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James H. Nicoll Memorial Lecture

A quarter century of accepting the challenges while avoiding the pitfalls of ambulatory surgery

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As modern surgery developed during this century, a series of events chronicled by several courageous physicians laid the foundation upon which ambulatory surgery rose to the prominence it commands today. Their pioneering reports insightfully addressed the importance of selection, selection of appropriate patients, selection of appropriate procedures.

The practice of ambulatory surgery was first documented in the medical literature in 1909 when James H. Nicoll, a Glasgow surgeon, addressed the British Medical Association [1]. Nicoll said, "I desire to bring forward certain views concerning surgical operations in infants and young children. During the past 10 years, the work in the outpatient clinic at the Glasgow Royal Hospital for sick children has included some 9000 operations (strictly speaking 8988); nearly one-half of them were children under 3 years of age, a large proportion of them being infants under a year.

(In that group of operations) we have performed tendon repairs, cleft lip and cleft palate surgery, elevation of depressed birth fracture of the skull, pyloromyotomy and hernia surgery. All 8988 were treated as outpatients...

A much larger share of the operative work of a children's hospital than is even now so treated should be done in the out-patient department... The treatment of a large number of the cases at present treated indoor constitutes a waste of the resources... The results obtained at a tithe of the cost are equally good... We keep similar cases in adults too long in bed.

Sucklings and young infants should remain with their mothers after operation... Even when the child is bottle-fed, separation from the mother is often harmful... For 7 years I have had a small house, near the Glasgow Children's Hospital for the accommodation of young infants and their mothers. The mothers are catered for, and themselves nurse their infants... No children's hospital can be considered complete which has not, in the hospital itself or hard by, accommodation for a certain number of nursing mothers whose infants require operation".

Nicoll felt the ambulatory surgical setting was best for infants and young children because, "with their wounds closed by collodion or rubber plaster, (they) are easily carried home in their mother's arms, and rest there more quietly, on the whole, than anywhere else. They are visited at home by the hospital sisters."

James H. Nicoll, ambulatory surgery pioneer, ambulatory surgery visionary.

In 1916 Ralph Waters, often referred to as the father of the specialty of anaesthesiology in the United States, opened the Down-Town Anesthesia Clinic in Sioux City, Iowa, for minor surgery and dental cases—a prototype of today's freestanding center [2].

He told of providing anaesthesia services and surgical facilities to suit local dentists and patients who in Water's words "objected to going to the hospital because of the time and expense involved... And to surgeons (who were) also anxious to establish extra hospital clinical facilities... (A) careful physical examination (is made) on all suspicious risks... A sphygmomanometer and stethoscope are constantly present and frequently used... The well trained and alert assistant is useful (for she) often warns me that the next patient is short of breath or shows some other evidence of needing careful examination".

Waters concluded, "As to the satisfaction of my patrons, I think I can say this: There are none who have fault to find with our work. We aim to keep an abundant supply of nitrous oxide and oxygen and use it freely. Many patients and some doctors object to the

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fees, but they come back and their friends come back. Satisfactory anesthesia and too large fees work out better than bargain sale fees and unsatisfactory anesthesia... People forget the fee, but they never forget the hurt nor fail to tell their friends about it... The future for such a venture, I believe is bright. When the war is over, I trust many of you may develop downtown minor surgery clinics of much larger scope".

It was not until the 1960's that the messages of Nicoll and Waters were heard. An ambulatory surgery program was initiated in 1962 at the University of California at Los Angeles (UCLA); Cohen and Dillon in 1966 published their report, "Anesthesia for Outpatient Surgery", in the Journal of the American Medical Association [3]. They concluded, "It is possible to conduct a program of anesthesia for outpatient surgery without compromising patient safety... Safety of the patient is not a matter of inpatient versus outpatient. Safety is an attitude, and, where good practice is followed in selection of patients by the surgeon, with careful preanesthetic evaluation and careful anesthetic technique, there is no reason to expect more complications than (with) hospitalization".

An ambulatory surgical facility within the hospital but separated from the hospital's operating suite was opened in 1966 at George Washington University (GWU), Washington DC. Levy and Coakley, in November 1967, reported on the first year of "in and out-surgery" [4]. A review of the published proceedings stated, "The authors report an interesting and successful experiment in providing surgical procedures for ambulant patients. The advantages are immediately obvious in these days of shortages in beds and manpower".

The selection process reported by the University of California at Los Angeles and George Washington University became the guideline for startup programs:

- The patient must be in good health or having a systemic disease, it must be under good control.
- Surgeons are encouraged to send patients for an anaesthesia interview if they have concern about the patient's health status or if the patient is concerned about their anaesthesia.
- Operative procedures best suited are those of short duration (less than 90 min) associated with minimal bleeding and minor physiological derangement. Infected cases are rarely considered.
- Anaesthetic management is not a crucial issue if health status of patient and type of surgery are carefully considered.

Wallace Reed and John Ford, two Phoenix, Arizona anaesthesiologists developed an ambulatory surgery facility outside the administrative umbrella of a hospital, outside the hospital campus. The Phoenix Surgicenter, a freestanding facility, opened in 1970 [5,6]. The term surgicenter was originated by Wallace Reed. A plaque in its lobby proclaims, "Dedicated to the principle that high-quality outpatient surgical care can be provided in a caring personal environment, in a freestanding ambulatory facility at a lower cost than other alternatives".

In an article that appeared in October 1969 discussing the surgicenter as an innovation in the delivery and cost of medical care, Wallace Reed and John Ford wrote "The surgicenter is a response from the private sector to the many urgent appeals from the government, labor, industry and the medical profession to streamline the delivery of medical care and reduce its cost" [5]. The opening of the Phoenix Surgicenter was a landmark accomplishment, earning Reed and Ford the prestigious Lambert Award for their outstanding contribution to medical care in the United States.

As the word spread, physicians, health care professionals, administrators and government agencies sought a means of coming together to learn from each other about the new way of providing surgical care at lower cost:

- Care without the need for lengthy hospitalization
- Care that freed up hospital beds that were in short supply
- Care that maintained quality without disruption of the family unit
- Care that limited exposure to cross infection

To meet this need, the Society for the Advancement of Freestanding Ambulatory Surgery Care was established in 1974; it is now known as the Federated Ambulatory Surgery Association (FASA). Wallace Reed was a founder and first president. Currently, there are more than 2300 freestanding centers in the United States where over 4.2 million surgical cases were performed during the past year. There are over 2900 individual members of FASA.

The Society for Ambulatory Anesthesia (SAMBA) was organized in 1984. At an ambulatory anaesthesia meeting, I raised the issue "I feel the time is right to develop an outpatient anaesthesia specialty society". Seated at the table were, Burton Epstein, Surinder Kallar and Harry Wong; the response was positive. I became SAMBA's first president. The other three were elected in the order mentioned. Membership today exceeds 4500.

During the mid 1980's, 3-day surgery units in the United Kingdom were recognized as leading facilities:

- Addenbrooke's Hospital, Cambridge—Tom Ogg
- Kingston Hospital, Surrey—Paul Jarrett
- Barnet General Hospital, London—Sarah Penn

Ogg, Jarrett and Penn assumed leadership roles in the founding of the British Association of Day Surgery (BADS) in 1990. All three have been president.

Claude De Lathouwer, in 1991, in Brussels, Belgium, brought together leading authorities from throughout the world to participate in the first European Congress on Ambulatory Surgery. This beginning led to the

formation in 1995 of the International Association for Ambulatory Surgery (IAAS). Claude De Lathouwer became the first president.

Four cornerstones formed the foundation upon which an ambulatory surgery skyscraper was erected:

- Reports of James Nicoll and Ralph Waters
- Ambulatory surgical programs in the USA (UCLA, GWU), and the UK (Addenbrooke's, Kingston, Barnet General)
- The freestanding Phoenix Surgicenter
- FASA, SAMBA, BADS and IAAS supported by societies and individuals from many countries, providing the educational and collegial venues necessary to further interest and growth in ambulatory surgical care.

For those physicians and facilities that led the way, the challenges faced became the challenges met:

- Addressing potential pitfalls
- Publicizing successful outcomes
- Championing the acceptance of ambulatory surgery.

In a presentation during the 1970's I said, "The success of ambulatory surgery depended upon the five Ps:"

- Provider education
- Procedure selection
- Patient selection
- Post anaesthesia care
- Payer education

I shall briefly discuss each looking at where we were a quarter century ago and where we are today.

Provider education: Surgeons are still the initial contact; to this day they must have guidelines: what constitutes an acceptable procedure; an acceptable patient; when to contact the anaesthesiologist for early consultation with patients who are not ASA physical status one or two. Anaesthesiologists continue to limit the use of traditional premedicants, long acting drugs, agents that increase morbidity. Initially regional anaesthesia (spinal, epidural) was viewed with caution for the day-surgery patient. Today, regional techniques are well accepted alternatives to general anaesthesia. Nursing staff paradigms shifted from traditional methods of care of the sick hospital patient to caring for the healthy day-surgery patient. Success is still dependent upon physicians, nurses, non professional staff, patients and family members understanding and accepting the nuances of participating in compacted perioperative care.

Procedure selection: With new surgical techniques and technology we have moved far beyond UCLA and GWU criteria; we have vaulted beyond Wallace Reed's early procedure criteria "almost any operation which does not require a major procedure in the abdomen, thorax or cranium is acceptable" [7].

Patient selection: Whereas initially selection was limited to American Society of Anesthesiologists (ASA) physical status one or two, or an occasional patient whose systemic disease was under good control; presently we are seeing a number of patients with considerable pre-existing disease assumed to be under optimal control, an increasing number of challenging infants and octogenarians.

Patient evaluation in advance of the day of surgery (visit, telephone), important then and even more important today, it continues to limit last minute postponement or cancellation and provides for a more efficient operating room schedule. At Stanford University (California, USA) a preoperative evaluation clinic directed by anaesthesiologists has proven to be cost effective: 88% decrease in day of surgery cancellations; $112 per patient decrease in preoperative testing costs; decrease in cardiology and pulmonology consultations [8].

To this day, we cannot only rely on the surgeon's office evaluation—-still too cursory, usually directed toward the surgical problem. Facilities still need a brief but informative questionnaire that allows the anaesthesiologist to assess anaesthesia risk and plan for care; allows the facility staff to plan for special needs (positioning for the patient with arthritis, history of substance abuse, a hearing aid that should be left in place, locating a responsible adult for home care).

The basic tenets for patient selection have not changed. Patients should:

- have any medical problems well controlled
- accept the responsibility of postoperative care after discharge
- be accompanied home by a responsible adult

We must never become too cavalier; careful selection remains the keystone for successful outcome. However, arbitrary limits placed upon type of surgery, age of patient, or duration of procedure appear to be unwarranted.

Post anaesthesia care: Postoperative information (what to expect when at home, contact telephone numbers) should be explained to the patient and the responsible adult at a level that is easily understood by both—a printed copy should be given to them. The facility must have documented protocols and criteria that are applied consistently. Every effort must be made to assure a safe and smooth transition to the home setting. Essential then, essential today, essential tomorrow.

There has been a steady, albeit slow move away from time-based recovery where the patient is required to stay for a minimum amount of time, unrelated to clinical activity level, and replacement by criteria-based recovery where patients who meet specific criteria are considered ready for discharge, regardless of time spent. Today, even though time-based recovery still exists in some facilities, the requirement for a post anaesthesia care unit (PACU) stay is being questioned by other facilities. Patients who receive short-acting anaesthetics,

local anaesthesia with sedation, or regional blocks are being moved directly from the operating room to a secondary, less intensive recovery area if specific discharge criteria are met. Preliminary results from a multicenter study conclude: patients can safely bypass the labor-intensive first phase of post anaesthesia care (70–100% of patients receiving local anaesthesia with sedation; 13–40% of patients who received general anaesthesia) [9]. On average, time spent in the less intensive phase II recovery unit was either the same or shorter than the duration of stay for patients who were initially admitted to the phase I unit.

Recovery care is truly in a state of flux, on the one hand, as some facilities attempt to bypass the PACU, other day-surgery units are expanding their recovery care, providing 24–72 h of care for patients who have had more complicated procedures, in a continuing attempt to contain costs and to avoid use of hospital beds. Assessment of patient needs and time spent in the PACU is becoming an increasingly relevant issue, from both a clinical and cost standpoint.

The rate of unplanned admissions following day-surgery appears stable; varying among facilities, but with experience gained, averaging 1% despite the increasing complexity of patients and procedures. The leading causes continue to be vomiting, pain, bleeding and more extensive surgery than planned.

Payer education: In a quarter of a century we have moved from educating payers about the safety and cost effectiveness of outpatient procedures to educating payers that all procedures and all patients are not acceptable for ambulatory surgery.

Whereas initially a shortage of hospital beds was the impetus for ambulatory surgery, attempts to control the cost of health care has fueled most of the recent growth. By the end of this decade, it is expected that over 70% of all elective procedures in the US will be performed on an ambulatory surgical basis. Similar patterns are expected throughout many other areas of the world. We will be continually challenged to merge excellence of care with lowering of cost. Extrinsic pressures must never cause us to lose sight of the special needs and challenges of the ambulatory surgery patient.

In the 21st century, there will be increasing pressure from government, industry and healthcare payers to perform more complex ambulatory surgical procedures, to manage increasing numbers of patients with health problems. Although the hospital is still a most important player, the surgical pie is being further divided as more procedures move away from the hospital to free-standing surgical facilities and physicians' office surgeries. Where a surgical procedure is performed should remain a medical decision and should not be dependent only upon cost or reimbursement.

Our past accomplishments must not lull us into a state of complacency. We still have not had sufficient outcome studies to definitively answer questions posed a decade ago by Burton Epstein:

- How do we identify the inappropriate patient?
- What are the risks of anaesthetizing the geriatric out-patient?
- Should all patients be evaluated prior to the day of surgery? If so, how?
- Are any laboratory tests required preoperatively in the young and healthy patient?
- Should all patients be required to tolerate fluids by mouth and void prior to discharge?

We must continually reassess patient and procedure selection, laboratory and diagnostic testing, choice of anaesthetic drugs and techniques, post anaesthesia care, discharge criteria, causes of unplanned admission. Every ambulatory surgery facility must develop action plans based upon outcome data. Patient safety must always be everyone's primary objective.

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