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This edition of the Journal of Ambulatory surgery contains 4 disparate but interesting articles. From Copenhagen, we have a thought-provoking variation of Altemeier's Procedure applied to stomal, rather than rectal prolapse with 8 of the 10 procedures performed in a day case setting. The procedure is elegantly illustrated by a series of photographs demonstrating each step of the operation. The author concludes that the procedure for full thickness prolapsed colostomy stoma offers a safe and easy day surgery option.

The second paper comes from Milton Keynes in the South Midlands of England. The authors are interested in the post-operative outcome of patients undergoing laparoscopic cholecystectomy, where the patients have failed both day case and overnight stay surgery, staying more than 48 hours. They suggest that in their series, this unfortunate group of patients accounts for 8% of the total and when compared to successful day case laparoscopic cholecystectomies, these patients are more likely to have had acute cholecystitis rather than biliary colic, and have a longer operating time with more drain insertions and conversions to the open procedure. The authors bravely state that some of these factors may be avoidable with greater attention to surgical detail and that their results continue to improve through a continuous audit programme.

Thirdly, comes our first paper from Iran. Here the authors are comparing post-operative pain scores after inguinal hernia repair by local anaesthesia versus general anaesthesia. Not surprisingly, patients in the local anaesthesia group had lower pain scores and a shorter length of stay. The authors are keen to promote local anaesthetic hernia repair in their country where the technique is performed in few centres.

Finally we have a comprehensive overview from Manchester, England, of 25 studies describing the experience of the patient and carer in the immediate post-operative period following day surgery. The author concludes that the main problems are threefold and relate to pain, anxiety and a lack of information. The article suggests that this is the result of the nurse/patient contact becoming more fragmented with the nurse/patient relationship now consisting of brief interactions in the outpatient department, preassessment, in the day surgery unit and in the community with little or no interaction on a professional basis between them. The author proposes that the solution may lie in the enhancement of the hospital/community interface with greater communication between the two.

Enjoy!

Doug McWhinnie

Joint Editor-in-Chief

The adaptation of Altemeier's procedure to treat end colostomy prolapse: A simple option for day surgery

O. Bulut

Abstract

Aim: A simple technique similar to an Altemeier perineal proctectomy is presented as a localised correction under intravenous sedation.

Methods: Ten patients with prolapse of an end colostomy underwent this modified procedure between October 2010 and November 2011. Standard surgical and anaesthetic protocols were used.

Keywords: Colostomy; stomal prolapse; stoma-related complications; day case; ambulatory surgery.

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Results: Eight of the 10 procedures were performed in outpatient settings and completed within 60 minutes. The postoperative course was uneventful in each patient. The median follow-up was 11 months (range 4–15).

Conclusion: This approach would appear to be a safe and reasonable alternative option for local treatment of a prolapsed colostomy stoma.

This paper was presented at the annual meeting of the Danish Surgical Society, Copenhagen, Denmark, June 13–15, 2012.

Disclosures

Orhan Bulut has no conflicts of interest or financial ties to disclosure.

Introduction

Stoma prolapse is one of the late complications of end colostomies and the estimated incidence is reported as ranging from 2–3% to 12%, dependent upon follow-up [1]. Stomal prolapse interferes with the patient's quality of life and results in peristomal dermatitis, bleeding and difficulty in fitting the stomal appliance. Occasionally, stomal prolapse may lead to incarceration and strangulation requiring surgical correction. In the absence of an associated hernia, revision of the stoma usually does not require a laparotomy [2]. Some minimal invasive techniques including the use of stapling devices have been described for local correction of stomal prolapse [3–5]. However, most of these procedures are challenging on fragile elderly patients, especially in the case of incarceration and strangulation.

We present a simple technique similar to an Altemeier perineal proctectomy for the local surgical treatment of stomal prolapse, under minor sedation in a series of 10 patients.

Methods

Surgical technique

The patient is placed in the supine position and 15 mg pentazocine and 5 mg midazolam are given intravenously for analgesia and sedation, respectively. A full thickness circumferential electrocautery incision is made on the prolapsed bowel approximately 5–7 mm from the mucocutaneous junction (Fig. 1). The space between the 2 layers of the prolapsed bowel wall are identified with the tip of a surgical clamp and circumferentially incised (Fig. 2). The everted colon is dissected, and the feeding vessels immediately adjacent



Figure 1 Circumferential electrocautery incision on the prolapsed bowel.



Figure 2 Identification of the space with the tip of a surgical clamp between the 2 layers of the prolapsed bowel.

to the bowel wall of the elongated section of prolapsed colon are ligated from the inner component of the prolapsed colon, effectively doubling the length of everted segment (Fig. 3). The elongated bowel is drawn out through the colostomy opening. Once, haemostasis has been achieved, the prolapsed colon is resected and the new stoma is fashioned as an end stoma with absorbable eversion sutures (Fig. 4). The sutures incorporate serosa at the base of the stoma including the circumferential mucosal edge. Three or four stay sutures are inserted between the edges of the remaining circular mucosal wound and the open end of bowel. It is important to see that there is an adequate amount of bowel projecting beyond the skin level to avoid stenosis. Further sutures are then placed between the stays to secure an accurate apposition of the two epithelial surfaces. Eversion of the new stoma prevents the development of the stricture at the anastomotic site.



Figure 3 The everted colon segment following the dissection of feeding vessels adjacent to the bowel wall.



Figure 4 The corrected stomal prolapse just after final maturation.

Results

A total of ten patients with full thickness prolapse of end colostomy underwent this procedure between October 2010 and November 2011. Table 1 summarizes demographic and perioperative data. Initial surgery was performed for colorectal cancer in 7 patients. Two patients were operated for ischemic colitis and one, previously operated for anal atresia, underwent sigmoidostomy as a final surgical procedure. Stomal prolapses developed within 3–16 months after the initial surgery and different conservative measures have been tried in the management of this complication. Two patients underwent emergency surgery by this technique due to incarceration or strangulation of the prolapsed colostomies (Fig. 5), requiring in-patient rather than day surgery.



Figure 5 Incarcerated stomal prolapse with oedema and ulcerations.

In two patients who had developed anastomotic stricture, and had been treated with several mechanical dilatations, an anastomosis was fashioned between the distal end of the intestine and the mucosal edge. All procedures were completed within 60 minutes and the blood loss was minimal. The postoperative course was uneventful in each patient. The median follow-up was 11 months (range 4–15). In the follow-up period, two patients had recurrences at 3 and 5 months, respectively.

Discussion

Treatment options for stomal prolapse vary from temporary, conservative measures to surgical intervention. Conservative measures include osmotic therapy with granulated sugar and manual reduction often results in recurrence [6]. A variety of surgical techniques has been used either locally at the stoma site or following laparotomy with attempting internal fixation or translocation of the colostomy. Surgical intervention with local revision can be performed in the absence of an associated hernia and laparotomy can be avoided in the majority of the cases. The procedures requiring laparotomy or major stoma revision are associated with remarkable morbidity, especially in elderly patients. In general, conventional procedures are more difficult to perform and often need general anaesthesia followed by several days of hospitalisation. Abulafi et al. described an adaptation of Delorme's technique to treat mucosal prolapse. This method involves an incision to the mucosa near the mucocutaneous junction followed by excision of the redundant mucosa and plication of the muscular wall [7].

Recently, several methods describing the use of stapling devices to amputate the prolapsed segment as a local correction without laparotomy have been published. In general, the stapling devices seem to be useful in the local treatment of mucosal prolapse and the procedures can be performed under sedation without further medication or general anaesthesia [5,8,9]. However, avoidable complications such as ulceration and strangulation in cases with prolapse in permanent stomas require acute surgical treatment. Several attempts of manual reduction as a temporary measures in fragile, elderly patients may result in severe prolapse with resultant bowel oedema or ischaemia and strangulation. Local care of stomal prolapse is possible especially if the stoma is not incarcerated [10]. Therefore, the application of stapling devices may not be an easy and safe option in cases of oedematous, ischemic prolapsed colostomy in the emergency situation.

Only two of our patients underwent emergency surgery in this study and they were discharged on the first postoperative day. All

Table I Patient characteristics and perioperative data.

Patient	Gender	Age	Reason for colostomy	Initial surgery	Complications	Follow-up (months)
1	F	70	ischaemic left colon	LH	-	4
2	M	61	rectal cancer	APR	-	15
3	M	57	rectal cancer	APR	recurrence	14
4	M	75	rectal cancer	APR	-	14
5	M	77	ischaemic left colon	LH	stricture	12
6	M	38	anal atresia	Sigmoid colostomy	stricture	13
7	M	75	rectal cancer	HO	-	10
8	F	72	rectal cancer	HO	-	7
9	M	56	sigmoid colon cancer	HO	recurrence	6
10	M	71	rectal cancer	APR	-	4

F:female M: male LH:left hemicolectomy APR:abdominoperineal resection HO:Hartmanns operation

patients rapidly returned to their normal life and recovered well without any complications. Two recurrences have been observed with this technique during the follow-up period. One underwent the same procedure for recurrence and another patient is now ready for reversal procedure. Although we currently use this approach only for stomal prolapse of end colostomies, it may be possible to be performed on patients having prolapsed loop stomas.

Conclusion

Although long-term data are lacking, this approach seems to be easy and safe to perform and is a reasonable option for local treatment of a full thickness prolapsed colostomy stoma, particularly in cases of emergency. We have successfully employed Altemeier's perineal proctectomy technique to treat end colostomy prolapse as a outpatient procedure in 8 out of ten patients in our small series and commend this minimal technique as suitable for day surgery practice.

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What factors are associated with prolonged hospital stay following planned day-case Laparoscopic Cholecystectomy?

J Isherwood, DPJ Howard, R Saunders, Y Jabri, D Phillips, D McWhinnie

Abstract

While many studies of day case laparoscopic cholecystectomy focus on improving day case rates, the outcomes of those patients who fail day case discharge and have a prolonged length of stay (>48 hours) are less well documented. This case-controlled study investigates the

factors responsible for prolonged admission following planned day-case laparoscopic cholecystectomy in a District Hospital performing approximately 250 laparoscopic cholecystectomies per year with a background day-case rate of 35%.

Keywords: Day case surgery; Laparoscopic cholecystectomy; Length of stay; failed discharge.

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Introduction

The implementation of day-case laparoscopic cholecystectomy (LC) in England is a key National Health Service (NHS) target proposed by the NHS Institute of Innovation and Improvement. [1] Laparoscopic cholecystectomy is a high volume surgical procedure, and when performed as a day-case enables increased surgical department efficiency and reduced service cost with no reduction in patient satisfaction, safety, morbidity, re-admission rate, pain, or quality of life. [2, 3]

The majority of studies looking at this target have focused on the safety of day case laparoscopic cholecystectomy, and deemed it a safe method of practice. [4]

Other studies and guidelines have investigated ways of improving day-case rates across the NHS. [5–7] However, few studies have investigated why patients fail to achieve day-case discharge following elective surgery and what factors are responsible for this. This case-controlled study investigates the factors responsible for prolonged admission (> 48 hours) following planned day-case LC in a large District General Hospital performing approximately 250 LCs per year with a background day-case LC rate of 35%.

Methods

Over a 3 year period from 2007–2010 all patients undergoing consecutive planned day-case laparoscopic cholecystectomy (n=776) were included in the study. Patients' demographics, operative details, antibiotic usage, intra- and post-operative complications, and analgesic requirements were recorded using a standardised proforma. The case-controlled groups under investigation were classified as successful day cases (same day admission and discharge) or failed day cases with prolonged admission (>48hr admission). All consecutive failed day-cases (DC) with greater than 48hr admissions (n=62) were included. Their outcome measures were compared and contrasted to a matched control group of consecutive successful DC patients (n=62). IBM SPSS Statistics version 15 (IBM Corporation, New York) was used for statistical analysis.

Results

The 62 prolonged stay (>48 hours) patients represented 8.0% of the total LCs performed over the 3 year period (62/776). The demographic profile of the study groups, (Failed DC and Successful DC) revealed similar patient age (58yrs v 53yrs), sex (male: 24.2% v 29.0%), co-morbidity, smoking status (21% v 24.2%), BMI > 35 (24.2% v 16.4%), ASA grading, and previous abdominal surgery rate (40.3% v 37.1%) (Table 1).

The most common indication for surgery (Figure 1) in the failed DC group was acute cholecystitis (45.2%) while in the successful DC group this accounted for only 21.0% of indications (p<0.01 2-tailed X² test with Yates correction). In contrast, biliary colic was the primary indication for surgery in the successful DC group in 67.7% of cases but only 30.6% but in the failed DC group. (67.7% vs 30.6%, p<0.01 2-tailed X² test with Yates correction). The operative duration was longer in the failed DC group compared with successful DC group (median 90mins vs 60 mins p<0.001, Mann-Whitney U-Test). Conversion to open (30.6% vs 0%) and use of intra-abdominal drains (45.2% vs 1.6%) were also significantly greater in the failed DC group (p<0.001 2-tailed Fisher's Exact Test) as were early post-operative complications (42.9% vs 16.2%) (p<0.05 2-tailed X² test with Yates correction). The experience level of the lead surgeon did not have a statistically significant impact on length of stay.

Generic operative complications such as post-operative nausea and vomiting (PONV), chest pain, port site pain and wound haematoma were similar between the 2 groups (Table 1), but the proportion of specific operative complications was significantly greater in failed DC versus successful DC (using 2-tailed Fisher's exact testing), including sub-hepatic collections (8.1% v 0%) and bile leaks (8.1% v 0%). Social care concerns and poor pain control were responsible for prolonged admission in 8.1% and 11.3% of cases respectively.

Discussion

This study reveals multiple factors associated with failed discharge in patients undergoing planned day-case LC. Many (but not all) of these factors are preventable and their avoidance is likely to result in higher day-case LC rates and better patient care. Overall, the factors correlated with prolonged unplanned admission were:

Table I Summary of all data collected for consecutive patient suffering unplanned prolonged hospital stay (Failed DC) versus those achieving successful day-case discharge (Successful DC).

Demographics	Failed DC Group(n=62)	Successful DC Group (n=62)	p value
Patient Age *	58 (48-67)	53 (39-62)	NS
Male (%)	24.2	29.0	NS
Diabetes (%)	17.7	9.7	NS
Smoker (%)	21.0	24.2	NS
ASA grade (%)	I 29.0 II 61.3 III 8.1 IV 1.6	I 30.6 II 56.5 III 3.2 IV 0.0	NS NS NS NS
BMI > 35 (%)	24.2	16.4	NS
Previous abdo surgery*	40.3	37.1	NS
Indication for LC (%)	Biliary Colic 30.6 Cholecystitis 45.2 Recent pancreatitis 8.1 Previous jaundice 6.4 Empyema 4.8	Biliary Colic 67.7 Cholecystitis 21.0 Recent Pancreatitis 4.8 Previous jaundice 1.6 Empyema 1.6	<0.01 <0.01 NS NS NS
*Operative time (mins)	90 (60-110)	60 (50-70)	<0.001
Lead Surgeon (%)	Consultant 66.2 Registrar 29.0 Associate Specialist 4.8	Consultant 42.1 Registrar 47.4 Associate Specialist 10.5	NS NS NS
Conversion open (%)	30.6	0.0	<0.001
Drain insertion (%)	45.2	1.6	<0.001
Post-operative Complications (%)	Total : 42.9 PONV : 8.1 Subhepatic collection: 8.1 Bile Leak 8.1 Chest pain / LRTI 6.5 Wound haematoma: 1.6 Urinary Retention 3.2	Total : 16.2 PONV : 6.5 Subhepatic collection: 0 Bile Leak: 0 Chest pain / LRTI 0 Wound haematoma: 3.2 Urinary Retention 1.6	<0.01 NS =0.058 =0.058 NS NS NS
Significant post-op port-site Pain (%)	11.3	4.8	NS
ITU admission (%)	3.2	0.0	NS
Mortality (%)	0.0	0.0	NS

*Values are given as median and interquartile range.

Pre-operative Surgical indications (cholecystitis vs biliary colic)

Operative Longer operating time, conversion to open , use of intra-abdominal drains

Post-operative Delayed removal of drains, bile leaks and perihepatic collections

Although only 8% of all planned day-case laparoscopic cholecystectomies result in a prolonged hospital stay, these patients represent an unfortunate group who suffer significant morbidity, including post-operative pain, PONV, and specific procedure-related complications including conversion to the open procedure. The need for a surgical drain in LC should be minimal, as a dry liver bed should be a surgical pre-requisite before exiting the abdomen. Even if a drain is considered necessary, it is possible in most cases to remove the empty drain later in the day and allow safe discharge. Finally delayed discharge as a result of social concerns can be prevented by ensuring appropriate social support is in place before admission.

A reduction in length of stay may require improved surgical technique with appropriate attention to detail. In the hospital in question the conversion rate has been reducing year on year since 2005 as a result of an ongoing teaching and audit programme. Thus, if this trend continues, a reduction in prolonged stay patients should be expected, benefiting both the economic fortunes of the hospital, but most importantly, the quality of care of the patient.

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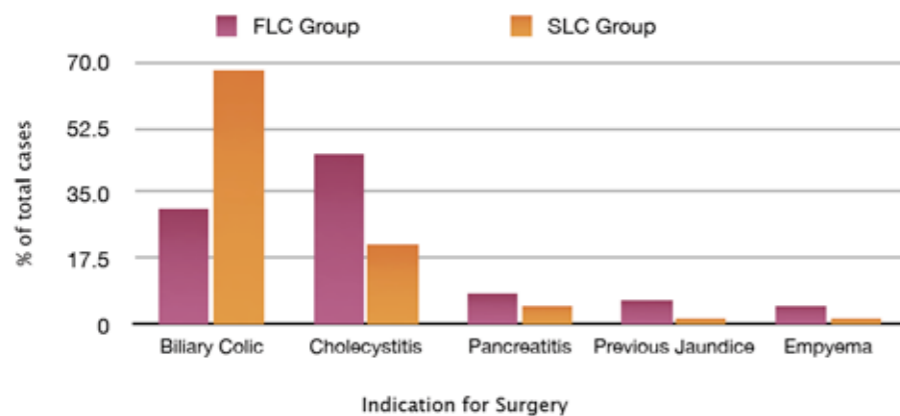


Figure 1 Indications for surgery in both groups.

Assessment of the effect of local versus general anesthesia on the pain perception after inguinal hernia surgery

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Abstract

Background: The aim of this study is to compare pain score and complications of local and general anesthesia in surgical treatment of inguinal hernia

Methods: 100 patients with inguinal hernia were selected. In the LA (local anaesthesia) group (n=50) morphine (0.1-0.2 mg per kg) was injected initially for premedication before herniorrhaphy was performed with local anesthesia by 1% lidocaine. In the GA (general anaesthetic) group (n=50), after premedication, the operation was performed under general anaesthesia. Major complication such as vasovagal reflex, drug reaction, operation time, pain score, local and general complication and length of stay in hospital were evaluated.

Keywords: Local anesthesia, Postoperative complications, postoperative pain, inguinal hernia.

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Results: The operation time was similar between groups, but the length of stay was one day in the LA group and up to five days in the GA group. Vasovagal reaction was seen in 2 percent of LA cases and in 4 percent of the GA group. The 4 hour post operative visit pain score was 2.5±1.3 in LA cases and 6.9±1.8 in the GA group (p<0.0001) but the 8 hour post operative visit pain scores were similar in both groups (6.66±1.3 and 6.4±1.5 respectively).

Conclusion: Local anaesthesia for inguinal hernioplasty offers a reduction in early postoperative pain and a reduction in length of stay when compared to general anaesthesia.

Introduction

Inguinal hernia repair is one of the most common day surgical procedures performed in men, but the optimum method of anesthesia/analgesia in these patients remains unclear [1-2]. Groin hernia repair under local anaesthesia is cost-effective and safe [3-7], but within our country, it is not routinely used in all surgical centres. In this study, we compared local and general anesthesia in patients with groin hernia looking at the outcome measures of complications, post-operative pain and length of stay.

Methods

Male adult patients (n=100) scheduled for primary unilateral inguinal repair were recruited for this study from May 2006 until May 2007. Exclusion criteria were: age less than 20 years, allergy to local anesthetics, recurrent hernia, psychiatric or neurological disease, femoral hernia, renal or hepatic insufficiency, anticoagulant treatment and bleeding abnormalities. The study was approved by the regional Ethics Committee. Patients received verbal information about the trial.

Patients were randomly allocated to local (LA) and general (GA) anesthesia groups based on the order of patient admission. In LA group (n=50) patients received Morphine Sulphate (0.1-0.2 mg/kg IV) as premedication. At surgery, field infiltration with 1% Lidocaine (Pasteur Institution Production, Iran) 8-10ml was performed over the proposed incisional site on the lower abdomen. A further 8-10 ml of 1% Lidocaine was infiltrated under the external oblique aponeurosis to achieve ilioinguinal and iliohypogastric nerves block. In the GA group (n=50), after premedication, general anesthesia

was induced by Nesdonal (5 mg/kg), Atropine (0.5 mg) and Succinylcholine (1-1.5 mg/kg) and it was maintained with Halothane 0.8-1.5%, NO₂ 50% and Oxygen. For muscle relaxation, we used Atracurium (0.5 mg/kg, IV). The Lichtenstein tension-free method of inguinal hernia repair was used in both groups and all procedures were performed by the same surgical team. Perioperatively, pulse rates and blood pressure were monitored and a vasovagal reflex was defined as bradycardia and hypotension which was managed with Atropine. Operating time from onset of local infiltration in LA group and anesthesia in GA group to transferring to the recovery room was recorded. Subjective pain assessments were performed 4 and 8 hours after operation by visual analogue 10-point scale (VAS). Post operative pain management was similar in both groups (Morphine Sulphate, PRN). Post operative local (hematoma, seroma, infection) and general (nausea, vomiting, urinary retention, atelectasia and aspiration) complications were also recorded.

All data values were expressed as mean±SD and a probability value of P less than 0.05 was considered significant. Variables such as Intra operative and post operative complications were compared by χ^2 and Fisher's exact tests. We compared quantitative variables, such as operating time and length of hospital stay by t test and VAS values by using Mann-whitney U test. SPSS 15.0 software was used for data analysis.

Results

In this study, 100 patients were enrolled. Table 1 presents the demographic data, including the American Society of Anesthesiologists Classification and operative time. No significant differences were seen between groups. Length of hospital stay was

Table 1 Demographic and operative data.

	Local anaesthesia	General anaesthesia	P
n	50	50	-
Age(years)	47.56±17.32	49.64±16.34	NS
Operative time(min)	21.7±4.03	23.26±5.2	NS
ASA class I	45	49	NS
ASA class II	55	51	NS

NS = Not significant

1±0.5 days in LA group and 2.5±1.3 in GA groups (P = 0.02).

Intra operative complications

There were no neurological complications in groups. Vasovagal reflex was occurred in 2% of LA versus 4% in GA groups (NS)

Post operative local complications

Hematoma was occurred in 4% of LA and 6% of GA group (NS). Seroma was recorded in 2% of GA group (NS). Wound infection was similar in both groups (2%).

Post operative general complications

Nausea and vomiting were occurred in 2% of GA group. Urinary retention was occurred in 6% of GA group while atelectasis, diagnosed according to post operative early fever was found in 4% of GA group. Aspiration occurred in 2% of GA group. None of these findings were significant.

Post operative pain

VAS values in 4 and 8 hours after operation are shown in Figure 1. At 4 hours postoperatively the VAS was 2.5±1.3 in the LA group and 6.9±1.8 in the GA group (P <0.0001). At 8 hours after operation the VAS was 6.6±1.3 in the LA group and 6.4±1.5 in the GA group (NS).

Discussion

Pain is an important problem after hernia repair and local anaesthesia as an ambulatory procedure is a well-known method for managing post operative pain [8-15]. For many years, inguinal hernia repair has been one of the most common operations worldwide. Yet, there is still no consensus regarding the optimum mode of anaesthesia. General anaesthesia and regional analgesia in a variety of forms such as caudal and lumbar epidural block, ilioinguinal nerve block, wound infiltration, wound instillation and topical administration of local anesthesia [16] have been used with varying success.

Post operative pain in inguinal hernia repair is caused by the activation of cutaneous and subcutaneous receptors of afferent nerve fibers. These fibers are stimulated by tissue trauma during surgery with inflammatory agents released into the wound tissue. In Callesen et al [17] study, there were no significant differences in cumulative pain scores in different surgical techniques for open repair of inguinal hernia.

Our results showed that the use of local infiltration for inguinal hernia repair has substantial advantages over general anesthesia. None of our LA patients required heavy sedation, and fewer post operative complications were occurred these group.

Operating time of surgery with local anesthesia was shorter than GA group. In Nordin study [1], duration of surgery with local anesthesia was significantly longer.

Post operative pain scores differences may be related to the half-life of Lidocaine with good local anaesthesia maintained at for hours but not at 8 hours. Advantages of local anesthesia have been reported by other authors. In eight randomized studies [18-25], authors compared local anaesthesia with general anaesthesia. Results of two of these studies showed no significant pain difference between groups [19-24].

Sakellaris et al [26] showed that local anaesthetic infiltration with Robivacaine can modulate hypothalamic-pituitary-adrenal axis response. He showed that painful stimulants can cause cortisol and prolactin release and post operative pain.

Toivanen [27] showed that ilioinguinal block lasted 6 hours post operatively, and after that its effect declined as was found in our own study.

Perhaps our most significant finding in terms of ambulatory surgery was the significant difference in length of stay between our LA and GA groups. Most of the LA group returned home the same day, demonstrating an economic advantage for our institution and quality care for our patients.

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Literature review: Home recovery following day surgery

Mark Mitchell

Abstract

Aim: To evaluate the experiences of patients and caregivers in the early transition phase of recovery at home following day surgery.

Background: A global increase in elective day surgery has taken place over the last two decades. This has arisen from enhanced surgical and anaesthetic techniques, healthcare cost containment and patient preference. Minimal hospital stay ensures meticulously managed medical practices dominate leaving nursing-based knowledge limited room for expression. However, patients may require much help once discharged hence providing nurse-led involvement much potential.

Data Sources: Five databases from 2000 – 2011 were searched including MEDLINE, CINAHL, British Nursing Index, PsychINFO and Cochrane Database of Systematic Reviews. Reference and citation tracking was performed on included publications.

Review Methods: One reviewer screened titles and abstracts for possible inclusion over a 10 month period. Data synthesis involved thematic analysis informed by the findings of the included literature.

Keywords: Literature review, day surgery, ambulatory surgery, recovery, caregivers, carers, nurses and nursing.

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Results: Twenty-five studies were included in the review. Common themes were pain, information provision and anxiety. Pain management was a concern exacerbated by reduced information. Much information had been forgotten due to latent effects of anaesthesia, limited opportunity on the day of surgery or information booklets lacking a problem-solving approach. Anxiety was associated with inadequate information, unexpected events or by carers striving to supervise a successful recovery.

Conclusions: Recovery at home with limited access to healthcare professionals presented a number of challenges mostly relating to inadequate knowledge/ information. Future research should explore continued nurse/ patient contact, nurse-led support services and patient and carer information booklet content.

Introduction

A global transformation has taken place in elective surgery over the last 20 years as a result of innovations in minimally invasive surgical techniques [1]. This trend will continue as the level and diversity of surgical procedures able to be undertaken on a day-case basis grows [2]. The reasons for such reforms concern advances in laparoscopic surgical techniques [3], improved anaesthetic practices [4], increase use of short acting/ regional anaesthesia [5], healthcare cost containment [6, 7] and patient preference [8].

Nursing has been central to such change managing day surgery units [9], conducting nurse-led pre-assessment clinics [10], undertaking nurse specialists roles [11] and implementing enhanced recovery practices [12]. However, meticulous surgical/ anaesthetic practices and limited patient stay have restricted the opportunity for the wider expression of nursing-based knowledge [13, 14]. Nursing has adapted to these developments with little advancement of nursing-based knowledge aside from practices derived from descriptive studies or expert opinion. For example, Bothe & Donoghue [15] describe the organisation of care following the introduction of two new surgical procedures, Marley & Swanson [16] nursing management of post-operative complications and Roberts & Fenech [17] implementation of an enhanced recovery protocol. As a result nursing knowledge may need to broaden to investigate the complete patient experience of surgery, especially as many challenges arise for patient and carer following discharge [13]. Flanagan [18] states "Despite much health care being shifted from in-patients to out-patient settings, with much of the actual care being conducted in the home, nurses have not shifted their focus of care from the hospital setting." (p.50).

Criteria for acceptance for day surgery covers three domains i) medical (fitness for anaesthesia), ii) surgical (operation possible in day surgery) and iii) social (adult escort, adult support for 24 hours and suitable domestic circumstances) [19]. If all criteria are met, surgery can be undertaken and the patient duly discharged. Consequently, minimal surgical stay obliges nurses to ensure patients adhere to a relatively inflexible schedule of admission, treatment and discharged [20, 21]. Information is offered during the whole process to assist home recovery but largely the day surgery unit has no further contact with patients. However, patients have not fully regained all pre-operative functions at discharge [22], can experience problems once discharged [23], recovery can take longer than expected [24], numerous unforeseen events can arise [25, 26] and contact the General Practitioner or District Nurses can be minimal [27].

The brief time for nurse/ patient interaction inherent in all stages of the patient's journey has ensured information provision [28] and its timely delivery [29] are central to the nurses' role [30]. However, information provision for home recovery is not always adequate [31] and post-operative telephone contact in the United Kingdom sporadic [8]. Following a study by Moran et al [32] concerning telephone support, the most valued aspects for patients were reassurance, information provision and the opportunity to ask questions. All patients considered such support to be the responsibility of the day surgery unit. Carer responsibility and arrangements before and after surgery can be extensive [33] and as more complex surgery is undertaken such responsibility may increase [34]. For example, a recent thoracic day surgery study required carers to manage patients discharged with an ambulatory chest drain (Heimlich valve which removes air from a pneumothorax) in situ for 2 weeks [35]. Amid

such innovation, the profession may need to broaden its focus on surgical recovery, establish a more co-ordinated hospital/ community ethos (18) and consider the wider psycho-social implications [36].

Review

Aim

This literature review seeks to describe, evaluate and summarise the pertinent published material [37, 38] and content guided by the PRISMA Statement [39]. A number of literature reviews have been undertaken previously on home recovery following day surgery but these have been medically orientated (post-operative morbidity focus and subsequent revision of treatment) [40, 41], focussed purely on nursing management of pain (42) or care during hospitalisation [43-45]. Rosén et al [46] has more recently undertaken a review largely concerned with post-operative symptom management and states “As more surgery is undertaken in day surgery, it is necessary to map out symptoms, experiences and management, at home, in a much more detailed manner that recognises and addresses individual and social consequences.” (p.16). The purpose of this review is to identify studies from the literature expressly focussing on recovery at home following day surgery with a view to uncovering the wider nursing support required. The aim is therefore to evaluate the experiences of patients and caregivers in the early transition phase of recovery at home following day surgery.

Search methods

Initial databases searched were MEDLINE, CINAHL, Cochrane Database of Systematic Reviews, British Nursing Index and PsychINFO between March - December 2011. The search terms used were day/ ambulatory surgery and recovery, day/ ambulatory surgery and caregiver\$/ carer\$ all with ‘adults only’. Additional papers accessed from reference and citation tracking, British Association of Day Surgery website (www.daysurgeryuk.org) and International Journal of Ambulatory Surgery website (www.iaas-med.com). Analysis was undertaken by a single researcher over a 10 month period. Each citation was considered for possible inclusion viewing first the title, followed by the abstract where necessary. Those found to be unrelated were discarded. A total of 803 studies meeting the initial criteria were uncovered (569 in MEDLINE, 207 in CINAHL, 18 in Cochrane, 5 in British Nursing Index and 4 in PsychINFO) (Fig. 1).

Inclusion/ exclusion criteria

All articles included were written in English between 2000 – December 2011. To be included, the focus had to be wholly and solely on adult patients’ experiences of recovery at home following day surgery and raise nurse-led support issues. Thereby, home recovery needed to be a sustained focus. However, studies focussing on return to work or contact with healthcare professionals were included as they contained informative aspects of the recovery process. Studies were excluded for several reasons. Many medical studies had a predominant morbidity focus associated with improvement in practice [47–49], rate of surgical recovery [50], in-patient surgery [51], management of medical treatment in day surgery [52] or assessment of hospital-based recovery [53]. Studies with an ophthalmic [54], dental [55] or oncology focus [56] were excluded as these were regarded as areas perhaps requiring separate reviews because of the possible additional issues associated with such surgery. Mixed sample studies examining possible differences between day, 23 hour and in-patient surgery [24, 57] were excluded as they were undertaken largely to examine the feasibility of converting in-patient surgery into day-case surgery. Studies concerning the development of validated tools to measure recovery were of relevance [58–63] although were excluded as their

focus was not specifically on recovery but on validating tools to assess recovery. Five studies were reported twice. Brattwell et al [64] and [65] were included as one reported recovery at 4 weeks, the other at 6 months. Dewar et al [66] and [67] are included as the second reporting had a differing focus. Mottram [68] and [69] are included as the second paper had a unique focus on the sociological impact of day surgery. Markovic et al [70] was reported twice as the first focused on quality of care and the second on pain management [71]. Finally, Rosén et al [72] reported post-operative discomfort and Rosén et al [73] examined level of discomfort over a sustained period.

Search outcome

Twenty five studies are included in this review. Thirteen studies employed quantitative research methods and nine a qualitative approach. Three had an experimental design thus providing some comparative data (Table 1). Although three studies used an intervention in the design, Dewar et al [66] and [67] describe the same intervention in both papers. In Wasowicz-Kemps et al [74] the treatment group were provided with a post-operative exercise plan together with an accelerometer (device clipped to the trousers to measure and display distance walked). The control group received no post-operative exercise plan only the accelerometer.

After examining the abstracts, 692 studies were excluded for many reasons but mainly a lack of day surgery focus. Thus 111 full-text articles were considered for review. After retrieving and reading the full papers, a further 86 were excluded for a number of reasons but mainly a wider medical focus (Fig. 1). Finally, 25 articles were included and reviewed. The final number included 13 quantitative research studies, 9 qualitative research studies and 3 quasi-experimental research design studies. Analysis was undertaken by a single researcher.

Sample and Setting

The setting for each study was patients who had undergone elective day surgery and discharged home. Seven studies were conducted in Sweden, six in the United Kingdom, four in the USA and three in Australia, two in Denmark and one each in Hong Kong, Finland and Holland. Sample sizes ranged from 7 [75] to 358 [76]. Participants’ treatment included gynaecological, urological, orthopaedic, Ear Nose and Throat, cosmetic surgery and general surgery.

One study used purposive sampling and the remainder convenience sampling. Response rates, where available, ranged from 68% to 91%. The techniques for data collection varied with eleven studies gathering data by tape-recorded telephone interviews, eight by postal questionnaire, four by tape-recorded face-to-face interviews, two by postal diary and two by biological measures/ physical testing and diary completion. Twelve studies used more than one data collection technique [64–67, 74, 76–82] and data was collected in the patients’ home in two studies [77, 83].

Measures

Only two studies [53, 64] used the same post-operative measure of recovery although the European Quality of Life-5D instrument is not day surgery specific [84]. McIntosh and Adams [79] employed the Quality of Recovery instrument (QoR-40) [85] and Hospital Anxiety and Depression Scale [86]. Berg et al [76] used the validated Swedish Post-discharge Recovery Scale [62] and Quality of Recovery-29 Scale [87] modified scales of the original by Kleinbeck [63] and Myles et al [85] per se. Rosén et al (72, 73) utilised the Swedish version of the Brief Pain Inventory (BPI-SF) [88]. Six studies used open-ended questioning and in all cases one question commenced the interviews [68, 69, 72, 75, 83, 89].

Seven studies used research-designed open and closed questionnaires regarding experiences during convalescence such as morbidity,

Table 1 Day Surgery studies examining patients’ experiences of home recovery (2000 – Ecover.)

Author	Purpose	Design/ Time frame	Sample/ Setting	Measures	Major Findings
1 Bandyopadhyay et al (2007)	To investigate pain following discharge.	Telephone tape-recorded and face-to-face interviews (August - October 2000).	n=315 Australian patients having GA for breast surgery, D&C, termination and ‘other procedures’ (numbers in groups not provided). in public and private hospitals surveyed with an additional n=10 face-to-face interviews.	Researcher-designed telephone questionnaire regarding pain experience, management and information. Interviews also explored pain management strategies.	70% reported pain following discharge and more than half were in pain after 48 hours. Easy to understand patient information helped pain management. Younger patients (<35 years), those with prior day surgery experience and patients with limited information were more likely to report pain. However, some of the patients underwent breast biopsy and termination of pregnancy which may again have influenced the level of pain and anxiety.
2 Barthelsson et al (2003a)	To explore patients experiences of day surgery.	Open-ended, face-to-face, tape-recorded interviews (Study period February 2000 - October 2001).	n=7 Swedish patients having GA for laparoscopic fundoplication interviewed 1 week after surgery for 60 minutes.	Interviews commenced with one question “What was your experience of having ‘keyhole’ fundoplication as a day surgery procedure?”	Four themes emerged relevant to the surgery - anxiety and memory loss, pain and dysphagia, desire for delayed discharge and returning to normal activities. Patients desired more information and a desire to talk to surgeon prior to discharge on the day of surgery. However, data was gathered from a small sample.
3 Barthelsson et al (2003b)	To explore patients experiences of day-case laparoscopic cholecystectomy.	Open-ended, face-to-face, tape-recorded interviews (Study period May 1999 - June 2000).	n=12 Swedish patients having GA for laparoscopic cholecystectomy interviewed for 45 minutes 1 week after surgery.	Interviews commenced with one question “How did you experience having ‘keyhole’ cholecystectomy at the day surgery department?”	Four main themes emerged – living with gallstones, experiences of day surgery, experiences during first week and returning to activities of daily living. Living with gallstones - anxiety regarding when attack would come, socially disabling. Experiences of day surgery - not meeting the surgeon, anxiety regarding surgery and forgetting information. Experiences during first week - varying degrees of pain and nausea and vomiting, many questions arising on how to manage aspects of care, abdominal symptoms, telephone support. Returning to activities of daily living - managing young children, hospital staff’s casual attitude to recovery, normal activities in approx. 1 week and preferring to remain in hospital although feeling good about being home.
4 Berg et al (2011)	To describe post-operative recovery on post-operative days 1, 7 and 14 after differing orthopaedic day surgery procedures.	Post-operative postal survey (Study period not provided).	n=238 Danish patients having GA for knee arthroscopy (n=140), hand/arm (n=128), foot/leg (n=71) and shoulder orthopaedic surgery (n=19) surveyed at 1, 7 and 14 days post-surgery.	Post-operative self-reported questionnaires - Swedish Post-discharge Surgery Recovery (S-PSR), Quality of Recovery-23 (QoR-29), Perceptions of Health and demographic data.	In comparison, shoulder surgery patients experienced slower rate of recovery and were more physically dependent. Recovery took at least 2 weeks for shoulder surgery patients. Higher age and positive emotional state may have a beneficial influence on recovery. Recommends investigating recovery and emotional status. However, many younger patients in the sample did not return their questionnaires at 14 days post-surgery which may have influenced the results.

Table 1 Continues overleaf.

Author	Purpose	Design/Time frame	Sample/Setting	Measures	Major Findings
4 Berg et al (2011)	To describe post-operative recovery on post-operative days 1, 7 and 14 after differing orthopaedic day surgery procedures.	Post-operative postal survey (Study period not provided).	n=238 Danish patients having GA for knee arthroscopy (n=140), hand/ arm (n=128), foot/ leg (n=71) and shoulder orthopaedic surgery (n=19) surveyed at 1, 7 and 14 days post-surgery.	Post-operative self-reported questionnaires - Swedish Post-discharge Surgery Recovery (S-PSR), Quality of Recovery-23 (QoR-29), Perceptions of Health and demographic data.	In comparison, shoulder surgery patients experienced slower rate of recovery and were more physically dependent. Recovery took at least 2 weeks for shoulder surgery patients. Higher age and positive emotional state may have a beneficial influence on recovery. Recommends investigating recovery and emotional status. However, many younger patients in the sample did not return their questionnaires at 14 days post-surgery which may have influenced the results.
5 Bisgaard et al (2001)	To explore recovery following uncomplicated laparoscopic cholecystectomy.	Pre- and post-operative postal survey (October 1997 - June 1999).	n=200 Danish patients having GA for laparoscopic cholecystectomy completed pre- and post-operative questionnaires on physical recovery.	Pre-operative self-reported questionnaire regarding expected duration of convalescence. Post-operative self-reported questionnaire completed on day of return to work/ main recreational activity. VAS for fatigue and verbal rating scale for PONV.	For younger patients in less physical employment the recommended period of convalescence was 2 days but was actually 6 days (range, 0 - 28 days). For patients in more physical employment the recommended period of convalescence was 7 days but was actually 10 days (range, 0 - 52 days). Absence from main recreational activity was a result of pain and fatigue. It would appear the estimated period of convalescence suggested by the medical team was optimistic.
6 Bisgaard et al (2002)	To analyze recovery following uncomplicated laparoscopic cholecystectomy.	Diary completion and bio-physical testing for 1 week prior to surgery and for 1 week after surgery (September 1998 - April 1999).	n=20 Danish patients having GA for laparoscopic cholecystectomy underwent pre and post-operative bio-physical testing plus post-operative diary completion.	Wrist-worn physical movement monitor for 1 week before/ 1 week after surgery; sleep pattern diary for 1 week before/ 1 week after surgery; treadmill exercise test 1 day before surgery/ post-operatively day 2 and 8; nocturnal pulse oximetry 1 night (1 week before surgery)/ post-operative nights 1, 2 and 3; pulmonary function test 1 day before surgery/ post-operative at 3 hours then on day 1, 2, 3 and 8; pain/ fatigue self-assessment 6 hours after surgery then for 30 days and date of return to work recorded.	Recovery measures suggest patients returned to normal levels of functioning on 2 nd or 3 rd post-operative day. Physical motor ability was normalised after 2 - 3 days and sleep by 2 nd night. Post-operative cardio-respiratory function was normalised after 3 and 10 days. Pulmonary peak flow measurements returned to normal by post-operative day 1 and fatigue levels normalised within first few post-operative days. However, it is recognised the close professional attention this group received may have contributed to swift recovery. Concludes recovery can be 2 - 3 days following laparoscopic cholecystectomy as opposed to previous in-patient open cholecystectomy recovery of 2 - 3 weeks. However, the post-operative management of this group was quite extensive.

7 Brattwall et al (2010a)	Exploration of the longitudinal changes in health profile following discharge.	Postal survey (Autumn 2006 - Spring 2008).	n=355 Swedish patients having GA for hernia repair (n=107), arthroscopy (n=122) and breast augmentation (n=126) surveyed pre-operatively and again at 1, 3 and 6 months.	Euro-Quality of Life (EQoL) questionnaire which has 5 dimensions (mobility, self-care, usual activities, pain/ discomfort and anxiety/ depression) plus extra items regarding sleep, sexual activity and analgesia use.	40% reported pain and immobility issues and this was significantly greater in hernia repair and arthroscopic procedure patients. Patients undergoing arthroscopic procedures experienced a slower recovery. Majority of patients satisfied although information provision and pre-operative preparation viewed as important. Many expected a faster recovery, especially arthroscopic procedure patients. Patients voluntarily undergoing cosmetic breast augmentation were included in the sample which may have influenced the overall findings.
8 Brattwall et al (2011) (2 nd Reporting)	Explore self-assessed recovery and restitution of symptoms after day surgery during the first 4 weeks.	Postal survey (Autumn 2006 - Spring 2008).	n=355 Swedish patients having GA for hernia repair (n=107), arthroscopy (n=122) and breast augmentation (n=126) surveyed pre-operatively and again at 24 hours then 1, 2 and 4 weeks.	Pre-operative interview regarding demographics and symptoms. Four questionnaires given to complete at the arranged date concerning pain, mobility problems, depressed mood, sleep disturbance, need for analgesia, satisfaction with procedure, support required, unplanned visits to hospital and other need for health care contact.	No serious complications or sequelae stated. 32% (n=9%) had unscheduled contact with the hospital (visit/ telephone) during first post-surgery week. n=15 patients with pain, n=5 with swelling, n=5 wound dressings and mobilisation/ questions n=7. n=38 patients contacted hospital during weeks 3 and 4 for mainly pain and wound related issues. The majority needed help from a relative during the initial period at home. 13% of hernia repair patients and 13% of arthroscopic surgery patients would have preferred longer in hospital. 43% of breast augmentation would have preferred longer in hospital although these patients were already 23 hours stay.
9 Briggs et al (2009)	Safety and acceptability of day-case laparoscopic cholecystectomy.	Telephone survey (May 2005 - May 2008).	n=106 United Kingdom patients having GA for laparoscopic cholecystectomy surveyed at 2, 5 and 14 post-operative days.	Researcher-designed questionnaire regarding pain, nausea and vomiting, analgesia use, wound care, diet, mobility, satisfaction and contact with primary healthcare providers.	94% satisfied with day surgery. Mild pain and nausea reported by vast majority 2 nd day. 90% back to normal activity after 14 days. 33% of patients gained advice from primary healthcare providers during first 14 days with wound care most common reason for contact. 6% preferred an overnight stay. Improved information regarding wound healing recommended and education of staff and patients very important. Study largely concerned with introduction of day-case laparoscopic cholecystectomy.
10 Cheng et al (2002)	To investigate compliance with post-operative instructions.	Telephone survey (Study period not provided).	n=102 United Kingdom patients having GA for wide variety of surgery surveyed at 24 hours	Researcher-designed questionnaire regarding travel home, time arrived, carer details/ time/ place in attendance, activities after 24 hours (driving, alcohol, cooking, cleaning, childcare). Questionnaire in appendix.	All but three escorted home by carer (taxi driver escorted others). All patients remembered instructions regarding avoidance of certain tasks for 24 hours. n=29 had no carer for 24 hours, n=3 leaving them on home arrival. 70% of carers slept in same room, 4% drove a vehicle within 24 hours, half with passengers. Over a quarter went out of the house with n=5 visiting their General Practitioner. n=10% admitted to cooking, cleaning and caring for children. However, over 50% of the original sample were lost and could not be contacted by telephone.

Table I Continues overleaf.

Author	Purpose	Design/ Time frame	Sample/ Setting	Measures	Major Findings
11 Cox & O'Connell (2003)	To investigate experiences of home recovery.	Postal and telephone survey. (Study period 6 months although date not provided).	n=80 Australian patients having GA for gynaecological surgery surveyed regarding experiences of recovery during first 10 days.	Researcher-designed post-operative symptoms diary for days 1 to 4 of recovery. Patients' who returned the diary by post were telephoned after 10 - 15 days regarding problems - carer support, information and contact with healthcare professionals.	Main problems day 1 to 4 mobility, tiredness, pain and diet with mobility, tiredness and pain the most difficult to manage. Main problems on day 10 pain (60%), mobility issues (30%) and tiredness (25%). 45% contacted healthcare professionals for suture removal, pain management, medical problems and emotional support. Carer for 3 days viewed as very important. 18% stated they would have preferred in-patient stay for 'professional monitoring'. However, the findings relate to a specific surgical - diagnosis and treatment of endometriosis.
12 Dewar et al (2003)	To determine if telephone interviews with patients during home recovery improved outcomes.	Postal diary completion and telephone survey (Study period 1 - 5 days over a 5 month period although date not provided).	n=222 American patients having GA for anal surgery (n=85), hernia repair (n=32), arthroscopy (n=69) and breast augmentation or breast reduction (n=36) surveyed at 1 - 5 post-operative days.	Sample divided into intervention and control group. Intervention group given pre-operative pain management teaching and telephoned daily for first 3 post-operative days. Both groups telephone on day 5 for pain assessment. Pre-operative State-Trait Anxiety Inventory and pain measured using Brief Pain Inventory (Visual Analogue Scale 1 - 10).	During first 3 days intervention group had statistically significantly less pain than control group and also at day 5. Further, from day 1 - 2 the intervention group had statistically significantly less pain moving than control group. No difference established between two groups regarding nausea and vomiting, constipation, fatigue, dizziness and grogginess. By day 2 intervention group had statistically significantly greater ability to concentrate and have relations with others. There was no statistically significant difference between the groups regarding analgesia consumption. Patients appeared to benefit considerably from post-operative telephone advice. Patients voluntarily undergoing cosmetic breast augmentation were included in the sample which may have influenced the overall findings.
13 Dewar et al (2004) (2 nd Reporting)	To describe telephone interviews with patients during home recovery.	Postal diary completion and telephone survey (Study period 1 - 5 days over a 5 month period although date not provided).	n=222 American patients having GA for anal surgery (n=85), hernia repair (n=32), arthroscopy (n=69) and breast augmentation or breast reduction (n=36) surveyed at 1 - 5 post-operative days.	Sample divided into intervention and control group. Intervention group given pre-operative pain management teaching and telephoned daily for first 3 post-operative days. Both groups telephone on day 5 for pain assessment. Pre-operative State-Trait Anxiety Inventory and pain measured using Brief Pain Inventory (Visual Analogue Scale 1 - 10).	Many patients had misconceptions regarding pain management and required additional information. Patients unable to absorb information on discharge and some also unable to grasp information via telephone on day 1 and 2. Patients developed unforeseen questions during recovery. Many reluctant to take analgesia due to side-effects, fears of addiction or viewed pain as something to be endured. Some anal surgery patients too embarrassed or somewhat reluctant to discuss problems. No discussion regarding differences between intervention and control groups provided. Patients voluntarily undergoing cosmetic breast augmentation were included in the sample which may have influenced the overall findings.

14 Flanagan (2009)	To investigate experiences of home recovery.	Telephone, tape-recorded interviews. (Study period 6 months although date not provided).	n=77 American patients having GA for knee arthroscopy interviewed at 12, 24 and 72 post-operative hours.	Researcher-designed post-operative open-ended interview schedule with an additional demographic details section.	Experiences at 12 hours concerned relief that event was over, satisfaction but much nausea, vomiting and sore throat. At 24 hours much pain and a lack of preparation to manage pain. A good deal of anxiety concerning pain, swelling, immobility and wound management. At 72 hours pain continued and also fatigue with the realisation that one day surgery does not equal to one day recovery. Patients welcomed the therapeutic element implicit in the telephone calls. However, all patients were only undergoing one type of investigative orthopaedic surgery.
15 Gilmartin (2007)	To investigate patients' perceptions of discharge planning and home recovery.	Open-ended, face-to-face, tape-recorded interviews. (Study period 6 months although date not provided).	n=30 United Kingdom patients having GA for gynaecological (n=14), urological (n=12) and general surgery (n=4) surveyed between 7 - 10 post-operative days in the home.	Researcher-designed post-operative open-ended interview focussing on the lived experience for the first week of recovery. Interviews began by asking to "relate their experiences of discharge preparation".	Discharge planning was considered by the majority to be well organised. However, many problems arose from the communication of information. Being given information whilst recovering from general anaesthesia, lack of opportunity to speak with the surgeon post-operatively, absence of relatives to listen to instructions, limited ability regarding symptom management and little awareness of potential problems. However, this was a small purposive day surgery patient sample.
16 Horvath (2003)	To investigate patients' physical recovery once home.	Postal survey (Study period not provided).	n=91 American patients having GA for gynaecological surgery surveyed for 1 to 6 post-operative days.	6-page pack with daily log of pain (1-10), fatigue (Rhoten Fatigue Score) and function (Katz Index of Activities of Daily Living). Telephoned on post-operative day 3 and 5 to prompt questionnaire completion.	40.7% reported moderate pain 1 st post-operative day. Not until day 6 did 90% report mild pain. Moderate to severe fatigue experienced by almost half of patients at day 3. Informed by staff they would be active by day 3 although more than half needed 5/6 days. Pain significant factor in delayed recovery. However, some patients were undergoing diagnosis and treatment for infertility which may have caused additional concern. Telephone support recommended for late on day 1 to aid recovery. Pre-operative information should state assistance with activities of daily living needed for 4 to 6 days following surgery.
17 Lau et al (2001)	To identify significant factors influencing recovery and return to work.	Telephone survey (Study date 1999).	n=149 Hong Kong patients having GA for hernia repair surveyed (Post-operative period of survey not provided).	Age, gender, occupation, duration of convalescence, date of return to work, type of hernia/ method of surgical repair.	Heavy duty workers returned to work significantly later than sedentary workers. Also, patients aged 50 years or below returned to work sooner although this just failed to reach a statistically significant level. Although this paper was published in 2001, data was collected between 1995 to 1998.
18 Markovic et al (2002)	To identify informal support during convalescence at home.	Telephone survey (Study date August - October 2000).	n=312 Australian patients having GA for gynaecological surgery surveyed at 48 hours.	Researcher-designed post-operative open and closed item questionnaire focussing on information requirements, hospital admission, home recovery and advantages/ disadvantages of day surgery.	Private patients (28% of sample) statistically significantly less satisfied with information provision. Carer's responsibility looking after the patient while undertaking domestic duties was demanding. Quality of care greater for patients sharing the household with the carer. 12% of patients had to care for other family members once home. Day surgery described as convenient although emotional support limited. A number of patients underwent investigative breast surgery or termination of pregnancy which may have adversely influenced their views of recovery.

Table 1 Continues overleaf.

Author	Purpose	Design/ Time frame	Sample/ Setting	Measures	Major Findings
18 Markovic et al (2002)	To identify informal support during convalescence at home.	Telephone survey (Study date August - October 2000).	n=312 Australian patients having GA for gynaecological surgery surveyed at 48 hours.	Researcher-designed post-operative open and closed item questionnaire focussing on information requirements, hospital admission, home recovery and advantages/disadvantages of day surgery.	Private patients (28% of sample) statistically significantly less satisfied with information provision. Carer's responsibility looking after the patient while undertaking domestic duties was demanding. Quality of care greater for patients sharing the household with the carer. 12% of patients had to care for other family members once home. Day surgery described as convenient although emotional support limited. A number of patients underwent investigative breast surgery or termination of pregnancy which may have adversely influenced their views of recovery.
19 McIntosh & Adams (2011)	To examine the association between pre and post operative anxiety its influence on recovery after 48 hours.	Postal survey (2008).	n=54 United Kingdom patients having GA for minor (n=7), intermediate (n=39) and major (n=8) surgery (specific surgery not detailed).	Demographic details, Hospital Anxiety and Depression Scale (HADS) on admission. Further copy of HADS and Quality of Recovery Scale (QoR-40) for home completion after 48 hours.	Female patients found to be more anxious than males although no statistically significant relationship was established between anxiety and quality of recovery. However, only a small timeframe of recovery was examined and the measures employed were possibly inappropriate. The HADS was originally developed for measuring anxiety in psychiatric patients and the QoR-40 scale used to measure recovery is not refined for day/ short stay surgical recovery (see Idvall et al 2009).
20 Mottram (2011a)	To explore patients' experiences of day surgery using a sociological framework of analysis.	Semi-structure, telephone interviews (2004 - 2006).	n= 145 patients and n=100 carers in the United Kingdom. Patients underwent GA for general, ENT and orthopaedic surgery (numbers in groups not provided).	Two interviews at 48 hours and 4 weeks following surgery. Open-ended, tape-recorded interview which commenced with the question "How are you feeling since you had your surgery?"	Parson's sick role examined. Patients experiences could be divided into three themes i) Resisting sick role (72%) - incapacity forced individuals to grudgingly accept resting, anxiety for carers as patients would not accept temporary disability, ii) Limited ascription to the sick role (24%) - by accepting the sick role they gained some protection from employers, iii) Actively seeking the sick role (4%) - some felt the sick role was denied them by the process of day surgery. Western culture of efficiency has pervaded health care leaving little room for convalescence.
21 Mottram (2011b) (2 nd Reporting)	To explore patients' experiences following discharge from day surgery.	Semi-structure, telephone interviews (2004 - 2006).	n= 145 patients and n=100 carers in the United Kingdom. Patients underwent GA for general, ENT and orthopaedic surgery (numbers in groups not provided).	Two interviews at 48 hours and 4 weeks following surgery. Open-ended, tape-recorded interview which commenced with the question "How are you feeling since you had your surgery?"	Three themes emerged all under the category of 'limited professional support following discharge' - i) unexpected occurrences, ii) lack of perceived support and, iii) nostalgia for times past. Unexpected occurrences concerned access to a healthcare professional for correct advice. Lack of perceived support concerned limited professional advice and reduced district nursing insight into their problems. Nostalgia was associated with less personalised, local care being replaced by a standardised more global service. Anxiety arose from a modern NHS which encourages self-reliance and self-care.

22 Rosén et al (2010)	To describe perceived causes of discomfort during home recovery.	Postal survey (May 2006 - May 2007).	n=298 Swedish patients having GA for urological, orthopaedic and general surgery surveyed at 48 hours (n=118), 7 days (n=110) and 3 months (n=46) post-surgery.	One open-ended item on a questionnaire "If you are still experiencing discomfort related to your surgery, what is the reason, in your opinion."	Frequency of discomfort due to pain and wound problems most prominent feature at 48 hours, 7 days and 3 months. Cause of discomfort rated as type of surgery, incorrect treatment, insufficient access to healthcare providers and limited information. Patients dissatisfied with information provision regarding what symptoms to expect and how best to treat these symptoms should they occur. However, the patients experienced a wide range of surgical procedures.
23 Rosén et al (2011) (2 nd Reporting)	To describe patients' perception of pain, their return to normal activities and daily function overtime	Postal survey (May 2006 - May 2007).	n=298 Swedish patients having GA for urological, orthopaedic and general surgery surveyed at 48 hours (n=283-286), 7 days (n=268-271) and 3 months (n=190-239) post-surgery.	Swedish version of Brief Pain Inventory-Short Form. This examines pain in relation to daily function. Additional 'yes/no' items asked also relating to activity and work.	55% of patients rated worst pain experienced at 48 hours, 43% at 7 days and 34% at 3 months. General activity, normal work and ability to walk particularly affected by pain. Pain interfered with return to work at 7 days. Consequently only 57% had returned to usual activities after six days. However, orthopaedic patients were employed in the survey and such chronic healthcare conditions have the potential for persistent longer term pain.
24 Suhonen et al (2008)	To describe day-case surgery patients' Health-Related Quality of Life.	Postal survey (March - August 2004).	n=131 Finnish patients having GA for mainly orthopaedic surgery surveyed 2 weeks before and 2 weeks after surgery.	European Quality of Life-5D - a Health-Related Quality of Life instrument with five dimensions (mobility, self-care, usual activities, pain/ discomfort and anxiety/ depression). A Visual Analogue Scale for 0 - 100 worst and best imaginable health state.	Pre-operatively, 41% reported some problems with mobility and 79% moderate pain. 51% had no problems with usual activities prior to surgery and this decreased to 35% after surgery. Patients with underlying chronic health issues had lower EQ-5D scores than patients with no underlying chronic health issue. Self-care activities disturbed following surgery although many patients had underlying chronic orthopaedic conditions. As the prevalence of people with musculoskeletal disorders increases with growth of an older population, recovery issues relating to level of home care required may increase.
25 Wasowicz-Kemps et al (2009)	To assess resumption of physical activity following day surgery.	Diary of daily activity and accelerometer (November 2005 - October 2006).	n=64 Dutch patients having GA for laparoscopic cholecystectomy monitored using accelerometer device for 7 days before surgery and 7 days after surgery (accelerometer device clipped to trousers to measure and display the distance walked). Diary of daily activity for 7 post-operative days.	Sample divided into intervention and control group. Intervention group given post-operative recovery exercise plan and accelerometer. Control group just given accelerometer and they could not view the amount of activity undertaken display. Diary given to both groups for recording of pain, nausea, wound, fatigue and other factors limiting activity.	Most patients not fully recovered after 1 week. No statistically significant difference established between the two groups regarding physical activity levels. Women in intervention group showed a statistically significant difference in physical activity levels than women in the control group after 1 week. Patients who were encouraged to mobilise quickly felt less hindered by pain during physical activity. For all patients pain limited activity (80%) and they experienced fatigue (63%) together with many wound management issues (72%). However, the practical application of patients being fitted with an exercise monitoring device may limit this approach.

Table I Continues overleaf.

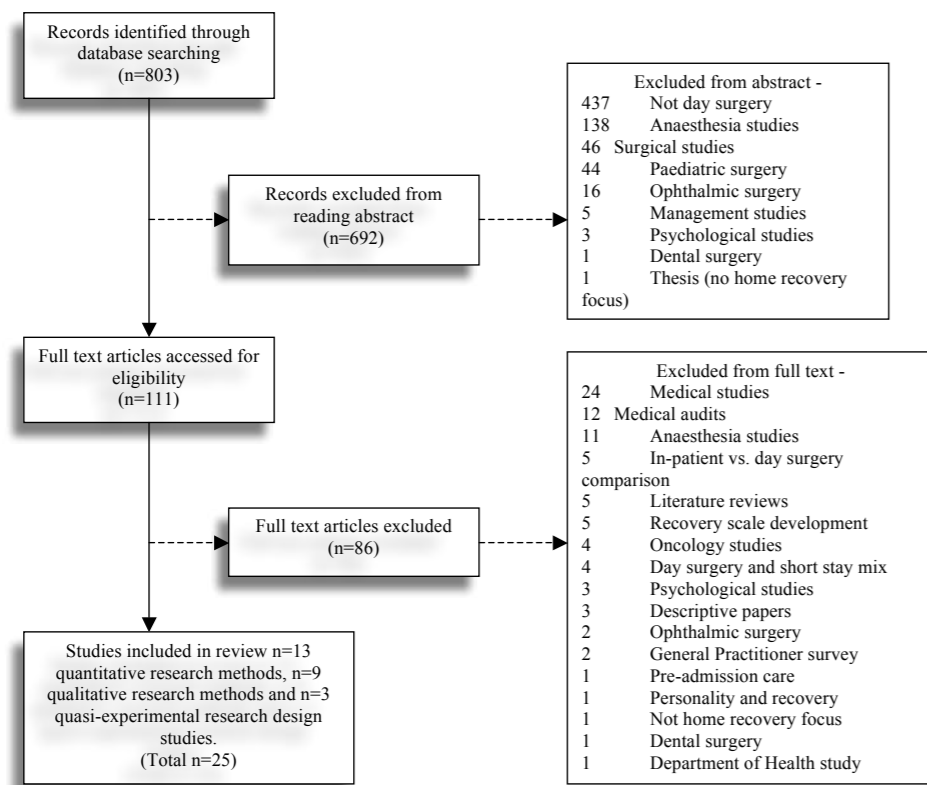


Figure 1 Screening Process.

wound management, diet, contact with healthcare providers, activity and return to work [3, 18, 70, 71, 78, 90, 91]. There was little information, if any, provided in the papers regarding testing for validity and reliability of the researcher-designed questionnaires. A number of studies [66, 73, 76, 79-82, 92] used validated measures such as Visual Analogue Scales for pain, State-Trait Anxiety Inventory [93], European Quality of Life measure [84], post-operative nausea and vomiting scale [94] and an activity level scale [95].

Five studies used patient diaries (mostly for 1 to 5 post-operative days) to record symptoms such as pain, nausea, fatigue, wound management and other factors limiting activity [66, 67, 74, 77, 78]. A further study [77] utilised a battery of exercises and recorded physical movement on a wrist-worn movement monitor for one week before and after surgery. A similar quasi-experimental study involved a leg-worn physical movement monitor for one week before and after surgery [74] where the treatment group were provided with a post-operative exercise plan. In total nine methods of measurement of recovery were used - morbidity, activity level, anxiety, quality of life, open/ closed researcher-designed questionnaires, diaries, healthcare provider contact, biometric assessment and physical monitoring.

The measures of recovery used were largely researcher-designed, non-validated measures or not day surgery specific. Two systematic reviews of recovery measures [40, 58] recommend using the Quality of Recovery Scale [85] but this scale is anaesthesia orientated and not day surgery specific (ambulatory surgery only 14% of sample). However, Idvall *et al* [87] have produced a validated day surgery specific scale (QoR-29), adapted from the recovery scale originally by Myles *et al* [85] (QoR-40). The Post-discharge Surgical Recovery Scale by Kleinbeck [63] provides a broad approach and is day surgery specific [58, 62] likewise the comprehensive 24-Hour Functional Ability Questionnaire by Hogue *et al* [61] for anaesthesia recovery. The Functional Recovery Index by Wong *et al* [59] is brief and simple to administer but largely examines pain and activity level. Flanagan and Jones [60] studied the feasibility of the Symptom Distress Scale [96] and Functional Health Pattern Assessment Screening Tool [97]) but these measures are not day surgery specific.

Results

The themes to emerge from this review concern pain management, information provision and post-discharge anxiety. Thirteen quantitative studies measured recovery by patient's experiences of returning to 'normal' routine, level of morbidity, level of activity and returning to paid employment. The experience of pain and its management were perceived as challenging. The degree of pain was greater than had been anticipated and had lasted longer than patients had been informed. In conjunction, a lack of guidance regarding unexpected situations gave cause for concern. For example, delayed wound healing, prolonged pain, continued fatigue and prolonged convalescence were aspects not covered by the information offered.

In an experimental study by Dewar *et al* [66] patients in the treatment group benefitted statistically significantly from pre-operative teaching regarding pain management and daily telephone calls. In the second reporting, Dewar *et al* [67] determined patients required post-operative encouragement to take analgesia due to fear of side-effects and addiction. Further, many patients had unforeseen questions arising during recovery. In the experimental study by Wasowicz-Kemps *et al* [74] no statistically significant difference was established for the patients in the treatment group who were given a post-operative recovery exercise plan. However, a statistically significant difference was established with regard to gender. Future studies need to consider assessment of recovery with a validated day surgery specific instrument.

The nine qualitative studies measured recovery using the patient's personal experiences of surgery and convalescence. Pain was deemed to be more common in younger patients, those with limited post-operative information and thus made recovery more challenging. Anxiety was associated with limited information, unexpected events and by carers attempting to ensure their relative gained adequate rest. Relatives were largely absent at the point of discharge hence much information was forgotten due to the latent effects of anaesthesia or not gained due to a lack of opportunity to speak prior to discharge.

Discussion

Pain Management

Approximately half of the studies suggest pain management to be a challenging issue. Cox and O'Connell [78] surveyed 80 patients undergoing gynaecological surgery and established, on post-operative day ten, 60% were still experiencing pain. The remaining 40% had been experiencing pain for an average of 7 days. Many women accessed other healthcare professionals for advice as they had been experiencing symptoms longer than informed. The estimated period of recovery suggested by the doctors was viewed as optimistic and not recovering at the stated pace gave rise to concern [78, 80]. However, these findings relate to a specific surgical procedure (diagnosis and treatment of endometriosis) a condition which may have wider implications for patients. Horvath [81] uncovered 15% of patients were experiencing severe pain during the first post-operative day with 41% experiencing moderate pain. Pain was found to be statistically significantly related to delayed recovery and concerned many patients who were informed recovery would take 2 or 3 days. Suhonen *et al* [82] surveyed 131 orthopaedic patients for 2 weeks and 79% reported experiencing moderate levels of pain. However many participants were undergoing treatment for chronic orthopaedic conditions. Bandyopadhyay *et al* [71] interviewed 315 women and established 54% were still experiencing pain after 48 hours. It was suggested factors leading to an inability to manage pain were being younger (<35 years), having previous experience of day surgery and limited information. However, some of the patients underwent breast biopsy and termination of pregnancy which could prompt a more emotive response.

In a study by Rosén *et al* [72] pain was experienced by 56% of patients after 48 hours, 38% after 7 days and 25% after 3 months. Persistent discomfort was attributed to incorrect treatment, insufficient access to healthcare provision and lack of information. In a 2nd reporting by Rosén *et al* [73], 55% of patients rated worst pain at 48 hours, 43% at 7 days and 34% at 3 months although the patients surveyed experienced a wide range of conditions. Flanagan [18] interviewed 77 patients undergoing knee arthroscopy and reported participants to be pain free after 12 hours. However, after 24 hours not only were patients experiencing much pain but had made no preparations for its management. The sudden onset frightened many as they had initially been pain free leading to the conclusion something was 'wrong'. The long-acting local anaesthetic nerve block, used during surgery had ceased to work and this aspect of treatment had been poorly understood. Many patients held misconceptions regarding pain management and required follow-up support [67], viewed pain as a symptom that must be endured and did not request help from their families or General Practitioner despite increasing levels of discomfort.

Brattwall *et al* [64] revealed patients undergoing arthroscopic procedures and inguinal hernia repair experienced statistically significantly more pain than patients having breast augmentation. After 4 weeks, 33% of arthroscopic procedure patients stated they were still experiencing pain, 11% of inguinal hernia repair patients and 10% of breast augmentation patients. However, comparing patients undergoing voluntary cosmetic surgery with patients undergoing treatment-centred surgery may be a problematic comparison. Brattwall *et al* [65] (2nd reporting) stated many patients needed carer support during the first week with pain being the most challenging issue. Berg *et al* [76] surveyed patients undergoing differing types of orthopaedic surgery (knee arthroscopy, hand/ arm, foot/ leg and shoulder surgery) and established shoulder surgery patients to experience a slower, less comfortable recovery. Barthelsson *et al* [89] suggested patients experienced quite differing degrees of pain following laparoscopic cholecystectomy although the

sample size was somewhat limited. Analgesia was provided for the first 48 hours and pain management good but on the 3rd day when the prescribed analgesia was complete for some, the pain returned.

Information Provision

Gilmartin [83] interviewed a small purposive sample of patients in their homes after 7-10 days and found discharge to be well organised although aspects of information provision were challenging. Some patients felt drowsy following general anaesthesia and could not absorb the information adequately prior to discharge. In a study by Briggs *et al* [3] of patients following laparoscopic cholecystectomy it was established 33% contacted a healthcare professional within 14 days for an unplanned consultation and in the majority of cases this was for advice on wound management. In a small study of 7 patients undergoing laparoscopic fundoplication (surgical repair of hiatus hernia) information provision (written and oral) was deemed thorough [75] but not perceived to be sufficient. A number of studies likewise highlight an information deficit especially with regard to handling unforeseen events [67, 69, 89].

Bandyopadhyay *et al* [71] recommend information provision should be improved as patients who had a good understanding of their treatment experienced a better recovery. Lau *et al* [90] studied patients returning to work following inguinal hernia repair (data collected 1995 to 1998) and it was uncovered younger patients who had sedentary jobs returned to work statistically significantly sooner. Bisgaard *et al* [80] suggested absence from recreational activities for 2 days following laparoscopic cholecystectomy and return to work after 1 week. Cheng *et al* [91] established reasonable compliance with post-surgery instruction although 4% drove, 3.3% consumed alcohol, 28% went out and 10% cooked food, did ironing and cared for children all within 24 hours of surgery. However, over 50% of the original sample was unable to be contacted.

Dewar *et al* [66] conducted a quasi-experimental study where the treatment group were provided with pre-operative teaching on pain management and the control group with no such intervention. Although no difference was established between the two groups with regard to analgesia consumption, the treatment group experienced statistically significantly less pain during the first 5 days. However, all patients were telephoned each day for 3 days and both groups benefitted from the advice offered. In a quasi-experimental study by Wasowicz-Kemps *et al* [74] the treatment group received a post-operative recovery exercise plan prior to surgery and the control group no additional information. The level of physical activity in both groups was monitored by an accelerometer (device clipped to the trousers to measure and display the distance walked). No statistically significant difference was established between the two groups although the planned physical activity with an accelerometer resulted in a reduction of subjective pain and a faster recovery, especially for females. Female participants in the treatment group were found to be statistically significantly more active than females in the control group. However, the practical application of patients being fitted with such an exercise monitoring device may limit its clinical application.

Post-discharge Anxiety

Mottram [69] interviewed 145 patients and 100 carers and uncovered much anxiety associated with a contemporary healthcare system that encouraged self-reliance and self care with limited professional help. Many reflected on a National Health Service that once offered a more personal and local approach. Rosén *et al* [72] suggested the lack of access to healthcare providers and limited information was a cause of concern and dissatisfaction. Barthelsson *et al* [89] studied patients following laparoscopic cholecystectomy and many experienced pre-operative anxiety and expressed a desire for pre-operative sedation. Additionally, the latent effects of anaesthesia gave rise to many

patients forgetting information leading to much apprehension once home. McIntosh and Adams [79] surveyed 54 patients concerning anxiety and home recovery but established no relationship. However, the timeframe examined was only 48 hours and the measures employed possibly inappropriate as the Hospital Anxiety and Depression Scale (HADS) was originally developed for anxiety in psychiatric patients [86] and the Quality of Recovery Scale (QoR-40) [85] not refined for minimal stay surgery.

Markovic *et al* [70] interviewed 315 females following discharge and suggested the lack of a supportive person during admission, no medical supervision at home, domestic responsibilities and role of the carer to be challenging issues. However, a number of patients underwent investigative breast surgery or termination of pregnancy both of which may have a strong influence on recovery. In a second reporting by Mottram [68] using a sociological framework for analysis, three themes emerged with regard to the 'sick role' (98). Firstly, 72% of patients actively resisted the sick role causing much anxiety for the carers who were concerned about adequate rest. For this group of patients 'one day surgery' equated to 'one day recovery'. Secondly, 24% gave limited acknowledgment of the sick role but by accepting the role recognised they would gain some protection from their employers. "This group of people, although not actively seeking the sick role, seemed to feel that the day surgery process minimised their condition in the eyes of their employers and families" [68 p.144]. In the final theme 4% of patients were actively seeking the sick role and regretted the demise of a period when they would have been an in-patient, receiving cards, flowers, visitors and communicating more fully with the doctors and nurses. Brattwall *et al* [65] reported 43% of patients undergoing breast augmentation deemed even a 23 hours stay in hospital to be too short.

Bisgaard *et al* [77] studied patients recovering from laparoscopic cholecystectomy who underwent a challenging exercise plan and biological measurement. A wristband was worn to monitor movement, treadmill exercise 1 day prior to surgery then again on post-operative days 2 and 8, pulmonary function testing 1 day prior to surgery then again on post-operative days 1, 2, 3 and 8. In addition, biological measures were taken together with some subjective data. For one week prior to surgery patients' experienced sleep disturbance but following surgery sleeplessness was statistically significantly reduced. In a further quasi-experiment design by Dewar *et al* [66] all patients were telephoned during the post-operative period and judged to benefit from advice regarding pain management. Likewise, Flanagan [18] stated patients welcomed the telephone interview (undertaken as part of the research process) as it offered a therapeutic element to recovery.

Limitations

The review is open to English publication bias and thereby possibly excludes a number of studies from the Scandinavian countries where research in this area is prominent [99, 100]. A limitation also occurred from the varied methods of data collection employed by the studies (low morbidity rates, resumption of 'normal' activity level, return to work, time) and limited use of validated day surgery specific measures of recovery. Furthermore, many studies (especially medical) do not always stipulate from which group of patients data is collected. For example, an aspect of surgery can be examined with no clear expression of in-patient or day-case treatment. Finally, an international review can create problems with terminology as day surgery in America is defined 23 hour stay but this is not the case in Europe. In addition, some studies employ the term 'out-patient surgery' and must be read carefully to determine if this is day surgery or indeed a brief outpatient's department procedure.

Conclusion

The opportunity for the expression of nurse-led knowledge in fast-paced, contemporary surgery has been limited by innovations in surgical and anaesthetic practice, healthcare emphasis on controlling cost/ time and a lack of contemporary surgical nursing evidence on which to base innovative care and education. This review has established patients require a degree of professional insight beyond the acute setting in the form of telephone support and/ or personal contact to offer information with regard to pain management, dealing with unforeseen events and anxiety. More nurse-led interventional studies focussing on the challenges arising from this review are required using validated measures of recovery, specific to minimal stay surgery. Without such evidence, nursing-based knowledge may remain under-represented in modern elective surgery.

Surgeon/patient and anaesthetist/patient contact has remained relatively unchanged in this new surgical era but nurse/ patient contact has become more fragmented. Nursing contact now takes place during brief interactions in the out-patient clinic, pre-assessment clinic, day surgery unit and community with little or no interaction on a professional basis between these groups [13, 101]. However, a more co-ordinated approach to communication and information provision is also required to establish a greater hospital/ community nursing ethos [13] especially with the possible increase in the number of elderly patients undergoing day surgery [46]. Modern elective surgical nursing must adapt to the meticulous medical practices of minimal stay surgery and seek to develop its unique contribution to modern surgery by further investigation into the hospital/ home transition.

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