Out in the cold? An audit cycle of perioperative temperature management in a British day surgery unit, in response to the publication of NICE guidelines on the perioperative management of inadvertent hypothermia in adults.

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The Future of Day Surgery

Ambulatory Pathways

Shortening length of stay and maximising income from tariff

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“The ambulatory surgical pathway delivers the best clinical care and is also financially advantageous”
Dr Ian Smith President British Association of Day Surgery

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Clare Hammond
Ward Sister, Surgical Day Unit
University Hospital of North Staffordshire
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Editorial

BILL HORTON

“\textit{The Truth is Out There}\textsuperscript{*}”

Well, they have announced the hose pipe ban and the closing date for abstracts for BADS ASM will have passed by the time this edition of the \textit{Journal of One Day Surgery} lands on your door mat. Therefore summer must be just around the corner and we are in freefall towards our annual celebration of innovation and care quality enhancement. I look forward to reading the abstracts submitted: I am always impressed by the enthusiasm and innovation embodied in them. It is a fundamental reflection of the cohesive thinking of the Day and Short Stay Surgery community.

The Riviera International Conference Centre (RICC) in Torquay is celebrating its 25th Anniversary. As return visitors, we are guaranteed a warm welcome and can help them celebrate this milestone.

In the last edition, we proudly launched the Oxford Specialist Handbook \textit{Day Surgery}, I believe that sales are going very well and there has been considerable interest from overseas – especially the United States. I think it important to acknowledge the special discount for BADS members that has been negotiated by co-editor Mr Doug McWhinnie.

I believe that I am one of many day surgery clinicians who remain a might bemused by the NICE guidelines on perioperative hypothermia and their application to same day surgery practice. It was difficult to identify our successfully discharged clients with the co morbidities that we are warned will complicate cold post operative patients.

When I was first developing an interest in ambulatory care, I remember a Day Surgery Grandee advising me that our patients are not sick, they are just having an operation. We should not inflict in patient care upon them.

Hinde and co authors, in their paper “\textit{Out in the cold}”, have risen to the challenge and sought data to either support or challenge the guidelines where little prior relevant quality evidence existed. I am mindful of the two fictional FBI agents Fox Mulder and Dana Scully of the TV series the X Files who battled with accepted opinion and sought to explain the inexplicable and supernatural.

They were driven by the motto “\textit{The truth is out there}”.

Continuing our theme of “truth hunters,” Allan and co-authors, by redesigning their upper limb surgery service, robustly tackle the belief that regional anaesthesia reduces theatre utilisation and surgical productivity. With their commitment and enthusiasm have they proved to us that default to local anaesthesia can result in an improvement in both parameters and also deliver higher day surgery rates?

Similarly, Clancy and co authors, over a four year period, have been evolving their breast cancer day surgery services. They demonstrate a progressive shift towards day surgery.

They also demonstrate the need to seek hard accurate information and evolve new safety infrastructures to overcome robustly held belief as to why patients for safety need to spend their first post operative night in a hospital bed.

Of the NHS, a frequent consideration is can we deliver greater value and quality for less money? I suppose it is a somewhat softer version of the question are we underfunded or wasteful?

MacLeod and co authors focus on the preoperative phase of the patient pathway.

Their paper challenges the value of pre operative chest radiography to the patient outcome and also the costs in pre operative staff hours invested. They also consider the emotional burden on the patient of this additional episode of uncertainty and any additional hospital appointments.

In this edition, although focusing on different sub specialities of ambulatory surgery, the authors have demonstrated a number of common themes.

Foremost in their endeavours remain patient safety and the quality of the care they are delivering to them.

Not only are they are seeking to reduce length of stay for the patient but also to minimise the disruption both patho-physiological and to their life style that is consequent to surgery.

Research is about seeking the fact of the matter. It is laudable to challenge the status quo and unvalidated custom and practice. “\textit{The truth is out there}”; so let us intensify the search for the best care and our shortest stay surgical pathways.

I hope to meet you in Torquay.

BILL HORTON

*Reference*

In my last letter, I talked extensively about our new textbook “Day Case Surgery”. Just after the journal went to press, we negotiated a 20% discount from Oxford University Press for all BADS members which is valid until December 2012. To take advantage of this offer, you need to log into the members’ area of the BADS website and then follow the link which will take you to a special part of the Oxford University Press online shop. In addition to our own textbook, the discount applies to all of the OUP medical titles, providing even greater benefit from your BADS membership.

A few members have reported difficulties accessing the restricted part of the BADS website. We have recently done some upgrading to the servers which should have solved these issues, but please get in touch with the office or webmaster if you are still experiencing problems. The new servers mean that we will be able to add even more content to this area, including a package of educational materials to support revalidation in day surgery, so keep an eye on this part of the web.

Another benefit of your membership is a substantial reduction in the cost of the annual scientific meeting and I hope that many of you will have booked your place by now. After a gap of five years, we have returned to Torquay, which was a very popular venue last time. We have negotiated some reduced rail fares with First Great Western which should make the journey less daunting. Details of this offer, which applies to travel from First Great Western stations and some connecting routes, can be found on the conference booking form.

The theme of this year’s meeting is “Challenges in day surgery” and one of the biggest challenges is managing the huge variations in practice which we continue to observe. Appropriately then, Philip Da Silva will start the meeting by discussing the diversity of practice which has been identified by his work with the NHS Atlas of Variation. My President’s lecturer, Professor Jan Jakobsson from the Karolinska Institute in Sweden, will expand this into a review of variation within Europe and will also highlight some examples of excellent practice which we should adopt here. Many will argue that variation is both inevitable and desirable, with more than one way of achieving similar outcomes. This concept will be explored in detail using the example of hernia repair, showing the importance of selecting the best operation for each patient taking into account the expertise of the individual operator. The influence of the individual will be further considered by Trevor Dale, with some fascinating lessons on the impact of human factors, both beneficial and harmful, from the airline industry. This will be supplemented by a session considering the aspects which make up the ideal day surgery team, including the expectations and responsibilities of the patient; a theme further explored by Alf Collins in his Keynote lecture.

Another current challenge is how to best use the day surgery facilities to manage non-elective cases. One of the plenary sessions will examine a variety of possible pathways which have been used in a wide range of specialities. We also have two lively debates, one exploring the optimum model for preoperative assessment, the other examining the financial viability of a common laparoscopic procedure in the current challenging economic environment. One opportunity to maximise income is to ensure that clinical activity is correctly recorded and charged for, which means getting the clinical codes right every time. Sue Eve-Jones is guaranteed to breathe a fresh spark of life into a potentially uninspiring topic; a lecture not to be missed.

For our anaesthetic colleagues, we have again mapped much of the programme to their Royal College matrix. Torquay will also offer the usual free papers and trade exhibition and will see the launch of three new BADS booklets. These will complement the theme of the meeting and cover surgery under local anaesthesia, the optimal day surgery patient pathway and a long overdue update of the skills mix booklet, looking at staffing and management issues in day surgery. In addition, you will get plenty of opportunities to network and exchange ideas with likeminded colleagues and can, as always, expect to come back enthused and inspired. June is fast approaching, so book your place now!

IAN SMITH
Wide local excision and sentinel lymph node biopsy for early stage breast cancer – feasibility of day-case surgery

RACHEL CLANCY, DAVID BUNTING & ROGER WATKINS

Keywords: Breast cancer, intermediate surgery, ambulatory care pathway.

Abstract

Introduction: In breast cancer patients there remains considerable variation in practice with regard to the length of hospital stay following intermediate breast and axillary surgery. A prospective study has been undertaken to assess the safety and feasibility of a new ambulatory care pathway for these procedures.

Patients and Methods: Over a 4 year period 159 patients undergoing wide local excision (WLE) and sentinel lymph node biopsy (SLNB) for early breast cancer were selected to be treated by a new day-case pathway.

Results: Overall 123 (77%) patients completed the day care pathway as intended and none required emergency re-admission following successful discharge home. The rate of complications was as expected and no serious untoward incidents related to the new pathway were reported.

Conclusions: With close attention to all elements of the patient pathway, high rates of successful day case combined breast and axillary surgery are both feasible and safe.

Introduction

Advantages of day care surgery

Compared with a conventional in-patient stay, day-case surgery has several potential benefits.

Day care patients avoid the need for a post operative hospital bed and the nursing care that accompanies an overnight admission. Consequently expenditure for each surgical episode is significantly reduced. Indeed, the shift of cancer treatment services from in-patient to ambulatory care was one of the key actions in the Cancer Reform Strategy published in 2007.8 In addition, patient satisfaction with day-surgery for breast cancer has been shown to be high.9

Current guidelines

In 2007 the British Association of Day Surgery (BADS) published guidelines indicating that certain types of intermediate breast and axillary surgery should be performed as day-case procedures.8 These included excision or biopsy of breast tissue with or without localisation and sentinel lymph node mapping and biopsy (SLNB). The guidelines recommend that wide local excision (WLE) of breast lesions should be performed as a 23-hour stay procedure rather than a day-case procedure. Similar guidelines were also published in 2009.4 In the current guidelines the recommendations are that whereas 80% of cases undergoing SLNB can be treated as a day-case it is expected that only 15% of cases undergoing WLE would qualify for a day case pathway. In practice sentinel node biopsy is usually performed at the same time as WLE and the two procedures should therefore be considered together rather than as separate entities.

Aims

The aim of the current study was to assess the feasibility, efficiency and safety of performing WLE and SLNB for T1 and T2 breast tumours that were N0 on clinical examination, as a combined procedure using a day care pathway rather than with a traditional post-operative overnight stay.

Patients and Methods

A prospective study to evaluate a new day-case pathway was performed between June 2007 and March 2011. Patients included in the study underwent wide local excision (WLE) of either a palpable or impalpable breast cancer [T1 or T2] along with sentinel lymph node biopsy.

Authors’ Addresses

RACHEL CLANCY F2 Doctor
DAVID BUNTING Specialist Surgical Registrar
ROGER WATKINS Consultant Surgeon
Primrose Breast Care Centre, Derriford Hospital, Plymouth, PL6 8DH, UK
(SLNB) under general anaesthesia. Impalpable lesions were localised pre-operatively using either a hook-wire or ultrasound guidance, and satisfactory excision confirmed by intra-operative specimen radiography. All patients had no clinical evidence of axillary metastases and in the second half of the study period the majority had also undergone axillary ultrasound assessment. Sentinel node localisations were performed using radioactive technetium-labelled nano-colloid injected pre-operatively and imaged by lympho-scintigraphy, followed by injection of Patent Blue V dye once general anaesthesia had been induced. In each case the surgical episode was planned as day-case procedure with the full agreement of the patient and their carers.

Patients were informed about the proposed day-care pathway when initially seen in the Breast Clinic with the results of their triple assessment. Patients were selected as being suitable based on their general health status, distance required to travel home and availability of a suitable carer in the post-operative period. In each case the patient was warned that an overnight stay might be required in some circumstances, especially if recovery from anaesthesia was delayed. Those patients deemed unsuitable for day case surgery or specifically requesting overnight post-operative stay were excluded from the study.

Steps were taken in each case to ensure that the majority of patients where surgery was planned as a day case procedure were successfully treated as such, unplanned admissions being avoided if at all possible. The day case pathway for WLE and SLNB consisted of the following important features.

**i) Patient education and information**
Prior to surgery patients were assessed in a pre-operative clinic where they had the opportunity to liaise with their Breast Care Nurse Specialist (BCNS). At this time patients were given both written and verbal information regarding day surgery. They were given the opportunity to ask questions and to express any concerns regarding their treatment pathway.

**ii) GP Notification**
Once the decision to adopt the new day case pathway was made for each patient their GP was notified of the arrangements by a standard letter.

**iii) Special preoperative investigations**

* a) Localisation of impalpable breast cancers
Radiological and ultrasound localisation were performed on the day of surgery in most patients but if this was not feasible localisation was performed on the preceding day, usually in the late afternoon. Standard fixation of hook wires was used to prevent their displacement and surface localisation marks with permanent skin markers were covered with a waterproof dressing.

* b) Sentinel lymph node localisations
For patients undergoing surgery during a morning list, injection of radio-isotope and lymphoscintigraphy were performed during the afternoon of the preceding day. For those undergoing surgery in the afternoon isotope injections were performed on the day of surgery. The dose of isotope was varied according to the delay between injection and surgery, larger doses being used if injection was performed on the preceding day.

Those patients requiring localisation and/or radioactive isotope injection on the day prior to surgery returned home after the procedure and attended the following day for their day surgery.

**iv) Peri-operative care**

* a) Admission
Patients were admitted to either a dedicated day surgery unit or to the pre-operative admission lounge of the main theatre complex depending on which theatre was being used. Following routine pre-operative checks, patients were encouraged to walk to the anaesthetic room. Premedication other than simple oral analgesics was not used.

* b) Anaesthesia and surgery
Operations were all performed under general anaesthesia, in most cases using total intravenous anaesthesia. SLNB was performed prior to excision of the breast cancer but intra-operative analysis of the sentinel lymph node was not performed and no patients underwent axillary lymph node clearance at the time of their initial surgery.

Where specimen radiography was required to confirm successful excision of an impalpable breast lesion a mobile digital X-ray system was used in theatre. In many cases wide local excision was followed by reconstruction of the breast shape using a variety of tissue displacement techniques. Particular attention was given to obtaining meticulous haemostasis. Small bore suction drains were used to prevent post-operative fluid collection. 0.25% levo-bupivacaine was routinely injected into all surgical wounds at the end of each operative procedure.

**v) Post-operative recovery**

* a) Early mobilisation
Early mobilisation was encouraged to provide protection against deep vein thrombosis and enable patients to return home as soon as possible. Transfer of the patient from trolley to chair was performed as soon as was feasible in each case.

* b) Oral intake
Patients were encouraged to eat and drink early after their operation, removing their intravenous access once adequate oral intake had been established.

* c) Drains
Where used, suction drains were removed by the recovery ward staff immediately prior to discharge according to written instructions from the surgeon.
Management of pain, nausea and vomiting

All patients had intravenous paracetamol during their procedures. If possible patients were not given opioid analgesia. Necessary medication was given to provide relief from side effects such as nausea and vomiting.

Discharge

Patients were considered fit for discharge if there were no obvious immediate complications, if their pain was well controlled and they were able to mobilise adequately. In addition they had shown they could tolerate oral fluids satisfactorily and that they felt safe and ready to be discharged from hospital.

Nurse-led discharge was in accordance with instructions given by the surgeon in each case. Patient information given on discharge included the first scheduled outpatient appointment at which the surgical sites would be reviewed and the histopathology results discussed. In addition patients were given information needed for any emergency that might arise and a standard discharge letter for their GP.

Post-operative care

On the morning of the first post-operative day the patients' BCNs telephoned each patient to ensure that there were no significant problems. Review by the BCNs or referral to the GP or consultant surgeon could be arranged at this stage if deemed necessary. In addition in the second half of the study period a twice-weekly open access clinic led by one of the BCNs was established and patients were encouraged to attend if they had any non-urgent problems.

Results

159 patients were studied over a 4 year period. Their mean age was 58 (range 27–78) years. 70 (44%) patients required pre-operative ultrasound localisation whereas 32 (20%) had radiological localisation using a hook wire. The remaining 56 (35%) patients had easily palpable tumours and did not require pre-operative localisation.

Two patients had type II diabetes, several had stable ischaemic heart disease and one had severe multiple sclerosis.

Overall 123 (77%) completed the day-case pathway as intended with the remainder requiring an unplanned overnight stay. Of the 36 (23%) patients requiring overnight admission all but one was successfully discharged home the following morning.

No patients required unplanned admission to hospital following successful discharge home on the day of surgery. The most common reasons for an unplanned overnight stay immediately following surgery were delayed recovery from anaesthesia and post-operative nausea and vomiting. Anaphylaxis secondary to Patent Blue V dye was noted as a cause in one patient and development of a breast haematoma necessitated overnight stay in another case. A detailed list of the reasons for unplanned overnight stay is shown in Table 1.

59 patients underwent surgery during a morning session of which 8 (14%) required an overnight stay. In contrast, of 100 patients having surgery in the afternoon 27 (27%) remained in hospital overnight. It appeared that patients operated during the morning session were less likely to require an overnight stay but the difference did not reach statistical significance.

Although the numbers of patients per year recruited into the study remained relatively constant during the study period the success rate for completion of the day-case pathway with no need for an overnight stay improved from 35% in 2007 to 100% 2011 (Figure 1). This trend, analysed by individual years, towards improving performance with time does not reach statistical significance but analysis of the 99 cases performed in 2009–11 compared with the 60 undertaken in 2007-08 does show a significant reduction in the number of patients requiring an unplanned overnight stay from 38% in the first part of the study period to 13% in the latter years (Chi-square with Yate’s correction=12.15, P<0.001).

Three patients developed a significant haematoma at the site of their breast surgical procedure. One patient was admitted overnight following her surgery and the haematoma evacuated the following day. The two other patients had already been discharged home but neither required readmission, their haematomas being managed conservatively.
Discussion

According to recent Hospital Episode Statistics [HES] data the mean length of stay for breast cancer surgery has reduced considerably over the last 10 years. In 2000, the length of stay for mastectomy was 6.5 days falling to just under 4 days by 2011. Similarly for wide local excision the figures show a fall from 3.5 days to just one day in the same time frame. These overall figures disguise enormous variation with some hospitals currently reporting a mean length of stay for WLE of over 2 days whilst others achieve successful day-case rates in excess of 50%.

Introduction of a shorter length of stay after breast cancer surgery in the Netherlands was successfully accomplished by actively encouraging centres to take part in the programme. As a result the number of patients being treated by a short stay programme almost doubled. No increase in the rates of complications, readmissions or re-operations was observed and hopefully such evidence will encourage other centres to adopt similar programmes.

In the current series a careful audit of complications was undertaken. Again no increase in complications was noted and no serious untoward incidents that could be attributed to the day pathway were reported. Overall almost three-quarters of all patients successfully completed the planned day case pathway and none of these required emergency readmission as a result of complications. This finding is similar to that of an earlier series reported in 2005.

In order to stream-line the pre-operative pathway some patients required their localisation and/or lymphoscintigraphy to be performed on the day prior to surgery. This occurred mainly in those patients having their surgery first on a morning theatre list. Such timing of surgery appeared to be associated with the best chance of successfully completing the day case pathway but further cases in the series are required to establish statistical significance. Although surgical procedures performed in the morning often necessitated an additional hospital visit this pathway proved acceptable to patients and no episodes of wire dislodgement leading to failed localisation were reported.

Although 23% of patients required an overnight stay, there were significant improvements during the course of the study. In its last three months 100% success was achieved. Prior to this period the rates of over 85% are similar to other initial studies. It was encouraging to see the success rate improve during the study as staff became more familiar and confident with the pathway. Satisfactory feedback from patients was probably also a contributory factor in the improved figures as the programme evolved.

Delayed recovery from anaesthesia was the commonest reason for unplanned overnight stay in this study. A late start or delays in completing a surgical procedure were contributing factors in several cases, a problem noted in previous reports. Use of a mobile X-ray facility in the operating theatre allows rapid surgical specimen radiography to confirm satisfactory excision and avoids delays associated with transportation of specimens. In this way the surgical procedure time is minimised which is particularly important now that SLNB is usually performed prior to WLE. Any unnecessary prolongation of anaesthetic time is likely to increase the possibility of an unplanned overnight stay. Mobile specimen radiography machines can now be connected to the PACS system allowing the radiologist performing the localisation to also confirm accurate excision of the target lesion in a timely fashion.

The judicious use of pre-emptive analgesia allows patients to return home the same day as their surgery. The choice of analgesia is important as side effects such as drowsiness, nausea and vomiting may delay discharge. In the current study systemic analgesics were given in addition to local anaesthetic infiltration of the surgical wounds using 0.25% levo-bupivacaine which was standard in all cases.

Thoracic para-vertebral blockade has also been used for ambulatory breast cancer operations in an attempt to reduce the need for systemic analgesics, thus further avoiding the side effects of narcotic drugs. The technique has proven very effective and popular with patients improving their post-operative pain control and reducing the likelihood of an overnight stay. Performing breast surgery under para-vertebral blockade alone without the use of general anaesthesia has also been reported, allowing the majority of patients to be discharged home on the day of surgery, a conclusion supported by others using similar techniques. In a limited recent study there appeared to be no extra benefit from an additional continuous para-vertebral blockade lasting 48 hours when compared with a single injection.

Better control of nausea and vomiting following general anaesthesia has been achieved over the last few years but further improvements are still required. Avoidance of opioid analgesics is seen as crucial in this regard as they appear to be an important factor in producing nausea and vomiting thus preventing patients from returning home on the same day as their surgery.

In the current study, drains were removed prior to discharge home thus avoiding the need for drain removal at a subsequent visit. This seemed to be satisfactory and in line with current practice to limit the duration of drainage following breast and axillary surgery. Although it is acceptable for patients to go home with drains in situ, arrangements would be needed for subsequent drain removal to be undertaken. It was felt that this would detract from the acceptability of the day-case pathway and might also increase costs.

The current study suggests that successful completion of the day-case pathway is less likely to occur if surgery is performed later in the day. Scheduling theatre lists for morning sessions would minimise the chances of an unplanned overnight stay but such planning of lists is not always feasible due to other constraints. An alternative would be to provide extended post-operative recovery facilities, perhaps to 10pm, although it is recognised that
some patients, especially the elderly, may not wish to travel home at such a late hour.

It is important to note that for some patients day-case surgery is not always an option due to their underlying co-morbidities and logistical problems. Despite initially agreeing in principle to the day case pathway, a majority of patients were subsequently reluctant to return home the same day in the current series. Several factors may have been responsible for their decision such as their distance to travel home and the speed at which they had recovered from their anaesthetic.

In addition to careful selection of patients, appropriate patient preparation and education are vital to the success of day-care surgical pathways. It is important to instil confidence in patients and ensure that their expectations are realistic. Women reporting a positive experience with day-case breast cancer surgery were also those reporting good preparation along with adequate support. If patients are provided with structured and planned education, good outcomes of care can be achieved more effectively. Patients should be made fully aware of what they can expect both before and after surgery so they become more autonomous and therefore less vulnerable. Continued efforts are required to improve patient education in order to enhance the patients’ perceived quality of care.

Economic evaluations have shown that reducing length of stay after surgery for breast cancer can save considerable sums of money without increasing the expenses incurred by individual patients. Reductions in both mean societal and health care costs have confirmed the cost-effectiveness of both day case breast surgery and short stay with discharge home within 24 hours. Potential cost savings are likely to prove a further incentive to adopt ambulatory care pathways as resources come under greater pressure.

**Conclusions**

This study has shown that with close attention to all parts of the patient pathway high rates of successful day surgery are feasible. A day case surgical pathway for intermediate breast and axillary surgery has many benefits and this study shows it to be safe. Undertaking surgical procedures in the morning rather than the afternoon, the use of pre-emptive analgesia and better control of post-operative nausea and vomiting should minimise the risk of unplanned overnight stay episodes and will hopefully enable better levels of patient satisfaction and compliance.

**Acknowledgements**

The authors acknowledge the assistance of the following Breast Care Nurse Specialists in helping to implement the new day-care pathway; Jo Lobb, Jenny Richards, Cheryl Brown, Pat Coghill

**References**

5. Information Centre for Health and Social Care. www.ic.nhs.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.

We are pleased to announce that BADS members can now receive a 20% discount on selected Oxford University Press publications including the recently published BADS Day Surgery Handbook.

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Implications of changing from general to regional anaesthesia as the primary anaesthetic for elective elbow, wrist and hand surgery

CHARLOTTE ALLAN, HARRY AKERMAN, NICHOLAS GODDARD & DAVID WARWICK

Keywords: Ultrasound guided, regional anaesthesia, supraclavicular block, brachial plexus block, axillary block, infraclavicular block.

Abstract
We describe how we changed the provision of anaesthesia for forearm, wrist and hand surgery from general anaesthesia to routine ultrasound-guided regional anaesthesia. Our surgical throughput and day case rates improved, with high patient satisfaction. We now routinely recommend ultrasound-guided anaesthesia.

Introduction

The phrase ‘let’s do this case under a regional block’ has been traditionally met with a groan from surgeons and theatre staff alike. Delays were inevitable as the technique took time to perform and the patients had to be left to ‘cook’ whilst the block took effect. However, there are many potential advantages to awake upper limb surgery (Table 1).

The techniques available that allow awake surgery of the arm include local infiltration, intravenous regional anaesthesia [Bier’s block], peripheral nerve blockade, or brachial plexus blockade.

Types of Brachial Plexus Blockade (Figure 1)

Interscalene block: this is the most commonly used block for shoulder surgery, although a unilateral phrenic nerve palsy is almost inevitable and it is frequently associated with ulnar sparing. For these reasons it is contraindicated in those with severe respiratory disease and is often inappropriate for hand surgery.

Table 1 Advantages of regional anaesthesia include:

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<th>Advantage</th>
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<td>Patients can remain conscious maintaining their own airway thus avoiding morbidity associated with general anaesthesia</td>
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<tr>
<td>Improved post-operative analgesia</td>
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<tr>
<td>Reduced opioid induced side effects [nausea, vomiting, respiratory depression, drowsiness]</td>
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<tr>
<td>Aspiration of gastric contents unlikely</td>
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<tr>
<td>Reduced nursing input required post operatively</td>
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<td>Earlier discharge from hospital</td>
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Authors’ Addresses
CHARLOTTE ALLAN BM MRCP FRCA EDIC, PGC-CU Locum Consultant Anaesthetist
HARRY AKERMAN MBBS FRCA Consultant Anaesthetist
NICHOLAS GODDARD MBCH BA FRCA Consultant Hand Surgeon
DAVID WARWICK MD FRCS FRCS(ORTH) EDHS Specialist Trainee Anaesthetist
University Hospital Southampton, NHS Foundation Trust, Southampton, SO16 6UY
Supraclavicular block: this covers the whole arm including the tourniquet site. Hence this block has been referred to as the ‘spinal of the arm’. The brachial plexus is close together here allowing the local anaesthetic to work quickly although ulnar sparing can occur. Pneumothorax rates were reported as 0.5–6% but with ultrasound guidance the rates are now thought to be less than 1 in 1000. Ipsilateral diaphragmatic paralysis occurs in around 50% of patients, depending on the amount of local anaesthetic used.

Infraclavicular block: many anaesthetists avoid this because it is technically more challenging than the other blocks, although it maybe more reliable than supraclavicular blockade. For many anaesthetists it is the site of choice for running continuous brachial local anaesthetic infusions due to superior analgesia and a more comfortable catheter site reported by patients.

Axillary block: this is really 4 distinct peripheral nerve blocks [radial, ulnar, median and musculocutaneous]. It is often preferred in those with severe respiratory disease because it has the lowest incidence amongst the brachial plexus blocks of phrenic nerve palsy and there is no risk of pneumothorax. As a reasonable degree of arm abduction is required, it is not always possible to perform in those with restricted shoulder movements.

Ultrasound-guided blockade
Ultrasound has advantages over previously used techniques for regional anaesthesia such as needle induced paraesthesia or nerve stimulation. Ultrasound blocks are quicker to perform, have a faster onset, longer duration of action, and a lower failure rate. Ultrasound enables the anaesthetist to direct the needle to varying points to ensure circumferential spread of local anaesthetic around a nerve (the doughnut sign) (Figure 2). This is probably the greatest advantage of ultrasound. Nerve stimulation or similar techniques can only suggest that the needle is in proximity to the nerve; the spread of the local anaesthetic is unknown.

Service change: How we provide an awake hand surgery service
In our tertiary referral centre prior to 2009, surgery was performed under general anaesthesia, with or without supplementary nerve-stimulated axillary blockade. There was no regular anaesthetist allocated to this list. In January 2009 we started offering all patients undergoing upper limb surgery by a single consultant surgeon the option to have their surgery awake under ultrasound-guided supraclavicular blockade by a dedicated consultant anaesthetist. By May 2009 our service was fully established and the majority of patients were opting for awake surgery. We have reviewed the impact of the awake hand surgery service on the patients and the hospital.

The concept of awake surgery is discussed with patients in the hand clinic. Those who are medically unfit patients or who want to discuss the anaesthetic are referred to the anaesthetic preassessment clinic; otherwise, the patient first meets the anaesthetist on the day of surgery in a dedicated preadmission suite.

All blocks are undertaken in the anaesthetic room as we do not currently have a block room. A trained member of staff monitors the patient during the operation whilst the anaesthetist and the Operating Department Practitioner (ODP) administer the next block. Blocking the next patient in advance ensures that the time between cases is no more than that needed to clean the theatre and to prepare the surgical equipment for the following case. Sedation is offered to all patients, normally ≤2mg of midazolam is required if requested by the patient.

A case requiring general anaesthesia (GA) mid way through the list can cause disruption to flow. To prevent delays, the regional case following the GA is blocked during the case before the GA case. This blocked patient is monitored in recovery whilst awaiting surgery to avoid any delay.

Different anaesthetic agents are used according to the type of surgery. For soft tissue surgery we use prilocaine for the supraclavicular block and bupivicaine for distal blocks. Prilocaine ensures a fast onset block that lasts for the duration of surgery but will then wear off an hour or two later allowing the patient to regain some motor function: whilst the distal bupivicaine blocks provide longer lasting analgesia. For cases of longer duration or bony operations we administer a mix of lignocaine with adrenaline and bupivicaine for the supraclavicular block. These blocks take slightly longer to take effect but then provide a longer-lasting dense motor and sensory block.

Audit of the effects of introduction of regional anaesthesia
We retrieved information from the theatre database for the Consultant Hand Surgeon over two, one year periods:

1. Prior to the Regional Block Service (GA year – 2008)
2. After the Regional Block Service (RA year – 2010)
For the GA year, we included only lists for which the consultant surgeon was present. In the RA year, we included only lists where both the consultant surgeon and the consultant anaesthetist were present.

Surgical review of cases between the 2 time periods showed there were no changes in operative case mix or surgical technique. Neither was there a change to admission or theatre management. We, therefore, attribute all advances to the introduction of awake regional anaesthesia and the presence of a regular consultant anaesthetist. The median number of cases for each list in both years was 5. The ‘GA year’ comprised 30 lists with 149 patients whilst the ‘RA year’ covered 27 lists with 140 patients.

<table>
<thead>
<tr>
<th>GA Year</th>
<th>RA Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median cases per list</td>
<td>4.9</td>
</tr>
<tr>
<td>(range)</td>
<td>3–7</td>
</tr>
<tr>
<td>Number of patients</td>
<td>149</td>
</tr>
<tr>
<td>Number of Lists</td>
<td>30</td>
</tr>
<tr>
<td>Number of patients</td>
<td>140</td>
</tr>
<tr>
<td>Number of Lists</td>
<td>27</td>
</tr>
</tbody>
</table>

There was no difference in late starts or over runs between the two years.

In the RA year 8 patients had a general anaesthetic (usually patient choice) whilst 18 patients had a general anaesthetic and regional block, most of whom needed a GA due to iliac crest bone harvesting. The majority (102) had a block with or without sedation. Four sets of notes from the ‘Awake Year’ could not be found (Figure 3).

Operating List utilisation
In the GA year the median time from start of anaesthetic to start of surgery for the first patient of the day was 13 minutes. This time increased to 25 minutes when we started the list with a case performed solely under a regional block in the RA year. (Figure 4). We attributed the increased anaesthetic time to a supraclavicular block taking longer to perform and work when compared with a general anaesthetic.

Assessing overall theatre utilisation (the time the theatre was not being used for surgery between 08.30 and 18.00); the mean time theatre was unused in the GA year was 114 minutes/day and in the RA year this was 106 minutes/day. The time saved in the RA year by the quicker turnaround mitigates the longer start time at the beginning of the list.

Day Surgery Incidence
The day surgery increased from 49% in the GA year to 70% in the regional year. 76% of all awake regional cases were discharged home on the same day of surgery. (Figure 5). This is a substantial improvement, due to reliable post-operative analgesia and the elimination of general anaesthesia-associated side effects. The saved bed cost would, hypothetically, more than pay for the cost of the ultrasound machine and extra staff member.

Recovery
The median time spent in the recovery ward during the GA year was 50 minutes. In the RA year our blocked patients spent a median of 35 minutes and those requiring a GA and a block spent 55 minutes.

We considered 35 minutes to be longer than needed for the blocked patients. Further investigation attributed this delay to factors including portering, ward nurse availability and accumulation of documentation rather than any clinical need of the patient to stay in recovery.

Discharge time
We were surprised to find only a small improvement in the time patients spent post operatively on the day ward prior to discharge home. The GA year patients stayed on the ward for a median of 130 minutes whilst the RA year patients stayed a median of 120 minutes. Further investigation highlighted ‘transport’ as by far the most common cause of delay in discharge once patients are clinically ready to go home.
Consent and patient engagement
Awake anaesthesia allows patients to engage with their condition and its management. Many patients appreciate the ability to see their pathology and to see the techniques used for its treatment. During the operation the surgeon has the opportunity, if the patient wishes, to show the pathology and explain its significance. Arthroscopic and fluoroscopic images can be explained. An understanding of the surgical procedure and the surgeon's thought processes may have a very positive influence on a patient's post-operative attitudes and recovery. Another advantage for the surgeon is that the post-operative ward round was much shortened as the majority of patients have been discharged home before the end of the operating day. The usual post-operative physical checks for swelling having been undertaken by the trained day-surgery nurses and the explanation of pathology, treatment and follow up had already been given in the operating theatre.

The Patient's Perspective
In the early phase of our awake service, most patients expected a general anaesthetic and so a block was only offered for those who questioned the need for a GA. As the benefits of awake surgery became more apparent to us, the threshold at which we would suggest awake surgery dropped. Patients are now told that ‘what we normally do is...’ and very few choose the GA option.

Our confidence in recommending this mode of anaesthesia to patients has been validated by patient feedback. We contacted 56 of 60 consecutive patients who had undergone awake surgery two days after their operation and asked a set of questions about their experience.

Pain during block administration.
Most patients found the supraclavicular injection less painful than the 22g cannula put in the back of their hand. [Figure 6].

![Figure 6: Patients experience of regional block insertion.](image)

Sedation
All patients are offered ‘as much or as little sedation as they want’. 93% of patients either had ‘no’ or ‘mild’ sedation (≤2mg midazolam) during the administration of the block and subsequent surgery. 8% would have preferred a different amount (6% would have chosen to have more sedation and 2% less). Throughout surgery, we offer patients more sedation but this is almost always refused as the patient is comfortable and occupied with conversation, the radio or a personal music player.

Post-operative pain
In the recovery ward, 98% of patients had no pain or mild pain. During the first post operative night, 67% reported either no pain or mild pain. Moderate pain was reported by 20% and severe pain by 13%. In the 38 patients who had any post-operative pain, the recalled time to onset was a mean of 12.7 hours.

Overall satisfaction
As measured on a 4 point scale rating (completely satisfied/ satisfied/ dissatisfied/completely dissatisfied), 91% were ‘completely satisfied’ with a further 7% being ‘satisfied’ with our overall service. 91% of our patients would choose to have awake surgery again when asked if they would ‘given what you know now’.

Patient information leaflet
In response to previous feedback from patients we have developed a patient information leaflet with information about how we do the block, why we do the block, what patients should expect their blocked arm to feel like, care of the blocked arm and how to contact us if concerned. Side effects and potential complications are also mentioned although all patients are fully consented on the day of surgery. 100% of the patients were satisfied with the amount and quality of information they were given regarding their block.

Discussion
The introduction of an ultrasound regional anaesthetic service has led to high levels of patient satisfaction without detriment to theatre throughput and has considerably improved day surgery rates. These results have given both consultant surgeon and anaesthetist confidence to recommend this service. Patient information leaflets are now routinely given to the patient by the surgeon in the hand clinic when they are booked for theatre or by the pre- assessment clinic.

Our service has evolved with the results of the audit. We now start each list with a case requiring simple infiltration anaesthesia by the surgeon, such as a carpal tunnel or trigger finger release. This maintains theatre productivity whilst the anaesthetic team blocks the second case, aiming to have the patient ready for theatre by the time the first case finishes. We hope this has reduced dormant theatre time. Many of our regional patients now avoid recovery altogether being discharged directly back to the ward from theatre.

References


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### Book Review

#### Oxford Specialist Handbooks: Day Case Surgery

Edited by Ian Smith, Douglas McWhinnie and Ian Jackson

Published by Oxford University Press

414pp; Indexed; Line Diagrams and Illustrations in Monochrome    ISBN 978-0-19-958433-8

This is the must have book for rapid reference and guidance to all aspects of Day Case Surgery. By design, it is aimed at all stakeholders including surgeons, anaesthetists, nurses, allied health care professionals and trainees of all the aforementioned vocations. It will also prove an invaluable reference work for managers and administrators. Comprehensively, it covers all aspects of day and shortest stay surgical practice: ranging from its orchestration to discharge of patients to and integration with primary care. This first edition follows the same successful style of the previously published Oxford Specialist Handbooks series. Topics included range from the organization of services to ambulatory anaesthesia, surgery, peri operative nursing as well as teaching and training. The book is in the usual white coat pocket size format but in this instance lacks a hardwearing protective cover utilized by others in the same series.

The book is organised into 20 chapters which are broadly subdivided into background, history and organization issues, pre operative assessment and selection criteria, anaesthesia and surgery, day care nursing, developing and evolving short stay services and teaching and training. Summarising the basic principles without excessive detail, subjects are clustered into manageable bite size sections sprinkled with gems of experience and expertise. The diagrams, figures and pictures are clear, well labelled and augment the pages of explanation and facts. Each chapter is well written and contains a succinct review of the area and is presented in an easy to read bullet point format. This allows the reader to cover topics quite rapidly. It is written by national and international experts in Ambulatory Surgery in a simple and well balanced format. The pictures are in black and white: the summary pages and figures are well laid out and attractively presented.

The book has a very broad appeal and delivers a common reference work for the whole multidisciplinary team. It summarizes and reviews subjects for the senior and experienced as well as providing an excellent revision aide to trainees. There is no doubt that it would also prove extremely useful for medical students and foundation year doctors as they contemplate career selection and sub specialist interests. At the end of each chapter there are the cardinal references listed for those who would like to investigate topics in greater depth.

Summarising the major anaesthetic and surgical procedures which are performed in the day surgery setting, it does not go into huge detail and assumes certain baseline knowledge. For example, the section on Gynaecology is brief and list like: this will prove helpful for examination preparation and information recall.

The later chapters which included ‘Pushing the Boundaries’, ‘Outcome Measures’, ‘Developing Day Surgery Units’, ‘Patient Safety’ and ‘Patient Experience’ will prove of great interest. They are not only relevant to the multidisciplinary short stay surgery team and their immediate management but will also prove a powerful resource for the nascent Clinical Commissioners from General Practice. They deliver great insight into these thorny topics and discuss quite sensitive issues such as outcome measures and patient safety which are so relevant to modern medical care in a risk averse society.

The editors are to be congratulated on delivering this valuable addition to the available literature.

I would highly recommend this book to all individuals involved in Day and Short Stay Surgery as well as having copies available in the units themselves.

**AMJID ALI RIAZ**

Consultant Upper GI, Laparoscopic and General Surgeon, West Hertfordshire Hospitals NHS Trust (Watford General, Hemel Hempstead & St Alban’s City Hospital)

**Correspondence address:** Department of Surgery, West Hertfordshire Hospitals NHS Trust (Watford General, Hemel Hempstead & St Alban’s City Hospital), Vicarage Road, Hertfordshire WD18 0HB
Introduction

Breast cancer is the most common cancer in the United Kingdom, with over 48,000 new cases per annum. It is increasingly being treated with day case procedures, and recently the British Association of Day Surgery and the NHS Improvement scheme jointly endorsed a day surgery/one night stay model for breast cancer care. The Department of Health has made reducing length of stay a focus of their Cancer Reform strategy and this year have published an update “... promoting day case/23 hour stays for breast surgery and other procedures” and “reducing lengths of stay for those who do need to be admitted as emergencies”.

Successful day-case surgery depends upon efficient pre-operative assessment, and until recently routine pre-operative chest radiography was recommended during this assessment as screening for metastatic disease on all patients undergoing surgery for breast cancer. The current British Association of Surgical Oncology guidelines do not include or exclude its use; recommending instead development of local protocol, with no guidance on how to shape that protocol. In our experience, routine chest radiography has a very low yield for detecting metastases, and does not significantly alter patient’s management. Its use has generated debate amongst the chest physicians for decades; current opinion regarding screening for disseminating tumours favours computed tomography. Other authors regard it as useless in cancer staging. In addition, chest radiography brings with it significant costs – in terms of patient radiation exposure, stress, and through utilisation of resources and administrative time.

We therefore performed an analysis of our recent experience of breast cancer surgery, focussing on the patient investigations performed and their impact on the subsequent management and outcome, to assess their desirability

Methods

Patients

A retrospective analysis was performed of all patients undergoing breast cancer surgery between March 2007 and June 2009. A local database comprising patient details, operation performed and histology was used to identify relevant patients. Patients were included who had histological evidence of breast cancer and underwent surgery in this hospital. Patients were excluded if their radiographic history was not available or was not performed for staging purposes, such as emergency admissions under different specialities. 14 patients with locally advanced disease had pre-operative CT imaging arranged by the oncologists and were also excluded.

Radiography

Patients fitting the inclusion criteria had their pre-operative investigations reviewed for abnormal findings, with reports from consultant radiologists, and were categorised as normal or abnormal. They then had their post-operative investigations scrutinised, and further categorised as having any evidence of metastases.

Keywords: Surgery, breast cancer, staging, pre-operative assessment.

Summary: Until recently, routine chest radiography to stage patients undergoing surgery for breast cancer was recommended, and no firm guidelines existed. We believed this step to be of limited use, so analysed all recent breast cancer surgery admissions. Of 149 patients, 136 had normal chest x-rays. Of the abnormal, none had a change of management. Of the patients not imaged, none show any concurrent evidence of metastasis. Of the 5 patients with evidence of metastases, only 1 had abnormal pre-operative results. We therefore believe that pre-operative staging chest radiography is unnecessary, and a detrimental step in the patient journey.

Authors’ Addresses

IAIN A MACLEOD, AMANDA TAYLOR & KIAN CHIN

Milton Keynes General Hospital, Standing Way, Milton Keynes, Buckinghamshire, MK6 5LD

Keywords: Surgery, breast cancer, staging, pre-operative assessment.

Summary: Until recently, routine chest radiography to stage patients undergoing surgery for breast cancer was recommended, and no firm guidelines existed. We believed this step to be of limited use, so analysed all recent breast cancer surgery admissions. Of 149 patients, 136 had normal chest x-rays. Of the abnormal, none had a change of management. Of the patients not imaged, none show any concurrent evidence of metastasis. Of the 5 patients with evidence of metastases, only 1 had abnormal pre-operative results. We therefore believe that pre-operative staging chest radiography is unnecessary, and a detrimental step in the patient journey.
Clinical results

The case notes were reviewed to confirm any radiographic findings, and also to assess any impact on management from the investigations performed.

Results

A total of 149 patients were identified as fitting the inclusion criteria. The histology findings are summarised in Table 1.

<table>
<thead>
<tr>
<th>Histology</th>
<th>Frequency (percent in brackets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>invasive ductal</td>
<td>96 (65.8)</td>
</tr>
<tr>
<td>invasive ductal and DCIS</td>
<td>15 (10.1)</td>
</tr>
<tr>
<td>invasive lobular</td>
<td>15 (10.1)</td>
</tr>
<tr>
<td>DCIS</td>
<td>10 (6.7)</td>
</tr>
<tr>
<td>papillary</td>
<td>4 (2.7)</td>
</tr>
<tr>
<td>tubular</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>cribriform</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>invasive lobular and ductal</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>invasive ductal + cribriform</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>neuroendocrine</td>
<td>1 (0.7)</td>
</tr>
</tbody>
</table>

Of the 149 patients, 140 had undergone a staging pre-operative chest radiograph. 136 of these were considered normal by both the consultant surgeons and consultant radiologists. Of the 4 patients with abnormal radiography, only 2 were consistent with metastases and neither of these underwent a change of management because of the findings.

9 patients did not undergo routine pre-operative staging. None of these show any evidence of metastases currently.

5 patients of this cohort show current signs of metastases. All of them underwent pre-operative imaging, with only 1 patient showing abnormalities. Concerns at surgery, not the pre-operative radiography, prompted further investigation which at the time did not confirm spread of the disease. Subsequent follow-up only revealed metastases more than 1 year after the operation.

The results are summarised in Figure 1.

Discussion

Our results confirm that the significant yield from a routine pre-operative staging chest radiograph is very low. Only 3% of patients demonstrated any abnormality, and only half of these were consistent with lung metastasis.

Figure 1. A flow diagram detailing the number of patients who had undergone pre-operative chest radiography (1st arrows), whether the results were normal (2nd arrows) and whether there is any evidence of metastatic disease currently (3rd arrows); note those who did not undergo chest radiography could not have an abnormal result so this stage is missed.

Further, no patients had a change of management based solely on the radiographic findings; all patients who are fit need to have a tissue diagnosis so will undergo surgery, and post-operative investigation and management will be driven primarily by patient choice, the clinical condition of the patient and surgical findings. It should be self-evident that an investigation with very little chance of identifying a significant result, and with no chance of influencing management, ought to be avoided. This will improve the efficiency of the pre-operative assessment department, allowing greater capacity for the increasing number of day surgery patients the government expects.

Further, chest radiography is not without its cost. On a human level, it means a further attendance at the hospital for patients who are already under intense emotional stress, as well as the concomitant anxiety about the results. There is also a risk to the patient’s health. It is estimated that 0.6% of de novo cancers in the UK are caused by medical irradiation, representing 1,700 cases per year. Although the majority of these will be from radiation-intensive investigations, it is paramount that we as clinicians do as much as we can to reduce this exposure. On a monetary level, a chest radiograph (at the time of the analysis) cost £26. Expanded to the whole country, this equates to a total of over £1 million annually spent on routine staging radiography. The savings from avoiding this can be funnelled into improvements elsewhere in the day surgery journey, simplifying budgets and improving outcomes.

Our experience since removing routine chest radiography from our pre-operative assessment protocol echoes the statements above. It has not only improved patient enjoyment of the more streamlined Ambulatory Care Pathway, but it has saved money and reduced the burden on local resources, including radiology and the pre-operative assessment department. Our recommendations
are therefore that protocols for the management of breast cancer should not include routine staging chest radiography pre-operatively unless there are compelling clinical indications such as a requirement for the anaesthetic assessment.

References

13. Local hospital management report this figure as including the estimated cost of the staff wages to perform and analyse the investigation, and some allowance for the cost of the hardware.
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Introduction

Since the publication of guidance from the National Institute for Health and Clinical Excellence (NICE) on the management of inadvertent preoperative hypothermia in 2008, there has been an increased awareness of the problems caused by a low core temperature in the perioperative period. The guidelines define perioperative hypothermia as a core temperature below 36.0°C at any time from one hour prior to the start of anaesthesia to 24 hours after entering the postoperative recovery room. Hypothermia remains a common problem for the in-patient surgical population, despite easy interventions to either treat or prevent it.

There is good evidence that hypothermia can cause physiological derangements affecting multiple organs that can increase perioperative morbidity. These include an increased rate of adverse cardiac events (6.3% vs 1.4%), increased blood loss (16%) and increased relative risk for blood transfusion (22%). There is also evidence to suggest that there is an increased rate of wound infection (19% vs 6%), prolonged stay in recovery (94 minutes vs 53 minutes) and prolonged hospital stay (increase of 2.6 days).
There has been some discussion as to the relevance of the NICE guidelines to the day surgery patient population. One audit found that 40% of patients became hypothermic after day surgery, increasing to 52% when surgery lasted more than one hour, apparently favouring the application of NICE guidelines. Implementation of the NICE guidelines clearly has economic implications but NICE argues that the cost of implementing the guidelines can be largely offset against the resulting reduction in blood transfusion requirements, cardiac complications and wound infections. Whilst clearly relevant for major in-patient surgery, or surgery for high risk patients, such events are less likely and certainly less common in the day surgery setting.

This audit cycle was designed to assess the incidence of hypothermia in patients attending Torbay Hospital Day Surgery Unit and the compliance with NICE guidance. The data was also used to consider cost implications and relevance of the NICE guidelines to our day surgery patient cohort.

**Methods**

Audit one was conducted over a two week period in December 2008, aiming to capture all adult patients undergoing general or regional anaesthesia in the three day surgery theatres in Torbay Hospital’s Day Surgery Unit. Audit two, a re-audit, was conducted in November and December 2009 for a further two week period. Our audit standard was based on the 14 criteria of the 2008 NICE guidelines (Table 1), although not all criteria were tested.

A paper based questionnaire was used to collect patient demographic data and temperature recordings on admission to the unit, on arrival in the anaesthetic room and finally on arrival in primary recovery. A chi-squared test was used to determine whether duration of time in theatre had any effect on postoperative temperature. Information on the use of active warming devices and postoperative shivering were also recorded. The data collection was performed by the day surgery nursing staff, operating department practitioners and anaesthetists. Additional details were obtained from our electronic patient record, Daynamix © Calcius Systems in 2008 and Galaxy Surgery (©Isoft Ltd) and Anaesthesia Manager (©PICIS) in 2009.

All temperatures were recorded using a SureTemp® Plus 690 electronic thermometer. Sublingual temperatures were recorded on admission and in the anaesthetic room. The axilla was most frequently used in recovery due to patient compliance. Patients were telephoned the following day, which is standard practice for all patients treated in our unit to assess satisfaction and elicit any complications including pain, nausea and vomiting.

Following the initial audit in 2008, as per NICE guidance, new written information was provided to the patients during preoperative assessment explaining the need to keep warm prior to surgery. The written information described the risk of hypothermia and asked them to bring in warm clothes and to inform the nursing staff if they felt cold. Additionally, following the initial audit, results obtained were presented and made available to staff within the Day Surgery Unit, to provide education on the NICE guidelines and their relevance to practice in their working environment.

**Results**

One hundred and eleven patients were included in the initial audit, and 118 patients were included in the re-audit in 2009: a total of 229 patients. Of these, complete data was obtained for 211 patients.

**Preoperative Phase**

The populations were typical of those expected in day surgery with the majority of patients ASA I and II (Table 2).

<table>
<thead>
<tr>
<th>ASA</th>
<th>Number in 2008</th>
<th>Number in 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>82 (73.9%)</td>
<td>77 (65.2%)</td>
</tr>
<tr>
<td>2</td>
<td>28 (25.2%)</td>
<td>34 (28.8%)</td>
</tr>
<tr>
<td>3</td>
<td>1 (0.9%)</td>
<td>7 (5.9%)</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>111</strong></td>
<td><strong>118</strong></td>
</tr>
</tbody>
</table>

According to NICE guidance, patients of ASA 2-5 are at higher risk of hypothermia and this is regarded as one risk factor. Our results showed that 29/111 (26%) in 2008 and 41/118 (35%) in 2009 had ASA as a risk factor for hypothermia.

Temperature distribution on admission to the day surgery unit and on arrival in the anaesthetic room is shown in Table 3. As per NICE guidelines, no preoperative warming was required in 99% of patients in 2008. In the re-audit in 2009 only one patient had a temperature less than 36.0°C (35.9°C) on arrival to the unit, and without any active warming this had increased to 36.7°C on arrival in the anaesthetic room.

**Intraoperative Phase**

NICE guidelines highlight patients at higher risk of hypothermia (Criteria 4 of NICE Guidelines – see Table 1) and recommend pre-emptive warming of any patient with two or more risk factors. Those falling into the higher risk category in our day surgery population did so by virtue of being both ASA 2–5 and having intermediate surgery. Seven (7.5%) of patients had both risk factors in 2008 and 14 (11%) had both risk factors in 2009.

In addition NICE recommend that any patient undergoing...
Table 1 The 14 criterion for NICE guidance on the management of inadvertent peri operative hypothermia.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Criterion 1** | Patients should be offered written information about:  
• the treatment and care they should be offered, including the *Understanding NICE guidance* booklet  
• the service providing their treatment and care  
• the importance of staying warm before surgery to lower the risk of postoperative complications  
• the possibility of the hospital environment being colder than their home  
• bringing additional clothing, such as a dressing gown, vest, warm clothing and slippers, to help them keep warm comfortably  
• the importance of telling staff if they feel cold at any time during their hospital stay. |
| **Criterion 2** | Families and carers should be offered written information about:  
• the treatment and care they should be offered, including the ‘Understanding NICE guidance’ booklet  
• the service providing the patient’s treatment and care  
• the importance of staying warm before surgery to lower the risk of postoperative complications  
• the possibility of the hospital environment being colder than their home  
• bringing additional clothing, such as a dressing gown, vest, warm clothing and slippers, to help them keep warm comfortably  
• the importance of telling staff if the patient feels cold at any time during their hospital stay. |
| **Criterion 3** | Patients should be assessed for their risk of inadvertent peri-operative hypothermia and potential adverse consequences before transfer to the theatre suite |
| **Criterion 4** | Patients should be managed as higher risk if any two of the following apply:  
• ASA grade II to V  
• pre-operative temperature below 36.0°C (and pre-operative warming is not possible because of clinical urgency)  
• undergoing combined general and regional anaesthesia  
• undergoing major or intermediate surgery  
• at risk of cardiovascular complications. |
| **Criterion 5** | Patients’ temperature should be measured and documented in the hour before they leave the ward or emergency department |
| **Criterion 6** | Patients whose temperature is below 36.0°C should have:  
• forced air warming started pre-operatively on the ward or in the emergency department  
• forced air warming maintained throughout the intraoperative phase. |
| **Criterion 7** | Patients’ temperature should be measured and documented before induction of anaesthesia and then every 30 minutes until the end of surgery |
| **Criterion 8** | Patients’ temperature should be 36°C or above before induction of anaesthesia |
| **Criterion 9** | The following patients should be warmed intraoperatively from induction of anaesthesia using a forced air warming device:  
• those at higher risk of inadvertent peri-operative hypothermia and who are having anaesthesia for less than 30 minutes  
• those having anaesthesia for longer than 30 minutes |
| **Criterion 10** | Patient’s temperature should be measured and documented on admission to the recovery room and then at 15-minute intervals. |
| **Criterion 11** | Ward transfer should not be arranged unless the patient’s temperature is 36.0°C or above. |
| **Criterion 12** | Patients whose temperature is below 36.0°C postoperatively should be actively warmed using forced air warming until they are discharged from the recovery room or until they are comfortably warm. |
| **Criterion 13** | Healthcare professionals who measure patients’ temperature with any device should:  
• be aware of, and carry out, any adjustments that need to be made in order to obtain an estimate of core temperature from that recorded at the site of measurements  
• be aware of any adjustments that are made automatically by the device used. |
| **Criterion 14** | Intravenous fluids of 500ml or more and blood products should be warmed to 37°C using a fluid warming device |
surgery lasting 30 minutes or more should have perioperative warming \((\text{criteria 9})\). If the presence of two risk factors and/or anaesthesia for 30 minutes or more are considered, in 2008, a total of 65.0% and in 2009, 50.0% of cases should have been pre-emptively warmed from induction of anaesthesia if NICE guidelines were fully instituted within our unit. In 2008, no patients had active warming in theatre. In 2009, three patients had a forced air warmer applied intraoperatively. None of these patients had temperatures less than 36.0°C prior to surgery. Two fulfilled NICE criteria for pre-emptive warming and all spent at least 59 minutes in theatre.

Theatre time was typical for a day surgery population and is shown in Table 4. Table 5 shows the relationship between the time spent in theatre and the incidence of hypothermia in the recovery period. When comparing recovery temperatures for those in theatre for less than 30 minutes with those in theatre for 30 minutes or more, no statistically significant difference was found between the groups.\(p = 0.41\)

NICE also recommends the warming of any fluids infused in volumes of 500ml or over. It is standard protocol in our unit to infuse one litre of crystalloid to adult patients undergoing general anaesthesia. This is not routinely warmed.

**Recovery Phase**

In 2008 6 (6.5%) patients had a temperature of less than 36.0°C on arrival in primary recovery. None of these patients had the combination of pre-operative risk factors suggested by NICE guidance to indicate the need for intraoperative warming. One patient was cold in the anaesthetic room at 35.8°C. Three were anaesthetised for greater than 30 minutes, with only one of these anaesthetics predicted to last greater than 30 minutes. None were actively warmed in theatre or recovery. There was no evidence at follow up of any adverse effects in terms of unplanned admission to hospital, patient satisfaction or pain scores. Three different patients were warmed in recovery as they felt subjectively cold but none had temperatures of less than 36.0°C.

During the re-audit, 9 (7.6%) patients had a temperature of less than 36.0°C on entering primary recovery. One of these patients had preoperative risk factors which would have indicated the need for intraoperative warming. None of these patients had either forced air warming or fluid warming in theatre. Three were anaesthetised for greater than 30 minutes. One of these patients had forced air warming in recovery and their temperature rose to 36.5°C within 20 minutes. At follow up, one of these patients reported poor patient satisfaction but the specific reason was unclear.

In 2009 four different patients were recorded as shivering on arrival in primary recovery. Of these, none had temperatures less than 36.0°C however one was noted to feel subjectively cold, and 2 patients were given forced air warmers. No patients were admitted due to inadvertent hypothermia.

---

**Table 3** Temperature distribution on admission to the Day Surgery Unit and on arrival in the anaesthetic room.

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>Admission</th>
<th>Anaesthetic Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=36.5</td>
<td>76 [81.7%]</td>
<td>65 [69.9%]</td>
</tr>
<tr>
<td>36.0-36.4</td>
<td>17 [18.3%]</td>
<td>27 [29.0%]</td>
</tr>
<tr>
<td>&lt;36.0</td>
<td>0</td>
<td>1 [1.1%]</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>93</td>
</tr>
</tbody>
</table>

**Table 4** Mean time in theatre and mean surgical time

<table>
<thead>
<tr>
<th>Mean Time in:</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theatre (minutes)</td>
<td>37</td>
<td>36</td>
</tr>
<tr>
<td>Surgery (minutes)</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Number of patients in theatre 30 minutes or longer</td>
<td>61 [65.0%]</td>
<td>59 [50.0 %]</td>
</tr>
</tbody>
</table>

**Table 5** Time spent in the operating theatre and the number of patients who were hypothermic after this time.

<table>
<thead>
<tr>
<th>Time in theatre (minutes)</th>
<th>Number of patients</th>
<th>Number hypothermic (&lt;36°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>91</td>
<td>8 [8.8 %]</td>
</tr>
<tr>
<td>30–59</td>
<td>93</td>
<td>3 [3.2%]</td>
</tr>
<tr>
<td>60–89</td>
<td>23</td>
<td>3 [13.0%]</td>
</tr>
<tr>
<td>90–120</td>
<td>4</td>
<td>1 [25.0%]</td>
</tr>
</tbody>
</table>
Table 6 Patient temperatures on arrival in primary recovery.

<table>
<thead>
<tr>
<th>Recovery</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;36.5°C</td>
<td>47 [50.5%]</td>
<td>54 [45.8%]</td>
</tr>
<tr>
<td>36-36.5°C</td>
<td>40 [43.0%]</td>
<td>55 [46.6%]</td>
</tr>
<tr>
<td>&lt;36°C</td>
<td>6 [6.5%]</td>
<td>9 [7.6%]</td>
</tr>
<tr>
<td>Number warmed</td>
<td>3 [3.2%]</td>
<td>3 [2.5%]</td>
</tr>
</tbody>
</table>

Discussion

Our audit cycle has shown that inadvertent peri-operative hypothermia is uncommon in Torbay Hospital Day Surgery Unit in contrast to other studies despite lack of full adoption of the NICE guidelines. There was also very limited evidence of any morbidity associated with any of the cases of recorded postoperative hypothermia, and certainly no increase in unplanned hospital admission following surgery. This raises the question: are the NICE guidelines on hypothermia relevant to our day surgery population?

The reasons for the observations in this audit cycle could be numerous. Day case patients undoubtedly have different characteristics to in-patients, being elective admissions and thus not acutely unwell with the associated problems that acute illnesses pose. Anaesthetic and surgical techniques are different and refined, with minimally invasive procedures and rapid onset and offset anaesthetic techniques the norm.

Pre-operatively, written guidance has now been included on patient information leaflets, thus fulfilling NICE criteria simply and cost effectively. The waiting area is kept warm at approximately 21°C. Unit policy is also to keep patients mobile and change them into surgical gowns as close to induction as possible. This practice appears to work and the results show that patients are arriving warm in the anaesthetic room.

Intraoperatively forced air warming would be recommended in 57% of patients when combining results from 2008 and 2009, and fluid warming in 100% of patients undergoing general anaesthesia if unit protocol was adhered to. In spite of this not being implemented, no complications were observed in any of the patients included in the audit. There was no statistically significant relationship between time spent in theatre and the number of patients arriving in primary recovery with hypothermia - indicating that time in theatre may be an inappropriate criterion for the instigation of forced air warming in day surgery patients.

In 2008 and 2009, a few patients, 6 [6.5%] and 9 [7.6%] respectively, arrived in primary recovery with temperatures of less than 36.0°C. Only three of these patients had potentially predictable peri operative characteristics and no adverse events were recorded. This is significantly less than that reported by Hoyle et al, where 40% of their patients were hypothermic. However they reported that hypothermia appears to have been well tolerated in their day case population as no adverse consequences were reported during their audit period. Our findings would reflect this observation.

The cost implications of fully implementing NICE guidelines are not insignificant. In our day surgery unit, based on the results of this audit and current equipment costs within the trust, costs would have amounted annually to up to £49 500 for forced air warming and £45 000 for fluid warming. From the results of our audit and the work of others, there appears to be limited evidence to suggest that inadvertent hypothermia causes actual harm to day surgery patients. The NICE suggestion that the additional cost of full implementation of the inadvertent hypothermia guidelines would be offset against the resulting reduction in wound infections, cardiac complications and blood transfusion requirements appears not to be supported in the day surgery population (although we have not audited wound infections). There is perhaps a case that day surgery should have its own guidelines or acknowledged as exempted from the current guidelines. Of relevance and potentially in support of this, on closer examination of the full NICE guideline the following disclaimer can be found to which attention should perhaps be paid before rushing to implement NICE guidance on hypothermia ‘across the board’

Disclaimer

As with any clinical practice guideline, the recommendations contained in this guideline may not be appropriate in all circumstances. A limitation of a guideline is that it simplifies clinical decision making. Decisions to adopt any particular recommendations must be made by practitioners in the context of:

- Available resources
- Local services, policies and protocols
- The circumstances and wishes of the patient
- Available personnel and devices
- Clinical experience of the practitioner
- Knowledge of more recent research findings

The intention of our department is, therefore to:

- Continue to provide written information to patients regarding the risk of hypothermia
- Continue the successful practice of maintaining a warm waiting area, keeping patients mobile preoperatively and changing into theatre gowns as close to induction as possible
- Record patient temperatures in the anaesthetic room and in recovery
- Provide warming if needed or for patient comfort.
We are not however pre-emptively warming all patients identified by NICE guidelines as it appears that the cost is not justified. This was similarly observed in a non-day surgery setting and in ENT patients. Evidence to support the use of NICE hypothermia recommendations in the day surgery setting remains weak. When assessing the financial commitment in implementing these NICE guidelines across our whole day surgery patient population, there does not appear to be adequate evidence that patient outcome is adversely affected by their selective omission.

References


Running a financially viable hernia service in the era of best practice tariffs: JODS 22.1
Authors: Kreckler S, McWhinnie D, Khaira H & Jackson I

Dear Sir

Whilst the concept of providing excellent patient care in a financially efficient manner is not a new one, a combination of factors such as the Government’s Payment by Results initiative and the current economic climate certainly re-enforce the need for cost-efficiency in healthcare.

The above article raised some interesting points. Not only is the tariff for day case hernia repair £300 greater than for an elective case with an overnight stay, but also the surplus or deficit that each procedure generates will be directly affected by the cost of performing an operation.

Table 2 lists example costing based on staff pay, drugs and surgical equipment. However it may not provide an accurate reflection of the best choice of anaesthetic agents, both in terms of clinical benefit and cost-effectiveness. The table lists enflurane as a potential maintenance agent for anaesthesia, despite the fact that enflurane no longer appears in the British National Formulary, and appears to no longer be available in the UK.

The cost of a propofol, opioid, enflurane/sevoflurane anaesthetic is given as £108.39 for a 1 hour operation.

A study, undertaken at South Devon NHSFT by Blandford et al, concluded that an anaesthetic technique consisting of total intravenous anaesthesia (TIVA) using 50ml syringes of propofol with 1mg alfentanil added to each, and a laryngeal mask airway would cost no more than 68.8 pence/minute or £41.28 for a 1 hour case. This reduction in cost of £67.11 per hour of general anaesthesia is a potential saving.

We also believe that a TIVA technique may provide further cost reduction by avoiding unplanned overnight admissions.

Dr Ian Davies
CT2 Anaesthetics,
South Devon NHS Foundation Trust

Dr Jane Montgomery
Consultant Anaesthetist,
South Devon NHS Foundation Trust

Reference


The development and evaluation of a new blended learning ambulatory surgery nursing course: JODS 22.1
Author: Maggie Tarling

Dear Sir

This paper points to a ‘gap’ in the market for day surgery training for nursing staff.

My understanding is that this is a national deficiency. It would be useful to know what the perceived ‘technical and operational’ training gaps are that this course fulfils as the learning outcomes relate to socio-cultural principles.

I am not sure how a service manager would appreciate the benefits of this to support practical improvements in day surgery pathways.

Regarding the methodology, I would have found it useful to know how the evaluation was conducted – for example:

• Were the questionnaires completed after each module?
• Were the questions pre-configured?
• How many responses this related to as a proportion of the total course attendees?

Nursing staff have developed skills that support the day surgery needs of patients.

It would be useful to link this with some evidence of how staff report their new skills have supported a change to their local service for day surgery.

Such examples would add credence to the future development of the course.

The evaluation features the views of the course attendees, which is fine, but a manager would want some assurance that staff were learning skills that would support the day surgery service for example competency skill sets linked to job descriptions and role profiles.

Beryl Woodall
Associate Director – Operations and Service Improvement, Aintree University Hospital
The Journal of One–Day Surgery (JODS) is a quarterly publication published by the British Association of Day Surgery (BADS) specifically for Surgeons, Anaesthetists, Nurses, Clinical Directors, Directorate Managers, Directors of Operations, Executive Directors, Chief Executives and all who work in or are associated with Day Surgery in the UK. It provides essential information for all professional in the world of Day Surgery and circulated directly to over 700 individual members.

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Probably more than you think.

All anesthetised patients are at risk of inadvertent perioperative hypothermia (IPH). Not only is hypothermia uncomfortable for patients, it creates bottlenecks in recovery. It's also risky – and surprisingly expensive.

A 2001 UK study of 421 clean surgery patients found that 14% of non-warmed patients developed surgical wound infections. In contrast, patients who received active pre-operative warming had an infection rate of just 5%.

And wound infections are just one of several adverse consequences of IPH. They add up quickly. NICE estimates the average cost saved by preventing IPH to be between £101 and £668 per patient.

Cost of adverse consequences of IPH:

<table>
<thead>
<tr>
<th>Consequence</th>
<th>Cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical wound infection (major surgery)</td>
<td>3,858</td>
</tr>
<tr>
<td>Morbid cardiac event (cardiac arrest)</td>
<td>2,021</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>1,144</td>
</tr>
<tr>
<td>Hospital length of stay per day</td>
<td>275</td>
</tr>
</tbody>
</table>

Avoiding hypothermia is a lot less expensive. Pre-warming with the unique Bair Paws® forced-air warming gown reduces the core temperature drop nearly all surgical patients experience from anesthesia. The same Bair Paws gown used for pre-warming can often be used for warming throughout surgery and recovery.

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NICE guidelines for the prevention of inadvertent hypothermia call specifically for forced air warming of any patient: undergoing a procedure of 30 or more minutes; cold (36°C) before or after surgery; or whose operation, though less than 30 minutes, puts them at risk of hypothermia.

Pre-induction warming with the unique Bair Paws forced-air warming gown (above) can help patients reach recovery warmer for cases less than one hour. The same gown can often be used for intra-operative warming to prevent hypothermia in longer cases.