Clinical review

Recent advances

General surgery

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BMJ 1997;315:586-9

Introduction

In the modern era of managed care, surgeons have been pressured to re-evaluate the management of many common disease processes and seek cost effective measures while maintaining the quality of patient care. Recent advances in anaesthesia and minimal access surgery have facilitated the remarkable expansion of ambulatory or "short stay" surgery. As a result, patients with gall stones, gastro-oesophageal reflux, and peptic ulcers now have less morbidity and shorter hospital stays.

Methods

The topics in this article were selected after we conducted an informal survey among the general surgeons at our institution. The consensus was that these topics, which have been influenced by managed care and advancing technology, represent the most recent and ongoing changes in general surgery. A Medline search for the topic *ambulatory surgery* used the keywords "ambulatory surgery," "postoperative nausea and vomiting," "propofol," and "preemptive analgesia." The keywords in the search for *minimal access surgery* were "laparoscopic common bile duct exploration," "reflux disease," "laparoscopic fundoplication," "pancreatic pseudocyst," and "perforated duodenal ulcer." Additional keywords included "surgical treatment" and "laparoscopic and minimally invasive surgery." Articles published since 1995 formed the basis of this review.

Ambulatory surgery

Ambulatory surgery was introduced in 1970, and its widespread acceptance was influenced by patients, surgeons, and cost considerations. Today, the growth of outpatient surgery is fuelled by a healthcare industry that demands high quality care at a lower cost. The current competitive healthcare environment has exerted tremendous pressure on surgeons and hospitals to increase the number and variety of outpatient procedures. It has been estimated that by the year 2000, about 75% of all surgical procedures in the United States will be ambulatory procedures.¹ The recent successful expansion of outpatient surgery is predicated on advances in anaesthesia and a sweeping acceptance of minimally invasive techniques.

Summary points

Important improvements in the management of postoperative nausea, vomiting, and pain have led to an expansion of outpatient surgical procedures, which now include cholecystectomies, mastectomies, and repair of large complex hernias

Patients with complex surgical problems such as common bile duct stones, gastro-oesophageal reflux disease, and pancreatic pseudocysts can now benefit from minimally invasive surgery because of its wide application and improved technology

Our current understanding of the importance of *Helicobacter pylori* in the pathogenesis of peptic ulcers has revolutionised the management of perforated duodenal ulcers

The most common reasons for patients to require admission after outpatient procedures are postoperative nausea, vomiting, and pain. The recent availability of improved anaesthetics and new delivery strategies have markedly reduced the need for an overnight stay in hospital.¹

Several techniques have been developed in an effort to minimise postoperative nausea and vomiting. For example, the intravenous anaesthetic agent propofol has become widely used in outpatient surgery. It is popular because it induces anaesthesia rapidly and smoothly, and it is associated with a prompt return of mental and psychomotor function.² Propofol has also been shown to be an effective antiemetic agent when used to induce and maintain anaesthesia.³ For the patient, these benefits translate into a shorter time to full postanesthesia recovery ("street fitness"). The shorter stay in the recovery room more than compensates for the slightly higher cost of propofol.

Intraoperative administration of the antiemetics ondansetron (Zofran) or dolasetron mesylate (Anzemet, a drug under investigation) are also effective in preventing postoperative nausea and vomiting. Interestingly, ondansetron is maximally effective when it is given at the conclusion rather than at the beginning

of the surgical procedure.⁴ The prophylactic use of these agents is usually reserved for patients undergoing outpatient abdominal operations such as laparoscopic cholecystectomy or for patients with a history of severe postoperative nausea. When nausea and vomiting occur after surgery, giving two agents such as droperidol and metoclopramide has been shown to alleviate these symptoms better than a single agent.⁵

Treating postoperative pain continues to be a challenging problem despite the availability of powerful analgesics and new delivery techniques. One increasingly popular concept for reducing postoperative pain involves the use of "pre-emptive analgesia," in which pain pathways are altered before surgical incision as an adjunct to general anaesthesia.⁶ The long acting local anaesthetic bupivacaine can be injected into incision sites or along nerve roots preoperatively to block transmission of sensory nerve signals at their source. Among 120 patients undergoing laparoscopic cholecystectomy, postoperative pain was less intense and analgesic consumption was lower in patients treated with bupivacaine before surgical incisions than in those treated after incision.⁷ The intraoperative administration of ketorolac (Toradol, a non-steroidal anti-inflammatory drug) has been shown to decrease postoperative pain significantly and facilitate the transition to oral pain medications.⁸

Together, these anaesthesia strategies and agents have allowed general surgeons to safely and confidently expand the variety of outpatient procedures. These procedures now include total mastectomy, laparoscopic cholecystectomy, removal of large soft tissue tumours, and repair of complex hernias.

Minimal access surgery

Treatment of common bile duct stones

The tremendous benefits of laparoscopic surgery, which include small cosmetically appealing incisions, decreased pain, a shorter stay in hospital, and faster recuperation have changed the practice of general surgery. Perhaps the best example is laparoscopic cholecystectomy, a procedure that has succeeded in becoming the new gold standard for gall bladder removal.

One question currently under debate is, how do you manage patients with both gallstones and common bile duct stones? A decade ago, common duct stones were removed during a common duct exploration which was appended to the "open" cholecystectomy. During the early years of laparoscopic cholecystectomy, an array of options was used to manage patients with both gallstones and suspected common bile duct stones: preoperative endoscopic retrograde cholangiopancreatography (ERCP) followed by laparoscopic cholecystectomy; open cholecystectomy with exploration of the common bile duct; and laparoscopic cholecystectomy with postoperative endoscopic retrograde cholangiopancreatography. In the best of hands, endoscopic retrograde cholangiopancreatography has a failure rate of 3-23%, a mortality of 1%, and a complication rate of about 10%.⁹ In an effort to eliminate the need for two procedures and additive complication rates, surgeons have explored the feasibility and safety of laparoscopic removal of common duct stones. Recent reports by experienced laparoscopic surgeons indicate that laparoscopic exploration of the common

Fig 1 Transcystic duct stone extraction. The cholecystoscope is equipped with a wire basket and irrigation for stone capture and withdrawal

bile duct plus cholecystectomy can be successful in 95% of patients, with complication rates that are comparable or better to those reported with endoscopic retrograde cholangiopancreatography alone.¹⁰ Thus, within the past few years, the previously complicated algorithm for the management of common bile duct stones has been simplified. Laparoscopic exploration of the common bile duct uses a fibre optic cholecystoscope and a wire basket for extracting stones. The safest approach to the common bile duct is usually through the cystic duct, thereby avoiding extensive dissection of the common bile duct and minimising the risk of major biliary or vascular injury (fig 1). This transcystic approach is successful about 90% of the time.¹¹ In cases where a transcystic approach is not possible, an incision is made in the common bile duct and the stones are extracted.

Overall, the laparoscopic modality for common bile duct stone removal combined with cholecystectomy has gained popularity because it permits a definitive procedure in one stage. Endoscopic retrograde cholangiopancreatography is now most commonly reserved for patients with biliary obstruction, acute ascending cholangitis, or severe biliary pancreatitis or for patients who are poor surgical candidates.¹ Laparoscopic exploration of the common bile duct is rapidly emerging as the preferred approach to the management of common duct stones.

Treatment of gastro-oesophageal reflux

Gastro-oesophageal reflux disease results from a functionally incompetent lower esophageal sphincter. It is a common disease that gives rise to severe and persistent symptoms of dysphagia, heartburn, non-cardiac chest pain and regurgitation. Complications, including ulceration, stricture, asthma, and Barrett's metaplasia occur in about 20% of patients with gastro-oesophageal reflux disease.¹² Although symptoms can be relieved medically, they often recur once the

treatment is discontinued. Only antireflux surgery can effectively correct the dysfunction and modify the course of reflux oesophagitis. The goal of antireflux surgery is to re-establish lower oesophageal sphincter tone to a physiological level. Variations of the operation, known as a fundoplication, are referred to by several eponyms (Nissen, Toupet, Hill, etc). The procedure is performed by wrapping the gastric fundus around the lower oesophagus, closing the hiatus, and securing the wrap in the abdomen (fig 2). Until recently, this procedure required a large laparotomy incision to gain access to the oesophageal hiatus. Antireflux surgery does not require resection of a large specimen; this made the disease an ideal candidate for laparoscopic surgery. The minimally invasive approach has achieved similar results to open operations, with the added benefits of lower morbidity, less pain, and shorter stays in hospital.¹³ As with laparoscopic cholecystectomy, laparoscopic fundoplication is rapidly replacing open surgery in centers with surgeons experienced in minimally invasive techniques.

Treatment of pancreatic pseudocysts

Pancreatic pseudocysts are fluid collections that usually result from severe acute or chronic pancreatitis. Several treatment options are available for persistent symptomatic pseudocysts: external percutaneous drainage; surgical excision; and internal drainage (usually into the stomach). This last procedure, termed pancreatic cystgastrostomy, traditionally required a long abdominal incision resulting in a prolonged stay in hospital. Armed with advanced laparoscopic skills and improved instrumentation, many surgeons are now exploring new possibilities in the treatment of pancreatic pseudocysts. Intraluminal laparoscopic cystgastrostomy is a new technique in which pseudocysts are approached via the lumen of the stomach.¹⁴ Under videoscope guidance, small calibre cannulas are passed percutaneously into the stomach, the pseudocyst is located, and an incision 3-4 cm long is made through the common posterior gastric and anterior cyst wall. The cystic contents are then evacuated and internally drained. The procedure is completed with removal of the trocars and suture closure of the holes (fig 3). Thus, a procedure which traditionally required a laparotomy

Fig 2 Completed fundoplication. Permanent sutures are used to secure the wrap within the abdomen

Fig 3 Laparoscopic drainage of a pancreatic pseudocyst. The stomach is insufflated via the nasogastric tube to provide a "working chamber." Intra-abdominal instruments are used to drain the pseudocyst into the stomach lumen

and a long stay in hospital can now be done laparoscopically with lower morbidity and a brief hospital stay. Indeed, intraluminal laparoscopy could also be used to treat early gastric cancer, gastric polyps, and suture ligation of bleeding gastric and duodenal ulcers.

Perforated duodenal ulcers

It is well established that *Helicobacter pylori* is present in 90-100% of patients with duodenal ulcers and 70-90% of patients with gastric ulceration.¹⁵ Since its discovery the surgical management of complications due to peptic ulcer disease has changed radically. Bleeding, perforation, or obstruction occurs in 20-25% of patients with peptic ulcer disease.¹⁶ In the past, patients presenting with perforated duodenal ulcers routinely underwent an acid reduction operation. This consisted of a truncal vagotomy with gastric drainage or resection or a highly selective vagotomy with closure of the perforation. However, our understanding of the critical importance of *H pylori* infection in the pathogenesis of duodenal ulcer disease has influenced most surgeons to treat perforated duodenal ulcers with simple closure. The procedure typically involves an omental patch repair, performed through a limited supraumbilical laparotomy or by minimal access surgery.¹⁷ Postoperatively, an *H pylori* eradication regimen is implemented. *H pylori* can be eradicated in over 90% of patients by using antibiotics and antisecretory treatment.^{18 19}

Conclusion

Health care is in the midst of dramatic change. Economic pressures combined with advances in both knowledge and technology have fuelled the successful growth of ambulatory surgery. Advances in our under-

standing of pain perception have translated into creative approaches that minimise postoperative discomfort. Increasingly complex surgical procedures are being performed on an outpatient basis. Advances in technology and surgical expertise have facilitated the expansion of minimal access surgery to include the treatment of complex surgical problems such as gall stones, oesophageal reflux, and pancreatic pseudocysts. Laparoscopic surgery offers patients the benefit of a shorter hospital stay, better cosmesis, and less postoperative pain. In addition, patients are often able to return to active work sooner, enabling them to once again become productive members of the community. Our current understanding of the importance of *H pylori* in the pathogenesis of duodenal ulcers has revolutionised the surgical management of perforated ulcer disease.

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A paper that changed my practice

Optional illness

Certain articles have a way of following you throughout your entire career, cropping up in widely differing circumstances. In my case, one such article would be "Varicose veins an optional illness" which appeared in *The Practitioner* 27 years ago.¹ Rather than attempting a précis of it, I quote the admirably brief summary by Dr Jeremy Holmes, its author: "Eleven out of twenty-four patients admitted for routine vein strip for varicose veins were involved in recent emotional upsets or family crises. It is suggested that they might have become troubled by their veins in response to these difficulties, and have sought operation as a way of resolving them."

The paper is elegantly designed and its conclusions go no further than the facts at hand allow. It suggests that there can be a temporary need for falling ill, leading to negotiation with a physician and the transforming of an affliction or a blemish into an illness. For the patient, undergoing surgery can be a way of showing hurts, doing penance, being babied, crying out for help, or even getting a new personality. For the doctor, making the diagnosis of varicose veins may be a way of not seeing the patient's problem of living.

Dr Holmes's paper has had an extraordinary influence on my own practice, thinking and teaching in the quarter century that has elapsed since my first reading of it. It is as applicable today to coronary bypass and operations for degenerative disease of the knee joint as it was then to varicose veins. Time and again, I have encountered patients who, through a feeling of neglect by family or society, chose to undergo surgery for doubtful indications, even excusing suboptimal outcomes by a process of cognitive dissonance.² Despite my awareness of some of the problems these people were facing and of the idea of a temporary need to be ill, I was never able to

"rescue" anyone from the fate on which he or she had decided.

My next encounter with Dr Holmes's paper took place recently. I have become interested in how descriptions of disease and mortality seem to move back and forth between medical sources, on the one hand, and the popular sphere or fiction on the other. Sleep paralysis, restless legs, phantom limb pain, and even the phenomenon of anticipated or "voodoo" death were depicted by such authors as Hardy, Mann, Melville, and Wolfe years before they were delineated for the "first" time in modern medical literature. Of late, in my reading for pleasure, I have been continually on the lookout for instances of crossings from one domain to the other and it should not prove difficult to imagine my astonishment when I came across the following lines by Camus in his essay "The Enigma," written in 1950: "Doctors know that certain illnesses are desirable: they provide, in their own way, a compensation for a functional disorder which, in their absence, would express itself in a more serious disturbance. Thus there are fortunate constipations and providential attacks of arthritis."³ Is this not an early formulation of optional illness?

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We welcome filler articles of up to 600 words on topics such as *A memorable patient*, *A paper that changed my practice*, *My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk.