Acta Medica Okayama

Volume 47, *Issue* 5 1993 *Article* 10

OCTOBER 1993

Common bile duct injury during laparoscopic cholecystectomy.

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Abstract

Bile duct injury can occur more frequently during laparoscopic cholecystectomy than in open cholecystectomy. Three cases of common bile or hepatic duct injuries occurred in a series of eighty laparoscopic cholecystectomies; In case 1, the common bile duct was misidentified as the cystic duct. In case 2, bile peritonitis occurred on the fourth postoperative day caused by necrosis of the common hepatic duct involving the cautery surrounding it. In case 3, a bile leak occurred due to an incision at the confluence of the cystic and common duct. Dissection of the cystic duct at the infundibulum of the gallbladder, blunt dissection of the Calot's triangle, the handling of clips with special attention for safety were thought to be necessary in order to lower the risk of bile duct injury. Preoperative endoscopic retrograde cholangiography (ERCP) is recommended to avoid bile duct injury.

KEYWORDS: bile duct injury, laparoscopic cholecystectomy

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*PMID: 8273459 [PubMed - indexed for MEDLINE]

Acta Med Okayama 47 (5) 351-353 (1993)

— Brief Note —

Common Bile Duct Injury during Laparoscopic Cholecystectomy

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Bile duct injury can occur more frequently during laparoscopic cholecystectomy than in open cholecystectomy. Three cases of common bile or hepatic duct injuries occurred in a series of eighty laparoscopic cholecystectomies; In case 1, the common bile duct was misidentified as the cystic duct. In case 2, bile peritonitis occurred on the fourth postoperative day caused by necrosis of the common hepatic duct involving the cautery surrounding it. In case 3, a bile leak occurred due to an incision at the confluence of the cystic and common duct. Dissection of the cystic duct at the infundibulm of the gallbladder, blunt dissection of the Calot's triangle, the handling of clips with special attention for safety were thought to be necessary in order to lower the risk of bile duct injury. Preoperative endoscopic retrograde cholangiography (ERCP) is recommended to avoid bile duct injury.

Key words : **bile duct injury, laparoscopic cholecystectomy**

Laparoscopic cholecystectomy has become a widespread technique for removing the diseased gallbladder, because it is minimally invasive, has a reduced recovery period and improved cosmetic results. However, it should be recognized that bile duct injury may occur more often with this procedure. Bile duct injury was reported to occur due to misidentification of the common bile duct as the cystic duct or the overuse of cautery or laser on the area surrounding the common bile duct (1). We had three cases of common bile or hepatic duct injuries, which occurred early in a series of eighty laparoscopic cholecystectomies, and we want to clarify some important points to avoid similar injuries.

The patient in case 1 was a man, aged 68 years; the first case in this series. After dissection of the cystic duct, intraoperative cholangiography was performed. Only the lower part of the common bile duct was demonstrated by the cholangiography (Fig. 1). Immediately the procedure was converted to laparotomy, and the incised site was repaired by interrupted sutures without T-tube drainage.

The patient in case 2 was a woman, aged 33 years; our 6 th case. Laparoscopic cholecystectomy was done uneventfully. The first three postoperative days (POD) were smooth. However, on the 4 th POD a considerable amount of bile appeared in the Penrose drain. Laparotomy was carried out to identify the cause, and necrosis of the common hepatic duct due to excessive cauterization was revealed as the cause, and hepaticojejunostomy was performed. Recovery was uneventfull after the procedure, and she was discharged 39 days after operation. Retrospectively, analizing the videotape of the original operation and the histlogical slides of the resected common hepatic duct (Fig. 2), we concluded that the use of cautery in dissecting the Calot's triangle caused a heat injury to the common hepatic duct.

The patient in case 3 was a woman, aged 24 years; our 34 th case, in whom the Calot's triangle was very high so the porta hepatis and the cystic duct were very short. Intraoperative drip infusion cholangiography (DIC) was performed after attempts to clip the cystic duct. We

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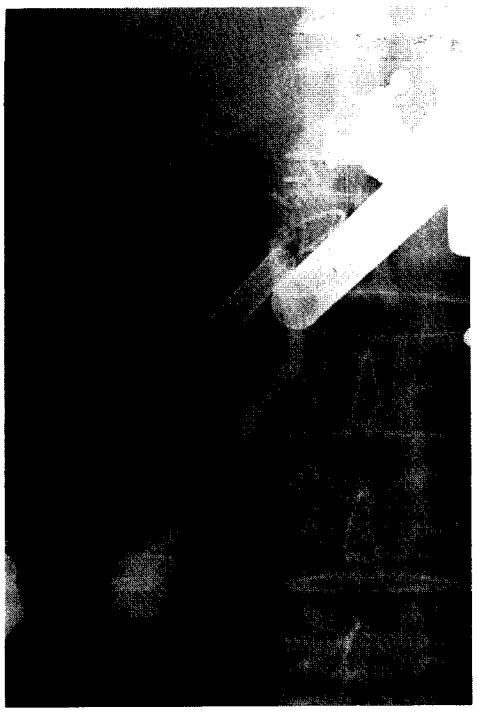

Fig. 1 Intraoperative cholangiography which shows only the lower part of the common bile duct. Arrows show the clip on the common bile duct.

Fig. 2 Histological features of the resected common hepatic duct. Coagulation necrosis with no inflammatory reaction in the restricted area (**) is consistent with that caused by surgical cautery.
*: Lumen of the common hepatic duct, **: Necrotized wall of the common hepatic duct, ***: Connective tissue surrounding of the common hepatic duct.

Table 1 Complications in the 80 cases of laparoscopic cholecystectomies

Complication	No.	(%)
Bile duct injury	3	(3.8 %)
Subcutaneous emphysema	1	(1.3 %)
Bleeding	2*	(2.5 %)

*Bleeding from fine branch of the cystic artery occurred in both cases, and was controlled easily under laparoscopy.

supposed that the site of clipping was 1 cm from the confluence of the cystic and the common bile duct. After excision of the cystic duct, major leakage of bile was noted. A laparotomy was performed after unsuccessful attempts to stop the leakage. In fact, the original incision had been performed at the confluence of the cystic and the common duct, and not 1 cm above as previously thought.

In performing laparoscopic cholecystectomy, surgeons should take specific precautions to lessen the incidence of these kinds of complications. The most common complications are reported to be bile duct injury and bleeding. The complications encountered in our series are shown in Table 1. The incidence of bile duct injury during laparoscopic cholecystectomy was reported to be 0–7 % (2–7). On the other hand, for open cholecystectomy it was reported to be 0.3–0.5 % (8). In our series of 80 cases the incidence was 3.8 %. If experience improves technique, the incidence of bile duct injury should decrease. The Southern Surgeons Club reported the incidence of bile duct injury was 2.2 % in the total of each group of the first 13 patients operated on by different surgical teams, and 0.1 % thereafter (9). All of our cases of bile duct injury occurred within the first 34 cases. Thereafter no bile duct injuries occurred.

Davidoff *et al.* (1) reviewed twelve cases of bile duct injury during laparoscopic cholecystectomy, and identified two main reasons: the misidentification of the common bile duct as the cystic duct, and the abuse of cautery or laser surrounding the common duct. Hunter (4) has emphasized the following maneuvers to avoid bile duct injury during laparoscopic cholecystectomy: a) the use of a 30° forward oblique viewing telescope which leads to a wider visual field, b) firm cephalic traction on the fundus of the gallbladder, c) lateral traction on the infundibulum of the gallbladder, d) dissection of the cystic duct at the infundibulum of the gallbladder, e) routine fluoroscopic cholangiography. We had been using a 0° forward viewing telescope, but now use an oblique viewing one. In

case 1 we did not apply the 3rd and 4th maneuvers. In case 3, the 4th maneuver was insufficient and management of clips was not appropriate. Because, cholangiography was only performed by intraoperative DIC, we misunderstood the site of the clipping to be distant enough from the common duct. In case 2, the common hepatic duct injury was caused by cautery. Because of this accident, we think the dissection of Calot's triangle should be carried out bluntly without using cautery.

To lower the risk of bile duct injury during laparoscopic cholecystectomy, the handling of clips with special attention to sefety, and blunt dissection of the Calot's triangle are as important as Hunter's five maneuvers. We also recommend that routine preoperative endoscopic retrograde cholangiography may be useful to visualize the actual anatomy of the bile duct on each patient.

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Received March 2, 1993; accepted May 21, 1993.