sustain simple closed ankle fractures requiring surgery. This suggests that we see 60 of these patients in a year and therefore have potentially saved 120 “bed days”, which amounts to £18,000, each year since 2011.

**Discussion**

In conclusion, this study has found that the introduction of the trauma nurse coordinator and ankle fracture management guidelines have made a significant impact on the management of ankle fracture patients by lowering both the inpatient admission rates and average length of stay. It is worth noting that in 2011 after the introduction of the trauma nurse coordinator there was an increase in the number of patients admitted compared to the previous year. Although not statistically significant, a possible explanation for this trend could have been a lower average time to theatre through the coordinator’s role to expedite efficiency.

There were no significant differences in complication rates between patients who were managed as out and inpatients, which suggest that these guidelines for outpatient management are a safe option in ankle fracture management. There is possibly a lower complication rate in those discharged preoperatively but further data and analysis is required before this can be confirmed.

An estimate of the cost saved due to the introduction of the two initiatives amounted to £18,000 per year. Given the current economic climate, any saving regardless of amount will be beneficial to hospital trusts.

The authors were surprised to find that not more patients were managed as outpatients in 2012 following the introduction of the guidelines (Figure 2). This study has not looked into the reasons why patients were admitted in 2012 despite the new guidelines. A further study to look into these reasons and therefore establish whether or not the guidelines have been effectively distributed and understood by departmental staff would be beneficial.

The average length of stay of patients managed as outpatients also came as a surprise to the authors (3.8 days). Again, a further study looking into why these patients remained in hospital postoperatively for this duration
New Publications from the British Association of Day Surgery

Quality in Day Surgery
This booklet sets out the key elements of care for a day surgery patient and indicates how, where and by whom the best quality care should be delivered for a patient having a day surgery procedure.

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The aim of this handbook is to discuss how sedation can be effectively and safely delivered in the day surgery environment.

Also still available:
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- Patient Safety in the Ambulatory Pathway
- 10 Dilemmas in Pre-Operative Assessment for Day Surgery
- Nurse Led Discharge
- 10 Dilemmas in Day Surgery
- 10 More Dilemmas in Day Surgery
- Day Case Laparoscopic Cholecystectomy (2nd Edition)
- Issues in Paediatric Day Surgery
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- Local Anaesthetic Hernia Repair
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- Enhanced Recovery after Surgery
- Patient Warming in Day Surgery
- Managing Patients with Diabetes for Day- and Short-Stay Surgery
- Day Surgery under Local Anaesthesia
- Pathway to Success
- Team Work & Staffing

Available from the BADS online shop at www.bads.co.uk
This specialist handbook is the culmination of collaboration between the British Association of Day Surgery and Oxford University Press.

The editors, Smith, McWhinnie and Jackson, have recruited experts from around the world to deliver an up-to-date and comprehensive guide to all that is best practice in Day and Short Stay Surgery.

Contents

• Origins and importance of Day and Short Stay Surgery and its benefits to health economies.
• Pre assessment and preparation for same day admission for medical intervention or surgery.
• The selection and delivery of the differing modalities of anaesthesia to facilitate surgery.
• Post operative care, complications and follow-up thereafter.
• Issues specific to the various types of surgery.
• Focussing on the patient centred clinical journey.
• Workforce issues and organisational development.
• Developing the required facilities.
• Pushing the boundaries and evolving to meet future challenges and developments.

This book has been produced as the workshop manual for all clinicians involved in the day to day delivery of shortest stay surgery.

However, it is anticipated that it will become the reference work for those who are to be intimately involved in the design and commissioning of elective interventional services.
would also be useful. Considering simple ankle fractures in otherwise fit and healthy people can be fixed quickly and effectively, if there are no post operative reasons to remain as an inpatient, the authors would propose the idea of managing this population of patients as a day case.

When safe to do so, discharging patients with ankle fractures, who require surgery, from the A&E department until the date of surgery is an acceptable combination of quality care and cost effectiveness. Furthermore, with an estimated amount of £18,000 saved per annum, this approach to ankle fracture management will not only be the preferred choice of patients but also the hospital administrators.

References


Mini Cholecystectomy: A Day Case Alternative to Laparoscopic Cholecystectomy

WILLIAM CARR, ANANTHA MADHAVAN & SIMON WAKEFIELD

Abstract
Introduction Whilst laparoscopic cholecystectomy has become the standard technique for cholecystectomy across the UK there remains some patients in whom a laparoscopic approach is not possible. Evidence comparing laparoscopic to mini open cholecystectomy has shown both procedures to be safe and effective with short post-operative stays although poor day case rates. Since these studies the day case rate of laparoscopic cholecystectomy has steadily increased in the UK up to 43%. This study aims to assess the feasibility of day case mini cholecystectomy.

Methods: A case series of emergency admissions requiring cholecystectomy was prospectively evaluated to assess the feasibility of day case mini cholecystectomy for interval cholecystectomy and for <23hr stay for emergency cholecystectomy.

Results: 22 patients underwent mini cholecystectomy over an 18-month period after acute admission under a single surgeon. 17 underwent interval mini cholecystectomy with a 47% day case rate and 88% <23hr stay. 5 patients underwent emergency mini cholecystectomy with <23hr stay possible in 60%.

Conclusions: Day case and same day discharge is safe and possible after MC. For some patients with contraindications to laparoscopic cholecystectomy mini cholecystectomy provides an alternative approach that facilitates day case surgery.

Introduction

Mini-cholecystectomy (MC), defined as a cholecystectomy through a <8cm incision provided a popular alternative to open cholecystectomy before the advent of laparoscopic cholecystectomy (LC). However the laparoscopic technique has revolutionized gall bladder surgery and the majority of cases are now performed as day cases. Comparisons of the outcomes between mini-cholecystectomy and laparoscopic cholecystectomy however have not shown the laparoscopic technique to be superior. The 10-year results of a prospective randomized trial comparing MC and LC have shown similar results in terms of conversion rates and chronic pain. Whilst cosmetic appearance was slightly superior in the LC group residual abdominal symptoms were less with MC.

Amato have demonstrated that MC is safe and effective in series of 121 high-risk elderly patients with a mean length of stay of 3 days. Similar results have been reported elsewhere. Amir reported a mean length of stay of 1.5 days in a series of 200 cases. Purkayastha reported a meta-analysis of randomised controlled trials including 2032 patients comparing MC to LC finding that MC increased the length of stay by 0.37 days, reduced the operation time by 14.14 minutes but found no significant differences in other post-operative outcomes. LC was shown to take slightly longer to perform.

Since the introduction of laparoscopic cholecystectomy and the increasing emphasis on day case surgery MC is not widely performed. Nevertheless there has been an institutional change in the development of services to facilitate day case surgery that mean that MC is feasible as a day case. We believe that the mean stay of 1.5 days can be significantly reduced in an institute with high day case laparoscopic cholecystectomy rates.

Many surgeons believe the laparoscopic technique to be superior and never consider MC as an alternative. However in some patients laparoscopic cholecystectomy is not possible due to significant intra-abdominal adhesions from previous surgery or the patient is unable to tolerate a pneumoperitoneum. All laparoscopic surgeons therefore need a technique to deal with cholecystectomy when the laparoscopic approach is not possible. For many surgeons this is a standard open cholecystectomy, associated with a longer hospital stay.

Authors’ Address
MR WRJ CARR Surgical Registrar Northern Deanery.
MR A MAHAVAN Surgical Registrar Northern Deanery.
MR S WAKEFIELD Consultant Surgeon.
James Cook University Hospital, Middlesbrough.
admission and higher post-operative complication rates.

This study aimed to assess the feasibility of MC as a day case procedure in an institution aiming to achieve high rates of day case cholecystectomy.

Methods

All patients presenting to a single surgeon as acute admissions with gallstones and in need of cholecystectomy were offered a choice of LC or MC over an 18-month period. All patients in this study presented as acute surgical admissions initially. Emergency MC was performed during the index admission if clinically indicated. Patients were otherwise discharged home with a planned date to attend for MC. A single surgeon supervised all MC.

Data was collected prospectively to assess baseline demographics, indication for cholecystectomy, operative procedure, performing surgeon experience, length of hospital stay and complications. A 6-week telephone follow up was performed to assess recovery.

Technique

A 5cm incision is placed 2cm inferior and 2cm lateral to the xiphisternum running parallel to the costal margin. The anterior rectus sheath is opened and a muscle splitting technique used to gain access to the peritoneal cavity. A retrograde cholecystectomy is then performed with ligation of the cystic artery and ducts. Intra-operative cholangiogram is performed selectively. The incision can be extended to muscle cutting followed by division of the falciform ligament when needed to improve access. Local anaesthetic is infiltrated into the wound (0.5% chirocaine) and oral analgesia commenced with paracetamol and codeine as first line choices.

Results

Between October 2011 and April 2013 22 patients underwent MC. All patients presented initially as acute surgical admissions and agreed to MC in preference to LC. 5 underwent emergency MC whilst 17 were discharged and underwent an interval MC.

Baseline demographics are shown in Table 1. The age range of patients was from 19 to 90 with a mean of 54. The mean BMI was 27 (21–39). The majority of patients were ASA 2. Pre operative indication for surgery is shown in Table 2. In the emergency surgery cohort the intra operative findings included 2 perforated gangrenous gallbladders, 1 mucocele and 2 thick walled gallbladders in keeping with severe cholecystitis. In the elective group 1 empyema, 1 cholecysto-enteric fistula, 5 thick-walled gallbladders in keeping with chronic cholecystitis and 10 thin walled gallbladders were removed. Mean operating time was 46
minutes for interval MC and 56 for the emergency MC (Table 3). 1 emergency MC patient required extension of the incision to 8cm to remove a perforated gallbladder.

Length of stay results are shown in Table 4. 3 emergency MC patients were discharged on Day 1 post op. 1 patient required ITU admission for severe sepsis, acute renal failure and pneumonia. He was discharged successfully on day 10. The final patient stayed 48hrs after his emergency procedure for a mucocele of the gallbladder to correct acute renal impairment. In the interval MC cohort 8 (47%) patients were successfully treated as day cases. 7 patients were observed overnight before discharge the following morning in 23hr stay beds. 88% of interval MC patients were therefore discharged as day cases or 23hr stays. 2 patients were admitted for ongoing care. 1 patient required a 5 day stay for observation and monitoring after MC for a cholecysto-enteric fistula which resulted in a wound infection and the second for 7 days for treatment of cellulitis at the surgical incision.

There were no biliary complications and no patient required further surgical intervention or readmission to hospital within 30 days.

### Discussion

In this selective cohort of patients presenting with acute biliary problems to the on call surgical team MC has been shown to be a safe and effective technique for cholecystectomy. A wide range of gallbladder pathology was encountered including cholecysto-enteric fistula and perforated cholecystitis, which were both managed successfully using MC.

This cohort represents a more complicated cohort than may be expected in most large series of cholecystectomy as all patients had presented as emergencies and is reflected in the mean age of patient and ASA grade. The surgeon did not accept referrals for elective cholecystectomy. As a result the number of MC performed for biliary colic associated with a thin walled GB was only 23%. Despite this <23hr stay was achievable for 88% of patients listed for interval MC.

---

### Table 3 Operative Results.

<table>
<thead>
<tr>
<th></th>
<th>Emergency MC</th>
<th>Interval MC</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Time</td>
<td>56 (55–60)</td>
<td>46 (28–70)</td>
<td>48</td>
</tr>
<tr>
<td>Cholangiogram</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Skin Incision &gt;5cm</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Falciform divided</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Bile Spillage</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Post op Drain</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

### Table 4 Length of stay.

<table>
<thead>
<tr>
<th></th>
<th>Emergency MC</th>
<th>Interval MC</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Case</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>23hr Stay</td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>48hrs</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>&gt;48hrs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### Table 5 Postoperative complications.

<table>
<thead>
<tr>
<th></th>
<th>Emergency MC</th>
<th>Interval MC</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wound Infection</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
MC without significant post operative morbidity. However the efficacy of MC in high risk (age>80, ASA 3–5) has been previously described although understandably in these patients mean length of stay was 3 days. A meta-analysis in 2007 showed that length of stay was slightly shorter for LC than MC (by 0.37 days) although the length of stay for MC two of four randomised controlled trials analysed was over 3 days. Basu described the feasibility of day case MC recognising that it would have been possible to discharge 78% of patients as day case procedures in a simulation study. We believe this is the first case series to describe the feasibility of MC as a day case/ <23hr stay procedure after acute surgical admission.

UK national data shows that the national rate for day case cholecystectomy is 43% although this is on an upward trend. The day case rate for MC in our series was 47%, which compares favourably to the published local and national rates.

MC has been widely commended as an alternative to LC in countries where laparoscopic facilities are not available and it is estimated that for cost effectiveness LC must reduce length of stay by 3 days to become cost effective. Nevertheless the economic argument in support of MC is significantly enhanced if performed as a day case procedure.

2 patients in the interval MC group had previously undergone extensive abdominal surgery for Crohn’s disease and LC would not have been possible. MC clearly provided an effective alternative with 1 patient treated as a day case and one as <23hr stay.

The operating surgeon in this study was not a hepatobiliary specialist and did not have a dedicated day case list. All MC patients were therefore added to the end of an all day operating list preceded by major colorectal cases. As a result the majority of cases were performed in the afternoon decreasing the possibility of same day discharge. Nevertheless the patients were admitted into the day case unit and were treated along the same care pathways used for day case LC cases.

Long term outcome data from trials comparing MC to LC is limited but limited evidence suggests little overall difference, with MC being associated with less abdominal symptoms and LC a slightly superior cosmetic appearance. We feel our case series is in keeping with this conclusion.

Whilst only demonstrated in 2 patients in this series the main benefit for MC is in patients with contra indications for LC. MC facilitates a minimally invasive alternative to standard incision open cholecystectomy and hence enables day case surgery. As a result all surgeons specialising in day case cholecystectomy should have an alternative technique for cholecystectomy in these patients that is still possible as a day case. We believe MC provides this.

References


8. Institute for Innovation and Improvement. NHS Better Care, Better Value Indicators [Internet]. Available from: http://www.productivity.nhs.uk/OperationType/3040/Of/Indicator/609/For/National/And/25th/Percentile

Keywords: Pre-operative fasting, guidelines, recovery.

Abstract

Prolonged fasting before general anaesthesia has been shown to be detrimental to patients undergoing surgery. Current guidelines suggest that a short period of pre-operative fasting may strike an appropriate balance between reducing aspiration risk and avoiding dehydration, thus improving outcomes in the surgical patient population. The purpose of this audit was to determine current starvation practice in our Day Surgery Unit (DSU) and compare it to the national recommendations for pre-operative fasting. We compared actual fasting time with length of stay in recovery until discharge. We aimed to identify any correlation as a potential proxy to the quality of the patient journey and a potential measure of DSU efficiency.

A paper audit tool was completed by theatre staff over a one week period in DSU. Both adults and children undergoing general anaesthetic or a regional technique were included in this audit. 85 cases were reviewed. 94% of patients were informed that they could take clear fluids up to two hours prior to surgery and 95.2% informed they could eat up to six hours prior to surgery. 51.2% of patients reported being hungry or thirsty pre-operatively. Median time between last fluid intake and start of anaesthesia was 4 hours 50 minutes (2:17 – 17:05). Median time between last food intake and start of anaesthesia was 12 hours 54 minutes (6:09 – 21:31).

Of the cases considered, almost all were starved according to or for longer than the minimum times stipulated by current guidelines (98.8%). In fact, more than one fifth of adults (21%) and 40% of children were deprived fluids for 8 hours. Our findings did not demonstrate any significant relationship between fasting time and length of time from recovery to discharge. However, multiple patient and intra-operative factors may considerably confound the picture and further investigation would be of benefit.

Recommendations will emphasise the importance of appropriate pre-operative fasting and offer suggestions to mitigate excessive starvation.

Introduction

Starvation guidelines aim to reduce the risk of aspiration pneumonitis at the time of induction of general anaesthesia. The practice of pre-operative fasting arose after Mendelson’s description of his eponymous syndrome in 1946. In 2001, the AAGBI published recommendations based on the American Society of Anesthesiologists guidelines. They proposed a six hour minimum pre-operative fasting period for solids with clear fluids only thereafter until two hours prior to surgery. They suggested a minimum two hour period of complete starvation before surgery⁴.

Shorter pre-operative fasting periods have been shown to improve the patient experience. Smith et al found that shorter preoperative fluid fasting reduces post-operative nausea and vomiting in elective gynaecological surgery⁵. No significant difference has been demonstrated in residual gastric volume in patients fasted for six hours versus those allowed intake of free clear fluids until two hours before anaesthesia. Moreover, the gastric pH was found to be higher in the latter cohort, thus potentially reducing the sequelae of any aspiration⁶. Such research has shaped current opinion. The Royal College of Nursing (RCN) 2005 guidelines state that ‘the patient should be also encouraged to take fluids as close as possible to two hours preoperatively’⁷.

Within our Trust, a pre-operative fasting audit was performed in 2013 across all theatres. It revealed that only 66.7% of patients were informed that they could take fluids until two hours pre-operatively. However, multiple patient and intra-operative factors may considerably confound the picture and further investigation would be of benefit.

Recommendations will emphasise the importance of appropriate pre-operative fasting and offer suggestions to mitigate excessive starvation.

Authors’ Address
DR SOPHIE FORSTER LANE  CT2 Anaesthetics (ACCS)
DR SONIA DAMLE  CT2 Emergency Medicine
DR SOHINI SENGUPTA  Consultant, Anaesthetic Department, St George's Healthcare NHS Trust, Blackshaw Road, Tooting, London, SW17 0QT.
Correspondence: sophie.lane05@gmail.com
clear fluids up to two hours prior to surgery and only 85.9% were informed they could eat up to six hours prior to surgery. The aim of this audit was to assess compliance with AAGBI and Trust guidelines in DSU. We assessed starvation times and any correlation between fasting time and length of recovery stay.

**Methods**

A paper audit tool was completed by theatre staff for all patients over a one week period in DSU. A total of 151 patients underwent general anaesthesia or had a regional technique. Data was analysed using Microsoft Excel. Correlation between fasting time and time to discharge from recovery was analysed using Pearson product-moment correlation coefficient.

**Results**

85 audit tools were adequately completed (56%). 46 patients (54%) were female, 39 (46%) male. Six cases were children (7%). The age range was between 2 and 77 years (median 37 years).

94% of patients were informed that they could take clear fluids up to two hours prior to surgery and 95.2% informed they could eat up to six hours prior to surgery. 98.8% of patients were starved in accordance with Trust guidelines. 51.2% of patients reported being hungry or thirsty pre-operatively. Median fasting times are shown in Figure 1. Median time between last fluid intake and start of anaesthesia was 4 hours 50 minutes [2:17 – 17:05]. Median time between last food intake and start of anaesthesia was 12 hours 54 minutes [6:09 – 21:31].

21% of adults and 40% of children were deprived of clear fluids for over eight hours. A very weak negative correlation was found when comparing fluid fasting time with length of time to discharge (correlation coefficient -0.064). A very weak positive correlation was found when comparing food fasting time with length of time to discharge (correlation coefficient 0.12).

65.7% of patients were pre-assessed in DSU, of whom 92.4% were given written starvation information. This is similar to 90% when grouping other pre-assessment settings. Note that although Figure 2 suggests that 50% of those seen in hand surgery pre-assessment clinic did not receive written information, this equates to only one person.
A total of 98.8% of patients were starved in keeping with both Trust policy and AAGBI fasting guidelines. A greater percentage of patients were receiving both verbal and written starvation information compared to the 2013 audit. However, starvation times were shown to be far more prolonged than necessary. This was similar to that found in 2013 [6 hours 8 minutes for clear fluids, 11 hours 7 minutes for food].

A review in 2010 by de Aguilar-Nascimento et al highlighted that shorter starvation times reduce insulin resistance and gastrointestinal discomfort. The same team looked at 60 women undergoing cholecystectomy, randomised to receive preoperative oral carbohydrates two hours before surgery versus conventional starvation regime of nil by mouth from eight hours pre-operatively. They found reduced vomiting and abdominal distension in the group who received oral carbohydrates. Significantly, the study group also had a reduced length of hospital stay.

Similarly, the enhanced recovery programme for elective colorectal surgery recognises the benefit of a reduced fasting time by encouraging pre-operative oral carbohydrate drinks. These have been shown to reduce hospital stay, promote more rapid return of bowel function and reduce loss of muscle mass. A recent meta-analysis examined the effects of pre-operative carbohydrate supplementation on postoperative recovery versus placebo or starvation. 27 randomised control trials were included for analysis. They concluded that there was a small reduction in length of hospital stay (0.30 days shorter, 95% CI -0.56 to -0.04) and no increased risk of complication rates.

This audit found no clinically significant correlation between fasting times and post-operative time to discharge. However, in view of the small number of patients included in our study and many anaesthetic, surgical and patient related factors influencing time to discharge it is not surprising that we could not demonstrate a significant effect of fasting on length of stay.

Current RCN guidelines are reflective of recent data that show prolonged fasting to be disadvantageous. Chin et al examined pre-operative fasting guidelines in 70 Day Surgery Units. As recently as 2006, 16% of day units deprived adults of clear fluids for at least eight hours and 5% for children. Despite our Trust policy stating minimum two hours for clear fluids and six hours for food, our data suggests that the emphasis is still not on preventing prolonged starvation and 51.2% of patients complained of pre-operative hunger and thirst.

We propose an action plan that focuses on encouraging fluids until two hours prior to surgery as opposed to emphasising the need for starvation. Arun et al recently demonstrated that implementing such changes reduced starvation time for fluids from 9.25 hours to four hours in children. They achieved this through posters on the wards and in the pre-assessment clinic. They also actively encouraged anaesthetists to prescribe fluids for children waiting more than two hours if changes in surgery schedule took place.

Within our own DSU, we will also aim to offer fluids to those patients waiting more than two hours pre-operatively. We are aware that this is often a difficult task in the day surgery setting, with short procedures and potential for changes in list order. We also aim to correct the discrepancy in provision of written information within different pre-assessment settings. We feel that a key implementation is education of patients on the importance of preventing prolonged fasting. As such, the results of this audit will be presented to the appropriate pre-assessment staff with emphasis on encouraging fluid intake up until two hours pre-operatively. We plan to re-audit these changes within 12 months.

References

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BADS DIRECTORY of PROCEDURES
National Dataset

Fourth Edition

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Introduction

Day surgery should be offered to as many patients as possible. A ‘day case unless proven otherwise’ attitude assists this occurring. There has been considerable expansion in the surgical procedures offered within day surgery, with more complex operations now becoming possible where patients safely go home the same day.

The nature of some of these more complex operations and more maxillofacial and ENT procedures being performed in day surgery means more patients may require tracheal intubations during these procedures.

This will then include patients with known difficult airways or newly predicted difficult airways found in the pre-operative setting who we still want to offer day surgery. Also there are always the unpredicted difficult airways that are only discovered once the patient is anaesthetised and appropriate management is critical to avoid morbidity or mortality in these patients.

Therefore anaesthetists need to be aware that they will encounter difficult airways in day surgery and have plans and equipment necessary to manage these successfully. The recent NAP4 report\(^1\) highlights that morbidity and even mortality from airway disasters occurs without prejudice across the spectrum of patients, including previously fit and well patients undergoing minor surgery.

Authors’ Address

DR RACHEL TIBBLE. Consultant Anaesthetist, Royal Derby Hospital.
DR LAURA CARRICK. SpR Anaesthetist. Work done whilst at Royal Derby Hospital.
Correspondence: DR RACHEL TIBBLE, Anaesthetics Offices, Royal Derby Hospital, Uttoxeter Road, Derby DE22 3NE.
Videolaryngoscopes are a relatively recent addition to the range of equipment available for management of a difficult airway. They are not universally available but increasingly considered as part of difficult airway algorithms by the Difficult Airway Society (DAS) and taught on many difficult airway courses nationally.

We wanted to evaluate the place videolaryngoscopes have in management of a difficult airway in our Day Surgery Unit by asking the opinion of both trainee and consultant Anaesthetists that work there.

**Methods**

A questionnaire was sent to all east Midlands anaesthetic trainees and also to consultants at the Royal Derby Hospital. This contained direct questions asking whether an anaesthetist would prefer to use a videolaryngoscope if they had predicted, before anaesthesia was initiated, that the airway may be difficult and whether they would use one if their first attempt at intubation had failed (an unpredicted difficult airway). We also asked whether a videolaryngoscope should be available immediately to hand in areas where difficulty with intubation was a possibility.

The trainee anaesthetists were also asked which airway training courses they had attended, whether videolaryngoscope use was taught on these courses and their experience using the scopes in practice.

Replies were then collated.

The number of intubations in our day surgery unit in 1 year was determined by searching patient records and type of surgery for these patients documented. This was compared to predictions by the NAP4 study of number of cases performed before a difficult or failed airway was encountered.

**Results**

51.8% of trainees had been to a difficult airway course.

Experience using a videolaryngoscope clinically is shown in Table 1, which outlines the type of videolaryngoscope used in practice and the numbers of trainees who have used each one. 100% of trainees had used at least one sort of videolaryngoscope.

<table>
<thead>
<tr>
<th>Video-Laryngoscope model</th>
<th>Number of trainees</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airtraq</td>
<td>24</td>
<td>92.31</td>
</tr>
<tr>
<td>Glidescope</td>
<td>20</td>
<td>76.92</td>
</tr>
<tr>
<td>C-MAC (Storz)</td>
<td>10</td>
<td>38.46</td>
</tr>
<tr>
<td>V-MAC</td>
<td>2</td>
<td>7.69</td>
</tr>
<tr>
<td>McGrath</td>
<td>12</td>
<td>46.15</td>
</tr>
<tr>
<td>Pentax-AWS</td>
<td>11</td>
<td>42.31</td>
</tr>
<tr>
<td>Bullard</td>
<td>2</td>
<td>7.69</td>
</tr>
<tr>
<td>Bonfils</td>
<td>2</td>
<td>7.69</td>
</tr>
</tbody>
</table>

88% trainees and 81% consultants would use a videolaryngoscope for predicted difficult intubations.

58% trainees and 95% consultants would use one if their first attempt at intubation failed.

98% and 100% would want a videolaryngoscope available in areas where difficult intubation was possible.

Our general day surgery unit currently intubates over 900 patients per year (34% of our general anaesthetic cases). 35% of these were dental surgery including patients with learning difficulties. 34% were ENT operations such as tonsillectomy, panendoscopy and mastoid surgery. 23% were laparoscopic surgery mainly for laparoscopic cholecystectomy.

**Conclusions**

Airway difficulty is a real issue in day surgery units. NAP4 found a failed intubation occurred in 1 in every 1-2000 routine cases. In our Unit we perform around 2500 operations per year using general anaesthesia with over 900 as planned intubations thus showing difficult airways are a likely occurrence in our unit.

An unpredicted difficult airway is the main concern as if there is no suspected difficulty, plans to manage a difficult airway are not always thought through before anaesthesia is induced. None of our currently used pre-operative tests, even when used in conjunction, predict difficulty with 100% sensitivity or specificity.

Only 50% who had significant morbidity after an airway disaster had features of a predictable difficult airway when pre-operative tests were reviewed.

There should really be an airway plan for any patient given a general anaesthetic in case difficulty is encountered. Our audit shows not only that experience with videolaryngoscope use is increasing among trainees but also that anaesthetists prefer to have one available for immediate use in areas where difficult airways are a possibility. Theatres where maxillofacial or ENT operations were common where intubation is needed to facilitate certain operations and regional anaesthesia is not an alternative were felt to be most at risk.

Trainees were less likely than consultants to use the videolaryngoscope in an unpredicted difficult airway.
having failed to intubate once. Their comments in our audit showed reasons for this related to local guidelines they felt they had to follow, in calling for senior help or inserting a laryngeal mask airway, rather than using a videolaryngoscope even if they had used it previously.

All trainees had exposure to using a videolaryngoscope clinically despite only 51% having been on a difficult airway course. Those that had not were mainly ST1, ST2 or CT3 so very likely to attend one during their training at a later date.

The Difficult Airway Society draws up guidelines and algorithms to follow when faced with a difficult airway or failed intubation. They are considering including videolaryngoscopes as an integral part of this pathway. It will be interesting to re-audit the trainee response when this occurs.

We consider that having a videolaryngoscope available as part of our daycase ‘difficult airway trolley’ is very important, to be kept in the day case unit for when these situations arise. This reduces the risk of not having the appropriate equipment to hand if unexpected difficulty occurs as brain hypoxia longer than a few minutes increases the chance of a poor outcome.

Availability of this scope in the unit will also enhance the training opportunities for anaesthetic trainees which should enhance their confidence in dealing with unexpected difficult airways if they occur on unsupervised lists.

Reference

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Intrathecal hyperbaric 2% prilocaine for day surgery: a prospective, observational study

RAMYA SRIRAMAN, ANIL HORMIS & KIM RUSSON

Keywords: Hyperbaric, prilocaine, ambulatory, intrathecal.

Abstract
We recently introduced 2% hyperbaric prilocaine to our hospital and evaluated its use for various day surgical procedures. Data collection was prospective. A total of 70 patients were included. The maximum duration of surgical anaesthesia was 115 minutes. The mean time to ambulation was 150 minutes (range 53-300 minutes), and to discharge was 227 minutes (range 98-372 minutes). One patient had to be admitted due to inability to walk by the time the Day Surgery Unit closed. We conclude that the use of 2% hyperbaric prilocaine is safe and effective in day surgical procedures, and the use of low doses facilitates early ambulation and discharge.

Introduction
Spinal anaesthesia for day surgery has many reported benefits, including low postoperative morbidity and better patient satisfaction. However, it is not a commonly used technique because of the perceived risk of residual motor blockade necessitating overnight admission. The introduction of low-dose spinal anaesthesia with short motor blockade duration has been a major advance in daycase anaesthesia in the past decade. The use of low dose bupivacaine in combination with fentanyl for spinal anaesthesia has been shown to be effective in short outpatient procedures, with reduced ambulation and discharge times.1

Recently there has been a revival of interest in older local anaesthetics for use in spinal anaesthesia. This is due to the fact that these agents [chlorprocaine, articaine, mepivacaine and prilocaine] are claimed to cause less Transient Neurological Symptoms [TNS] than lignocaine, which was the main drug used for short duration spinal anaesthesia for several years.2-3 A recent study demonstrated that the combination of 2% isobaric prilocaine [20 mg] and fentanyl[20 micrograms] offers faster resolution of motor blockade compared to that of low-dose isobaric bupivacaine [7.5mg] and fentanyl[20 micrograms] for spinal anaesthesia in ambulatory arthroscopic knee surgery.4 The hyperbaric formulation was only introduced in the U.K. in 2010, following a randomized controlled trial comparing 15 mg of hyperbaric 0.5% bupivacaine with 60 mg of hyperbaric 2% prilocaine, which demonstrated faster onset of sensory and motor block and faster recovery with the latter.5 However, the optimum dose of 2% hyperbaric prilocaine for various procedures in day surgery is unclear, and studies using a low dose of 2% hyperbaric prilocaine are limited. At the Rotherham hospitals NHS foundation trust, we recently introduced 2% hyperbaric prilocaine for day surgery, and we aimed to evaluate its use for various day surgical procedures.

Methods
Patients undergoing day case surgery that was suitable to be performed under spinal were given the choice of general or spinal anaesthesia. Intrathecal 2% hyperbaric Prilocaine dosing was based on information shared by Kings Lynn Hospital. Data collection forms were filled in prospectively. The form had three sections. The first section was completed by the anaesthetist. The further two sections were filled in by the recovery nurses and then the day surgery unit nurses. Data in the first section included: type of operation, time of insertion of spinal, patient position during insertion, dose of spinal 2% hyperbaric prilocaine and adjuvants, level of block expected and achieved, the Bromage score to assess degree of motor blockade (0= no motor block, 1= hip blocked, 2=knee blocked, 3=hip and knee blocked, 4=hip, knee and ankle blocked) in the anaesthetic room, time to achieve block, surgery start and finish time, the need for supplemental intra-operative analgesia or conversion to general anaesthesia. The following data was collected: bromage scores upon arrival.
in recovery, any problems in recovery, time to standing unaided, whether patients were able to pass urine prior to discharge, and time eligible for discharge. The day surgery staff telephoned patients the next day for follow up.

**Results**

2% hyperbaric prilocaine was used in 96 day surgery patients between August 2011 and April 2012. However, evaluation forms were returned only in 70 patients. Surgical specialties included orthopaedics (61%), general surgery (23%), gynaecology (10%) and urology (6%). Orthopaedic procedures included foot osteotomies, anterior cruciate ligament (ACL) reconstruction, toe replacements and fusions, and bunionectomies. General surgical procedures included EUA rectum, haemorrhoidectomies and inguinal hernia repairs. Gynaecological procedures included hysteroscopies, STOP procedures, Tension free Vaginal Tapes (TVTs) and endometrial ablations. The dose range of prilocaine and opioid additives used are shown in Figures 2 and 3. The most commonly used dose of prilocaine was 30 mg, and that of fentanyl was 10 micrograms. All spinal injections were performed in the sitting position, and patients were then placed unilateral for five minutes for lower limb procedures, but remained sitting for perianal procedures. Mean time to achieve a satisfactory block after injection was 8.7 minutes. 73% of patients had a Bromage score of 0 (42%) or 1(31%) in the anaesthetic room. Mean surgical duration was 31 minutes. Mean time to ambulation was 150 minutes, (range 53–300) and mean time to discharge was 227 minutes (range 98–372). Intraoperative problems were encountered in four patients. One patient had a complete failure of spinal and needed conversion to a general anaesthetic. Another patient needed conversion to GA 80 minutes after the spinal. The third patient was able to feel skin stitches in the inguinal region one hour after spinal injection, and the fourth patient needed nitrous oxide and oxygen supplementation 75 minutes after injection. Passing urine was not an essential criterion for discharge and 60% did not void before discharge. However, no problems were reported by these patients on the follow-up telephone call the next day.

**Discussion**

2% hyperbaric prilocaine for intrathecal use was licensed in the U.K. in July 2010. The Scottish Medicines Consortium has recommended its use for ambulatory surgery because a favourable profile has been reported in this setting. Since 2010, there have been a few randomized controlled trials that used 2% hyperbaric prilocaine. However, it is noteworthy that none of these are from the UK.

Our evaluation has demonstrated that low dose 2% hyperbaric prilocaine combined with fentanyl can be used safely and effectively for a variety of day surgical procedures. Median time to ambulation in our study was 150 minutes, and median time to discharge was 221 minutes, which are comparable to other studies with similar doses of prilocaine.

A systematic review of spinal anaesthesia for ambulatory knee arthroscopy using hyperbaric bupivacaine found that, when spinal anaesthesia is administered in the unilateral position, doses of bupivacaine as low as 4–5 mg can produce enough anaesthesia with no or very low incidence of failure. This study also reported a high incidence of pruritus (50–75%) with the addition of intrathecal opioids. We were able to achieve good success rates with hyperbaric prilocaine administered in the sitting position followed by unilateral positioning. Also, at a fentanyl dose of 10 micrograms, our patients did not complain of pruritus when the follow-up telephone call was made the day after surgery.

The Camponovo trial showed no differences in the groups with respect to patient haemodynamics, even though relatively high [40 and 60 mg] doses of hyperbaric prilocaine were used. We did not specifically ask anaesthetists to note intraoperative blood pressure readings in our study. However, hypotension was not documented as an intraoperative problem in any of our patients.

The incidence of urinary retention following 60 mg of hyperbaric 2% prilocaine was reported to be 23% by Kreutziger et al. However, the authors admit that the dose

| Table 1 | Characteristics of intrathecal block with 2% hyperbaric prilocaine in patients undergoing day surgical procedures. Time in minutes. |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | Mean (SD)       | Range           | Median          | IQR 25-75       |
| Injection to block | 8.7(4.9)        | 3-25            | 8              | 5-11            |
| Anticipated surgery duration | 39(22.1)        | 10-120          | 30             | 25-45           |
| Actual surgery duration | 30.8(18.8)      | 3-115           | 25             | 20-40           |
| Anaesthesia+ surgery | 54.6(25.2)      | 17-138          | 50             | 39-70           |
| Time to ambulation | 150(61.3)       | 53-300          | 150            | 112.5-210       |
| Time to discharge eligibility | 226.8(65.2)    | 98-372          | 221            | 167-273.75      |
of prilocaine used may have been excessive for the type of surgery (lower limb procedures). Passing urine is not an essential criterion for discharge in low-risk patients from our unit in accordance with recommendations by BADS. The cost effectiveness of prilocaine in the day surgery setting was explored recently in Germany. The study concluded that the use of hyperbaric prilocaine 2 % for 60 min operation time is cheaper than the use of bupivacaine 0.5 % as long as patients do not stay in the recovery area for longer than 120 min and are discharged from the recovery area. We did not explore cost-effectiveness of hyperbaric prilocaine in our setting, but we intend doing this in the near future.

As ours was an observational study rather than a formal clinical trial, it has several limitations. We were unable to standardadise the doses of prilocaine and opioid additives used. This was due to the fact that several anaesthetists were involved and they were understandably worried about the duration of action of a low dose when using the drug for the first time. The lack of a dedicated investigator meant that we had to rely on day surgery nursing staff for observations in the recovery area and for follow up the next day. Attempts to make patients stand up for assessing ambulation and discharge readiness were made by the regular nurses working in the day surgery unit, and it is likely that during busy times, the assessment may have occurred later than the actual recovery of motor blockade.

As the use of intrathecal 2% hyperbaric prilocaine is recent, with limited published studies with a low dose regime, our evaluation provides useful data on its use in the day surgical setting. We successfully used a 30 mg (1.5 ml) dose of prilocaine in a variety of cases. No problems were reported by nurses in PACU. Importantly, our primary aim...
was to introduce the concept of a new drug in a low dose for day surgery in our anaesthetic department and undertake an evaluation of its performance. We are happy to report that most anaesthetists who used the drug found it satisfactory for their procedures.

To conclude, hyperbaric 2% prilocaine can substitute bupivacaine in ambulatory surgery, and further studies would be needed to find out if a low-dose hyperbaric 2% prilocaine regime is a cost-effective option when compared to either low dose bupivacaine or general anaesthesia.

Acknowledgements

We thank all the anaesthetic consultants and trainees who returned evaluation forms for our study. We are also grateful to day surgery staff for following up our patients and completing the relevant sections of the data collection forms.

Dr Beverley Watson and Dr Jon Allen for sharing the doses used at Kings Lynn Hospital.

Conflicts of interest

Dr Kim Russon is a paid Consultant for Mercury Pharma in respect to Ampress but not Prilotekal.

References

A randomised controlled trial to determine the influence of carbon-polymer warming blankets on the incidence of perioperative hypothermia during and after short, day-case operations  JODS 24.4

Authors: Manu Sharma, Michael Dixon, Feras Eljelani, David Crook & Mark Harper

Dear Sir

We read with interest the study by Sharma et al regarding the use of warming blankets as a measure to prevent inadvertent perioperative hypothermia (IPH) in short day case operations.¹

It was interesting to read that the incidence of IPH was as high as 60% in their initial audit on which their power calculations were based, and subsequently 39% in the study population. An audit in the day surgery unit in our institution over two consecutive time periods revealed a much lower incidence of IPH with 8.8% of patients spending less than 30 minutes in the OR (n = 91) and 3.2% those spending 30-59 minutes in the or (n= 93) developing IPH². None of these were actively warmed. Our standard practice is however to keep the waiting area warm, keep patients mobile and dressed until as close to induction as possible, and provide written information to patients regarding the risk of hypothermia.

We also note that in their study, the treatment group exhibited a higher prevalence of IPH at all points in time from admission to the recovery unit, until discharge (Table 2) and similar or lower mean non invasive temperatures when compared to routine practice (Table 3). There is limited evidence in the literature of any morbidity or adverse outcomes in day surgery patients experiencing IPH. The outcome described in this study was unplanned hospital admission, of which the rate was higher in the treatment group.

We therefore wonder if the study conclusion that electric warming blankets reduce IPH in short day surgery procedures in this population is justified and that, as the discussion suggests, there may be a different mechanism whereby patients warmed for short operations may in fact lose heat more rapidly. The focus may therefore need to be ensuring warmth earlier in the patient pathway.

We agree that shivering is an unpleasant and unpredictable occurrence and that warming for patient comfort should be certainly be instituted in these circumstances. However, we stand by our current policy of maintaining a warm waiting area, keeping patients in their usual clothing for as long as possible, informing them to alert staff if they feel cold, checking patient temperatures in the anaesthetic room and in recovery and ensuring the use of forced air warming where indicated, but not as standard in every day case procedure.

References


The authors response . . .

Thank you for your interest in our paper¹. You raise some interesting and relevant issues.

Regarding the differences in the measured incidence of inadvertent perioperative hypothermia (IPH), this is, to a large extent due to inaccuracies in measurement. The commonly-used, non-invasive methods of perioperative temperature measurement are simply not accurate enough². Therefore it is unsurprising that estimates of the prevalence of IPH vary so widely. The rate of IPH in your unit is low compared to both our and previously published studies such as Leeth et al which reported an incidence of 30%, during a 6 month period [Leeth, 2010 #2060]. While this could well be the result of your practice, it would still be informative to determine the incidence of IPH is when measured using an oesophageal thermistor (we placed ours via the gastric port of an LMA supreme).

Your second point also illustrates the problem with measurement. It is interesting that you have picked up on the results of Tables 2 and 3 as these are the non-invasive (and therefore less accurate) measurements which we included because we didn’t have oesophageal...
readings pre- and post-operatively. If you refer to the more accurate oesophageal readings in Figures 1 and 2, you will see that these show no differences in mean temperature but a clear tendency towards an increased incidence of IPH in the control group.

You are quite right in your assertion that there is limited evidence of any morbidity or adverse outcomes in day surgery patients experiencing IPH. However this is absence of evidence rather than evidence of absence. As we point out in our introduction, “The lower limit of 30 minutes was extrapolated from studies of longer operations. There is very little data on the prevalence of and the intra-operative management of inadvertent perioperative hypothermia and its consequences in day surgery procedures.” It is this gap in the evidence base we are trying to address.

We did not power the study to detect a statistically significant difference in the outcome of unplanned admission so, while this finding is intriguing, it is not possible to draw any conclusions – except for the inevitable ‘more research is needed’.

So, for these reasons, we stand by our conclusion that an electric warming blanket may reduce the incidence of IPH in short, day-cases. However, the evidence is by no means conclusive and it remains to be seen whether the prevention of IPH is of clinical significance in this group. We do think more work in this area is needed and justified. Multi-centre trials, formally comparing warming techniques with approaches such as yours could be the best approach.

Many thanks,
Dr M Harper (Consultant, Royal Sussex County Hospital, Brighton)
Dr M Sharma (Anaesthetic ST6, Kings College Hospital, London)

References
The editor welcomes articles on all matters related to day- and short-stay surgery for consideration for publication – editor@bads.co.uk

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