

# AMBULATORY SURGERY

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



*The Official Clinical Journal of the*  
INTERNATIONAL ASSOCIATION  
FOR AMBULATORY SURGERY

VOLUME 20.1 MARCH 2014



# AMBULATORY SURGERY

**VOLUME 20.1**

<b>Editorial</b>	<b>3</b>
<b>Day case laparoscopic cholecystectomy, room for improvement: A United Kingdom District General Hospital experience</b>	<b>4</b>
Ramez Antakia, Sameh Abd Elsayed, Wissam Al-Jundi, Ryan Dias & Krish Ravi	
<b>The effects of general anaesthesia on memory recall following day-case knee arthroscopy</b>	<b>10</b>
S. El Shafie, J. Craik, AM. Day, J. Desborough, N. Bardakos & R. Twyman	
<b>The Role of Patient Satisfaction Surveys to Improve Patient Care in Day Surgery</b>	<b>13</b>
R.R. Thurairatnam, G.S. Mathew, J. Montgomery & M. Stocker	
<b>Does early return to physical activity affect the cure rates for mid-urethral sling surgery?</b>	<b>16</b>
Jay Iyer & Ajay Rane	



We all recognise that recall of post-operative information given to our patients can be variable and inexact and indeed several studies over the years have addressed this issue. In this edition we publish an observational study from Epsom, England evaluating memory recall after day case arthroscopy in 96 patients. The authors suggest that memory impairment may be significant for up to 2 hours after anaesthesia which indicates the importance to all of us of providing written post-operative instructions to our patients in addition to discussing the outcome of any procedure with both patient and carer!

Our second paper relates to patient satisfaction questionnaires. It is a fundamental principle in day surgery units to evaluate patient satisfaction. While a single audit of opinion is of little value, repeated audits over time can be an invaluable tool in assessing trends in patient outcomes. Often these measured outcomes are metrics required by the service provider and may not necessarily reflect the patients' perception of quality. From Torquay, England, comes an audit highlighting the importance of allowing the patient the opportunity to comment on their experience rather than only answering the set questions asked. The authors added the open question 'how can we further improve your day surgery experience?' Of 315 patients completing the survey, 94.6% expressed positive remarks regarding their care but interestingly, over 7% of patients commented about outcome measures such as inadequate waiting facilities or excessive perioperative waiting times which were not part of the standard

questionnaire. It just goes to prove that sometimes the most revealing outcomes are found not in what you ask, but in what you don't ask!

Over the years, we have received and reviewed many submissions on day case laparoscopic cholecystectomy. This paper from Chesterfield, England serves to remind us that while day case laparoscopic cholecystectomy may now be routine for many, for others, the learning curve continues. An interesting comment from the authors relates to drain insertion and failure to discharge on the day. We would certainly concur with this but suggest as others have done that removal of the drain is possible after a few hours, allowing the patient to still be discharged the same day.

Finally, from Townsville, Queensland we have a paper addressing the issue of whether early or late mobilisation and activity following ambulatory urethral sling surgery for stress incontinence provides the better outcome. A prospective study of 50 patients demonstrated no difference between the groups suggesting no contraindication to early mobilisation. It is nice to see yet another study of day case surgery proving the advantage of returning to normality as soon as possible rather than artificially delaying normal patients' recovery.

**Doug McWhinnie**

Editor

# Day case laparoscopic cholecystectomy, room for improvement: A United Kingdom District General Hospital experience

Ramez Antakia, Sameh Abd Elsayed, Wissam Al-Jundi, Ryan Dias, Krish Ravi

## Abstract

**Background:** Laparoscopic cholecystectomy (LC) is the surgical treatment of choice for symptomatic gallstones. The current NHS innovation drive is to perform 60% of all elective laparoscopic cholecystectomies as day cases.

**Methods:** A retrospective data analysis was performed for all day case laparoscopic cholecystectomies in a single institution between January 2009 and December 2011. Causes of failed discharges, post-operative complications and readmission rates were recorded.

**Results:** A total of 476 patients were listed as day-cases. 348 patients (73%) were discharged the same day. 128 patients (27%) were admitted, of these 89 (69.5%) were discharged within 24 hours and 21 (16%) were discharged within 2 days. 39 patients who failed discharge were due to pain only (30%), 6 due to nausea & vomiting (5%), 55 due to

other reasons (43%) and the remaining 28 due to a combination of symptoms. All 15 patients who had a drain inserted, stayed overnight ( $P < 0.001$ ). All those patients who had a procedure lasting longer than two hours, failed same day discharge ( $P < 0.001$ ). Our overall rates for complications, conversions to open and readmission were 2.5%, 1.5% and 1.7% respectively. Our daycase rate doubled from 22% in 2009 to 50% in 2010 and then plateaued at 48% in 2011 as more emergency cases were being performed over this period.

**Conclusion:** Day case laparoscopic Cholecystectomy is a feasible and a safe treatment for symptomatic gallstones. Patients should be listed on a morning list and drain insertion avoided whenever possible, with robust protocols for management of post-operative pain and vomiting.

**Keywords:** day-case; day surgery; laparoscopic cholecystectomy; day case laparoscopic cholecystectomy.

**Authors' address:** Department of Surgery, Chesterfield Royal Hospital NHS Foundation Trust, Calow, Chesterfield, Derbyshire S44 5BL.

**Corresponding author:** Ramez Antakia, 20 Stumperlowe Mansions, Stumperlowe Lane, Sheffield, S10 3QQ  
Tel: +44 798 333 6264 E-mail: antakia26@hotmail.co.uk

## Introduction

Gallstones are common and 4 to 45% of the adult UK population are diagnosed with gallstones depending on age and gender [1, 2]. Although the majority are asymptomatic, about 1 to 4% becomes symptomatic every year. Since 1990s, laparoscopic surgery for gallstones became more popular [3, 4, 5]. The median hospital stay dropped from 8.8 days for open surgery down to 2.7 days for Laparoscopic cholecystectomy (LC) [6].

LC is currently the treatment of choice for symptomatic gallstones as it offers a shorter hospital stay due to smaller wounds and reduced postoperative pain. Patient satisfaction [7, 8] and cost effectiveness [9, 10] render day case laparoscopic surgery desirable for clinicians, surgeons and managers, but patient safety still remains the main priority [11]. Bleeding and bile duct injury are the serious complications that can be encountered following LC [12, 13] and are usually detected intra-operatively.

While some clinicians argue that patients feel safer if they are observed overnight [12], advocates of day surgery claim that significant bleeding following LC is rare [12] and that bile duct injury is either detected intra-operatively or few days later [12]. Gurusamy et al 2008 showed that there was no difference in the rates of serious complications after LC whether patients were discharged home either on the same day or if they were admitted overnight for observation [14]. In the year 2000, with the aim of continuous healthcare improvement, the NHS Plan advocated by the department of health in UK proposed that 75% of all elective surgery should be performed as day case surgery [15]. The British Association of Day Surgery (BADs) recommended that 60% of elective laparoscopic cholecystectomies could be done as day cases per annum [16].

The BADs standards recommended for day case LC are summarized as follows [17].

The following patient factors should be considered when offering a day case procedure: previous upper abdominal surgery (e.g. gastrectomy is a relative contraindication), severity of gallstone complications (previous attacks of pancreatitis and/or obstructive jaundice, frequent episodes of cholecystitis and their severity), Body Mass Index (BMI), existing co-morbidities and patient education and understanding.

Surgery & anaesthesia-related factors that should be considered include anaesthetic technique, surgical technique, post-operative management of pain, nausea and or vomiting, operative time and adequate recovery time prior to discharge (at least 6 hours of monitoring advised [17, 18]).

We present our experience of performing day case LC examining these various factors influencing a day case procedure with a view to improve our practice and achieve these recommendations.

## Patients and Methods

We carried out a retrospective cohort study over a three-year period from January 2009 to December 2011. Patients, booked to have a day case LC, were identified through the theatre computer system; using the code "J183" i.e. Total Cholecystectomy. Inclusion criteria included all patients booked for day case LC during the study period. Exclusion criteria included all other patients booked to undergo elective inpatient, expedited and emergency LC. All patients identified as breaches by the "Hospital Episode Statistics" (HES) were analysed and their pre-operative, intra and post-operative records were reviewed. We examined various parameters that could have potentially had

an impact on patient's hospital length of stay such as patient's body mass index (BMI), co-morbidities (using the American Society of Anaesthesiology "ASA" classification), underlying psychological issues (e.g. depression, anxiety), surgeon's and anaesthetist's level of experience/grade, drain insertion, operative time and length of recovery.

A member of the surgical team and the nursing staff using a standard protocol reviewed all patients in the pre-assessment clinic. Patients unsuitable for a day case procedure were identified prior to admission. Any patient with BMI >45 and/or chronic pain issues were referred for a further anaesthetic assessment, and a joint anaesthetic/surgical decision was made regarding overnight stay. All patients received routine deep venous thrombo-prophylaxis preoperatively in accordance with their body weight, with subcutaneous low molecular weight heparin.

A standard anaesthetic protocol was followed, but it was up to the individual anaesthetist to tailor the anaesthetic to the patient's needs. Anaesthetic induction was carried out in all patients using propofol, midazolam, fentanyl and atracurium and maintained using isoflurane +/- nitrous oxide till gall-bladder bed dissection was complete. Patients routinely received cyclizine +/- dexamethasone intra-operatively for antiemesis [17] along with intravenous (IV) fluids. Nasogastric tube intubation was not undertaken routinely in all cases. They were inserted only at the surgeon's discretion to decompress a dilated stomach to gain access to the surgical field. IV antibiotics were not given routinely in our practice, but only given in case of spillage of bile or stones or if there was significant active inflammation detected intra-operatively.

IV paracetamol and tramadol were used for intra and post-operative analgesia and IV ondansetron for anti-emesis as required. Patients were encouraged to mobilize early and oral fluid and dietary intake were given as soon as tolerated. On discharge, patients were given wound care advice, and advised to contact their general practitioner (GP) or the emergency admissions unit at the hospital or present to the Accident & Emergency (A&E) department in case of severe symptoms within 48hrs of the procedure.

### Inclusion and Exclusion Criteria

The inclusion criteria for day-case LC were patients with symptomatic gall stones, ASA grades 1, 2 and 3 who had adult company at home for the first 48 hours and a history of uncomplicated gallstones (no previous episodes of severe pancreatitis or cholecystitis or percutaneous cholecystostomies). These patients with complicated gall stones were thoroughly assessed for suitability for a day case procedure and were offered day case LC only if the surgical procedure was not expected to be difficult and there was always a provision for overnight admission if required. Patients with severe sleep apnoea and previous extensive abdominal surgery were not considered for day case LC.

### Discharge Criteria

Patients were discharged the same day if they were able to tolerate oral diet, pass urine, mobilise safely, were haemodynamically stable without significant pain, nausea and or vomiting. Furthermore, wounds had to be completely dry at the time of discharge. For quality assurance, the Consultant in charge of the patient took the decision for discharge in the initial 2 years of the study and subsequently this evolved into a protocol-driven nurse led discharge.

Primary outcome was classified as a successful day case LC and discharge in patients identified for a day case procedure preoperatively. Secondary outcomes were considered as failed day case discharges (due to complications directly related to surgery, post-operative pain, nausea and vomiting and other reasons for failed discharge) and readmissions following a successful day case procedure and discharge.

### Statistical Methods

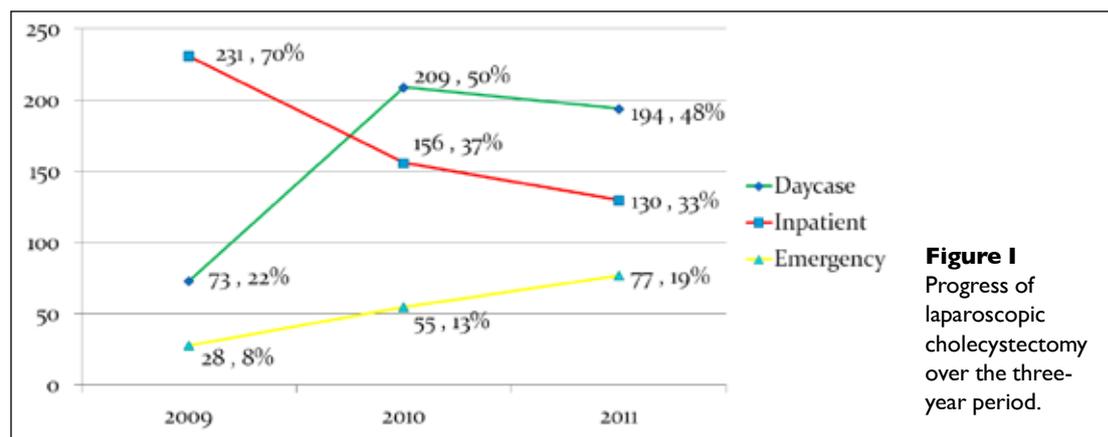
Statistical analysis was carried out using the Chi-Square test to compare variables between the groups where applicable.

## Results

A total of 476 patients were booked for day-case LC over the three-year period. The breakdown for all laparoscopic cholecystectomies performed during that period is shown in Table 1. Our day surgery rate doubled from 22% in 2009 to 50% in 2010 and 48% in 2011, but we were also performing more emergency/same-admission LC (Figure 1).

**Table 1** Breakdown of laparoscopic cholecystectomy over the three-year period.

	2009	2010	2011	
<b>Elective Daycase</b>	73 (22 %)	209 (50 %)	194 (48 %)	<b>476</b>
<b>Elective Inpatient</b>	231 (70 %)	156 (37 %)	130 (33 %)	<b>517</b>
<b>Emergency</b>	27 (8 %)	55 (13 %)	77 (19 %)	<b>160</b>
	<b>332</b>	<b>420</b>	<b>401</b>	<b>1153</b>



**Figure 1** Progress of laparoscopic cholecystectomy over the three-year period.

The initial HES search identified 250 breaches. After reviewing all medical case notes, only 150 cases that were initially booked for day surgery were identified as breaches. Amongst the remaining, 89 were booked as elective inpatients and 11 had emergency LC and these were excluded for analysis. Among these wrongly coded 100 cases, only 8 (8%) were from the third year. Out of the 150 breaches, 22 patients were still discharged the same day (i.e. coding error). Therefore true day case breaches were only 128 cases. Analysis of these breaches yielded the following results; the male/female ratio was 31/97, and the median age was 53 years (range 18-78 years). Patients' obesity is displayed in table 2 according to the BMI classification (Table 2) [19]. BMI was not an inclusion or exclusion criteria in our study. Significant obesity (class II and morbid) was not found to be a significant factor hindering day surgery as shown in other studies [20]. Indeed this was borne out in this study as 101 patients (80%) of breaches had a BMI <35 and only 26 patients (20%) who breached had a BMI ≥35.

**Table 2** BMI of true day-case breaches.

Classification	BMI	Number of patients
	Not available	1
Underweight	<18.5	0
Desirable weight	18.5 – 24.9	17
Overweight	25 – 29.9	49
Obese - class I	30 – 34.9	35
Obese - class II	35 – 39.9	14
Morbidly obese – class III	≥40	12

The agreed anaesthetic protocol was followed in all patients. The majority of breaches were ASA class 1 (104 patients, 81%), 22 patients were class 2, and the remaining two patients were class 3 using the ASA classification illustrated in table 3 [21]. Therefore good patient selection in our cohort did not render existing co-morbidity a significant factor affecting breaches.

**Table 3** Risk classification of the American Society of Anaesthesiology (ASA).

Classification	Physical condition of the patient
1	Normally healthy
2	Discrete systemic disease
3	Serious, non-incapacitating systemic disease
4	Life-threatening incapacitating systemic disease
5	Moribund with death expected within 24 hours

Anaesthesia was carried out by a consultant in 109 cases (85%), and by registrar/staff grade in the remaining 19 patients. Seven surgeons, across different subspecialties (four colorectal surgeons, two upper gastro-intestinal surgeons and one general/endocrine surgeon), provided the day case service. Surgery was performed by a consultant grade in 96 patients (75%), and by a registrar/staff grade in the remaining 32 cases supervised by a consultant. Therefore anaesthetist and surgeon's grade was not a significant factor affecting breaches.

All of our surgeons used the standard four-port technique. The pneumoperitoneum was induced with the open Hasson's technique, and then maintained at a pressure of 10 mm Hg. Insufflation pressure was rarely increased up to 13 mm Hg to improve the surgical view and dropped back to 10 mm Hg once the critical surgical dissection was done. Pneumo-peritoneum does not appear to be a significant factor affecting day-case breaches in other studies [22]. This was not accurately demonstrated in this study, as documentation was not accurate.

Five patients (out of the 128) had previously been diagnosed with psychological issues namely anxiety and depression. However these numbers were too small to show any significance that prevented same day discharge. Of these 5 patients, three patients had difficult procedures. One procedure was difficult due to presence of significant inflammation and adhesions. Two other procedures were longer than 2 hours, where one was converted to an open procedure and the other was complicated by intra-operative bleeding. The two remaining patients were admitted overnight for pain control and discharged the next day.

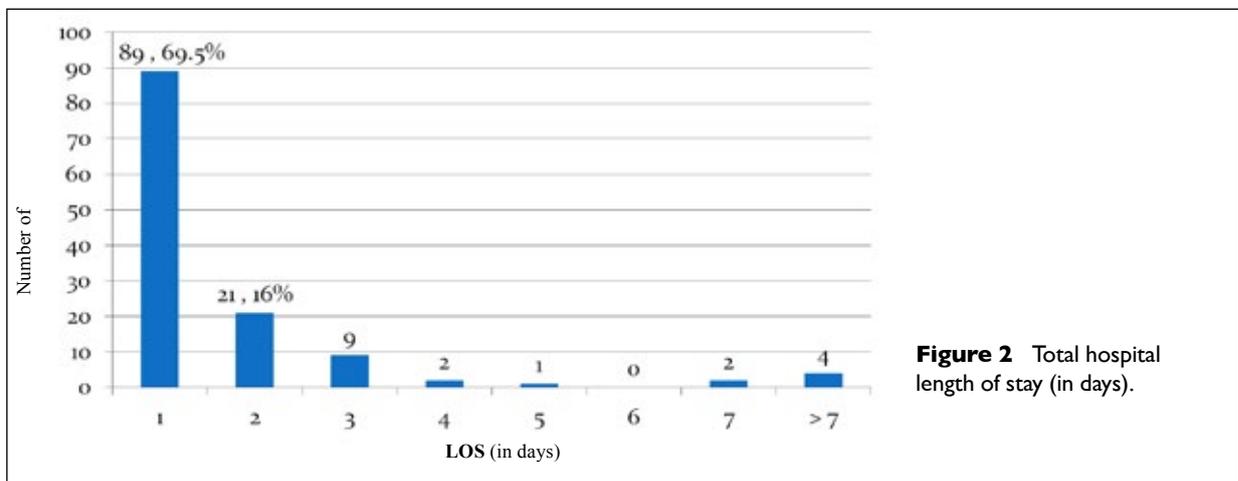
34 day case breaches had a drain inserted, of which fifteen patients had no clear reason documented, which was a statistically significant factor preventing same day discharge (P<0.001). In 5 cases, a drain was inserted after conversion to an open procedure. Four other patients had drains inserted following difficult subtotal resections and common bile duct (CBD) stones requiring Endoscopic Retrograde Cholangiopancreatography (ERCP) on the same day. Indications for drain insertion are illustrated in Table 4.

**Table 4** Indications for drain insertion in day case breaches.

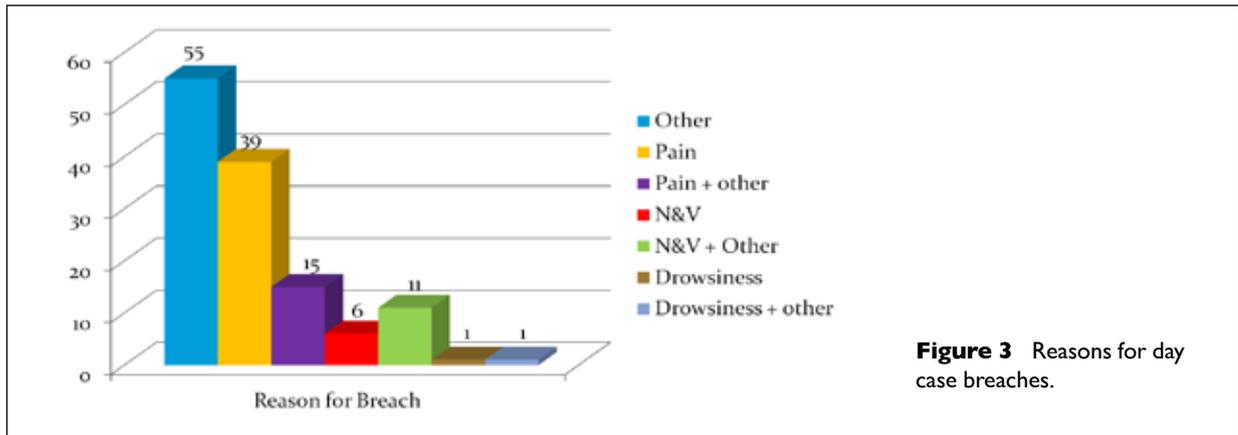
Number of patients	Reason/finding
15	Non specific reasons (12 patients discharged within 24 hrs)
12	Difficult procedure +/- conversion
2	Laparoscopic subtotal cholecystectomy
2	CBD stones + ERCP on the same day
1	Associated intra-operative Asystole + liver bed ooze
1	Associated urine retention
1	Pneumonia, low O <sub>2</sub> saturation & HDU admission

The mean operative time (time from knife to skin till wound closure) was 95 minutes (range 40-245 minutes). The procedure lasted for two hours or longer in 31 cases. 30 of these 31 patients breached their intended day case stay, which was statistically significant (P<0.001). Prolonged and difficult procedures were due to significant inflammation and adhesions compromising the surgical operative field. This led to conversion to open in seven cases, of which two patients had subtotal cholecystectomy. The total hospital length of stay ranged from 1 to 14 days as shown in Figure 2.

The most common cause of failed discharge was persistent pain requiring overnight admission for pain control in 39 patients (30.5%) or a combination of pain with other symptoms in 15 patients (11.7%). Six breaches (4.7%) were due to nausea and vomiting alone, or combined nausea and vomiting with other symptoms in eleven (8.6%) patients. 82 patients had other (55) and combined (27) symptoms as outlined in Figure 3. Among "other" causes that led to



**Figure 2** Total hospital length of stay (in days).



**Figure 3** Reasons for day case breaches.

**Table 5** Other reasons leading to breach of day-case surgery.

Other reasons for breach	Number of patients
Overnight drain (including high output)	16 (4)
Difficult procedure (including gall bladder tear + bile leak)	15 (6)
Conversion to open	7
Poor documentation	7
Urine retention	6
Late finish / low oxygen saturation	4 (each)
Tachycardia / low blood pressure	3 (each)
Pyrexia / social / high blood pressure	2 (each)
Non-procedure related (chest pain / ECG changes / vasovagal episode / bradycardia / AF / intra-operative asystole / blood in endotracheal tube / CBD stones + ERCP / allergic reaction / red tender right breast / painful right eye)	1 (each)

overnight admission, the commonest were: overnight drain insertion in 16 cases, 15 procedures described as difficult, 7 conversions to open, 7 had poor documentation, and 6 patients had post-operative urinary retention. All other reasons for failed discharges are detailed in Table 5.

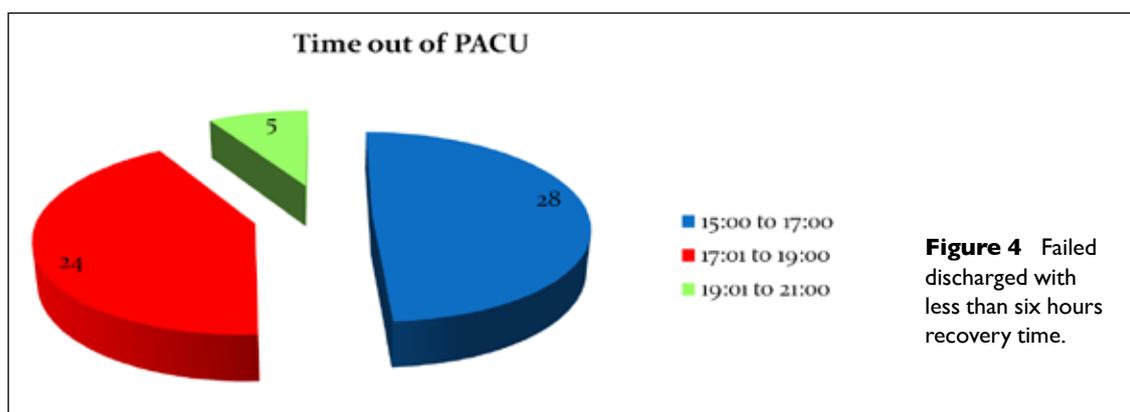
Twelve patients (9%) developed post-operative complications, 8 of which required readmission. The most common complication was recurrent abdominal pain in 8 patients, and wound infection in 3. The overall readmission rate within 30 days was 1.47%, but immediate readmission within 48 hours for a day case LC was only 0.2%. Complications are illustrated in Table 6 with readmissions and the hospital length of stay (LOS) in days.

Post-operative recovery time was calculated as the time from patient's return to the day surgery unit until the time of discharge. In our study, recovery time started when the patient left the post-operative care unit (PACU) to return to the day surgery ward. As our day surgery unit closes at 21:00, all patients who left PACU after 15:00 had less than 6 hours recovery time. In the first two years, all patients who had six hours recovery or less in the day surgery unit breached their intended day case admission. After assessing the first two years results and applying our new discharge protocol, some patients who left PACU between 15:00 & 17:00 in the third year (2011), managed to be discharged successfully on the same day. All patients who had less than 4 hours recovery time failed to be discharged on the same day. Time out of PACU is displayed in figure 4.

**Table 6** Post-operative complications in day-cases.

Complications	Readmission	LOS (in days)
Low O <sub>2</sub> saturation + SOB	No	14
Low O <sub>2</sub> saturation + SOB	No	4
Umbilical port bleeding + fast AF & ST depression	No	4
Abdominal pain (wound infection)	No	0
Worsening RUQ pain 6 days later	Yes (CTPA: postop atelectasis)	1 then 3
Wound infection 3 days later	Yes	1 then 2
Pain around drain site 5 days later	Yes	1 then 2
Recurrent RUQ pain 7 days later	Yes (MRCP: normal)	0 then 1
Recurrent RUQ pain 8 days later	Yes (MRCP: normal)	1 then 2
Recurrent RUQ pain 9 days later	Yes (subphrenic collection aspirated)	1 then 3
Abdominal pain & DVT 4 days later	Yes	0 then 1
Severe postop abdominal pain 1 day later	Yes	0 then 1

Right upper quadrant (RUQ), magnetic resonance cholangiopancreatography (MRCP), computed tomographic pulmonary angiography (CTPA), deep vein thrombosis (DVT)



**Figure 4** Failed discharged with less than six hours recovery time.

## Discussion

This study represents one of the largest up-to-date UK studies. Patient demographics (age, gender, ASA grade) were comparable between successful day-cases (348) and failed discharges (128). Coding errors were noted during the first two years of our study, but decreased significantly over the third year. Accurate coding systems are crucial for record keeping and for receiving the correct tariff from primary healthcare providers. Only 150 out of the initially identified 250 cases were true day case procedures. Of the wrongly coded 100 cases, only 8 (8%) were from the third year. 22 of the 150 identified day case breaches were still discharged the same day, 14 (64%) of which were from the third year. Thus although these 14 cases were correctly coded as day cases, outcome coding (successful versus failed day cases) is also crucial as it reflects the overall unit performance.

Accurate documentation is essential and in our study seven failed discharges had no clear reasons stated in their notes for an overnight admission (6 patients in the first 2 years). All seven patients were discharged successfully the next day. Patient education is also vital during the decision-making process. Two failed discharges were due to social reasons, which could have been avoided with better counselling, both of which occurred in the first 2 years. Following assessment of the first two years performance, a new discharge protocol was

instigated which led to improvement in the services provided and patient education in the third year.

Drain insertion should be avoided whenever possible or only when indicated. Briggs et al 2009 discharged patients, who had a drain inserted for mild ooze intra-operatively, the same day as these patients were monitored for 6 hours post-operatively and the drain was removed prior to discharge [23]. Therefore a recovery period of at least 4 hours is advisable. Our study clearly demonstrates that drain insertion had a negative outcome for day case LC.

Abdominal pain is still the main cause of in-hospital morbidity and readmission; hence robust measures for management of post-operative pain are essential. Our conversion to open rate of 1.5% compares well with the literature [23, 24]. Our morbidity and complication rate of 2.5% compares favourably with those reported by other centres [7–10, 23, 24]. There were no mortalities in either group during the study. Also our overall readmission rate of 1.7% compares favourably with other national and international centres [23, 24] and our readmission rate within 48hrs was only 0.2%.

Our overall day case rate was 48% (476/993) for the period of this study but showed a year on year improvement. Our overall day case discharge rate was 73% (348/476) but again showed a declining

unplanned admission rates in the latter half of this study period. On the basis of our inclusion criteria, when the study was initiated a higher than accepted unplanned admission rate was accepted in favour of a high day case rate. Furthermore, we were able to achieve a high day case rate without a dedicated day care surgery unit. This study shows that day case LC is safe and feasible in a district general hospital setting in the UK [4, 5, 7-10, 23-30] though there is room for further improvement within our service.

## Acknowledgments

The authors confirm that there was no conflict of interest regarding this study. No funding was received from external sources, and the study was conducted to improve our clinical practice and the health services provided to our patients.

## References

- Bateson MC. (2000). Gallstones and cholecystectomy in modern Britain. *Postgrad Med J*, **76**, 700–703.
- Acakovschi M. (2001). Cholesterol gallstone: from epidemiology to prevention. *Postgrad Med J*, **77**, 221–229.
- Calland JF, Tanaka K, Foley E, et al. (2001). Outpatient laparoscopic cholecystectomy: patient outcomes after implementation of a clinical pathway. *Ann Surg*, **233**, 704–715.
- Kiely JM, Brannigan AE, Foley E, et al. (2001). Day case laparoscopic cholecystectomy is feasible. *Ir J Med Sci*, **170**, 98–99.
- Leeder PC, Matthews T, Krzeminska K, et al. (2004). Routine day-case laparoscopic cholecystectomy. *Br J Surg*, **91**, 312–316.
- Leo J, Filipovic G, Kremensova J, et al. (2006). Open cholecystectomy for all patients in the era of laparoscopic surgery – a prospective cohort study. *BMC Surg*, Apr 3, **6**, 5.
- Toumi Z, White S, Sharma S, et al. (2010). True day case laparoscopic cholecystectomy: safety and feasibility in a district general hospital in the UK. *Webmedcentral Hepatology*, **1**(10), WMC00886.
- Kasem A, Paix A, Grandy-Smith S, et al. (2006). Is laparoscopic cholecystectomy safe and acceptable as a day case procedure? *J Laparoendosc Adv Surg Tech A*, **16**(4), 365–368.
- Zegarra RF, Saba AK, and Peschiera JL. (1997). Outpatient laparoscopic cholecystectomy: safe and cost effective? *Surg Laparosc Endosc*, **7**, 487–490.
- Skattum J, Edwin B, Trondsen E, et al. (2004). Outpatient laparoscopic surgery: feasibility and consequences for education and health care costs. *Surg Endosc*, **18**, 796–801.
- Mueenullah K, Aliya A, Laila A, et al. (2005). Unanticipated hospital admission after ambulatory surgery. *J Pak Med Assoc*, **55**, 251–252.
- Keulemans Y, Eshuis J, de Haes H, et al. (1998). Laparoscopic cholecystectomy; day-care versus clinical observation. *Ann Surg*, **228**, 734–740.
- Shamiyeh A, and Wayand W. (2004). Laparoscopic cholecystectomy: early and late complications and their treatment. *Langenbecks Arch Surg*, **389**, 164–171.
- Gurusamy KS, Junnarkar S, Farouk M, et al. Day-case versus overnight stay for laparoscopic cholecystectomy. *Cochrane Database Syst Rev* 2008, **3**, CD006798.
- Department of Health. The NHS plan. 2000.
- British Association of Day Surgery. (2009). *BADS Directory of procedures*. Third Edition London. London.
- McVhinnie D, Ellams J, Cahill J, et al. (2004). *Handbook of Day Case Laparoscopic Cholecystectomy*. BADS publication. Available at: <http://www.daysurgeryuk.net/bads/joomla/files/Handbooks/LaparoscopicCholecystectomy.pdf>
- Gurusamy KS, and Samraj K. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Cochrane Database Syst Rev* 2006, **4**, CD005440.
- Reddy S. (2006). *Care pathway for the management of overweight and obesity*. London: The Department of Health.
- Khan MA, Hall C, and Smith I. (2005). Laparoscopic cholecystectomy in the obese day case patient. *J One-Day Surg*, **14**(2), 4–6.
- Keats AR. (1978). The ASA classification of physical status – a recapitulation. *J Anesthesiol*, **49**, 233–236.
- Chok KS, Yuen WK, Lau H, et al. (2006). Prospective randomized trial on low-pressure versus standard-pressure pneumoperitoneum in outpatient laparoscopic cholecystectomy. *Surg Laparosc Endosc Percutan Tech*, **16**(6), 383–386.
- Briggs CD, Irving GB, CD Mann, et al. (2009). Introduction of a day-case laparoscopic cholecystectomy service in the UK: a critical analysis of factors influencing same-day discharge and contact with primary care providers. *Ann R Coll Surg Engl*, **91**, 583–590.
- Victorzon M, Tolonen P, and Vuorialho T. (2007). Day-case laparoscopic cholecystectomy: treatment of choice for selected patients? *Surg Endosc*, **21**(1), 70–73.
- Ammori BJ, Davides D, Vezakis A, et al. (2003). Day-case laparoscopic cholecystectomy: a prospective evaluation of a 6-year experience. *J Hepatobiliary Pancreat Surg*, **10**(4), 303–308.
- Jain P, Hayden J, Sedman P, et al. (2005). A prospective study of ambulatory laparoscopic cholecystectomy: training, economic, and patient benefits. *Surg Endosc*, **19**, 1082–1085.
- Lau H, and Brooks D. (2002). Contemporary outcomes of ambulatory laparoscopic cholecystectomy in a major teaching hospital. *World J Surg*, **26**, 1117–1121.
- Simpson J, Savarise K, and Moore J. (1999). Outpatient laparoscopic cholecystectomy: what predicts the need for admission? *Am Surg*, **65**, 525–529.
- Psaila J, Agrawal S, Fountain U, et al. (2008). Day-surgery laparoscopic cholecystectomy: factors influencing same-day discharge. *World J Surg*, **32**, 76–81.
- Proske JM, Dagher I, Revitea C, et al. (2007). Day-case laparoscopic cholecystectomy: results of 211 consecutive patients. *Gastroenterol Clin Biol*, **31**, 421–424.

# The effects of general anaesthesia on memory recall following day-case knee arthroscopy

S. El Shafie<sup>1</sup>, J. Craik<sup>2</sup>, AM Day<sup>3</sup>, J. Desborough<sup>4</sup>, N. Bardakos<sup>5</sup>, R. Twyman<sup>6</sup>

## Abstract

**Declaration:** The authors would like to declare that this study has not been published or being reviewed by other journals.

Retention of new information may be impaired during recovery from general anaesthesia. Patients are likely to be anxious if they cannot recall information conveyed at the surgeons' postoperative visit. Previous studies have shown evidence of short-term memory impairment after GA.

Patients undergoing day case knee arthroscopy under general anaesthesia were told five random words and three diagnostic findings from their operation, by the surgeon prior to discharge. The patients were telephoned the following day to test their recall of words and diagnostic findings, with a maximum possible score of eight. 96 patients

were available for the telephone follow-up. The patients were grouped according to the interval between the end of anaesthesia and the time the information was given to them.

For knee arthroscopy day cases it appears that, allowing as much time as possible after anaesthesia, at least two hours if possible, before reviewing a patient in the recovery area will likely enhance his/her later recall of the clinical information, potentially setting patient expectations at the appropriate level and improving compliance with postoperative rehabilitation.

For the surgeons' post-operative visit to be valuable to the patient, it should take place at least two hours following cessation of anaesthesia. It is advisable to endorse verbal communication with written information..

**Keywords:** Anaesthesia, Arthroscopy, Recovery, Memory, Day case.

**Authors' addresses:** <sup>1</sup> Research Fellow, Elective Orthopaedic Centre, Epsom, UK Epsom Hospital, Dorking Road, Epsom, Surrey, KT18 7EG, United Kingdom. *E-mail:* sherifelshafie@gmail.com *Tel:* 01372735422 *Fax:* 01372735425

<sup>2</sup> Registrar in Trauma and Orthopaedics, Epsom & St. Helier University Hospitals, UK <sup>3</sup> Operating Department Practitioner in Trauma and Orthopaedics, Epsom & St. Helier University Hospitals, UK <sup>4</sup> Consultant in Anaesthetics, Epsom & St. Helier University Hospitals, UK

<sup>5</sup> Orthopaedic Surgeon, Athens, Greece <sup>6</sup> Consultant in Trauma and Orthopaedics, Epsom & St. Helier University Hospitals, UK

**Corresponding author:** S. El Shafie *Email:* sherifelshafie@gmail.com *Tel:* 01372735422 *Fax:* 01372735425

## Introduction

Good communication is an essential element of the doctor-patient relationship. In the surgical setting, during post-operative recovery, patients may be anxious about the operative findings. The patient should be informed fully about the diagnostic findings and management decisions. Guidelines from the British Association for Day Case Surgery (BADs), state that the practice of giving diagnostic information to patients who may be under the effects of a general anaesthetic should be avoided, whenever possible [1, 2]. Some patients may appear alert and conversational following surgery, but may still be affected by the amnesic effects of general anaesthetic agents [3–5]. The duration of these effects is unknown. Patients may be concerned and worried if they cannot recall important diagnostic and management information which was given to them during the recovery phase risking psychological harm and possible medico-legal action, particularly if any decisions on further treatment are taken at this time [3, 6].

Healthcare providers aim to maximise the proportion of surgical cases carried out on a day stay basis. The quality of patient care and the patients' experience of their care are of paramount importance. There is much interest in the management of the day stay process, including recovery from anaesthesia. Several studies have assessed the time required for adequate recovery and safe discharge from hospital, using a variety scoring methods and criteria [7, 8]. We found three published papers in which memory for new information was tested after general. Using visual memory tests, Ogg et al. demonstrated that patients undergoing day case gynaecological procedures under general anaesthesia suffer considerable memory impairment for at

least the first post-operative hour. Full memory function returned at three hours post-operatively [3]. Blandford et al. showed that post-operative patients who had an interval of up to an hour to recover before being given verbal information, achieved a higher recall score 30 minutes later, compared with a group given the information at a mean of 18 minutes after recovery. On the basis of such findings, it has been recommended that the post-operative surgeons' review be conducted as late as possible after recovery to maximize retention of information by patients [4]. In a comparative study between propofol and thiopentone for day-case use Heath et al. proved that at 1 hour after recovery memory is impaired [9].

Our prospective study enrolled a group of patients undergoing knee arthroscopy as a day case procedure under general anaesthesia. The aim of the study was to investigate the relationship of the recall of information given at the post-operative visit with the time elapsed after general anaesthesia. To this end, we formulated two research questions: (a) how much verbal information conveyed to patients during the surgeon's post-operative review is retained 24 hours later? (b) is there a difference in the amount of retained information when this is given at different times after recovery from anaesthesia?

## Methods

All patients included in this study underwent arthroscopic knee surgery on a morning operating list between June 2011 and May 2012 as a day case procedure by, or under the direct supervision of, the senior author. The patients were consented to enrolment on the day of surgery and were given an outline of the study. All patients

undergoing knee arthroscopy by the senior author were included in the study. Patients with preexisting mental disorders or known long term memory disorders were excluded from the study. All surgery was carried out under general anaesthesia. A record was made of the anaesthetic agents administered to each patient. The following time points were recorded: start times of anaesthetic induction and of the operation; the time of completion of surgery, the time at which the administration of anaesthetic agents was discontinued, and the time of the surgeon's post-operative review. For each patient, a record was made of the duration of the operation, duration of administration of anaesthetic agents and the time interval between the end of administration of anaesthetic agents and the post-operative review by the surgeon.

At the post-operative visit in the recovery area, each patient was told three phrases which described the arthroscopic findings and five random words. The random words were produced by an internet-based random word that randomly generates words of a given type and complexity; those were set as nouns with least complexity. The three phrases and five words gave a combined maximum possible memory score of eight. All patients were asked to repeat each word once and to commit them to memory before being tested the following day. Patients were instructed not to make a written record of the words. Patients were discharged by the nursing staff according to the criteria used in the Day Case Unit. At noon on the day after surgery, patients were contacted by telephone and asked to recall both the three arthroscopic findings and the five random words. A record was made of the memory score. Local Research Ethical Committee approval was obtained prior to starting the study.

For the purposes of data analysis patients were divided into three groups according to the time interval between the end of anaesthesia and the post-operative review (Group 1: less than 60 minutes, Group 2: 60–120 minutes, 3: more than 120 minutes). Trend analysis using analysis of variance (ANOVA) with Dunnett's post-hoc test (Group 1, serving as the control group and sequentially compared with Groups 2 and 3) was used to compare the memory scores amongst the three groups. Results are reported as mean values with ranges or standard deviations, as appropriate. Statistical significance was set at the  $\leq 0.05$

level. All statistical analyses were performed using IBM SPSS®.

## Results

A total of 114 patients met the inclusion criteria to be enrolled in the study. Eighteen patients were lost to follow-up, as attempts to make contact the following day failed, leaving 96 patients (84.3%) available for analysis. The mean patient age was 53 years (range 16 – 90 years), there were 53 male patients and 61 female patients. The mean duration of anaesthesia was 41 minutes (range 20 – 78 minutes). The arthroscopic procedures done were diagnostic, lateral meniscectomy, medial meniscectomy, excision of loose body and synovectomy. Three patients received an anaesthetic for more than 1 hour each. The mean operative time was 29 minutes (range 10 – 60 minutes). Patients who had surgery at the beginning of the theatre session experienced a longer time period until their post-operative review, which took place at the end of the operating session. The mean time from the end of the anaesthetic to the post-operative review was 107 minutes (range 10 – 280 minutes)

Propofol was administered to all 96 patients in combination with the following: fentanyl in 62, isoflurane in 28 or sevoflurane in 39 and nitrous oxide in 36 patients. Across the three groups, there was no significant variation in the types of anaesthetic agents used, the duration of administration of the anaesthetic agents or the operative time (Table 1).

There was a statistically significant linear trend in the memory scores within the three patient groups ( $p = 0.03$ ). Post-hoc analysis demonstrated a significant difference ( $P = 0.02$ ) in the memory scores between group 1 (4.0, SD= 2.5) and group 3 (5.2, SD= 1.7). There was no significant difference ( $p = 0.6$ ) identified between groups 1 and 2 (Table 2).

Memory scores (minimum 0, maximum 8; reported as mean values with standard deviations in parentheses and corresponding 95% confidence intervals in a separate column) amongst patients, stratified in three groups, according to the time interval they were spoken to in the recovery area by the operating surgeon.

**Table 1**

	Patient Group	Mean anaesthetic time in minutes (SD*)	Mean operative time in minutes (SD)	Anaesthetic agent used (percentage of use within group)				
				P	F	I	S	N
1	<60 minutes (n=25)	42.0 (16.2)	31.63 (16.7)	25 (100%)	15 (60%)	6 (24%)	10 (40%)	6 (24%)
2	60-120 minutes (n=36)	41.4 (10.9)	26.71 (8.6)	36 (100%)	23 (64%)	24 (33%)	15 (42%)	16 (44%)
3	>120 minutes (n=35)	42.1 (9.5)	30.58 (9.7)	35 (100%)	24 (69%)	10 (29%)	14 (40%)	14 (40%)
	Total (n=96)	41.8 (11.9)	29.38 (11.6)	96	62	28	39	36

Mean anaesthetic and operative time, anaesthetic agents used. \*Standard deviation. P=Propofol, F=Fentanyl, I=Isoflurane, S=Sevoflurane, N=Nitrous Oxide.

**Table 2**

	Patient Group	Memory Score	95% Confidence Interval
1	<60 minutes (n=25)	4.0 (2.5)	2.6 – 5.0
2	60-120 minutes (n=36)	4.1 (1.9)	3.5 - 4.7
3	>120 minutes (n=35)	5.2 (1.7)	4.6 - 5.6
	Total n=96	4.5 (2.0)	4.0 - 4.9

Memory scores (minimum 0, maximum 8; reported as mean values with standard deviations in parentheses and corresponding 95% confidence intervals in a separate column) amongst patients, stratified in three groups, according to the time interval they were spoken to in the recovery area by the operating surgeon.

## Discussion

Several studies have shown the effect of a range of analgesics and anaesthetic agents on impairment of memory after general anaesthesia [9–11]. Impairment of memory may be of particular relevance if patients are unable to recall surgical findings or post-operative instructions conveyed during the surgeons' postoperative review. In some reports, patients have been unable to recall any part of a consultation, despite appearing alert and conversational at the time [3–5]. Although it is recognised that post-operative memory impairment occurs following a general anaesthetic, the precise duration of this impairment is unknown [9–11].

Despite the presence of previous reports on the immediate post-operative recall of patients [3–5] the present investigation is the first to assess this in the field of day case orthopaedic surgery. The evaluation of patients at approximately 24 hours after surgery, rather than prior to discharge, constitutes a further strength of our prospective study. On the other hand, the influence of patient-related factors such as co-morbidities, level of education, fluency of English language) on their memory was not examined and the use of randomly selected words to test memory is not a validated test of memory function. These are the two weaknesses of this study and could both well be the subjects of future research.

Blandford et al. conducted a prospective study to assess patient recall following general anaesthesia using propofol. The study was based on evidence that neurobiological changes required to commit new information to memory are likely to occur within 30 minutes. Using a verbal method of testing recall, groups of patients were given five words to remember during recovery from general anaesthesia for day surgery [4]. An "early" group of patients were told the words at a mean of 17.6 minutes post-anaesthetic and a "late" group at a mean of 58.1 minutes post-anaesthetic. The patients were asked to recall the words after a 30-minute interval. The "late" group scored a mean recall of 3.4 words, compared with 4.4 words for a control group of patients who did not have anaesthesia or surgery. In contrast, the "early" group had a mean recall score of 1.85 words ( $p < 0.001$ ).

Ogg et al allowed one minute for 40 otherwise healthy women to memorise pictures on cards and tested their recall after 10 minutes. The tests were performed either one or three hours after general anaesthesia for minor gynaecological surgery. The conclusion was that memory impairment was maximal at one hour and was regained only at three hours [3]. Visual memory recall following general anaesthesia has also been shown to be a valuable test for post-operative antegrade amnesia [5].

In the current study, we selected patients having day case arthroscopic knee surgery because the anaesthetic technique and the duration of surgery are fairly consistent. Our surgical practice in the day unit is to review each patient before discharge. We chose to use a verbal recall test, similar to that used by Blandford et al, which matches the verbal communication used during the post-operative surgical review. However, we felt it more logical to test the recall of information after an interval of 24 hours, offering patients more time, compared with similar studies published previously [3, 4]. A random selection of common words for recall was used in addition to diagnostic and procedural information, as the latter alone could be prone to bias from pre-operative consultations and the patients' own knowledge and research of their condition. Contacting the patients by telephone the following day proved a successful method, as 84% were available for the assessment.

Our results suggest a linear association between the time interval from the end of anaesthesia and the memory score ( $p = 0.03$ ). This has particular relevance for retention of new information given to

patients immediately post-operatively. For orthopaedic day cases it appears that, allowing as much time as possible after anaesthesia, at least two hours if possible, before reviewing a patient in the recovery area will likely enhance his/her later recall of the clinical information, potentially setting patient expectations at the appropriate level and improving compliance with post-operative rehabilitation.

The post-operative patient review is an essential element of current surgical practice. Maximising the interval between the end of anaesthesia and the surgeons' post-operative visit is associated with increased retention of new information. It may be prudent to reinforce verbal information about diagnostic findings and post-operative management with additional measures such as written instructions, especially if patients are seen soon (less than two hours) after they recover from anaesthesia.

## References

1. Cahill H, Jackson I, McWhinnie D. **Guidelines About the Discharge Process and the Assessment of Fitness for Discharge**. British Association of Day Surgery.
2. Day case and short stay surgery: 2. *Anaesthesia*. 2011;**66**(5):417–34.
3. Ogg TW, Fischer HB, Bethune DW, Collis JM. Day case anaesthesia and memory. *Anaesthesia*. 1979;**34**(8):784–9.
4. Blandford CM, Gupta BC, Montgomery J, Stocker ME. Ability of patients to retain and recall new information in the post-anaesthetic recovery period: a prospective clinical study in day surgery. *Anaesthesia*. 2011;**66**(12):1088–92.
5. Bethune DW. Test of delayed memory recall suitable for assessing postoperative amnesia. *Anaesthesia*. 1981;**36**(10):942–8.
6. Ogg TW. Use of anaesthesia. Implications of day-case surgery and anaesthesia. *British Medical Journal*. 1980;**281**(6234):212–4.
7. Letourneau JE, Denis R. The reliability and validity of the Trieger tests as a measure of recovery from general anaesthesia in a day-care surgery unit. *Anesthesia progress*. 1983;**30**(5):152–5.
8. Marshall SI, Chung F. Discharge criteria and complications after ambulatory surgery. *Anesthesia and analgesia*. 1999;**88**(3):508–17.
9. Heath PJ, Ogg TW, Gilks WR. Recovery after day-case anaesthesia. A 24-hour comparison of recovery after thiopentone or propofol anaesthesia. *Anaesthesia*. 1990;**45**(11):911–5.
10. Kennedy DJ, Ogg TW. Alfentanil and memory function. A comparison with fentanyl for day case termination of pregnancy. *Anaesthesia*. 1985;**40**(6):537–40.
11. Heath PJ, Kennedy DJ, Ogg TW, Dunling C, Gilks WR. Which intravenous induction agent for day surgery? A comparison of propofol, thiopentone, methohexitone and etomidate. *Anaesthesia*. 1988;**43**(5):365–8.

# The Role of Patient Satisfaction Surveys to Improve Patient Care in Day Surgery

R.R.Thurairatnam, G.S. Mathew, J. Montgomery, M. Stocker

## Abstract

**Introduction:** Patient satisfaction surveys are validated tools in assessing the quality of healthcare services [3]. This has been implemented in our day surgery department as part of a continuous quality improvement process.

**Methods:** Data from postoperative phone calls were collected over two five month periods in 2011 and 2012. Responses to the question, "how can we improve your day surgery experience" were collected.

**Keywords:** Patient satisfaction surveys; Day case; Ambulatory surgery.

**Authors' addresses:** Anaesthetic Department, Torbay Hospital, South Devon Healthcare NHS Foundation Trust, Lawes Bridge, Torquay, United Kingdom, TQ2 7AA

**Corresponding author:** R.R.Thurairatnam Tel: +441803614567 Email: rthurairatnam@doctors.org.uk

**Results:** Overall patients expressed positive remarks about their care, but specified improvements regarding waiting area facilities and waiting times.

**Conclusions:** Patient satisfaction surveys, alongside objective postoperative outcome measures, provide a more complete healthcare quality assessment [3].

## Introduction

Measuring outcomes and quality in healthcare is challenging. A definition of quality may differ according to the observer's standpoint. Patients, doctors, anaesthetic assistants, recovery nurses and managers are likely to have their own perspective on 'quality' and may suggest different metrics to measure it [1]. Researchers have shown that for measuring healthcare system's performance, the assessment of patient satisfaction is a more sensitive indicator than the traditional measures of morbidity and mortality patterns [2]. Based on available evidence patient satisfaction surveys are validated tools in assessing the quality of healthcare services [3, 4, 5]. They are an important outcome measure and often refer to the patient's subjective view of various aspects of healthcare, such as the availability of personal and technical resources, interpersonal characteristics of care providers and the adequacy of verbal and written communication. This concept is consistent with various business models in respecting consumer sovereignty.

Limitations with feedback surveys have been their inability to address the gap between healthcare providers and patients, caused by the inherently different goals of the service provider and the individual client, and the differences that exist among various individual clients [4]. Although outcome measures have efficiently been assessed through specific questioning and feedback, patients have reported that most surveys "never ask them the questions that they want to answer" [6]. Based on this information we developed a questionnaire with just one open-ended question; "how can we further improve your day surgery experience?" Our aim was to assess whether our patients' perceptions of the service they had received could provide specific information and to use that as an additional tool to improve the quality of our Day Surgery Unit.

## Methods

Torbay Day Surgery Unit first implemented the newly formatted Patient Satisfaction Survey in 2011, which asked for patients' suggestions on how to improve their overall day surgery experience. Questionnaires were distributed to all patients undergoing day-case

procedures under general anaesthetic over a five-month period in 2011 [7].

In addition to the specifically measured outcomes such as service rating, postoperative pain, nausea and drowsiness scores, the open-ended questionnaire gave a greater insight into the patients' perceptions of the quality of care received. As investigators we maintained an impartial approach while collecting patient feedback, to preserve the authenticity and meaningfulness of qualitative data. Based on initial findings the questionnaire was then incorporated into the routine 24-hour postoperative follow up phone call in 2012. Data was then collected from the follow-up phone call using a computerised record system (Galaxy Surgery ©CSC) over a five-month period in 2012.

## Results

Our Day Surgery Unit treats over 7000 patients a year. In 2011, 315 patients completed the survey and 94.6% expressed positive remarks about staff and the care received (Table 1). This indicates a high level of patient satisfaction. The descriptive statements in the survey also highlighted suggestions for improvement (Table 2).

**Table 1** Positive remarks regarding care from the 2011 survey.

Comments regarding positive aspects of care	Number of Responses
No improvements necessary	120 (38.09%)
Positive staff attitudes	170 (53.96%)
Overall service rating	Excellent 89 (28.25%)
	Very Good 41 (13.01%)
	Good 22 (6.98%)

"Excellent", "amazing", "professional", "efficient", "compassionate", "attentive", "friendly", "providing a personal touch", "respectful and caring", "approachable", "informative", were the phrases used to describe staff attitude and care. The overall service received responses

**Table 2** Suggestions for improvement from the 2011 survey.

Patient suggestions for improvement in care	Number of Responses
Quality of food	4 (1.26%)
Comments on waiting area facilities	13 (4.12%)
Perioperative waiting time	10 (3.17%)
Clean environment	7 (2.22%)

like “awesome”, “first class” and “totally positive” [7]. Only 10.1% of patients had suggestions for improvement. 4 patients commented on the quality of food, with 2 patients describing the toast as dry. 10 patients commented on the prolonged waiting time, however 8 patients were pleased that staff were reassuring and informative. 13 patients commented on the waiting area facilities with the main suggestion being the need for up-to-date reading material. 4 out of the 13 patients raised concerns about the lack of adequate seating in the waiting area and the need for separate adult and paediatric waiting rooms.

Specific remarks about improving patient care included “more nurses in preoperative ward for anxious patients”, “patients to be wheeled down to theatre”, “advice to bring in slippers and dressing gown” and “speedy discharge”. Increasing the availability of extra stackable chairs and recycling magazines to which staff held regular subscriptions in waiting areas were cost-effective measures introduced following the initial survey [7].

In 2012, out of the 363 comments received, 86.7% patients expressed positive remarks about their care. Several comments were made about the “superb”, first class and “excellent” care received, reaffirming that the Torbay Day Surgery Unit runs a very efficient service that has consistently maintained its reputation. Descriptive patient remarks highlighted similar aspects of patient care as those in the 2011 survey (Table 3 and 4).

**Table 3** Positive remarks regarding care from the 2012 survey.

Comments regarding positive aspects of care	Number of Responses
No improvements needed	251 (69.1%)
Positive staff attitudes	67 (18.5%)
Efficient service	55 (15.2%)

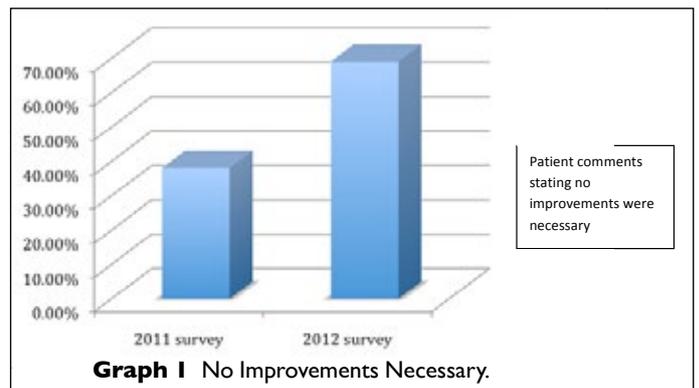
**Table 4** Suggestions for improvement from the 2012 survey.

Patient suggestions for improvement in care	Number of Responses
Quality of food	2 (0.5%)
Waiting area facilities	10 (2.8%)
Perioperative waiting time	32 (8.8%)
Sick note availability	4 (1.1%)
Patient information leaflets	7 (1.9%)

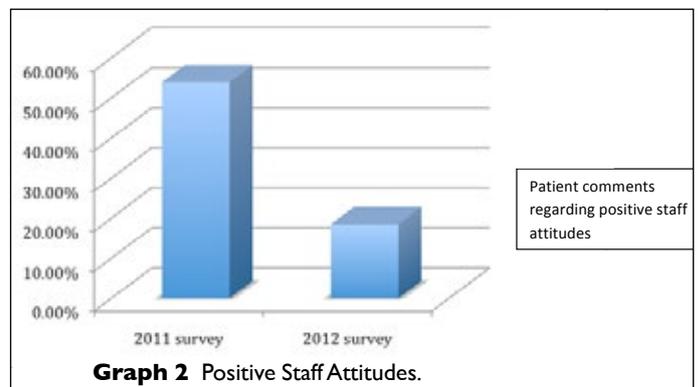
Issues identified in 2011 included inadequate space in waiting areas and lack of up-to-date magazines, which had since been addressed and are not commented on here. Comments regarding waiting areas involved requests for separate child and adult waiting and consultation areas.

32 (8.8%) patients commented on prolonged waiting times; an increase compared to the previous survey (3.17%). Some suggestions were made of staggering arrivals to the day surgery unit. We also identified that the perioperative information may lack clarity and that sick notes were not always available in a timely manner, which were factors not identified in the previous survey. Other comments put forward by the patients included “better fitting gowns”, “family to accompany into anaesthetic room”, “avoid booking mistakes” and “avoid long wait for old notes”.

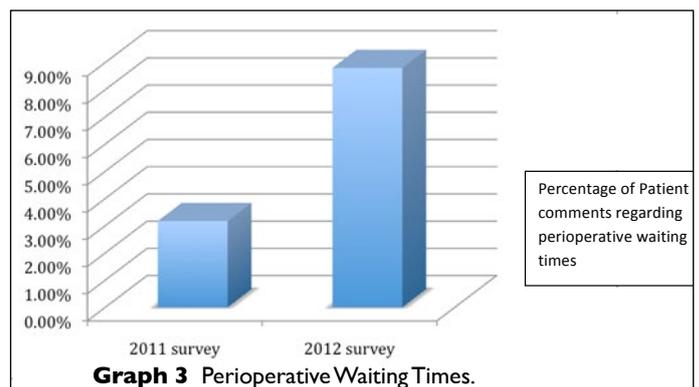
The increased number of patient remarks in 2012 asking for no further improvements in the day surgery service delivery is suggestive of a high level of contentment among patients of the care received (Graph 1).



The 2012 survey showed a decrease in the number of positive comments regarding staff interactions, although both surveys were reassuring in that all the comments made about staff attitudes were very positive (Graph 2).



Discontent about the prolonged perioperative wait was the main issue noted in the 2012 survey (Graph 3). Out of the 32 patients concerned about waiting time overall, 26 patients commented on the prolonged preoperative waiting time, with a few suggestions for staggered arrivals.



Comparisons of both the surveys were quite useful in identifying ongoing issues that need further improvement and their impact on patients' satisfaction.

## Discussion

Quality improvement is now a driving force in healthcare and is an essential aspect of service delivery at all levels [8]. It is achieved by the ongoing analysis of service delivery and continuous adaptations based on regular feedback of performance. Available evidence suggests that healthcare quality assessment becomes more authentic and legitimate if the patient perspective is integrated into the measurement tool [9].

Simple measures of "satisfaction" are now recognized as providing little specific information that can be used in quality improvement and there is a need for rigorous methods to elicit patients' views [10, 11]. We felt that an experience-based, descriptive survey would provide more specific information. This survey was initially introduced to establish the patients' subjective view of what they thought was important about their day surgery experience. Using an open question enabled this assessment. "The toast was dry", "multiple flavoured yogurts", background music in waiting areas", "up-to-date reading materials in waiting areas" are all simple descriptive suggestions that highlighted the need for improvement in the quality of food and the waiting area facilities. The increased number of comments on the prolonged preoperative wait in the 2012 survey is indicative of the fact that we need to implement measures to make the waiting rooms comfortable and relaxing for the patients. Making the waiting experience more enjoyable, results in a higher customer satisfaction level [12].

Potential disadvantages of open questioning are that they are harder to interpret. Open questioning may identify personal opinions about the healthcare experience that are not always applicable to day case service provision as a whole. Patient narratives can be perceived as time-consuming to collect and not representative. One of the limitations of the survey has been the inability to understand the extent of a problem, due to the reduced response rate and representativeness of the sample. The cost effectiveness of implementing change is dependent on this. In order to highlight the patients' subjective view, these results were analysed in isolation, that is, without assessment of other routine postoperative outcome measures (such as postoperative pain, postoperative nausea and vomiting scores).

This patient feedback survey was designed as an additional quality assurance tool and has enabled our unit to involve patients as far as practicable in making decisions about their own care. Measures have already been taken to implement changes based on the suggestions made by patients from the surveys conducted so far. By giving our patients the opportunity to express their thoughts we were able to identify specific concerns and areas for improvement. This questionnaire has now been incorporated into the Torbay Day Surgery department's continuous quality improvement process.

## Conclusion

This open-ended questionnaire survey confirmed that most of our patients have a very positive experience of ambulatory surgery, but more importantly, it helped to identify specific areas for improving patient care. Their use alongside objective postoperative outcome measures can provide a more complete healthcare quality assessment. It is worth emphasising that there is no "gold standard" measure of patient satisfaction [13]. Positive remarks like "everything was perfect as always" and "perfect from start to finish" gives our day surgery unit the momentum to strive for further excellence.

## References

1. Cook TM et al. Shaping quality: the use of performance polygons for multidimensional presentation and interpretation of qualitative performance data. *Br. J. Anaesth.* 2012; **108** (6): 953–960.
2. Shafique SM Quality of Health Care: An Absolute Necessity for Public. *The Internet Journal of Healthcare Administration.* 2007 **4**:2.
3. Fitzpatrick R. Surveys of patient satisfaction – Important general considerations. *BMJ* 1991; **302**:887–9.
4. Jeon Y et al. Measuring Client Satisfaction in Residential Aged Care Settings: A Narrative Review of Instruments. *The Internet Journal of Healthcare Administration.* 2012; **8**:1.
5. Tsianakas V, Maben J et al. Using patients' experiences to identify priorities for quality improvement in breast cancer care: patient narratives, surveys or both? *BMC Health Services Research* 2012; **12**:271.
6. Kelly J et al. *The Journal of One-Day Surgery* 2011; **21**:3:58.
7. Mathew G, Stocker M, Montgomery J. How could we improve your Day Surgery Experience? - A Patient Survey. *The Journal of One-Day surgery* 2012; **22**:22
8. Victorian Government Department of Human Services, Melbourne, Victoria. *A guide to using data for health care quality improvement.* June 2008.
9. Bate SP, Robert G: Bringing user experience to health care improvement: the concepts, methods and practices of experience-based design. Oxford: Radcliffe Publishing; 2007.
10. Cleary PD, The increasing importance of patient surveys. *BMJ.* 1999; **319**(7212): 720–721.
11. Chumbley GM et al. Why do patients feel positive about patient-controlled analgesia? *Anaesthesia.* 1999; **54**:4:386–389.
12. *The ecology of waiting within an ambulatory waiting room.* Cayuga Medical Center in Ithaca, New York. December 2002.
13. Cohen G, Forbes J, Garraway M. Can different patient satisfaction methods yield consistent results? Comparison of three surveys. *BMJ* 1996; **313**:841.

# Does early return to physical activity affect the cure rates for mid-urethral sling surgery?

Jay Iyer, Ajay Rane

## Abstract

**Disclaimer:** The work involved no external funding. Both Dr Iyer AND Prof Rane act as Consultants to the American Medical Systems but receive no royalties from the company.

**Aim:** The aim of this study is to assess the effect of early physical activity on objective and subjective cure rates after a mid-urethral sling.

**Methods:** This is a pilot study in which 50 patients with primary urodynamic stress incontinence underwent sling surgery and were assigned to either the Early Physical Activity (EPA) or NO Physical Activity (NPA) groups. All patients were evaluated at 3 months with urodynamic studies and questionnaire.

**Keywords:** cure rates, mid-urethral sling, early physical activity, post-operative.

**Authors' addresses:** The Townsville Hospital and James Cook University, 100 Angus Smith Drive, Douglas 4814 Queensland, Australia

**Corresponding author:** Dr Jay Iyer PO Box 1417, Thuringowa Central, 4817 Queensland, Australia  
Tel: +61747274097 Fax: +61747274099 Email: drsgiyer2002@yahoo.co.uk

**Results:** The objective cure rate in the early activity and no activity group were 76% and 88% respectively ( $p=0.465$ ). Meanwhile, the subjective cure rate in the activity group was 56% compared to 68% in the control group ( $p=0.56$ ).

**Conclusion:** There was no statistically significant difference in subjective or objective cure rates between the two groups at three months.

## Introduction

There has been a long standing notion that restriction of activity during the period of convalescence following pelvic reconstructive surgery plays a major role in determining the effectiveness of a surgery especially for the first six weeks. This restriction has minimal scientific evidence to support it [1,2].

In this pilot study we used the MiniArc™ sling for the treatment of stress urinary incontinence. Accordingly, we found no evidence-based guidelines through a Medline search from 1980–2010 using the following search criteria ‘early return to daily activity post incontinence surgery’, ‘activity restrictions after incontinence surgery’, ‘convalescence recommendations following incontinence surgery’, ‘physical activity and incontinence surgery’, ‘sexual function post incontinence surgery’ and ‘does a period of convalescence influence outcome of incontinence surgery?’ The aim of this study was to assess the effect of early physical activity on cure rates of mid-urethral slings.

## Materials and Methods

In this study all patients were recruited from the urogynaecology clinic following the diagnosis of urodynamic stress urinary incontinence (USI). Ethics approval was received from our institution (HREC/09/QTHS/20). These patients were assigned to receive the MiniArc™ sling for the treatment of their USI. Patients with no concomitant reconstructive surgical requirements were randomly assigned to either prescribed early physical activity or no physical activity. Patients with other concomitant procedure requirements were assigned to the ‘no physical activity’ group only. This was to ensure that this study did not compromise the outcome of concomitant procedures performed [Table 2].

All patients received pre and postoperative counselling with regard to the objectives of the study, particularly the activities that the patients assigned to the activity group would be required to perform. The surgery was performed in a standard fashion per protocol established by the manufacturer [3]. All patients received post-operative written instructions and questionnaires which included the prescribed Activity leaflet, daily activity diary for the EPA group along with MBLUFTS and PGI-I which were administered for all patients [4]. The NPA group was given “standard” advice to avoid heavy lifting or strenuous activity for 4–5 weeks. In the absence of complications all patients were to be discharged on the day of surgery after a successful trial of void. In order to standardize “pelvic effort” it was imperative that the patients assigned to the Physical activity group did daily prescribed physical exercises over and above daily activity (see appendix). Patients were advised to keep a diary of all the activities including coitus, laundry, driving and sports. At 12 weeks all patients were followed up with urodynamic evaluation.

25 patients were recruited in each arm. Exclusion criteria from the study included previous anti-incontinence surgery, intrinsic sphincter deficiency, detrusor over activity, significant voiding dysfunction, lower urinary tract anomaly, neurogenic bladder disorders, previous radiation therapy to pelvis, past history of any fistula involving the urinary tract, allergy to polypropylene or local anaesthetic and any condition that could potentially prevent patient from undertaking prescribed exercises.

All patients had a detailed urogynaecologic history, physical examination and a multi-channel urodynamic evaluation. MBFLUTS and PGI-I questionnaires were employed both pre- and post-operatively to evaluate the impact of incontinence and voiding dysfunction on quality of life. Evaluation also included collection of intra-operative and post-operative complications.

Objective cure was defined as no leakage of urine on coughing during the stress test on Urodynamics. Subjective cure was defined as no urine loss reported by the patient during physical effort. Urodynamic techniques and measurements, terms and diagnostic criteria conform to the recommendations of the International Continence Society [5,6].

The Statistical Package for Social Sciences (SPSS 14.0) was used for data analysis. Continuous data were reported as the Mean  $\pm$  Standard Deviation (SD) and analysed with Student's t test. Categorical relationship were analysed by the  $\chi^2$  test with Yates' correction or Fisher's exact test, as appropriate. Probability values of  $<0.05$  were considered statistically significant.

## Results

From June 2009 to October 2009, 50 patients with urodynamic SUI were enrolled in the study. At 3 months all 50 patients were available for follow up. The population's demographic and clinical characteristics are shown in Table 1. Preoperative demographics, clinical characteristics and urodynamic parameters were similar in both groups except that there were a higher number of post menopausal women in the EPA group.

In the EPA group, 22 patients had MiniArc™ Sling surgery alone with three minor procedures performed concomitantly. In the NPA group, 7 (28%) patients had sling as the only surgery while 18 (82%) patients underwent various concomitant reconstructive pelvic floor surgeries. Table 2 summarises the types of surgeries performed in both the EPA and NPA groups. All the cases were performed under a general anaesthetic. Of the total of 50 patients, 48 (92%) patients were discharged on the same day.

**Table 1** Demographics.

	<b>EPA</b>	<b>NPA</b>	<b>P value</b>
<b>Age (years)</b>	47 (41 – 59)	54 (43 – 64 )	0.299
<b>Parity, median (range)</b>	3 ( 2 -3 )	3 ( 2 – 4 )	0.455
<b>BMI (kg/h<sup>2</sup>)</b>	25.5 ( 23.6 – 29.4 )	25.8 ( 22.3 – 37.7 )	0.793
<b>Abdominal Hysterectomy, n (%)</b>	1 ( 4 )	1 ( 4 )	1
<b>Vaginal Hysterectomy, n (%)</b>	2 ( 8 )	2 ( 8 )	1
<b>Menopause, n ( % )</b>	8 ( 32 )	15 ( 60 )	0.047
<b>Cystometry capacity (ml, mean <math>\pm</math> SD )</b>	439.8 ( SI $\pm$ 75.8 )	441.3 ( SI $\pm$ 44.3 )	0.933
<b>Uroflow (ml/s, mean <math>\pm</math> SD )</b>	33.6 (SI $\pm$ 14.6 )	29.0 ( SI $\pm$ 8.4 )	0.17
<b>MUCP ( cm H<sub>2</sub>O, mean <math>\pm</math> SD )</b>	43.7 ( SI $\pm$ 17.6 )	40.6 (SI $\pm$ 17.6 )	0.54

**Table 2**

<b>Types of Surgery</b>	<b>EPA, n (%)</b>	<b>NPA, n ( % )</b>
<b>MiniArc alone</b>	7 ( 28 )	22 ( 88 )
<b>Other concomitant procedures</b>		
Posterior Fascial Repair	3 ( 12 )	0 ( 0 )
Posterior Fascial Repair & Anterior Fascial Repair	3 ( 12 )	0 ( 0 )
Posterior Fascial Repair & Anterior Fascial Repair & Perineoplasty	2 ( 8 )	0 ( 0 )
Posterior Fascial Repair & Perineoplasty	2 ( 8 )	0 ( 0 )
Perineoplasty	2 ( 8 )	0 ( 0 )
Posterior Mesh Repair ( APOGEE )	1 ( 4 )	0 ( 0 )
Posterior Mesh Repair ( POSTERIOR ELEVATE)	1 ( 4 )	0 ( 0 )
Fentons	2 ( 8 )	0 ( 0 )
Laparotomy & Right Salpingoophrectomy	1 ( 4 )	0 ( 0 )
Partial Colpocleisis	1 ( 4 )	0 ( 0 )
Microwave Endometrial Ablation ( MEA )	0 ( 0 )	2 ( 8 )
Intravesical Steroid Injection	0 ( 0 )	1 ( 4 )
<b>TOTAL</b>	<b>25 ( 100 )</b>	<b>25 ( 100 )</b>

Table 3 depicts the duration taken by patients in the EPA Group to return to their routine activities like cooking, washing, laundry and driving. 36% of the women were able to return to their daily lifestyles the following day. 96% patients were able to resume their routine within the first week of surgery. All patients were compliant in performing the prescribed daily exercises as well.

**Table 3**

Return to routine daily activities (days from operation )	Number of patients	Percentage (%)
Day 2	9	36
Day 3	3	12
Day 4	3	12
Day 5	2	8
Day 6	2	8
Day 7	5	20
After 1 week	1	4
<b>Total</b>	<b>25</b>	<b>100</b>

Only 15 patients (60%) in the EPA Group were sexually active. Of the sexually active women, 4 (26.7%) patients resumed sexual activity within 2 weeks while 10(66.7%) took between two and four weeks respectively. After the sixth post-operative week, all 15 patients reported resumption of sexual activity. None of these patients reported any problem during their sexual activity except one patient who complained of discomfort owing to mesh exposure. Table 4 summarises the sexual function in the Activity Group. Of the 14 patients in the EPA group who had sexual intercourse within 6 weeks of surgery, only 2 patients complained of leakage of urine on urodynamics.

Table 5 shows the objective cure rate for USI in the NPA group was 88% after 3 months compared to 76% in the EPA group ( $p=0.46$ ), while the subjective cure rate for USI was 68% and 56% respectively ( $p=0.56$ ) which were statistically not significant. Two patients (8%) in each arm had voiding dysfunction of which two were treated conservatively and the other two were treated surgically with sling division.

De novo urge incontinence was found in 16% of patients in the NPA group compared to 4% in the EPA group. However, Urodynamic Detrusor overactivity was demonstrated only in one patient in the NPA group and two patients in the EPA group. Overactive Bladder symptoms were the main complaint among the 24% of patients in the NPA group compared to 16% of patients in the EPA group. 6 of these patients with distressing OAB symptoms were given trial of anti-muscarinic drugs. De novo urge incontinence and OAB symptoms were higher in the NPA groups with none of the complications reaching statistical significance .

All the patients in the NPA group were satisfied with the outcome of the surgery whilst two patients (8%) in the EPA group were partially satisfied due to worsening of their overactive bladder symptoms. 68% of the patients in the EPA group were very satisfied with the outcome of the surgery compared to 64% in the NPA group.

**Table 4**

	Number of patients	Percentage (%)
Sexual function before the operation		
Sexually active	15	60
Sexually not active	10	40
Duration taken to resume sexual function (week)		
Week 1	1	6.7
Week 2	3	20.0
Week 3	4	26.7
Week 4	3	20.0
Week 5	1	26.7
Week 6	2	13.3
Beyond 6 weeks	1	6.7
Women who engaged in intercourse within 6 weeks of surgery		
Continent at 3 months post surgery	12	86
Leaking at 3 months post surgery	2	14

## Discussion

The EPA group was able to achieve normal routine activity in addition to prescribed activity successfully without compromising their surgery. In fact, 24 out of 25 patients in the activity group were able to return to their daily activities within the first week of surgery quite effortlessly.

Through this pilot study we have tried to contest unsubstantiated traditional beliefs that early return to physical activity after incontinence surgery, a short period of convalescence and an absence of restrictions during convalescence are important factors for failure of surgery. The rationale of these older recommendations revolves around the theory that keeping the abdominal and vaginal pressure low in the convalescence period probably helps prevent wound dehiscence, promotes tissue repair and perhaps in the long run prevents recurrence. However, there is very little evidence to recommend the type or duration of restriction of physical activity [1,2].

In recent times there have been a few studies that have attempted to challenge the recommendations on convalescence period and activity restrictions for a variety of surgical procedures. Fast-track vaginal surgery programs with short hospitalisation lasting 24 to 48 hours did not result in increased incidence of pain, bleeding or rupture of the vaginal scar and therefore it did not appreciably increase the risk of recurrence pelvic organ prolapse [8]. A short period of convalescence of 1 to 3 weeks with restrictions on lifting more than 10 kg, sports and sexual intercourse did not result in an increased recurrence of pelvic organ prolapse (POP) compared to 6 weeks convalescence [9]. A study from Denmark reveals that by simply changing the recommendations for the convalescence period after inguinal hernia surgery, the need for sick leave was reduced from a median of 3 weeks to 6 days [10]. Another study has shown that the risk of recurrence after hernia surgery is not increased by less restrictive

**Table 5**

Results and complications at 3 months post operation	EPA , n ( % )	NPA , n ( % )	p value
Cure rates			
Negative stress test	22 ( 88 )	19 ( 76 )	0.46
Women without SUI symptoms	17 ( 68 )	14 ( 56 )	0.56
Satisfaction scores (0-10)			
Very satisfied (9-10 )	16 ( 64 )	17 ( 68 )	0.76
Satisfied (6-8)	9 ( 36 )	6 ( 24 )	0.35
Partially Satisfied (3-5)	0 ( 0 )	2 ( 8 )	0.15
Not Satisfied (0-2)	0 ( 0 )	0 ( 0 )	-
Complications			
Voiding dysfunction	2 ( 8 )	2 ( 8 )	1.0
Urodynamic Detrusor Overactivity	1 ( 4 )	2 ( 8 )	0.55
Denovo Urge Urinary Incontinence	4 ( 16 )	1 ( 4 )	0.16
Overactive Bladder symptoms	6 ( 24 )	4 ( 16 )	0.48
Urinary Tract Infection	1 ( 4 )	0 ( 0 )	0.31
Groin pain	1 ( 4 )	0 ( 0 )	0.31
Mesh Exposure	1 ( 4 )	1 ( 4 )	1.0
Dysparuenia	1 ( 4 )	0 ( 0 )	0.31
Orgasm pain	1 ( 4 )	0 ( 0 )	0.31

**Table 6**

MINISLING	Objective outcome	Subjective outcome
MAS	82	62
Jiménez Calvo J et al		
MiniArc™	90.2	80
TVT Secur™	80.4	80
Jiménez Calvo J et al		
MiniArc™	92	90
Sottner O et al		
MiniArc™	76.7	86.8
De Ridder D et al		
MiniArc™	85	NA
Monarc™	89	NA
Gauruder-Burmester A et al		
MiniArc™	82	69.1
77.8		
Debodinance P et al		
TVT Secur™	83	NA
Khandwala S et al		
TVT Secur™	79	85
Gopalan P et al(our data)	82	62

recommendations [11]. In a recent edition of a gynaecologic textbook suggested that activity can be gradually increased in the first two post-operative weeks. From the beginning of the third week the patient may go outdoors and, if able, drive at the end of the month [12]. Recent prospective studies have shown that the majority of patients had returned to normal levels of activities including cleaning, shopping, driving, outdoor activities, and non-strenuous work within 1 to 2 weeks post vaginal surgery [13,14].

Ottensen M et al [2] has shown that chronic coughing and chronic straining to pass stools when constipated seem more important as creators of high vaginal/abdominal pressure which could play a major role in the progression and recurrence of pelvic organ prolapse by causing more stress on a healing scar than controllable activities, e.g. lifting. In the study of Weir et al. [1], lifting moderate weights did not create higher abdominal pressure than unavoidable daily activities in a group of healthy volunteers. Unlike physical activities, a high intra-abdominal baseline pressure is correlated to a high BMI and to a high prevalence of urinary incontinence [15,16].

As most patients undergoing incontinence surgery are elderly, one may speculate that some of them may lose agility during a convalescence period with too many and, perhaps, unnecessary restrictions. Therefore, post-operative counselling should concentrate more on treating chronic cough and constipation than restrictions of moderate physical activities.

In conclusion, our study has attempted to show that women can be allowed to return to early physical activities without necessarily changing the outcome of the surgery. In this pilot study, the objective cure rates (88% versus 76%) and subjective cure rates (66% versus 56%) were higher in the NPA group as compared to the EPA group. Although these results were not statistically significant the lower cure rates among the EPA group could be attributed to the significantly higher number of post menopausal women in it. Studies have shown how menopausal effect on tissue quality could influence the efficacy of incontinence surgeries [17,18]. Moreover these results compare favourably with other studies done with Minislings [Table 6 & 19-25]. Restrictions advised during the convalescence period potentially have physical, social and economic ramifications. Limitations of our study include a small sample size since there was no other data to refer from. We admit to the need for more long-term prospective studies to study the tenuous and perhaps questionable link between surgical outcomes of surgery for urinary incontinence and early return to physical activity with different rehabilitation regimens. The results of this study should pave way to further studies using "standard slings" and perhaps single compartment prolapse surgery.

## Appendix I

### MANDATORY DAILY PELVIC EFFORT FOR EPA GROUP

Activity	Repeats
Knee bends	10
Sit-stand	10
Jumps	10
Pick up heavy shopping bag(4kg to 10kg)	10

## References

- Weir LF, Nygaard IE et al (2006) Postoperative activity restrictions: any evidence? *Obstet Gynecol* **107(2)**:305–309.
- Ottensen M, Møller C et al (2001) Substantial variability in postoperative treatment, and convalescence recommendations following vaginal repair. A nationwide questionnaire study. *Acta Obstet Gynecol Scand* **80**:1062–1068.
- American Medical Systems procedure video and brochure.
- Ilker Yalcin PhD, Richard C. Bump MD(2003) Validation of two global impression questionnaires for incontinence *Am J Obstet Gynecol* **189**:98–101.
- Abrams P, Cardozo L, Fall M et al (2002) The standardization of terminology of lower urinary tract function: report from the Standardization Sub-committee of the International Continence Society. *Am J Obstet Gynecol* **187**:116–126.
- Bernard T. Haylen, Dirk de Ridder et al (2010) An international urogynecological association (IUGA)/international continence society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurology and Urodynamics* **29(1)**:3.
- Annett Gauruder-Burmester, Graf Popken (2009) The MiniArc sling system in the treatment of female stress urinary incontinence. *International Braz J Urol Vol.* **35 (3)**: 334–343.
- Ottensen M, Sørensen M et al (2002) Fast track vaginal surgery. *Acta Obstet Gynecol Scand* **81**:138–146.
- Ottensen M, Sørensen M, Kehlet H, Ottensen B (2003) Short convalescence after vaginal surgery. *Acta Obstet Gynecol Scand* **82**:359–366.
- Callesen T, Kehlet H (1999) Short convalescence after inguinal herniorrhaphy with standardized recommendations: Duration and reasons for delayed return to work. *Eur J Surg* **165**: 236–41.
- Kark AE, Kurzer MN, Belsham PA (1998) Three thousand one hundred seventy-five primary inguinal hernia repairs: advantages of ambulatory open mesh repair using local anesthesia. *J Am Coll Surg* **186**: 447–55.
- Clarke-Pearson DL, Olt G, Rodriguez G et al (1996) Preoperative evaluation and postoperative management. *Novak's Gynecology*. 12th edn. Baltimore, Maryland: Williams & Wilkins, 1996: 543–617.
- Papa Petros PE (1998) Development of generic models for ambulatory vaginal surgery – a preliminary report. *Int Urogynecol J* **9**: 19–27.
- Ottensen M, Sørensen M, Smidt-Jensen S, Kehlet H et al (2000) *Fast track vaginal surgery and short convalescence*. Poster: NFOG, 2000.
- Noblett KL, Jensen JK, Ostergard R (1997) The relationship of body mass index to intra-abdominal pressure as measured by multichannel cystometry. *Int Urogynecol J Pelvic Floor Dysfunct* **8**:323–326.
- Mommsen S, Foldspang A (1994) Body mass index and adult female urinary incontinence. *World J Urol* **12**:319–322.
- Andrew Hextall(2000) Oestrogens and lower urinary tract function. *Maturitas* **36(2)**: 83–92.
- Michèle Lachowsky, Rossella E. Nappi (2009) The effects of oestrogen on urogenital health. *Maturitas* **63(2)**:149–151.
- Jiménez calvo J, Hualde Alfaro A et al (2008) Our experience with mini tapes (TVT Secur and MiniArc) in the surgery for stress urinary incontinence. *Actas Urol Esp* **32(10)**: 1013–8.
- Jiménez calvo J, Hualde Alfaro A (2010) Stress urinary incontinence surgery with MiniArc swing system: our experience. *Actas Urol Esp* **34(4)**:372–7.
- Sottner O, Halaska M et al (2010) New Single Incision Sling System MiniArc in treatment of the female stress urinary incontinence. *Ceska Gynecol* **75(2)**:101–4.
- De Ridder D, Berkens J et al (2010) Single incision mini-sling versus a transobutator sling: a comparative study on MiniArc and Monarc slings. *Int Urogynecol J Pelvic Floor Dysfunct* **21(7)**:773–8.
- Gauruder-Burmester A, Popken G (2009) The MiniArc sling system in the treatment of female stress urinary incontinence. *Int Braz J Urol* **35(3)**:334–41.
- DeBodinance P, Lagrange E et al (2008) TVT Secur: more and more minimally invasive. Preliminary prospective study of 110 cases. *J Gynecol Obstet Biol Reprod* **37(3)**:229–6.
- Khandwala S, Jayachandran C, Sengstock D (2010) Experience with TVT-SECUR sling for stress urinary incontinence: a 141-case analysis *Int Urogynecol J Pelvic Floor Dysfunct.* **21(7)**:767–72.



## **Ambulatory Surgery is the official clinical journal for the International Association for Ambulatory Surgery.**

Ambulatory Surgery provides a multidisciplinary international forum for all health care professionals involved in day care surgery. The editors welcome reviews, original articles, case reports, short communications and letters relating to the practice and management of ambulatory surgery. Topics covered include basic and clinical research, surgery, anaesthesia, nursing; administrative issues, facility development, management, policy issues, reimbursement; perioperative care, patient and procedure selection, discharge criteria, home care. The journal also publishes book reviews and a calendar of forthcoming events.

### **Submission of Articles**

All papers should be submitted by e-mail as a Word document to one of the Editors-in-Chief. Anaesthetic papers should be sent to **Beverly K. Philip** and surgical papers to **Doug McWhinnie**. Nursing, management and general papers may be sent to either Editor.

Electronic submissions should be accompanied, on a separate page, by a declaration naming the paper and its authors, that the paper has not been published or submitted for consideration for publication elsewhere. The same declaration signed by all the authors must also be posted to the appropriate Editor-in-Chief.

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

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