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Editorial:

We live in a global village, learning and experiencing newer concepts and ideas, aimed at improving our life style. The pace of which, all over the world, is evidently on a bullish increase. I do not see any option but to keep up.

Day Surgery Journal of India, as we are now titled, has tried to highlight the work done from around us.

In this issue, we have an article from Dr. Lindsay Roberts, from the Land Down Under, who has the distinction of shaping the Australian Day surgery, by setting up policies and guidelines. His article is interesting to read. I am always interested in history of how we came to and where we are.

Dr. Dhayagude's article speaks of years of experience and various possibilities in Ambulatory surgery, especially in the children, who have dislike for doctors and hospitals. I have always held that anaesthesia is the most important branch of Day Care surgery. The success or failure of any Day-case surgery is dependent much more on an efficient anaesthesiologist than a surgeon!

Dr. Dick De Jong writes from his perspective of being recently the President of an International organisation solely dedicated to Ambulatory surgery. The technological advancements that he writes in his article are something to speculate about. It is indeed not possible to think of any country not wanting or advancing towards Ambulatory surgery. We should soon hope to be able to boast of a well organized and widely accepted Day Surgery concept in our country.

Ophthalmology is almost 100% Day surgery. Dr. Natarajan and his team of doctors have done remarkable work in their specialty, indicating once again; advancements that have taken place in Eye care. Rarely do you see any patient undergoing eye surgery requiring hospitalization; this is now so well accepted that it would raise a cause of concern and surprise from the patient or their relatives, if they were asked to be hospitalized. Therefore, if Ophthalmology, which involves the most important sensory organ of your body, has advanced to Day surgery, without protests from anyone, then I do hope that the simpler surgical afflictions from other surgical specialties can be performed as Day Care too.

Dr. Yuen and his team from Hong Kong have produced an amazing and sustainable protocol of Day case selection for successful Laparoscopic Cholecystectomy, in a country which is so close to us. A lot of encouragement and strength needs to be derived from this work.

The one common factor seen in the international articles published earlier and now, is the fact that they are growing in tandem with the healthcare policy makers of their respective countries. It is heartening to see that the concept of Day Surgery is considered important to the citizens of their country and contributes to the economics of time and money.

Will we also have the privilege of being heard and taken seriously? I do not know. How do we go about making such changes in our healthcare system without the government support, I do not know. But, as individuals, a change in the small area of your practice will go a long way, for we have decided to take the step towards the change. And succeed we will.

We thank our sponsors for supporting us in this endeavour, the contributors and the readers need to be duly acknowledged and thanked. My special thanks to the advisory committee and Dr. Seema Row, my wife, for helping me in editing this issue and much more!

I request our readers to contribute their experiences and ideas by writing articles, essays, and letters to the Editor. Constructive criticism is welcome too. Remember, this is a team effort, every contribution, however big or small, is of significant importance. It helps in increasing the awareness of this 'small revolution' called: **Day Care Surgery**.

Naresh T. Row

Day Surgery - National and International: From the Past to the Future.

Lindsay Roberts

Chairman of the Australian Day Surgery Council from 1990 to 2000 and President of the International Association for Ambulatory Surgery from 2001 to 2003.

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In February 1981, a working party was formed by the Royal Australasian College of Surgeons, the Faculty of Anaesthetists of the Royal Australasian College of Surgeons (now the Australian and New Zealand College of Anaesthetists), the Australian Association of Surgeons and the Australian Society of Anaesthetists with the inclusion of a group of co-opted members, to prepare the first manual of standards for day surgery. This manual, "Day Surgery; Report and Recommendations", was published in September 1981 and revised in 1987 and 1997. An expanded revision was completed in July 2004.

In 1987, recognising the potential for future expansion of day surgery, the working party was formalised as a committee and in 1988 changed its name to the National Day Surgery Committee. It was during this same period that an accreditation process was established by the Australian Council on Hospital Standards (now the Australian Council on Healthcare Standards). Clinical Indicators, specifically applicable to day surgery were prepared in 1994 and have been successfully introduced for quality assessment of day surgery practice.

By 1996, the Committee was soundly established as the most informed body on day surgery in Australia. Its activities in all aspects of day surgery practice were expanding; especially the preparation of standards, and its membership had increased to include co-opted representatives from all

organisations involved in the provision of procedural services within the health care system. The estimated ultimate potential for day surgery had increased from 50% to 75% (possibly more) of all operations/procedures. Having regard to these increased activities and responsibilities, together with its enhanced authority, the committee changed its name to the Australian Day Surgery Council in October 1996 and continues as such today.

The first modern, purpose designed and constructed free standing day surgery centre was built in Dandenong, Victoria in 1982 and the first free standing centre on the campus of a public hospital, Campbelltown, NSW in 1984. By 1993 there were 83 such centres; however their numbers have increased rapidly over the past decade - today there are 248 freestanding day surgery centres in Australia and they continue to be built.

Since the publication of "Day Surgery; Report and Recommendations" 1981, the Australian Day Surgery Council has reiterated its stance of equal support for hospital based day surgery units and free standing centres however the development of hospital based units has lagged behind. It is acknowledged that a considerable volume of day surgery is practiced in hospitals, approximately 50% of all operations/procedures. About one third of private hospitals have day surgery units, however, I am unaware of any data

Note:

In the above text "day" and "ambulatory" are synonyms.

indicating the number of public hospitals that have dedicated day surgery units. Anecdotally, it seems that most day surgery patients in public hospitals are located in ward beds or, at most, in a day surgery ward. This apparent failure of the public hospital system to fully utilise all the patient and cost efficiencies and benefits of day surgery should be addressed as a matter of urgency.

The International Association for Ambulatory Surgery was formed in 1995 and Australia (Australian Day Surgery Council) is a foundation member. Initially located in Brussels, the Central Office was transferred to London (Royal College of Surgeons building) in 2004. The official journal of the Association is “Ambulatory Surgery”. Currently it has 15 full members, five Associate members (including the Australian Day Surgery Nurses Association) and numerous individual members.

An important initiative of the Association was the preparation of International Definitions of Ambulatory Surgery, which have been translated into 10 languages. Criteria of standards for various aspects of day surgery practice have also been written and this process will continue. The Association considers these initiatives very important to facilitate the comparison of day surgery practice from one country to another and to assist in the development of this high quality, cost effective procedural service in those countries where it has not been introduced.

The Association holds second yearly International Congresses on Ambulatory Surgery. So far, there have been five Congresses – Brussels, London, Venice, Geneva and Boston; they have all been very successful. The next four Congresses are to be held in Seville (2005), Amsterdam (2007), Brisbane (2009) and Aarhus (2011).

The Australian Day Surgery Nurses Association was formed in 1995 and is totally focused on the advancement of the highest quality, safe nursing practice in day surgery centres/units. It has over 700 members and conducts regular conferences and education sessions for nurses throughout the country. It publishes a journal, three times a year, called “Day Surgery Australia”; it has also produced “Best Practice Guidelines” and they are a credit to them.

The ADSNA is a member of the Australian Day Surgery Council and the International Association for Ambulatory Surgery.

So much for the past and the present - what about the future? Day Surgery has not yet reached its full potential in Australia – or anywhere else for that matter. Currently, approximately 50% of all operations/procedures are carried out as day surgery although considerable variation from hospital to hospital and surgeon to surgeon still remains! Unquestionably, freestanding day surgery centres are the most patient and cost efficient facilities and it is from these centres that the absolute costs of day surgery practice can be collated. Certainly, the most inefficient model is to have day surgery patients spread throughout hospitals occupying acute beds – so called “day surgery wards” are not much better. In both models, patients are utilising expensive acute beds, equipment and services and this is more so in the public than the private hospital system. The ideal would be to integrate dedicated free functioning day surgery units within hospitals such that they operate the same as a freestanding centre. An obvious and even better model would be to build the freestanding centres on the campus of hospitals.

So what is the ultimate potential for day surgery? In 1999, Twersky and Showan predicted that by 2005, 82% of all surgery in the USA would be carried out as outpatient (day) surgery and 24% of this would be office-based surgery.

Unbelievable – yes, but they are heading that way!

The Australian Day Surgery Council is a unique council totally dedicated to day surgery, just as the Australian Day Surgery Nurses Association is totally dedicated to day surgery nursing. They are unsurpassed as the most informed bodies on all aspects of day surgery in Australia and will continue to provide their proven expertise for day surgery to achieve its ultimate potential.

This will be an onerous challenge as the further expansion will include the most major operations capable of being carried out in day surgery compatible with the highest levels of quality and safety that have already been set and which must be protected.

In order to achieve this further expansion of day surgery it will be essential to introduce the concept of extended (overnight) recovery in day surgery centres/units and post-discharge convalescent limited care accommodation facilities (medi motels). Both concepts are important for more major operations however limited care accommodation facilities have the added advantage of allowing socially stressed patients eg elderly, solitary, disabled etc and those from rural and remote areas, who would otherwise require admission to acute bed hospitals, to be treated in day surgery followed by a couple of days convalescence before returning home. An added advantage is the cost of limited care accommodation which is approximately half that of acute hospital beds. The Australian Day Surgery Council has published standards for these concepts however the health insurance industry has failed to provide a facility rebate for either!

Office based surgery in purpose built units, which are extensions of medical practitioners consulting rooms, is not yet established in Australia largely due to the failure of health insurers to provide a facility rebate. A large number of more minor operations/procedures, possibly 20-25% could be carried out in such units and the Australian Day Surgery Council has published comprehensive "Guidelines for the Accreditation of Office Based Surgery Facilities" to ensure that standards of quality and safety are not compromised. The absence of an office based surgery rebate is a major disincentive and as such, many of these patients are currently treated in day surgery centres/units at much greater cost.

An important generally acknowledged sequela of day surgery has been its influence on medical education – especially the teaching of undergraduate clinical skills. The big majority of patients with surgical conditions and pathology so essential for teaching clinical skills are now treated in day surgery and for all practical purposes are not available to medical students. This is a cause of frustration and concern to clinical tutors (surgeons) and students alike. One solution is the development of large day surgery centres/units in teaching hospitals to which the majority of clinical education would be transferred while retaining some teaching in

acute bed wards.

This matter is deserving of urgent consideration by medical schools.

In the international forum, the greatest challenge is to assist the introduction and expansion of ambulatory surgery into those countries where this high standard procedural service, provided in centres/units of low capital and ongoing costs, has not yet been introduced or is in its earliest stages of development. To achieve this, the International Association for Ambulatory Surgery needs to expand its membership to include such countries. The International Congresses on Ambulatory Surgery are important forums for the propagation of knowledge, experience and expertise in this most valuable procedural service.

In Summary:

- Day Surgery in Australia and many other countries is established as an indispensable procedural service within the nation's health care system.
- It has not yet reached its ultimate potential and the introduction of extended (overnight) recovery; limited care accommodation facilities (medi motels) and office based surgery units should be vigorously supported.
- There is now an imperative for the Commonwealth Department of Health and Ageing to formalise the recategorisation of procedural services and for health insurers to introduce facility rebates for these concepts.
- The Australian Day Surgery Council is unsurpassed as the most informed body on all aspects of day surgery in Australia and will continue with its activities and in its advisory role to achieve these goals.
- There is sound logic in and great potential for developing dedicated day surgery centres/units in teaching hospitals to become the focus of teaching clinical skills in the medical education curriculum.

- The challenge for the International Association for Ambulatory Surgery is to promote and stimulate the development of day surgery in those countries where this valuable procedural service has not yet been introduced or is in its earliest stages.

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Progress and Dilemmas in Paediatric Anaesthesia in Day care Surgery

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Introduction:

For years we have been doing outpatient pediatric surgery under general Anaesthesia but only for real minor cases such as I & D abscesses, reduction of closed fractures, excision of small lumps and circumcision. But for last decade or so we have started doing more and more cases as day care, of course the success has been attributed to advances in surgical techniques and in the field of Anaesthesia.

However patient's safety can never be compromised in the name of 'fast tracking and cost containment'. Top priorities for successful outpatient surgery are the 4 A's—Alertness, Ambulation, Analgesia and Alimentation.

All of you must have experienced that patients demand quality care these days. The parents have multiple questions and you must spend time giving satisfactory answers to their questions:

1. How long the child needs to be starved?
2. Can you put the child to sleep in our presence?
3. How will you look after my hyperactive child?
4. Will the child get lot of pain after the surgery?
5. When can we start feeding the child?
6. When the child can return to various activities?

For successful outcome of day surgery we have to take careful decision regarding:

1. Selection of patient
2. Selection of procedure
3. Information to family members
5. Anaesthetic consideration
6. Postoperative management
7. Discharge criteria
8. Prevention of complications.

Special risk factors and Exclusion criteria:

1. Premature babies – Babies less than 60 weeks PCA.
2. H/O Sudden death syndrome in family.
3. URTI-increases perioperative respiratory complications –cough, Laryngospasm and bronchospasm.
4. Asthama- Treatment continued in preoperative period.
5. Heart condition- Murmur should be investigated and patient should be stable on treatment, Antibiotic coverage essential.
6. Seizures-patient should be well controlled and stable. Medication should be continued.
7. Hepatic & kidney functions should be within normal range.
8. Mental handicaps and Autism-patients should be stable.

9. Diabetes Mellitus-patients are not suitable for day care surgery.
10. Sickle cell disease-patients need proper preoperative vigilance and preparation so they are excluded.
11. Obesity- they have multiple problems, hence they are excluded.
12. Syndromic babies – may have metabolic problems, difficult airway, hence excluded.
13. Malignant hyperthermia – susceptibility, therefore, excluded.

Procedures commonly performed as day care:

1. Gen. surgery – circumcision, hernia, orchidopexy, exc. of lumps, I & D of Abscesses, tongue-tie release and many more major surgeries.
2. Diagnostic and therapeutic procedures – Laryngoscopy, tracheo-bronchoscopy, oesophagoscopy, dilatation, gastroscopy, colonoscopy, cystoscopy, CT Scan, MRI, Transoeso-echocardiography, cardiac catheterization.
3. ENT- Tonsil and adenoid surgery, Myringotomy, tube insertion, closed reduction of nasal fracture.
4. Dental – Extraction, restoration.
5. Ophthalmology – EUA, Lacrimal duct probing, exc. of chalazion or cyst.
6. Plastic Surgery – Otoplasty, exc. of skin lesions, scar revision, procedures for syndactyly and polydactyly.
7. Orthopedic - closed reduction of fractures and arthroscopy, cast changes, removal of pins and plates.

In these procedures there are no physiological disturbances, such as, major fluid or blood loss, minimal risk of anaesthetic and surgical complications.

Simple nursing care is required post-procedure that can be taken by parents, such as, administration of oral medication like analgesics, antibiotics and anti-emetics. No major limitations on child's activities are required.

Preoperative assessment and tests:

Day care surgery demands the highest standards of professional skill and organization. Although the

operation could be minor, an Anaesthetic is never minor.

It is advisable to operate the patients with physical status of ASA grade I & II only. Routine screening includes CBC, Routine urine examination. Investigations appropriate to clinical complaints and examination findings are done additionally.

Coagulation profile may be done in appropriate situation.

Pre-operative fasting (in hours):

Ingested material:	Minimum fasting period:
Clear fluids	2 hrs.
Breast milk	4 hrs.
Infant Formula milk	6 hrs.
Light meal toast, cereal	6 hrs.
Heavy meal & fried food	8 hrs.

(In emergency surgery we have to follow a full stomach routine, which is not common in day surgery).

Pre-medication:

Pharmacological pre-medication is extremely useful

- 1) To allay anxiety
- 2) To facilitate separation from parents
- 3) To allow smooth induction by mask or IV.
- 4) To reduce autonomic reflexes.
- 5) To reduce airway secretions.

When one tries to anaesthetise a crying and howling child, there is an increased incidence of cough and laryngospasm.

The choice of premedicant is based on patient's age, physical status, emotional maturity, the surgical procedure and personal preference. Out of the oral, rectal, nasal, sublingual and transmucosal routes, the oral route is more popular.

Commonly used drugs in a pediatric patient are:

- Middazolam- 0.5 mg/kg orally, 35-45 min. pre-op.
- 0.2-0.3 mg/kg nasally, 20 min. pre-op.
- 0.5-1 mg/kg rectally, 1-1½ hour pre-op.

Ketamine- 5-6 mg/kg orally, 30-45 min. pre-op. (Since both are bitter in taste they can be given with honey.)

Syrup Pedichloryl- 50-75-mg/kg 1½ to 2 hours pre-op.

Syrup Diazepam- 2 mg/5ml (1 mg/5yr.).
Syrup Triclofos- 500 mg/5ml (30 mg/kg).

Atropine- 0.04 mg/kg orally to reduce secretions, 45 min. pre-op.

Local anaesthetic skin preparation such as tetracaine gel or Lignocaine –prilocaine mixture cream is excellent. Painless venepuncture in the presence of parents and small sedative dose given before wheeling the patient to OT, is well appreciated.

Induction of Anaesthesia:

Ideal agent should produce rapid smooth induction, rapid emergence, prompt recovery and minimal side effects, so the patient can be discharged early.

Inhalational Induction:

Halothane and sevoflurane, are the two preferred agents. They have pleasant smell and within few breaths the babies can be put to sleep, then intravenous line can be taken.

Sevoflurane offers better cardiovascular and haemodynamic stability. It helps rapid induction and emergence, it provides excellent intubating conditions, it is not linked with hepatitis and does not sensitize myocardium to catecholamines.

Intravenous Induction:

It is smooth when painless venepuncture is performed. Propofol is the drug of choice as it offers safe smooth induction with low incidence of side effects. Dose recommended is 2-3 mg/kg.

Advantages of Propofol:

- 1) Respiratory depression and depression of Laryngeal reflexes, more than thiopentone, allows easy placement of Laryngeal mask airway or intubations, without muscle relaxant.
- 2) It has anti-emetic property.
- 3) Emergence is fast without hangover. Pain while injecting can be minimized by adding Lignocaine 0.2 mg/kg IV with Propofol. Thiopentone can be used in the dose of 5-7 mg/kg.

Intramuscular induction:

Ketamine in the dose of 4-6 mg/kg can be given 5-10 min. before wheeling the patient to O.T., atropine or Glycopyrolate should be added to minimize salivary secretions. Ketamine must be given in a monitored care setting.

Midazolam can be given IV in the dose of 0.05 mg/kg. To sedate the child so other monitoring devices can be applied and then, induction can be started.

Maintenance:

Short or medium acting muscle relaxants such as Atracurium, Rocuronium or vecuronium can be used and analgesia can be provided with Fentanyl or Pethidine or Pentazocine. Relaxants should be adequately antagonized at the end. For maintenance halothane or Isoflurane are popular for their easy availability; however, sevoflurane or Desflurane can also be used. Succinylcholine is indicated in emergency situation or during difficult airway for its short action. It should be avoided in undiagnosed myopathies as it can cause life threatening hyperkalemic cardiac arrest.

MRI or CT Scan in children can be done under propofol alone, as these procedures are painless. Propofol, 100-150 microgm/kg/min., can be infused through the syringe pump. However, monitoring of airway is absolutely essential.

Airway Maintenance:

Indications for intubations do not differ between outpatients and inpatients. Most procedures around head & neck need intubation. Laryngeal mask airway or combined, pharyngeal airway can be used without the use of muscle relaxants. However, in emergency situation one must be aware that they do not protect airway against the aspiration of gastric contents.

Fluids:

Every patient should have intravenous line and adequate maintenance fluids, deficit for the fasting should be given in the form of Isolyte-P or Dextrose-saline. The fluids should be continued in the postoperative period until the child starts taking oral fluids.

Pain Management:

For day care surgery it is extremely important part of pediatric anaesthesia. We have to consider multimodal pain management, which extends

Intraoperative analgesia to postoperative analgesia. Intraoperative Fentanyl or Pethidine or pentazocine is supplemented with regional blocks or peripheral nerve blocks according to the type of surgery.

Penile Block:

Dorsal nerve of the penis is the most reliably blocked by bilateral injection method to overcome septation of the sub pubic space and to avoid midline vessels. Injections are made bilaterally from sub pubic margin 0.5 cm lateral to midline with short beveled 24-25G needle. It is useful to use the bone of the pubic arch as depth gauge and withdraw needle a little before aspirating, then injecting. plain Bupivacaine 0.5%, 0.1ml/kg per injection.

Ilio-inguinal / Ilio-hypogastric block: Injection of Bupivacaine 0.25%, 0.3ml/kg, using a short bevelled 22G needle deep to external oblique aponeurosis will ensure block of both nerves at a point one finger's (patient's) breadth medial to anterior superior iliac spine.

Metacarpal / Metatarsal blocks:

Can be given for syndactyly or polydactyly surgery. The effect of Bupivacaine in these blocks can last for 6-8 hours.

Caudal-epidural block:

Single injection is very effective for orchidopexy, inguinal hernia, orthopedic surgery of lower extremity.

Bupivacaine 0.25%, 0.5ml/kg for sacral or lumbar blockade, 0.75ml/kg for lower thoracic blockade (T10) and 1ml/kg for mid thoracic blockade (T8). Caudal block lasts for about 4-6 hours. The duration can be doubled by adding clonidine-1microgm/kg or quadrupled by adding preservative free Ketamine - 0.5mg/kg. These additives should not be used in infants.

Brachial plexus block:

For upper extremity surgery is very useful and lasts for 6-8 hours. There are different approaches such as inter-scalene, para-scalene, axillary or supra-clavicular. Axillary approach is easier, safer and reliable. 22G short bevelled needle can be used and single shot injection can be given at the highest point in the axilla just above the axillary artery. 'Pop' can be felt when sheath of the neurovascular bundle is pierced.

Bupivacaine 0.25% and 1% Lignocaine with adrenaline, mixed in equal volume, can be given in the dose of 0.5 to 0.75 ml/kg.

Sciatic, Femoral or 3-in-one block:

can be given for surgery on lower extremity. Mixture of 0.25-0.5% Bupivacaine and Lignocaine with adrenaline can be used in the quantity of 1ml/kg with a short beveled long needle.

Ankle Block:

It can be given for surgery on the foot. One must remember that patients with lower extremity block are prone to injury when discharged. So they should be properly looked after at home. When it is not possible to give above blocks, surgeon can properly infiltrate the surgical wound in layers while closing and this simple method can give good analgesia postoperatively. Postoperative analgesia can be supplemented with oral analgesics before the onset of pain when the effects of regional and peripheral blocks have worn off.

Oral Analgesics:

For mild pain paracetamol 10-15 mg/kg alone or in combination with NSAID can be given. Keterolac 10mg/kg or Ibuprofen or Paracetamol can be given in the form of rectal suppositories to young children every 6 hourly.

Complications:

Most commonly seen complications are:

- Pain,
- Sore throat, headache and drowsiness,
- Postoperative nausea and vomiting, which can be prevented by Ondansetron 0.1 mg/kg IV or Dexamethasone 0.1-0.15mg/kg or Metoclopramide 0.1 mg/kg can be given. Promethazine 0.5 mg/kg—may prolong recovery time.

Croup:

This may occur immediately after extubation or within 3 hours. Treatment involves humidified O₂ & if severe, nebulization with epinephrine. Patients should be observed for 2-3 hours after they settle down.

Our problems can be enlisted as:

- 1) Lack of proper organized day care facility.
- 2) Lack of proper information and understanding of the parents.
- 3) Lack of proper pre and postoperative monitored care area.
- 4) Lack of certain drugs and equipment.
- 5) Lack of insurance cover by some insurance companies.

Discharge Criteria:

- Vital signs and conscious level normal.
- Protective airway reflexes fully regained.
- No respiratory stridor.

- No active bleeding.
- O₂ saturation above 95% on room air.
- Nausea vomiting absent.
- Only mild pain or discomfort.
- Appropriate ambulation for age.
- Written or verbal instruction and contact number issued.
- Responsible person to take the child home.

Conclusion:

Success and popularity of out patient surgery can be attributed to proper evaluation in the clinic, appropriate preoperative fasting, and use of newer anesthetics, anti emetics and analgesics with better monitoring in peri-operative period.

A Surgeon's View on Ambulatory Surgery

Dick de Jong

Past President IAAS

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Introduction:

In many countries, it's impossible to imagine healthcare without Ambulatory Surgery. Accumulating evidence indicates that outpatient surgery offers significant advantages over inpatient surgery. Patients operated on an ambulatory basis report faster recovery and better psychological adjustment, given that selection of the procedure, preoperative preparation, the surgery performed and postoperative care, all were optimal.

The pronounced shift towards outpatient surgery has been made possible, for an important part, by an equally impressive technological revolution both in anaesthesia as well as in surgery, which has led to the development of approaches that require less postoperative care.

Moreover, ambulatory surgery is highly cost-effective. In its early days Ambulatory Surgery was the hobby of enterprising physicians, today, more and more health care insurers have to acknowledge that ambulatory surgery has financial advantages as well. From place to place, however, it appears that neither physicians nor healthcare governments are fully convinced of the advantages day surgery has to offer, and it will take much time and energy to change this attitude.

After a few remarks on history, this article focuses on strategies to emphasize the advantages Ambulatory Surgery has to offer.

For the individual surgeon it includes not only a

perfect operative technique: proper selection both of the procedure and the patient, and attention for the management of postoperative pain as well. The central theme should be: let's first improve surgical treatment; a reduction in postoperative length of stay will follow then. Close collaboration with anaesthetists and nurses is essential to achieve this goal.

Moreover, it is advised that the individual day surgery unit should register clinical indicators, in order to keep an eye on overall quality of procedures. And finally, physicians and nurses should unite and strive to establish a national day-surgery association: some experiences in the Netherlands and with the International Association will be discussed.

Development of Ambulatory Surgery:

Ambulatory or day surgery is a clinical admission for a surgical procedure, with discharge of the patient on the same working day. In the early days of surgery all operations were done on an ambulatory basis, since hospitals, both conceptually and as an institution, developed later in history (1). Ambulatory surgery in its present form is commonly said to have started in 1909 when James Nicoll, a paediatric surgeon from Glasgow, reported a series of 8988 children, operated upon on an ambulatory basis (2). The first report of Ambulatory Surgery performed in a free standing unit came from Ralph D. Waters, anaesthesiologist from Sioux City, Iowa, USA, who reported in 1919 on his Down-Town

Anesthesia Clinic, equipped for surgical and dental procedures under general anaesthesia (3). Finally in 1969, Ford and Reed, anaesthesiologists from Phoenix, Arizona, presented their concept of the Surgicenter[®], designed 'to provide quality surgical care to the patient whose operation is too demanding for the doctor's office, yet not of such proportion as to require hospitalisation' (4). From that time on, the number of admissions for day surgery increased strongly in many countries, especially in the USA, Australia and Europe (United Kingdom, Belgium, France, the Netherlands and the Scandinavians). This increase was highly facilitated by innovations in surgical and anaesthetic techniques. The implementation of new surgical procedures, for example minimal invasive surgery like endoscopy, and new short-acting anaesthetics with minimal cardiovascular side effects made early discharge possible in a fast increasing number of cases. However, there is still quite some variation in the use of day surgery, at least among countries, but also in individual hospitals in many countries. The attractiveness of day surgery can be increased only when professionals in individual units render excellent patient care.

Selection of procedures and patients:

A large number of surgical procedures can be done on an ambulatory basis. Day surgery (rather than inpatient surgery) must be regarded the standard for all elective surgery. It should be considered the principal option and no longer an alternative form of treatment.

However, not all patients can be treated on a day surgical basis. It is not the operation that is ambulatory, it is the patient! It is of paramount importance that all patients are carefully selected, taking social, medical (co-morbidity) and surgical criteria into account.

Preoperative assessment, the providing of information to patients and caretakers, appropriate treatment and follow-up after discharge: all require meticulous attention for detail.

For day surgery commonly acceptable general surgical procedures are operations for inguinal hernia, breast lesions and proctologic problems. Varicose vein surgery, venous access surgery and access surgery for haemodialysis are all performed by vascular surgeons on an ambulatory basis. But

new techniques evolve rapidly, enabling an increasing number of general surgical and vascular procedures to be performed in day care with or without extended recovery.

Management of postoperative pain:

Effective pain management after ambulatory surgery is important, not only for humanitarian reasons, but also because incomplete pain control contributes to postoperative nausea and vomiting (PONV), reduced mobility of the patient and delayed resumption of normal activities (5). Inadequate postoperative pain control is a significant cause of patient dissatisfaction with ambulatory surgery, may lead to many undesired effects, and sometimes unanticipated (re)admission. Prevention of pain is better than relief (6). In the selection of operative procedures, the amount of postoperative pain should be taken into account. For example, endovenous obliteration of varicose veins requires the extra investment of the necessary device and disposable catheters, but advantages as less post-operative discomfort and faster return to normal activities, as compared to conventional stripping, have been documented (7).

Preoperative education of the patient is important, surgeons should not only explain exactly what they are planning on doing (give procedural information), but also provide their patients with sensory information, i.e. information about possible unpleasant feelings postoperatively (8). Only combined sensory-procedural information gives the most benefit in reducing pain. During the operation, everything should be done to lessen postoperative pain; hence the use of nerve blocks and/or infiltration of wound edges are highly recommended. Also, pain management at home deserves attention to detail.

Clinical indicators:

It is recommended that units for Ambulatory Surgery use clinical indicators to monitor the overall quality of procedures. The International Association for Ambulatory Surgery (IAAS) advises the continuous registration of:

- 1) Cancellation of booked procedures, either failure of the patient to attend the day surgery unit ('no show' or 'do not attend, DNA') or after arrival of the patient, due to medical or organisational reasons,
- 2) Unplanned return to the operating room on the same day,
- 3) Unplanned overnight admission and

4) Unplanned return to the hospital after discharge home.

These indicators might be compared by data from other units or from the literature (benchmarking!) and might provoke the adaptation of certain procedures, when unsatisfactory results are obtained (9).

Professionals, unite! The Dutch experience:

Ambulatory surgery, in the Netherlands rather differently defined as a surgical procedure with a post-operatively required nursing time of at least 2 hours (up to a maximum of 8), is by now well established. The first units were founded in the seventies of the last century. In the beginning incentives didn't come from the government but from local hospital managers who visited ambulatory surgical centres in the UK and the USA. From 1985 onwards day surgery expanded tremendously partly due to a greater awareness of doctors and patients, but also due to a government-induced reduction of the number of hospital beds, also leading to the fusion of many smaller hospitals with large ones. At this moment departments for ambulatory surgery are present in almost all hospitals, even in university hospitals: a few years ago, three university hospitals (Amsterdam, Groningen and Rotterdam) reopened their completely rebuild units for day surgery. In addition to these in-hospital units, many free-standing ambulatory surgery centres have been established. In 2004, 49 percent of all operative procedures were performed on an ambulatory basis, and this figure is expected to increase to 65 percent in the years to come. The data of the IAAS international survey on ambulatory surgery from the Netherlands are quite comparable with those from other countries like the United Kingdom, with minor exceptions only (10). For example, almost 65 percent of all tonsillectomies with or without adenoidectomies (and even 97 percent of all adenoidectomies) are done on an ambulatory basis in the Netherlands, against only 15 percent in the United Kingdom. In both countries, a laparoscopic cholecystectomy still is seldom performed in day surgery, but it seems reasonable to believe that this figure will increase in the upcoming years.

But of course, the accumulated data of all hospitals in a country don't tell the whole story: there might be huge differences in the amount of procedures

performed between hospitals. This issue was investigated by Kroneman et al in 2003, who tried to link the number of certain procedures performed (curettage, cataract surgery and laparoscopic cholecystectomy) to available hospital-dependent variables as hospital size, number of beds available (a relative shortage of beds would promote ambulatory surgery?), number of GP's (less burden on social network?), age of the population in the area (less ambulatory surgery in an elderly population?), etc.(11). Unfortunately this approach wasn't effective in explaining the results found, and it was concluded that more detailed data on physician partnership and hospital circumstances are needed to do so.

But a much more important issue than volume and types of procedures performed is quality improvement of day surgery. In 1994, the Dutch Association for Day Surgery (NVDK) was established for this purpose. The executive committee organises an annual congress for its members, and stimulates the publication of a quarterly journal (titled 'KORTOM' what can be translated as 'in short'). But a very important step was recently taken by the publication of a National Standard for Ambulatory Surgery. The development of this standard was initiated by the government, who asked the Dutch Normalisation Institute (NEN, Delft, the Netherlands) to organise things. All parties involved in ambulatory surgery (departments for ambulatory surgery, patients/consumers, anaesthetists, surgeons, insurance companies, government) were invited to contribute to the composition of a protocol for ambulatory surgery. The Dutch Association was supposed to represent all departments for ambulatory surgery. The Standard focuses on the patient passing through the process of day surgery. An essential step in this process was strict requirements to be met. For example, in the guidelines, preoperative assessment has been given an important place. The role of the consulting nurse and the anaesthetist was clearly defined. But likewise the representatives of the patients/consumers appreciated the fact that it was agreed by all participants that in at least 80 percent of cases the waiting-time for a scheduled appointment with a consultant should not exceed 15 minutes. The updated version of this National Standard is now in the process of evaluation. Once accepted every department for ambulatory surgery has the choice to use it or not. But certification of the unit might

become difficult when the Standard is completely rejected.

The International Association for Ambulatory Surgery (IAAS):

In 1995, the International Association for Ambulatory Surgery was established in Brussels, Belgium. The Dutch Association was one of its founding members. One of the major challenges of IAAS is to maintain a high quality of ambulatory surgery, and to improve the development of ambulatory surgery all over the world. To do so, IAAS initiates the organisation of an International Congress every 2 years. The next congress will be organised in Amsterdam, the Netherlands, from April 15th–18th, 2007 (www.iaascongress2007.org). Since 1993, IAAS also publishes the journal *Ambulatory Surgery*. Membership of IAAS is available for all National Associations for Ambulatory Surgery.

To promote the understanding of people active in ambulatory surgery, IAAS documented all national definitions, with translations in English, of the words day surgery, office-based surgery, extended recovery, etc. This list of definitions is available at the IAAS Central Office.

In order to keep track of the numbers of ambulatory surgical procedures performed, IAAS initiates from time to time (preferably every two year, but this seems to be too frequent due to the labour-intensity of the task) the collection of national data, not from member countries only: provided the availability of a reliable contact, every country might participate. The core-issue was the selection of a basket of 20 procedures, suitable to cover all essential aspects of day surgery. Procedures in the final basket included not only hernias and varicose veins, but also laparoscopic cholecystectomy and laparoscopic-assisted vaginal hysterectomy. The collected data were first published in 1998 (12), the second set in 2000 (10), a third survey of this kind will be published soon. These surveys document the variability in the number of procedures performed, and stimulate the discussion of reason and outcome, for example during the annual meeting of the representatives of all member countries, where delegates after reporting their local data discuss the obstacles present. No country is perfect yet, or maybe ever will be perfect! Obstacles almost always focus on problems with reimbursement of the procedures performed, and/or lack of interest of the

medical profession in ambulatory surgery: both problems are not easily solved. An interesting approach was used by the National Health Service (NHS) in the United Kingdom: in order to increase the number of procedures in some hospitals the NHS Modernisation Agency appointed and trained medical professionals (surgeons, anaesthetists, nurse-managers) to exert peer pressure to speed-up things, hopefully with great success.

To improve the quality of ambulatory surgery, this year IAAS will publish a handbook on all aspects of day surgery, including organisation, anaesthesia and surgery (13). The section on surgical procedures is written by consultants of all surgical specialities, and contains a wealth of procedures, at this moment or in the near future, possible to be performed in an ambulatory setting. Some of the near-future operations include the laparoscopic fundoplication (Nissen fundoplication) for gastro-oesophageal reflux disease, or insertion of an endo-prosthesis for aortic aneurysm. It might be concluded that IAAS played and will continue to play a significant role in the promotion of Ambulatory surgery (14).

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25G Sutureless Vitrectomy

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Since the advent of couching by Sushrata, ophthalmic surgical techniques undergoing rapid developments and modifications. The aim is to adopt the technique with best possible outcome by least possible invasion of ocular anatomy. With the rise in sutureless cataract surgeries with minimal patient morbidity post operatively, vitreoretinal procedures also underwent lots of changes. A sutureless surgery means that the hospital stay is reduced to negligible & the patient is sent home the same day with minimal redness of the eye and discomfort. It also means that the patient is able to resume work as soon as possible.

Though the more sophisticated instruments and lasers developed for the vitreoretinal surgery but the patients need to undergo 20 gauge sclerotomies and post operative morbidity because of sutured wounds. Tunnel based sclerotomy by Chen⁴ was suggested to create self sealing incisions for VR surgery but it requires a conjunctival peritomy and suturing and is associated with complications like wound leakage, extension, dehiscence, hemorrhage, vitreous and / or retinal incarceration, retinal tears, dialysis and difficulty in passing instruments. Modifications in vitrectomy instrumentation aimed at decreasing the size of instruments must achieve a balance between ability to achieve smaller incision sizes versus maximizing instrument functionality, recognizing that high instrument functionality may not always be compatible with small size.

At first, there were no suitable materials to use as sutures in the eye, so the eye had to be bandaged and heal on its own.

This meant the patient was confined to bed with their head literally sandbagged to prevent movement that might jeopardize the healing process. Overall the quest for least morbidity for patient postoperatively undergoes full circle from No suture Era in cataract surgery to again sutureless vitreoretinal surgery. In the early 1970s, Machemer¹ used a 17-gauge 1.5mm diameter multifunctional instrument capable of cutting and aspirating the vitreous followed by a smaller vitreous cutter of 20 gauge (0.9 mm) designed by O'Malley and Heintz² in 1974. The race for smaller instruments doesn't end here. In 1990 De Juan and Hickingbotham³ designed a variety of 25-gauge (0.5mm diameter) vitreoretinal instruments and thus the era of sutureless vitrectomy begins.

Transconjunctival sutureless vitrectomy system (TSV) 25 gauge developed by Fujii et al⁵ allows self-sealing transconjunctival sclerotomies and minimizes surgically induced trauma, improves operative efficiency and hastens postoperative recovery. The self-sealing sclerotomy obviates the need for conjunctival peritomy and no sutures are required at any conjunctival or scleral opening site. The development of smaller gauge instruments may prevent the incorporation of multiple functions in their design. Also due to the smaller size, the infusion and aspiration rates are reduced. However, there are settings where the full capabilities of 19-20 gauge instruments may not be required and smaller gauge instruments may be more desired due to their less invasive nature.

Instrumentation:

The TSV consists of a 25-gauge microcannula system and a wide array of vitreoretinal instruments specifically designed for this operating system. Integral to this vitrectomy instrument system is the 25-gauge microcannula system. It consists of a microcannula, an insertion trocar, an infusion cannula, a plug forceps, and a cannula plug. The cannula remains in place and newly designed smaller instruments can be introduced through it to perform surgery in the posterior segment.

The **microcannula** consists of a thin-walled polyamide tube 3.6 mm in length with an inner/outer diameter of 0.57/0.62 mm. A collar is present at the extraocular portion, which can be grasped with forceps to manipulate the microcannula. A funnel-shaped entry was designed to facilitate access of instruments. Once inserted through the eye wall, sutures are not required to hold the microcannula in place. The microcannulas are inserted through the conjunctiva into the eye by means of a trocar that, when inserted into the cannula, forms a continuous bevel with the microcannula, allowing ease of entry. The trocar is then withdrawn leaving the cannula in place. The main purpose of the 25-gauge microcannula system is to maintain the alignment between the conjunctival and the scleral entry site, because no prior conjunctival dissection is required for insertion of the trocar and cannula. Therefore, the 25-gauge cannula system is referred to as an “**entry site alignment system**” (EAS). (Fig.1)

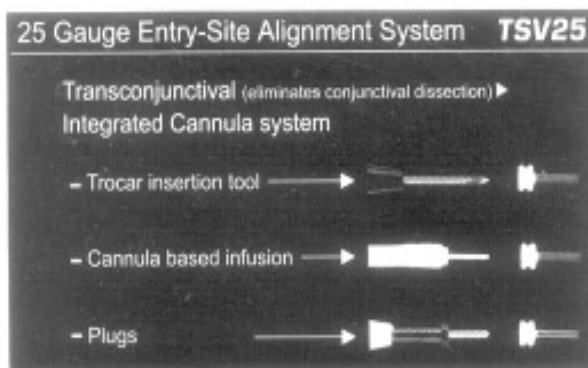


Fig.1: 25 gauge ‘Entry Site Alingment System’

The 25-gauge **infusion cannula** consists of a small metallic tube 5mm long with an inner/outer diameter of 0.37/0.56 mm. The intraocular portion of the infusion cannula is directly inserted into the eye through the microcannula. A collar at the extraocular portion allows the infusion cannula to be held and facilitates its manipulation.

A wide array of **vitreoretinal microsurgical instruments** (Fig.2) complying with the 25-gauge standards has also been designed. These include a high-speed vitreous cutter, illumination probe, intraocular micro forceps, rigid retinal pick, flexible and extended retinal pick, tissue manipulator, laser probe, diathermy probe, aspirator and others.



Fig.2: Array of 25 Vitreo Retinal Instruments

Infusion and Aspiration rates:

Due to the small size the infusion and aspiration rates at various settings are reduced by 6.9 and 6.6 times respectively when compared with the 20 gauge system⁶.

Time Measurement comparison:

In a published study done by Fujii GY et al⁶, the mean total operative time was found to be significantly greater for the 20 gauge (26 min 7sec) than for the 25 gauge vitrectomy (17 min 17sec). The differences in operating times were noticeably greater for the ‘initial opening’ and ‘final closing’ steps of the surgery. The ‘vitrectomy’ time was an average of 1 min 23 sec longer using the 25 gauge TSV.

Techniques:

Stretching the conjunctiva at the beginning of the procedure with cotton tipped applicator before entering the pars plana ensures that at the end, when the trocar is removed, the conjunctiva will help cover the hole made by trocar. Three entries using trocar cannulas are made in the inferotemporal, superotemporal and supreonasal quadrants. The trocar creates 0.5mm conjunctival and scleral incisions. An infusion cannula is inserted into the IT cannula and plugs used to temporarily close other entry sites till use (Fig3, Fig4)

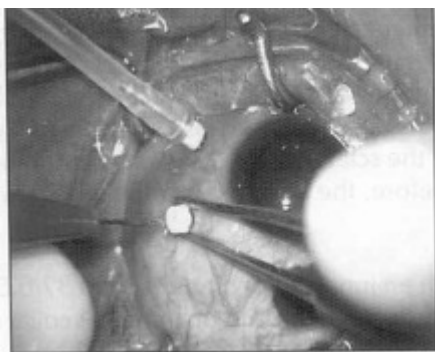


Fig.3: Removal of trocar leaving the cannula in place as a channel for the introduction of 25 gauge instruments. The infusion line can be seen in position.

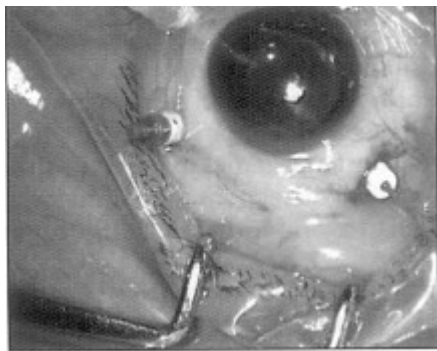


Fig.4: Insertion of 25 gauge vitrector through the cannula.

The other cannula is kept plugged (Blue) till the introduction of endo illuminator.

The TSV requires some modifications of technique during vitrectomy. Maximum cut rates are required to achieve optimal fragmentation of intraocular

tissue and to decrease the possibility of obstruction in aspiration line, which is narrower than standard 20-gauge vitrectomy systems. The vitreous cutter is used with maximum aspiration rate (500mmHg) and concomitant high cutting rate of 1500cpm. The difference between minimum infusion rate and maximum aspiration rate is larger in the TSV system, which allows for greater safety margin against hypotony during aspiration. The 25-gauge cannula should not be used concurrently with standard 20 gauge vitreous cutter as it may result in hypotony during aspiration resulting form functional discrepancy between infusion and aspiration rates of both systems. The TSV system can provide a better gas fill as it is a more closed system. The 25 g. cutter can be used to sweep blood off the retina.

After removal of the trocar pressure is applied to each site to ensure that they are not leaking. The conjunctiva should snap back, of the conjunctiva begins to swell and form a bleb, there may be a leak. Some surgeons prefer to take a fixation forceps and manually close the wound and hold it for a moment until the underlying vitreous can block the wound site form beneath the sclera.

Indication:

Many vitreoretinal procedures that do not involve extensive dissection, are likely to benefit from a less invasive procedure, because much of the surgical trauma in those cases may be related to the conjunctival and scleral incision procedures. The TSV system has been used in epiretinal membrane peeling, macular hole surgery, retinal detachment with minimal or no proliferative vitreoretinopathy, branch retinal vein occlusion sheathotomy, vitreous hemorrhage, endophthalmitis. The TSV is of potential benefit in smaller eyes of children where use of standard instruments may incur technical difficulties related to the ocular size⁶.

With the rise in health awareness, more and more patients presented early with less complications. Such cases can be better dealt with TSV 25 System. Newer surgical indications like vitrectomy for diabetic macular edema makes the scope of this system further more. Glaucoma prone patients undergoing vitreoretinal procedures may have a better mobile and healthy conjunctiva for the future antiglaucoma surgery. Meanwhile, combined sutureless cataract and vitreoretinal surgery by TSV 25 G System makes the major

ophthalmic surgery a day care procedure with least possible morbidity for the patients, the ultimate goal for any surgeon.

Limitations:

The TSV system should not be used on previously scarred operated eyes as it is difficult to enter the sclera and the trocar may bend. In highly myopic patients with thin sclera, wound does not close in the same manner as other patients. It is difficult to infuse silicone oil through 25-gauge cannula. In retinal detachments with proliferative vitreoretinopathy, because of smaller port and diameter of 25-gauge cutter, the cutting and aspiration rates are reduced so its efficiency in dense fibrous proliferation may be limited. The increase flexibility of 25 gauge instruments may not be able to control eye positions during the surgery. There is also a theoretical possibility of suture less sclerotomies serving as a conduit for the entry of bacteria.

Surgeons may experience wound leaks that need to be sutured in their initial cases. A re-operation the next day is worse than suturing at the time of closure.

Results:

Being a relatively new technique few studies are available in literature. Fujii et al described⁶ their initial experiences in a consecutive series of 35 eyes. They used the TSV in cases of retinal detachment, retinopathy of prematurity, Norrie disease, epiretinal membrane, macular hole, branch retinal vein occlusion, persistent diabetic macular edema and vitreous hemorrhage and retained lens material post cataract surgery.

No wound leakage was seen in any case and the postoperative IOP was maintained. In idiopathic epiretinal membrane cases, core vitrectomy and membrane peeling was performed satisfactorily. Sheathotomy at the pathologic arterio-venous crossing was performed by using a nitinol pick that can be extended to adjust its curvature, which enables the surgeon to get optimal positioning at the dissection point of the crossing. It was possible to peel epiretinal membranes and perform sheathotomy without prior vitrectomy in some cases. Treatment of retinal detachment was successful in all cases,

although none of these cases had severe proliferative vitreoretinopathy.

In our initial experience TSV was found to be suitable in cases with epiretinal membranes, macular hole and fresh vitreous haemorrhage. The TSV system was used in 4 cases requiring Vitreoretinal procedures. The four cases were Epiretinal Membrane in a post laser diabetic patient, Idiopathic Macular Hole, Retinal Detachment and Vitreous Hemorrhage. We evaluated the operative time, wound closure, limitations of the system and the outcome of surgery. The average operating time was 30 mins and all the wounds showed good closure with no wound leaks. The epiretinal membrane was successfully removed with an increase of three lines in visual acuity. The macular hole showed flat edges with an open hole. The retinal detachment underwent resurgery for recurrence. The vitreous hemorrhage was old and repeatedly clogged the cutter. Probably the further improvement in technology will make us able to handle complicated cases in the near future.

Conclusion:

In select cases where full capabilities of conventional vitrectomy system are not required, the 25-gauge TSV system can offer better patient comfort, care and management by reducing operative time effectively. With more advancement in technology, future of sutureless 25 G vitrectomy and thus the vitreoretinal surgery going for a major turning point.

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Development of Outpatient Laparoscopic Surgery in Hong Kong

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Abbreviations: Laparoscopic cholecystectomy: LC; Endoscopic totally extraperitoneal inguinal hernioplasty: TEP; Day Surgery Centre: DSC; Pre-anaesthetic clinic: PAC.

INTRODUCTION:

Since the introduction of laparoscopic surgery in the late 1980s and early 1990s, it has soon become the standard treatment for a variety of diseases. In recent studies, some of the laparoscopic procedures have been evaluated as a safe and effective outpatient procedure (1, 2). In Hong Kong, we have been practising outpatient laparoscopic cholecystectomy (LC) and outpatient endoscopic totally extraperitoneal inguinal hernioplasty (TEP) since 2000 and 2001, respectively (2-4). Now they have become our standard treatments for selected patients with symptomatic gallstone diseases and groin hernias. Unlike other western countries, advocating outpatient procedures in Hong Kong is not cost-driven but patient-driven. Patients in Hong Kong have a drive to receive a high standard of surgical service and alternative treatments for surgical diseases.

OUTPATIENT LAPAROSCOPIC CHOLECYSTECTOMY (LC):

Since 2000, we have been routinely performed outpatient LC in selected groups of patients with symptomatic gallstone diseases. Patients of

American Society of Anaesthesiologists (ASA) risk classification I or II, less than 70 years of full perioperative details were explained. They would be given the date of operation and written instructions concerning the preparation, admission and highlights of procedures. Patients were admitted at 7:30 am on the day of operation.

Outpatient LC was defined as operations performed on patients who could be discharged before 6:00 pm on the day of operation. We adopted the standard four-port technique using 12 mmHg of CO₂ pneumoperitoneum, and intraoperative cholangiography was not routinely used. Gastric tube and Foley catheter were not used. More than 95% of the patients were operated by two experienced specialist surgeons (YWK, LH) and the remaining 5% of the cases was performed by higher surgical trainees under supervision. Patients were then transferred to Day Surgery Centre for close observation.

Results:

In 2000, the successful outpatient LC rate was only 72.7%, among which 8% was overnight stay and the

conversion rate was 9.1% (4). The successful rate gradually increased to 100% in 2004 (Table 1) and no conversion was noted. The incidence of postoperative nausea and vomiting was low. Pain control was also excellent. So far there have been no major complications encountered except mild wound infections. Nearly all patients returned to their preoperative activities-of-daily-living by two weeks.

Pre-anaesthetic clinic (PAC):

The establishment of PAC was a major milestone in the development of outpatient LC. It allowed early assessment by the anaesthesiologist, preoperative counseling by nursing staff and routine investigations before operation. It has been shown that PAC significantly reduced patients' anxiety (5), contributing to a potential favourable impact on outcomes. As in the earlier phase of outpatient LC, the overnight stay rate was 8% and almost all of the patients stayed overnight due to psychosocial reasons (2).

Day Surgery Centre (DSC):

Another milestone for outpatient LC was the establishment of DSC. It provided a place for patients to relax before operation and for close observation after operation. Nursing staffs were trained for early recognition of potential complications. In addition to clinical observation, patients were considered eligible for discharge when they fulfilled a set of pre-discharge criteria (Table 2). A 24-hour hotline was provided before discharge. A dedicated nursing staff would perform phone questionnaire on postoperative days one and three. The operating surgeon would follow all the patients at DSC at postoperative weeks one and four.

Standard anaesthetic protocol and postoperative pain management:

Postoperative nausea and vomiting was a common problem leading to failure in outpatient laparoscopic procedures. We adopted a standard anaesthetic protocol in performing the operations. Anaesthesia

TABLE 1. Outcomes of outpatient laparoscopic cholecystectomy (LC) over a five-year period:

	2000	2001	2002	2003	2004 (till May)
Total	11	28	30	45	21
Outpatient LC	8 (72.7)	25 (89)	27 (90)	44 (97.9)	21 (100)
Overnight LC	2 (18)	2 (7.1)	2 (6.7)	1 (2.2)	0 (0)
Conversions	1 (9.1)	1 (3.6)	1 (3.3)	0 (0)	0 (0)
Readmission	1 (3.6)	1 (3.6)	0 (0)	0 (0)	0 (0)

* Data are expressed as number with percentage in parentheses.

TABLE 2. Discharge criteria:

	Score *
Vital signs:	
Within 20% of pre-op value	2
Between 20-40% of pre-op value	1
> 40% or < 40% of pre-op value	0
Ambulation and mental status:	
Oriented AND gait steady	2
Oriented OR gait steady	1
Neither	0
Pain, nausea or vomiting:	
Minimal	2
Moderate	1
Severe	0
Surgical bleeding:	
Minimal	2
Moderate	1
Severe	0
Intake and output:	
Has had PO fluid AND voided	2
Has had PO fluid OR voided	1
Neither	0

*To be eligible for discharge, the patient must achieve a score of ≥ 8 . Pre-op = preoperative; PO = per-oral.

was induced using intravenous propofol and fentanyl at the body-mass-dependent dose. Following an endotracheal intubation, all patients were put on mechanical ventilation and on inhalational anaesthetic agents (nitric oxide and isoflurane) for maintenance. Before reversal of the anaesthesia, all of them would be given intravenous metoclopramide as the anti-emetics. Another dose of metoclopramide or ondansetron would be given when necessary after the procedure if they developed repeated vomiting. Opiate-free anaesthetic protocol, involvement of an experienced anaesthesiologist and good communication between the anaesthesiologist and the operating surgeon (so as to reduce inhalational anaesthetic gas at the end of operation earlier) would be the keys to the avoidance of postoperative nausea and vomiting.

At the end of the operation, all port-sites would be infiltrated with 2-3 ml of 0.25% bupivacaine. After the operation, all patients were given adequate oral Dologesic® (Llorens Pharmaceuticals, Miami, FL, USA) 1 tablet every 6 hours and diclofenac (Voltaren SR®; Novartis Pharmaceuticals, Basel, Switzerland) 100 mg tablet daily when necessary. Pain control based on the above regimen was excellent (3-4).

OUTPATIENT ENDOSCOPIC TOTALLY EXTRAPERITONEAL INGUINAL HERNIOPLASTY (TEP):

TEP was first performed in 1999 at our institution. With an experience of 200 in-patient TEPs, outpatient TEP has been performed since 2001. Between March 2001 and 2003, patients who underwent outpatient TEP by a single surgeon (HL) at our department were recruited. Inclusion criteria were reducibility of the inguinal hernia, ASA risk classification of I or II, as well as the presence of a competent adult to accompany the patient home and look after the patient for 24 hours. In addition, patients had to live within one hour's travel to the hospital. Previous lower abdominal surgery was considered a contraindication for TEP.

All patients were admitted to DSC on the day of operation. Pre-emptive ketorolac 30 mg was administered intravenously upon induction of general anaesthesia. The standard anaesthetic protocol and the anaesthetic team were the same as

described in outpatient LC. The operative details were described elsewhere (6). A three-port technique was employed. Balloon dissection and urinary catheter were not utilized. The extraperitoneal space was dissected and created using endoscissors with diathermy. A Prolene mesh of 10 x 14 cm² (Ethicon, Inc., Somerville, NJ, USA) was placed to cover the deep inguinal ring, the posterior wall of the inguinal canal, and the femoral ring. Wounds were infiltrated with 0.5% bupivacaine as in outpatient LC.

Results:

A total of 417 patients underwent TEP during the study period. One hundred and two patients (24.5%) with 114 inguinal hernias, who underwent TEP as an outpatient procedure, were recruited. All TEPs were successfully performed. None of the patients required conversion. The successful rate was 97%. Three patients were admitted overnight because of ECG changes during surgery and dizziness. One patient required readmission to hospital on postoperative day one because of wound pain and vomiting. Overall, the rate of postoperative nausea and vomiting was very low. Only mild postoperative complications such as: seroma and bruising, were encountered, but they were all self-limiting. No recurrence was noted at a mean follow-up of 5 months (2).

The important roles of DSC, a standardized anaesthetic protocol and postoperative pain management as well as the PAC have been previously discussed. In addition, a randomized trial was conducted to compare the outcomes of outpatient TEP with outpatient open Lichtenstein hernioplasty.

Comparison with outpatient Lichtenstein hernioplasty in male patients:

From 2002 to 2004, a total of 200 male patients were randomized to undergo either outpatient unilateral TEP or open Lichtenstein hernioplasty under general anaesthesia. All TEPs were successfully performed without conversion. The mean operation time for TEP (50 ± 13.2 min) was significantly shorter than that for open repair (58 ± 17.6 min) ($P < 0.001$). The pain score at rest was significantly lower in the TEP group than in the open group. On average, the patients returned to work 8.6 days after TEP and 14 days after Lichtenstein hernioplasty ($P = 0.006$).

The incidence of chronic groin pain 1 year after TEP (9.9 %) was significantly lower than that after open surgery (21.7%) ($P = 0.032$).

In conclusion, outpatient TEP was superior to open Lichtenstein hernioplasty for repair of primary inguinal hernia in male patients. The benefits of outpatient TEP included less pain, a faster return to work, and a lower incidence of chronic groin pain (7).

FUTURE DIRECTIONS:

Despite the early success in outpatient LC, striving for a higher standard of patient care is still the ultimate goal for surgeons. Recently, a randomized trial was conducted at our department to compare low-pressure (7 mmHg) versus standard-pressure pneumoperitoneum (12 mmHg) in outpatient LC. It was shown that for simple and uncomplicated gallstone diseases, low-pressure pneumoperitoneum was safe and effective with similar outcomes when compared with diseases treated under standard-pressure pneumoperitoneum (8).

It is not uncommon for patients with groin hernias to have significant co-morbidities, which are considered a relative contraindication for TEP because it needs to be performed under general anaesthesia. The early result of these patients undergoing TEP under spinal anaesthesia was released from our department. Four patients successfully underwent TEP under spinal anaesthesia. Two patients required conversion to open repair because of lack of cooperation and inadequate spinal anaesthesia. No significant complication was encountered. To shorten the operation time, an experienced laparoscopic surgeon was the pre-requisite for a successful procedure. Nonetheless, good cooperation among the anaesthesiologist, surgeon and patient cannot be overlooked (9). It provided an alternative choice other than open repair for patients with significant co-morbidities.

DISCUSSION:

Our results showed that most patients undergoing laparoscopic surgery had a high level of satisfaction (3). Less than 3% of the patients refused an outpatient LC if they were to be treated again, reflecting that patient acceptance was high (3). Opponents against outpatient laparoscopic surgery,

probably is because of its potential complications, and more importantly, delayed diagnosis due to early discharge. Previous studies showed that most postoperative complications related to LC such as bile leakage, retained ductal stones and biliary pancreatitis were not apparent on the first 2 days of postoperation (11-13). After patients were discharged from the hospital, the nursing staff in DSC would perform telephone follow-up on postoperative days 1 and 3. Possible complications such as abnormal discharge from wound, unusual degree of wound or abdominal pain and fever would be noted. After initial assessment on the phone, patients would be arranged to have a follow-up by the operating surgeon at their earliest convenience. So far, no major complications have been encountered.

There is still much room for developing other outpatient procedures as well as refining the techniques of the present procedures. Reports showed that laparoscopic anti-reflux surgery, laparoscopic adrenalectomy and laparoscopic splenectomy were all feasible in an outpatient setting (10). Different laparoscopic procedures, however, would have different learning curves. As illustrated in our experience, when the majority of patients were operated by experienced laparoscopic surgeons, the training for surgical trainees might be hampered. A recent study showed that outpatient LC could be performed safely by surgical trainees under direct supervision (14). We were in the same situation and hopefully, trainees could do more outpatient laparoscopic procedures in the future.

The training of laparoscopic surgeons should ideally start with the relatively “easy-mastered” outpatient procedure, such as LC before embarking on other more advanced techniques. Apart from the surgeons’ perspective, other associated “hard and soft wares” such as the establishment of the DSC, availability of well-trained nursing and anaesthetic staff, etc, should be ready before the commencement of outpatient laparoscopic surgery. It would be disastrous if potential complications are overlooked. Without great courage, successful outpatient laparoscopic surgery would not be possible.

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