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Editorial

As I was going through the previous issues of this Journal, I found that, most of the articles tell a story. A story or a journey of innovativeness, of struggle, of hard work and dedication, of a want to do something different, something new, more challenging and with an end result of a win-win situation for everyone. Authors from all over the world have interesting stories to tell. Some write in the form of a retrospective analysis of their work, then some write an essay. They all have one subject, and that is, One-day surgery.

The International experience: journey to Amsterdam, in April 2007, to attend the 7th IAAS Congress, yours truly had the distinction of being the first surgeon to be invited as a Guest speaker. Even though we are not a member country, we were well received.

India received an International award for Best Poster presentation from amongst the participating countries. One more first to our credit!

The International organization is very keenly watching the progress we make in Day care surgery. It is evident for the articles published in this issue, of experience of our two distinguished Invited Guests, Dr. Hugh Bartholomeusz from Australia, writes on his progress on One-day surgery, which is brief and to the point. He now heads a chain of centers specializing in Cosmetic and Reconstructive surgery.

Dr. Carlo Castoro, from Italy, is part of team of International faculty, instrumental in setting standards for Ambulatory surgery. He has detailed guidelines for standard and safe One-day surgery for the world.

Closer to home, Dr. Bansals, have now set up a chain of centers dispensing care for urological patients and patients who can benefit by minimal access techniques. Most of them are now being done as Day-case.

Dr. Pravin Gupta, a Proctologist, has once again penned his experiences on newer methods of treating anal surgeries as Day care.

Anaesthesia provides the main stay in making it possible for any case to be discharged as day-case. Dr. Nandini Dave and Dr. Anjana Sahu's article touch on the details of discharge criteria's, which are note worthy. Especially, the score chart.

The day is now not far, when exclusive One-day centers will be set up across the country, which will provide multispeciality secondary surgical care as Day care. It will be now, when the great potential of ambulatory surgery will be realized for select surgical cases.

Public health care providers are very keen to see more and more cases performed as day-case, which would reduce the load that they have to bear, as well as reduce the burden on the government healthcare expenses, which can be utilized for care of critical patients.

More to come in the next issue, read on!

Dr. T. Naresh Row

*“My grandfather once told me that there were two kinds of people:
those who do the work and those who take credit.
He told me to be in the first group. There is much less competition”
- Indira Gandhi*

Applications of radiofrequency in day care proctology surgery

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Abstract:

Background- Modalities like Cryosurgery, Photocoagulation, Electro surgery and Lasers are being used in the field of proctology since long. A machine that generates ultra-high frequency current waveform [radiofrequency] has emerged as a new tool to deal with many of the common ano rectal conditions.

Objective- The purpose of this paper is to enumerate the benefits of radiofrequency with emphasis on its advantages over conventional procedures. Based on extensive personal experience of using radiofrequency surgery in the performance of various anal pathologies, an attempt is made here to relay in narrative form the procedures from a "how-we-do-it" perspective.

Conclusion- Our experience indicates that radiofrequency surgery not only facilitates but also improves the performance of surgical procedures in treating anal fistula, hemorrhoids, pilonidal sinus, anal papillae, anal polyps, anal warts, anal condylomas, anal antibiomas and papillomas. It significantly shortens operative time, causes negligible intra-operative bleeding, facilitates faster recovery by allowing rapid healing and minimizes the chances of postoperative complications. It permitted us to perform most of the above procedures as a day care surgery.

Add to this, its cost-effectiveness coupled with better patient acceptance, radiofrequency surgery, applied judiciously, could significantly improve the performance of a proctologist. The technique could be effectively applied in conjunction with conventional maneuvers to better the results of these procedures.

Keywords- Radiofrequency, Proctology, Conventional procedures, Day care procedures.

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Introduction to Radio surgery

Radiofrequency surgery, to begin with, was used for treatment of snoring and is now being extensively used in the practice of dermatology¹, cosmetology, neurosurgery, hepatology and ENT procedures. It has multi-faceted usages in the respective medical fields. 2,3,4.

However, to-date, proctologists have used this instrument very sparingly and that too out of curiosity rather than being serious. For a surgeon practicing proctology, there are two important goals to achieve. Whenever a new technique is adapted, it should aim at minimizing tissue damage and obtaining hemostasis during reconstruction, excision or ablation process. Radiofrequency is a refined type of electro surgery that utilizes a wave of electrons at a frequency between 2 and 4MHz, to incise, excise, ablate or coagulate tissue.

Radio surgery can simply be termed as an electro surgery at radiofrequency. It is necessary to eliminate any possible misconception about radio surgery by other older modality 'electrocautery' which is quite different from radio surgery.

The word 'cautery' is derived from the Greek word kauterion, a branding iron, and, as its name suggests, electrocautery acts like an electric branding iron. In electrocautery, the heat [rather than the radio wave] is transferred to the soft tissue by convection. A massive cell destruction result from the application of cautery and the destruction caused by this cauterization is equivalent to that of a third degree burn 5.

The high frequency radio surgery and its results also should not be confused with diathermy. Such electro surgical generators are sometimes called by other names. In Europe, it is called as “Surgical Diathermy” while in the United States; they are termed as “Bovie” or “Electro cauterization machine.” With radiofrequency, the targeted tissue temperatures stay localized within a 38-70°C range thus limiting heat dissipation and damage to adjacent tissue. In contrast, electrocautery, diathermy or laser temperatures are significantly higher (750-900°C) which result in significant heat propagation in excess of the desired therapeutic need 6.

Electro surgical machines operating at frequencies below 3 MHz cause the electrode itself to heat and it has been found that these electrodes, if made of steel, melt away with use. It has been determined that the ideal frequency for achieving effortless cutting of tissues is approximately 4 MHz7.

Radiofrequency energy has been used extensively in many different medical applications and specialties for its ability to achieve a precise and controlled thermal ablation of soft tissue. The heat is not generated by the electrode itself as in standard electrocautery but is caused by resistance of the tissue falling in the path of the waves sent through the electrode tip 8.

Soft tissue resistance to these radio waves causes the cellular water in the soft tissue to heat, which produces steam and results in cellular molecular dissolution of individual tissue cells. The tissue cells absorb heat because of a natural resistance when in contact with waves of high frequency which are converted from the current. The surrounding cell layers, therefore, remain unaffected.

9-10

The radiofrequency unit- While there are different radiofrequency units in the market, we found the Ellman dual frequency 4MHz unit, which has a long successful history and which comes with a multitude of electrode tips very handy for a large variety of surgical maneuvers. The unit produces output power of 100 Watts at two different frequencies i.e. 4MHz and 1.7MHz. While the frequency of 4MHz is used for four standard settings like 1. Cutting, 2. Cutting and Coagulation, 3. Pure coagulation and 4. Fulguration, the frequency of 1.7MHz is used for bipolar coagulation. The unit has a digital display and audible signal to indicate when the unit is activated. The amount of energy to be delivered through the electrode can be preset between 1 and 100J.

An ‘antenna’ is used to focus the “radio wave” which unlike traditional electro surgical units, does not have to be in skin contact with the patient, rather it needs to be in the close proximity of the operating field. The antenna plate is not a passive electrode as is used in electro surgery. This antenna avoids the risk of electrical burns to the patient12-13. The unit is activated by a foot pedal. The ‘active’ or patient electrode is interchangeable.

Since last 8 years, we have been working with this equipment with satisfactory results. The procedure is suitable in all age group of patients [Table 1]. We have routinely used this unit to perform most of the proctological surgeries.

The advantage of simultaneous cutting and coagulation achieved by this machine has attracted us most. According to us, such versatility of the tool is the prime need of procedures within the ano rectal area, which is vascular and has only limited accessibility. During many procedures, the area of operation is blurred due to frequent bleeding. This problem makes the procedure more difficult and time-consuming.

Figure 1: Radio Surgical Unit



Indications for a 3.8 - 4.0MHz dual frequency Radio surgery for common anal pathologies [Figure 1]:

Hypertrophied anal papillae.

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External piles.
Sentinel tags in fissure in ano.
Perianal warts and condylomata.
Rectal polyps.
Fibrous anal polyps.
Perianal and pilonidal sinuses.
Post fissure antibiomas.
Perianal papillomas.
Biopsies.
Fistula-in-ano.
Hemorrhoids.
Rectal prolapse.

Techniques:

Most applications are accomplished with under local anesthesia, short general anesthesia or under a caudal block.

Although, different types of electrodes are available with the unit, we could perform most of the procedures using a loop, a ball and a fine needle electrode.

Hypertrophied Anal Papilla:

It is a common finding in more than 50% of the cases of chronic anal fissure and is responsible for minor but disturbing complaints like discharge, pruritus or a foreign body sensation. They are trapped in the tight sphincter at times to cause severe pain. They immediately disappear when touched with the ball electrode in a coagulation mode. 14.

External Piles:

They either are in an isolated form with no internal pathology or may be a part of interno-external hemorrhoids. If small, they are coagulated with the ball electrode. However, a large sized mass is required to be shaved off with a round loop electrode.

Sentinel Piles in Fissure in Ano:

Sentinel pile or tags are a common accompaniment of chronic anal fissures. In our opinion, these must be removed for two reasons. First, they may interfere with the healing of the fissure and second, they become a cause of concern for the patient that 'something' was still left behind.

If the tag is small, it can be directly coagulated with a ball electrode, but if it is large, then it is excised with the round loop, securing the bleeding points and coagulating them later. 15.

Perianal Warts and Condylomata:

Perianal warts and condylomata are not very common. These are mostly the result of perverted sexual practice and cause perianal soiling and pruritus. They may reach within the anal canal and can bleed at times.

These could be shaved off using a loop electrode in a cut and coagulation mode. Once all of them are removed, the operated area is 'sterilized' by rolling a ball electrode on coagulation mode to ensure removal of invisible warts and the viral colony. The intra-anal warts can simply be coagulated rather than being excised.

Rectal Polyp:

A child is often found to be the common sufferer of rectal polyps. Sometimes adults may also have a large polyp slipping down during defecation and needing a manual repositioning.

These are vascular, delicate structures and can easily be detached if manipulated. If the polyp is large enough to be delivered out of the anus, then its pedicle is caught in a hemostat and the polyp is shaved off with loop electrode and then the base is coagulated with ball electrode. A small polyp can be coagulated in-situ.

Fibrous anal polyyps:

These are exaggerated anal papillae. Over a period, they attain excessive fibrous thickening, and acquire a rounded expanded tip, which can even be felt on digital examination.

These are either coagulated in situ using the ball electrode, or if found large enough, could be shaved off with a loop electrode after coagulation of the base. 16.

Perianal and Para sacral Sinuses:

These include the pilonidal sinuses, post anal sinuses and post-traumatic sinuses. These are a source of constant pain, edema and pus discharge.

The patient is operated in a left lateral position. Methylene blue dye mixed with hydrogen peroxide is injected in the sinus opening, which spreads out in the sinus tract. The tracts so identified, are then incised and laid open with the needle electrode. The bleeding points are coagulated with the ball electrode in coagulation mode. The wound is left open for secondary healing. 17.

The wound healing in this procedure is excellent and the scarring is minimal. 18.

Perianal Papillomas:

These are coincidentally found while performing proctological procedures for some other pathology. These can precisely be removed using a loop electrode of a suitable size. The raw area left behind may require a touch of a ball electrode in coagulation mode to arrest any oozing from the base.

Perianal Antibiomias:

It follows an inadequate or delayed drainage of the anal abscess, which assumes chronicity. The abscess is treated with antibiotics to result in being walled off with fibrotic tissue and forming into an 'antibioma' [antibiotic granuloma, organized abscess, sterile abscess].

The aim of treatment is to curette the complete cavity, which could be achieved by incising the center of the lump using a needle electrode in cut and coagulation mode. All the granulation tissues, which feel hard with little bleeding, are scrapped out with a round loop electrode until a soft red base is reached.

Biopsies:

Biopsies can be performed for suspected growths in and out of the anus. A round loop electrode is best tool, which is used on a cutting mode so that the histology is not distorted due to lateral heat. A brisk bleeding is encountered from the base, which could be compressed for a few minutes or else coagulated with ball electrode.

There is no distortion of the resected edges of biopsy specimens. Histologically, it has been shown that tissue damage with radio surgery is actually less than with a conventional scalpel. 19.

Fistula in Ano:

The Ellman Dual Frequency has been found to be the most exciting and effective tool in operating fistula-in- ano. 20.

The versatility of this instrument is its biggest asset in performing this surgery. The ease of operation, minimal bleeding, a short procedure time and early recovery of the patient are but few of the highlights of radiofrequency fistulotomy. 21.

The patient is operated either under a short general anesthesia or under caudal block. The procedure is performed keeping the patient in a lithotomy position. While viewing through an anoscope, methylene blue dye mixed with hydrogen peroxide is injected through the external opening. The dye emerges out from the internal opening. A probe is gently passed through the external opening and is brought out of the anal canal through the internal opening. The blue spot of the dye emerging from the internal opening is a good guide in this maneuver. Keeping the probe in the

fistula tract, the skin overlying the probe is coagulated by moving the ball electrode over its complete length. This reduces the amount of bleeding during incision of the tract.

With a needle electrode the tract is then slit opened over the probe. The edges of the wound are shaved off by the loop electrode to create a pear shaped wound tapering towards the anus. The bleeding points are held in the hemostat and are coagulated. 22-23.

Hemorrhoids:

Radio surgery is useful in both early and advanced hemorrhoids. The non- prolapsing internal hemorrhoids could be directly coagulated in-situ with the ball electrode of a sufficient length under a surface anesthesia as an office procedure. 24.

For grade III hemorrhoids, these are first ablated with a ball electrode on coagulation mode and then the ablated pile mass is plicated with catgut to ensure fixation of the anal cushions to the underlying structures. It is observed that with this procedure, the hospital stay is minimized, postoperative pain is less, recurrence rate is low and return to work is faster. The results are more assuring when compared with conventional hemorrhoidectomy. 25.

In-situ radiofrequency ablation of advanced grades of hemorrhoids has also been found to be effective in controlling prolapse and bleeding. 26-27.

Rectal Prolapse:

Radiofrequency has been used as an adjuvant therapy in elderly patients with rectal prolapse. A circumferential coagulation of the anoderm is made with the ball electrode and then a Thiersch's stitch is tied to encircle the anal verge. The radiofrequency coagulation was found to induce fibrosis and a zone of band helping in tightening the anal opening and preventing prolapse. 28.

Post-Operative Care:

Almost all the abovementioned procedures are carried out as day care surgeries. Patients are routinely discharge on the evening of the procedure. Only patients having post anesthesia symptoms like nausea, vomiting, urinary retention etc. are watched in the hospital overnight. Analgesics, antibiotics and stool softeners are prescribed according to the departmental protocol. No specific wound care is found needed, except a warm water Sitz bath two times a day.

Complications:

No major complications were encountered.

Few minor ones include:-

- Deep dissection causing more scarring and longer time for healing.
- Excessive release of power causing more smoke and charring.
- Accidental burns either on the patient or on operator due to unintended activation of hand piece.

The only way that a radiofrequency surgery could result in tissue damage is when heat is allowed to accumulate in the tissue to the point where excessive dehydration occurs and the tissue is destroyed. Preventing the accumulation of such heat is the basic objective of radio surgical technique. The two factors, which are to needed to make this a good technique, are the power setting on the unit and the swiftness of the cutting stroke.

Precautions to be taken while operating with radiofrequency unit— The human body reacts as an electrolyte liquid. The more hydrated the tissue, the more easily the electric current passes through the body, and the more dehydrated the tissue, the less easily current passes through the body. If the surface of the skin is very dry, current will not pass from the electrode tip to the tissue cells due to the very high resistance caused by the dryness acting as an insulator. Nonetheless, the area should not be wet but just moist, as too much moisture on the tissue surface will cause the current to spread²⁹. Radiofrequency should not be used by, or on anyone who wears a pacemaker. The instrument should not be used in the presence of flammable or explosive liquids or gases. The skin should not be prep with alcohol.

If proper settings are not known, the operator should start with low power setting and cautiously increase power until an ideal cut is accomplished, with no tissue drag and minimum sparking. The finer the electrode used, the less lateral

heat spread and the least damage to adjacent tissue is achieved³⁰. A skilled application of radiofrequency surgery does result in great patient satisfaction while achieving a best possible time management in the whole exercise. ³¹.

The radio surgical generators and needle electrodes used in this study, however, do not measure tissue impedance and temperature. The electrodes are reusable and may be kept in cold sterilization solution when not in use.

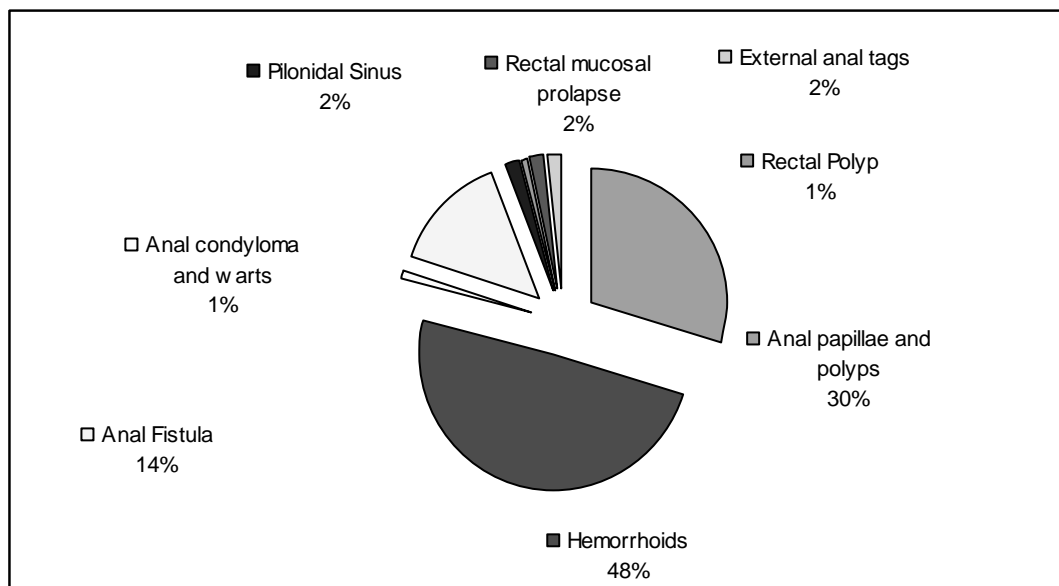
Conclusion:

Based on our personal experience and weighing the pros and cons of the technique, we are of the opinion that radiofrequency surgery could certainly prove to be a safe and convenient alternative to many of the conventional ano rectal procedures.

Table 1- Age wise distribution of patients operated with radiofrequency surgery:

Age group	Number of patients	Percentage of total patients (n=2480)
1 to 10 years	494	20%
11 to 30 years	1013	41%
31 to 50 years	738	30%
51 years and above	235	9%

Figure 1- Distribution of various anal pathologies operated as day care surgery with radiofrequency device.



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DAY SURGERY “MY PERSONAL JOURNEY”

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When I obtained my fellowship in Plastic and Reconstructive Surgery in 1984 the notion of Day Surgery did not exist. We were treating our multiple skin cancers under general anaesthesia with at least an overnight stay and all the big reconstructive procedures including Abdominoplasties, Breast Reductions and Facelifts were done in hospital with at least a three day stay. As my surgical practice developed in the Ipswich and West Moreton region, it became clear to me that a number of these procedures could be done as day cases. I therefore slowly converted all the skin cancer surgery to become day cases but I was unwilling to perform reconstructive procedures in day surgery for many years.

In 1995 it became obvious, to control my own surgical destiny, I should consider building a Day Procedure Centre. At that time in Australia there existed only 30 of such centres. These were mainly owned by surgeons and distributed in the capital cities of Brisbane, Sydney and Melbourne. I therefore designed and built a Day Procedure Centre consisting of consulting rooms and one theatre. This centre was designed to appear like the surrounding buildings with a “cottage” feel dating back to the architecture of the 1860’s. I was able to enact my personal attitude towards day surgery procedures. This involved treating patients in a dignified and homely manner with attention to detail of personalized quality service within a “state of the art” technological centre. Patients were given dressing gowns and pyjamas rather than the sterile hospital gowns, they were admitted only half an hour before their procedures and they were given thorough pre-operative and post-operative care instructions. All patients were rung on the day after surgery to ascertain that they were well, and understood their post-operative instructions.

In order to encourage my colleagues of various surgical disciplines to participate in the Day Surgery Centre, I set up a legally constituted unit trust which would allow them to benefit from performing procedures at my centre. Slowly the centre grew from my involvement with an Ophthalmologist to include another Plastic Surgeon, a General Surgeon performing Endoscopy, Maxillofacial Surgeons, Urologists, and all Dental Practitioners who performed general anaesthesia procedures. My own experience expanded from simple multiple skin cancer excisions to involve all reconstructive procedures including Breast Reductions, Abdominoplasties, Liposuction, Facelifts, and some Breast Reconstructions. We were regulated by law to have written agreements from the local private and public hospitals to allow admission of any patients that were not suitable for discharge on the day of surgery. In the first five years of this operation the number of patients transferred to other facilities was only a staggering three. The centre had become accepted within the local region as the first multi-disciplinary day surgery and patients and medical practitioners alike chose the facility in preference to the local private hospital.

After ten years of operation and a throughput of approximately two thousand patients per year, the centre became too small for the increasing demand of surgical procedures. I therefore bought 700sq metres of freehold space within a local new medical centre and designed and built a new two theatre complex. Our challenge was to retain the homely atmosphere of our previous centre within what was now a very modern building. By using the same quality standards

and “family” approach to our patients, we have been able to achieve this goal and have increased our surgical throughput.

During this time the number of day procedure centres has grown to over 270 freestanding units within Australia. Most of these centres are still owned by medical practitioners and they have varying profit sharing structures dependent upon the investment protocols of their surgeons. Most of the centres are in the capital cities and large regional centres. Some are multi-disciplinary but a number have been established specifically for disciplines such as Ophthalmology, Otolaryngology, Gastroenterology and Plastic and Reconstructive Surgery. All centres are financially viable and some, I believe, generate earnings before income tax of approximately 20% of their gross turnover. All centres must have a State Government license to operate and a Commonwealth Government provider number to enable them to be reimbursed by the Private Health Funds for procedures that are performed within their facility. Each centre must negotiate on a yearly basis with each of over twenty Private Health Funds operating within Australia. Approximately 50% of the Australian population are privately insured and, like other countries in the world, waiting lists for surgery at the public hospitals are exceedingly long. In this environment, even uninsured patients elect to pay for private day surgery treatment.

All centres have strict quality control guidelines and must be accredited by one of three agencies. The major agencies for accreditation are the ACHS (Australian Council for Healthcare Standards) and ISO9001 (International Standards Organisation for Day Surgery). To qualify for accreditation, surveys are conducted by both organisations at regular intervals and certificates of accreditation issued to each facility. As well as this, each state government performs their own licensing inspections on a regular basis and in some states, a Quality and Complaints Council has also been established. This council also requires regular data from each day procedure centre. The burden of all three regulators on the finances of each centre has become extraordinarily significant.

The peak body for day surgery management in Australia is the Australian Day Surgery Council. It has been legally constituted by the Royal Australasian College of Surgeons, Australian and New Zealand College of Anaesthetists, and the Australasian Society of Anaesthetists. A six member central committee is appointed by these bodies and it co-opts representatives from twenty other associations who have an interest in day surgery. Foremost among these is the Australian Day Surgery Nurses Association and the Australian Day Hospital Association. The Australian Day Surgery Council elects two representatives to sit on the International Association of Ambulatory Surgery. Currently these representatives are Dr Lindsay Roberts and I. Lindsay has recently retired from the Executive Committee of the Association where he served two years as the International Association President. I have been recently elected onto the Executive and have also been chartered with the responsibility of being the President of the Organising Committee for the International Association of Ambulatory Surgery Conference in Brisbane in 2009. This is the first time that the conference has been held in the Southern Hemisphere.

When I reflect on my association with Day Surgery over the last twelve years, I am extremely humbled by the thought that I may have in some small way contributed to the success of Day Surgery within Australia. I see the future of Day Procedure Centres lying in extension toward 23 hour care and becoming teaching centres of excellence for medical and nursing undergraduates and surgical registrars. Because of the success of many individual day surgeries, it is my view that the corporate sector will begin to show an interest in acquiring these profitable centres. All in all, the future is certainly bright for Day Surgery in Australia.

Current status of day care surgery for Benign Prostatic Hyperplasia (BPH)

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The role of day case surgery is expanding worldwide. This is the result of the realization by managers of its economic efficiency, by the medical staff of their ability to treat large volume of patients quickly and efficiently and by the patients themselves that effective minor surgery can be undertaken without the need for a night in hospital. [1].

For decades, transurethral resection of the prostate (TURP) has been considered the “gold standard” surgical intervention for patients with LUTS/BPH. Following TURP, 70–85% of patients experience improvement of symptoms. However, TURP can be associated with significant morbidity, including TUR syndrome, intraoperative and postoperative bleeding with need for blood transfusions, and acute myocardial infarction. The relatively high incidence of complications traditionally associated with TURP has driven the development of novel surgical/minimally invasive treatments for LUTS/BPH. In last 15 years there has been a significant change in the management of lower urinary tract symptoms (LUTS) presumably secondary to benign prostatic hyperplasia.

Here, we discuss several alternatives to TURP, which can be used to treat LUTS/BPH, in particular the TURP analogues such as bipolar transurethral resection in saline (TURIS), transurethral vaporization of the prostate (TUVAP) and holmium laser resection / enucleation (HoLRP/ HoLEP), energy-based thermal ablation with transurethral needle ablation (TUNA), transurethral microwave therapy (TUMT) and Photoselective laser vaporization (PVP), botulinum toxin injections, and mechanical intervention with intraprostatic stents. New surgical and minimally invasive treatments for LUTS/BPH should have a comparable efficacy and durability to TURP, but better safety outcomes, such as fewer perioperative and postoperative complications, which reduce the length of hospital stay, allowing the procedure to be done on day case basis. Furthermore, the new techniques should be less costly.

Transurethral Microwave thermotherapy (TUMT)- TUMT is a heat-based therapy based on increasing

intraprostatic temperatures greater than 45°C, which cause coagulation necrosis in the targeted peri-urethral glandular tissue of the transition zone. The heat is delivered through a Foley type self retaining catheter with a microwave antenna. This heat penetrates within the prostate to about 15 mm. Several devices are available, with the main difference between them being the degree of energy delivered, the cooling system, and design of the antenna. TUMT is effective in relieving LUTS and improving voiding parameters, according to studies with at least 1 year of follow-up. In sham-controlled studies, symptom scores decreased between 40% and 70%, whereas peak urinary flow rates increased 14% to 60% (2). The incidence of major complications associated with microwave treatment has been found lower than with TURP. Prolonged post-operative catheterization times, urinary tract infections and post-treatment irritative symptoms such as dysuria, however are more common reported complications. The most important advantage of TUMT is that it can be performed in an outpatient setting within an office without the need for anesthesiologists.

Transurethral needle ablation (TUNA)-

TUNA is another temperature based minimally invasive treatment for prostate that uses the thermal properties of radiofrequencies. The TUNA catheter is fitted with 2 deployable needles angled 40 degrees from each other. The needles deliver thermal energy by emitting 460- to 465-KHz signals from an automated generator that maintains a target temperature of more than 450C at the periphery and approximately 100 degree C at the centre. Coagulation necrosis can be achieved at a mean 3 mm from the tip of the needles through agitation of water molecules causing friction and subsequent heat. Large prostate may need multiple puncture for complete treatment. Depth of penetration

by the deployed needles is preset and based on volume assessment and urethral length measurements. Needle length can be controlled with extendible teflon shields and generator wattage can be changed to avoid unwanted damage to surrounding structures, such as the urethra and rectum.

TUNA device is inserted with a 0° optical lens, under direct vision similar to a rigid 18F cystoscope under local anaesthesia. The length of needle deployment in prostate is calculated with TRUS. Pathological studies demonstrate that the thermal injury may extend 5 to 6 mm beyond the tip of the deployed needle; transversely the lesion created during ablation may cover a distance of 10 mm. One lesion usually is performed per 20 g of prostate tissue. Depending upon the size of prostate gland (20 to 75 g), one to three planes of treatment are created, beginning 1 cm from the bladder neck and continuing at 1.5 cm increments until approximately 1 cm proximal to the verumontanum. Patient is discharged home with or without catheter on the same day.

TUNA is well tolerated with only negligible discomfort and significant symptom score improvements. There is lower risk of adverse events compared with other more invasive treatments. Effects on sexual function are minimal with lower rates of retrograde ejaculation and erectile dysfunction rates in approximately 3% of cases (3).

Transurethral balloon dilatation of prostate (TUBDP)-

The hypothesis behind BDP was that rupturing the anterior fibromuscular stroma would reduce the resistance and improve the symptoms. However the randomized study of BDP and diagnostic cystoscopy showed that BDP was no more effective than cystoscopy at relieving LUTS. BDP therefore has fallen out of favor as an alternative for managing LUTS/BPH (4).

Prostatic stents-

Stenting the prostatic urethra to relieve LUTS was first described in 1980. Several stents has been developed since then. Stents have been classified into temporary and permanent

1) Temporary- These remain in the urethral lumen and can be replaced at the intervals. They are used as an alternative to indwelling catheter for short term relief of prostatic obstruction either in patients with contraindications for surgery or in patients who are awaiting surgery or in patients who do not want to undergo surgery. They are usually of 4 types: spiral stents made of coiled stainless steel wire, self expandable nitinol stents, polyurethane stents and biodegradable stents which breakdown into small fragments and are excreted per urethra. These stents allow normal voiding and are easy to insert and remove on an outpatient basis. Most promising application of these stents may be for preventing urinary retention as a results of thermally induced edema after TUMT. Urgency, frequency and encrustation and stent migration are the commonly seen complications of these stents. The drawbacks of these stents are that they require a specialist follow-up and are very expensive if multiple replacements are needed (5).

2) Permanent - These stents are meant for definitive treatment, they get incorporated into the urethral wall and these in turn avoids encrustation and migration. They are used in patients with urinary retention or in patients with absolute contraindication for TURP. They are made up of self-expandable woven tubular mesh that maintains its position by outward external pressure. Pain, storage symptoms and incontinence are the few associated complications. Important drawback of stent is that it is difficult to remove (6).

Urethral fluid balloon-based thermotherapy-

It is based on principle of producing heat-induced coagulative necrosis and subsequent ablation of obstructing hyperplastic tissue. It uses a closed loop catheter with two balloons, the anchoring balloon within the bladder is the proximal one which keeps the catheter in place and cigar shaped treatment balloon stretches and treat the prostatic urethra. Water at 60 – 70°C temperature is circulated through the dilated treatment balloon. The remainder of the catheter shaft is insulated to prevent damage to non-target tissue. Temperature ideally is limited to 43°C for the urethra. The advantage of procedure is that it can be performed in a single 45 min office session under local anaesthesia. Major drawback of procedure is a need for post-procedural catheterization since immediate tissue ablation is not produced (7).

Transurethral ethanol ablation of prostate (TEAP)-

It was initially introduced as a transperineal injection with phenol being the agent injected. The disadvantage of this was extraprostatic leakage of agent that led to higher incidence of adverse events. Transurethral method of injecting ethanol has been found to be a safer approach. Prostatic capsule was found to act as a relative barrier to ethanol diffusion after transurethral injection. Considerable lobular volume of necrosis (42%) was found. In a European

multicenter study average reduction in prostatic volume of 16% was found and requirement for TURP was found in 7% of patients at 1 year follow-up (8).

Rotoresection of prostate-

It involves an axially adjustable actively rotating crank with a milling-head spiked electrode fitting into a specifically designed working element. It is driven by a micro motor which transmits rotation to the electrode. In a prospective study AUA symptom score decreased from 20.5 ± 3.8 to 1.12 ± 1.56 and the Qmax rose from 8.7 ± 2.1 to 21.8 ± 8.5 ml/sec (9).

Botox injection-

Botulinum toxin A (BTA) injection is effective to control both mechanical and dynamic components of BPH. This conclusion is based on studies that chemical denervation using BTA causes subsequent atrophy of the gland, and cholinergic stimulation causes prostatic stromal smooth muscle contraction and that BTA blocks acetylcholine release at the neuromuscular junctions and in autonomic neurons. BTA induces prostate apoptosis and reduces prostate volume in animals and human. Neither systemic complications, such as respiratory depression or hyposthenia, nor local complications, e.g. gross hematuria, UTI, urinary retention or urethral stricture, occurred after BTA injection. The injection method was safe and simple, and no patient needed narcotic analgesics after the injection. With a dose of 100 or 200 U of BTA injected into the prostate, 31 of 41 men had 30% improvement in LUTS and QoL indices. The effect was prompt, and was maintained for 6 months.

There has been no report of local or systemic complications with prostate BTA injection. However, a long-term follow-up is needed to confirm its safety regarding the risk of developing prostate cancer (10).

Holmium Laser Enucleation of Prostate (HoLEP): Holmium laser enucleation of the prostate (HoLEP) continues to be one of the most rigorously analyzed surgical techniques for the treatment of men with obstructive symptoms of BPH (11).

Gilling et al popularized the use of Holmium laser for resection of prostate (11). More recently for enucleating very large prostate HoLEP has been described. In one study the average procedure time was found to be 134 mins (range 25 to 470 mins), mean specimen weight was 68gms (3 to 376gms), the hospital stay was on average 1.1 day. The need for postoperative transfusion is significantly low. The episodes of TURP Syndrome were never experienced. The length of hospital stay, time to catheter removal and number of adverse effects are significantly lower with HoLEP than TURP. Holmium laser has also been used for vaporization of prostate. Disadvantage of vaporization is that it can be used for small size prostates and retreatment rate is significantly high (12, 13).

The main advantage of Holmium laser over other lasers is its versatility. It can be used for bladder tumor resection and also for stone fragmentation. It has been concluded that HoLEP is a significant addition to the surgical armamentarium of urologist. HoLEP has been found to be safe in patients on anticoagulant medication, patients with prior history of IHD and patients with coagulopathy (14).

However The HoLEP procedure requires steep learning curve and early attempts can be associated with unpleasant complications such as bladder mucosal injury. HoLEP with tissue Morcellation does not appear to alter the ability to detect prostatic cancer in pathological specimens. There is no difference in sexual function by comparing erectile function or orgasmic function domains comparing HoLEP and TURP.

Potassium titanyl phosphate (KTP) laser:

High-powered potassium titanyl phosphate laser has been recently found to be a user friendly option over TURP. KTP laser uses a higher power output than previous lasers to vaporize BPH tissues. KTP energy can be delivered to the prostate in the noncontact mode without significant loss of energy. This causes heating of the tissue, resulting in instant vaporization. Constant irrigation washes out the vapour while limiting the depth of thermal penetration to 1–2 mm. This is in contrast to the holmium laser which is highly absorbed by the irrigating medium, causing an air–tissue bubble interface. The use of postoperative catheters is usually at the discretion of the surgeon. A significant proportion of patients can be totally catheter free [15]. Catheters when used for short periods may be useful till recovery from spinal anaesthesia or in patients operated in the evening. In one centre, more than 65% of the patients are treated without postoperative catheters (unpublished data). The increasing profile of safety demonstrated with PVP along with its remarkable haemostatic properties have encouraged the use of PVP in patients with ischemic heart disease (patient on anticoagulants) with great success (15).

Green Light laser has made day-case prostatectomy a true prospect and may consign TURP and open prostatectomy to the annals of history. The procedure is virtually bloodless, safe associated with short period of catheterization and

can be carried out as a day case procedure. Early symptomatic and flow rate improvement is similar to TURP. The main drawbacks of KTP laser are the high set up costs and lack of tissue for analysis (16).

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Day Surgery: Making it Happen

Key issues in the implementation and development of Day Surgery services.

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Introduction

Day Surgery, rather than inpatient surgery, is increasingly being considered the norm for all patients undergoing elective surgery.

The treatment of appropriate non-emergency cases by day surgery can be advantageous not only for the patients and their families but also for health care providers and the communities they serve – more patients can be treated more effectively and more efficiently.

Despite these widely accepted considerations, there are considerable variations in the rates of day surgery across Europe and worldwide.

The development of high quality day surgery services in European countries is now considered an health care priority for the Governments. For this reason a joint initiative of the International Association of Ambulatory Surgery and of the European Observatory on Health Systems and Policies led to the publication of the Policy Brief *Day Surgery: Making it Happen*. This policy brief is intended for policy-makers and health care professionals exploring how day surgery can respond both to the needs of hospital administrators and to the surgical care needs of specific patients and to help those who wish to expand the provision of day surgery. It identifies the major prerequisites for a successful expansion of day surgery and will be of particular value to health professionals and policy makers where day surgery is still in its infancy.

This policy brief can be of particular value also for non European Countries and most of the content can be useful for developing Countries facing challenging health care problems.

In this short paper we will summarize the content of the policy brief *Day Surgery: Making it Happen* with a prospective view to the specific needs of developing countries.

State of the Art

Results of a recent survey conducted in 19 countries showed an extremely wide variation in the percentage of day cases among countries (Toftgaard and Parmentier 2006).

The range varies between less than 10% (Poland) and over 80% (United States and Canada). A closer look at these figures also reveals large variations between procedures in the various countries, ranging from 0% to over 90%.

This variation can also be seen within countries, between hospitals in the same country and between departments and specialists in the same hospital. There are a number of reasons for this diversity including the following: regulations and incentives in different countries, financial reimbursement of day surgery, resistance to change and individual practices of surgeons and anaesthetists. The latter is often a factor in variations within the same country.

Day surgery covers a wide spectrum of procedures in all surgical specialities, from operations under local anaesthesia to major ones under general anaesthesia.

Improvements in surgical and anaesthetics techniques have brought about an ever-widening range of procedures which are suitable for day surgery; a good example is nowadays the expansion of laparoscopic and minimally invasive surgery.

Nevertheless some basic principles are to be applied when considering a procedure appropriate for day surgery:

- reduced surgical trauma.
- abdominal and thoracic cavities should only be opened with minimally invasive techniques.
- postoperative pain should be manageable with oral analgesia.
- no significant risk of blood loss.
- no rigid time limits exist but length of procedure should be restricted to less than two hours.

Day surgery is increasingly being considered the first choice for all elective surgical operations but it is necessary to have a system in place for selecting patients carefully, taking into account surgical, medical and social criteria. Which patient is then suitable for day surgery? We should perform the right surgical operation in the right patient. A fundamental pragmatic question to consider is whether the management or outcome would be improved by pre- or postoperative hospitalization. If not, the patient should undergo treatment on a day basis. Criteria of choice must be adapted to the single patient in a particular local setting. Social criteria for instance may vary widely in different situations; home circumstances and easy access to a telephone or transportation in case of emergency are important elements.

Day surgery outcomes

The rationale of day surgery is that it is as safe, if not safer, and of the same quality as inpatient surgery for the same procedure.

There is evidence in the published literature that the incidence of major morbidity directly associated to day surgery is extremely low, less than 1%, and deaths related to day surgery are extremely rare.

Minor complications such as pain, nausea, drowsiness or fatigue are, however, quite frequent and must be carefully prevented and managed.

Several studies reported high levels of patient satisfaction with day surgery.

Economic outcomes

The financial benefits of day surgery over inpatient surgery are now well established; hospital costs are from 25% to 68% lower than inpatient surgery for the same procedures.

It is, however, important to recognize that substantial sums of money are only saved when cases are transferred from the inpatient unit to the day unit and inpatient beds are closed or released for more complex and emergency cases. This fact could be of great value for countries where surgical facilities are inadequate to meet patients needs.

Concern has been raised about day surgery transferring extra costs to patients and caregivers. The reduced risk of cancellation and earlier return to work associated with day surgery may actually reduce costs for the patient.

Designing the model

The introduction of day surgery should take account of both local needs and existing surgical provision and configuration of facilities.

Day surgery is usually carried out in one of four organizational models:

- Hospital-integrated facility – dedicated day-surgery beds in an inpatient facility, sharing operating theatres, recovery facilities, and medical and nursing personnel with the inpatient department.

- Self-contained unit on hospital site – operating theatres and ward dedicated to day-case surgery and functionally separate from the inpatient areas of the hospital. Nurses and administrative personnel are dedicated to the day unit. Many surgical specialties working in the same unit share facilities and non-medical personnel.

- Free-standing self-contained unit – identical to self-contained units but not on a hospital site. They may be more cost-effective than self-contained units on hospital sites. Free-standing units have the potential to provide day surgery near to where the patient lives.
- Physician's office-based unit – small, self-contained surgical annexes in surgeon's consulting rooms.

Expansion of day surgery can take place in existing hospitals using various permutations of inpatient or day wards with inpatient or dedicated operating theatres (hospital-integrated facilities). However, these facilities, based on configurations created for traditional surgery, often present physical barriers to the establishment of integrated pathways, and the separation of staff and functions can make it difficult to develop the necessary cohesion and teamwork among staff, making them less than ideal in terms of cost-effectiveness and quality of care. The ideal day surgery service on a hospital site is provided by a self-contained day unit (self-contained unit on hospital site) which is functionally and structurally separate from the inpatient unit.

Multidisciplinary approach Human resources

It is the leadership and management as well as staff members, and not the physical structure or the quality of the equipment, that determines the success of a day-surgery service. Success requires the implementation of policies that extend all the advantages of day surgery to the patient, the health care professional and the community at large.

Day surgery units tend to achieve maximum efficiency and effectiveness when management and staff are specific to that service.

Day surgery requires a multidisciplinary approach. For a successful outcome it requires active participation by all players – managers, nurses, surgeons, anaesthetists and general practitioners. There is a need for a flexible approach, with regular re-evaluation of practice to provide a level of care that reflects individual patient needs. However, there is limited evidence on the most appropriate staffing models for the different types of day-surgery units. Staffing models must be adapted to the local situation.

Improved job satisfaction and enhanced staff competency through investment in training and development leads to better staff retention, flexibility of the workforce, better informed and educated patients and carers because staff are motivated and familiar with the entire patient experience.

Patient information

Patient information provision is crucial, not only to ensure the success of the procedure, but also for patient safety. An informed patient is able to better adjust to surgery and minimize the risks in the postoperative period. Information should be given to the patient in a structured manner. The use of both oral and written information is essential.

Day Surgery: developing countries' perspective

Developing countries worldwide are facing many different challenges and health care priorities.

However, a common aspect is shortage of everything apart from patients.

In virtually everything developing countries there are limited facilities, medical equipment, human resources, drugs and financial resources. Medical facilities both at the primary and secondary level are often inadequate for the large populations they are intended to serve. Training of health care professional is often not optimal and there are tremendous workloads.

Health care policy in developing countries does not reflect the real surgical needs of the populations. This is particularly true for children surgical conditions. Surgery should be considered an essential component of basic health care for example in relation to the management of congenital pathologic conditions and traumatic injuries. At other time surgery can be preventive as in the case of elective hernia repair.

A lack of political commitment by governments and international agencies may be the single most important reason why surgical care has not progressed in developing countries.

Irrespective to the availability of resources, political commitment is the principal prerequisite for ensuring essential health services for the disadvantaged in these countries. (Bickler SW and Rode H, 2002).

Surgical care should be an essential component of child and adult health programmes in developing countries.

The development of day surgery services adapted to the particular needs of these countries could provide a significant improvement of health care services and a better use of available resources. There is sufficient evidence in the literature that day surgery is feasible and well accepted by patients in developing countries. However, the provision of day care services as of inpatient surgery must be adapted to the different needs of the populations of urban and rural areas.

MAKING IT HAPPEN

Overcoming barriers – fear and resistance to change

Day surgery is an innovative approach to surgical health care and, as in all innovative situations, there may be initial resistance to change (Jarrett and Staniszewski 2006). In France, the publication of a major study by the National Insurance Company (CNAM) on the experience with day surgery in that country was important in changing the prevailing opinion, showing as it did that the advantages obtained elsewhere were equally relevant in France (Toftgaard and Parmentier 2006). There may also be legal and regulatory barriers to be overcome. For example, until the end of the 1990s, day surgery was prohibited in public hospitals in Germany.

The barriers to expansion of day surgery include the following:

- Regulatory – national regulations and legislation may preclude a shift to day surgery.
- Economic – reimbursement may be more advantageous for hospitals or surgeons if patients are hospitalized for 24 hours or more, or patients may be obliged to pay a percentage of the total fee for day surgery, as opposed to full coverage by health plans for regular hospitalization.
- Educational – lack of educational programmes for undergraduate and postgraduate medical students may reduce awareness of the benefits of day surgery.
- Facility design – available health facilities may not be configured in ways that facilitate the development of day surgery, in terms of both their internal configuration (ensuring ease of patient flows) and their external configuration (ease of access by patients).
- Local, home and community support – lack of adequate community services may preclude some patients from obtaining day surgery.
- Information – prospective patients and their referring physicians may not be fully aware of the opportunity to have day surgery.
- Organizational – weak multidisciplinary teamwork.

Education – training issues

Day surgery is expected to continue to grow in many countries; existing services are expanding, and new services are beginning to develop in eastern Europe and in many low-income countries. This creates a need for enhanced training of undergraduate medical students and residents, linked to continuing professional development for existing staff, from all of the professional backgrounds involved in the provision of day surgery.

Undergraduate teaching in a day-surgery facility is, however, sometimes difficult and costly. There is a need to ensure consistency in the learning experience, demanding new educational approaches that take account of the fact that, unlike a traditional surgical facility, patients are only on site for a short time.

Day surgery makes demands on the different skills of each professional involved, and each professional needs to keep abreast of the advances being made in surgery, anaesthesia and nursing. Appropriate continuing professional development programmes are essential to maintaining safe day surgery. Continuing medical education and professional societies are well established in many countries and provide opportunities for the experienced day-surgery professional to remain up to date. Events should be multidisciplinary to facilitate communication within teams.

Aligning incentives

In spite of its many benefits, day surgery cannot and will not develop in isolation. A change in behavior requires encouragement. Therefore, incentives are needed on all levels to overcome the barriers to its growth and development. Incentives may be aimed at hospitals, managers, professionals or patients. Examples include:

- financial incentives – a change in reimbursement schedules can promote day surgery;
- educational – continuing medical education and continuing professional developments provide opportunities for staff members, helping to create champions for change;
- quality incentives – improvements in safety and quality will bring preferential referrals and thus more income and greater financial rewards.

THE FUTURE OF SURGICAL SERVICES

The considerable diversity in the utilization of day surgery, both within and among countries, indicates that day surgery is likely to expand further, even assuming no change in technology.

Yet science is changing. Further developments in day-surgery processes, patient selection, pre- and postoperative procedures and pain relief as well as progress in minimally invasive clinical and anaesthetic techniques are likely to reduce surgery time and increase the number and type of procedures suitable for day surgery.

In recent years a move from day surgery to office-based surgery for some procedures has been observed. Office-based surgery is carried out in self-contained surgical annexes in medical practitioners' premises. From the patient's viewpoint, office units are smaller and thus can be more personal and closer to where they live, compared with dedicated facilities in hospitals.

Problems in office-based surgery can arise where there is a weak system of regulation or accreditation. Where this occurs, there may be pressure to reduce costs, leading to poor facilities, inadequate patient monitoring, absence of a specialist anaesthetist, and surgeons undertaking procedures for which they are not fully trained.

10 KEY RECOMMENDATIONS IN MAKING DAY SURGERY HAPPEN

- 1. Consider day surgery, rather than inpatient surgery, the norm for all elective procedures**
- 2. Separate flows of day-surgery patients from inpatients**
- 3. Design day-surgery facilities according to local needs, structurally separate from inpatient facilities whenever possible**
- 4. Provide day-surgery units with independent management structures and dedicated nursing staff**
- 5. Take advantage of motivated surgeons and anaesthetists to lead the change**
- 6. Achieve economies by ensuring that expansion of day surgery facilities is accompanied by reductions in inpatient capacity**
- 7. Invest in educational programmes for hospital and community staff**
- 8. Remove regulatory and economic barriers**
- 9. Align incentives**
- 10. Monitor and provide feedback on results (including patients' views)**

Conclusion

Day surgery will be an integral component of health care in the future.

An understanding of the scope of day surgery is of critical importance for health policy makers. An expansion of day surgery will have profound implications for the design of health facilities and the composition of the health care workforce.

The expansion of day surgery entails a change in mindset. Often, changes in national policies and regulations will be necessary, such as the removal of incentives that promote unnecessary hospital stays or obsolete professional demarcations. Once these changes have been put in place, it will often be necessary to reorganize and/or redesignate existing structures, extend the roles of health professionals and other staff, explore ways of achieving better integration with primary care services to ensure optimal pre- and postoperative care, and develop appropriate financial and non-financial incentives.

Political commitment by governments and international agencies may be the single most important step in the development of a policy for the provision of appropriate surgical services for the disadvantaged in developing countries.

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Discharge following ambulatory surgery – Current concepts and recommendations.

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Introduction

As the scope of ambulatory surgery continues to expand, more complex procedures, on sicker patients and those belonging to the extremes of age are being performed. In order to ensure patient safety and to administer a complication free anaesthetic, it is important to have stringent selection of patients and well established discharge criteria. Ideally, ambulatory anaesthesia should permit rapid recovery with minimal or no residual cognitive or psychomotor impairment. At discharge, patients must be clinically stable and able to rest at home under the care of a responsible adult. Clinical criteria are generally used to guide discharge, but as the nature of surgery and the patients co-morbidities become complex, the timing of discharge also becomes crucial. A negligible readmission rate is essential to the success of any day care facility.

Stages of Recovery

The process of recovery is a continuous one, beginning from the cessation of anaesthetic to the return of the patient to his preoperative physiological state. The entire process may take hours to days, depending on the anaesthetic drugs used. Recovery has been traditionally divided into three phases.

Phase I: This includes the period from cessation of anaesthetic, to the time the patient regains protective reflexes and motor function. This is a crucial time and patients need close supervision. Phase I recovery occurs in the Post Anaesthesia Care Unit (PACU) under vigilant monitoring. The Aldrete score was designed in 1970 to assess early recovery. The score assigns a score of 0, 1, and 2 each to activity, respiration, circulation, consciousness and colour. The modified Aldrete score which includes pulse oximetry to assess oxygenation is commonly used to judge the adequacy of Phase I recovery and the transfer to a step down unit or an ambulatory surgical unit (ASU). A score greater than 9 is required for discharge from PACU. A limitation of the Aldrete score is that it does not assess nausea, vomiting and pain.

Fast tracking: The availability of ultra short acting anaesthetic agents and cerebral function monitors e.g. Bispectral Index, which permits titration of agents to the depth of anaesthesia, has resulted in faster recovery time. Phase I recovery can now be completed in the OR itself, permitting direct transfer of patients to the step down unit. This bypassing of the PACU, has been called "fast tracking". Substantial cost savings can result from bypassing the PACU which mandates a high nurse – patient ratio.

Phase II/ Intermediate recovery: This is the period of stay in the ASU or step down unit until the patient is fit to be discharged home. There are several tests to assess intermediate recovery including Trieger dot test, Maddox wing test, reaction time tests, use of driving simulators etc. The drawbacks with these tests are that they are complex and time consuming, and they require special equipment that may not be readily available. Also, these tests, as a guide to discharging patients, have a major failing in that the patient may be in pain or have nausea or vomiting. Clinical criteria, therefore, continue to be popular in deciding discharge.

Korttila et al developed criteria for safe discharge following ambulatory surgery.

Guidelines for Safe Discharge after Ambulatory Surgery

Vital signs must have been stable for at least 1 h

The patient must be

Oriented to person, place, and time
Able to retain orally administered fluids
Able to void
Able to dress
Able to walk without assistance

The patient must not have

More than minimal nausea and vomiting
Excessive pain
Bleeding

The patient must be discharged by both the person, one who administered anaesthesia and the person who performed surgery, or by their designates. Written instructions for the postoperative period at home, including a contact place and person, must be reinforced.

The patient must have a responsible, “vested” adult escort to take them home and stay with them at home.

Subsequent studies have conclusively shown that patients who are forced to drink oral fluids prior to discharge have an increased incidence of post operative nausea and vomiting (PONV). It is no longer recommended therefore to have the patient drink prior to discharge.

Similarly, it is no longer mandatory for all outpatients to void prior to discharge. Certain high risk groups for urinary retention have been identified, where, in case of urinary complications, ultrasound monitoring of bladder volume can be used to determine the need for catheterization, and may be superior to clinical judgment.

Chung et al devised the postanesthesia discharge scoring system (PADSS). This scoring system is a simple method for providing a uniform assessment of all ambulatory surgical patients. PADSS was modified to eliminate requirements for oral fluid intake and documentation of urinary output prior to discharge.

The Post Anaesthesia Discharge Scoring System for determining home readiness:

Vital signs

BP and pulse within 20% of preoperative baseline	2
BP and pulse 20%–40% of preoperative baseline	1
BP and pulse >40% of preoperative baseline	0

Activity level

Steady gait, no dizziness, or meets preoperative level	2
Requires assistance	1
Unable to ambulate	0

Nausea and vomiting

Minimal: successfully treated with PO medication	2
Moderate: successfully treated with IM medication	1
Severe: continues after repeated treatment	0

Pain: The level of pain that the patient has should be acceptable to the patient. Acceptability

Yes	2
No	1

Surgical bleeding

Minimal: does not require dressing change	2
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Moderate: up to two dressing changes required	1
Severe: more than three dressing changes required	0

Regional anesthesia is popular in the ambulatory setting because it confers the benefits of better pain control, less nausea and vomiting, and shorter lengths of stay in the PACU. Discharge times from the ASU however, seems similar to general anaesthesia techniques. Before allowing patients to ambulate after spinal anesthesia, it is important to ensure that the motor, sensory, and sympathetic blocks have regressed. Suitable criteria to judge block regression include normal perianal (S4–5) sensation, plantar flexion of the foot, and proprioception in the big toe. For peripheral nerve blocks, it may be acceptable to discharge patients home before full regression of motor and sensory block provided explicit instructions are given regarding care of the insensate limb.

Complications after ambulatory surgery

Postoperative complications can lead to delays in discharge, admission and readmissions. Re admission rate is an important outcome measure for a day care facility.

Postoperative pain

Strong predictors for post operative pain are orthopaedic and urologic surgery and long duration of surgery. Postoperative analgesia combining intraoperative opiates, local anesthesia, and NSAIDs, referred to as either balanced or multimodal analgesia, can lead to significantly shorter discharge times, lower pain scores, and a lower incidence of nausea and vomiting, compared with traditional opiate-based anesthetic techniques

Nausea and Vomiting are common complaints which can delay discharge. Risk factors for the development of PONV are female gender, history of PONV or motion sickness, nonsmoking status, and use of postoperative opioids. Additional important predictors include surgery duration > 60 min, major and laparoscopic gynecological surgery, intra-abdominal surgery, and middle-ear surgery.

Modifications in the anaesthesia technique can reduce the incidence of PONV. Use of Propofol, prophylactic anti emetics e.g. 5HT₃ antagonist Ondansetron in high risk groups is advocated. Gastric distension after mask ventilation can precipitate PONV. Gastric decompression may benefit. Use of Neostigmine may be associated with an increased incidence of PONV when used as a reversal drug because of its gastrointestinal effects. The rapid recovery characteristic of Mivacurium makes reversal drugs unnecessary and allows Neostigmine to be eliminated from the anesthetic technique. The opioid analgesics have a powerful emetic action, and one effective method of reducing the incidence of PONV is to minimize their use.

Less Common Postoperative Complications include sore throat, headache, dizziness, and drowsiness. Perioperative dehydration seems to aggravate the symptoms. Administering 20 mL/kg (versus 2 mL/kg) of saline IV can reduce the incidence of thirst, dizziness, and drowsiness for up to 24 hours postoperatively. Occurrence of post spinal headache can be minimized by

use of pencil point needles or fine gauge Quinke needles. Risk factors for sore throat include endotracheal anesthesia compared with anesthesia provided by a laryngeal mask airway, female sex, younger patients, use of succinylcholine, and gynecological surgery.

Various scoring systems have been devised to guide the process of discharge and home-readiness, to ensure patient safety. To avoid inappropriate or premature discharge, the anesthesiologist must ensure that the patient is “street fit” prior to discharge, that there is appropriate documentation of recovery, and that specified discharge criteria are met.

Another factor that influences discharge is the surgeon’s skill and the number of outpatient procedures he/she performs in a given year. Patients having operations by “low-volume” surgeons tend to have an extended length of stay when compared with outcomes of “high-volume” surgeons.

Unanticipated hospital admission

Unanticipated hospital admission is defined as the admission of patients scheduled for ambulatory surgery due to unforeseen problems such as surgical and anesthetic complications. The commonest causes are: surgical factors (pain, extensive surgery, bleeding), anesthetic factors (PONV and anesthesia-related complications), social, and medical factors .

Otorhinolaryngology, urology and general surgery account for the top three types of surgery admitted to hospital. The predictive factors are male patients, age > 50 years, ASA physical status III, surgical time greater than 60 min (fourfold

increased risk of admission), postoperative bleeding, excessive pain, nausea and vomiting, and excessive drowsiness or dizziness.

In association with ambulatory surgery, **hospital re-admission** is defined as an ambulatory surgical patient requiring inpatient admission following discharge from an ASU due to complications.

Patients undergoing urologic procedures such as transurethral resection of bladder tumour, varicocelectomy and hydrocelectomy, are more likely to return to hospital. The leading causes of readmission to hospital related to these procedures are bleeding and surgical complications. Other causes are pain, urinary retention and infection. Age > 85 years, previous inpatient hospital admission within six months, and invasiveness of surgery are the risk factors identified. General surgery, ENT and urology are the specialties associated with the highest readmission rate.

Appropriate selection of patients can reduce the complication rate. It may be prudent for a day care facility to select patients with ASA status I, II or III if the disease is well controlled. Although there are no age limits specified, premature babies, low birth weight and small for gestational age infants until six months of age may be excluded. The surgery should be of a short duration (1-2 hours), with minimal haemorrhage and postoperative pain. Requirements for post discharge nursing must be minimal. Equally important is the competency of the surgeon and the anaesthesiologist which should guide selection criteria.

Finally, obtaining patient feedback provides valuable insight into the quality of services. Studies reveal that outpatients tend to value highest those elements of care representing information and communication. Written information regarding the complications of anaesthesia and surgery and instructions pertaining to post operative care should be made available to the patient. Scoring systems guide transfer of patients from the OR to the PACU and determine fitness for discharge. A practical, easy to use scoring system applicable to all post anaesthesia situations should be adopted by every day care facility.

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