“AEIOU: the ABC’s” of Conversion from Laparoscopic to Open Cholecystectomy

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ABSTRACT

Background and Objectives: To examine and classify the reasons for conversion and the points at which laparoscopic cholecystectomies are converted to open procedures and whether these change over time.

Methods: This is a retrospective study of all patients undergoing cholecystectomy from June 1, 1990 to June 30, 1995. Reasons for conversion were classified using the “AEIOU:ABC” system developed for this study and conversion points were assigned chronologically.

Results: The “AEIOU:ABC” classification system was utilized. The most common reasons for conversion were: acute inflammation N=61 (26.1%); adhesions N=51 (21.8%); and organ system pathology N=39 (16.7%). The most common conversion points were; after visualization of the peritoneal cavity but prior to dissection of the cystic structures N=103 (44.0%); dissection of the cystic structures N=58 (24.8%); initial laparoscopy N=36 (15.4%). When the reasons for conversion were evaluated for changes over time there was no statistically significant change for the total group or any individual surgeon. Conversion points did not change with increasing operative experience.

Conclusion: The “AEIOU:ABC” classification system is a simple, effective, and easy to use system for classifying the myriad of reasons for conversion. The system needs to be validated prospectively not only for laparoscopic cholecystectomy but for possible application to other laparoscopic procedures.

Key Words: Cholecystectomy, Laparoscopic—retrospective study

INTRODUCTION

Reports of laparoscopic cholecystectomy (L.C.) have listed multiple reasons why L.C. are converted1-4 to open cholecystectomies (O.C.), making comparisons among series difficult. There has been no system for reporting the reasons for conversion or the point at which the operation is converted (“conversion point”), and few papers have addressed whether these change over time or vary among surgeons. The goal of the study was to create a simple, effective, and inclusive classification system for reasons for conversion and conversion points, allowing examination among surgeons regarding why and when L.C. are converted and whether these parameters change over time.

MATERIALS AND METHODS

This study is a retrospective study of all patients undergoing cholecystectomy (ICD 9 code numbers 51.22 and 51.23) in Saginaw, Michigan, at Saint Luke’s, Saint Mary’s and Saginaw General Hospitals from June 1, 1990 to June 30, 1995 (including the first laparoscopic cholecystectomy). None of the 13 surgeons had operative L.C. experience in his/her general surgical residency program. The following data were retrieved from each patient’s chart: name, medical record number, age, race, male, female, zip code, type of insurance, operation performed, surgeon, first assistant, dates of admission, operation, and discharge, the presence of stones either by preoperative studies, intraoperatively, or on pathological diagnosis, whether the operation was primary for cholecystectomy or occurred incidentally, time of procedure, and diagnostic preoperative studies.

The reason for conversion and conversion points were recorded by review of the dictated operative record and classified using the “AEIOU:ABC” system developed especially for this study: A= acute inflammation (erythema, edema, & other signs of peritonitis), E=equipment failure, I= initial laparoscopy, O=organ system pathology (anatomic anomalies, unclear anatomy, bile duct stones or injury), U=unexpected intraoperative findings, A= adhesions, B=bleeding (hemorrhage), C=conditions suboptimal (Table 1).
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Conversion of laparoscopic to open cholecystectomy occurs at readily identifiable steps ("conversion points") of the operation. In this study, these conversion points were assigned chronologically: 1) initial laparoscopy; 2) after visualization of the peritoneal cavity but prior to formal dissection of the cystic structures; 3) dissection of the cystic structures; 4) intraoperative cholangiogram; and 5) during or after removal of the gallbladder.

Data were entered on Dbase IV, analyzed using SPSS statistical program, using p<.05 for significance with Chi-square for categorical data and ANOVA for continuous data. When examining changes over time, surgeons' total number of LC were broken down into groups of 20 in chronological order. When comparing conversion points to reasons for conversion, initial laparoscopy was deleted from both groups to prevent inherent statistical significance.

RESULTS

During the five years under review, 13 surgeons performed 3,247 cholecystectomies; 2,420 (74.5%) performed by laparoscopic cholecystectomy, 593 (18.3%) performed by open cholecystectomy, and 234 (7.2%) converted from laparoscopic cholecystectomy to open cholecystectomy. The median number of cholecystectomies performed during the study by individual surgeons was 248 (Range 62-608).

Utilizing the “AEIOU:ABC” classification system, the most common reasons for conversion were: 1) acute inflammation N=61 (26.1%); 2) adhesions N=51 (21.8%); and 3) organ system pathology N=39 (16.7%) (Figure 1).

The most common conversion points for the total group were: 1) After visualization of the peritoneal cavity but prior to formal dissection of the cystic structures N=103 (44.0%), 2) Dissection of the cystic structures N=58 (24.8%), and 3) Initial laparoscopy N=36 (15.4%) (Figure 2).

When comparing reasons for conversion to the conversion point for the total group, the majority of conversions N=183 (78.2%) occurred early in the procedure due to Acute inflammation N=61 (26.1%) and Adhesions N=51 (21.8%) and later in the procedure due to Organ System Pathology N=39 (16.7%) and Bleeding N=32 (13.7%). This was statistically significant for the entire group of surgeons, (p>.000001, N=234). When analyzing individual surgeons using the above criteria, seven surgeons displayed the same pattern for conversion (p<0.0002 to 0.05) as described for the entire group. However, the other six surgeons exhibited no significant trend on analysis (Table 1).

When the reasons for conversion were evaluated for changes over time there was no statistically significant change for the total group nor for any individual surgeon.

When examining conversion points changing over time, the total group showed no significant change. Individually, two surgeons converted cases earlier (p<0.05) as the number of cases increased; the other 11 surgeons showed no significant change over time.
DISCUSSION

The “AEIOU:ABC” classification is a convenient, effective and easy method of categorizing reasons for conversion into distinct subgroups based upon the unique aspects of laparoscopic procedures. The prominent reasons for conversion in this study were 1) Acute Inflammation, 2) Adhesions, and 3) Organ System Pathology. This is consistent with previous reports in the literature citing the most frequent causes of conversion.1-4 Thus the “AEIOU:ABC” classification system identifies correctly, in a retrospective manner, the most common causes of conversion from laparoscopic to open cholecystectomy.

Using the “AEIOU:ABC” system and comparing the reasons for conversion to the point at which an operation was converted, a pattern of converting early in the operation due to Acute Inflammation and Adhesions and later due to Organ System Pathology (Biliary) and Bleeding/Hemorrhage was noted for the entire group. This is consistent with a report in the literature4 that analyzed the reasons for conversion. However in this experience, all surgeons did not show this trend, and this may be due to the larger number of surgeons in this report.

In this experience, the points at which L.C. were converted for the entire group and individual surgeons did not change over time in a statistically significant manner. This is in contrast to a previous report1 in which laparoscopic conversion points did change over time with earlier conversions occurring more often as the number of cases increased.

CONCLUSION

The “AEIOU:ABC” classification system has been developed as a tool for classifying conversions from L.C. to O.C. based on our retrospective chart review experience. The system is a simple, effective and easy to use classification system for classifying the myriad of reasons for conversion. By applying the system to our data, we have shown that when the reason for conversion is compared to the point in the operation where a conversion takes place, the entire group, and several, but not all, surgeons convert in a predictable manner. The system needs to be validated prospectively not only for L.C. but for possible application to all laparoscopic procedures.

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