

Trends in day surgery in the Netherlands

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Trends in day surgery in the Netherlands

Trends in chirurgische dagbehandeling in Nederland
(met een samenvatting in het Nederlands)

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1

Introduction

Developments in hospital care

Medical care in hospitalised patients has been subject to major changes during the last century. Since the nineteenth century, bed rest was a substantial part in the treatment of many diseases.¹⁻⁵ At that time, the Dutch hospital was also called a “bed house,” and the physician’s status and earnings were highly dependent on the number of available beds.

During the twentieth century, evidence emerged that bed rest had no benefit at all and might even be harmful for most conditions.¹⁻⁶ Prolonged immobilisation was now considered to have negative effects on the circulatory system, pulmonary function, and oxygen uptake, and to cause muscle atrophy, osteoporosis, constipation, and a high risk of deep venous thrombosis, pneumonia, and pressure ulcers. One became gradually convinced that patients—unless severely ill—should be stimulated to mobilise rather than be confined to bed.

With this insight, the indications for clinical admission to the hospital became narrower. Furthermore, in the 1980s, the Dutch government pursued a policy of reduction of the total number of beds and centralisation of hospital care in fewer hospitals of bigger size by fusions and liquidation of small hospitals.^{7,8} Day care was a solution to provide medical care for the same number of patients using fewer beds. In addition, the ongoing rise of costs in medical care necessitated more efficient use of available hospital beds. Today, many diagnostic and therapeutic procedures, such as colonoscopy, treatment of deep venous thrombosis, and administration of chemotherapy, take place without hospitalisation.

Developments in perioperative care

In the beginning of the twentieth century, perioperative care was based on many ancient beliefs about wound care, postoperative diet, and mobilisation, among others.⁹ Surgical procedures were more extensive without the modern attributes such as electrocautery. Anaesthesia had more side effects; vomiting was very common after any surgical procedure.

After inguinal hernia repair, patients were confined to bed for at least 11 days and restraint from work for 8 to 12 weeks was advised, whereas the care after appendectomy consisted of keeping a patient in Fowler’s position, gastric lavage, duodenal drainage, frequent enemas with

turpentine, the use of stupes, complete abstinence of food and fluid by mouth, and adequate rest at night. After abdominal surgery, there were “those of the radical school who encouraged the patient to get up as soon as the sutures are removed,” and “those of the conservative school who would not allow a patient up until after 16-24 days.”⁹

The increasing popularity of evidence-based medicine and improvements in surgical and anaesthesiology techniques resulted in the abandonment of numerous old habits in the perioperative care of surgical patients. Bed rest after surgery was found to be associated with a delay in the convalescence due to previously mentioned factors without preventing complications, as was thought before, so the duration of immobilisation was shortened considerably. The use of drains, urine catheters, and gastric tubes could be omitted or their application shortened.¹⁰⁻¹² Preoperative starvation and bowel preparation did not contribute to recovery after surgery or the prevention of complications,¹³⁻¹⁵ and there was no reason to withhold early nutrition after surgery.^{16,17} Furthermore, there was no evidence for the prolonged use of intravenous antibiotics after abdominal surgery.

Meanwhile, anaesthesiology techniques improved with the use of shorter acting anaesthetics, better prevention and control of postoperative nausea and vomiting, and more effective pain management. A good example of the clinical implementation of these changes in perioperative care is the multimodal fast track program after colorectal surgery that was first described by Kehlet and now has been increasingly adopted in clinical practice in Western countries.¹⁸⁻²⁰

The shorter perioperative hospitalisation time entailed a shift of the place where information and medical care were provided from hospital ward to outpatient clinic. Clinical pathways were designed for various diseases where patients could get a faster diagnosis with fewer and shorter hospital visits for investigations and treatment.

Day surgery

In light of these developments and the need for an efficient use of hospital beds in times of shortage, day surgery became popular and showed a quantitative and qualitative increase, with more extensive procedures being performed in patients of older age who had more comorbidity. Procedures were considered suitable for day surgery when

the operation time was less than 60 minutes, when the postoperative course was predictable with a small risk of postoperative haemorrhage, and when postoperative pain and nausea could be controlled outside the hospital. With a higher volume of performance, the predictability of outcome of a specific procedure in a specific centre grew. Among the interventions commonly performed as day cases were inguinal hernia repair, varicose vein stripping, and cataract surgery.²¹ With the introduction of laparoscopic surgery, formerly more extensive operations such as cholecystectomy²²⁻³³ and Nissen fundoplication³⁴⁻³⁹ were reported to be safe and feasible as day surgery procedures.

In addition, anaesthesiology techniques were further tailored to day case procedures. The main issue in ambulatory anaesthesia was the safety of discharging the patient after a short postoperative observation period, which was studied for many different procedures and in many settings. The incidence of reported death and major morbidity associated with day surgery was extremely low.⁴⁰⁻⁴²

Besides warranting safety, anaesthesiology techniques were also focused on the patient having a rapid and clear-headed emergence as well as on preventing postoperative pain, nausea and vomiting, and other side effects such as shivering and headache.²¹ Because of these qualities, many now consider propofol to be the cornerstone of modern ambulatory general anaesthesia. Others advocate that locoregional techniques seem to have good potential in day surgery, although some controversy exists about the risk of urine retention and prolonged leg paralysis.²¹ New challenges have included day surgery in elderly patients and in morbidly obese patients.⁴³⁻⁴⁶

Day surgery in the Netherlands

The first day surgery unit for children's tonsillectomies in the Netherlands was opened in Haarlem in 1973, and the first general day surgery unit opened 5 years later in Zwolle.⁴⁷ After that, many hospitals followed. Unlike in some other countries, the Netherlands had no hospital-associated hotels, so that prolonged care after day surgery was not possible. With the budget system that was implemented in 1983, day surgery remained financially unattractive for hospitals, whereas short-stay admission for relatively simple procedures was more rewarding. Financial compensation for the same procedure during two clinical

admission days (with an overnight stay) was approximately five times more than that for one-day surgery.

In 1994, the Nederlandse Vereniging voor Dagbehandeling en Kortverblijf (NVDK), Dutch Association of Day Surgery and Short Stay, was founded. It joined with many other national day surgery associations in 1995 to form the International Association for Ambulatory Surgery (IAAS), with the purpose of promoting the development of high-quality day surgery programmes. Thereafter, international databases were formed, a journal called *Ambulatory Surgery* was published, and seminars and conferences were organised.

Outline of this thesis

The main theme of this thesis is the development of day surgery in the Netherlands and the current state of some related clinical issues. Studies in this thesis will address the following questions:

1. Which quantitative and qualitative developments of day surgery can be observed in the Netherlands during the last decades?
(chapter 2 and 3)
2. What is the current quality of day surgery? **(chapter 4)**
3. Is day surgery feasible in morbidly obese patients? **(chapter 5)**
4. What is the application of thrombosis prophylaxis in day surgery and what evidence exists for the need of prophylaxis?
(chapter 6)
5. What is the course of postoperative activity resumption after day surgery? **(chapter 7)**

The following studies are conducted to answer these questions.

In **chapter 2**, the early developments from 1984–1995 of day surgery in the Netherlands are described. Differences between hospitals are analysed based on seven specific day surgery interventions and a future perspective is formulated. **Chapter 3** is a sequel to chapter 2, where further developments from 1996–2004 are shown.

In **chapter 4**, during 1 year the quality of day surgery in a Dutch teaching hospital is illustrated by the number of complications, unplanned admissions and readmissions, and patient satisfaction.

In **chapter 5**, the feasibility of day surgery in morbidly obese patients

who undergo laparoscopic gastric banding is examined and compared with those who are admitted overnight.

Chapter 6 focuses on the use of thrombosis prophylaxis in day surgery patients by Dutch surgeons and gynaecologists; an overview of current literature is given.

In **chapter 7**, resumption of postoperative activity is measured by an accelerometer. Patients stimulated to fast mobilisation after a regular laparoscopic cholecystectomy in day surgery are compared with those who are not encouraged to resume regular activities.

In **chapter 8** the results are summarised and the content of this thesis in general is discussed.

Finally, a summary in Dutch is provided in **chapter 9**.

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2

Growth potential of ambulatory surgery in The Netherlands; developments 1984-1995

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Abstract

Day surgery is becoming increasingly popular in the Netherlands. In this study the quantitative developments of day surgery are assessed and further potential growth in the future is calculated.

Methods Numbers of admissions in the period 1984-1995 were obtained from a national data base of the National Hospital Institution (NZi). From SIG Health Care Information numbers were obtained with regard to seven specific interventions in the years 1991-1995, i.e. breast tumour excision, inguinal hernia repair, varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract surgery and tonsillectomy. The potential further increase if any of the number of interventions in day surgery was determined by placing the hospitals in order of decreasing proportions of day care, and subsequently applying the proportions of the 5th and 10th hospital, respectively, to the whole group.

Results The number of day care admissions increased from 172,000 (9,9% of all admissions) to 649,000 (29,1%). Of all seven studied interventions the percentage carried out in day surgery increased, but the percentages varied greatly from one hospital to another. In 1995, the mean number of these interventions in day care was 115,000 (57% of all 201,000 interventions). The shift from clinical interventions to day surgery would be 42,000 and 51,000 (21% and 25% of 201,000), respectively; day care operations would then amount to 166,000 (83%) and 157,000 (78%).

Conclusion Day surgery increased in quantity as well for all hospital admission as for seven specific procedures in the Netherlands. In view of intra- and inter-hospital differences a considerable increase in day surgery is possible in the near future.

Introduction

Various interpretations of daycare exist: it may be defined as an office procedure, e.g. the removal of a sebaceous cyst, or a hospital stay of less than 24 hours for any given intervention. In the Netherlands the National Advisory Board on Intramural Health Care Planning and Building formulated the following definition: day-care is hospital care during several hours, which is generally available and necessary, for a diagnostic procedure or treatment by a medical specialist.¹ Along this definition ambulatory surgery is the hospital care which a patient receives, who undergoes a surgical procedure and is admitted to and discharged from the hospital on the same day. It is not just the procedure itself.

The history of ambulatory surgery in The Netherlands started in 1973 with the introduction of children's tonsillectomies at the Maria Hospital in Haarlem. The first day center was established at "De Weezenlanden" Hospital in Zwolle in 1975. Since then the majority of Dutch hospitals followed.

The objective of this study is to assess the quantitative development of ambulatory surgery in The Netherlands using national databases. In addition, further growth potential is calculated in two scenarios based on seven commonly performed operations in Dutch hospitals.

Methods

The number of all clinical and daycare admissions in the period 1984-1995 in The Netherlands were obtained from the database of the National Institute for Health Care Management (NZi). The average hospital stay per year was calculated for both daycare and clinical admissions and for clinical admissions only.

After 1990 data became available of specific procedures performed either as ambulatory surgery or as in-hospital surgical procedure. These data were obtained from SIG Health Care Information in Utrecht for the period 1991-1995. Seven specific operations were selected including breast tumour excision, inguinal hernia repair, varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract surgery and tonsillectomy. In the case of inguinal hernia repair and tonsillectomy, patients with an age < 15 years were classified in a distinct group from those > 15 years old. Subsequently, the fraction of these seven interventions, which was performed in day surgery, was calculated for each year and for all 130 Dutch hospitals.

In the year 1995 similar fractions were calculated for each hospital separately. For privacy reasons these individualised data were not reducible to the hospitals. In this way it was possible to study the differences between the proportions of day surgery for each of the seven procedures within one hospital and to compare it with other hospitals. Finally, the growth potential of day surgery of the seven interventions was calculated using two scenarios. The proportions of day surgery exhibited by the hospitals ranked fifth (scenario 1) and tenth (scenario 2) in decreasing order of proportion of day surgery, were assumed to be attainable for all of the hospitals in the Netherlands. The growth potential for every intervention was determined by calculating how many interventions would be performed in day surgery if all hospitals would operate the same percentage day surgery as was found in scenario 1 or 2

Results

The total number of admissions in The Netherlands increased with 27.4% from 1.75 million in 1984 to 2.23 million in 1995. The number of daycare admissions increased from 172,000 (9.9 % of all admissions) to 649,000 (29.1 %) (figure 1).

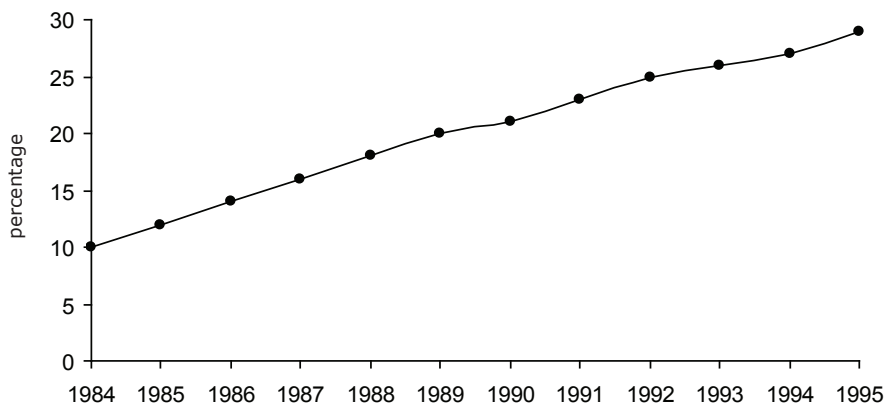


Figure 1: Percentage day care of all admissions in the years 1984 - 1995. (Source: National Institute for Health Care Management).

In the same period the hospital stay of the clinical admissions hospital decreased from 12,2 days to 9,5 days. The decrease was even more if the hospital stay of daycare admissions was included in this analysis. (Figure 2).

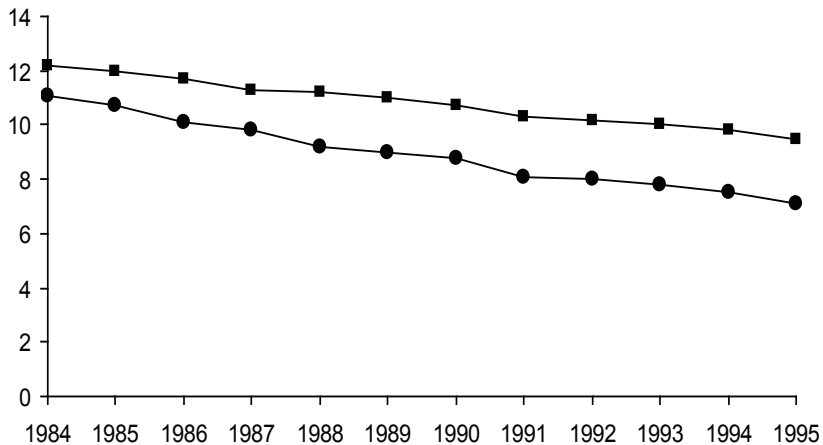
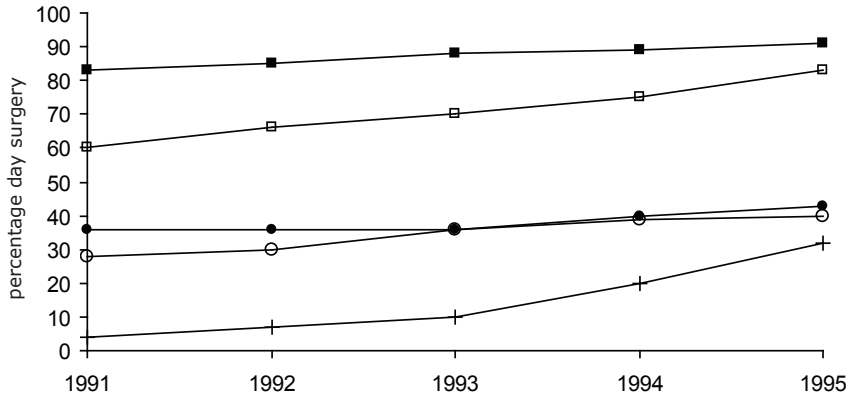


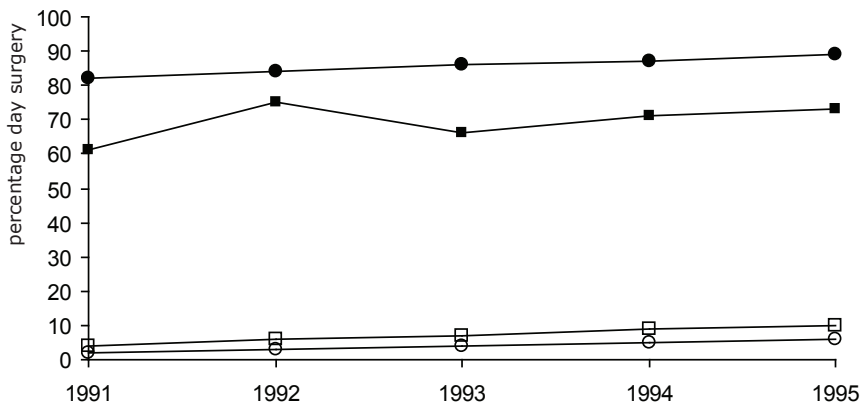
Figure 2: Average hospital stay in days in the period 1984 - 1995: clinical admissions (■) clinical admissions and day care admissions (●). (Source: SIG Health Care Information)

All seven investigated interventions showed an increase in proportion of day cases from 1991 to 1995 (figure 3). There was a large variation in the proportions of ambulatory surgery for each of the seven selected operations among the hospitals (table 1). Such variation was also found between the procedures within the hospitals. A particular hospital could score a high percentage of ambulatory surgery in one procedure, but low in another. None of the hospitals had highly ranking day care proportions for all seven interventions.

In 1995 115,000 (57%) of the seven investigated interventions were performed in ambulatory surgery. Scenario 1 suggests a potential increase to 166,000 interventions (83 %) and scenario 2 to 157,000 (78 %) (table 2).



A



B

Figure 3. Percentage day surgery of all interventions regarding seven interventions in the period 1991 - 1995:
 (a) breast tumour excision (●), varicose vein surgery (○), laparoscopic sterilisation (■), knee arthroscopy (□) and cataract surgery (+);
 (b) inguinal hernia repair upon patients ≤ 15 (■) and > 15 years old (□), tonsillectomy upon patients ≤ 15 (●) and > 15 years old (○).

Intervention	Median (range)
Breast tumour excision	38 (2-88)
<i>Inguinal hernia repair:</i>	
Patients ≤ 15 years old	77 (20-100)
Patients > 15 years old	4 (0-100) *
Varicose vein surgery	29 (1-93)
Laparoscopic sterilisation	94 (11-100)
Knee arthroscopy	89 (12-100)
Cataract surgery	27 (0-86)
<i>Tonsillectomy:</i>	
Patients ≤ 15 years old	91 (11-98)
Patients > 15 years old	2 (1-88)

* In one hospital only 2 patients > 15 years old underwent inguinal hernia repair in 1995 (both in day surgery). Without this hospital the range would be 0-59 %

Table 1. Median and range of percentages day surgery (per hospital) of all hospitals in The Netherlands in 1995. (Source: SIG Health Care Information)

Intervention	Absolute number (%)		
	In 1995*	Scenario 1**	Scenario 2***
Breast tumour excision	4,695 (40)	9,362 (80)	8,425 (72)
<i>Inguinal hernia repair:</i>			
Patients ≤15 years old	4,200 (73)	5,341 (93)	5,169 (90)
Patients >15 years old	1,612 (9)	8,151 (46)	5,848 (33)
Varicose vein surgery	3,594 (43)	7,453 (89)	7,285 (87)
Laparoscopic sterilisation	13,597 (91)	14,783 (99)	14,633 (98)
Knee arthroscopy	11,883 (83)	14,356 (100)	14,069 (98)
Cataract surgery	16,865 (32)	40,951 (77)	36,164 (68)
<i>Tonsillectomy:</i>			
Patients ≤15 years old	58,215 (89)	63,800 (97)	63,800 (97)
Patients >15 years old	510 (6)	2,017 (22)	1,467 (16)
Total	115,171 (57)	166,214 (83)	156,860 (78)

* Source: SIG Health Care Information
 ** In scenario 1 the percentage day surgery in all hospitals is equal to the percentage which the hospital ranked fifth, when arranging all hospitals in decreasing order of proportion of day surgery, exhibited in 1995
 *** Scenario 2: as in scenario 1 but considering the hospital ranked tenth.

Table 2. Number of interventions performed in day surgery (% day surgery of all interventions)

Discussion

In 1984 the Health Insurance Funds Council advocated the substitution of clinical care by day care, which would lead to a more efficient use of available resources.² The percentage of day care has risen from approximately 10 to 29% since that time. This increase can be considered a consequence of surgical, anesthesiological and financial factors. Surgical factors included the recent introduction of minimally invasive techniques, such as endoscopic surgery and faco-emulsification (technique for cataract treatment).^{3,4} New, short acting anaesthetics, such as propofol resulted in a swift recovery. One of the major stimulating financial factor was the increase of the hospital's compensation for a day care admission. This tariff grew from 57 euro's in 1983 to 91 euro's in 1987 and has stabilised at 170 euro's since 1988. This is still low compared to the tariff for a clinical admission. It is not clear how the savings made, e.g. by the reduction of evening-, night- and weekend shifts of nurses, counterbalance the investment and running costs. The eventual financial consequences of day surgery for hospitals remain controversial.⁵⁻¹² It is obvious that insurance companies consider day surgery to be more attractive, which they reflect by sponsoring initiatives to increase the proportion of ambulatory surgery in certain areas.^{5-8, 10, 12}

There are striking differences between the proportions of day surgery performed in different hospitals. In addition, within any given hospital, a great variation exists between the individual interventions. Acceptance and local habits may play a part in this situation. The application of day care is highly dependent on the attitude and interest of managing staff, doctors and nurses. The presence of an adequate infrastructure for day surgery is mandatory.

The percentage of cases in day care rose approximately 2 % per year during the last 12 years. This is equal to approximately 45.000 interventions a year. Based on the given scenarios of the seven investigated interventions, one can calculate a substantial growth by substitution only. Whether a further increase of day surgery is desirable should ultimately be determined by further studies concerning the quality of care and patients' satisfaction. Although the additional load on general practitioners and district-nurses appears small to us, this will also need further investigation. The quality of care remains the most important objective, whether it is given in clinically or in day care.

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3

Further developments in day surgery in the Netherlands 1996-2004: continuing increase

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Abstract

Day surgery in the Netherlands has shown an increase from 1984-1995. On the basis of seven index procedures for day surgery, a future scenario was formulated in 1995. In the present study, the developments of day surgery in the Netherlands were evaluated in the period 1996-2004, and the realisation of the previously defined future scenario was studied.

Methods All data were provided by the national database from Prismant Foundation in Utrecht, the Netherlands. The total number of clinical and day care admissions of all surgical specialties among different age groups was assessed from 1996-2004. The proportion day surgery of the seven index procedures for day surgery (breast tumour excision, inguinal hernia correction, single sided varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract extraction, and tonsillectomy) was calculated in 2004 and compared with numbers in 1995 and, in addition, the relation to hospital size and type, patient age and sex, and health care region was assessed.

Results Day surgery in the Netherlands showed an increase from 37% to 49% of all surgical admissions from 1996-2004. In particular, elderly patients were operated in day surgery more frequently during the studied period. Cataract surgery, varicose vein surgery, inguinal hernia repair, and tonsillectomy showed an increase in day surgery, whereas knee arthroscopy, breast tumour excision, and laparoscopic sterilisation did not. The future scenario was not achieved for most procedures. Small hospitals (<200 beds) performed more index procedures in day surgery than bigger ones (89% versus 79%). Academic centres performed day surgery in 67% of the index procedures compared with 81% in nonacademic hospitals. Differences in sex and health care region were not related to the proportion of interventions performed in day surgery.

Conclusions Day surgery in the Netherlands increased during the last decades, with the most substantial rise among elderly patients. The future scenario formulated in 1995 was not achieved, indicating a further growth potential.

Introduction

During the last decades, the hospital length of stay after surgical procedures has been reduced. Day surgery, defined as the hospital care a patient receives who undergoes a surgical procedure and is admitted to and discharged from the hospital on the same working day, is an efficient way of using medical resources. In an earlier study on the developments of day surgery in the Netherlands, day care admissions increased from 10% to 29% of all hospital admissions in the period 1984-1995.¹

To focus on surgical day care, 7 "index procedures", including breast tumour excision, inguinal hernia correction, single-sided varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract extraction and tonsillectomy, were assessed. These procedures were previously selected by the International Association for Ambulatory Surgery as index procedures to monitor the impact of day surgery in different countries because of their wide application in surgical practice and their generally accepted suitability for day care.² Previously, we observed an increase in the percentage of day surgery for these index procedures in the Netherlands between 1984 and 1995, with a substantial variety between the hospitals.¹ In order to design a future scenario for further growth potential of day surgery, these hospitals were ranked from high to low proportions of day surgery. Subsequently, the expected growth was calculated based on the assumption that all hospitals would be able to achieve an equal proportion of interventions in day surgery as the hospital ranked tenth in 1995.

The aim of this study was to assess the quantitative developments of day surgery in the Netherlands in the period 1996-2004 and to evaluate whether the formerly stated future scenario was fulfilled.

Methods

All data were provided by Prismant Foundation in Utrecht, the Netherlands, after being rendered anonymous. At Prismant, all Dutch hospital admissions are registered in a national database, including medical data such as diagnoses, surgical procedures, and patient data, including age, sex, and hospital length of stay. After 2004, the Prismant registration was incomplete as many hospitals did not provide data after the introduction of a new health care system. In the period 1996-2004, the total number of hospital admissions and the percentage of day surgery was assessed

in all surgical specialties, including general surgery, orthopaedic surgery; ear, nose and throat surgery; ophthalmology, gynaecology, plastic surgery, urology, neurosurgery, oral/dental surgery, and thoracic surgery. Only admissions linked to a surgical intervention under general or regional anaesthesia were included; patients who were admitted for observation or diagnostic procedures outside the operation room were excluded. The effect of age was examined by grouping patients in five-year increments.

Percentages of day surgery of the seven index procedures were assessed in 2004 and compared with the earlier data, using the same national codes. To examine factors of influence on the frequency of day surgery, the proportion of day surgery of the index procedures was assessed in hospitals of different size and type, in the various health care regions, and in relation to patients' gender.

Results

In the period 1996-2004, the total number of surgical admissions increased from 970,000 to 1,141,000. Meanwhile, the percentage of interventions performed in day surgery by all surgical specialties increased from 37% to 49% (Figure 1). During the study period, the proportion of older patients operated in day surgery increased (Figure 2).

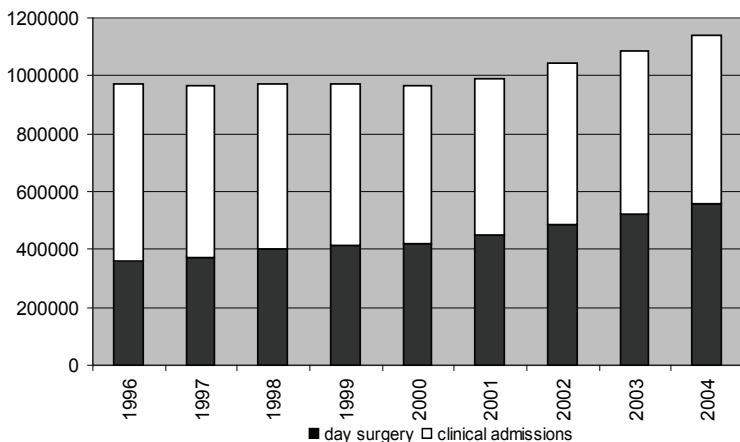


Figure 1a. Number of admissions linked to a surgical intervention 1996-2004

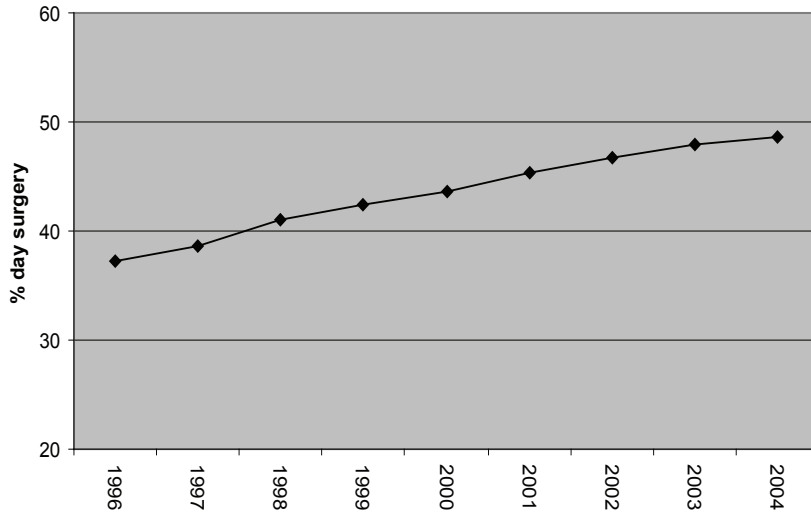


Figure 1b. Percentage of day surgery of total number of surgical admissions 1996-2004.

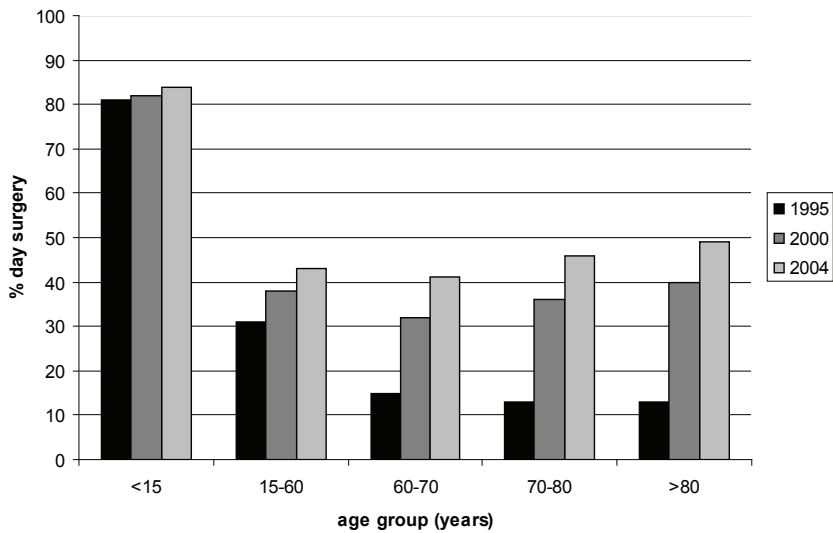


Fig 2. Percentage day surgery of all admissions in surgical specialities per age group in 1995, 2000 and 2004.

Index procedures

Table 1 shows the percentages of day surgery of the index procedures in 1995, expected percentages according to the future scenario, and the realised percentages in 2004. Only two of the studied procedures achieved the expected increase. The highest increase was seen in cataract extractions, followed by varicose vein surgery and inguinal hernia repair in adults.

Assessment of the seven index procedures in 2004 showed a greater proportion of day surgery in the smaller hospitals (<200 beds) compared with hospitals with 200 or more beds (89% versus 79%). In academic hospitals, 67% of the index procedures were performed in day surgery compared with 81% in non-academic hospitals. Day surgery was equally distributed among male and female patients (79% and 80%, respectively). Performance in the 27 Dutch health care regions varied from 67% to 85%, without a distinct pattern in topographic distribution.

Procedure	% DS of total number of procedures		
	1995	Expected*	2004
Cataract surgery	32 %	68 %	95 %
Varicose vein surgery	43 %	87 %	77 %
Inguinal hernia repair			
patients ≤ 15 years old	73 %	90 %	75 %
patients > 15 years old	9 %	33 %	38 %
Tonsillectomy			
patients ≤ 15 years old	89 %	97 %	94 %
patients > 15 years old	6 %	16 %	14 %
Knee arthroscopy	83 %	98 %	84 %
Breast tumour excision	40 %	72 %	41 %
Laparoscopic sterilisation	91 %	98 %	87 %
Total	57 %	78 %	80 %
*Expected percentage of day surgery according to a future scenario formulated in 1995 : all Dutch hospitals were ranked from high to low proportions of day surgery. The expected future percentage day surgery was defined as the proportion of day surgery exhibited by the hospital ranked tenth.			

Table 1. Percentage of day surgery of the total number of seven index procedures in the Netherlands in 1995, expected future percentages, and actual percentages in 2004.

Discussion

As expected, day surgery has continued to increase from 1996-2004. The percentage of the total number of surgical admissions increased from 37% to 49%. Considering patient characteristics, a remarkable increase was seen in the number of elderly patients treated in day surgery. Apparently, advanced age was no longer considered a contraindication for day surgery after various published reports showed no compromises in patient safety.³⁻⁵

Compared with other Western countries (United States of America, Canada, Denmark, Finland, Norway, Belgium, Germany, France, Spain, and Italy), the studied index procedures in the Netherlands were performed in intermediate proportions of day surgery.² In recent years, the highest increase was observed in cataract surgery in elderly patients, with the actual numbers far exceeding the expected numbers of day care. The total number of cataract extractions in the Netherlands increased from 53,000 in 1995 to 117,000 in 2004, with a proportion of 32% and 95% in day surgery, respectively. This development can be attributed to a political decision to increase the financial incentive to shorten waiting lists for this procedure in the late 1990s. The only other procedure to achieve the future scenario projected from 1995 was inguinal hernia repair in adult patients, with 38% performed in day surgery, which is not yet considered as the highest achievable proportion.

The percentage of the index procedures knee arthroscopy, breast tumour excision, and laparoscopic sterilisation did not increase in the studied period. One explanation could be the lack of financial incentives to perform more day surgery in these procedures. Otherwise, this disappointing result could be partly attributed to different interpretations of national intervention codes. For example, no code had yet been defined for sentinel node biopsy, which was performed more often in combination with breast tumour excision in the period after 1995. To be performed in day care, this procedure requires accurate logistic planning in order to facilitate radioguided localization and lymphoscintigraphy before surgery on the same day. Laparoscopic sterilisation was sometimes performed during another intervention for which the patient was hospitalised; for example, in combination with caesarean section.

Differences in day surgery between hospitals seem to have resulted from differences in case mix: more complex care shifted to larger hospitals,

whereas smaller hospitals confined themselves to more relatively noncomplex procedures that were suitable for day surgery. Meanwhile, academic hospitals performed relatively little day care, which was to be expected considering their focus on providing more specific care in a patient population with more co-morbidities.

Not only will this trend of centralisation of different kinds of health care be of influence on future developments, but the further course of day care will also be highly dependent on the reorganisation of the reimbursement system for Dutch health care. During the past years, development of day care was negatively influenced by the budget health care system, which made an overnight stay more financially rewarding for hospitals than day surgery for the same intervention. Since 2004, a new financial system based on diagnosis treatment combinations has been gradually introduced.^{6,7} Payment in this system is according to fixed amounts per diagnosis for approximately 80% of the hospital care. The remaining 20% of all diagnoses, including varicose veins, inguinal hernia, cataract, and adenoid or tonsil disease, will have negotiable prices.

The financial consequences for day surgery are unpredictable at this time, although some believe that day care will become more rewarding than it is now and the shift from clinical admission to day surgery will continue. Moreover, health insurance companies may demand a minimal percentage of day surgery cases for certain procedures in hospitals with which they contract. If financial restraints decrease, the future of day surgery will depend more on medical factors such as developments in minimally invasive surgery and optimisation of anaesthesiology care.

In conclusion, day surgery in the Netherlands has grown during the last decades, with the most substantial increase among elderly patients. An earlier formulated future scenario has not yet been achieved, indicating that a further increase is possible.

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4

Assessment of day surgery in a district training hospital: safety, efficacy and patient satisfaction

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Abstract

Day surgery has been expanding in quantity and quality during the last decades. This study assessed the quality of day surgery in the St. Antonius Hospital in Nieuwegein, the Netherlands.

Methods During 1 year, all patients treated by general surgeons in ambulatory surgery in the St Antonius Hospital, Nieuwegein, were evaluated by telephone questionnaires 6 weeks after surgery to measure the following three aspects of quality of care: safety, efficacy, and patient satisfaction. Questions were asked about complications, visits to the emergency department, the outpatient clinic, and the general practitioner, as well as the need for extra care at home. Unplanned clinical admissions after day surgery and readmissions were registered. All outpatient clinic charts were also checked for complications. Whenever the registration of complications was incomplete, the patient's general practitioner was contacted.

Results During the study year, 854 patients were scheduled for day surgery, and 823 patients (96.4%) returned home the same day. Reasons for clinical admission after day surgery were pain and/or nausea (n = 8), an operation late in the afternoon (n = 7), haemorrhage (n = 6), more extensive surgery than expected (n = 3), and others (n = 7). Of all patients who returned home the same day, 54 (7 %) experienced a complication, mostly minor. One pulmonary embolism occurred, and six patients underwent reoperation. Six patients were readmitted. In the hospital and outpatient clinic, 40 patients (6%) were seen without an appointment, and 91 patients (14 %) visited their general practitioner. After surgery, 84 patients (13%) got extra help at home. Of the patients who were successfully treated in day care, 14% would have preferred an overnight stay.

Conclusions Day surgery in our population was safe, the unplanned admission and readmission rate was 4.3%, and 86% of the patients would choose day surgery again. A better control on postoperative pain and nausea and more adequate information about the postoperative course can improve the quality of ambulatory surgery in this hospital.

Introduction

Day care is defined as the care a patient receives who is admitted to a hospital for a diagnostic or therapeutic intervention performed by a specialist and who is discharged home on the same working day. Perioperative hospital stay is shortened and more procedures are performed in day care. Whereas the safety of inguinal hernia repair in day surgery was discussed in 1989,¹ nowadays laparoscopic cholecystectomy is reported to be suitable for same-day discharge.²⁻¹⁰ Day care has also increased in quantity: the number day admissions as a percentage of the total amount of admissions in the Netherlands increased from 10% in 1984 to 29% in 1995.¹¹ In 1997, 40% of admissions of the surgical specialties were day care (source: SIG, Utrecht, the Netherlands).

With a shorter postoperative period of observation, quality of care must be warranted. The aim of this study was to measure the quality of surgical day care in a population of general surgery patients. Quality of medical care can be defined by using many different aspects, such as professionalism, accessibility, social intercourse between medical personnel and patients, and safety.¹²⁻¹⁴ In this study, we chose to examine three aspects of quality: safety, efficacy, and patient satisfaction.

Methods

All general surgery patients aged older than 18 years who were admitted to the day care unit of the St. Antonius Hospital in Nieuwegein between February 1, 1998 and January 31, 1999, were prospectively assessed. Informed consent was obtained before inclusion on the day care department.

The outcome measures were the number of complications within 30 days (as an indicator for safety), the number of unplanned clinical admissions and readmissions; the number of postoperative visits to the outpatient clinic, the emergency department, and the general practitioner; the number of days that extra care by family or friends at home was provided (as indicators for efficacy), and patient satisfaction.

All patients listed on the daily operation schedule as day care by general surgery were included. After 6 weeks, a person who did not work at the hospital interviewed them by telephone to obtain responses to 10 questions about the outcome measures. Patient charts were screened for complications, and the digital hospital registration system was

searched for information about (re)admissions. In case of missing data, the patient's general practitioner was contacted to obtain a complete record of all complications.

Definitions

A clinical or unplanned admission was defined as an admission for at least one night after the operation. A readmission was an admission to the hospital within 30 days after surgery, excluding planned admissions. The study definition of a complication was that used by the Association of Surgeons of the Netherlands: "a situation or event that is harmful for a patient's health in a way that necessitates a change in therapy, and which originates or occurs in the course of a medical treatment and was not the aim of the procedure". Patients who experienced a complication were asked who diagnosed it and how it was treated. Extra care at home was counted by day for every day that somebody came, or that a housemate or family member stayed home from work or school or cancelled appointments, to care for the patient and/or for household help the patient received during several hours per day. Hospital visits were categorized as follow-up (planned) visits and acute (unplanned) visits.

Patient satisfaction was evaluated by asking if the patient was pleased to be home on the same day or would have preferred an overnight stay. Patients were also asked to grade the entire treatment from 1 (very bad) to 10 (outstanding).

Results

During the study period, 854 patients were admitted to the day surgery unit for a general surgical procedure (Table 1). The median age was 48 years, and 59% were women. The number of unplanned admissions was 31 (3.6%), for reasons listed in Table 2.

Of the 823 patients who went home on the same day, six were readmitted (0.7%; Table 3), 54 complications were registered (6.6%; Table 1), and six patients underwent reoperation. The most frequent complication was wound infection (n = 28; 3.3%). The only major complication was pulmonary embolism, which occurred in one patient 22 days after a subfascial endoscopic perforantectomy in varicose veins.

Procedures	N	unplanned admissions	re-admissions	woundinfections	postoperative haemorrhage	other complications	Reoperations
breast surgery	232	7	2	6	1	5	4
hernia correction	143	6		7		2	
varicose vein surgery	137	5	1	4	1	7	
excision/incision biopsy	85	1		1		1	
(peri-)anal surgery	70	1	1	4	5		2
ganglion	41			2		1	
removal of bone implants	41	1		2		1	
lap. cholecystectomy	23	6	2				
others	82	4	–	2	–	2	–
Total	854	31	6	28	7	14	6

Table 1. Procedures performed by general surgeons in the St. Antonius Hospital in Nieuwegein, the Netherlands from 1-2-1998 until 31-1-1999, unplanned clinical admissions after day surgery, re-admissions, complications and re-operations within 30 days after surgery.

Reason for unplanned admission	N
pain and/or nausea/vomiting	8
time of surgery late in afternoon	7
haemorrhage	6
surgery more extensive than expected	3
urine retention	1
fever	1
hyperglycaemia (DM)	1
vasovagal collaps	1
unknown	3
Total	31

Table 2. Reasons for unplanned clinical admission after day surgery (n=31)

Reason for re-admission	Primary procedure	Postoperative day
haemorrhage	lateral internal sphincterotomy	1
haemorrhage	Excision of gynaecomastia	1
hematoma	Lumpectomy breast	1
pain	Laparoscopic cholecystectomy	1
pain and dyspnea	Laparoscopic cholecystectomy	1
pulmonary embolism	Subfascial endoscopic perforator vein surgery	22

Table 3. Reasons for re-admission after day surgery within 30 days (n=6)

After 6 weeks, 656 patients were interviewed (80%). Reasons for the missing interviews were not answering the telephone more than five times or a wrong telephone number (n = 138; 17%), refusal to cooperate (n = 4; 0.5%), and other reasons such as insufficient understanding of the Dutch language (n = 25; 3%). In six cases, additional evaluation of the medical chart did not reveal enough information so the general practitioner was contacted. The 656 patients who were successfully interviewed attended follow-up visits 1093 times and were seen at acute visits (without previous appointment) 40 times (Table 4). After surgery, 91 patients (14%) consulted their general practitioner (Table 4).

At home, 84 patients (13%) received extra help from family and friends for a mean period of 3 days. No one required professional homecare.

From all successful day cases, 86% of patients were satisfied with the discharge, and the remaining 14% would have preferred to stay overnight, mainly because of being too sick for discharge and because of a safer feeling in the hospital. The median score for the total treatment was 8 on a scale from 1 to 10, and 7% of patients gave a score below 6.

Reason for consultation	Hospital (unplanned)	General practitioner
Wound	17	29
Pain	9	18
Seeking information		11
Removal of stitches		10
Tight plaster cast or bandage	4	
Haematoma	4	
Folow up visit		5
Haemorrhage	2	
Dyspnea	2	
Standard postoperative home visit		2
Dysfunctional port a cath system	1	
Flebitis	1	
Total	40	91

Table 4. Reasons for unplanned visits to the hospital and consultations by general practitioner after day surgery.

Discussion

Safety was expressed in number and nature of complications in this study. Most complications were minor, and it is questionable whether they could have been prevented by a longer clinical observation. The complication rate of 6.7% can not be easily compared with numbers in other studies because of differences in populations (for example, not only general surgery, other ways of registration, shorter follow-up periods or, most important, other definitions of a complication).¹⁶⁻¹⁹ Warner et al described an incidence of postoperative major morbidity and mortality of one in 1366 in a group of 45 000 day surgery patients.¹⁶ One serious complication occurred in our group 22 days after subfascial endoscopic perforantectomy of the right lower leg: A 34-year-old man was readmitted because of pulmonary embolism. In this hospital, thrombosis prophylaxis is not routinely administered in day surgery patients.

Raeder et al reported a wound infection rate after day surgery of 3.5% in 642 patients (compared with 3.4% in our study).²⁰ They made the

diagnosis if one or more of the following four criteria was present: discharge of pus, positive culture, surgical drainage of the wound, and antibiotic treatment; whereas in our study, we used the same definition for all complications, namely, if it was diagnosed and treated by a doctor. Another important difference is that the patients in the Raeder et al study were all examined by the researchers, whereas in this series, only anamnestic information in combination with data from patient charts was used.

Other parameters to consider when evaluating the quality of day surgery are unplanned admissions and readmissions. If these numbers are high, one should reconsider if it would not be more efficient to offer clinical care. The percentage of 3.6% unplanned clinical admissions was higher than that reported in the literature of 0.3% to 1.3%.^{18, 21-24} However, these are studies in populations of all surgical specialties and not only general surgery. Furthermore, some authors define day surgery or ambulatory surgery as a hospital stay of less than 24 hours, so that an unknown number of patients stay overnight.

The most frequent reasons for clinical admission after day surgery are pain and postoperative haemorrhage,²¹⁻²⁴ which is in concordance with our findings. Nausea and operation late in the afternoon were not as often reasons for postponed discharge as in this study. The high admission rate after laparoscopic cholecystectomy (6 of 23) can be explained by the fact that these were the first day cases in this hospital. Social indications for unplanned admission, such as the absence of an accompanying person to bring the patient home, were not found in our group. It is likely that sufficient consideration is given to social circumstances during preoperative assessment.

An optimisation of treatment and prevention of postoperative pain, as well as nausea and vomiting, in addition to changes in the operation schedule so that all of the day surgery procedures are planned in the morning, could prevent almost half of the unplanned admissions to our hospital. Another organisational improvement could be providing prolonged care for day surgical patients in the evening.

The readmission rate of 0.7% is not different from earlier reports.²⁵⁻²⁷ Readmission was not correlated with the patient's age. Besides laparoscopic cholecystectomy with two readmissions for pain and/or observation after 23 procedures, no specific procedures were identified as more at risk for readmission.

After earlier discharge from hospital, an increased workload for the emergency department and the general practitioner can be expected. A total of 40 unplanned visits (6%) were registered at the hospital emergency department or acute outpatient clinic. General practitioners in the neighbourhood (approximately 280) saw 91 patients (14%) after surgery. Other reports mention 3% rate of visits at the hospital after a day surgery procedure^{18,26} and a 4% to 6% rate at the general practitioner.^{17,18} The accuracy of the comparison is hindered by differences in populations and organisational structure.

For the hospital as well as the general practitioner, the wound is the most frequent reason for consultation; however, wound healing was uncomplicated in most of these patients. Although better education about normal wound healing might avoid some of these consultations, patients should not be discouraged from seeking medical advice if in doubt. Postoperative pain is another important factor for going to the doctor, which indicates that pain management should be improved by better preventive and therapeutic measures. The third reason for consulting the general practitioner was to acquire information. Information about the procedure and related issues should, of course, be provided in the hospital by the surgeon, nurses, and in written form.

No gold standard exists for assessing patient satisfaction.²⁸ Outcomes strongly depend on the subject and the nature of the questions asked.²⁹ We chose simple "yes" or "no" questions combined with a grade for the whole treatment and concluded that most patients are satisfied with early discharge and with their treatment.

This study can be used for two purposes. First, this evaluation can be the basis for an improvement cycle: in our hospital more extensive procedures are planned in the morning now, prolonging the opening time of the day surgery unit until evening hours is being negotiated, there is more attention for postoperative pain and nausea, and the written information given to patients will be modified with respect to wound healing and expected postoperative course. After implementation of these adjustments, a new evaluation will follow. Second, the assessment of these aspects of quality enables benchmarking against other hospitals, after which a judgement of quality of day surgery in hospitals can be made.

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5

Laparoscopic gastric banding for morbid obesity: day surgery versus overnight stay

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Abstract

In Western countries, laparoscopic gastric banding is increasingly used in the surgical treatment of morbid obesity. The purpose of this study was to investigate the feasibility, safety, morbidity, and costs of day surgery (DS) compared with overnight stay (OS).

Methods From July 2001, consecutive patients, who were planned for laparoscopic adjustable banding and met the criteria for day surgery, were randomised into a DS group and an OS group. All patients received standardised anaesthesia and were operated by one surgeon. The following items were registered during one week and after six weeks: complications, length of stay, reported pain, nausea and activity resumption and patient's satisfaction. Costs were compared.

Results Fifty patients were included and randomized into two groups of 25 patients. In the DS group, 76% of patients were successfully discharged the same day, without readmissions. Four procedures were converted. One complication occurred in each group. Patients in the DS group seemed to experience more pain ($p = 0.009$). Satisfaction scores were 8.1 (DS) and 8.8 (OS) ($p = 0.06$). Half of the DS patients and most of the OS patients preferred a clinical admission. DS treatment cost 600 euros less than OS.

Conclusion With proper patient selection, laparoscopic gastric banding can be performed safely and at lower cost as an day surgery procedure. Patients however often prefer an overnight stay.

Introduction

Morbid obesity is an increasing health problem in Western countries. Surgical treatment is the only therapy which can guarantee sustained long-term weight loss, and the number of bariatric interventions is rapidly increasing world wide.¹ Laparoscopic gastric banding is the preferred surgical treatment in Europe and is now gaining wide acceptance in the United States.

There is a progressive tendency towards shorter hospitalization after various surgical interventions. Efficiency has a high priority in medical care, and day surgery is becoming more important, with more procedures of increasing complexity being performed in older patients with coexisting morbidities. Morbid obesity used to be considered a relative contraindication for day surgery, as most morbidly obese patients are graded class II-III according to the American Society of Anesthesiologists.

The main goal of this study was to assess the safety and feasibility of laparoscopic adjustable banding as a day surgery procedure in morbidly obese patients. Second, differences in postoperative morbidity between day surgery and clinical admission were examined prospectively (complications, postoperative pain, nausea, resumption of normal activity), and patient satisfaction and costs were compared

Materials and methods

Patients

Between July 2001 and September 2003, 50 consecutive morbidly obese patients who were planned for laparoscopic adjustable banding and fulfilled the inclusion criteria were randomly allocated to either a day surgery procedure (DS) or a clinical admission with an overnight stay (OS). Inclusion criteria were age ≥ 18 years, considered suitable for day surgery after preoperative screening by the anesthesiologist, and the presence of a responsible adult supervising the patient during the first night at home. Exclusion criteria were important comorbidity and residence > 30 minutes away from the hospital. Randomization was done by sealed envelopes that were opened directly after inclusion. The study was approved by the hospital ethics committee, and patients were included after written informed consent.

Surgical procedure

Patients were scheduled for surgery after screening by a team consisting of a bariatric surgeon, a physician, a psychologist, and a dietician. Indications for surgery were a body mass index (BMI) > 40 or a BMI between 35 and 40 with serious comorbidity. Preoperatively, patients were seen by a multidisciplinary team consisting of a bariatric surgeon, an internist, a nutritionist, a psychologist, and a nurse-practitioner (who also provided the follow-up visits after surgery).

All operations were performed by one surgeon (BvR) using the LAP-BAND device (INAMED Health, Santa Barbara, CA) according to the technique described by Belachew and Zimmermann², with the pars flaccida modification. All patients received thromboprophylaxis with nadroparin (0.6 mL) approximately 1 hour preoperatively.

Anesthesia was given according to a defined study protocol, which included general anesthesia induced with propofol (2.5 mg/kg) and fentanyl (0.0025-0.005 mg/kg) and maintained with propofol (6-10 mg/kg/60 min) and remifentanyl (0.4-0.5 µg/kg/min). Antiemetics were not administered routinely, but metoclopramide 10 mg was given intravenously in case of nausea. Paracetamol (1 g four times daily) and diclofenac (50 mg, 3 times daily) were prescribed for pain as needed.

The participating patients in the DS group had to be mobile and able to void before leaving the hospital. Furthermore, both the surgeon and the anesthesiologist had to declare the patients fit for discharge after their clinical condition was evaluated. The day after operation, all patients were seen at the outpatient clinic by the nurse practitioner. Patients in the OS group were discharged the next morning. In both groups, a contrast swallow was performed the day after surgery to document the proper position of the band.

Outcome measures

Primary outcome measures were length of stay and complications within 6 weeks, which were registered prospectively. Secondary outcome measures included postoperative pain and nausea, overall well-being, and resumption of normal activity. These were assessed by means of visual analogue scales preoperatively, each day during the first week after surgery and after 6 weeks. Patient satisfaction was measured by a questionnaire that was completed at 6 weeks. Patients graded their satisfaction with the received treatment from 1-10 and were asked if

they would prefer DS or OS if a similar intervention were necessary in the future.

Cost analysis

Integral declaration costs were calculated per patient. Hospital charge data were retrieved from the billing department and divided between admission costs (day case or clinical admission day), operation costs, and additional costs. A day on the day-surgery unit was charged as a day case (219 euros). If a day patient's discharge was postponed to the next morning, the admission costs changed from a one-day case into two clinical admission days (2 × 573 euros). Operation costs included the costs of the materials used and the cost of the operation facilities, including operation time and personnel. Additional costs included consultations from other specialists and unforeseen laboratory investigations and x-rays.

Statistical analysis

Data were analyzed by using SPSS version 11.0 (SPSS, Chicago, IL) statistical software for Windows (Microsoft, Redmond, WA). The probability level accepted for statistical significance was set at $p < 0.05$ for all comparisons between day surgery and overnight stay (completed on an intention-to-treat basis). The unpaired two-tailed t test was applied to compare quantitative data and the χ^2 test for nominal data. The visual analogue scales outcomes were analyzed by multivariate analysis of variance repeated measures.

	Day surgery procedure (n=25)	Overnight stay (n=25)	p Value
Age: mean (range)	37 (23-58)	41 (25-29)	0.76
Sex (M/F)	2/23	4/21	0.38
Body mass index (kg/m ²) (range)	47 (37-61)	47 (39-60)	0.30
Comorbidity			
Hypertension	3	5	0.70
Diabetes mellitus	2	5	0.42
Others	2	1	1.0
Previous abdominal surgery	7	6	0.75
Operating time: min (range)	74 (45-180)	73 (45-120)	0.94

Table 1. Clinical characteristics of patients undergoing laparoscopic adjustable banding as an day surgery procedure versus overnight stay

Results

Between July 2001 and September 2003, 50 of 72 eligible patients were randomized for DS or OS (Figure 1). Reasons for exclusion were comorbidity ($n = 14$), residence further than 30 minutes from the hospital ($n = 4$), and other logistic reasons ($n = 3$). One patient refused participation because of preference for an overnight stay. The two groups were well matched for age, sex, BMI, and operating time (Table 1). Comorbidity was not routinely considered a contraindication for day surgery, and two DS patients and four OS patients had more than one systemic disease in addition to morbid obesity. No patients were lost to follow-up; however, two patients (one in each group) did not complete all of the questionnaires with visual analogue scales and satisfaction rates.

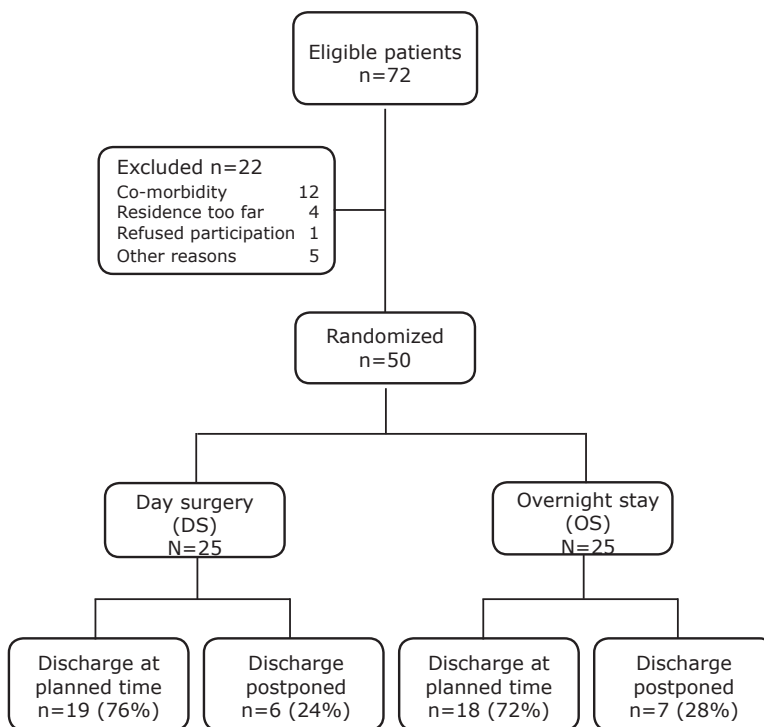


Figure 1 Study flow diagram

Length of stay

In the OP group, 19 (76%) of 25 patients were discharged the same day (Figure 1). Reasons for a prolonged hospital stay were conversion to open procedure (n = 1), complication (n = 1), pain and nausea (n = 2), and logistic omissions (n = 2). In the OS group, 18 (72%) of 25 patients returned home the day after surgery. The reasons for a postponed discharge in this group were conversion (n = 3), complication (n = 1), pain (n = 1), and other reasons (n = 2). The mean hospital stay was 1.48 days (range, 1-7) in the DS group and 2.32 (range, 2-4) in the OS group (p = 0.004). No patient was readmitted.

Conversions and complications

Four conversions to an open procedure were necessary (one patient in the DS group and three in the OS group). Reasons for conversion were hemorrhage (n = 2) and unsatisfactory exposure of the operating field (n = 2). During the 6 weeks of follow-up, one major complication occurred in a DS patient. Several hours after an uncomplicated procedure followed by an episode of excessive vomiting, acute abdominal pain developed that appeared to be due to an acute anterior herniation of the fundus through the band with strangulation. An open partial resection of the stomach was performed. The patient's further postoperative course was uneventful, and the patient was fully recovered and discharged after 7 days. A patient in the OS group had a corneal lesion that was managed by conservative means, but postponed discharge for two days. No other complications occurred, including infectious or thromboembolic complications.

Pain, nausea, overall well-being, and activity resumption

Figure 2 gives an overview of the course of postoperative pain, nausea, overall well-being, and resumption of normal activity, scored by means of visual analogue scales from 0-100. The OP group scored significantly worse for postoperative pain (p = 0.009).

The use of pain medication in both groups was similar, although OP patients showed a trend of taking medication longer and more often than OS patients. Postoperative nausea (p = 0.158), overall well-being (p = 0.091), and activity resumption (p = 0.381) were equal during convalescence in both groups.

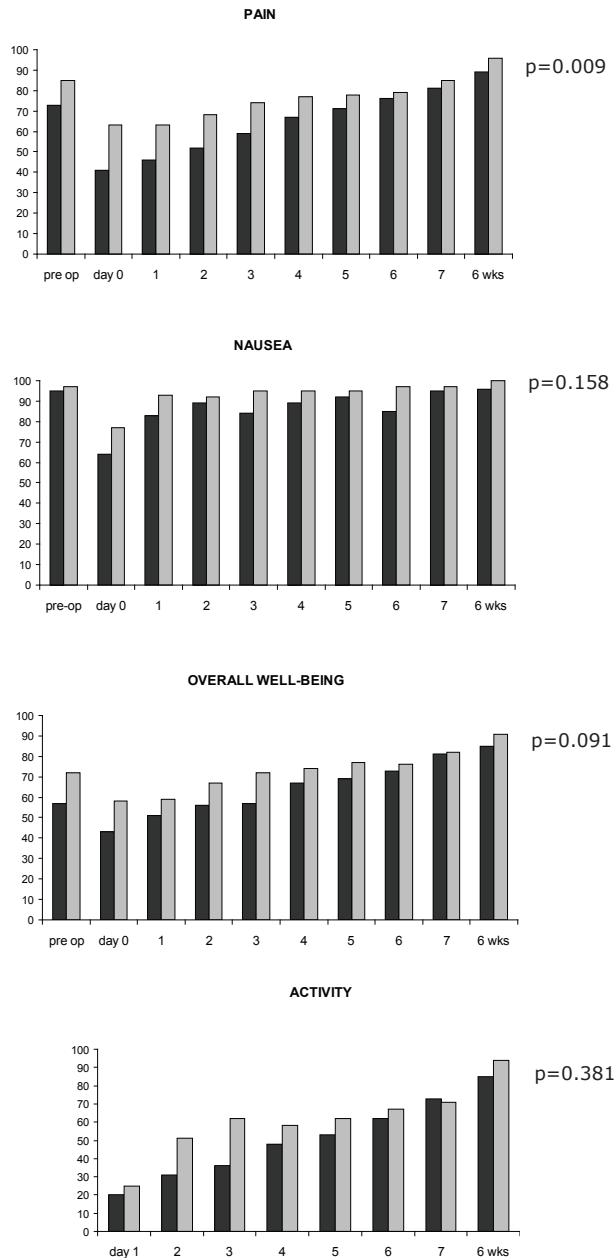


Figure 2. Visual analogue scales (pain, nausea, well-being and activity) in first postoperative week and after 6 weeks: ■ = DS, □ = OS, from 0 (worst situation) to 100 (best situation).

Patient satisfaction

Six weeks postoperatively, the mean score for the surgical treatment was 8.1 (range, 4-10) in the DS group and 8.8 (range, 7.5-10) in the OS group ($p = 0.06$). Of the DS patients, 48% (12/25) would have chosen day surgery again versus 8% (2/25) of the OS patients. Frequently mentioned reasons for preferring an overnight stay included having nursing care, a feeling of safety when observed in the hospital, and a better pain control in the hospital. Reasons for preferring day surgery were appreciation of recovery in one's own environment and a good previous experience with day surgery setting.

Costs

Table 2 summarizes the costs for each group. The difference between an uncomplicated procedure in the DS and OS groups was 927 euros in favor of day surgery. Considering the intention-to-treat principle, the costs per patient in this study were 594 euros less in the DS than in the OS group..

	Day surgery		Overnight stay	
	Expected	Actual	Expected	Actual
Admission	219	579	1.146	1.329
LAGB ^a	2.779	2.810	2.779	2.873
Unforeseen		220		0.5
Total	2.998	3.609	3.925	4.203

^aLAGB, laparoscopic adjustable gastric banding, operation room, and material costs

Table 2. Costs in euros per patient for day surgery and overnight stay

Discussion

At our institution, one surgeon had been performing laparoscopic adjustable banding since 1995. Approximately 300 bands had been placed before the start of the study, which shows that this procedure is safe and feasible in a Dutch day surgery setting where the day surgery ward is a part of the hospital and no hospital hotels exist. More than 75% of the planned day cases could actually be discharged on the same day, and no serious surgical or anesthesiologic complications were recorded after discharge. The only patient with a serious complication in the outpatient group (acute strangulation of the fundus) developed evident symptoms during the afternoon and would never have met discharge criteria. In our opinion, this event does not compromise the safety of performing laparoscopic banding in day surgery.

In our department, LAP-BAND patients are normally scheduled for discharge the day after surgery. In the OS group, discharge was postponed in > 25% of the cases. This percentage is even higher than the failure rate in the DS group, which seems to be mainly due to three conversions and a complication. The conversion rate (8%) was unfortunately high in the study period compared with the literature (0%-9.3% conversions; most studies, < 1%), without a logical explanation by the authors. Although the groups are small, patients in the DS group seem to experience more pain and to be less satisfied. This could be due to their return visit to the hospital on the first postoperative day, discomfort during the journey, and the contrast-swallow.

After de Waele et al, who described a preliminary series of 10 patients undergoing laparoscopic banding in an ambulatory setting³, and Kormanova et al, who discharged 20 patients within 23 hours after surgery⁴, Watkins et al published their experience with gastric banding in a self-standing ambulatory surgery center in the United States⁵. They treated 343 selected patients with a mean BMI of 44.5 and concluded that gastric banding was an appropriate ambulatory procedure in selected patients and in experienced hands.

A remarkable difference between our two groups was found in the costs. A DS procedure in our study costed 3609 euros, which was approximately 600 euros less than OS treatment. An equal number of conversions and complications in both groups can be expected and makes the difference about 900 euros.

The number of patients successfully discharged at a previously scheduled time, as well on a day surgery basis as after overnight stay, could increase by an improvement in logistic management. Perioperative care in all surgical procedures, whether in day care or in clinical admission, requires the carefully planned implementation of well-defined protocols or clinical pathways among the surgical, nursing, and operating room staff, as well as strict adherence to these protocols of the staff involved⁶. These protocols should include patient selection criteria and information on pre- and postoperative care, including pain management, for patients and their caregivers. Failure to meet the predefined discharge criteria in our study seems partly due to insufficient staff information before the study and the lack of adherence to protocols.

Ambulatory or day surgery has become more popular over the past years. In the beginning, less extensive interventions such as inguinal hernia surgery, varicose vein surgery, and breast surgery were performed as day cases and proved satisfactory to both doctor and patient. As the infrastructure of ambulatory surgery improved, other interventions came to the new day surgery units. New upcoming interventions, among others, are laparoscopic cholecystectomy and Nissen fundoplication, minimally invasive parathyroidectomy, axillary dissection, and laparoscopic adrenalectomy, of which several studies have shown the safety and feasibility⁷⁻¹⁴. Morbidly obese patients are a distinct patient category with their own surgical and anesthesiologic challenges. With the ongoing shift of medical treatment and support from hospital to outpatient clinic, safety and quality of care must be warranted and should continue to be evaluated.

In conclusion, our study confirms that laparoscopic gastric banding can be safely added to the list of day surgery surgical interventions. Good preoperative information and postoperative guidance are pertinent preconditions for a successful outcome. Patients often prefer an overnight stay, and postoperative pain management needs to be optimized.

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6

Thrombosis prophylaxis in day care surgery and gynaecology in the Netherlands

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Abstract

Data about the risk of deep vein thrombosis in patients undergoing surgical procedures in day care are limited. The present study describes the clinical practice of and attitudes towards thrombosis prophylaxis in day surgery among surgeons and gynaecologists in the Netherlands.

Method: Data from all departments of general surgery (n=118) and gynaecology (n=106) in the Netherlands were obtained by questionnaires and telephone interviews. A PubMed and SUMSearch literature was performed and all available national and international guidelines about the use of thrombosis prophylaxis in day surgery were evaluated.

Results: All institutes responded to the questionnaire. In day care setting, thrombosis prophylaxis was administered to all patients at 57% of the departments of surgery. In 24% of the surgical centres anticoagulation was never used; in 19% prophylaxis was limited to patients with an increased risk for thrombosis. In gynaecological departments, these rates were 4% (always prophylaxis), 81% (never prophylaxis) and 15% (individualized prophylaxis). The majority of surgeons (92 %) felt the need for administration of thrombosis prophylaxis in day care; 41% of the gynaecologists disagreed. Guidelines considering thrombosis prophylaxis in surgery were scarce.

Conclusion: There is a wide variety in thromboprophylaxis in surgical and gynaecological day care in the Netherlands. Specific guidelines are warranted.

Introduction

Deep vein thrombosis and pulmonary embolism are common and often preventable surgical complications. Risk factors in surgical patients include surgery itself, prolonged immobility, obesity, varicosis, cardiac dysfunction and increasing age. Prophylaxis by means of low molecular weight heparine has proven to significantly reduce the number of postoperative thromboembolic complications.¹⁻³ In day surgery, where procedures are less invasive and lengthy and patients probably have less risk factors, the risk for thromboembolic complications is assumed to be lower. The number of surgical procedures performed in a day care setting is presently increasing, as is the complexity of these interventions. Day care surgery is no longer limited to young and otherwise healthy patients, but is also offered to elderly patients with co-morbidity. More complex and lengthy procedures are being performed. This may have consequences for the need for thrombosis prophylaxis in day care. We investigated the current practice of thrombosis prophylaxis in patients undergoing day care surgery in the Netherlands and we performed a literature search for studies and guidelines about this issue

Methods

Questionnaire

A questionnaire was sent to all departments of general surgery (n=118) and gynaecology (n=106) in the Netherlands. Hospitals were divided into teaching- (including 8 academic centres) and non-teaching hospitals. The survey included questions about the practice of thromboprophylaxis in day surgery: indications and timing of this prophylaxis (pre- or post-operative), the type of anticoagulation and the local opinion about the need for thrombosis prophylaxis in ambulatory surgery. Furthermore we documented the presence of local guidelines for thrombosis prophylaxis in day care. Data were completed by sending a reminder after six weeks and telephonic interviews with non-responders.

Statistical methods

All data were analyzed using a statistical software program (SPSS 11.0). The probability level accepted for statistical significance was set at $p < 0.05$ for all comparisons. Differences between prescription practice and physicians' opinions were evaluated by using the Fisher's Exact test.

Search for guidelines

Databases Google, Pubmed and SUMSearch were screened for (inter)national guidelines on thrombosis prophylaxis in surgery and gynaecology. We searched for the key words "(national) guideline", "medical guideline", "thrombosis" and "low molecular weight heparine" or "LMWH". The national associations of surgeons in Belgium, Germany, the United Kingdom and France were contacted and asked for guidelines about the use of thrombosis prophylaxis in general surgery and – more specifically – for advices with regard to day surgery patients.

Literature

A systematic search for literature was performed on Medline, Pubmed and The Cochrane Library for the period from 1995 until 2004. The following search terms where combined: day surgery/ ambulatory surgery, gynaecology, thrombosis prophylaxis/thromboprophylaxis, DVT (deep venous thrombosis) and LMWH (low molecular weight heparin). The complete text of all articles was acquired and cross references where screened.

Results

Questionnaire

The majority of the surgeons (81%) and gynaecologists (73%) responded to the questionnaire or the reminder. Additional telephonic information resulted in a complete (100%) response in both groups. Figure 1 depicts the prescription of thrombosis prophylaxis in the Dutch centres.

The majority of the surgical departments (67/118; 57%) prescribed thrombosis prophylaxis to all ambulatory patients (28/118; 24 % did never and 23/118; 19% on demand), whereas most gynaecologists (86/106; 81%) never used anticoagulants in day surgery (4/106; 4 % always did and 16/106; 15% on demand)($p < 0.001$). There were no significant differences in the prescription of antithrombotics between teaching and non-teaching hospitals (Figure 2a and 2b).

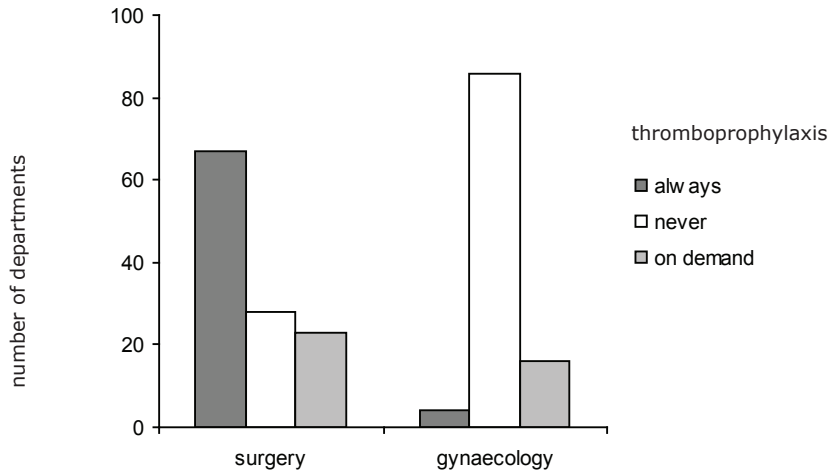


Figure 1. Comparison of prescription of thrombosis prophylaxis between general surgeons (118 departments) and gynaecologists (106 departments) in day surgery ($P < 0,001$).

In 72 % (85/118) of the surgical departments and in 52 % (55/106) of gynaecological departments, thrombosis prophylaxis for in-hospital patients was applied according to local guidelines. These guidelines provided information for thrombosis prophylaxis for day surgery in only 51% (60/118) of the surgical departments and 19% (20/106) of the gynaecological departments.

We asked the surgical ($n=23$) and gynaecological ($n=16$) departments, where anticoagulants are only prescribed to selected patients ("on demand"), for their indications. A history of DVT and certain types of surgery were frequently mentioned arguments for thrombosis prophylaxis (Table 1). Thrombosis prophylaxis was mainly administered as subcutaneous low molecular weight heparin (LMWH; nadroparine: $n=42$, dalteparine: $n=21$, enoxaparine: $n=7$, tinzaparine: $n=4$, LMWH not otherwise specified: $n=14$); a minority of surgical departments used warfarin (acenocoumarol; $n=2$). Gynaecologists ($n=20$) most often used nadroparine ($n=15$). Thrombosis prophylaxis was limited to a single subcutaneous injection of a LMWH before surgery in most centres: 79 % (71/90) of surgical and 65% (13/20) of the gynaecological departments. Four surgical departments administered thrombosis prophylaxis twice

on the day of surgery (before and after the intervention). Occasionally thrombosis prophylaxis was continued after discharge (surgery n=6, gynaecology n=2) for a period of one to five days or until the patient was completely mobilized.

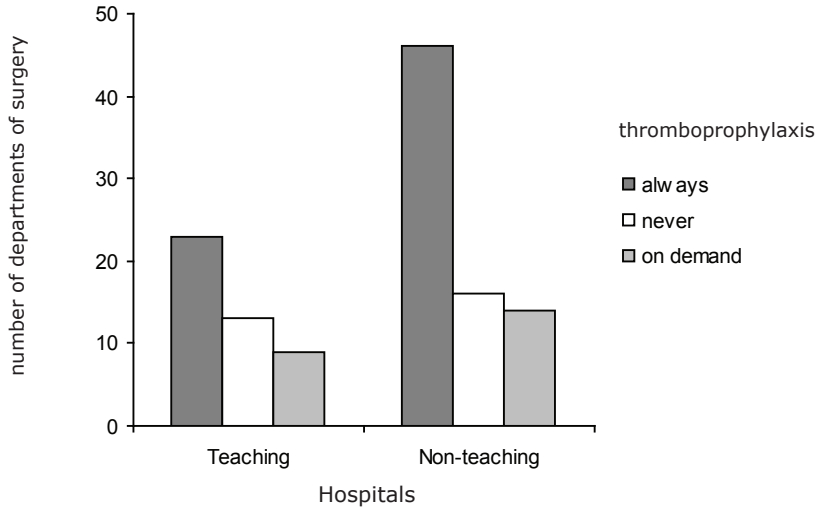


Figure 2a. Prescription of thrombosis prophylaxis in day surgery by **surgeons** in teaching- and non- teaching of hospitals ($p=0.556$).

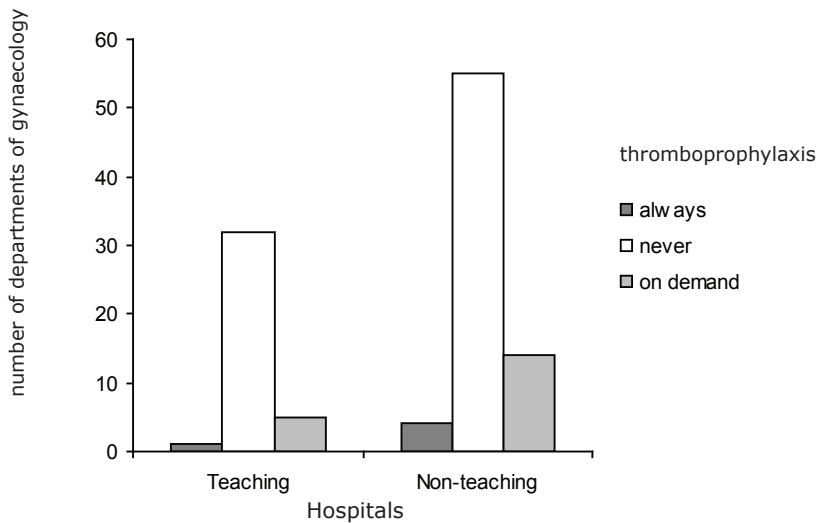


Figure 2b. Prescription of thrombosis prophylaxis in day surgery by **gynaecologists** in teaching- and non- teaching of hospitals ($p=0.916$).

	General surgery (n=23)	Gynaecology (n=16)
Previous DVT	9	7
Operation	8*	6**
Operating time	4	2
All 'high risk'	3	4
Thrombophilia	0	1
Obesity	4	0
Surgeon	1	1
Plaster cast	1	

* varicose vein surgery (n=4), knee arthroscopy (n=2), inguinal hernia (n=1), bursitis prepatellaris (n=1), all interventions not restricted to head and neck or upper extremity.

** laparoscopy at risk for conversion (n=2), extirpation of ovaries (n=2), diagnostic laparoscopy (n=1), endometrial ablation (n=1), laparoscopic sterilisation (n=1)

Table 1. Decisive factors for thrombosis prophylaxis in day surgery.

In Table 2 physicians' opinions to the evidence for thrombosis prophylaxis in day surgery are summarized; most surgeons (67%) had no doubts about the need for thrombosis prophylaxis in day surgery, whereas 41% of the gynaecologists were not convinced.

Different arguments in favour of thrombosis prophylaxis were given: the perception of an equal risk of thromboembolism in hospitalised and ambulatory patients, the awareness of sufficient data in literature supporting the use of thrombosis prophylaxis, the low risk of bleeding in patients on LMWH and occasional experiences with thromboembolism after day surgery. Arguments against routine prophylaxis were: lack of any thromboembolic event during many years of day surgery practice, the absence of evidence based medicine supporting the use of anticoagulants in day care surgery, the selection of an otherwise healthy group of patients, the relatively short period of postoperative immobilisation, the short operating time and the risk of bleeding exceeding the thromboembolic risk.

	General surgery (n=99)	Gynaecology (n=78)
Fully agrees*	66 (67%)	11 (14%)
Does not agree*	4 (4%)	32 (41%)
Partly agrees	25 (25%)	30 (38%)
No opinion	1 (1%)	2 (3%)
Not answered	3 (3%)	3 (4%)
* p < 0.001		

Table 2. Physician's opinion on "Indications exist for thrombosis prophylaxis in day surgery".

Guidelines

In the Netherlands, the Dutch Institute for Healthcare Improvement and the Association of Surgeons provide guidelines concerning the use of peri-operative thrombosis prophylaxis. Both institutes advocate the prophylactic use of LMWH in day surgery (evidence level 4: expert's opinion of members of the guideline groups).

Few (national) guidelines on the peri-operative use of thrombosis prophylaxis were found.

In the USA^{2,4,5} and Germany⁶, guidelines recommend thrombosis prophylaxis based on individual patient's risk factors (without formulating specific instructions for day surgery). "Low"-, "moderate"- and "high risk"- patient categories are defined with specific recommendations regarding thrombosis prophylaxis for these groups. Day care patients under the age of 40 and procedures which are performed in an ambulatory setting often belong to the category "low risk". According to these guidelines, no prophylaxis, other than early mobilisation, is recommended. The Scottish International Guidelines Network's guideline restricts their advice for prophylaxis to certain procedures.⁷ The National Institute for Clinical Excellence in the United Kingdom is currently developing a guideline. The New Zealand Guideline group and the Finnish Medical Society Doudecim have not published guidelines for prevention of DVT in surgical patients. No information on this subject could be found in other European countries.

Literature

No prospective studies on thrombosis prophylaxis in ambulatory surgery or gynaecology were found. Three retrospective studies showed incidences of thromboembolic complications of 0% – 0.05% in patients undergoing varicosis vein surgery, hernia repair and operations of the lower extremity in day care without prophylaxis.⁸⁻¹⁰ In our own prospective study on complications and quality of day surgery in a non-academic teaching hospital, the incidence of clinically established thromboembolic complications was 1/854 (0.1 %) after 30 days. All general surgery patients on the day care unit were included and none of them received thrombosis prophylaxis.¹¹

Hierholzer described an incidence of 0.2% in a population of 1705 ambulatory surgery patients from 1989 to 1997 who “often” received prophylaxis by means of LMWH.¹²

Discussion

There is a wide variety in clinical practice of thrombosis prophylaxis in patients undergoing day care surgery in the Netherlands. In general surgery departments, 76 % of the physicians prescribe anticoagulants as compared to 19% in gynaecological day surgery. Within the groups of surgeons and gynaecologists and within the different types of hospitals (teaching and non teaching), thrombosis prophylaxis in day care surgery is not consistent. In the absence of clear and evidence based guidelines thromboprophylaxis is mainly based on subjective arguments.

It is questionable whether the current practice of anticoagulation results in an adequate prophylaxis. In our study in >80% it was limited to a single, preoperative subcutaneous injection of LMWH. The risk for thrombosis is not limited to the day of surgery. A single injection of a LMWH will provide adequate protection for at most 24 hours. Most patients undergoing day care surgery are not protected against DVT after this period. Little is known about the postoperative immobilisation after discharge, which will highly depend on the type of surgery and the patient’s discomfort during convalescence.

The difference between surgeons and gynaecologists may be explained by a smaller a priori risk for thrombosis in the gynaecological patients or by shorter operating time in gynaecological procedures. Traditionally,

surgeons are confronted more often with thromboembolic complications (for example after trauma surgery) and it occurs to us that more awareness and interest exists among surgeons, which reflects in a greater amount of scientific articles on postoperative thrombosis in surgical papers than in gynaecological literature.

Only a limited number of national guidelines about thrombosis prophylaxis was found. These guidelines are based on meta-analyses about LMHW's versus unfractionated heparin in hospitalised surgical patients, a single study on ambulatory surgery⁹ but mainly on expert's opinion of the guideline authors. Risk assessment models combine several risk factors to estimate an overall risk. The individual risk factors are liable to subjective interpretation and the importance of each risk factor is not consistent.

Generally accepted patient-riskfactors for thrombosis include a previous thrombosis, varicose veins, age older than 40 years, obesity, malignant disease or known thrombophilia.¹³⁻¹⁹ In day surgery practice, a considerable amount of patients has one or more of these factors. Non-patient risk factors are a long operating time (mostly defined as > 30 minutes), certain types of operation, the duration of postoperative immobilisation and plaster cast.^{20,21} Nowadays more complicated surgery is being performed in day care, with many interventions taking longer than half an hour. In spite of the fact that Virchow's triad is shown to be present during laparoscopy, postoperative thromboembolic complications after laparoscopic cholecystectomy appear to be uncommon with or without prophylaxis.²²⁻²⁸

Thromboprophylaxis in day care should be carefully balanced against the risk of bleeding complications. Bleeding seems to occur more often after certain types of interventions, like for example breast surgery which nowadays is frequently performed in an ambulatory setting. Another rare but important bleeding complication is epidural haematoma after spinal anaesthesia, which has many advantages over general anaesthesia in day surgery. The role of LMWH before spinal anaesthesia remains an unsolved issue. While in the Netherlands LMWH's are not considered to add substantial risk to spinal anaesthesia and the last national guideline developed by anaesthesiologists in the Netherlands does not object to prophylactic administration of LMWH at any interval before single shot spinal anaesthesia in patients without other risk

factors³⁹, anticoagulants or non steroid anti-inflammatory drugs; in the United States the experience of 1 : 14,000 spinal haematoma with versus 1 : 225,000 without LMWH has resulted in guidelines advocating an interval of at least 12 hours between the administration of LMWH and spinal puncture.³⁰

As to the evidence for the need for thromboprophylaxis, prospective clinical trials with patients who undergo less extensive interventions during a short stay in hospital would be helpful. Because of the low prevalence of thrombosis after day care surgery, these studies should include a large number of patients.

Considering the fast development of day surgery with the changing patient population and operations, specific international guidelines are warranted. In the meantime, an individual assessment of risk factors for thrombosis and bleeding seems to be the most appropriate.

In conclusion, there is no uniformity in the prescription of thrombosis prophylaxis in day surgery among surgeons and gynaecologists in the Netherlands. Surgeons usually give LMWH, while most gynaecologists do not prescribe anticoagulants. Evidence from randomised trials lacks and a wide variety of opinions exists about the need for prophylaxis. There is an international trend to perform day surgery in elderly patients with more co-morbidity. Evidence based international guidelines for thrombosis prophylaxis in day care are urgently needed.

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Resumption of daily physical activity after day case laparoscopic cholecystectomy

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Abstract

Laparoscopic cholecystectomy has been proven to be safe and feasible as a day case procedure. Few studies investigated postoperative activity resumption. The goal of this study was to objectively assess daily physical activity after day case laparoscopic cholecystectomy and evaluate the effect of encouragement of patients.

Methods This prospective controlled study measured daily physical activity in an unselected patient population undergoing day case laparoscopic cholecystectomy by using an accelerometer for 1 week before surgery to 1 week after. First, a control group received standard care. Subsequently, an intervention group was encouraged to swift resumption of daily physical activity by means of standardized advice combined with individualized activity goals. Outcome measures were activity scores, visual analogue scores (VAS) for pain and nausea and subjective factors limiting activity.

Results Sixty four patients completed the study (n = 28 in the control group, n = 36 in the intervention group). In the control group, 36% of the patients reached their preoperative activity level after 1 week, as compared to 50% in the intervention group (p=0.19). Resumption of daily physical activity during the first postoperative week in the intervention group was not significantly different from the control group (MANOVA, p = 0.05). However, in contrast with men, women in the intervention group did show a faster recovery of daily physical activity as compared to the control group (MANOVA, p = 0.02). Although there was no significant difference in postoperative VAS scores for pain and nausea between both groups, patients in the intervention group experienced pain less often as a limiting factor (p = 0.006).

Conclusions Recovery of daily physical activity exceeded 1 week in most patients undergoing day case laparoscopic cholecystectomy. The use of an accelerometer and standardized encouragement accelerated recovery in women.

Introduction

Laparoscopic cholecystectomy has been proven to be safe and feasible as a day case procedure with lower costs than clinical admission and high patient's satisfaction rates.¹⁻⁹

However, little is known about post-operative recovery after operation because convalescence takes place at home and not during in-hospital observation. Several studies have assessed different aspects of recovery after laparoscopic cholecystectomy such as pain, nausea and vomiting and daily physical activity.¹⁰⁻¹⁵ Most of these studies used questionnaires to estimate recovery of daily physical activity and resumption of work, reporting different time intervals of 2 days to 4 weeks for resumption of recreational activities and 1 to 5 weeks for work resumption.¹⁰⁻¹⁴ To our knowledge, only one study used an accelerometer to assess activity levels after laparoscopic cholecystectomy. That study reported a relatively short postoperative recovery of daily physical activity of 2 days.¹⁵ All patients in the study were employed and of relatively young age (median age, 41 years); therefore, those findings may not be representative of an unselected population that includes more inactive patients.

Since postoperative activity has been reported to correlate with clinical outcome¹⁶, an early return to normal daily physical activity in more inactive patients may be beneficial. Until now, no studies investigated the effect of interventions aiming at an early recovery of daily physical activity after day surgery. Thus, the present study was conducted to 1) assess resumption of daily physical activity after day case laparoscopic cholecystectomy in an unselected population by using an accelerometer and 2) to evaluate the effect of an individualized physical activity intervention on postoperative daily physical activity.

Materials and Methods

Study design

The study was designed as a prospective controlled trial, assessing postoperative recovery of daily physical activity by using an accelerometer (Figure 1) in patients undergoing laparoscopic cholecystectomy in day surgery. Patients were first included in the control group and received standard care, with advices on postoperative recovery given by different surgeons and nurses according to their own professional opinion.



Figure 1.
The accelerometer: PAM® Model AM101,
PAM B.V., Doorwerth, The Netherlands

Before the intervention group entered the study, the entire surgical team (surgeons, residents, nurses) was instructed to give standardized postoperative advice on activity resumption at the outpatient clinic and on the day of surgery. This advice outlined the benefits of swift resumption of normal activities and emphasized the absence of restrictions. Written information was also provided. Before discharge, patients received an advice card with daily recommendations based on individual preoperative activity scores assessed by their accelerometer (Table 1). These recommendations were based on our experience with previous patients. This study was approved by the local ethics committee, and all patients gave informed consent.

Day	Activities	PAM score
Day 1	Lie down as little as possible and resume normal activities inside the house	-
Day 2	Walk the street several times	30 % = *
Day 3	Do not lie down in day time, undertake an activity outside	50 % = *
Day 4	Resume normal activities if possible	80 % = *
Day 5	Resume normal activities if possible	100 % = *

* The recommended PAM scores were calculated from the mean preoperative daily physical activity level and noted on the dotted lines.

Table 1. Personalized daily physical activity advice-card

Population

From November 2005 until October 2006, consecutive patients who underwent laparoscopic cholecystectomy in day surgery were asked to participate in this study. The indication for laparoscopic cholecystectomy was symptomatic cholelithiasis, whether or not after an episode of cholecystitis or pancreatitis. Patients were eligible when they were found suitable for day surgery after screening by the surgeon and anaesthesiologist. This included absence of serious co-morbidities (American Society of Anaesthesiologists class I/II), residence within 30 minutes from the hospital and an accompanying person present the first night at home. Exclusion criteria were conversion to open cholecystectomy and inactivity, defined as inability to walk stairs or pre-operative daily physical activity scores below 5 per 24 hours (see "Assessment of activity level").

Surgical procedure

All patients were admitted to the day surgery unit. Operations were performed by 14 surgeons and residents using two 10 mm trocars (subumbilical and subxyphoid) and two 5 mm trocars (right epigastric and iliac fossa). Before dividing the cystic artery and duct the "Critical View of Safety"¹⁷ was always created. No intra-operative cholangiography was performed, and no antibiotic prophylaxis was given.

Pain medication consisted of diclofenac (75 mg), morphine (10 mg) and fentanyl (3 µg/kg) peroperatively at induction of anesthesia, followed by paracetamol (1 g, 4 times daily) and diclofenac (50 mg, 3 times daily) as long as needed. All patients received ondansetron (4 mg) as prophylaxis against postoperative nausea.

Assessment of daily physical activity

Daily physical activity was assessed by using the PAM accelerometer (PAM® Model AM101, PAM B.V., Doorwerth, The Netherlands; Figure 1), which was clipped on the right hip during waking hours. This device measures accelerations in the vertical axis, resulting in a cumulative score (PAM score) which is a proxy measure for daily physical activity. PAM scores are expressed per 24 hours and range from 0 to 256. The PAM was validated previously in healthy individuals during walking on a treadmill and walking stairs, showing high correlations with whole body oxygen uptake ($r^2 = 0.82$ and $r^2 = 0.93$, respectively)¹⁸.

Before the study, all accelerometers were calibrated on a shaking machine at 3 Hz. Daily physical activity was measured from the seventh preoperative until the seventh postoperative day. Preoperative activity was defined as the average activity score of 7 days. Postoperative activity of each postoperative day was expressed as a percentage of the preoperative value. Patients who were classified as inactive before surgery (PAM score < 5)¹⁸ were excluded from further analysis. Postoperative inactivity was defined as a PAM score of 30% or less of the mean preoperative value, and complete recovery of DPA was defined as a PAM score exceeding 90% of the mean pre-operative value.

In the control group accelerometers were blinded by turning off the display. In the intervention group the display of the PAM was turned on after the operation, and patients were instructed individually by means of a personalized daily physical activity advice-card (Table 1) that provided recommendations for DPA on each post-operative day.

Patients also kept a diary with their daily activities. Compliance of patients to wear the accelerometer was tested by comparing activity scores with information in the diaries. Exceptionally high or low activity score values not matching the comments in the diaries were left out of analysis.

Assessment of pain, nausea and factors limiting activity

Pre- and postoperative pain and nausea were assessed in the diary using a 10 cm visual analogue scale (VAS). The preoperative VAS score was defined as the average score of 7 days. Subjective factors limiting activity were also assessed daily during the study period by using multiple choice questions where patient could register whether they were limited by pain, nausea, wound disturbance, fatigue or other factors.

Statistical analysis

All data were analysed using SPSS 12.0 (SPSS Inc, Chicago, IL, USA) statistical software. Differences between preoperative and postoperative levels of daily physical activity, pain, and nausea VAS scores were evaluated by Wilcoxon signed ranks test. The χ^2 analysis was used to evaluate differences between categorical data. Between-group differences were evaluated by the unpaired Student's t test or analysis of variance with repeated measures analysis of variance (MANOVA) where appropriate. Linear regression was used to calculate correlations. For all statistical comparisons, the level of significance was set at $p < 0.05$.

Results

Population

Eighty patients were included. From these patients, 64 (18 men and 46 women) completed the study. Reasons for drop out of analysis were non-compliance ($n = 6$), inactivity before the operation (PAM score <5) ($n = 7$) and technical failure of the accelerometer ($n = 3$). No significant differences in baseline characteristics between the control group and the intervention group were found (Table 2). In addition, these baseline characteristics were not significantly different between drop outs and included patients. Thirty percent of the included patients were unemployed (33% in the intervention group versus 24% in the control group, $p=0.56$).

	Control group ($n=28$)	Intervention group ($n=36$)	p
Age (years) (mean \pm SD)	45 \pm 15	49 \pm 14	0.39
Sex ratio (M:F)	11 : 17	7 : 29	0.07
Body Mass Index (kg/m ²) (mean \pm SD)	29.8 \pm 6	27.3 \pm 4	0.06

Table 2. Baseline characteristics of study patients

Surgery

No significant differences were observed between the control group and the intervention group in mean operating time (46 \pm 4 minutes versus 48 \pm 3 minutes, $p = 0.94$) and percentage of patients discharged on the same day (79% versus 72%, $p = 0.39$). One complication occurred in the control group (subhepatic abscess) and 3 complications occurred in the intervention group (urinary tract infection, wound infection and gallstone colic), all requiring re-admission ($p = 0.44$). Unplanned admissions after outpatient surgery occurred in 6 cases (21%) in the control group and 10 cases (28%) in the intervention group. Reasons for this prolonged hospital stay were nausea or general discomfort (control group, 2; intervention group, 5), logistic reasons (both groups, 2) and a

longer period of observation demanded by the operating surgeon (control group, 2; intervention group, 3).

Resumption of daily physical activity

In total, 872 pre- and postoperative days were analyzed. The data of 33 days (3.8%) were not included in the analysis because the accelerometer was not worn during the whole day, or the data did not match the registered activities in the diary.

On the seventh postoperative day, DPA levels were still lower than preoperative levels in both the control and the intervention group (PAM scores: 9 ± 7 versus 14 ± 7 [$p = 0.001$] and 12 ± 9 versus 17 ± 10 [$p = 0.03$] respectively). Ten patients in the control group (36%) achieved their normal daily physical activity level in the first postoperative week, whereas 6 patients (21%) were still inactive at that time. There were no significant correlations between recovery of daily physical activity at the seventh postoperative day and age or body mass index ($r = -0.09$, $p = 0.50$; and $r = -0.11$, $p = 0.42$, respectively).

Figure 2a shows daily physical activity levels of the first postoperative week in both groups. The difference in recovery of daily physical activity between the control group and the intervention group during the first postoperative week did not reach statistical significance (MANOVA, $p = 0.05$), nor did the difference in the number of normalized daily physical activity levels on the seventh day, with 36% in control group versus 50% in intervention group ($p = 0.19$).

Resumption of daily physical activity after day surgery

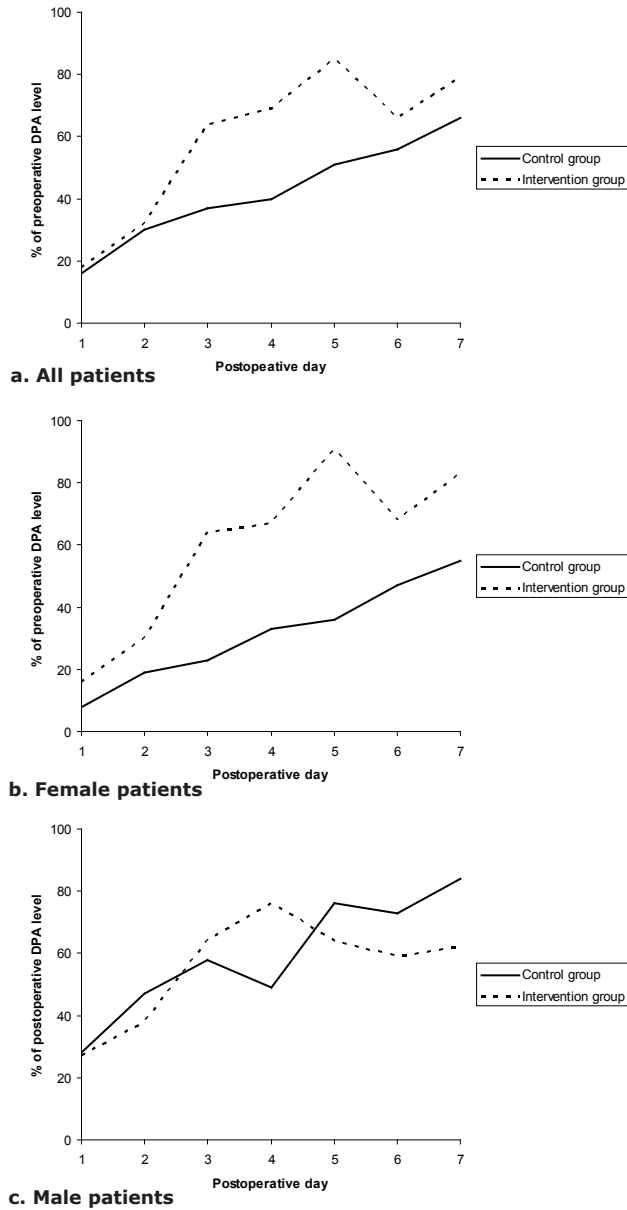


Figure 2. Postoperative daily physical activity (DPA) expressed as a percentage of the mean preoperative activity level in the control group and the intervention group **a** in all patients, **b** in female patients, and **c** in male patients

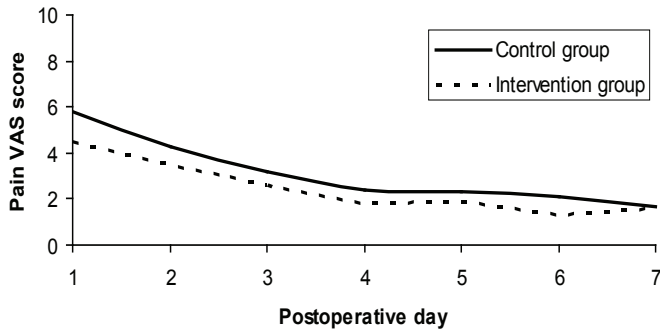
When comparing men and women in the control group, the number of normalized daily physical activity levels after 1 week was higher in men (73% versus 12%; $p = 0.003$). In addition, recovery of daily physical activity during the first postoperative week was faster in men (MANOVA, $p = 0.02$). Women in the intervention group showed a faster recovery of daily physical activity than those in the control group (MANOVA, $p = 0.02$, Figure 2b), whereas in men, there was no significant difference with the control group ($p = 0.91$, Figure 2c).

Furthermore, 1 week after surgery the number of normalized daily physical activity levels in the intervention group in women was significantly higher compared with the control group (48% versus 12% respectively, $p = 0.02$).

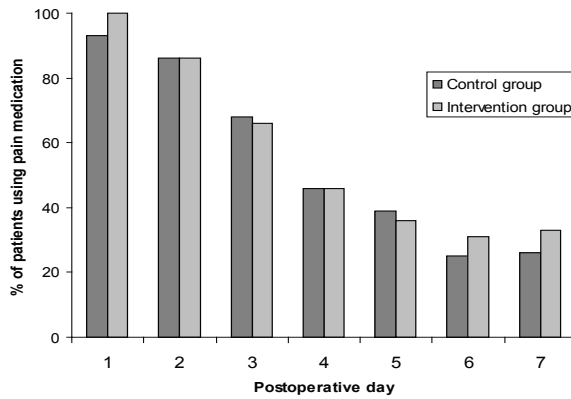
No differences were found in postoperative activity resumption between employed and unemployed patients in the control group (MANOVA, $p = 0.50$), nor in the intervention group (MANOVA, $p = 0.60$).

Pain, nausea and factors limiting activity

Pain VAS scores were significantly higher than pre-operative scores at postoperative day 1, 2 and 3 in the control group ($p < 0.001$, $p = 0.001$, and $p = 0.007$, respectively) and at days 1 and 2 in the intervention group ($p < 0.001$ and $p = 0.002$ respectively). There were no significant between-group differences in pain VAS scores (MANOVA, $p = 0.21$, Figure 3a) and pain medication usage ($p = 0.71$, Figure 3b) during the first week.



a. Postoperative pain



b. Postoperative pain medication

Figure 3. a Postoperative pain on a 10 cm visual analogue scale (VAS score) in patients in the control group and the intervention group. b postoperative pain medication use in both groups.

The VAS scores of nausea were similar in both groups (MANOVA, $p = 0.91$) and showed higher values than preoperative scores only on the first postoperative day in the intervention group ($p = 0.02$).

Subjective factors limiting activity experienced by patients in both groups during the first postoperative week included pain in 80% of all patients, fatigue in 63% and wound disturbance in 72%. Although VAS pain scores and pain medication use were similar in both groups, patients in the intervention group were significantly less often limited by pain in resuming their activities (MANOVA, $p = 0.006$, Figure 4). The number of patients limited by fatigue or wound disturbance did not differ between the groups.

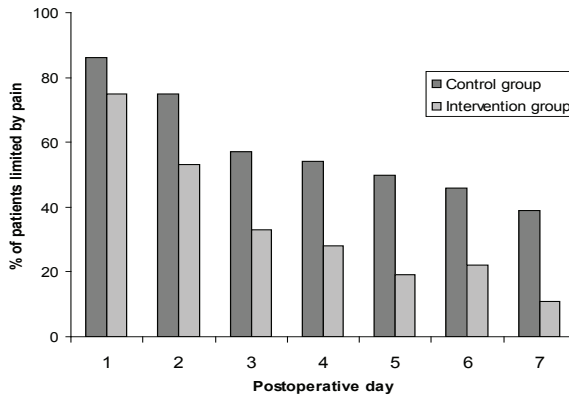


Figure 4. Percentage of patients subjectively limited in physical activity by pain

Discussion

The results of this study indicate that in an unselected population of patients undergoing laparoscopic cholecystectomy in day surgery, objectively measured recovery of daily physical activity exceeds 1 week in 64% of the patients. Moreover, the study showed that resumption of daily physical activity can be improved in women by standardized accelerometer-guided encouragement during the first postoperative week.

To our knowledge, only one study previously assessed postoperative daily physical activity after day case laparoscopic cholecystectomy.¹⁵ That study demonstrated that daily physical activity levels normalized on the second postoperative day. In our study, most patients were not fully recovered after 7 days. This relatively long recovery period is probably mainly determined by a difference in study population. In contrast to Bisgaard et al., who studied employed patients only, we used an unselected population suitable for day surgery, resulting in higher age (median 48 versus 41 years respectively), and a higher body mass index (median 28 versus 25 kg/m², respectively). Another reason for the prolonged recovery of daily physical activity in our study may be a difference in pain management. Whereas anaesthetic techniques were similar, Bisgaard et al. used a multimodal analgesic treatment

including incisional local anaesthetic and found an earlier postoperative normalization of pain scores as compared to the control group of our study (2 days and 4 days, respectively). Finally, the accelerometer that we used is not capable of quantifying physical activities, such as cycling, which may have caused an underestimation of postoperative activity. In both the control and the intervention group, however, the number of patients that cycled in the first postoperative week was lower than in the preoperative period (25% versus 71% in the control group and 25% versus 56% in the intervention group), ruling out a marked influence of this factor.

Another remarkable finding in this study is the discrepancy between postoperative pain VAS-scores and the experienced influence of pain on physical activity. Apparently, patients who were encouraged to mobilise quickly felt less hindered by pain in their activities. This finding emphasizes the subjective character of postoperative convalescence and indicates that it can be influenced by changing patient's expectations and the general opinion about postoperative recovery.

Although several randomized controlled trials have reported favourable clinical effects of multidisciplinary fast track programs, including activity promotion, to accelerate postoperative recovery after colonic surgery,¹⁹ no studies specifically addressed the effects of encouragement on physical activity after day surgery. In the present study, we demonstrated that individualized promotion of physical activity by using an accelerometer can improve recovery after day case laparoscopic cholecystectomy, particularly in women. The fact that we did not find such a beneficial effect in male patients may be explained by the fact that they recovered faster than female patients. A lack of power may also have played a role, because only 18 men were studied. Therefore, to confirm our results and identify other possible factors predicting the effect of individualized activity promotion after day case surgery, future studies should be performed with greater numbers of patients and a longer postoperative monitoring period.

The clinical meaning of a faster resumption of daily physical activity is not entirely clear. Redeker et al. demonstrated a relationship between activity resumption and functional recovery after coronary artery bypass grafting in women.¹⁶ Whether this also applies to surgical procedures with a good overall clinical outcome such as laparoscopic cholecystectomy remains

to be elucidated. Nevertheless, the findings of this study may have some important clinical implications. First, the information on postoperative recovery after laparoscopic cholecystectomy can be more specified, offering patients a realistic expectation of the convalescence phase after day surgery. Second, the relatively long period of inactivity that was found in this study may result in a higher risk of thromboembolism, especially in patients with other risk factors. This may have implications for the use of thrombosis prophylaxis. Third, since we demonstrated that encouragement has a beneficial effect on subjective pain perception and accelerates recovery in women, in our opinion, advice to resume all activities as soon as possible without restrictions should always be given. In this way, recovery of relatively inactive patients can probably be hastened which might have an effect not only on general well-being but also on duration of sick leave. To what extent the use of an accelerometer is contributory cannot be concluded from this study.

In conclusion, recovery of daily physical activity exceeded 1 week in most patients undergoing day case laparoscopic cholecystectomy. Encouragement of patients by using an individualized physical activity intervention with an accelerometer resulted in a reduction of subjective pain experience and a faster postoperative recovery of daily physical activity in women.

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8

Summary and future perspectives

Day surgery has undergone major developments in the Netherlands during the last decades.

This thesis describes these developments (**chapter 2 and 3**) and addresses several clinically related issues (**chapter 4 - 7**).

The findings of the studies from this thesis and the answers to the central questions as formulated in the introduction (**chapter 1**) are summarised and discussed here.

Which quantitative and qualitative developments in day surgery can be observed in the Netherlands during the last decades?

Developments in day surgery were studied using data from national databases from NZi (National Hospital institution) and Prismant Foundation. In the last decades, the proportion of day surgery in the Netherlands showed a steady growth. This involved both overall hospital admissions (from 10%-29% day care in the period 1984-1995; **chapter 2**) and admissions linked to a surgical intervention (from 37%-49% in the period 1996-2004; **chapter 3**). The most substantial increase was found in elderly patients.

To evaluate the developments of Dutch day surgery more specifically, seven interventions were studied that were marked as index procedures by the IAAS (International Association of Ambulatory Surgery) because of their wide application in surgical practice and their suitability for day care. These included breast tumour excision, inguinal hernia repair, varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract extraction, and tonsillectomy. From 1991 to 1995, the proportion of day surgery for all these procedures increased. However, in 1995 a wide variety existed between hospitals (**chapter 2**): percentages of day surgery showed a wide range for all index procedures, for example, 2% to 88% in breast tumour excision and 0 to 59% in inguinal hernia repair. From this finding, a future scenario was formulated in which all Dutch hospitals were ranked from high to low proportions of day surgery of the seven index procedures, and the assumption was made that the proportion of the tenth highest hospital was achievable for all Dutch hospitals. In this way, the future percentage of day surgery of all index procedures was estimated.

In **chapter 3** the same index procedures were assessed in 2004, and the future scenario was evaluated. The most spectacular increase was found in elderly patients undergoing cataract surgery, which far transcended the future scenario: 95% was performed in day care, whereas 68% was expected. The only other procedure where the future scenario was achieved was inguinal hernia repair in adults, with 38% done in day surgery, which is not yet considered as the highest achievable proportion. Hence, a further expansion of day surgery can be expected in the Netherlands.

More day surgery was performed in small hospitals (<200 beds) than in larger clinics (89% versus 79% of the index interventions), whereas fewer day care operations took place in academic centres than in nonacademic ones (67% versus 81%). These differences are probably due to differences in main interests: smaller hospitals are more prone to perform more relatively simple procedures suitable for day surgery, whereas academic hospitals tend to treat more patients with various comorbidities and/or requiring more complex surgery.

In the past, the development of day care in the past was negatively influenced by the budget health care system, which made an overnight stay more rewarding for hospitals than day surgery for the same intervention. Since 2004, a new financial system based on diagnosis treatment combinations has been gradually introduced in which payment is according to a fixed amount per diagnosis. Approximately 20% of diagnoses, including varicose veins, inguinal hernia, cataract, and adenoid or tonsil disease, have negotiable prices. Although it is not clear yet what financial implication this change in the health care system will have, presumably, day surgery will become financially attractive. Moreover, insurance companies may desire a certain amount of day care for a procedure in the hospitals with which they contract.

In conclusion, day surgery has shown a steady increase to 49% of all surgical interventions during the last two decades in the Netherlands. This increase was greatest among elderly patients. On the basis of the future scenario formulated in 1995, a further increase is to be expected.

What is the current quality of day surgery?

Quality of day surgery in the Netherlands is described in **chapter 4**. During 1 year, a cohort of 854 patients who were operated in day care by general surgeons in a nonacademic training hospital were assessed. In this series, 96% could be discharged on the same day. Readmission within 30 days occurred in 6 of 823 cases (0.7%), four times because of a complication. Furthermore 6 of 823 patients (0.7%) underwent reoperation. One potentially life-threatening complication occurred: a pulmonary embolism 22 days after varicose vein surgery.

After surgery, the general practitioner was consulted 91 times, and 40 unplanned visits to the hospital occurred. Patients would prefer day surgery again in 86% of the cases. The most frequent reasons why patients preferred an overnight stay were feeling unwell at discharge and feeling safer in the hospital. This observational series shows that day surgery in the studied hospital is efficient and safe.

Is day surgery feasible in morbidly obese patients?

Morbid obesity was considered a relative contraindication for day surgery. However, patients who underwent laparoscopic gastric banding in the St. Antonius Hospital seemed to have no medical need for longer hospitalisation at the end of the day of surgery. This is why a feasibility study on laparoscopic gastric banding in day surgery was conducted (**chapter 5**).

The study randomly allocated 50 consecutive patients to a day surgery group or an overnight stay group. Outcome measures were length of stay, postoperative convalescence (expressed in pain, nausea and vomiting, overall wellbeing, and resumption of activity), patient satisfaction, and costs. In the day surgery group, 76% of patients were successfully discharged on the same day compared with 72% discharges on the first postoperative day as planned in the overnight stay group.

No patients were readmitted. One patient in the day surgery group required reoperation several hours after surgery because of acute strangulation of the fundus of the stomach. In the overnight stay group, one corneal lesion occurred that was treated conservatively and the patient's discharge was postponed. In two-thirds of the day cases, the postponed discharge probably could have been prevented by optimisation of pain management and avoidance of logistic omissions.

One noteworthy finding was that day surgery patients experienced more pain during the first postoperative week. This may be partly attributed to the visit to the outpatient clinic on the day after surgery.

Half of the day surgery patients (48%) would choose day care again. The costs for day surgery were lower (€3600 versus €4200).

The study concluded that laparoscopic gastric banding is feasible in day surgery, although improvements need to be made in pain management.

What is the application of thrombosis prophylaxis in day surgery and what evidence exists for the need of prophylaxis?

Although the need for thromboprophylaxis in surgical patients is well established, this is not clear at all for day surgery. Because of the low incidence of deep venous thrombosis and pulmonary embolism after day surgery, a randomised controlled trial would need an exceptionally high number of patients to show a significant difference.

In **chapter 6** the clinical practice of thromboprophylaxis in surgical and gynaecological day care patients is described with a review of literature on this topic. No evidence was found for or against the use of prophylaxis in day care. Most Dutch surgeons (57%) administered prophylaxis to all their patients, whereas a minority of gynaecologists (4%) routinely used prophylaxis. Suggested explanations for these findings were different traditions and patient populations.

Until more evidence becomes available on its need, it seems advisable to prescribe thromboprophylaxis on an individual basis (as promulgated by most guidelines) after taking into account the patient's medical history and procedurally associated risk factors.

What is the course of postoperative activity resumption after day surgery?

The main difference between day care and clinical care is in the location of the convalescence phase. After day surgery, the patient recuperates at home, for the most part, without direct medical care. To be better informed on the course of this phase, a study was performed on physical

activity after laparoscopic cholecystectomy in day surgery (**chapter 7**). Physical activity was measured from 1 week before until 1 week after surgery by using a validated accelerometer. This small device was worn on the thigh during the day and gave a score every 24 hours. Two groups were studied: 28 control patients, who were not encouraged to resume activities, and 36 patients who were encouraged to resume their activities as soon as possible. Encouragement consisted of instructions by surgeons and nurses, combined with individual activity goals on the accelerometer. The first group was blinded for the activity scores, whereas the second group could see the score on the accelerometer. In the first group, 21% were still completely inactive after a week compared with 13% of the encouraged patients. Only 36% of the patients in the not-encouraged group had returned to their preoperative activity level at this time, whereas 50% in the encouraged group were. Only in women were differences significant between the groups.

A noteworthy finding was that overall, patients in this study had a slower recovery than that reported by others. Possible explanations for this observation include differences in populations with regard to preoperative activity level, employment, differences in assessment of activity, or the relatively low activity goals set in our study.

From this study we can draw the conclusion that resumption of physical activities after laparoscopic cholecystectomy takes longer than a week in more than half of the patients. Encouragement by means of an accelerometer was only effective in women in this population. Further research is needed to investigate factors of influence on recovery of activities and find strategies to improve convalescence.

Future perspectives

The further development of day surgery in future years will depend on several influences.

First and foremost, a clear financial influence exists. The Dutch health care system is currently subject to an important change from a budget system to a system based on diagnosis and treatment combinations where prices for many procedures will be negotiable with insurance companies that can choose to contract with individual hospitals according to their standards. It is not clear yet what effect this new system will

have, although one could speculate that less financial restraints for day surgery will remain.

Second, it will depend on medical developments in surgical techniques and anaesthesiology care and their consequences for less invasive surgery with fewer postoperative morbidity. The more predictable and uneventful the postoperative course of a specific procedure will be, the more suitable it will be for day surgery.

Finally, the third influence on the length of stay after surgery is social. What are the opinions of patients, doctors, and other medical personnel on a fast discharge from the hospital after an (extensive) intervention? What will be the extra workload on the general practitioner, home care, or extra care by family and friends? A smooth organisation of the aftercare and clear communication with the patient and with one another is crucial for a successful further increase of day surgery.

Conclusion

In the Netherlands, day surgery has increased during the last decades. The day care population has become older, which implies more comorbidity. Meanwhile, more extensive procedures can be performed in day care. After analysing specific day surgery interventions and regarding the changes in the financial health care system a further increase in day surgery is to be expected. These developments entail new challenges in medical care and management in the perioperative period.

Further research

Further research should focus on re-evaluation of developments in day surgery after several years and assessment of the developments in the types of procedures that are done. New index procedures could be studied, such as laparoscopic cholecystectomy, which is presently performed in day care in only 3% of patients although various reports show no differences in postoperative course between patients who have day surgery and those who stay overnight.

Because day surgery patients are more frequently of an older age and have various comorbidities, future research should focus not only on efficiency and safety of day care but also on the "normal" convalescence

phase at home so patients can be adequately informed on what to expect of an uncomplicated postoperative course and care can be further optimised. Specific problems and possible complications related to old age should be assessed.

Although postoperative nausea and vomiting now seem to be under control by preventive measures, pain management in hospital and after discharge needs further research and optimisation.

Many questions remain on the postoperative phase after day care interventions and factors that influence convalescence. With more extensive interventions being performed as day cases, immobilisation time after discharge will lengthen and it will become more important to determine indications for prolonged thromboprophylaxis. This requires randomised trials to study the need of prophylaxis in (elderly) patients after more extensive procedures in day surgery.

9

Summary in Dutch

Samenvatting in het Nederlands voor niet-ingewijden

Inleiding

De zorg in Nederlandse ziekenhuizen was in de vorige eeuw onderhevig aan grote veranderingen. In de 19e eeuw was het gebruikelijk om patiënten op te nemen in een ziekenhuis en te behandelen met bedrust. Men dacht toentertijd dat dit een probaat middel was voor allerlei aandoeningen, veelal bij gebrek aan meer specifieke therapieën. Halverwege de 20e eeuw werd echter duidelijk dat immobiliteit voor veel aandoeningen niet effectief was maar juist gepaard ging met tal van schadelijke effecten zoals spieratrofie, verminderde longfunctie en verhoogd risico op doorligplekken en diepe veneuze trombose.

Ondertussen evolueerde ook de zorg rondom en tijdens operaties. Chirurgische technieken werden minder invasief en de peri-operatieve anesthesiologische zorg verbeterde met als gevolg dat patiënten sneller herstelden. Daarnaast werd aangetoond dat er geen reden bestond voor vele oude gebruiken zoals laxeren voor operaties, gebruik van maagsondes en drains, beperking van postoperatief dieet en langdurige immobilisatie. Door dit soort maatregelen achterwege te laten kon de opnameduur verkort worden. Daarbij kwam dat vanaf de jaren '70 en '80 het beleid in Nederland sterk gericht was op concentratie van zorginstellingen en reductie van het aantal bedden. Dit had als gevolg dat de zorg efficiënter moest worden, hetgeen resulteerde in de verplaatsing van medische diagnostiek en behandeling van kliniek naar polikliniek of dagopname.

Tegen deze achtergrond kwam vanaf de jaren '70 van de 20e eeuw de chirurgische dagbehandeling in Nederland in opkomst.

Dit proefschrift beschrijft de ontwikkelingen van chirurgische dagbehandeling in Nederland in algemene zin en gaat meer in detail in op een aantal specifieke klinische aspecten. In **hoofdstuk 1** worden de onderzoeksvragen geformuleerd, die in dit proefschrift behandeld worden.

Hoe heeft de chirurgische dagbehandeling zich in Nederland ontwikkeld gedurende de laatste decennia?

Gegevens over de ontwikkelingen van dagbehandeling in Nederland werden verkregen uit databanken van het Nationaal Ziekenhuis Instituut

(NZi) en de Landelijke Medische Registratie beheerd door Prismant (voorheen SIG Zorginformatie). In eerste instantie werd het totale aantal opnamen (klinisch en dagbehandeling) in de Nederlandse ziekenhuizen beschreven (**hoofdstuk 2**); gedurende de periode 1984 -1995 bleek het percentage dagopnamen van alle specialismen te zijn gestegen van 10% tot 29% van alle opnamen. In een latere analyse van alleen chirurgische dagbehandeling – waarbij alleen de opnamen van snijdende specialisten gekoppeld aan een verrichting werden onderzocht – werd een toename gezien van 37% in 1996 tot 49% in 2004 (**hoofdstuk 3**). Na 2004 was de registratie van Prismant niet meer volledig omdat veel ziekenhuizen, na de invoering van de verplichte DBC (diagnose behandel combinatie) registratie, geen data meer leverden. De toename van dagbehandeling bleek zich vooral voor te doen bij oudere patiënten.

Om een nog duidelijker beeld van chirurgische dagbehandeling te krijgen werden zeven ingrepen nader onderzocht, die door de International Association of Ambulatory Surgery (IAAS) aangemerkt waren als zogenaamde index-ingrepen vanwege hun frequente voorkomen en de bewezen geschiktheid voor dagopname. Het betrof hier excisie van mammatumoren, enkelzijdige correctie van liesbreuken, enkelzijdige spataderoperaties, laparoscopische sterilisaties, arthroscopieën van de knie, cataractoperaties en tonsillectomieën. In het onderzoek over de periode 1984-1995 (**hoofdstuk 2**) werd een toename van het aandeel dagopname van deze index-ingrepen beschreven, waarbij in 1995 grote verschillen tussen Nederlandse ziekenhuizen bestonden: de percentages dagbehandeling varieerden sterk voor alle index ingrepen, bijvoorbeeld van 2% tot 88% voor mammatumor excisie en van 0 tot 59% voor liesbreukcorrectie. Vervolgens werd op grond van deze getallen een toekomst scenario berekend. Alle ziekenhuizen werden gerangschikt van hoog naar laag wat betreft het percentage ingrepen dat in dagopname werd verricht. Er werd gesteld dat het percentage dagopname dat werd verricht in het 10e hoogst scorende ziekenhuis in deze rij, uiteindelijk voor heel Nederland haalbaar kon zijn. Op basis van deze veronderstelling werd een schatting gemaakt van het percentage index-ingrepen dat in de toekomst in dagopname in heel Nederland zou kunnen plaatsvinden.

Het vervolgonderzoek wordt beschreven in **hoofdstuk 3**. In 2004 bleek dat de grootste toename in dagchirurgie werd gezien bij de cataractoperaties,

vooral bij oudere patiënten, waarbij het toekomstscenario ver werd overtroffen: 95% werd in dagbehandeling uitgevoerd terwijl 68% in het toekomstscenario was voorspeld. Ook het aantal liesbreukcorrecties bij volwassenen voldeed aan de eerder geformuleerde verwachtingen: 38% van deze ingreep werd uitgevoerd in dagopname, hetgeen overigens nog niet als het hoogst haalbare wordt beschouwd. Op grond van de analyse van deze index-ingrepen is verdere groei van chirurgische dagbehandeling in Nederland te verwachten.

In kleinere ziekenhuizen (<200 bedden) bleek meer dagopname plaats te vinden in vergelijking met grotere ziekenhuizen (89% versus 79% van de index-ingrepen), terwijl in academische centra juist minder in dagopname werd geopereerd dan in niet academische ziekenhuizen (67% versus 81%). Vermoedelijk kunnen deze verschillen worden teruggevoerd op een andere case-mix: kleinere centra zijn klaarblijkelijk meer gericht op minder complexe verrichtingen die veelal in dagchirurgie kunnen plaatsvinden, terwijl academische centra meer patiënten met complexe co-morbiditeit behandelen.

De financieringssystematiek voor de ziekenhuizen volgens het budgetsysteem is de laatste jaren mogelijk een negatieve factor voor de ontwikkeling van de daghospitaal chirurgie geweest aangezien het voor ziekenhuizen financieel gunstiger was om patiënten voor eenzelfde ingreep een nacht op de te nemen dan ze te behandelen in dagopname. Vanaf 2004 werd het diagnose behandel combinatie (DBC) systeem geleidelijk geïntroduceerd. In dit systeem wordt de vergoeding bepaald op basis van vaste prijzen voor bepaalde diagnoses. Ongeveer 20% van alle ziekenhuiskosten, waaronder operaties vanwege spataderen, liesbreuken, cataracten en tonsillectomieën, zijn de prijzen van de DBC's vrij onderhandelbaar. Hoewel het nog niet duidelijk is welke financiële consequenties deze veranderingen zullen hebben, is het aannemelijk dat dagbehandeling financieel aantrekkelijker zal worden. Wat ook meespeelt is het feit dat zorgverzekeraars normen kunnen stellen voor de minimale hoeveelheid dagbehandeling die een gecontracteerd centrum moet uitvoeren van een bepaalde ingreep.

De laatste twee decennia heeft chirurgische dagbehandeling in Nederland een gestage groei doorgemaakt tot 49% van alle ingrepen. De grootste toename vond plaats bij oudere patiënten. Op grond van het toekomstscenario van 1995 is verdere toename mogelijk.

Hoe is de huidige kwaliteit van chirurgische dagbehandeling in Nederland?

De kwaliteit van dagchirurgie in Nederland wordt beschreven in **hoofdstuk 4**. Gedurende een jaar werd een cohort van 854 patiënten onderzocht; zij werden in dagbehandeling geopereerd door algemene chirurgen in een perifeer opleidingsziekenhuis. In deze studiepopulatie werd 96% van de patiënten op de dag van de ingreep naar huis ontslagen. In deze groep was een heropname binnen 30 dagen na de ingreep noodzakelijk bij slechts 6/823 patiënten (0.7%), waarvan 4 in verband met een complicatie. Verder werden 6/823 (0.7%) patiënten opnieuw geopereerd wegens een complicatie. Er ontstond één potentieel levensbedreigende complicatie (een longembolie op dag 22 na een endoscopische varicesbehandeling). Postoperatief werd de huisarts 91 keer geconsulteerd en vonden 40 ongeplande ziekenhuisbezoeken op de polikliniek en spoedeisende hulp plaats. Van alle patiënten zou 86% opnieuw dagopname prefereren. Patiënten die liever in het ziekenhuis bleven gaven als belangrijkste redenen aan dat zij zich na de operatie nog te ziek te vonden en zich thuis minder veilig gevoeld hadden. Dit observationele onderzoek toont aan dat dagbehandeling in het onderzochte ziekenhuis efficiënt en veilig is.

Is bariatrische chirurgie mogelijk in dagbehandeling?

Van oudsher werd morbide adipositas (ziekelijke vetzucht) als een relatieve contra-indicatie voor dagchirurgie beschouwd. De ervaring in het St. Antonius Ziekenhuis leerde echter dat aan het einde van de operatiedag geen medische noodzaak bestond om patiënten, die een laparoscopische maagband plaatsing hadden ondergaan, langer opgenomen te houden. Dit vormde de aanleiding voor een onderzoek naar de haalbaarheid van deze ingreep in dagopname. Hiertoe werden 50 patiënten gerandomiseerd in een dagopname en een klinische opname groep, waarbij naast opnameduur tevens het postoperatieve herstel, de patiënttevredenheid en de kosten werden onderzocht (**hoofdstuk 5**). In de dagopname-groep kon 76% van de patiënten op de dag van de ingreep worden ontslagen; in de klinische groep werd 72% van de patiënten conform de planning ontslagen op de eerste postoperatieve dag. Er werden geen patiënten heropgenomen. In de dagopname groep

trad eenmaal een acute strangulatie van de maag op waarvoor een re-operatie werd verricht, terwijl in de klinische groep een cornealetsel optrad waarvoor de patiënt langer geobserveerd werd. Bij 2/3 deel van de dagopname patiënten zou uitstel van ontslag voorkomen kunnen worden door middel van een optimale pijnstilling en het vermijden van logistieke omissies. Opvallend was het feit dat dagopname patiënten gedurende de eerste week meer pijn hadden dan klinische patiënten. Dit zou deels verklaard kunnen worden door de controle op de polikliniek, die bij iedereen op de dag na de ingreep plaatsvond, en die bij dagopname patiënten mogelijk meer pijn induceerde ten gevolge van de reis op en neer naar het ziekenhuis. De helft (48%) van de dagopname patiënten gaf aan een volgende keer weer op dezelfde dag naar huis willen. Een ingreep in dagbehandeling was, zoals verwacht, goedkoper (3600 versus 4200 euro). Geconcludeerd kan worden dat bariatrische chirurgie in dagbehandeling mogelijk is, waarbij wel meer aandacht aan postoperatieve pijnbestrijding besteed zou moeten worden.

Wat is de plaats van tromboseprofylaxe bij ingrepen in dagbehandeling?

Over het nut van peri-operatieve tromboseprofylaxe bij geïmmobiliseerde klinische patiënten bestaat voldoende overeenstemming, maar voor chirurgische ingrepen in dagopname is de indicatie helemaal niet duidelijk. Onderzoek hiernaar wordt bemoeilijkt door de lage incidentie van diepe veneuze trombose en longembolie bij patiënten die een ingreep in dagopname ondergaan. Een gerandomiseerd onderzoek naar het effect van tromboseprofylaxe zal een zeer groot aantal patiënten moeten bevatten om een verschil aan te tonen. In **hoofdstuk 6** wordt de dagelijkse praktijk van tromboseprofylaxe bij chirurgische dagbehandeling onder Nederlandse chirurgen en gynaecologen beschreven, aangevuld met een overzicht van de beschikbare literatuur op het gebied van tromboseprofylaxe. De conclusie is dat er geen bewijs bestaat voor of tegen tromboseprofylaxe in dagbehandeling. De meeste (57%) chirurgen schreven tromboseprofylaxe voor aan alle dagopname patiënten, terwijl slechts 4% van alle gynaecologen dit deden. Een verklaring voor dit verschil werd gezocht in verschillende tradities en patiënten populaties. Als tromboseprofylaxe werd voorgeschreven was

dit in de overgrote meerderheid van de gevallen éénmalig op de dag van de ingreep, waarbij het de vraag dit een effectieve manier van profylaxe was. Totdat meer bekend is over het nut en de noodzaak van profylaxe lijkt het verstandig om (zoals de meeste richtlijnen voorschrijven) een individuele afweging te maken, die wordt gebaseerd op patiënt- en operatiegebonden risicofactoren.

Hoe verloopt activiteitshervatting na aan ingreep in dagbehandeling?

Een verschil tussen chirurgie in dagbehandeling en klinische opname ligt in de verplaatsing van de herstelfase naar de thuissituatie, waarbij deze zich grotendeels buiten het gezichtsveld van de behandelende arts afspeelt. Om meer inzicht te verkrijgen in het beloop van de herstelperiode werd een onderzoek gedaan naar de lichamelijke activiteit van patiënten na een laparoscopische cholecystectomie (verwijderen van de galblaas middels een kijkoperatie) in dagopname (**hoofdstuk 7**). Activiteit werd vanaf een week vóór tot een week na de ingreep gemeten met behulp van een gevalideerde activiteitsmeter. Dit apparaatje werd gedurende de hele dag aan de broekriem gedragen en gaf een activiteitscore per 24 uur. De studie werd verricht in twee groepen patiënten: een groep van 28 controlepatiënten bij wie de activiteit niet werd gestimuleerd en een groep van 36 patiënten die actief werden aangemoedigd tot spoedige hervatting van normale activiteit. Chirurgen, verpleegkundigen en polikliniek personeel werden geïnstrueerd patiënten aan te moedigen tot vroege mobilisatie, waarbij onder andere streefpunten voor dagelijkse activiteit werden meegegeven in combinatie met individuele streefscores van de bewegingsmeter. Voor de eerste groep waren de resultaten van de activiteitsmeter niet zichtbaar (geblindeerde groep); patiënten in de tweede groep konden wel hun scores van de activiteitsmeter per dag zien. In de eerste groep patiënten bleek 21% van de patiënten na een week nog vrijwel volledig inactief te zijn ten opzichte van 13% in de gestimuleerde groep. Slechts 36% van de patiënten in de niet-gestimuleerde groep was na één week weer terug op hun preoperatieve activiteitsniveau, terwijl in de gestimuleerde groep 50% na één week weer hersteld was wat betreft activiteit. Alleen voor vrouwen bleken verschillen in activiteit tussen de groepen significant te zijn. Het viel

overigens op dat het herstel van activiteit in de gehele groep langzamer was dan elders beschreven. Dit zou kunnen worden verklaard door een verschil in de onderzochte groepen patiënten. Mogelijk is in onze groep sprake van een reeds minder actieve groep patiënten voorafgaand aan de operatie. Wellicht is de arbeidsparticipatie van patiënten in andere studies hoger, waarbij de drang om weer aan het werk te gaan groter is. Het verschil zou ook verklaard kunnen worden door de relatief lage streefwaarden in dit onderzoek.

Uit dit onderzoek kan worden geconcludeerd dat activiteitsherstel na laparoscopische cholecystectomie bij meer dan de helft van de patiënten langer dan een week duurt en dat stimulatie met behulp van een bewegingsmeter alleen bij vrouwen een significant effect heeft gehad. Aanvullende studies zullen nodig zijn om factoren die van invloed zijn op herstel te identificeren. Met deze wetenschap kunnen meer specifieke maatregelen ter bevordering van het activiteitsherstel na chirurgische ingrepen worden ontwikkeld.

Toekomst

Het is de vraag hoe chirurgische dagbehandeling in Nederland zich in de komende jaren verder ontwikkelt. Een aantal factoren is daarbij van belang.

Ten eerste zal veel afhangen van de financiering van de zorg. Veel potentieel dagchirurgische ingrepen maken tegenwoordig onderdeel uit van het zogenaamde B-segment van de DBC's (diagnose behandelcombinaties); wat betreft financiering zou er dus geen prikkel meer moeten zijn om patiënten langer dan strikt noodzakelijk is, in het ziekenhuis opgenomen te houden. Een andere positieve prikkel voor chirurgische dagbehandeling is het feit dat zorgverzekeraars normen kunnen stellen voor een minimum aantal dagopnamen per ingreep dat door een gecontracteerd centrum verricht moet worden.

Ten tweede is de toename van dagchirurgie afhankelijk van technische ontwikkelingen op het gebied van chirurgie en anesthesiologie. Het herstel na een operatie verloopt beter als de operatie minder invasief is, minder lang duurt, er minder anesthesiologische bijwerkingen zijn en postoperatieve pijnstilling optimaal is. Kortom: hoe beter voorspelbaar het postoperatieve beloop van een bepaalde ingreep bij een bepaalde

patiënt, des te geschikter voor dagopname.

Ten derde zijn factoren van maatschappelijke aard van belang bij de opnameduur van chirurgische patiënten. Daarbij spelen factoren als de beleving en acceptatie van patiënten, artsen en andere zorgverleners van snel ontslag na een (uitgebreidere) ingreep een rol. Het is de vraag in hoeverre vaker een beroep zal moeten worden gedaan op de huisarts, thuiszorg of mantelzorg. Goede afstemming van nazorg en communicatie naar de patiënt middels protocollaire voorlichting over de ingreep en het te verwachten beloop, zal essentieel zijn voor de verdere uitbreiding van het daghospitaal.

Conclusie

Chirurgische dagbehandeling in Nederland is in de laatste decennia sterk toegenomen. De patiënten populatie is nu ouder dan vroeger en heeft derhalve meer co-morbiditeit. Ondertussen kunnen uitgebreidere ingrepen in dagopname uitgevoerd worden. Analyse van specifieke dagbehandeling ingrepen en veranderingen in het financieringsstelsel van de zorg scheppen een reële verwachting voor verdere groei in de komende jaren. Deze ontwikkelingen creëren nieuwe uitdagingen voor het optimaliseren van de peri-operatieve zorg.

Verder onderzoek

De komende jaren neemt de zorgvraag door een verouderende populatie toe, waarbij het beschikbare budget voor de gezondheidszorg waarschijnlijk niet in dezelfde mate zal toenemen. De zorg zal dus efficiënter moeten worden vormgegeven. Alleen al uit oogpunt van kostenbeheersing, zullen ingrepen naar verwachting zo veel mogelijk in chirurgische dagbehandeling moeten plaatsvinden. In verder onderzoek zullen andere ingrepen kunnen worden aangemerkt als index-ingreep. Hierbij kan gedacht worden aan laparoscopische cholecystectomie, die momenteel slechts in 3% van de gevallen in dagopname plaatsvindt in Nederland. In de literatuur blijkt echter geen verschil in beloop te bestaan tussen een laparoscopische ingreep in dagopname of in een klinische opname.

Er is nog niet veel onderzoek gedaan naar chirurgie in dagopname bij

oudere patiënten. Het is de vraag of een leeftijdsgrens gehanteerd zou moeten worden voor "grotere" ingrepen in dagopname. Het is niet ondenkbaar dat ouderen geheel specifieke problemen of complicaties hebben, die van invloed zijn op het beloop van de herstelfase thuis. Postoperatieve klachten zoals misselijkheid en overgeven kunnen tegenwoordig goed voorkomen worden. Pijnbestrijding in het ziekenhuis en thuis dient echter verder onderzocht en geoptimaliseerd te worden. Ook is het van belang te onderzoeken welke factoren bepalend zijn voor herstel van activiteit in de thuissituatie na meer uitgebreide ingrepen. Naar mate patiënten grotere ingrepen in dagbehandeling ondergaan en daarna thuis langer inactief zijn, wordt ook het vraagstuk over verlengde trombose profylaxe belangrijker. Dat vraagt om gerandomiseerde studies naar tromboseprofylaxe bij (oudere) patiënten na grotere ingrepen.

Dankwoord
Curriculum Vitae
List of publications

Dankwoord

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Curriculum vitae

The author of this thesis was born in march the 15th 1974 in Warsaw, Poland. On the age of three she immigrated to the Netherlands with her parents. She graduated from the Stedelijk Gymnasium in 's-Hertogenbosch in 1992. After studying Biology at the University of Utrecht during one year, she decided to switch to Medical Science. As a medical student the scientific work of this thesis was started at the department of surgery in the St. Antonius Hospital in Nieuwegein (dr. P.M.N.Y.H.Go). After the degree of Medical doctor was obtained in 1999, she worked as a surgical intern at the same department in the years 2000 and 2001. In this period the research for this thesis continued under supervision of dr. B. van Ramshorst and prof. dr. D.H. Biesma. In 2002 Surgical training started at the University Medical Center in Utrecht (prof. dr. I.H.M. Borel Rinkes). In January 2004 she returned to the St. Antonius Hospital in Nieuwegein for the final 4 years of her training (dr. P.M.N.Y.H.Go), which she will finish in July 2008. Since 2004 she lives in 's-Hertogenbosch again with her husband Hareld and their son Oscar.

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*Look at the patient lying long in bed. What a pathetic picture he makes!
The blood clotting in his veins, the lime draining from his bones,
the scybala stacking in his colon, the flesh rotting from his seat,
the urine leaking from his distended bladder, and the spirit evaporating from his soul*

(R.A.J. Asher, 1947)