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EDITORIAL: The Economic Downturn and Ambulatory Surgery.

The present financial crisis is affecting all countries to a greater or lesser extent. Governments are having to provide funds to shore up financial institutions, to provide liquidity to the markets and to try and stimulate economic activity. As a consequence, funding for other government activities is being reduced or, at best, contained with no allowance for inflation. Healthcare is no exception. In the area of elective surgery, ambulatory surgery is a proven high quality approach which has significantly lower costs than inpatient care. As few, if any, countries have maximised ambulatory surgery rates across all specialities and procedures, an increased transfer of patients from inpatient to ambulatory surgery could be used to maintain or increase elective surgery levels in the face of frozen or reduced funding. Perhaps the present fiscal crisis will open the eyes of governments and other healthcare providers to the benefit of stimulating the growth of ambulatory surgery.

There is no better time for those interested in ambulatory surgery to draw once again this approach to treatment to the attention of healthcare policy makers and providers in order that, by its increased use, patients can continue to have access to affordable and appropriate levels of quality elective surgical care despite the economic downturn.

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Day Case Surgery For Pressure Sore In A Tetraplegic Patient

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Due to progress of medicine, the number of spinal cord (SC) injured patients is growing with long-term survival (1), and the number of these patients presenting for elective surgery is increasing. Anaesthetic management in these patients is associated with specific difficulties. We report the case of one tetraplegic patient operated with a 23h day care treatment.

A young male patient 33 year old, ASA III, with a tetraplegia due to traumatic cervical lesion (C5) was scheduled for pressure sore surgery. Since his trauma management, he went on to tracheotomy and he was had been secondarily decannulated in the aim to close his ostomy. He was able to breathe and cough spontaneously and except for repeated tracheal suction, he did not need any respiratory treatment. Since he left the intensive care unit, he had no episode of autonomic dysreflexia; he was also tolerant to upright position. Before this operation, he only complained of shoulder and cervical pain related to muscle spasms and received daily oral tramadol (150mg) and clonazepam (10mg). His preoperative anaesthetic examination revealed no significant problem. Standard monitors and an i.v. line were placed in the operating room. His tracheostomy tube was removed and 5%lidocaine was pulverized through the ostomy, then a tracheal tube (6,5mm) was softly inserted in the trachea. After breathing

100% oxygen, a 50/50 mixture of air –oxygen with sevoflurane was used to induce anaesthesia, and maintained with around 0.8 MAC. TIVA sufentanil with an effect site concentration at 0.3ng per ml was used for intraoperative analgesia. He received i.v. 15mg atracurium and was mechanically ventilated to maintain end-tidal carbon dioxide tension at 35-40mmHg. Then, he was set in the prone position.

Surgery lasted 35 min. He awoke ten minutes later and was admitted in PACU where he received i.v. 50mg ketoprofen and 1g acetaminophen. He did not complain of any pain including his previous shoulder and cervical pain. Two hours later he was admitted in surgical ward where he received i.v. 50mg ketoprofen and p.o. 10mg morphine every 6 hours. He was discharged the next day with no complaint of pain including the cervical and shoulder pain. He was revisited a few days later without any event.

Pathophysiology of the chronic spinal cord lesions appears different from the acute phase. Cardiovascular changes are gradually adapted: autonomic dysreflexia is generally controlled and progressive tolerance to upright position is observed (1). Spinal cord injury results in a reduced anaesthetic requirement by at least 30% (2). We used control of the patient's cervical and shoulder pain to monitor a good level of analgesia.

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National Report

What's New in Day Surgery in Portugal? The importance of the introduction of organisational principles.

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Keywords: Day surgery in Portugal; Organisation; National Committee; Activity.

INTRODUCTION:

The recent governmental nomination of the National Committee for the Development of Day Surgery in Portugal (CNADCA) [1] led to a new national survey aimed at evaluating the present rate of day surgery and day surgery organizational quality.

NATIONAL DAY SURGERY ORGANISATION:

Sixty public Portuguese hospitals were included with data referred to 2006. Only 5 hospitals (8%) had no day surgery programme running in their hospitals. Forty-two hospitals (70%) had integrated facilities managing their patients totally or in part through inpatient facilities. Only thirteen programmes (22%) were using self contained units on the hospital site. The authors noticed that in 31 day surgery programmes (56.4%) there was no separation in the flow of day surgery patients and inpatients in the hospital organisation. The exclusive dedication of professionals to day surgery programmes happened most frequently with assistants (43.6%) and nursing staff (41.8%), and seldomly among anaesthetists (9.1%) and surgeons (5.5%). Clinical organization based on clinical protocols for patient selection and discharge criteria was used in 61.8% of the day surgery programmes. However, guidelines for pain control or post-operative nausea and vomiting prophylaxis were practised only in 43.6% and 36.4%, respectively. Written patient information was available in the majority of the day surgery programmes, but not all, giving the idea that there is still a long way to go to improve quality in Portuguese day surgery programmes. Few of them used clinical indicators to evaluate their clinical practice. The cancellation of booked procedures, unplanned return to the operating room on the same day of surgery and unplanned overnight admission were the most employed indicators. Nevertheless, post-operative supportive measures are being established in most of the day surgery programmes, namely personal phone contact with a staff member and a

follow-up phone call 24 hours after surgery to evaluate patients' clinical situations and to clarify any doubts that patients and/or their relatives might have.

NATIONAL DAY SURGERY PERFORMANCE:

In Table 1, results from the two last national surveys on day surgery activity shows a positive evolution of this surgical regimen, with an increase of 7.7% in 2006 when compared with 2005, and a 5-fold increase when compared with 1999 [2]. The development of day surgery in Portugal has a homogeneous increase between regions of the country, giving the impression that this positive movement is occurring all over the country (Table 2).

Table 1 – National evolution of day surgery, between 2005 and 2006.

	2005		2006	
	N	%	N	%
Total non-emergency surgery	325,638		290,893	
Total ambulatory surgery	73,390	22.5	79,067	27.2

Table 2 – National evolution of day surgery, by health regions (2005-2006).

Health Regions	Hospitals	2005		2006	
		N	%	N	%
North	17	26,877	22.9	29,962	29.2
Centre	17	15,826	20.8	18,954	26.5
Lisbon & Tejo Valley	21	27,133	24.0	27,741	26.3
Alentejo	3	2,114	20.0	2,035	22.0
Algarve	2	1,440	17.0	2,375	25.2
Total	60	73,390	22.5	79,067	27.2

However, the best way to evaluate the evolution of day surgery practice in our country is to compare the percentage of the most performed procedures on a day surgery basis. As can be seen in Table 3, almost all of the top 10 listed procedures had a positive growth in day surgery rates between 2005 and 2006.

Table 3 – Results of the top 10 performed day surgery procedures (2001-2006).

Surgical Procedures	2001	2003	2005	2006
	%	%	%	%
Cataract surgery	29.6	31.3	53.9	63.4
Circumcision	29.9	41.1	45.1	59.4
Carpal tunnel decompression	30.6	39.3	50.0	58.1
Squint surgery	9.5	28.9	51.0	49.5
Myringotomy	8.5	14.9	28.6	35.8
Laparoscopic sterilisation	13.1	23.5	28.9	26.4
Hernia repair	9.3	14.9	18.0	21.6
Tonsillectomy	4.2	9.3	14.9	19.6
Varicose vein surgery	8.7	13.3	11.9	15.3
Knee arthroscopy	1.2	1.9	4.4	6.3

BARRIERS FOR FUTURE DEVELOPMENT

From the national survey, we perceived that the great majority of hospitals (91.7%) have one or more constraints for the development of day surgery programmes (Table 4). The main problems are related to the logistics of hospitals due to their construction in the 70's and 80's when planning spaces and circuits dedicated to day surgery were not considered. Even though

some hospitals are trying to make small adaptations to begin their programmes by using this opportunity to change attitudes towards this new surgical concept, the lack of human resources, especially anaesthetists, increases the difficulties in initiating these programmes in our public hospitals.

Table 4 – Causes of constraints for the national development of day surgery (n=60).

Causes	North	Centre	Lisbon	Alentejo	Algarv e	Total
	(n=17)	(n=17)	(n=21)	(n=3)	(n=2)	(n=60)
Logistic problems	12	13	13	3	0	41 (68.3%)
Clinical equipment	2	6	3	0	0	11 (18.3%)
Human resources	8	9	9	0	1	27 (45.0%)
Hospitals w/ constraints	17	14	20	3	1	55 (91.7%)

ORGANIZATIONAL PRINCIPLES OF DAY SURGERY PROGRAMMES

After analysing the data of the present national survey, there is a feeling that some day surgery programmes are not different from the management of conventional inpatient surgery programmes with deep organizational, clinical and patient information deficits. In fact, the innovative character of day surgery programmes is based on the patient centred organizational model. This includes a separate flow pattern for day patients from inpatients, structurally separate day surgery facilities and dedicated day surgery staff all aimed at achieving gains in efficiency, quality and patient satisfaction.

To accomplish these aims, it is recommended that certain principles should be adopted in the organization of day surgery programmes. Such principles can be divided into basic principles i.e. those that are compulsory for every day surgery programme, and into advanced principles with the intention of achieving excellence and improving the organizational quality.

Examples of basic principles of day surgery programmes are:

1 – **Patient circuit** – with a separate flow of day surgery patients from inpatients, although it can be accepted to share the operating room and the post-operative anaesthetic care unit (PACU) in integrated models.

2 – **Management structure** – with the establishment of an independent structure well defined in the organisational system of the hospital, appointing a Clinical Director for each Day Surgery Unit (DSU).

3 – **Clinical protocols** – at least for patient selection and surgical procedures, and establish discharge criteria for patient safety.

4 – **Written clinical information** – with clear post-operative instructions, with information of what to do and who to contact in the case of complications, when to re-take chronic medication, when and how to re-initiate physical activity, etc.

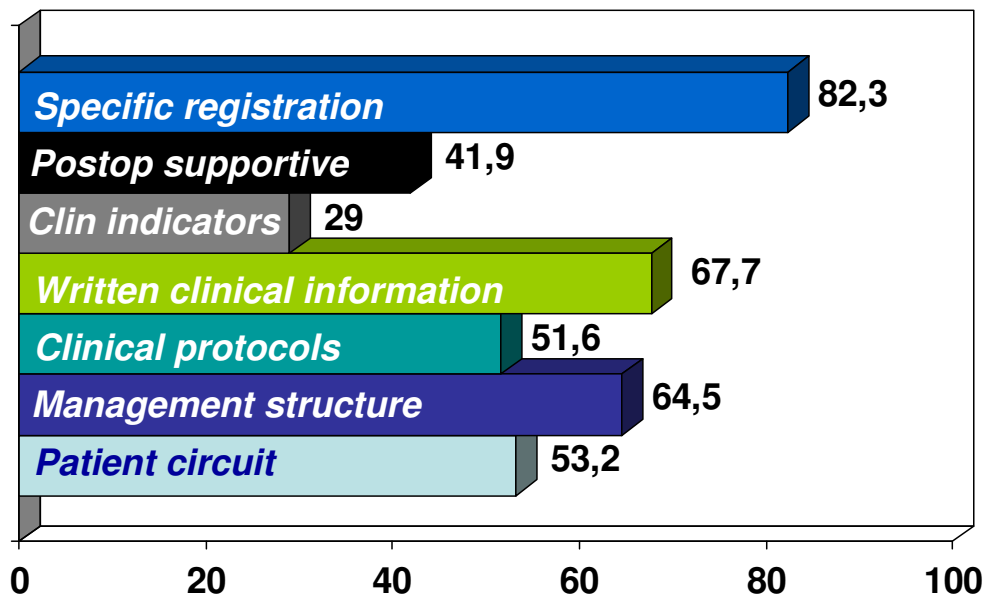
5 – **Continuous analysis of clinical indicators** – at least those more important for quality improvement in a day surgery programme, such as cancellation of booked procedures, and unplanned overnight admission.

6 – **Post-operative supportive measures** – such as the availability of a phone contact number of a clinical staff member and a phone call 24 hours after surgery to evaluate the patient's clinical situation, clarify any doubts and to inform the patient and relatives in the case of the existence of surgical complications.

7 – **Specific registration** of day surgery programmes data in a computerized system.

Interestingly, these basic principles of the organization of day surgery programmes are far from being present in Portuguese day surgery programmes (Graph 1).

Graph 1 – Percentage of Day Surgery Programmes with the Basic Principles established



Trying to move the quality of organization of day surgery programmes towards excellence, some Advanced Principles should be sought to be introduced: a) the implementation of a separate flow of day surgery patients from inpatients in all situations; b) proper day surgery facilities with waiting rooms for patients and relatives, and separate wards from inpatients for those included in ambulatory surgery with extended recovery programmes; c) dedicated assistants, nurses and administrative staff; d) more extensive clinical protocols especially for pain management control and post-operative nausea and vomiting prophylaxis; e) other written information including that for the pre-operative period and information especially orientated to relatives as well as patients; f) additional clinical indicators, such as unplanned return to the operating room on the same day of surgery, unplanned return and readmission of

the patient to the DSU, percentage of patients with severe pain or post-operative nausea and vomiting, etc; g) gather information about patient satisfaction through anonymous surveys.

CONCLUSIONS

There is a long way to go to progress day surgery in Portugal .In spite of the positive indicators for its development that have been shown, there is a national perception that we could perform better not only in the quantitative but also in the qualitative aspects of this field. The Portuguese Association of Ambulatory Surgery (APCA) has been pressing Government leaders to create incentive health policies to promote more and more day surgery in Portugal, and we hope that all the proposals made by the CNADCA will achieve the goal of performing more than 50% of non-emergency procedures on a day surgery basis by 2009.

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Flying Solo – A pilot study of Day case Robot Assisted Laparoscopic Surgery

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Abstract

Aim: To assess the feasibility of using a robot camera positioning device

(EndoAssist™) in the day case setting for the laparoscopic repair of inguinal hernia.

Methods: Twenty consecutive patients underwent surgery using EndoAssist (n=10) or a human assistant (n=10) to operate the camera. Demographic data and operating times were recorded.

Results: There was no statistically significant difference in the overall mean operating times of the EndoAssist and Human Assistant groups (73 v 76 minutes p= 0.71).

Conclusion: Day case robot assisted laparoscopic surgery is feasible and safe. There is no associated lengthening of the operating time and may indeed free up valuable personnel for more productive work.

Keywords: *Laparoscopic hernia repair; Robot; Day case.*

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Introduction

Minimally invasive surgical techniques have acquired indisputable importance in modern general surgery. Ideally, the principal surgeon should have control of the visual field during laparoscopic surgery but invariably this depends upon an assistant who holds and manoeuvres the camera. This surrogacy of control can distort the surgeon's observations and disturb hand-eye coordination, particularly if the assistant is unfamiliar with or uninterested in the operative procedure.

The advent of robotic technology in surgery has led to the development of novel positioning devices, potentially eliminating the need for an assistant to operate the camera [1]. EndoAssist™ (Prosurgics Ltd, High Wycombe, UK) is a free-standing robotic laparoscopic camera holding device that operates under surgeon control, utilizing a head motion tracking system (Fig. 1). An alternative robotic camera positioning device, AESOP™ (Computer Motion, USA), responds to the surgeon's verbal commands. This system needs to be secured to the operating table prior to surgery, requires each surgeon to have an individual voice card and has the potential for background noise to result in voice recognition errors. Furthermore, comparison of these two systems in controlled simulated environments has shown that EndoAssist was significantly quicker at completing both simple and complex tasks [2]. The investigators concluded that this reduction was as a result of greater accuracy and a reduced number of erratic movements seen with the EndoAssist system.

Figure 1: EndoAssist Camera Positioning Robot



We present the findings of our Phase I study to assess the feasibility of using EndoAssist in a day case setting for the laparoscopic repair of inguinal hernia. Inguinal hernia repairs constitute approximately 80,000 completed consultant episodes, 90,000 bed days and 38,000 day case procedures each year in England and Wales alone [3]. Although the majority of inguinal hernias are repaired using an open mesh technique, there is a continuing increase in the number of laparoscopic repairs performed since its introduction using mesh in 1991 [4].

Methods

Twenty consecutive patients underwent elective laparoscopic inguinal hernia repair as a day case procedure performed by a single surgeon. Ten of these operations were performed using EndoAssist as the sole assistant, with the remainder employing a human assistant to operate the camera. For robot assisted operations the free-standing EndoAssist device is positioned on the opposite side of the patient to the surgeon. The device is centred on the camera port using laser alignment and the laparoscope is then attached using a re-usable sterilised positioning arm. The device has 3 axes of movement centring on the entry point (pan, tilt and zoom). The surgeon wears a head-mounted optical transmitter and direction of head movements are detected by a sensor mounted on the laparoscopic viewing monitor. Movement of the robotic arm, and hence camera, in the desired direction is then initiated and terminated by foot pedal control. Total operating times for each case were recorded; this included robot set-up time for EndoAssist cases. Demographic details of each patient were also collated. Data analyses were performed using a two-tailed Students t-test.

Results

All cases were completed successfully without any complications and patients were discharged home the same day as the procedure. Both groups were predominantly comprised of men with no significant difference in the mean age ($p= 0.93$) (Table 1). Robot set-up times varied from 4-9 minutes for EndoAssist™ cases. The mean total operating time was 73 minutes (Standard deviation 23 minutes) for the EndoAssist group and 76 minutes (Standard deviation 27 minutes) for the Human Assistant group (Table 1). There was no statistically significant difference in the overall operating times between these two groups ($p= 0.71$).

Table 1: EndoAssist™ versus Human Assistant

	EndoAssist™ (n=10)	Human Assistant (n=10)
Male:Female	9:1	10:0
Mean Age (Range)/years	59 (37-77)	58 (37-84)
Mean Total operating time (Range)/ minutes	73 (44-94)	76 (55-95)

Discussion

There is no doubt that the assistance received by the surgeon during laparoscopic surgery is extremely important. Human assistance is costly and does not always provide a stable platform for the laparoscopic camera. The introduction of robots in laparoscopic surgery was described by Begin et al in 1995 and used to safely perform three laparoscopic cholecystectomies [5]. Considerable progress has been made in robotic technology and more recent studies have demonstrated the benefits of substituting the human camera-holder with a robot. Aiono et al randomised patients undergoing laparoscopic cholecystectomy to either robot or human assistant (6). There was a statistically significant reduction in the operating time when using EndoAssist of the order of 10%. Furthermore this work demonstrated a short and readily achievable learning curve of three cases to replicate the operating times of human assistant procedures.

There are clear limitations of this study with particular reference to sample size and lack of randomisation. However, this study has shown that robot-assisted laparoscopic inguinal hernia repair is feasible and can be performed safely in a day case setting. Furthermore, the timing data for robot assisted procedures includes initial learning curve cases without any pre-familiarisation period. Robot set-up was quickly acquired by theatre staff and even when including this additional time there was no significant difference in overall operating times for robot versus human assistant cases. Furthermore, with recent changes to medical and nursing work practices, the need for an assistant has obvious resource implications, preventing personnel being allocated to more appropriate duties.

Conclusion

Laparoscopic inguinal hernia repair can be performed safely using the EndoAssist robotic camera positioning device. Using this device does not appear to prolong the operating time and may free up valuable personnel for more productive duties appropriate to their training. This feasibility study has formed the basis of an ongoing randomised controlled trial to assess whether using EndoAssist can indeed result in a reduction in the operating time of laparoscopic inguinal hernia repairs.

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Being Ready on The Day...

A Short Report on the Evaluation and Outcomes of a Pilot

Ambulatory Surgery Crisis Resource

Management Course

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Key words: Ambulatory surgery; Day surgery; Crisis Resource Management; De-skilling; Team-based training; Scenario-based learning

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Abstract

Aim: To describe the development, evaluation and outcomes of a pilot crisis resource management (CRM) course developed specifically for the Ambulatory Surgery sector.

Methods: The scenario-based course (DaCRM) covered the diagnosis and management of a number of potential medical emergencies. Evaluation incorporated pre- and post course surveys and follow-up interviews.

Results: All participants applied learnings either clinically or organizationally in their workplace, and one successfully diagnosed and managed a malignant hyperthermia event.

Conclusion: Some important generalizable principles were demonstrated: team-based CRM training of clinical and non-clinical staff can increase confidence, ameliorate possible de-skilling in Ambulatory Surgery settings and can save lives.

Introduction

In the past two decades, pressures on the healthcare system and improvements in technology have led to the exponential use of ambulatory surgery carried out in dedicated day surgery units in public and private hospitals, and in more than 240 free standing day surgery centres throughout Australia (1). Currently, approximately half of all surgical procedures in Australia are carried out as day surgery and there is considerable potential for increasing that proportion (2). In the UK and the USA, around 65% and 70% respectively of elective surgery is performed as day procedures (3).

The standard of care in ambulatory surgery units may be high. However, the possibility of unexpected operative complications is ever present (4). Given that the underlying causes of adverse events often stem from non-technical aspects of clinical performance (5) and that staffing in stand-alone units may be stretched to the limit when responding to crises, the need for crisis resource management (CRM) training is essential. The latter covers non-technical skills such as 'team working, leadership, situation awareness, decision making task management and communication' (5).

The Course

In response to the needs of the private ambulatory surgery sector, the Skills Development Centre developed a multi-disciplinary Day Surgery Crisis Resource Management course (DaCRM). The pilot course was delivered by an anaesthetist, two (anaesthetic) registered nurses and two simulation co-ordinators. The course was scenario-based, since this approach allows participants to “engage with authentic situations and tasks which facilitate immersion with the content within realistic situations” (6). Eight people (4 females and 4 males; 4 doctors and 4 nurses) participated. The scenarios covered the diagnosis and management of anaphylaxis, malignant hyperthermia, arrhythmia and haemorrhage.

What follows is a description of DaCRM, the evaluation process and its outcomes. The Ethics Committee of The University of Queensland approved the evaluation process.

Evaluation Methodology

The evaluation strategy at the Skills Development Centre (SDC) is based on the four-stage Kirkpatrick model (reactions, learning, transfer, results) (7) which covers:

- participants’ initial reaction to the course in terms of
 - the extent to which participants were able to meet their learning objectives;
 - its relevance;
 - its fidelity;
 - appropriateness of format;
 - the learning environment.

- the extent of participants' learning by
 - measuring changes in their levels of confidence before and after the course,
 - assessing students' knowledge before and after the course, and
 - using higher-order questions to ask them to detail the elements of the program they will utilize.
- the level of transfer through
 - determining as far as possible the extent to which participants actually apply the knowledge and skills acquired in the course, in their workplace.
- the ultimate outcome of the course by
 - obtaining feedback through semi-structured interviews from the participants' supervisors (where appropriate, only) as to their performance in the areas covered by the course, and comparing that with baseline data (supervisors' assessment of performance in those who have not completed a CRM course).

Evaluation Methods

Evaluation of DaCRM was designed to be in three stages:

- A pre-course evaluation covering:
 - self-reported behavioural characteristics which relate specifically to CRM training (e.g. asking for help, directed communication, planning ahead etc.);
- An immediate post program evaluation to determine:

- the extent to which participants felt the program and the trainers helped them to reach the learning objectives of the program (using a survey based on CRM principles);
 - the practical ways in which participants will use the CRM principles; and
 - the efficiency of the administrative aspects of the CRM program (participants' orientation, enrolment, learning materials etc.).
- Follow-up interview to determine:
 - the extent to which participants' (self-reported) behaviour might have changed in their response to any critical event(s) they were involved in the 4-6 weeks following their training;
 - the extent to which participants consciously used the techniques they nominated for future use immediately following the program; and
 - upon reflection, the extent to which participants feel the CRM training they received could be further improved.

Given the seniority of the participants involved in the pilot course, no data were collected specifically from their supervisors (Stage 4).

Because of the ordinal nature of the data, non-parametric measures were used in the analysis of the data (Spearman's *rho*, Kruskal-Wallis, Wilcoxon), and a formula for non-parametric data was used to calculate effect sizes (8). The number of responses (from 8 participants) was too small for a reliability analysis to be performed on the instrument used in the immediate post DaCRM course evaluation. However, the same instrument has been used for similarly structured CRM courses and has been shown to be reliable with an alpha co-efficient of $>.90$.

Results

All participants (n=8) completed the immediate post course evaluation and all but one participant (7/8) completed the pre- and post course surveys and interview. Seven of the 8 participants (87.5%) thought the course was “excellent” and 1 participant (12.5%) that it was “very good”. All participants would recommend the course to their peers.

Statistically, there were too few participants to the results by training or gender, so the results are reported in the aggregate. However, there was a strong correlation between the number of years since participants’ graduation and their comfort with scenario-based learning ($r = .78, p <.05$).

Participants reported that the course helped all participants to consolidate or enhance their skills. They were also helped by the debriefing sessions to clarify what needs to be done in an emergency situation, and to learn how to deal with anxiety. Importantly, as confirmation that the course successfully demonstrated its underlying CRM principles, all participants nominated various CRM principles that they would use in the future, namely:

- directed communication (x 3);
- seeking help early (x 2):
- taking on a leadership role (x 3)
- situational awareness (x 1)
- using all available resources (x 1).

Additionally, two participants respectively said that they would use the revised techniques they had learned for the management of anaphylaxis.

Although one doctor thought the “dummy” should have changed colour to indicate cyanosis, the best elements of the course for participants were the task fidelity during realistic scenarios, and the opportunity for reflection during the concomitant de-briefing sessions. Comments included:

The simulations were very life-like. I identified weak areas in myself and my team, but it also helped me to know the others’ strengths. The scenarios were especially valuable for those of us who had not experienced an emergency for years (Nurse).

It made me aware of what I actually do! (Doctor).

It started me thinking about how I do things. It was a refresher for me. I reflected on my own skills and it’s led me to increase my research and to change the way I do things, and change my priorities (Nurse).

For two participants, the best element was their learning about new emergency management principles “which have changed over the years”:

... it raised my awareness about the changes in the approach to CPR. They’ve changed since I last did a course. It updated my CPR skills (Doctor).

Seven of the eight participants completed a semi-structured interview at follow-up. Since DaCRM, participants self-reported that there had been significant improvements in two aspects of their behaviour in a crisis, namely their use of directed communication

($d = .55$, $p = .04$) and their ability to assert themselves when necessary with more senior staff ($d = .56$, $p = .038$).

As a consequence of DaCRM, four participants had especially appreciated the need for teamwork, and also recognized what nursing staff were capable of doing in an emergency, for example:

I saw the value of teamwork. It helped me to assess the skills levels of my staff and to appreciate what they can do (Senior Nurse).

I now have more confidence in the nursing staff who did the course and a greater awareness of what nurses are capable of doing (Doctor).

Additionally, participants had since made changes to their environment:

I've updated my skills in resuscitation so that I now feel safer, and I'm much more in control than before. I've [also] checked all the equipment to make sure it's working (Senior Nurse).

I've made changes to the resuscitation equipment and to the way in which it's packaged (Senior Doctor).

Importantly, DaCRM brought home to a number of respondents the dangers of de-skilling in a Day-Only environment where

...most of the patients [seen] are healthy [so] we don't get the same problems as we would with sicker patients... (Doctor).

Of course, not getting “the same problems” cannot be relied upon. For example, even patients who have previously had normal anaesthetics may be at risk from malignant hyperthermia (9), and another DaCRM participant reported that he had:

... managed a malignant pyrexia since [DaCRM]. The diagnosis was correct, and then I used what I'd learned (filling the bladder with ice-water, changing the tubing etc.). I did what the text said and it worked well (Doctor).

Although ambivalence towards inter-professional learning initiatives has been reported previously (10), all participants in DaCRM believed it should continue to be run for both nurses and doctors. Some participants thought that it should also include administrative staff in the future:

Having nurses and doctors together was great. The nurses have to have hands-on training (Doctor).

It was nice to have a mix of nurses and doctors. It was nice to have everyone as a group (Nurse).

The mixed training was good. It was good to work as a team. I think it would be a good idea if more nurses and administrative staff also did the course together (Nurse).

The mix of nurses and doctors was good – possibly admin staff should do it as well to give them an overview of what will happen (Nurse).

Discussion

It has been noted that the careful selection of candidates for day surgery has been responsible for much of its success (11). Nonetheless, this may change as fitness criteria become increasingly less restrictive, the rate of day surgery increases and the surgery undertaken as day cases become more complex (12).

Infrequent exposure to emergencies or the opportunity to practise emergency management skills leads to de-skilling in this important area (13). Individuals need to receive appropriate training, and institutions should ensure their staff are given the time and resources necessary to train and practise. Above all, however, teams are greater than the sum of their parts and have an obligation to practise together in “real-time, real-environment scenarios [that] provide practise and [also] test the system” (14).

Simulation is a valuable addition to the teaching armamentarium when it is impossible to practise on live human beings (15). Additionally, training in a simulated environment

- “... can be standardised, controlled and taught with appropriate instruction, supervision and advice, [and]
- ... can be repeated until a defined performance criterion is met. For some individuals and some activities this may mean one or two attempts, for others it may require many attempts under instruction and supervision.” (RACS, 2005)

The majority of participants at follow-up had not experienced any emergencies following DaCRM but had nonetheless updated their knowledge and skills in relation to communication, resuscitation, anaphylaxis and malignant hyperthermia. Indeed, one medical participant had used the techniques learned in order to deal successfully with

the latter. This addresses the possibility voiced by a number of writers that some of the skills learned in a simulated environment may not be transferable to the real world (16-18), or that simulated teaching and learning may become divorced from the clinical context (18). It is clear from participants' application of CRM principles in their workplace, and from their comments relating to the value of the "interaction between participants in plausible scenarios" and the "realistic setting", that this is not the case for DaCRM.

An important reason for developing the Day Surgery Crisis Resource Management course was the awareness that staff in stand-alone units do not always have the same panoply of resources available as general hospitals, especially the presence of medical staff once surgery has finished for the day (19). Certainly this was reinforced in a request from a nurse participant that more advanced scenarios be written for them only, i.e. "without doctors" since it was felt that this would be more realistic at certain times of the day.

On the face of it this is a reasonable request. However, an important learning objective of CRM courses is that participants realize the potential of using all of the resources available to them. It would appear necessary for future DaCRM courses to reinforce the notion that nurses can and should use the other resources available to them when there are no medical staff around, namely administrative staff. The latter should be trained to fulfil appropriate roles during the management of a medical emergency.

Summary

Although the number of participants in this study was small and the feedback on follow-up based on self-report, the findings nonetheless support to important generalizable principles.

Medical and nursing staff working in an ambulatory surgery setting are at risk of becoming de-skilled in their management of medical emergencies and need to have their skills updated regularly. The use of realistic scenarios and up-to-date evidence-based techniques taught by DaCRM helped participants to upgrade and actually apply their ‘rusty’ emergency management skills, and to review and improve some of their work practises, including better communication.

To ensure that all available resources may be used by clinicians – especially by nurses later in the day – it would also be appropriate for administrative staff in stand-alone settings to receive CRM training also. Emergency scenarios should be designed with roles for both clinicians and non-clinicians, and it would be ideal if medical, nursing and administrative staff attended a course such as DaCRM as a team.

As the use of day case surgery increases and patient profiles change, so also should stand-alone facilities protect their patients’ safety through ongoing team training of their staff in the management of medical emergencies. The pilot Day Surgery Crisis Resource Management course was successful not only in terms of participants’ satisfaction, but importantly, in their ability to apply their learnings successfully in the real world.

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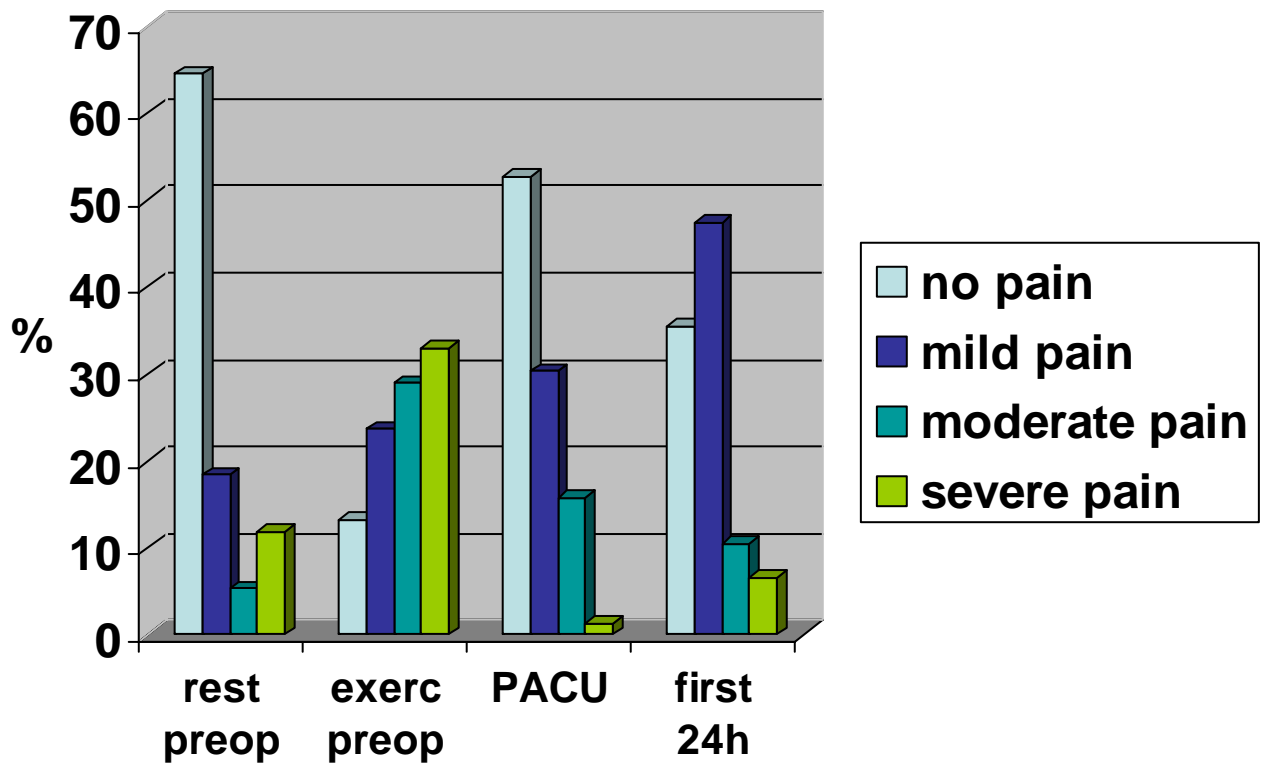
CKNOWLEDGEMENTS

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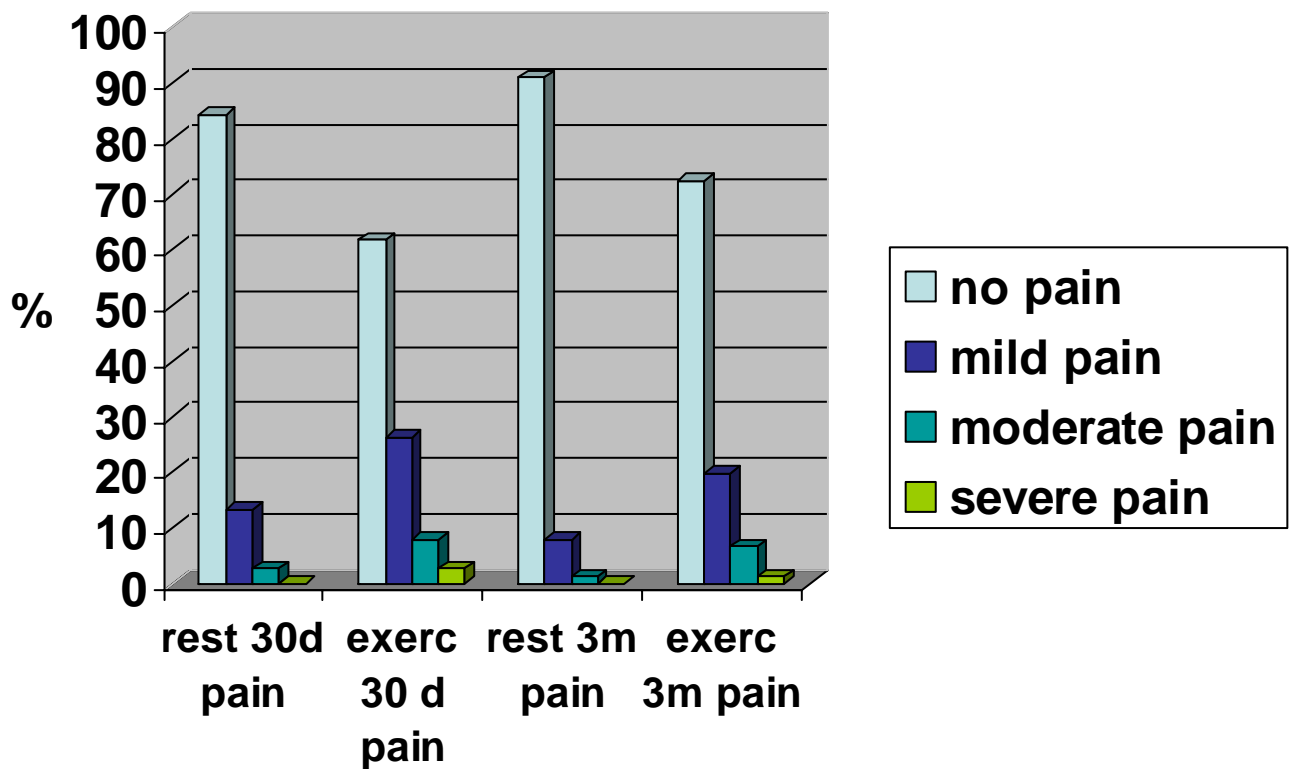
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Graphic 1 - Pain incidence in the preoperative period, at rest and with exercise, in the PACU (Postanesthetic Care Unit), and in the first 24 hours



Graphic 2 - Pain incidence in the postoperative period, at 30 days (d) in rest and with exercise (exerc); and at 3 months (m).

**Day-Case Inguinal Hernia Repair:
Is Post-Surgical Pain At 30 Days Indicative Of Chronic Pain?**

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Keywords: Day-case, inguinal hernia repair, chronic pain

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Abstract

Aim: To determine the incidence of chronic post-surgical pain in day-case inguinal hernia repair, and identify predictive factors.

Methods: Retrospective study by clinical records and a phone call questionnaire, 24h and 3 to 6 months after patients undergoing inguinal hernia repair, during a period of one year, applied to 90 patients.

Results: A response rate of 86% was obtained. At 30 days after the surgery the pain registered was similar to the 3-6 months results. No relation was found between the postoperative pain at 24h and future pain.

Conclusion: Early evaluation and treatment of pain before the 30 days is crucial.

Introduction

Inguinal hernia repair is a common procedure with a low short-term postoperative morbidity but with a reported incidence of chronic pain from 0% to 62% (1, 2, 3). The reason is not well identified. Chronic pain could be related to the surgical procedure used. A lower incidence is reported after laparoscopic repair (28,7%) versus open repair (36,7%) (4). Others factors could be related to a higher postoperative pain: middle age, male gender, recurrent hernia repair, preoperative pain and immediate postoperative pain, psychiatric pathology and treatment (2, 5). About 10,7% patients have a worse pain after the surgery (6), and the interference with work life and social activities was stated between 10 and 56,6% (6, 7). The estimated median time to the resumption of normal daily activity is 10 days; time to return to work, 21 days; time to athletic activities practice, 36 days (8).

The definition of chronic pain by The International Association for the Study of Pain is pain as the outcome measure, occurring for a minimum of 3 months after the surgical repair, and not existing the 6 months before (9).

Our Ambulatory Unit telephones all patients, at postoperative 24 hours. In this study we collected the information from preoperative records, the phone call at the 24h, the postoperative 30 days surgeon appointment and the phone call questionnaire at the 3 to 6 months after the surgery. The information included functional capacity, physical signs and symptoms, return to daily activities and to work. The aim of this investigation is to estimate the incidence of chronic post-surgical pain after hernia inguinal repair in day case surgery, to identify predictive factors and to assess its impact on patients' quality of life, in our population.

Methods

This was a retrospective study using clinical records and a phone call questionnaire performed twice, at 24h and at 3 to 6 months after patients' undergoing Lichtenstein inguinal hernia repair in the Ambulatory Surgery Unit.

The exclusion criteria were bilateral repair, recurrent hernia repair, inguinal hernia repair and other surgery in the same intervention, laparoscopic repair, repair without a mesh, and patients with cognitive dysfunction. The inclusion criteria were: male, ASA Physical Status Classes I and II, age over 18 years old and unilateral repair. A total of 90 patients were included

The anaesthesia protocol was general anaesthesia induction with propofol (1,5mg-2mg/Kg), fentanil (3µg/kg) and vecuronium (0,1mg/Kg), and maintenance with sevofluran and oxygen at 40%. The analgesia was accomplished by paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), and local infiltration with ropivacaine 0.5% done by the surgeon at the end of the procedure. Patients stayed in the Postanaesthetic Care Unit (PACU) about 4 hours, until they could tolerate oral intake and had voided. The patients were discharged home with paracetamol and NSAIDs

prescription for the first 3 days after the surgery and with the information to phone or return if they felt anything was wrong.

Data were collected from clinical records and phone call questionnaires at two different times, 24 hours and 3 to 6 months after the surgery. The first call, about early postoperative complications and patients satisfaction is routinely done in the Unit. The second questionnaire has two parts, the first about the preoperative state, and the second about the postoperative state. The pain was classified as none, mild, moderate and severe. The preoperative part included questions about pain in the inguinal area and pain in other locations, pain at rest or with exercise, analgesic need, and limitation of daily activities. The postoperative part included questions about pain at the immediate postoperative period, in the postoperative 24h and in the 30 days after, at rest or with exercise, and need for analgesic medication. This part also included the time to resume work; whether the patient felt better after the intervention than before the surgery; if the hernia repair corresponded to the individual expectation; and if necessary, this kind of intervention would be repeated.

Epi Info 2002 was the statistic programme. The Chi square test was used and considered statistically significant if $P < 0,05$.

Results:

Before surgery severe pain was reported at rest in 10% of the patients and with exercise in 32%, with activity limitation in 56% of the cases. Only 20% use medication to control the pain. Ten percent of patients had another pain with analgesic medication use. In the PACU was registered no pain was reported by 53,3%, mild pain by 29,3%, moderate pain by 16%, and severe pain by just one patient.

The same response rate of 86% was obtained for the phone call questionnaires at the immediate postoperative 24h and at the 3 to 6 months. At 24 hours after the surgery, only 10,5% of patients had moderate pain and 6,6% had severe pain (graphic 1). It was found that 7,9% didn't follow the analgesic medication regimen instituted. At three months after the surgery, 1,3% had moderate pain at rest and about 6,7% with exercise, and two patients used medication to control this pain. Five patients were directed to the chronic pain service because they complained of moderate to severe pain. All of these patients had moderate pain in the 24hours immediately after the surgery, but they didn't want to make any treatment.

At 30th day after the surgery, the patients were evaluated by the surgeon. The level of pain recorded was similar at 30 days to the level at 3-6 months after, with medication needed in 3,9% of the cases.

No booked procedure was cancelled. There was no unplanned return to the operating room on the day of the surgery, no unplanned overnight admission, and no unplanned readmission in the hospital. One patient returned the hospital at 48h after the procedure, due to skin infection in the surgical local.

A poor correlation was found between pain at the 24h and future pain. However, there was a strong relation $P (0,000)$ between rest and exercise pain at 30 days after the surgery and at 3 to 6 months after the surgery (table 1). There were no other significant differences.

Patients resumed their daily activities between 30 to 90 days after the surgery in 52% and 90 days after in 9,3%. The late return to work is, in almost all cases, attributed to social benefits. About 12% reported some activity limitation after the intervention, but 94% reported being better after the surgery. All of them would repeat the surgery again and the surgery corresponded a lot to their expectations.

Discussion

We found a low incidence of immediate and late postoperative pain compared to other studies. This study has some limitations, in that demographic variables were not considered, the surgical team was not always the same, and it is a retrospective study.

The institution of analgesic protocols is crucial in the Ambulatory Units, as are the phone call questionnaires. It is important that patients don't feel alone and by themselves. In this way the 24 hours phone call questionnaire is essential not only to get information about pain and other anaesthetic or surgical complications, but also to the patient have the feeling someone is taking care of him. In addition, the late follow up must not be forgotten.

The development of chronic pain was not related to 24h postoperative pain. However, this study did find that pain at 30 days after the surgery constituted an indicator of possible future pain. Early evaluation and treatment of pain, before the 30 days is crucial. A close follow-up and multidisciplinary approach is mandatory, although the administrative limitations could impair this purpose. The surgeons have an important place in the identification and control of pain in the follow up routine appointments. Therefore it is important to educate these professionals to the importance of pain vigilance and early treatment.

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Does Ring-Fencing Improve Efficiency in an Orthopaedic Day Case Unit?

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Abstract

Aim: To examine if ring fencing or isolation of day case beds from the main hospital improves the efficiency of the day case unit by reducing cancellations.

Methods: Two years of data were analysed, the first when the unit was within the main hospital and the second when it was isolated.

Results: There was no significant difference in the overall cancellation. There were a significantly greater number of cases cancelled on the day due to the non-availability of beds ($p < 0.001$) in the main hospital unit.

Conclusion: Isolation or ring fencing of day case beds can reduce cancellations.

Keywords: Day case; Ambulatory surgery; Utilisation; Efficiency.

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Introduction

Cancellation on the day of surgery remains a major cause of failure to complete planned day case surgery ^[1]. Previous audits within the United Bristol Healthcare Trust had identified high rates of failure to complete cases within the day case unit. This study was devised to ascertain the reasons behind this. During the aforementioned previous audits, high rates of non-completion had been thought to be due to “DNAs” (did not attend), or failure to attend by the patient for surgery. We analysed the reasons for failure to complete surgery more closely and compared two years worth of data to identify any trends.

During the course of 2004-2005 the day case unit was based within the main hospital of the trust, the Bristol Royal Infirmary. During the course of the year 2005-2006, the day case unit was moved to St Michael's Hospital to allow refurbishment and development of the main unit. This provided us with the opportunity to analyse these two separate blocks of data to determine if there was an advantage to having a geographically isolated day case unit. During the course of the year 2004-2005 the day case unit operated out of a day case ward. In times of bed pressure this ward could be opened at night by the Clinical Site Manager to act as an overflow for acute admissions. The resultant effect was a lack of beds to admit patients to in the morning and hence the cancellation of cases. For the period 2005-2006 when the unit was based at St Michael's Hospital which does not accept acute admissions for general surgery, general medicine or orthopaedics this did not occur as the day case bed area could not be opened at night to act as an overflow.

Materials & Methods

The original planned lists for day case surgery for orthopaedics are printed out each day before the list commences by the day case co-ordinators. Hard copies of these lists are filed. During the course of the list, the follow up for the completed case is noted next to that case on these hard copies. Cases that are not completed are marked as such and sometimes a reason is recorded. We analysed the lists for the two years as above and collected information on:

- Cases planned for the list
- Details of the cases planned and patient demographics
- Consultant in charge of the list
- AM or PM list
- Number of successfully completed cases
- Reasons for cancellation where noted

To complete the data, the hospital computer system was interrogated to ascertain the reasons for cancellation and to confirm the follow up data was correct. Both the Swift Op and PAS systems were interrogated. The data from the computerised theatre record (Swift Op) was cross-referenced with the hospital attendance data, the hospital appointment records and the appointment episode data (PAS). The day case co-ordinators use the appointment episode data to keep notes on reasons for cancellation or delay in surgery and this proved extremely useful in establishing the reasons for delay or cancellation. Where there were discrepancies between these records the main hospital notes were pulled to check once again the reason for cancellation.

The data was then collated into spreadsheet format for analysis and the data reproduced in table and graphical format for display purposes. The differences in cancellation rates were analysed for statistical significance using Fisher's exact test and the results recorded. Statistical analyses were performed using MedCalc for Windows, version 9.2.0.0 (MedCalc Software, Mariakerke, Belgium).

Results

A. Central day surgery unit

In the 12 months of 2004 to 2005, whilst the day case unit was located in the main building of the Bristol Royal Infirmary, there were 747 cases performed. There were 99 (11.7%) cancellations during this period. There were 186 orthopaedic day case lists performed with a mean number of cases per list of 4.5 (range 1 to 7).

B. Ring fenced day surgery unit

Whilst the day case unit was located in a geographically separate unit, there were 716 cases performed with a 101 (12.4%) cancellations. There were 190 orthopaedic day case lists performed with a mean number of cases of 4.3 (range 1 to 8).

The number of cases cancelled by category of cancellation and the percentage of the total number of cancellations are shown in the Tables 1 and 2.

Table 1: Reason for cancellation of cases in the period 2004-2005 (central day unit)

Reason for Cancellation	Number of cases	Proportion of cancelled cases (%)	Proportion of total cases (%)
No Bed	41	41.4	4.85
Medical	20	20.2	2.36
Procedure not Required	9	9.1	1.06
Administrative Error	11	11.1	1.30
Social	5	5.1	0.59
Insufficient Time	0	0	0
Other	3	3.0	0.35
DNA	10	10.1	1.18
Total	99		11.70

Table 2: Reason for cancellation of cases in the period 2005-2006 (ring fenced day unit)

Reason for Cancellation	Number of cases	Proportion of cancelled cases (%)	Proportion of total cases (%)
No Bed	0	0	0
Medical	19	18.8	2.33
Procedure not Required	16	15.8	1.96
Administrative Error	20	19.8	2.45
Social	15	14.9	1.84
Insufficient Time	5	5.0	0.61
Other	1	1.0	0.12
DNA	25	24.8	3.06
Total	101		12.36

We have demonstrated there was a highly significant difference in the cancellation rate due to no bed being available ($p < 0.001$), see Table 3. In three other groups significance was reached at a 95% confidence level ($p = 0.05$). These were cases cancelled for social reasons, cases cancelled due to insufficient time on the list and DNAs. In the case of insufficient time on the list, the numbers were very small and a Fisher's exact test was required to calculate a p value for this category, as can be seen from the table it was impossible to calculate 95% confidence intervals or relative risk for these figures. Cancellations for social reasons and DNAs were less highly significant than those due to no bed being available.

Table 3: Statistical analysis of cancellation data using Fisher's Exact Test

Reason for Cancellation	95% CI	Relative Risk	p value
No Bed	1.88 to 2.06	1.97	<0.0001
Medical	0.74 to 1.37	1.01	1.000
Procedure not Required	0.42 to 1.20	0.71	0.161
Administrative Error	0.43 to 1.12	0.70	0.104
Social	0.23 to 1.05	0.49	0.024
Insufficient Time	$-\infty$ to ∞	0.00	0.029
Other	0.84 to 2.60	1.47	0.624
DNA	0.33 to 0.95	0.56	0.01
Totals	0.84 to 1.13	0.97	0.765

Discussion

High cancellation rates lead to decreased efficiency and throughput of the day case unit. This in turn has economic implications for the Trust as a whole. It is our aim to target factors, of which we have control, which may influence the number of cancellations. Obviously some factors are harder for us to control than others.

Previous audits in our department had identified a high rate of non-completion of booked cases on the orthopaedic day case lists. It had been our personal observation that capacity was being lost to emergency admissions decreasing the availability of bed space in our unit. This is a common problem as the demand on beds increases ^[2]. The use of ring fencing elective beds has previously been shown to reduce the number of cancellations ^[3].

It is to be expected that during a time of significant upheaval for a department, such as relocation, cancellation rates may rise. We did demonstrate a rise in the number of cancellations due to social factors ($p=0.024$) and DNAs ($p=0.01$). We analysed the recorded reasons for cancellation in each of these cases. If the reason for cancellation was predictable and identifiable at the pre-operative assessment stage the cancellations were included in the administrative errors group for which there was no significant difference. Examples of cases in the social cancellation group included unwell relative or close friend on the day of surgery and recent bereavement. For patients that failed to attend (DNAs) we could not obtain reasons for this in the majority as the patient also failed to attend subsequent follow up appointments. We did also demonstrate a highly significant difference ($p<0.0001$) in the number of

cancellations due to the availability of beds. The same partial booking system was in place for both locations in an attempt to tackle patients failing to attend for surgery.

Our results show that 41.4% of cancellations in our main day case unit for orthopaedic surgery were due to lack of bed availability when there was no ring fencing in place. Day case activity needs to be managed separately from the emergency workload of an acute trust. In an ideal situation day case activity should be functionally separate from other activity in the same hospital. This will allow optimisation of service provision.

If ring fencing had been in place, or there was a separate day case unit during the period 2004 to 2005 we could reasonably expect the cancellation rate to fall from 99 to 58 cases out of the 846 booked. This would result in a cancellation rate of 6.9%, which is a marked improvement on the 11.7% cancellation rate actually seen during this period when beds were not ring fenced.

Our system of partial booking has obviously not managed to eliminate the problem of patients failing to attend for surgery. In one case the “DNA” was due to a patient walking out half way through a list and refusing to wait for surgery. In the remainder of our cases the reason for the DNA was not known and if the patient was sent a follow up appointment, they also failed to attend this. There will always be a proportion of patients that fail to attend for surgery ^[4]. In our system of partial booking, all patients had confirmed they would be attending for surgery. A more robust system could involve contacting patients in the week prior to their surgery. Unfortunately this would have significant administrative and cost implications. It

would also possibly create the situation where patients are cancelled due to being not contactable in the week prior to surgery but subsequently attending.

Conclusion

We feel our data supports the use of ring fencing of elective day case beds in order to improve day case unit efficiency. In a system that fosters an internal healthcare market, factors such as this are likely to become ever more significant in determining the success or failure of an organisation.

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