Cholecystectomy performed by General Surgery residents at the Hospital José Ramón Vidal in Corrientes, Argentina
Colecistectomía realizada por residentes en el Servicio de Cirugía del hospital José Ramón Vidal de Corrientes, Argentina

José R. Segovia, Césa H. Fernández Vera

ABSTRACT

Background: The first cholecystectomy was performed by Carl Langenbuch in July 1882. Erich Mühe performed the first laparoscopic cholecystectomy in 1982.

Objectives: The aim of this study was to evaluate morbidity and mortality associated with cholecystectomy performed by residents in our service.

Methods: We conducted a retrospective cross-sectional study. The information was retrieved from the medical records and operating room records of patients undergoing surgery at the Hospital José Ramón Vidal between January 2012 and January 2015. A total of 1870 cholecystectomies were performed: 1292 (69.1%) were laparoscopic procedures and 578 (30.658%) by conventional approach. All procedures were started and completed by resident physicians under the strict supervision of a staff physician or chief resident.

Results: 1203 (64.33%) patients were women and 667 (35.66%) were men. Ten patients (0.77%) required conversion. Morbidity was 0.53% (10 patients) and mortality was 0.05% (one patient). Second-year residents performed 240 (12.83%) procedures, third-year residents performed 1016 (54.33%) and fourth-year residents 311 (16.63%). After surgery, 1881 (96.8%) patients remained hospitalized for 24 hours and hospital stay duration was of two days in 59 (3.15%) patients.

Conclusions: Conventional and laparoscopic cholecystectomy are of great importance for the comprehensive training of residents in surgery: therefore, they constitute a procedure that can and must be performed by them, with appropriate supervision of a staff physician in adequate residency programs.

Keywords: cholecystectomy, gallbladder, residents

RESUMEN


Objetivos: evaluar la morbimortalidad de la colecistectomía realizada por residentes en nuestro Servicio.

Material y métodos: trabajo retrospectivo transversal. Se tomaron los datos de las historias clínicas y los libros de quirófano de pacientes intervenidos quirúrgicamente en el hospital José Ramón Vidal de Corrientes entre enero de 2012 y enero de 2015. Se realizaron 1870 colecistectomías: 1292 (69,09%) por abordaje laparoscópico y 578 (30,58%) por abordaje convencional. Todos los procedimientos fueron iniciados y finalizados por médicos residentes bajo supervisión de un médico del staff o jefe de residentes.

Resultados: 1203 (64,33%) fueron pacientes femeninos y 667 (35,66%), masculinos. En 10 pacientes hubo necesidad de conversión, siendo la tasa del 0,77%. La morbilidad fue del 0,53% (10 pacientes), la mortalidad fue del 0,05% (1 paciente). Los residentes de segundo año realizaron 240 (12,83%) procedimientos, los de tercero 1016 (54,33%) y los de cuarto año realizaron 311 (16,63%) colecistectomías. En el 96,84% (1811) de los pacientes la internación en el posoperatorio fue de 24 horas. En el resto, 59 (3,15%) pacientes, la internación fue de 2 días.

Conclusión: creemos que la colecistectomía convencional y la laparoscópica son de gran importancia en la formación del residente de cirugía; se trata de un procedimiento que puede y tiene que ser realizado por ellos, con supervisión apropiada, en un programa adecuado de sistema de residencias médicas.

Palabras clave: colecistectomía, vesícula biliar, residentes.
Introduction

The first cholecystectomy was performed by Carl Langenbuch in July 1882. Some authors reported that Erich Mühe performed the first laparoscopic cholecystectomy (LC) in 1982, while others proposed that the first procedure was done by Philippe Mouret in 1987.

The development of laparoscopic surgery is an example of an emerging technology that has significantly changed the way surgeons operate today. The knowledge of surgical anatomy of the gallbladder and the hepatic pedicle is important for the safe execution of any surgical procedure, avoiding bile duct injuries (BDI).

The aim of this study was to evaluate morbidity and mortality associated with cholecystectomy performed by residents in our service.

Material and methods

We conducted a retrospective cross-sectional study of patients undergoing surgery at the Hospital José Ramón Vidal in the city of Corrientes, Argentina between January 2012 and January 2015. The information was retrieved from the medical records and operating room records. A total of 1870 cholecystectomies were performed (Figure 1): 1292 (69.1%) were laparoscopic procedures and 578 (30.6%) by conventional approach.

All the procedures were started and completed by resident physicians (Figure 2) under the strict supervision of a staff physician or a chief resident. Our division has a laparoscopic training center where the residents perform exercises of progressive difficulty and are evaluated during two months. Once the initial training period was completed, training continued at the operating room during the first year. After a thorough familiarization with the laparoscopic instruments and devices, the residents started passing the instruments to the surgeons and continued inserting the Veress needle and performing exploratory laparoscopies, laparoscopic appendectomies and gallbladder bed dissection, always under strict supervision. Second-year residents started with the dissection of the gallbladder hilum.

Before surgery, patients underwent routine laboratory tests, including liver function panel, electrocardiogram with preoperative risk assessment and abdominal ultrasound which should be suggestive of cholelithiasis with inflammation of the gallbladder wall and presence of gallstones inside the gallbladder. Magnetic resonance cholangiopancreatography (MRCP) was performed in case of signs of choledocholithiasis (episodes of jaundice, choluria, recurrent biliary colics or common bile duct transverse diameter > 6 mm), abnormal liver function panel (elevated alkaline phosphatase) or absence of ultrasound abnormalities.

All the patients underwent selective intraoperative cholangiography.

Kocher’s incision was used for the conventional approach and laparoscopic cholecystectomy was performed using the American technique. In this case, four trocars were inserted: two 11-mm trocars (in the umbilicus and epigastrium) and two 5-mm trocars (in the right hypochondrium and right lumbar region). Pneumoperitoneum was performed with Veress needle pressure set at 12 mm Hg. An assistant managed the camera with his right hand and used his left hand for gallbladder fundus traction, and the surgeon controlled the other ports. The dissection of the Calot’s triangle was made with cold methods. Once the critical view of safety described by Strasberg was attained, two clips were applied on the proximal ends and of the cystic duct and one to its distal end, the proximal end of the cystic artery was clipped and electrocoagulation was applied. Intra-abdominal drains were used selectively. All the patients received antibiotic prophylaxis.
After surgery, 1881 (96.8%) patients remained hospitalized for 24 hours and hospital stay duration was of two days in 59 (3.15%) patients.

Results

Of the total population, 1203 (64.3%) patients were women and 667 (35.7%), were men.

According to the intraoperative findings, gallbladder disease was classified as: acute calculous cholecystitis (ACC): 1407 patients (49 with gallbladder empyema and on with gangrenous cholecystitis); cholelithiasis (CL): 441 patients; gallbladder polyp: 13 patients and scleroatrophic gallbladder: 9 patients.

Ten patients (0.77 %) underwent conversion: in 7, cholecdocholithiasis was suspected due to bile duct dilation; intraoperative cholangiography confirmed the diagnosis after several attempts of transcystic extraction. Bile duct injury occurred in two cases due to inadequate interpretation of the anatomy (one patient with a short cystic duct without cholecystitis and one with Mirizzi syndrome). In only one case conversion was due to uncontrolled bleeding of the cystic artery.

Complications occurred in 10 patients (0.53%) (Table 1). Mortality rate was 0.05%, in one patient with a history of cirrhosis undergoing an elective surgery. The patient presented hemodynamic instability in the immediate postoperative period and underwent exploratory laparatomy with packing for hemostasis.

Second-year residents performed 240 (12.8%) procedures, third-year residents performed 1016 (54.3%) and fourth-year residents 311 (16.6%) under the strict supervision of a staff physician or a chief resident.

Discussion

The knowledge of surgical anatomy of the gallbladder and the hepatic pedicle is important for the safe execution of any surgical procedure, avoiding BDIs.

<table>
<thead>
<tr>
<th>Complication</th>
<th>Patients n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection in the gallbladder bed</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Hemoperitoneum and evisceration</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Choleperitoneum</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Hemoperitoneum</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>UGIB*</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Postoperative pain</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>Biloma</td>
<td>1 (0.05)</td>
</tr>
<tr>
<td>BDI**</td>
<td>2 (0.10)</td>
</tr>
<tr>
<td>Total</td>
<td>10 (0.53)</td>
</tr>
</tbody>
</table>

*Upper gastrointestinal bleeding ** Bile duct injury

Calot’s triangle, described in 1891, has a base on top, a vertex on bottom and is bounded superiorly by the liver border and laterally by the common hepatic duct and the cystic duct. It contains the cystic artery, Mascagnini’s lymph node, connective tissue, and lymphatics. Rouviere’s sulcus is a cleft in the liver between the right lobe and the caudate process that contains the portal pedicle identified in most patients. It is advised to start dissection from above this structure, and exposure of the Calot’s triangle is of vital importance for both the conventional approach and laparoscopic surgery.

Identification of biliary and vascular variations is important to perform a safe cholecystectomy. Biliary variations include short cystic duct, long cystic duct with a course parallel to the common hepatic duct, and spiral cystic duct. The variations of the ducts that can drain from the liver usually pass close to the gallbladder and then flow into the main bile duct, close to or even below the confluence.

The cystic artery usually arises from the right hepatic artery, reaches the gallbladder neck and divides into two branches (anterior or posterior branches, also known as superficial and deep branches) that should be identified to avoid bleeding events. It can run near the base or close to the vertex of the Calot’s triangle, or in front of the common hepatic duct or common bile duct. Among vascular variants, the cystic artery can arise from the left hepatic artery, crossing in front of the bile ducts, from the superior mesenteric artery or from the gastroduodenal artery. An accessory cystic artery can be found, and can even cross in front of the common bile duct arising from the proper hepatic artery. The right hepatic artery runs behind the common hepatic duct, in the upper part of the Calot’s triangle.

An aberrant right hepatic artery has been found or replaced by the superior mesenteric artery in about 15% of the cases, passing behind the cystic duct and originating the cystic artery.

In 5-15% of the subjects, the right hepatic artery runs next to the cystic duct in Calot’s triangle before adopting a direction toward the hepatic hilum. Here, the cystic artery arises from the convex area of the angle or curve of the hepatic artery. This curve can easily be misinterpreted as the cystic artery and thus be inadvertently ligated.

Kaplan et al. reported a conversion rate of 20% in a population of 500 patients.

In the publication by Volkan et al., of 5164 laparoscopic cholecystectomies, the conversion to open surgery was 3.16% (163 patients).

In a retrospective study of 9542 consecutive laparoscopic cholecystectomies, Duca et al. reported 1758 complication events: 224 (2.3%) due to bleeding, 1517 (15.9%) due to gallbladder perforation and 17 (0.1%) injuries of the main bile duct.

Iribarren et al. reported a conversion rate of 2.05%, 4.7% in acute cholecystitis and 1.6% in elective procedures, with a mortality rate of 6.6%.
Laparoscopic cholecystectomy is a significant technological advance that also requires expertise in biliary surgery, specialized training and appropriate equipment. The lack of accomplishment might lead to major incidents which should not discredit the method.

This technique should be taught to medical residents from the first year of the residency program, always supervised by an experienced tutor.

Residents’ participation in LC as part of a well-supervised and structured program does not imply a greater risk for the patient or an increase in institutional expenditure.

Transcystic bile duct cholangiography can confirm and prevent bile duct injuries, reveal bile tract anatomy and facilitate technical training in cannulation of the cystic duct.

Fundus-first LC was described by Geiss and Fullum; the procedure could be safe in patients with acute cholecystitis when performed by experienced surgeons.

We do not perform this surgical approach by laparoscopy; in case of inflammation that does not allow a clear identification of the gallbladder hilum, we perform a subtotal cholecystectomy.

Early LC reduces hospital stay significantly. The procedure can be performed by residents with acceptable rate of intraoperative and postoperative complications.

Bockler et al. performed 252 LC in 252 patients during a 2-year period and reported that only 37% of the elective procedures and 29% of the urgent surgeries were performed by residents. In our service, residents perform all the surgeries (always supervised by a staff physician); third-year residents are those most involved.

In conclusion, as gallbladder and bile duct diseases are predominant in our hospital, we believe that conventional and laparoscopic cholecystectomy are of great importance for the comprehensive training of residents in surgery: therefore, they constitute procedures that can and must be performed by them, with appropriate supervision of a staff physician. Morbidity rates achieved are acceptable in an adequate medical residency program.

Considering the rate of complications reported in the published literature, we believe that our figures are within the expected ranges.

Reference


