The future and safety of ambulatory surgery

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Abstract

Although many advances have occurred in anaesthesia within the last 50 years, the movement of surgical procedures from a hospital setting to an ambulatory environment has had a major impact on general health care. Several factors have driven this process, including advances in anaesthesia and technology, the desire by payers to reduce healthcare costs, the demonstration of patient safety and the positive experience of patients undergoing same-day surgery. The safety of ambulatory anaesthesia and surgery is well established. Greater emphasis is placed on minor side-effects, quality of life and patient satisfaction. Advances in technologies,which continue to move procedures out of the operating room and into imaging suites and the office, are driving the future of ambulatory anaesthesia and surgery. The Society for Ambulatory Anesthesia's Clinical Outcomes Registry database was established to enhance the quality of ambulatory anaesthesia, develop benchmarks and establish best practice. The future and growth of ambulatory anaesthesia is secure with the ageing population and advances in technology.

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Introduction

This article will review the history of ambulatory anaesthesia and the drivers that are responsible for its growth. It will also review the present status and safety of ambulatory anaesthesia and the future of ambulatory anaesthesia.

Growth of ambulatory surgery and anaesthesia

James Nicoll documented the successful administration of 8 988 ambulatory anaesthetics in England from 1899-1908.[1] The next major step was quite remarkable. In 1918, Ralph Waters opened an outpatient facility in Sioux City, Iowa.[1] However, during the first half of 19th century, anaesthesia and surgery successes led to a greater trend towards hospitalisation, and away from outpatient surgery. In 1962, ULCA (the Neuropsychiatric Institute and Hospital) opened an outpatient surgical clinic within the hospital. In1966, George Washington University Hospital opened its ambulatory surgical facility.[1,2] In 1970, Reed and Ford opened the first stand-alone surgery centre in Phoenix, Arizona.[1] This was followed by a tremendous growth period in the USA, with 240 ambulatory surgery centres in 1983, which increased to 5 174 by 2008. In 1984, the Society for Ambulatory Anesthesia (SAMBA) was formed as the first specialty society dedicated to ambulatory anaesthesia.

The drivers for this phenomenal growth can be summarised as:

- The development of anaesthetic drugs and surgical technologies which enabled rapid recovery, allowing patients to be discharged home.
- Pressure to reduce healthcare costs.
- The demonstration that ambulatory surgery and anaesthesia was safe (possibly safer than inpatient surgery).
- Patient preference not to be admitted to hospital.

In the early 1960s, fentanyl and droperidol were first introduced, and played an important role in the opening of the ambulatory surgery centre at George Washington University.[3] The development of drugs for ambulatory anaesthesia, i.e. short-acting neuromuscular blockers, short acting opiates, newer volatile anesthetics and propofol was very important for its growth. Propofol soon followed. In

addition, major drug advances were made to minimise the adverse outcomes of surgery, i.e. pain and postoperative nausea and vomiting (PONV). Simultaneously, there were tremendous advances in endoscopic technologies. Ambulatory centres rapidly demonstrated markedly enhanced efficiency in performing surgeries. This translated into 40-50% cost savings for the same procedure performed in a hospital.[2] In the early 1970s, only 35% of payers covered ambulatory surgery in the USA, but 95% payers covered these procedures a decade later.

The management of ambulatory surgical centres has become a sophisticated science and business. Advances in anaesthesia and surgical technology continue to be seen. The growth of imaging techniques, and the need for sedation and anaesthesia for procedures that utilise these sophisticated imaging systems, have both become an important part of ambulatory anaesthesia. At the same time, patients have fuelled this demand for sedation during procedures that are either mild to moderately uncomfortable, or which take hours to perform. Recently, surgeries and procedures have started to move out of the ambulatory surgery centre and into the physician office. This presents a new challenge to the provision of safe anaesthetic care.

Patient safety

Initially, there was great concern with regard to patient safety when procedures were performed in an ambulatory centre. It became apparent that this was safer for patients because infection rates were lower when patients were kept out of the hospital.[1,2] Several studies showed zero morbidity or rare death within 30 days of surgery in an ambulatory surgery centre, and readmission rates of less than 1%. Fleisher et al reviewed the Medicare database from 1994-1999 and found that the overall rate of adverse events leading to admission to the emergency department or hospital was lowest in a free-standing ambulatory surgery centre, compared to a hospital-based ambulatory surgery centre or physician office.[4] They also found that the risk of an adverse event occurring was closely linked to the type of surgery. The highest risk was with an umbilical hernia and transurethral prostate resection, and the lowest with haemorrhoidectomy and cataract surgery. Fleischer et al also developed a risk index for admission following ambulatory surgery from a similar Medicare database.[5] The component risk factors were general anaesthesia (two points), surgery lasting longer than 120 minutes, a medical history of cardiac or peripheral vascular disease, cerebrovascular disease, malignancy and being human immunodeficiency virus-positive, regional anaesthesia and age > 65 years (all one point). The odds ratio for admission is three times greater for a score > 3, than one of 1 or less.

Patients also expressed a preference for having their surgery in an ambulatory surgical centre. Ninety-eight per cent of patients were satisfied with ambulatory surgery centres, compared with 94% who were content with hospitals, in a Centers for Medicaid and Medicare Services (CMS) study.

They ascribed their preferences to:

- Less paperwork.
- Lower costs and a more convenient location.
- Parking.
- No waiting at the ambulatory surgery centre.
- More organised and friendlier staff.

With safety established, greater emphasis was placed on less severe yet more frequent adverse outcomes, quality of life and patient satisfaction. Significant advances in the management of PONV were observed with this focus because of a slew of new antiemetics and the publication of PONV management guidelines.[6] SAMBA also developed guidelines for PONV, diabetic management, obstructive sleep apnoea, malignant hyperthermia and obesity.[6-10] Often, small steps taken from the time of the patient's visit through to discharge will markedly enhance patient satisfaction and reduce the impact of adverse events on the patient's experience.

The future of ambulatory anaesthesia

Ambulatory anaesthesia developed exponentially over the first 50 years. Significant growth and change will continue into the future. Change was driven largely by the introduction of new anaesthesia drugs and techniques. The future of ambulatory anaesthesia will probably be driven by advances in technology, largely in surgery, but also in anaesthesia.

The greatest change in ambulatory surgery and anaesthesia is likely to be the growth of surgeries and procedures which are performed in an ambulatory environment, and which specifically focus on the movement of surgeries out of the operating room into the office. Technological advances in imaging devices and surgical instrumentation, such as catheters or robotics, are helping to drive these changes. Office-based surgery is likely to continue to grow extensively for many years to come. This is driven by increased surgeon convenience, lower costs, patient convenience and advances in surgical instrumentation technology. Although basic anaesthetic management in the office remains similar to that in an ambulatory centre, this site of anaesthetic delivery presents multiple unique challenges. These include the lack of regulatory oversight of office-based surgery, anaesthetic delivery machines and devices, preoperative assessment and postoperative recovery, the scope of the surgical procedure, and lastly the appropriateness of patients having the procedure in an office-based setting. Similar growth of ambulatory anaesthesia is being delivered in radiology suites, electrophysiology and cardiology laboratories in a hospital setting.

Who provides anaesthesia services will be a great challenge in the future. Other medical specialties are practising some aspect of anaesthesia; and dentists, nurses and technicians developing anaesthesia training programmes. Sedasys® is a device which provides sedation through a closed-loop system with built-in safety alarms, thus minimising the need for an anaesthesia provider in procedures where only moderate sedation is required.[11]

In the USA, there is increasing pressure from payers, especially the government, to link payment to quality. Several programmes have been introduced, both at physician and facility level. Recently, six quality measures were introduced which need to be reported. Failure to report these measures reduces reimbursement.

SAMBA initiated its Clinical Outcomes Registry (SCOR) with the objective of enhancing patient safety by collecting specific patient data points. Data include preoperative history, procedures, providers, intraoperative anaesthetic management, postoperative management, outcomes and patient satisfaction. Presently, there are close to 100 000 patients from over 25 centres. This allows benchmarking quality metrics and helps with the development of best practice. As an example, using this database, we demonstrated the value of administering prophylactic antiemetics equal to the number of Apfel risk criteria to minimise postoperative PONV.[12]

Technology is driving major changes in optimising preoperative assessment, with increasing emphasis on distant acquisition of preoperative information through web-based questionnaires and telemedicine.

New drug development continues with short-acting sedatives (remimazolam), neuromuscular blockers (AV430A), reversal agents (cysteine), and newer analgesics (adenosine), as well as local anaesthetics. Similarly, developments will continue in anaesthesia equipment, such as drug-delivery systems, airway devices, video laryngoscopes and equipment for regional anaesthesia.

The development of technology for surgical procedures will be the biggest driver that will change the future of anaesthesia. The primary purpose of these technologies is to make surgery less invasive. Currently, they include advances in catheters, robotics, three-dimensional imaging and advances in endoscopic equipment. Advances will not only drive surgeries from an inpatient setting to the ambulatory environment, but also from the ambulatory environment to the office. Improvements in surgical technology are likely to increase the overall volume of procedures which require anaesthetic care. As procedures become less invasive, anaesthesia will continue to be pushed in the direction of sedation and regional anaesthesia, rather than general anaesthesia. Intraoperative perturbations in physiology are likely to be less. However, an older and potentially sicker population will become a feature in the ambulatory surgical environment.

The future of ambulatory anaesthesia remains robust following the tremendous growth that ambulatory anaesthesia has experienced in the last 50 years. The primary driver has been advances in surgical technology. This is likely to increasingly drive surgeries out of the hospital into the ambulatory environment, and especially into the office or imaging suites. The SAMBA SCOR project is likely to help best practice for ambulatory anaesthesiology to be developed to further enhance safety and quality of life.

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