ABSTRACT

Background and Objectives: Keys to economic survival in an era of decreasing reimbursement include controlling costs and avoiding complications. In an effort to reduce costs, laparoscopic cholecystectomy has been performed with same-day discharge from a hospital setting. The free-standing ambulatory surgery center offers even greater cost savings if safety can be assured. Facility charges, surgical technique and instrument selection influence the costs of the procedure.

Methods: A database was accumulated prospectively on the first 100 laparoscopic cholecystectomies performed in a free-standing ambulatory surgery center to assess costs, logistical constraints, and safety.

Results: Laparoscopic cholecystectomies were accomplished in 99 of 100 patients. One patient was suspected of having cancer during laparoscopy and was transferred to a nearby hospital for open cholecystectomy. There were no other postoperative hospitalizations for complications. The fixed facility charge for the procedure was $2990, and the total costs for all routinely disposable items (gowns, gloves, instruments, and adhesive bandages) was $98. The mean OR time was 29 minutes (standard deviation 13.7).

Conclusions: The free-standing ambulatory surgery center is an appropriate facility for an experienced operating team to perform laparoscopic cholecystectomy in selected patients. The surgeon’s selection of appropriate energy sources and instruments is essential to complete the operation in a most cost-effective manner.

Key Words: Cholecystectomy, Ambulatory surgery, Costs.

INTRODUCTION

Gallstones and their sequelae cause considerable morbidity, mortality, and healthcare costs around the world. Although laparoscopic cholecystectomy is highly effective, the health care costs of the procedure vary widely by institution and according to technical practices of surgeons. The facility costs can be reduced if cholecystectomy is performed on an outpatient basis. Further savings should accrue when an uncomplicated cholecystectomy is performed in a free-standing ambulatory surgery center (ASC), since the fixed costs of ASCs are less than those of full-service hospitals. However, a single complication can eliminate the gains of most frugal decision-making.

Convenience and cost savings are the primary reasons why ASCs have become popular with patients and surgeons. The typical ASC provides admission, surgical services, and recovery facilities in a geographically concentrated area. The ideal ambulatory center also provides overnight stay capability in the event of late afternoon operation or excessive nausea. For the surgeon, the ASC operating schedule is less apt to be altered by emergencies compared to a full-service hospital.

Essential outcomes for “successful” laparoscopic cholecystectomy in the ASC include completion of the operation without complication and discharge on the same day or the following morning in the event of overnight stay. Before considering cholecystectomy in the ASC, we reviewed our database of 1750 patients having laparoscopic cholecystectomies in a hospital setting. Empirical criteria for possible ambulatory operation included the following: a) age <65 years, b) low risk for common bile duct (CBD) stones, as defined by normal liver enzymes and common bile duct diameter of 5 mm or less, c) elective operation, d) absence of major medical problems, and e) no previous upper abdominal operations. Thirty-five percent (605/1750) of the hospitalized patients met these strict criteria for potential ambulatory center cholecystectomy; furthermore, 98% of those selected patients were discharged on the same day or else the next morning after operation. Only one patient (0.2%, 1/605) was converted to an open procedure; another was explored...
30 hours postoperatively with hemorrhage from the liver bed.7

Based on the analysis of our own data, we felt that laparoscopic cholecystectomy could be offered to selected patients in a free-standing ASC that had overnight stay. This report outlines the outcomes of the first 100 patients.

METHODS

Selection criteria for the ideal patient for ambulatory cholecystectomy were outlined in the preceding paragraphs (Table 1). However, some patients with mild abnormalities of either enzymes or common duct diameter were selected for operation in the ASC. For example, an elevation in serum alutamate oxalacetate transaminase (SGOT) in an obese patient with a 3 mm CBD diameter and a single large gallstone is most likely related to a fatty liver rather than to a CBD stone. In addition, a mild dilatation of the CBD (5.5 mm) would be expected in a 50 year old with a contracted and nonfunctioning gallbladder filled with stones.

Data from the first 100 laparoscopic cholecystectomies from the ASC were accumulated prospectively from January 1997 to November 1998. For comparative purposes, a similar database was accumulated concurrently on 218 hospitalized patients, who either did not meet our criteria or their insurer’s pre-certification for ambulatory center procedures. Note that 31% of the prospectively studied patients were chosen for ambulatory cholecystectomy.

The surgeon’s instrument choice and technique were the same as in the hospital. Each procedure was performed with monopolar electrosurgery with active electrode monitoring. Lasers, bipolar electrosurgery, and ultrasonic dissectors were not utilized as they all increase costs and operating times without any other discernible benefits for performing cholecystectomy. (For example, the use of the ultrasonic dissector is associated with a facility charge of over $1000.) Operative cholangiograms were obtained selectively. Total operating room time, surgeon operating time, time of discharge, and complications were recorded.

While efforts were made to perform the procedures in the morning to facilitate same-day discharge, many were performed later in the afternoon. Anesthetic practices varied with 12 different anesthesiologists but included short-term anesthetics with pre-emptive treatment of pain and nausea.8,9 The time of discharge was dictated by the patient’s return of GI function and level of discomfort. The patients were all contacted by telephone the day after discharge. Early follow-up appointments were scheduled, but patients were given the option of either coming to the office or calling in to report an excellent recovery.

RESULTS

Laparoscopic cholecystectomy was completed in 99 of 100 patients. The one exception was a 62-year-old lady in whom the gallbladder was found to be severely scarred with a thickened wall suggesting malignancy. The laparoscopic exam was aborted before major dissection was initiated, and she was transferred to a hospital where an open cholecystectomy was performed later that same day (no malignancy). There were no conversions to open operations, no transfusions, and no biliary or bowel complications. With the exception of the patient listed above, there were no other subsequent hospitalizations related to any complications of the procedure.

| Table 1. Ideal patient for ASC. |
|--------------------------------|
| liver enzymes | normal |
| CBD diameter  | ≤ 5 mm |
| presentation  | elective |
| age           | <65 years |

| Table 2. Disposition of ASC vs hospital patients. |
|-----------------------------------------------|
| Amb Surg Ctr | Hospital |
|----------------|----------|
| Mean age       | 43       | 58       |
| Completed lap chole (%) | 99.0 | 98.6 |
| Operative cholangiograms (%) | 19 | 39 |
| Discharge (%)     |          |          |
| Same day         | 74       | 15       |
| <24 hours        | 99       | 80       |
Same-day discharge was accomplished in 74 patients, and the remaining 25 patients were discharged the next morning. Some of the overnight stays were related to psychological conditioning and social factors (children at home, personal preference, etc.) more than to medical limitations. Overnight stay occurred more commonly early in the operative experience. Telephone follow-up on the day after discharge was accomplished in all patients; 60% of patients elected to have their follow-up “office visit” by telephone rather than in person.

The mean operating time was 29.1 minutes (standard deviation 13.7) with total use of the room averaging 56.2 minutes (standard deviation 12.3). Disposable instruments were avoided. The tabulated total facility costs for routinely disposable items (including instruments, gowns, sutures, metal clips, suction tubing, and adhesive bandages was $98.

During the same period, 218 laparoscopic cholecystectomies were attempted in the hospital, and the conversion to open operation occurred in 1.4% (Table 2). Since Medicare does not allow the performance of cholecystectomy in a free-standing center in Mississippi, all Medicare patients were treated in the hospital. While some other non-Medicare cholecystectomies were performed in the hospital by direction of the insurer, the majority were admitted because of acute complications of cholelithiasis.

Operative cholangiograms were obtained in 19% of the ambulatory care center patients. Twelve of the first 100 patients had mild abnormalities of liver enzymes that were judged acceptable for the ASC. Five patients had common bile duct diameters of greater than 5 mm. None of the operative cholangiograms in the patients performed in the ambulatory care center showed common bile duct stones. In the same period, operative cholangiograms and laparoscopic CBD explorations were performed in 39% and 6% of the hospitalized patients, respectively. As would be expected, the hospitalized patients were older and had more complex disease as reflected by a greater need for operative cholangiograms, CBD exploration, and a longer hospital stay (Table 2).

In the group of patients in whom operative cholangiograms were not obtained (214 of 318 patients), there were no bile leaks, duct injuries, or subsequent clinical evidence of missed common duct stones. The current fixed facility charge for laparoscopic cholecystectomy in the ambulatory center is $2990. The charge for most hospitalized patients in neighboring hospitals is variable but exceeds $4000.

DISCUSSION

Cost-control systems with global pricing and capitated care have changed the payment scheme for surgical services. With reimbursement relatively fixed, surgeons and managers must control costs and avoid complications.

Ambulatory surgical centers, offering fewer services than hospitals, enjoy lower fixed costs, which should lead to lower costs for selected procedures such as laparoscopic cholecystectomy. The first priority in moving cholecystectomy to the ambulatory surgical center is safety. Prerequisites include an experienced surgeon with a track record of few complications. A dedicated laparoscopy team must be well trained and provided with a caseload adequate to maintain proficiency. As outlined in this study, patient selection should limit the need for conversion to laparotomy or more advanced laparoscopic procedures. Conversion to open operation is appropriate in some circumstances and can be associated with discharge within 24 hours in selected patients. However, if needed, appropriate hospital care must be assured.

Numerous studies previously have shown the cost-savings of “reusable” over “disposable” instruments. The operating room times reported herein compare favorably to all previously reported studies, supporting the position that excellent reusable instruments do not prolong operating times. The Veress needle has been completely abandoned in favor of a rapid, open insertion of a blunt cannula under laparoscopic vision. The reusable clip applier does extend the operation by about 20 seconds (compared to the disposable multiclip applier) but with a cost savings of about $150 and no other alteration in outcome. The enthusiastic support of the surgeon and surgical staff is essential for a smooth transition to reusable instruments.

Suggestions that morbidity of cholecystectomy is reduced by using 2 or 3 mm instruments have not yet been documented by shorter recovery periods. The author’s preference is to use two 10 mm and two 5 mm cannulas. The gallbladder is extracted through the epigastric 10 mm port site as a time-saving maneuver but also because
there is a distinctly lower infection and hernia rate in the epigastric port site compared to the umbilicus. The 5 mm instruments are considerably more sturdy than their smaller counterparts, and the cosmetic differences between a 5 and 3 mm incision are arguably quite small.

The use of routine versus selective operative cholangiograms has been a matter of debate since inception, and consensus remains incomplete. Whenever there is a question regarding anatomy or suspicion of CBD stones, dynamic fluorocholangiograms are extremely important.

The facility charge of $2990 is currently one of the lowest reported charges in the United States. In Traverso’s fairly exhaustive study, the costs of laparoscopic cholecystectomy in a hospital setting was estimated to be $2,180, of which $595 was for disposable instruments. Our total cost of routinely disposable items was only $98, which included all instruments, gowns, gloves and adhesive bandages. Our shorter operating times are explained by factors such as patient selection, the selective use of operative cholangiograms and, perhaps, a fairly major interest in best uses of electrosurgery. However, Traverso pointed out that shorter OR times lead to true cost savings only when total staffing costs are reduced for the day or else when “demand elasticity” provides another case to increase output. The ASC is a more malleable entity than a full-service hospital for predicting staffing needs and limiting costs.

The cost-saving practices reported herein have not led to any discernible reduction in outcome for any patient. While the concept of outpatient cholecystectomy is gaining momentum, broader implementation of outlined practices, such as the use of reusable instruments, has been relatively slow since the incentive for change is variable and indirect. However, the importance of risk-management issues is heightened when patient recuperation occurs in an outpatient setting. Corporate leaders and insurers have an unexploited opportunity, a vested interest, and responsibility to offer cost-responsible educational programs for their surgeons and staff.

CONCLUSION

The ambulatory surgical center provides a low-cost environment for low-risk procedures. With appropriate selection of patients, coordination of the operating team, and experience of the surgeon, laparoscopic cholecystectomy can be safely performed in the free-standing ambulatory surgical center.

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