AMBULATORY SURGERY

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




The Official Clinical Journal of the
INTERNATIONAL ASSOCIATION
FOR AMBULATORY SURGERY

VOLUME 17.2 SEPTEMBER 2011

AMBULATORY SURGERY

VOLUME 17.2

Developments in non-anesthesiologist administered sedation in endoscopic procedures in the Netherlands

Jan H Eshuis

Introduction

All over the world we are seeing an ever-increasing number of medical diagnostic and therapeutic procedures outside the Operating Room, requiring sedation. The procedures often bring pain, anxiety and discomfort to the patient, resulting in poor cooperation from the patient. Suboptimal conditions for the physician as well as for the patient threaten the efficacy of the treatment as well as the safety for the patient. On the other hand stress during the procedure can cause morbidity and even mortality in high-risk patients.

Sedation techniques for these procedures have been described extensively. Anesthesiologists have specific expertise in pharmacologic, hemodynamic, and airway management aspects of sedation. Because in many countries departments of anesthesiology are short-staffed, reimbursement of more anesthesiologists would imply a significant increase in health care costs, and the number of invasive procedures is ever increasing, the need for safe non-anesthesiologist administered sedation became urgent. Traditionally, gastroenterologists use a benzodiazepine and an opioid, while performing their procedure. However, simultaneous performing an endoscopy as well as administering safely sedative medication as well as monitoring the patient is far from optimal. With expanding practice and newer techniques and medications there is a growing need for safe guidelines. Although in a review large numbers of endoscopies with gastroenterologist administered propofol have been declared "safe" by showing a small number of necessary intubations, ventilatory support, deaths or morbidity, questions could be raised about the occurrence of "hidden" morbidity, i.e. hypoventilation masked by normal saturation levels when giving oxygen-enriched air.

In the Netherlands a guideline for non-anesthesiologists on sedation and/or analgesia at remote locations was prepared in 1998 by a multidisciplinary group of specialists, all involved with this type of procedure and sedation. Because only gastroenterologists implemented this guideline by formulating protocols, health care authorities required reformulation and better adherence to this guideline. Instruments such as training, visitations and performance indicators were introduced in the guideline. Anesthesiologists and anesthesiologist-technicians play an important part in the formulation of the sedation guideline.

Traditional role of anesthesiologist-technicians in the practice of anesthesia in the Netherlands

From the beginning of modern anesthesia in the Netherlands (1946) specialized physicians gradually took over the anesthetic care from surgeons and nurses. Inspired by the already existing practice in the UK, formal training for specialized anesthesiologists was commenced. Nurses working in the OR gave support to these physicians. Both groups professionalized and the previous nurse became a well-educated specialized assistant to the anesthesiologist. A three year training course and a considerable well guided practical experience, combined with theoretical courses in physiology, pharmacology, anesthesiology, physics, chemistry, pathology, psychology provide them nowadays with an official diploma. They are well trained in ventilatory support, monitoring, resuscitation, pharmacology and a number of anesthesiologic acts and treatments. They are officially capable of acting in anesthetic patient care under responsibility of, and acting under orders of, the anesthesiologist. Often the latter has to take care of two Operating Rooms, which is only possible by the permanent presence of the anesthesia technician. The anesthesiologist's supervision varies from direct to supervision at a distance. This formal relation is vital for this model as well as for the technician's recently new part in providing sedation.

Role of anesthesiologist-technicians in the practice of sedation by non-anesthesiologists

Anesthesiologists have to participate in the sedation care of higher ASA class patients or patients undergoing complex procedures, while on the other hand take part in the formulation of guidelines for sedation and analgesia by non anesthetic personnel [3] for less complex patients and procedures.

It was in this context that two major teaching hospitals in the Netherlands, Academic Medical Center in Amsterdam and University Medical Center Utrecht decided to institute a training program. It was never the intention that the gastroenterologist or the gastroenterological nurse be the subject for training but rather the anesthesiologist-technician so that the optimal anesthetic influence can be applied into safe sedation practice. This group of trainees comprises a group of paramedical personnel with extensive knowledge of airway management, use of anesthetic drugs and monitoring vital signs. The focus was on skilled anesthesiologist-technicians with at least 5 years experience in their work. In correspondence with literature-based superiority of propofol as a sedative agent, the medicament of choice was propofol. The administrative system was a TCI technique (Target Controlled Infusion). All the experienced students were familiar with TCI-Propofol as an anesthetic agent in the OR. Lectures of two hours duration each were given according to the following schedule:

• Pharmacokinetics en Pharmacodynamics, TCI, Propofol, Alfentanil
• Gastroenterologists view: Endoscopic Procedures, risk, complications perforation, bleeding
• EKG, disturbances and arrhythmias
• Sedation Scoring
• Discharge Criteria and Recovery; Aldrete Score
• Communication, accompanying, support
• EEG and BIS monitoring
• Pulse Oximetry and Capnography during sedation
• Anaphylaxia and Allergic Reactions

• Guidelines on Sedation
• Airway management, oxygen supply in sedation
• Preoperative Screening
• Legal aspects of sedation by anesthesiologist technicians
• Communication and briefing with staff anesthesiologists

In addition, 100 sedation sessions are carried out by the trainees, 50 of them under direct supervision of an experienced tutor-anesthesiologist. Finally the trainee sits for the Sedation Exam.

The candidates are trained for Resuscitation on a yearly basis. If they were successful in the Sedation Exam, the anesthesiologist-technician then is called "Sedationist". They work under remote control of a staff anesthesiologist in the Endo-suite, who is on direct call. The sedationists preassess their patients on their own. They provide sedation care to ASA I and II patients, and occasionally also to stable ASA III. Higher ASA-classes, higher Body Mass Index, especially male, and patients with complex procedures are screened by the anesthesiologist, since these categories are associated with an elevated risk on sedation linked adverse events [4]. Saturation, EKG, Non Invasive BPM ánd capnography by a simple nose sampling system are monitored in every patient. It must be remembered that administered oxygen masks hypoventilation under sedation [5]. All data are stored in the existing Patient Data Management System. Usually TCI is started with the Target on 3–4 mcg/ml Propofol. Moderate sedation level is the target. In painful situations 1:10 diluted Alfentanil solution (50 mcg/ml) is administered. If necessary drugs like Atropine or Efedrine are used. Monitored recovery after the sedation is typically quick and uneventful, with use of an adapted Aldrete discharge criteria list.

This practice has been in existence now for three years. Thousands of patients have been treated during this time. No sedation related complications occurred. Both patients and physicians are very satisfied with this service. Having set this example, the two teaching hospitals are approached with requests from other hospitals to train more sedationists. Also the further skilled anesthesiologist-technicians are very satisfied with their responsibility and their relative independent status.

References

1. Recommendations on the administration of sedation for the performance of endoscopic procedures. A joint statement of a working group from the American College of Gastroenterology (ACG), the American Gastroenterological Association (AGA) and the American Society for Gastrointestinal Endoscopy (ASGE). March 2004. Available at: http://www.acg.gi.org/physicians/nataffairs/trisociety.asp. Accessed on May 10, 2010.
2. Rex DK, Heuss LT, Walker JA, Qi R. Trained registered nurses/endoscopy teams can administer propofol safely for endoscopy. ***Gastroenterology***. 2005; **129**:1384–91.
3. Knape, JTA; Adriaensen, H; van Aken, H; Blunnie, WP; Carlsson, C; Dupont, M; Pasch, T; Working Party on Sedation by non-anaesthesiology doctors: Guidelines for sedation and/or analgesia by non-anaesthesiology doctors. ***Eur J Anaesthesiol*** 2007; **24**:563–7.
4. Coté GA, Hovis RM et al Incidence of sedation-related complications with propofol use during advanced endoscopic procedures. ***Clin Gastroenterol Hepatol*** 2010; **8**:137–42.
5. Fu ES, Downs JB et al, Supplemental oxygen impairs detection of hypoventilation by pulse oximetry. ***Chest*** 2004; **126**:1552–8.

Minimal flow anaesthesia for short elective day case surgery; high vaporiser settings are needed but still cost-effective

M. Lindqvist, J. Jakobsson

Abstract

Aim: This is an observational study conducted in conjunction to the introduction of minimal fresh gas flow at our department. Data around the time to reach 1.2 % end-tidal sevoflurane, vaporiser setting to maintain this Et sevoflurane concentration and sevoflurane consumption at fresh gas flows; 1.0, 0.7, 0.5 and 0.3 L/min during elective day case anaesthesia in spontaneous breathing patients was compiled.

Data from forty ASA 1-2 patients were collected. End tidal sevoflurane concentration of 1.2 vol. % can be reached within 4 minutes when minimal flow anaesthesia is used. Dialed concentrations must however be kept about 2 to 4 times aimed Etsevo concentration still lower amount of sevoflurane is consumed.

Keywords: Day case anaesthesia; Drug; sevoflurane, Low fresh gas flow, cost-effective.

Authors' addresses: DM. Lindqvist, MD, Karolinska Institutet, Institution for Physiology & Pharmacology Department of Anaesthesia & Intensive Care, Karolinska University Hospital, Solna, Sweden.
J. Jakobsson, MD, PhD, Adjunct Professor, Karolinska Institutet, Institution for Physiology & Pharmacology, Department of Anaesthesia & Intensive Care, Danderyds Hospital, Stockholm, Sweden

Corresponding author: Jan Jakobsson *E-mail* Jan.jakobsson@ki.se

Fresh gas composition and flow rate have major influence on the consumption of inhaled anaesthetics. Reducing fresh gas flow has many potential advantages. We have in previous studies evaluated the effect of the composition of the fresh gas flow in day case anaesthesia. The impact on nitrous oxide on the sevoflurane consumption was shown repeatedly, reducing the sevoflurane consumption also when compared to a 1 L/min fresh gas flow [1, 2]. Also the independent effect of reducing the overall fresh gas flow was part of the evaluation in 2 studies, showing reduced sevoflurane consumption with lower flow rates [2, 3].

This is a presentation of data derived during implementation of minimal flow anaesthesia at our department. Time to reached a 1.2% end-tidal sevoflurane concentation, dialed sevoflurane vaporizer settings to maintain 1.2 end tidal concentration during surgery and sevoflurane consumption was compiled.

Methods

Data from fourty ASA 1-2 patients scheduled for elective foot surgery under general anaesthesia during the stepwise implementation of minimal flow, 0.3 L/min was compiled. All patients followed the routines of the department; fasting routines, preoperative information was all in accordance to the standard protocol.

All patients had betamethasone 8 mg intravenous after establishing an intra-venous line and an intravenous induction with propofol and low dose alfentanil. Local anaesthesia in the surgical area and or a peripheral block with lidocaine 10 mg/ml was applied prior to incision and bupivacaine at wound closure in all patients accordance to routines.

Patients were pre-oxygenated with FiO_2 1.0 with 3 L/min by facemask for at least 2 minutes for nitrogen wash-out before induction. After induction a laryngeal mask airway was placed and fresh gas flow set at 1 L./min oxygen. The vaporiser was set at 8 % and the fresh gas was kept at 1 L./min for 1 minutes. After the initial minute fresh gas flow was adjusted, reduced from our previous practice 1 L/min. To 0.7 L/min, 0.5 L/min and last a minimal flow of 0.3 L/min oxygen. Ventilation was assisted after induction when needed but patients were breath spontaneous as soon as possible. The dial vaporiser setting was adjusted in order to achieve an end-tidal sevoflurane concentration of 1.2 vol. %. The end-tidal concentration was kept at 1.2 % sevoflurane throughout the procedure. At wound closure the vaporiser was turned off and removed for weighing. The vaporiser was weighted prior to and after each procedure on a precise scale.

All patients were monitored in accordance with routines: pulse-oximetry; heart rate and oxygen saturation, non-invasive blood pressure. Respiration and gases was monitored with a main-stream multi gas monitor (VEO Multigas Monitor AX+ PHASEIN AB Svärdvägen 15, 182 33 Danderyd, Sweden)

Statistics

These are observational data compiled in conjunction with the implementation of reduced fresh gas flow at our department. All values are given as mean and standard deviation. Differences between groups are analysed by ANOVA, a $p<0.05$ was considered statistical significant. All data and analysis were done on a Macintosh computer with StatView TM SE (Abacus Concepts Inc., Berkeley, CA, USA) software.

Results

The groups did not differ with regard to patient demographics or duration of anaesthesia see Table 1. All surgery and anaesthesia was uneventful and all patients were discharged in accordance to routines within 120 minute after end of anaesthesia.

Mean time to reach Et_{sevo} 1.2 increased with the reduction in the fresh gas flow but it was reached with 4 minutes in all patients (Table 1).

Table 1 Patients' characteristics and main findings.

	FG 0.3 L/min (n=10)	FG 0.5 L/min (n=10)	FG 0.7 L/min (n=10)	FG 1.0 L/min (n=10)
Age (years)	53 ± 10	46 ± 10	46 ± 10	45 ± 9
Weight (kg)	77 ± 9	73 ± 13	72 ± 16	70 ± 15
Sex female/male	6/4	6/4	7/3	5/5
Duration of anaesthesia (min.)	20 ± 8	20 ± 9	19 ± 5	22 ± 9
Time to Reached 1.2 % Et_{sevo} (min.)	3.6 ± .7	2.5 ± .5	1.5 ± .7	1.8 ± .4
Et_{sevo} /Fi_{sevo}	0.7 ± .1	0.7 ± .1	0.7 ± .1	0.7 ± .1
Dialed vaporiser setting/ Et_{sevo}	3.1 ± .5	2.6 ± .3	2.2 ± .5	1.6 ± .1

Et_{sevo} – end-tidal sevoflurane concentration Fi_{sevo} – inspired sevoflurane concentration.

The mean required dialed sevoflurane vaporiser settings increased each step of reduced flow rates (Table 2) and the mean sevoflurane consumption decreased (Table 3). No influence of sex was found (Tables 2 and 3).

Table 2 Dialed vaporiser sevoflurane setting in order to maintain an Et_{sevo} 1.2%.

	Female (n=24)	Male (n=16)	Total (n=40)
FG 0.3 L/min (n=10)	3.8	3.6	3.7
FG 0.5 L/min (n=10)	3.0	3.2	3.1
FG 0.7 L/min (n=10)	2.2	2.4	2.2
FG 1.0 L/min (n=10)	1.9	1.9	1.9
Totals	2.7	2.8	2.9

Table 3 The effects of fresh gas flow and sex on sevoflurane consumed, change in vaporiser weight before and after surgery gr./min.

	Female (n=24)	Male (n=16)	Total (n=40)
FG 0.3 L/min (n=10)	.17	.17	.17
FG 0.5 L/min (n=10)	.22	.22	.22
FG 0.7 L/min (n=10)	.23	.24	.23
FG 1.0 L/min (n=10)	.26	.26	.26
Totals	.22	.22	.22

Discussion

We found fresh gas early institution of minimal flow seemingly efficacious and safe to use during minor routine elective day case anaesthesia in patients breathing spontaneous on a laryngeal mask airway. Our results must of course be put into the perspective of the limited number of patients studied and the fact that all patients were health ASA 1-2 patients undergoing elective short outpatient procedures.

Cost-effective and safe anaesthetic techniques are sought. Inhaled anaesthesia is commonly associated to lower cost that intra-venous techniques. We found in previous studies both sevoflurane and desflurane anaesthesia associated to lower cost compared to intra-venous techniques in minor day case anaesthesia [4, 5]. Also Smith et al found sevoflurane based anaesthesia cost effective; lower drug cost and no difference in emergence or time to discharge compared to propofol based anaesthesia [6]. In clinical routine anaesthetic technique, inhaled or intravenous, has not any major influence on recovery or patients' overall satisfaction [7].

We studied only a 1.2 % end tidal sevolfurane concentraion. It should be acknowledged that all patients studied followed the routine multi-modal pain management program. All patients had a peripheral block and or local anaesthesia infiltration at the surgical site prior to incision and alfentanil propofol co-induction. They also in accordance to the routines at our department had bupivacaine at wound closure and oral paracetamol and NSAIDs right at arrival in the recovery area. Multi-modal analgesia and minimising the opioid use facilitates recovery and is associated to low risk for PONV [8, 9].

We used fresh gas of oxygen only. We did not systematically register inpsired oxygen fraction. In low to minmal flow setting the oxygen fraction will decrease and needs to be closely monitored. The potential benefit of a slightly elevated oxygen fraction on postoperative nausea has been questioned. In the review by Rincón and Valero an effect on vomiting was seen and they concluded: *supplemental oxygen reduces the incidence of postoperative vomiting. Administration of supplemental oxygen could be an effective method of reducing postoperative vomiting* [10]. Orhan-Sungur et al could howveer not document any significant beneficial effect still no negative effects of higher FiO_2 have been seen in the studies evaluated [11].

Our results are in line with a recent French study looking at low flow anaesthesia in a circle system. They conclude "over dosage of dialed setting" is the fastest, reproducible and cheapest strategy to achieve (or to increase) a chosen end-tidal concentration [12]. We used one circle system with CO_2 absorber with the same volume for all patients studied. Dosch et al recently showed that, other than fresh gas flow rate, breathing system volume has the biggest effect on time to equilibrium when the composition of the fresh gas inflow is changed [13]. The risk for formation of toxic metabolites in the carbon dioxide absorbents associated to the administration of sevoflurane with low fresh gas flow has been debated. Recent studies with modern absorbents has however shown reassuringly low such formation [14].

The cost implications of lowering the fresh gas flow may not be seen

as important taking the the very small amounts of liquid sevofluarne consumed per each case into account. The effects should however be ut into the prespective of the annual number of anaesthetic time. It should also be acknowledged that although the halogenated inhaled anaesthetics cause major environmental effects the less amount of halogenated carbon sceleton released into the atmosphere the better [15].

Conclusion

We found lowering the fresh gas flow to 0.3 litre per minute seemingly effective and safe and reduces the sevoflurane consumption during minor routine elective day case anaesthesia in ASA 1-2 patients breathing spontaneously on a laryngeal mask airway vaporiser settings must however be kept 2–4 times aimed end-tidal sevoflurane consentration. This is merely pilot data but we believe that minimising the fresh gas flow is a rational strategy and should be considered for routine use. Further studies are however warranted.

References

1. Jakobsson I, Heidvall M, Davidson S. The sevoflurane-sparing effect of nitrous oxide: a clinical study. ***Acta Anaesthesiol Scand.*** 1999;**43**: 411–4.
2. Ekbom K, Assareh H, Anderson RE, Jakobsson JG. The effects of fresh gas flow on the amount of sevoflurane vaporized during 1 minimum alveolar concentration anaesthesia for day surgery: a clinical study. ***Acta Anaesthesiol Scand.*** 2007; **51**: 290–3.
3. Doolke A, Cannerfelt R, Anderson R, Jakobsson J. The effects of lowering fresh gas flow during sevoflurane anaesthesia: a clinical study in patients having elective knee arthroscopy. Ambul Surg. 2001; **9**: 95–98.
4. Heidvall M, Hein A, Davidson S, Jakobsson J. Cost comparison between three different general anaesthetic techniques for elective arthroscopy of the knee. ***Acta Anaesthesiol Scand.*** 2000 Feb;**44(2)**:157–62.
5. Dolk A, Cannerfelt R, Anderson RE, Jakobsson J. Inhalation anaesthesia is cost-effective for ambulatory surgery: a clinical comparison with propofol during elective knee arthroscopy. ***Eur J Anaesthesiol.*** 2002; **19**: 88–92.
6. Smith I, Terhoeve PA, Hennart D, Feiss P, Harmer M, Pourriat JL, Johnson IA. A multicentre comparison of the costs of anaesthesia with sevoflurane or propofol. ***Br J Anaesth.*** 1999; ***83***: 564–70.
7. Moore JK, Elliott RA, Payne K, Moore EW, St Leger AS, Harper NJ, Pollard BJ, Kerr J. The effect of anaesthetic agents on induction, recovery and patient preferences in adult day case surgery: a 7-day follow-up randomized controlled trial. ***Eur J Anaesthesiol.*** 2008; **25**: 876–83.
8. Bisgaard T, Klarskov B, Kristiansen VB, Callesen T, Schulze S, Kehlet H, Rosenberg J. Multi-regional local anesthetic infiltration during laparoscopic cholecystectomy in patients receiving prophylactic multi-modal analgesia: a randomized, double-blinded, placebo-controlled study. ***Anesth Analg.*** 1999; **89**: 1017–24.
9. Ku CM, Ong BC. Postoperative nausea and vomiting: a review of current literature. ***Singapore Med J.*** 2003; **44**: 366–74. Review.
10. Rincón DA, Valero JF. Supplemental oxygen for the prevention of postoperative nausea and vomiting: a meta-analysis of randomized clinical trials. ***Rev Esp Anestesiol Reanim.*** 2008; **55:** 101–9. Review. Spanish.
11. Orhan-Sungur M, Kranke P, Sessler D, Apfel CC. Does supplemental oxygen reduce postoperative nausea and vomiting? A meta-analysis of randomized controlled trials. ***Anesth Analg.*** 2008; **106**: 1733–8. Review.
12. Quénet E, Weil G, Billard V. Which settings to optimize anaesthetics delivery: fresh gas flow or delivered fraction? ***Ann Fr Anesth Reanim.*** 2008; **27**: 900–8.
13. Dosch MP, Loeb RG, Brainerd TL, Stallwood JF, Lechner S. Time to a 90% change in gas concentration: a comparison of three semi-closed anesthesia breathing systems. ***Anesth Analg.*** 2009; **108**: 1193–7.
14. Ryan SM, Nielsen CJ. Global warming potential of inhaled anesthetics: application to clinical use. ***Anesth Analg.*** 2010; **111**: 92–8.
15. Keijzer C, Perez RS, de Lange JJ. Compound A and carbon monoxide production from sevoflurane and seven different types of carbon dioxide absorbent in a patient model. Acta Anaesthesiol Scand. 2007; **51:** 31–7.

Address of Bertel Haarder, the Danish Minister of Health

Excerpt

"One of the big challenges in our health systems today is the *increasing demand for services from our citizens*. This is partly due to changing demographics – the fact that we all grow older and therefore suffer from more diseases – and partly to the fact that we are able to treat more diseases, and the fact that people want to be treated for things they not necessarily needed to be treated for some years ago. …

"And at the same time we are challenged by low economic growth rates. The overall result is a growing pressure on the health system in all countries. In the future it may not be possible to fulfill all the demands for treatment. We therefore need to find new ways to treat patients e. g. in their own homes or with shorter stay at the hospital.

"One of the ways to meet the challenge is the fact what you are doing in this Association. A substantial move from inpatient stay in hospital for several days to a stay in a Day Surgery unit for a few hours has helped very much to minimize the pressure on the resources in the health care sector.

"One thing that also makes me happy with this congress is to see the multi specialty cooperation not only between medical specialties within surgery and anesthesia but also with nurses and other health professionals from the day surgery facilities. I believe that such a cooperation where the work is done as teamwork and where established ways of doing things are challenged is useful for the whole health service system. …"

Day Case Surgery – Experience from a Nigerian Orthopaedic Hospital

A Ajibade[a], BL Lawson[b], FB Ayeni[a]

Abstract

Aim: To study the scope, rate, safety and problems of general ward-based day case orthopaedic surgery.

Methods: A five-year retrospective review.

Results: Procedures were minor or intermediate. The day case surgery rate, the substitution indices for selected procedures and selected clinical indicators of safety were low. Accidents and emergency beds were used to admit four day cases.

Conclusion: The day case surgery rate can be improved by performing more of the basket of procedures as day cases. The current practice appears safe but was associated with instances of block of Accident and Emergency beds.

Keywords: Day case surgery; Ambulatory surgery; Orthopaedic surgery; Nigeria; Developing country..

Authors' addresses: [a] Department of Clinical Services, National Orthopaedic Hospital, Dala, PMB 3087, Kano, Nigeria.
[b] Department of Orthopaedics, Alhawra Hospital, Umlujj, Kingdom of Saudi Arabia.

Corresponding author: A Ajibade *E-mail* ajifada2@yahoo.com

Introduction

Day case surgery (DCS) is the practice of admitting carefully selected and prepared patients into hospital on the day of operation for a planned, non-emergency surgical procedure and discharging them within hours of that surgery on the same working day [1]. It has been well documented that with proper patient selection and preparation DCS provides high quality, safe and cost-effective surgical care associated with high level of patient satisfaction [1, 2, 3].

In the developing world, the benefits of DCS are being exploited within various surgical specialties despite the suboptimal nature of complementary services [4] and technological development and the prevalence of general ward-based hospital-integrated practice, the least desirable model of DCS organization [5]. Studies of DCS in paediatric surgery [6, 7], plastic surgery [8] and urology [9] have been reported from Nigeria. We are aware of only one study from Nigeria on DCS in orthopaedic practice [10] even though orthopaedic procedures are part of multispecialty reports [3]. It is unlikely that a proper perspective of day case surgery practice in a specialty can be obtained from multispecialty studies.

National Orthopaedic Hospital, Dala, Kano, located in Northwestern zone of Nigeria with about 36 million inhabitants according to the 2006 population census, is a tertiary hospital which serves as a referral centre for the zone, other northern states and the Federal capital territory. This five-year retrospective descriptive study was aimed at evaluating the utilization, scope, safety and problems of day case orthopaedic surgery based on admission of patients into general wards in the hospital.

Methods

Case folders of patients who had day case orthopaedic procedures between January 2006 and December 2010 were retrieved. The total number of elective operations (including day cases) was obtained from the operation registers. Manipulations of congenital talipes equinovarus and removal of external fixators which did not require anaesthesia were excluded as they could have been performed in the out-patient clinic without the need for admission. Such procedures are often excluded for statistical purposes [1].

Patients were assessed and selected for DCS at the outpatient clinic by consultants who initiated requisite preparation. They were accompanied by a responsible adult and admitted on the morning of the procedures into any ward with available beds from where they were taken to theatre. Each operating team used the same table for day cases and in-patients. Day cases were not routinely operated before in-patients. Patients were observed in the theatre recovery room before they were returned to the ward. All patients were discharged from the ward to the care of their escort after senior residents had assessed them and found them fit for discharge.

Data were extracted on age, sex, domiciliary address, evidence of GSM phone documentation, ward used for admission, ASA grade, type of anaesthesia, procedure performed, surgeon's rank, direct admission and re-admission with reasons, complications, mortality and follow-up. Epi Info version 3.5.1 was used for data analysis. Descriptive statistics and tables were used for data presentation. The substitution index was calculated as the percentage of day case surgical intervention in relation to the total number of all surgical interventions (day case and in-patient operations) for some selected procedures [11].

Results

Records of 243 patients were retrieved. Sixty four patients were excluded in accordance with the exclusion criterion, leaving 179 patients comprising 119 (66.5%) males and 60 (33.5%) females. The median age was 25 years (range= 4 weeks – 78 years). One hundred and thirty eight (77.1%) patients lived within one hour's drive from the hospital. GSM phone numbers were documented for 101 (56.4%) patients. Four (2.2%) patients were admitted onto beds in the Accident and Emergency unit of the hospital. The median timing of the first postoperative visit was 14 (range= 0 – 60) days. The median duration of follow-up was 4 weeks (range= 0 – 140) weeks. Thirty seven (20.7%) patients were lost to follow-up.

One patient had manipulation under anaesthesia four times while another had it three times. One hundred and eighty four procedures were therefore done in the 179 patients. Two DCS rates were calculated (Table 1). Table 2 shows the scope of procedures performed: twenty one (11.4%) were performed by consultants; 152 (82.6%), by senior residents; and 11 (5.9%), by junior residents.

Table 1 Orthopaedic DCS rates.

Procedures considered	Number of Procedures	Number of in-patient operations	Total number of elective operations	DCS rate (%)
Procedures included in study only	184	5105	5289	3.48
Included and excluded procedures	248	5105	5353	4.63

Table 2 The scope of day case orthopaedic procedures performed.

Procedure	Number	Percentage
Biopsy	49	26.6
Removal of implants	35	19.0
Closed reduction of fractures and dislocations	17	9.2
Manipulation under anaesthesia	13	7.1
Surgical release	10	5.4
Tendon procedures	10	5.4
Refashioning/Amputation of finger or toe	10	5.4
Open reduction/osteoclasis and Kirschner wire fixation	9	4.9
Bone drilling/curettage/nibbling/decortications	6	3.3
Excision of corn, ganglion, infected callosity, infected bursa, or pyogenic granuloma	5	2.7
Removal of foreign body	5	2.7
Adjustment or removal of external fixator	5	2.7
Wedge excision of toe-nail with bed and matrix	3	1.6
Excision of extral digits	2	1.1
Sequestrectomy	2	1.1
Soft tissue release	1	0.5
Split thickness skin grafting	1	0.5
Partial fibulectomy and Intramedullary tibial nail adjustment	1	0.5
TOTAL	**184**	**100.0**

Biopsy and implant removal accounted for nearly half of the procedures. Chronic leg ulcers, bone and soft tissue tumours, a calcified subcutaneous nodule and an ulcerative mycetoma were biopsied. There were 34 (69.4%) incision biopsies, 14 (28.6%) excision biopsies and one synovial biopsy for suspected tuberculous synovitis in the knee. Table 3 shows the distribution of types of implants removed, indications for surgical release and types of tendon procedures. For some of the procedures presented in Table 3, substitution indices were calculated (Table 4).

Table 3 Implants removed, indications for surgical release and scope of tendon procedures.

Procedure	Number	Percentage
Implants removed		
Kirschner wires	22	62.8
Syndesmotic screws	4	11.4
Plate and screws	3	8.6
Rush nail	2	5.7
Locking screws	2	5.7
Tibial intramedullary nail	1	2.9
Knowles pin	1	2.9
TOTAL	**35**	**100.0**
Surgical Release		
de Quervain disease	6	60.0
Trigger thumb	2	20.0
Trigger thumb and finger	1	10.0
Carpal tunnel syndrome	1	10.0
TOTAL	**10**	**100.0**
Tendon Operations		
Open elongation of tendon Achilles	4	40.0
Percutaneous Achilles tenotomy	4	40.0
Extensor tendon repair for mallet finger	1	10.0
Extensor tendon repair following traumatic rupture	1	10.0
TOTAL	**10**	**100.0**

Table 4 Substitution indices for selected procedures.

Procedure	Day Case Surgery	In-patient surgery	Total elective cases	Substitution index (%)
Removal of plates and screws	3	72	75	4.0
Removal of intramedullary nails	1	19	20	5.0
Elongation of tendon Achilles	4	62	66	6.1
Tendon repair	2	16	18	11.1
Carpal tunnel release	1	3	4	25.0

Most of the patients were ASA I or II. There were 2 ASA III patients: a 30-year old male with chondrosarcoma of the proximal humerus who had incision biopsy done and a 72-year old female with anterior chest wall lipoma who had excision biopsy done. General anaesthesia and local anaesthesia were used for 142 (77.2%) and 40 (21.7%) procedures respectively. One (0.5%) procedure was done under spinal anaesthesia. A Bier's block was done for carpal tunnel release. Propofol was used in 47 (33.1%) of 142 procedures performed under general anaesthesia.

Six patients who had one procedure each required in-patient admission, giving a direct admission rate of 3.3%. Reasons for admission were indebtedness, drowsiness, bleeding from the operation site, and late operation following each of 4 procedures. No reasons were documented for 2 procedures. Four types of complications (Table 5) occurred after 5 procedures, giving a complication rate of 2.7%.

Table 5 Complications of 184 day case procedures.

Complication	Number	Procedure
Wound infection	2	Excisonal biopsy, Incisional biopsy
Wound dehiscence	1	Finger refashioning
Post-operative pain	1	Incisional biopsy
Post-operative surgical site ` 0 bleeding	1	Removal of intramedullary tibia nail
Carpal tunnel release	1	3

Discussion

Biopsy, mainly incision biopsy, was the commonest procedure performed followed by removal of implants. The biopsy rate of 26.6% is similar to the 35% reported by Adewole et al [10] but theirs was predominantly excision biopsy. They reported 2 internal fixations of forearm fractures with plates and screws; only Kirschner wire fixation was done in our study. The scope of orthopaedic procedures is, however, similar in both studies. Some orthopaedic procedures that are not currently being done as day cases in Nigeria include diagnostic and therapeutic knee arthroscopy, discectomy and subacromial decompression. This is likely explained by the limited development of minimal access orthopaedic surgery in the country. There is a need to increase the scope of procedures but not at the expense of safety and quality of care.

We found a DCS rate of 3.48%. Even when we included procedures that are normally excluded for statistical purposes we still obtained a rate of 4.63%. This low rate contrasts markedly with 68.03%, 37.3% and 51% reported from Nigeria for paediatric surgery [7], plastic surgery [8] and urology [9] respectively. A multispecialty study [3] found a rate of 30.4% even though it is unlikely that the subset of orthopaedic specialty in that study would give a DCS rate close to the overall rate. The study by Adewole et al did not include day case orthopaedic surgery rate [10] to which we could compare our result. However, we suspect that orthopaedic DCS rate is low in Nigeria compared to the specialties of paediatric surgery, plastic surgery, and urology.

The substitution indices for removal of plate and screws, removal of intramedullary nail, elongation of tendon Achilles, tendon repair and carpal tunnel release were 4%, 5%, 6.1%, 11.1% and 25% respectively. These results suggest that we can increase our DCS rate, without necessarily increasing the scope of procedures, by increasing the SI for procedures that we currently perform as day cases. For instance, it should be possible to remove most intramedullary nails in the femur and tibia as day cases using small incisions. Similarly, removal of plates and screws may be performed as day cases except in the hip and femur [11] where significant blood loss may occur with the need for volume replacement. Of the procedures, removal of implants (plate and screws, intramedullary nail) and elongation of tendon Achilles have the potential to increase our DCS rate since relatively more of them were performed as in-patient operations.

The stay-in rate, the complication rate and the absence of mortality, unplanned visit to the hospital and readmission within 30 days after operation suggest that DCS as currently practiced in our centre is safe. This may be explained by the minor or intermediate nature of the procedures done and the choice of ASA I and II patients. The nature of the procedures may also explain why most of them were safely performed by senior residents as reported by others [6, 9]. There were only 2 ASA III patients and both had biopsies in locations that are not associated with severe surgical trauma or significant blood loss. The Royal College of Surgeons of England recommended that ASA III patients may undergo only day case urological procedures [12]. It has, however, been noted that carefully assessed and prepared ASA III patients can undergo day surgery [13]. We believe that ASA III patients should be avoided in places where DCS is still infantile except the procedures are minor or intermediate as in our current practice.

Our stay-in-rate of 3.3% is close to the 2-3% recommended by the Royal College of Surgeons of England in 1992[12] but higher than the current average of 1% [14]. Considering the pervasiveness of poverty in the developing world, part payment may occasionally be accepted from patients based on the promise that full payment would soon be made. This may explain the unacceptable observation of indebtedness as a reason for conversion. Late operation could be avoided by having a theatre suite dedicated to DCS or ensuring that day cases are done before noon. Use of propofol could have prevented drowsiness as a cause of conversion. The reasons for conversion are thus largely avoidable and our stay-in-rate could have been lower. This study found a complication rate of 2.7% which falls within the reported complication rates of 0.9% to 13% [4].

Apart from the teaching hospitals in Ife and Jos which have a dedicated unit [9] and a day case ward [3] respectively, the organization of DCS in Nigeria is hospital-integrated and based on general wards as we currently practice in our centre. A criticism of general ward-based DCS is that emergency admission may block day case admission [15]. We found instances of the converse in this study: 4 patients occupied Accident and Emergency beds in order to have DCS. This undesirable block of emergency beds might have arisen because of pressure to admit the patients due to previous cancellations caused by non-availability of beds.

A limitation of this study is the high number of patients lost to follow up. This means that some complications and unplanned visits to other hospitals could have been missed. Some of these patients would probably have required readmission. The extended family system allows patients from distant areas to stay with their relatives in the city to have their procedures [7]. However, transportation problem might prevent presentation for follow up after their return home. Despite the documentation of GSM phone numbers of 56.4% of the patients, there was no evidence that they were called within the first 24 hours after operation. This might also contribute to missing information on the patients who did not present at all after operation. It is not unlikely, too, that patients felt better and did not come back to hospital.

Another limitation is the retrospective nature of this study. This did not allow us to study operation time as well as rate of and reasons for cancellations. These were not documented for most of the patients. Considering the non-complex nature of the procedures, it is likely that mean operation time was less than one hour. However, cancellation rate was likely to have been high because of the model of DCS organization in our centre.

Conclusion

The utilization of DCS can be improved by performing more of the basket of procedures as day cases rather than in-patients. The scope of procedures should be increased only with better organizational model and improvement in technological and surgical competence. While the ideal is a free-standing DCS unit within the hospital, the present practice can be improved by having a ward and a theatre suite dedicated to DCS. Our current practice appears safe despite the use of general wards and theatre suites shared with in-patient surgery. The block of accident and emergency beds by day cases resulting from our organizational model is undesirable.

Declaration

We hereby declare that the paper titled **Day Case Surgery – Experience in a Nigerian Orthopaedic Hospital**, authored by A. Ajibade, BL Lawson and FB Ayeni has not been published or submitted for consideration for publication elsewhere.

Dr A Ajibade

Dr BL Lawson

Dr FB Ayeni

References

1. Castoro C, Bertinato L, Baccaglini U, Drace CA, McKee M. Policy brief – Day Surgery: making it happen. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies, 2007.
2. Fadiora SO, Kolawole IK, Olatoke SA, Adejunmobi MO. Day Case Surgery: Experience in a Tertiary Health Institution in Nigeria. ***West Afr J Med*** 2007; 26(1):24–27.
3. Ojo EO, Ihezue CH, Sule AZ, Dakum NK, Misauno MA. The safety of day case surgery in a developing country. ***The Journal of One-day Surgery*** 2008; **18(1)**:13–18.
4. Ojo EO. Day case surgery and developing countries – A review. ***Niger J Clin Pract*** 2010; **13**:459–66.
5. Roberts L. Day Surgery – National and international from the past to the future. ***J. of Ambulatory Surgery*** 2006; **12**: 143–145.
6. Usang UE, Sowande OA, Adejuyigbe O, Bakare TIB, Ademuyiwa OA. Day case inguinal hernia surgery in Nigerian children: Prospective study. ***Afr J Paediatr Surg*** 2008; **5(2)**: 76–78.
7. Abdur-Rahman LO, Kolawole IK, Adeniran JO, Nasir AA, Taiwo JO, Odi T. Paediatric day case surgery: Experience from a tertiary health institution in Nigeria. ***Ann Afr Med*** 2009; **8(3)**: 163–167.
8. Legbo JN, Opara WEk. Day-care plastic surgery in Nigeria: coping with limited resources. ***Ann Afr Med*** 2005;**4(10)**: 14–18.
9. Sowande OA, Takure AO, Salako AA, Badmus TA, Olajide AO, Banjo OO, Adisa OA. Day Case Urology in a Dedicated Day Case Surgery in a Nigerian Teaching Hospital. ***J of Ambulatory Surgery*** 2009; **15(2)**: 4–6.
10. Adewole OA, Giwa SO, Kayode MO, Shoga MO. Day Case Orthopaedic Surgery in a West African Teaching Hospital. Nigerian Journal of Orthopaedics and Trauma 2008; **7(2)**: 57–59.
11. Calle JE, Parra P, Gomis R, Ramon T, Eustaquio FS. Use of the substitution index to identify improvement opportunities in major ambulatory surgery. ***J. of Ambulatory Surgery*** 2006; **12**: 159–166.
12. Royal College of Surgeons of England. ***Commission on the provision of surgical services. Guidelines for day case surgery***. London: HMSO, 1992.
13. Ansell GL, Montogomery JE. Outcome of ASA III patients undergoing day case surgery. Br J of Anaesth 2004; **92(1)**: 71–74.
14. Deutch N, Wu CL. Patient outcomes following ambulatory anesthesia. ***Anesthesiol Clin North Am*** 2003; **21(2)**: 403–415.
15. Al-fallouji MAR. Day Case Surgery. In: Alfallouji MAR. ed. P***ostgraduate Surgery – The Candidate's Guid***e. Oxford: Butterworth-Heinemann, 2nd Edition, 1998; 118-126.

American Society of Anesthesiologists Advisory:

Granting Privileges for Deep Sedation to Non-Anesthesiologist Sedation Practitioners

In December 2009, the US Centers for Medicare and Medicaid Services (CMS) gave the anesthesia service authority and responsibility to oversee all providers delivering all sedation/analgesia and anesthesia everywhere in the facility. To fulfill this responsibility, the American Society of Anesthesiologists created and adopted the "Statement on Granting Privileges for Deep Sedation to Non-Anesthesiologist Sedation Practitioners" in October, 2010.

ASA believes that anesthesiologist participation in all deep sedation is the best means to achieve the safest care. However, in some US hospitals and ambulatory surgery centers non-anesthesiologist physicians can obtain privileges for deep sedation. This advisory has set high standards of education, training, performance and quality improvement for non-anesthesiologist physicians who may potentially qualify for deep sedation privileges.

The advisory can be downloaded at

http://www.asahq.org/For-Members/Clinical-Information/Standards-Guidelines-and-Statements.aspx

Beverly K. Philip MD

Chair, ASA *Ad Hoc* Committee on
Non-Anesthesiologist Privileging

Day case laparoscopic cholecystectomy in a centre with more than 10 years experience in ambulatory surgery: indications, complications, length of stay, and readmissions

Christian Øystein Thomsen[a], Christina Bording[b], Steffen Jais Rosenstock Rasmussen[c]

Abstract

Aim: To review the results of outpatient laparoscopic cholecystectomy (LC) in a centre with more than 10 years experience of ambulatory surgery.

Methods: Data collected consecutively for one year for all cholecystectomy patients. Patient demography, indications for LC, per- and postoperative complications, grade of surgeon, length of stay and readmission data for patients undergoing LC as an outpatient day case or as an admission.

Results: 201 outpatients vs 117 inpatients in 1 year. 81.6% of outpatients was discharged within the first few hours after surgery. Complicated gallstone disease was associated with higher complication and conversion rates. Re-admission rate was a lower in the outpatient-group (4.0% vs. 6.8%). The complication rate was similar with both experienced and more junior surgeons.

Conclusion: Outpatient day case LC can be performed safely with low complication and conversion rates and by less experienced surgeons under adequate supervision. Approximately 80% of patients can be discharge within a few hours of surgery.

Keywords: Laparoscopic cholecystectomy; Ambulatory surgery; Per- and postoperative complications, Re-admission rate.

Authors' addresses: [a] Department of Surgery Bispebjerg Hospital, Copenhagen University Hospital
[b] Department of Gyn/Obs Hvidovre Hospital, Copenhagen University Hospital
[c] Department of Surgery Hvidovre Hospital, Copenhagen University Hospital

Corresponding author: Christian Øystein Thomsen *E-mail* cothomsen@yahoo.dk

Introduction

Laparoscopic cholecystectomy (LC) was introduced in 1991, and is now considered the treatment of choice for benign gall bladder disease. More than 7000 LCs are carried out annually in Denmark, with most cases performed as day-case procedures. Day-case LC was introduced at the Department of Surgery, Glostrup University Hospital, Copenhagen, Denmark in 1999. Different therapeutic and technical initiatives have been trialled locally to improve outcome and convalescence and shorten length of stay (LOS) [22]. It is unknown, however, if these initiatives have changed the outcomes, i.e. LOS, complications and readmissions.

We reviewed our experience of ambulatory LC over the last 10 years. Patient demography, indications for LC, incidence of per- and postoperative complications, length of stay (LOS), and readmissions for patients undergoing outpatient LC were assessed and compared with patients who had undergone inpatient surgery. Moreover, we examined whether the indications for surgery affected complication rates or LOS.

Patients and methods

Study population

Hospital records at Glostrup University Hospital were reviewed for the surgical procedure code JKA21 (laparoscopic cholecystectomy) and JKA20 (open cholecystectomy) performed over a one year period from May 15th. 2007 to May 14th. 2008. Medical records were retrieved and scrutinized by two authors (CØT and CR). The following data were recorded: sex, age, indication for LC, surgeon details, per- and postoperative complications, LOS, and re-admissions. In all patients the intended treatment was laparoscopic cholecystectomy.

Indication for cholecystectomy

Patients were divided into four groups according to the clinical indications for cholecystectomy.

Group 1: Uncomplicated gallstone diseases: biliary colic with no history of cholecystitis, gallstone pancreatitis or common bile duct (CBD) stones.

Group 2: Gallstone pancreatitis or CBD stones: previous or present gallstone pancreatitis or CBD stones.

Group 3: Cholecystitis: acute cholecystitis or planned LC because of previous incidence of cholecystitis.

Group 4: Other indications: benign gallbladder polyps, previous gallstone ileus, bowel obstruction from gallstones, emergency laparotomy, ERCP complications and causes unknown.

Length of stay (LoS)

LoS was calculated from the day of surgery until the day of discharge. Patients, who were discharged on the day of surgery, were regarded as having been admitted for 0 days. In case of readmission, LoS was calculated as the number of days admitted for the primary procedure plus the number of days of the readmission.

Readmission

Readmission within 30 days of surgery and the LoS of the readmission was recorded.

Complications of cholecystectomy

a) Peroperative complications

Complications recorded preoperatively were:

- Conversion to the open procedure
- Bile duct lesions: defined as accidental injury to the common bile duct, cystic duct or common hepatic duct which required suturing, biliary stenting or reconstructive surgery.
- Bleeding: if estimated blood loss exceeded 500 ml, blood transfusion were given per- or postoperatively, or re-operation for bleeding was necessary
- Bowel lesions were defined as transmural or serosal lesions of the small or large bowel.

b) Postoperative complications

Complications recorded postoperatively were:

- bile leak confirmed by ERCP or MRCP.
- intra Abdominal abscess proven by ultrasound or CT.
- wound complications defined as haematoma or infection requiring antimicrobial treatment or surgical drainage.
- pulmonary complications were defined as X-ray or CT proven pneumonia, pleural effusion, or pulmonary embolism.
- Other complications.

Location of Surgery

Patients for day case surgery were admitted to the Department of Outpatient Surgery (DKA) and those for overnight stay were admitted to the inpatient surgical ward (COP).

DKA opened on weekdays and closed daily at 4.30 p.m. [6]. Patients scheduled for outpatient LC received their operations between 08.00 a.m. and 01.00 p.m. At 3.00 p.m. all patients were examined by the surgeon and discharged, if possible. Patients not ready for discharge were re-examined at 04.30 p.m. and either discharged or admitted to the surgical ward as unplanned overnight admissions.

Patients scheduled for LC at COP consisted of two different groups:

1) patients suffering from gall stone disease requiring surgery within a few days (acute cholecystitis, mild gallstone pancreatitis, or accumulated gall stone symptoms)
2) patients where difficult surgery could be foreseen, patients with severe co-morbidity, patients living alone, or patients who did not speak Danish.

Grade of surgeon

The grade of the operating surgeon in charge was considered a proxy for surgical experience and recorded as resident, senior registrar or senior consultant.

Method of LC

The French LC method was employed where the surgeon stood between the patient's legs. A 12 mm trocar was placed just above the umbilicus. Three 5 mm trocars were positioned in the right lower quadrant, below the xiphoid, and in the upper left quadrant, respectively. Intra Abdominal Pressure was set at 12 mm Hg, and a 5 mm, 30° camera was used. Gentamicin 160 mg was administered intravenously during surgery. The cystic artery and duct were ligated with titanium-clips or Liga-Sure®. The gall bladder was removed via an Endobag through the umbilical wound. Closure of the umbilical wound was performed with Vicryl 2-0 resorbable sutures in the fascia. The skin was closed with nylon 3-0.

Statistical methods

The data was analysed using the programme SPSS ® version 10.0. Sex specific mean (variance) and median values (interquartile range) for age and LoS were calculated and categorized according to surgery site (COP; DKA) and indication for surgery (groups 1-4). Mean and median values were compared with the Student-t test, the Kruskall Wallis and Mann-Whitney U tests.

Proportion (%) of per- and postoperative complications by sex, site of surgery, and indication for surgery was calculated and compared using the $\chi 2$ test. Ninety five percent confidence intervals (CI) for proportions were extracted from the binomial distribution. Level of significance was set at 5%.

Results

Demography

Between May 15th. 2007 and May 14th. 2008, 318 cholecystectomies were performed (Table 1). The majority of cases (n=201) were performed on a day-case basis, while 117 LCs required overnight admission. Mean and median ages were 48.6 and 47.0 years respectively. The median ages for males and females were similar (51.0 and 47.5 years) Patients operated at COP were older than patients operated at DKA (median 52 yrs. vs. median 45 yrs., Kruskall Wallis test p = 0,046). More women than men had surgery (male:female ratio 1:2,2).

Indication for LC

More than half (54.1%) of the LCs were performed for uncomplicated gallstone disease. Of these, 138 of the 172 patients (80.2 %) were day cases (Table 1). Acute cholecystitis accounted for 28 % of the LCs and was the most frequent cause of LC at COP. Of 89 patients who had surgery for cholecystitis, 35 (39, 3%) underwent acute LC. The remaining 54 patients were scheduled for LC after 3 months. Most of these (n=40) were treated as day-case patients at DKA.

Complicated gall stone disease (cholecystitis, CBD stones, and gall stone pancreatitis) was more frequent in males than in females. In patients presenting with gallstone pancreatitis or CBD stones (Group 2), 15.3 % were male and only 9.5% were female and in those presenting with cholecystitis (Group 3) 38.8 % were male and 23.2% female.

Complications

A total of 35 (11%) patients had complications. As some patients had more than one complication, the cumulated number of peroperative and postoperative complications was 43 (13.5 %).

a) Peroperative complications

Eight patients (2.5 %) had a peroperative complication (Table 2), four (2.0 %) in the day surgery (DKA) cohort and four (3.4%) who had overnight admission in COP . Peroperative complications were more common in patients with cholecystitis (6.7% vs. 0.9 %, $\chi 2 = 12.82$, d.f.=3, p = 0.005). One true bile duct lesion involving the CBD and right hepatic duct was seen. The patient was subsequently transferred to a specialist centre for hepato-biliary surgery. Two patients suffered duct damage at the junction of the cystic duct and common bile duct and were managed locally.

b) Postoperative complications

There were 35 postoperative complications in 27 patients (8.5%). Nine patients had more than one complication. Postoperative complications were equally distributed between men and women (7.1% vs. 9.1%, $\chi 2$ test, d.f.=1, p = 0.6). The incidence of postoperative complications was significantly higher in the

Table 1 Indication for LC in 318 Danish adults at Glostrup University Hospital, May 15th 2007 until May 14th 2008.

Cause of Surgery	COP	DKA	Total	Male:female ratio
Group 1: Uncomplicated gallstone diseases n=172 (54.1%)	34 (29.1%)	138 (68.7%)	172	1:3.4 (39/133)
Group 2: Gallstone pancreatitis or CBD stones* n=36 (11.3%)	25 (21.4%)	11 (5.5%)	36	1:1.4 (15/21)
Group 3: Cholecystitis (acute or elective) n=89 (28%)	49 (41.9%)	49 (41.9%)	89	1:1.3 (38/51)
Group 4: Other indications** n=21 (6.6%)	9 (7.7%)	12 (6.0%)	12 (6.0%)	1:2.5 (6/15)
Total	**117 (36.8%)**	**201 (63.2%)**	**318 (100%)**	**1:2.2 (98/220)**

*gallstone pancreatitis (n=15), CBD stones (n=20), gallstone pancreatitis and CBD stones (n=1). **former gallstone ileus (n=1), gall bladder polyps (n=9), emergency laparotomy (n=2), ERCP complication (n=1), unknown cause (n=8).

Table 2a and 2b Per- and postoperative complications in 318 adult Danes who underwent out-patient LC (DKA, 2a) or LC under admission (COP, 2b). n (%)[95 % confidence interval] *.

Table 2a: DKA Per- and postoperative complications.

Peroperative	Group 1: Uncomplicated gallstone diseases n = 138	Group 2: Gallstone pancreatitis or common bile duct (CBD) stones n = 11	Group 3: Cholecystitis (elective) n = 40	Group 4 Other indications n = 12	Total N = 201
Bile duct lesion	-	-	1 (2.5%)	-	1 (0.5%)
Bleeding	-	-	1 (2.5%)	-	1 (0.5%)
Bowel lesion	-	-	2 (5,0%)	-	2 (1.0%)
Postoperative	**-**	**-**	**-**	**-**	
Intra-abdominal abscess	1 (0.7%)	-	-	-	1 (0.5%)
Bile Leakage	2 (1.4%)	-	1 (2.5%)	-	3 (1.5%)
Wound complication (hematoma/abscess)	1 (0.7%)	-	1 (2.5%)	-	3 (1.5%)
Pulmonary complications	1 (0.7%)	-	1 (2.5%)	-	2 (1.0%)
Other**	1 (0.7%)	-	-	-	1 (0.5%)
Total	**6 4.3 % [2.0;9.2]**	**0**	**7 17.5 % [8.8;13.2]**	**1 (8.3%) [1.9;36,0]**	**14 (7.0%) [4.2;11.4]**

admitted patients operated at COP (15.4%) compared with patients undergoing day surgery at DKA (4.5 %) ($\chi 2 = 11.32$, d.f.=1, $p < 0.005$). Likewise, patients with cholecystitis had more complications than other patients (13.5% vs. 6.6%, $\chi 2$ test=5.18, d.f.=1, p = 0.046) as a result of increased numbers of wound infections and intra-abdominal fluid collections (Table 2).

Postoperative bile leakage were reported in 7 (2.2%) of the total of 318 patients and were treated with percutaneous drainage and CBD stenting.

One patient died from their complications (mortality = 0.3%) .

Conversion to open surgery

Seventeen of 318 (5.3%) patients undergoing LC were converted to open surgery. Conversion rates in Groups 1 to 4 were 1.7%, 5.6%, 12.4% and 4.8% respectively. Conversion occurred in 6 patients (3.0 %) undergoing day case surgery in DKA and 11 (9.4 %) in patients admitted to COP. r In patients with cholecystitis, the conversion rate to the open procedure was 14.3% in patients who had acute surgery and 11.1% in patients undergoing planned surgery. Almost one fifth (18.4%) of operations for cholecystitis in men required conversion to open surgery.

Table 2a and 2b Per- and postoperative complications in 318 adult Danes who underwent out-patient LC (DKA, 2a) or LC under admission (COP, 2b). n (%)[95 % confidence interval] *.

Table 2b: COP Per- and Postoperative complications.

Peroperative	**Group 1:** Uncomplicated gallstone diseases n = 34	**Group 2:** Gallstone pancreatitis or common bile duct (CBD) stones n = 25	**Group 3:** Cholecystitis (elective) n = 49	**Group 4** Other indications n = 9	Total N = 117
Bile duct lesion	-	2 (8.0%)	-	-	2 (1.7%)
Bleeding	-	-	1 (2.0%)	-	1 (0.9%)
Bowel lesion	-	-	1 (2.0%)	-	2 (0.9%)
Postoperative	**-**	**-**	**-**	**-**	
Intra-abdominal abscess	-	-	4 (8.2%)	-	4 (3.4%)
Bile Leakage	1 (2.9%)	1 (4.0%)	1 (2.0%)	1 (11.1%)	4 (3.4%)
Wound complication (hematoma/abscess)	1 (2.9%)	1 (4.0%)	3 (6.1%)	1 (11.1%)	6 (5,1%)
Pulmonary complications	-	1 (4.0%)	2 (4.1%)	2 (22.2%)	6 (5,1%)
Other**	-	-	-	-	1 (0.5%)
Total	**2 5.9 % [1.8;19.2]**	**5 20.0% [8.9;39.4]**	**16 32.7 % [21.2;46.7]**	**1 (8.3%) [1.9;36.0]**	**14 (7.0%) [4.2;11.4]**

Grade of surgeon

LCs were distributed equally between the groups of surgeons (residents 31.4%, senior registrars 34.6% and senior consultants 34.0%) with no differences noted in complication rates between groups.

Length of Stay

Median (mean) LoS was 0 (0.86) days at DKA for intended day cases and 2 (5.06) days at COP for admitted patients (Mann Whitney test $p<0.005$, Student-t test $p < 0.05$) (Table 3). No sex difference was seen in LoS.

LoS was longer for patients with complicated gall stone disease (Kruskall Wallis test $\chi 2 = 47.74$, d.f. $=3$, $p < 0.005$). Surgery at COP was associated with longer median LoS than surgery in DKA, regardless of the indication (2 days vs. 0 days LoS :Mann Whitney test, $p < 0.005$).

Thirty-seven of the 201 patients allocated to have day surgery at DKA (18.4%) could not be discharged. Surgical or anaesthesia complications and conversions accounted for 15 admittances. The remaining patients suffered from PONV, or late finishing surgery.

Readmissions

Table 3 LoS (median and mean values, days) after LC, by cause of surgery and site.

Cause of surgery	**Mean (variance) Days**	**Median (IQ-range) Days**	**Mean (variance) Days**	**Median (IQ-range) Days**
Group 1: Uncomplicated gall-stone diseases	2.71 (0-19)	1.5 [1.0 ; 3.0]	0.52 (0-21)	0 [0 ; 0]
Group 2: Gallstone pancreatitis or common bile duct (CBD) stones	4.96 (0-37)	2 [1.0 ; 6.0]	0.09 (0-1)	0 [0 ; 0]
Group 3:	5.88 (1-44)	2 [1.5 ; 6.0]	2.48 (0-21)	0 [0 ; 1.75]
Cholecystitis (acute or elective)	9.78 (0-49)	5 [1.5 ; 10.5]	0 (0-0)	0 [0 ; 0]
Group 4	5.06 (0-49)	2 [1.0 ; 4.0]	0.86 (0-21)	0 [0 ; 0]
Other indications	1 (2.9%)	1 (4.0%)	1 (2.0%)	1 (11.1%)
Total	**1 (2.9%)**	**1 (4.0%)**	**3 (6.1%)**	**1 (11.1%)**

Table 4 Reasons for readmission, by operation site (n/%).

Reason for readmittance	DKA (n=201)	COP (n=117)	Total (n=318)
Pains	3 (1.4%)	1 (0.8%)	4 (1.2%)
Bile Leakage	1 (0.5%)	-	1 (0.3%)
Intra abdominal abscess	-	4 (3.4%)	4 (1.2%)
Wound infection/hematoma	3 (1.4%)	1 (0.8%)	4 (1.2%)
Common bile duct stone	1 (0.5%)	-	1 (0.3%)
Malaise	-	2 (1.7%)	2 (0.6%)
Total	**8 (4.0 %)**	**8 (6.8 %)**	**16 (5.0%)**

Sixteen (5%) patients were readmitted (Table 4) but the readmission was unrelated to location of surgery ($\chi 2 = 1.264$, d.f.=1, $p = 0.29$) or the indication for surgery ($\chi 2 = 2.37$, d.f.=3, $p = 0.49$) .

Discussion

In 1999, LC was implemented as a standard outpatient procedure at Glostrup Hospital. Since then, the number of operations performed has increased steadily, and the setup, logistics and procedures have undergone continuous refinement. We previously reported in 2001 our results for day case LC performed in DKA [6] where the day case rate was 77% with a readmission rate of 5%. This present study confirms that 2/3 of patients with gall stone disease could be handled safely on a day-case basis in our hospital with more than 80 % of patients scheduled for day-case LC discharged as planned, and again only 5% of patients requiring readmission. However our frequency of post-operative complications in 2001 was only 1.5% compared to 5 % in DKA patients in this study [6]. This increase may be explained by a more liberal access to out-patient surgery for patients in ASA III, the inclusion of patients with a previous episode of cholecystitis, and differences in the calculation and recording of post-operative complications. More women than men underwent LC, but complicated gall stone disease was more common in men. The overall complication rate was 13.5% with an incidence of bile duct lesions of 0.9 %. Most postoperative complications were due to infections, and were primarily seen after cholecystitis. Conversion to open surgery occurred in 5.3 %, most commonly in men and in patients with cholecystitis. The longest LoS was seen after complicated gall stone disease.

Over the past decade we have seen a steady increase in the number of LCs performed in our centre and our pathway and operative techniques have evolved to maximize our day case numbers.

Minimizing the surgical and anaesthetic stress response may reduce postoperative pain and PONV (post-operative nausea and vomiting). NSAIDs, acetaminophen, and local skin analgesia are part of the standard procedure in most centres [22]. Preoperative steroid and anti-emetics are widely used and appear to reduce PONV, but a recent Cochrane Review was inconclusive [23]. Preoperative beta blockage reduces the use of opioids and painkillers, but further studies are needed [24]. Gabapentin and intraperitoneal local analgesia do not seem to have any pronounced effect. Providing local anaesthesia is applied to the surgical wounds, the preparation itself does not influence outcome [21,22,25,26]. Development of smaller cameras and instruments has lead to the use of smaller and fewer trocars. More recently the SILS-technique has shown promising results. Propofol has now replaced older drugs, and laryngeal-mask rather than endotracheal intubation is commonly used for day cases in most centres today.

High age, high ASA score, complicated gall stone disease, previous abdominal surgery, drainage, conversion, PONV and high BMI increase LoS after LC [3,7,10,12,14]. High age is not a contra-indication for day case outpatient LC does not contra indicate outpatient LC but may be associated with co morbidities, which may necessitate hospitalization [2,3,4,5].

In this study, LC on COP compared to DKA was associated with longer LoS irrespective of indication for surgery. While this may be explained by differences in co- morbidity and age, a lack of a dedicated ambulatory pathway with inadequate preoperative information and obsolete ward routines may also have extended LoS at our COP inpatient facility.

We found a shorter LoS than previously reported in Denmark [1,3] and a two to six times longer LoS after complicated gall stone disease in accordance with previous reports [7,8]. This difference could be due to more postoperative morbidity and higher rates of conversion [9,10,11].

The finding that 18.4 % of DKA patients could not be discharged has previously been reported [5, 6]. The reasons for this include conversion to the open procedure but in successful LCs the main cause of admission was PONV. It is possible that extending opening hours in DKA may also result in fewer patients being admitted.

Patients with mild gall stone pancreatitis had LC at COP within the first week of the symptoms. Patients with severe gall stone pancreatitis and patients who had ERCP were scheduled for LC in DKA 3 months after the initial attack. The present data suggest that LC can be done in such cases without prolonging LOS, but with a slightly increased risk of complications.

The cumulated number of complications was 13.5%, which is higher than previously reported [2,5,13]. One severe and two minor bile duct injuries (0,9% [0,0;2,0]) were recorded. This is not significantly different from the rate reported in the National Danish Cholecystectomy Database (DGD) (0.6 % in 2006 0.5% in 2008) [1], or in international reports (0.3-1.6%) [1,7,18,19]. Seven cases of bile leakage emerged in the postoperative period and were usually caused by cystic duct leakage. Method of ligation (Ligasure vs. clips) did not seem to affect the rate of leakage [30].

The use of abdominal drains for bleeding, bile spillage or contamination, was not considered a complication. Drains prolong LoS and increase the risk of pain and infection [14,15]. No scientific evidence supports the use of drains unless a bile leak is suspected. In this study only 5 of 30 drains inserted were for that reason.

No sex difference was seen in complications rates. Other studies have, however shown more complications in males [2,3,9,20] and after complicated gallstone disease [2,7,8,9,10,11].

Less experienced surgeons did not appear to have more complications than more experienced operators. A possible explanation may relate to an experienced surgeon being summoned for help by the junior in difficult cases with the experienced surgeon then being registered as the operating surgeon.

Conversion to open surgery was performed in 5.3% (national rate 8%, international rate 1.5% -10%) with higher rates in cholecystitis (8-32%) [1,9,10,11,12,27,28,29]. In this study conversion rates in cholecystitis patients were slightly lower in scheduled LC than in acute LC. Moreover, almost 1/5 of men with cholecystitis underwent open cholecystectomy. Other studies have shown that conversion rates are not increased if surgery is postponed until acute cholecystitis has ceased [11,13]. Timing of LC in these cases is difficult and future studies should assess whether earlier or later surgery may lower conversion rates.

Patients suspected of CBD stones all had a preoperative ERCP/ MRCP or per-operative cholangiography. The low number of readmission due to CBD stones (n=1) implies that this preoperative work up is sufficient in most gall stone patients.

In conclusion, the outcome of LC in this department seems to match the results of both national and international centres. LC can be performed safely by younger surgeons under adequate supervision and as an out-patient day case procedure with low complication and conversion rates. Surgery for complicated gall stone disease should warrant extreme caution due to a higher risk of complications.

Improved patient information, focused treatment of the side effects of anaesthesia and surgery may contribute to lower LoS and Fast-Track regimens for patients undergoing LC under admission may contribute to lower LoS and the rate of readmissions. Randomized studies should focus on the impact of the timing of surgery in complicated gall stone disease.

Conflicts of interest: None

References

[1] Årsrapport. Dansk Galde Database 2007 og 2008.

[2] Giger U, Michel J et al. Risk Factors for Perioperative Complications in Patients Undergoing Laparoscopic Cholecystectomy: Analysis of 22953 Consecutive Cases from the Swiss Association of Laparoscopic and Thoracoscopic Surgery Database. ***J Am. Coll Surg*** 2006 Nov; **203(5)**: 723–728.

[3] Carbonell AM, Lincourt AE et al. Do patient hospital demographics predict cholecystectomy outcomes? A nationwide study of 93578 patients. ***Surg endosc*** 2005 May; **19**: 767–773.

[4] Rathore MA, Andrabi SIH et al. Day case laparoscopic cholecystectomy is safe and feasible: A case controlled study. ***Int Jour of Surg*** 2007; **5**: 255–259.

[5] Psaila J, Agrawal S. Day-surgery laparoscopic Cholecystectomy: Factors Influencing Same-Day Discharge. ***World J Surg*** 2008; **32**: 76–81.

[6] Kristiansen VB, Trap R et all. Laparoskopisk kolecystektomi i dagkirurgisk regi. Ugeskr Læger 2001; **163(47)**: 6576–6579.

[7] Simopoulos C, Botaitis S et al. The Contribution of Acute Cholecystitis, Obesity, and Previous Abdominal Surgery on the Outcome of laparoscopic cholecystectomy. ***The American Surgeon*** 2007 April; ***73***: 371–376.

[8] Borzellino G, Sauerland S et al. Laparoscopic cholecystectomy for severe acute cholecystitis. A meta-analysis of results. ***Surg Endosc*** 2008; **22**: 8-15.

[9] Pavlidis T, Marakis G et al. Risk Factors Influencing Conversion Of Laparoscopic to Open Cholecystectomy. ***Jour of Laparoendoscopic & Advanced Surgical Techniques*** 2007; **17(4)**: 414–418.

[10] Livingstone E, Rege R. A nationwide study of conversion from laparoscopic to open cholecystectomy. The American Jour of Surgery 2004; **188**: 205–211.

[11] Tang B, Cuschieri A. Conversions during Laparoscopic Cholecystectomy: Risk Factors and Effects on Patient Outcome. Review Article. ***Jour of Gastrointestinal Surgery*** 2006; **10(7)**: 1081–1091.

[12] Rio P, Dell'Abate P et al. Videolaparoscopic Cholecystectomy for Acute Cholecystitis: Analyzing Conversion Risk Factors. ***Jour of Laparoendoscopic & Advanced Surgical Techniques*** 2006; **16(2)**: 105–107.

[13] Tan J, Suyapto D et al. Prospect audit of Laparoscopic cholecystectomy experience at a secondary referral centre in South Australia. ***ANZ J. Surg*** 2006; **76**: 335–338.

[14] Tzovaras G, Liakou P et al. Is there a role for drain use in elective laparoscopic cholecystectomy? A controlled randomized trial. ***Am J Surg.*** 2009 Jun; **197(6)**:759–63.

[15] Gurusamy KS, Samraj K et al. Routine abdominal drainage for uncomplicated laparoscopic cholecystectomy. ***Cochrane Database Syst Rev.*** 2007 Apr; **18 (2)**:CD006003.

[16] Triantafyllidis I, Nikoloudis N et al. Complications of laparoscopic cholecystectomy: our experience in a district general hospital. ***Surg Laparosc Endosc Percutan Tech.*** 2009 Dec; **19(6)**: 449–58.

[17] Karvonen J, Gullichsen R et al. Bile duct injuries during laparoscopic cholecystectomy: primary and long-term results from a single institution. Surg. Endosc 2007; **21**:1069–1073.

[18] Malik A, Laghari A et al. Iatrogenic biliary injuries during laparoscopic cholecystectomy. A continuing threat. ***International Jour of Surgery***. 2008; **6**: 392–395.

[19] Ou Z, Li S et al. Prevention of common bile duct injury during laparoscopic cholecystectomy. ***Hepatobiliary Pancreatic Dis Int.*** 2009 Aug; **8(4)**: 414–417.

[20] Dolan J, Diggs B et al. The national mortality burden and significant factors associated with open and laparoscopic cholecystectomy: 1997-2006. ***Jour of Gastrointestinal Surgery*** 2009 Dec; **13(12)**: 2292–2301.

[21] Zimmer PW, McCann MJ et al. Bupivacaine use in the Insuflow device during laparoscopic cholecystectomy: results of a prospective randomized double-blind controlled trial. ***Surg Endosc.*** 2010 Jul; **24(7)**:1524–1527.

[22] Bisgaard T, Rosenberg J et al. Treatment of early pain after laparoscopic cholecystectomy. ***Ugeskr Læger*** 2005; **167(24)**: 2629–2632.

[23] Carlisle J, Stevenson CA. Drugs for preventing PONV. ***Cochrane Database for systemic Reviews*** 2006 Issue 3. Art.No. CD004125

[24] Collad V, Mistralletti G et al. Intraoperative Esmolol infusion in the absence of opoids spares postoperative fentanyl in patients undergoing ambulatory laparoscopic cholecystectomy. ***Anesth Analg.*** 2007 Nov; **105(5)**: 1255–1262.

[25] Peng PW, Li C et al. Use of low-dose pregabalin in patients undergoing laparoscopic cholecystectomy. Br J Anaesth. 2010 Aug; 105(2): 155-165

[26] Gilron I, Orr E et all. A randomized, double-blind, controlled trial of perioperative administration of gabapentin, meloxicam and their combination for spontaneous and movement-evoked pain after ambulatory laparoscopic cholecystectomy. ***Anesth Analg.*** 2009 Feb; **108(2)**: 623–630.

[27] Harboe KM, Bardram L et all. The quality of cholecystectomy in Denmark: outcome and risk factors for 20,307 patients from the national database. S***urg Endosc.*** 2010 Dec 7. [Epub ahead of print]

[28] Hussain A, Masannat Y et all. Conversion after laparoscopic cholecystectomy in England. Surg Endosc. 2009 Oct; 23(10): 2338–2344.

[29] Zehetner J, Leidl S et all. Conversion in laparoscopic cholecystectomy in low versus high-volume hospitals: is there a difference? ***Surg Laparosc Endosc Percutan Tech.*** 2010 Jun; **20(3)**: 173–176.

[30] Schulze S, Damgaard B et al. Cystic duct closure by sealing with bipolar electrocoagulation. JSLS 2010 Jan–Mar;14(1):20-2. Epub 2010 Apr 21.

International articles on Ambulatory Surgery

Jost Brökelmann (Germany), Ian Jackson (UK): IAAS Executive Committee Members

In this section we will highlight some of the many articles published internationally on topics around ambulatory surgery.

Please send details of any articles you feel should be included via webmaster@iaas-med.com.

Increase in outpatient knee arthroscopy in the United States: a comparison of National Surveys of Ambulatory Surgery, 1996 and 2006. Kim S, Bosque J, Meehan JP, Jamali A, Marder R. *J Bone Joint Surg Am.* 2011 Jun 1;**93(11)**: 994 –1000.

Message: Between 1996 and 2006 the number of knee arthroscopies increased by 49 %. 99 % of arthroscopic procedures were performed in an outpatient setting. In 2006 the knee arthroscopy rate in the United States was more than twofold higher than in England or Ontario, Canada.

Patients' assessment of 4-week recovery after ambulatory surgery. Brattwall M, Warrén Stomberg M, Rawal N, Segerdahl M, Jakobsson J, Houltz E. *Acta Anaesthesiol Scand.* 2011 Jan;**55(1)**:92–8.

Message: 335 patients filled out a questionnaire recording pain pre- and postoperatively. Procedures done were inguinal hernia repair (IHR), arthroscopic procedures (AS) and cosmetic breast augmentation (CBA). Pain and mobility impairment were procedure-specific up to 4 weeks post-operatively.

Stress responses in medical students in ambulatory and in-hospital patient consultations. Pottier P, Hardouin J, Dejoie T, Bonnaud A, Le Loupp A, Planchon B, Leblanc Vicki. *Med Educ.* 2011 Jul;**45(7)**:678–87.

Message: For medical students consultations were more stressful in ambulatory than in the more familiar in-hospital setting. Women showed greater subjective stress levels than men, whereas men exhibited greater physiological stress levels. Further studies should explore the effects of these stress responses on the diagnostic skills of students.

Randomized clinical trial comparing ambulatory and inpatient care after inguinal hernia repair in patients aged 65 years or older. Mattila K, Vironen J, Eklund A, Kontinen VK, Hynynen, M. *Am J Surg.* 2011 Feb;**201(2)**:179–85.

Message: Open inguinal hernia repair was performed on 151 patients 65 years and older. After excluding patients because of lack of postoperative company (16%), unwillingness to participate (13 %) and medical conditions (10 %) all outpatients were discharged home as planned and none was readmitted to the hospital. Ambulatory surgery was safe and well accepted by older, medically stable patients.

Day surgery unit thoracic surgery: the first UK experience. Ghosh-Dastidar MB, Deshpande RP, Rajagopal K, Andersen D, Marrinan MT. *Eur J Cardiothorac Surg* 2011;**39**:1047–1050.

Message: Between 2007 and 2009 98 patients underwent thoracic surgery (mediastinoscopy, lung biopsies and others). 3.1 % were hospitalized right after surgery, 3.1 % after discharge. There were no deaths. Thoracic surgery can be performed safely and effectively as day surgery procedures.

Performance of open renal and bladder surgery at a freestanding pediatric surgery center. Stewart AF, Smith DP. *J Urol.* 2011 Jul;**186(1)**:252–6

Message: 343 open renal and bladder procedures were performed by a pediatric urologist between 2003 and 2009. 4 children had to be hospitalized within 48 hours. Thus nephrectomy, pyeloplasty and ureteral reimplantation seem to be excellent outpatient procedures for most children.

Stapled hemorrhoidopexy as a day-surgery procedure. Cosenza UM, Masoni L, Conte S, Simone M, Nigri G, Mari FS, Milillo A, Brescia A. 2011

Message: 292 hemorrhoidopexies were performed under spinal or local anesthesia. Mean surgery time was 18 miutes. The complication rate is comparable to that of inpatient procedures. Thus stapled hemorrhoidopexy is a safe and effective procedure also in a day-surgery unit.

Infection rate and risk factor analysis in an orthopaedic ambulatory surgical center. Edmonston DL, Foulkes GD. *J Surg Orthop Adv.* 2010 Fall;**19(3)**:174-6

Message: Over 11,000 consecutive orthopaedic surgeries were monitored for surgical site infections (SSI) over 5 years. The overall infection rate was 0.33%. Surgery time and duration of anesthesia administration were also associated statistically with SSI.

Abdominal myomectomy – a safe procedure in an ambulatory setting. Thomas, Robin L. *Fertility and sterility.* November 2010; **94(6)**: 2277–2280

Message: efficacy and safety of minilaparotomy myomectomy was to be evaluated in an ambulatory setting. One hundred eighty-nine women desiring fertility with symptomatic uterine leiomyomata were treated by minilaparotomy myomectomy. Mean operative time was 73 minutes. On average, patients required 3.5 hours of recovery time. Thus, minilaparotomy myomectomy can be accomplished in an outpatient setting with minimal blood loss, fast recovery time, and a low complication rate.

Systematic review of day surgery for breast cancer. Marla, S, Stallard, S. *International Journal of Surgery*. 2009; **7 (4)**; 318–323

Message: Day surgery for breast cancer is safe, with equivalent complication rates. However, there is lack of evidence from randomised controlled trials. Patient satisfaction and psychological well-being is high. This needs to be confirmed by patient questionnaires.

Quality of recovery from two types of general anesthesia for ambulatory dental surgery in children: a double-blind, randomized trial. König MW, Varughese AM, Brennen KA, Barclay S, Shackleford TM, Samuels PJ, Gorman K, Ellis J, Wang Y, Nick TG. *Paediatric Anaesthesia*. 2009 Aug;**19(8)**:748–55

Message: The aim of the study was to compare a sevoflurane-based anesthetic with a propofol-based technique. 179 pediatric patients were scheduled for ambulatory dental surgery using a double-blind and randomized trial design. The use of sevoflurane significantly increased both the risk of PONV and the number of postoperative nursing interventions. In contrast, a propofol-based anesthetic technique did result in significantly less PONV and fewer postoperative nursing interventions.

Three concentrations of levobupivacaine for ilioinguinal/iliohypogastric nerve block in ambulatory pediatric surgery. Disma N, Tuo P, Pellegrino S, Astuto M. *J Clin Anesth.* 2009 Sep;**21(6)**:389–93.

Message: The postoperative analgesia of three different concentrations of levobupivacaine was compared in children undergoing inguinal hernia repair (ilioinguinal/iliohypogastric(II/IH) block). A nerve block using 0.4 mL/kg of 0.25% levobupivacaine provided satisfactory postoperative pain relief after inguinal herniorraphy.

Suprapubic catheter insertion is an outpatient procedure: cost savings resultant on closing an audit loop. Khan A, Abrams P. *BJU Int.* 2009 Mar;**103(5)**:640–4

Message: An outpatient procedure of inserting a suprapubic catheter (SPC) is safe and feasible in most patients, and its widespread use would produce considerable cost savings.

Day surgery in Finland: a prospective cohort study of 14 day-surgery units. Mattila K, Hynynen M; Intensium Consortium Study Group. *Acta Anaesthesiol Scand.* 2009 Apr;**53(4)**:455–63

Message: At present, day-surgery accounts for approximately 50% of elective surgery in Finland. Finnish public hospitals have succeeded in providing good-quality care, and there still seems to be potential to increase the share of day surgery.

What specialties perform the most common outpatient cosmetic procedures in the United States? Housman TS, Hancox JG, Mir MR, Camacho F, Fleischer AB, Feldman SR, Williford PM. *Dermatol Surg.* 2008 Jan;**34(1)**:1–7

Message: The percentage of cosmetic procedures performed in an outpatient setting was as follows: dermatology (48%), plastic surgery (38%), general surgery (>4%), otolaryngology (>3%), ophthalmology (>3%), facial plastic surgery (1%), family practice (<1%), pediatrics (<1%), and internal medicine (<1%). Most cosmetic procedures were performed on white, female patients in the 40- to 59-year-old age group. Chemical peels and soft tissue fillers were the two most common procedures.

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

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

Submission of Articles

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

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

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

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