Antegrade Dissection in Laparoscopic Cholecystectomy

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ABSTRACT

Background and Objectives: The aim of this study was to evaluate the usefulness of gallbladder antegrade dissection (GAD) cholecystectomy to reduce the risk of common biliary duct injuries and to demonstrate that it is an easier and more time-sparing technique than the traditional one.

Methods: The operative procedure performed since 2002 consists of the incision of the visceral peritoneum from the infundibulum away from Calot's triangle along the gallbladder bed up to the fundus. Then it continues from the fundus up to the infundibulum. This method was used to perform 127 laparoscopic cholecystectomies (LC) (first group). We compared the results of 119 LC (second group) performed from 1998 to 2001 by means of a completely retrograde method.

Results: In both groups, there were no major complications; 1 vs 4 conversions (0.8% vs 3.4%), mean operative time 70 minutes vs 90 minutes, residual cholecdocholithiasis in 2 patients in both groups (1.6% for the first group vs 1.7% for the second group).

Conclusions: GAD for laparoscopic cholecystectomy can reduce the time of surgery and is an easier technique to perform. Therefore, it can be proposed as the standard procedure and not only be used for difficult cholecystectomies.

Key Words: Difficult cholecystectomy, Laparoscopy, Antegrade dissection, Retrograde dissection.

INTRODUCTION

Gallbladder antegrade dissection (GAD) during laparoscopic cholecystectomy is a well-known procedure in surgical practice. It is often used in difficult cholecystectomies because of acute or chronic phlogosis or in cirrhotic patients with portal hypertension.

In fact, some reports show a significant reduction in conversions of laparoscopic cholecystectomies (1.2% to 2.08% vs 5.2% to 18.75%) in patients treated with GAD compared with those who underwent a traditional laparoscopic procedure.1–8

The aim of this study was to demonstrate the validity of a surgical procedure that is even safer than the routine operation. Another aim was to evaluate the usefulness of GAD for obtaining a lower risk of common biliary duct injuries and to show an easier and more time-sparing technique than the traditional one.

METHODS

From 1998 to 2005, 246 laparoscopic cholecystectomies were performed at our Institution (University of Foggia, Department of Surgical Sciences, Division of General Surgery, Polyclinic of Foggia, Italy): 159 for simple cholecystolithiasis, 82 for acute cholecystitis, and 5 for cholecystolithiasis in cirrhotic patients. In our laparoscopic experience, a change of surgical technique was introduced so that antegrade dissection replaced retrograde dissection.

In both groups, a skilled laparoscopic surgical team performed all procedures.

Our surgical team has performed gallbladder antegrade dissection since 2002. The procedure involves incision of the visceral peritoneum from the infundibulum away from Calot's triangle along the gallbladder bed up to the fundus; then the dissection continues from the fundus up to the infundibulum. In this way, the gallbladder is left pedunculated by the cystic artery and cystic duct, which can be clipped and divided in turn. In our opinion, this technique has made the approach to the dissection of the gallbladder easier.

This method of dissection has allowed safe and complete
preparation of the cystic duct. In fact, the cystic duct is isolated, identified, clipped, and divided (at the end of the dissection) more easily. Then, its position and connections with the principal biliary duct (PBD) can be seen.

We compared the results of both groups of patients undergoing laparoscopic cholecystectomy in 2 different periods. From 1998 to 2001, 119 consecutive patients underwent a laparoscopic cholecystectomy by means of a traditional retrograde dissection. From 2002 to 2005, 127 patients underwent a laparoscopic cholecystectomy by means of a GAD as described above.

In both groups, the demographic and pathology data overlapped. The data for both groups are summarized in Table 1. The conditions that made the cholecystectomies difficult are the following: simple cholelithiasis (80 vs 79 for the GAD vs the retrograde dissection group), acute cholecystitis (43 vs 38), cholelithiasis in a cirrhotic patient (4 vs 2).

In each kind of pathology and in both groups of patients, the clinical scenarios were the following:

- patients with uncomplicated cholelithiasis had upper right quadrant pain, nausea, and sometimes vomiting;
- patients with acute cholecystitis had upper right quadrant pain and tenderness with rebound pain in some cases, chills before fever (up to 39.5°C), nausea, and vomiting;
- cirrhotic patients had upper right quadrant pain, nausea, and sometimes vomiting.

The hematologic and biochemical studies showed the following results for each kind of pathology in both groups of patients:

- patients with uncomplicated cholelithiasis had in some cases only a modest increase in the hepatic transaminases;
- patients with acute cholecystitis had leukocytosis (up to 21000/µL); most of them had an increase in GOT/GPT (up to 4 times the normal);
- in the cirrhotic patients, all the alterations of the hepatic function tests that are normally present in these patients were observed; all patients had up to an A6 Child-Pugh score.

The instrumental ultrasonographic (US) study showed the following results for each kind of pathology in both groups of patients:

- in the uncomplicated cholelithiasis, the abdominal US evaluation showed a normal thickness of the gallbladder wall (up to 6 mm);
- in the acute cholecystitis, the abdominal US evaluation showed signs of local phlogosis of the gallbladder characterized by an increase in the thickness of the gallbladder wall (more than 6 mm) associated in some cases with empyema and pericholecystic fluid gathering;
- the cirrhotic patients had all the US signs of portal hypertension and no signs of gallbladder phlogosis (gallbladder wall thickness up to 6 mm).

All patients of both groups affected by simple cholecystitis and the cirrhotic patients underwent a programmed laparoscopic cholecystectomy.

All patients in both groups affected by acute cholecystitis underwent laparoscopic cholecystectomy within 24 hours to 72 hours after the admission.

We have compared, above all, the operative time, the conversions, the major morbidity, and the gallbladder perforation with peritoneal contamination, hemorrhages, PBD injury, residual PBD stones attributable to the mobilization of little stones.

**RESULTS**

The elements evaluated for the comparison between the 2 patient groups were the following: lesion of the PBD, dehiscence of the cystic duct, gallbladder perforation, hemorrhagic complications, residual choledocholithiasis, conversions to an open approach, mean operative time, and hospital stay (Table 2).

In this study, complications not as significant as the hemorrhages and the PBD injuries were reported. On the
contrary, in the group that underwent a retrograde dissection, cystic duct dehiscence and a more representative conversion rate are in evidence. Gallbladder perforations occurred in 2 patients in the first group and 3 in the second group.

Average operative time in the GAD group was shorter, partly due to the increase in the surgeons’ laparoscopic experience from year to year.

In the group undergoing retrograde cholecystectomies, 4 conversions to an open procedure (3.4%) (3 acute cholecystitis and 1 cholecystectomy in a cirrhotic patient) occurred in comparison with 1 conversion (1 acute cholecystitis) (0.7%) in the group treated with GAD. Moreover, we registered an appreciable decrease in the conversions to an open procedure with the GAD technique.

**DISCUSSION**

Use of antegrade laparoscopic dissection is not aimed at eliminating conversion to an open procedure, which is safe for the patient, in some cases. In our opinion antegrade dissection, used extensively during laparoscopic cholecystectomy is not only a safe, easy procedure but also seems to reduce the operation time as well.

In this study, the results of the intraoperative lesions are very positive in both procedures.

In common practice, antegrade dissection is the procedure of choice for cholecystectomies considered difficult because of inflammation of Calot’s triangle, fibrosis, or both, presence of fatty tissue, and portal hypertension. Moreover, the lesions of the PBD occur also in a few patients without anatomic-pathologic alterations of Calot’s triangle.

In fact, the literature refers to a global incidence (minimal, moderate, and severe lesions, in all cases of laparoscopic cholecystectomies in all pathologic conditions) of about 1% (0.85%; one case every 120 laparoscopic cholecystectomies).

In this study, the low incidence of such complications as PBD injuries and hemorrhages does not allow us to show that one surgical technique is better than the other. Therefore, a statistical study cannot be proposed.

The lesions of the PBD and the hemorrhages have a low incidence (<1%), so they cannot be regarded as 2 meaningful elements for a statistical study about 2 groups of patients who undergo antegrade vs retrograde dissection cholecystectomy. Moreover, it should be necessary to enroll a lot of patients so as to build multicenter randomized studies.

Besides, we think that the laparoscopic cholecystectomy must always be carried out by minimizing all the risks of iatrogenic injuries regardless of the presence of inflammation or fibrosis.

In this way, GAD can be proposed as an easy, safe, and time-sparing technique, and it should be chosen as a procedure for training all residents in general surgery. Another object of discussion is the possible migration of stones in the course of GAD laparoscopic cholecystectomy.

In our study, the residual choledocholithiasis after laparoscopic cholecystectomy was the same in both groups of patients, ie, 1.6% for the GAD group versus 1.7% for the traditional cholecystectomies. So the antegrade dissection procedure has not confirmed the fear of the residual choledocholithiasis.

**CONCLUSION**

The GAD procedure has been accepted and used until now only for cases in which it is difficult to dissect Calot’s triangle because of the presence of phlogosis, fibrosis, or portal hypertension. So GAD for laparoscopic cholecys-
tectomy represents an easier procedure that seems to reduce the operative time. Therefore, it can be proposed as a standard procedure and not only for difficult cholecystectomies.

References:
1. Gupta A, Agarwal PN, Kant R, Malik V. Evaluation of fundus-first laparoscopic cholecystectomy. *JSLS*. 2004;8:255–258.
2. Rosenberg J, Leinskold T. Dome down laparoscopic cholecystectomy. *Scand J Surg*. 2004;93:48–51.
3. Ota A, Kano N, Kusanagi H, Yamada S, Garg A. Techniques for difficult cases of laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg*. 2003;10:172–175.
4. Mahmud S, Masaud M, Canna K, Nassar AH. Fundus-first laparoscopic cholecystectomy. *Surg Endosc*. 2002;16:581–584.
5. Kato K, Kasai S, Matsuda M, et al. A new technique for laparoscopic cholecystectomy—retrograde laparoscopic cholecystectomy: an analysis of 81 cases. *Endoscopy*. 1996;28:356–359.
6. Uyama I, Iida S, Ogiwara H, et al. Laparoscopic retrograde cholecystectomy (from fundus downward) facilitated by lifting the liver bed up to the diaphragm for inflammatory gallbladder. *Surg Laparosc Endosc*. 1995;5:431–6.
7. Martin IG, Dexter SP, Marton J, et al. Fundus-first laparoscopic cholecystectomy. *Surg Endosc*. 1995;9:203–206.
8. Kato K, Matsuda M, Onodera K, Kobayashi T, Kasai S, Mito M. Laparoscopic cholecystectomy from fundus downward. *Surg Laparosc Endosc*. 1994;4:373–374.
9. Tayeb M, Raza SA, Khan MR, Azami R. Conversion from laparoscopic to open cholecystectomy: multivariate analysis of preoperative risk factors. *J Postgrad Med*. 2005;51(1):17–20.
10. Ahrendt SA, Pitt HA. Biliary tract. In: Townsend CM, Beauchany RD, Evers BM, Mattox KL, eds. *Sabiston Textbook of Surgery*. Philadelphia, PA: Elsevier Saunders; 2004.