Complications of laparoscopic cholecystectomy

There are several interesting articles in this issue, which call for some comment.

In the multicenter study from Hungary by Regőly-Mérei et al. [3], in 4 years 26,440 laparoscopic cholecystectomies (LCs) were reported and the information was obtained via questionnaires. In the same time period, more than 27,000 additional gallbladders were removed in a standard open way. I cannot explain why LC did not gain wider acceptance (the operators inertia?, the economy?, special local circumstances?). There are gigabites of data available with an enormous variety of statistical approaches, but there are some interesting statements: “There was no significant correlation found between the percentage of biliary tract injuries and the absolute number of LCs performed in the same institutions . . .” The authors stated at a later stage that the incidence of complications decreased with experience. The sampling range was enormous. If my interpretation is correct, 21 institutions in the 4-year period performed 50 LCs (1½ per year) and in 29 other hospitals, fewer than 300 LC (75 cases per year) were performed. Three hospitals had more than 1,000 LC and two hospitals performed more than 2,000 LC procedures in the same 4-year time period.

I do not know how these large fluctuations of cases per hospitals could be brought to a common denominator if it comes to analysis.

Only 34.5% of the injuries were discovered during the first operation, whereas more than two-thirds were seen in an average of 6–7 postoperative days. The total number of ductal injuries was 148. The bottom line of the article is the 0.6% incidence of biliary tract injuries, which is higher, in my opinion, than in the pre-LC era, even in Hungary. The type of injuries were: complete transections, 20.3%; partial injuries, 35.1%; cystic duct lesion, 26.4%; excision of the duct: 6.8%.

The rest of the injuries were minor. The cystic “duct lesion” is not clearly described. Are we talking about a slippage of a clip? The rate of reoperation was 60.8% and the dominant repair was suturing of the bile duct over a T-tube (42% of cases). Whether this technique of repair is optimal can be addressed only if longer and accurate follow-up data are available.

The various contributors were blaming “identification difficulties” in 43.2% and problems in verifying the cystic duct common bile duct junction. The conversion rate, because of visible bile leak (drain) was 63.9%. The average performance of a cholangiogram was only 6.9%, which is low. The authors recommend further prospective studies “to determine the ideal surgical technique to decrease the incidence of injuries and the best primary reconstructive protocols.” Before commenting on this huge number of data and evaluation of 26,000 + LCs, I would like to mention the other article.

Carroll et al. [1] in this same issue reported on common bile duct injuries during laparoscopic cholecystectomy that resulted in litigation. The reason I would like to discuss these two articles together is because they contain many similar problems.

In Carroll’s report, the authors analyzed 46 ductal injuries that resulted in litigation. Fifteen were transections, but only 20% of the injuries were discovered during the primary operation. The average delay in diagnosis was ten days. These complications occurred whether the operation was performed by inexperienced or experienced laparoscopic surgeons, but these particular data are incomplete. The statement of decreasing injuries with the learning curve experience can be questioned. Four injuries occurred between 50–100 cases and five after experiencing over 100 cases. It is not uncommon that the learning period or learning curve explanation is debated. In the references 78,000 cases with a bile duct injury of 0.36 to 0.47% were quoted.

In 16 of these 46 cases, cholangiograms were performed, but in 11 cholangiograms, the hold up of contrast material was obvious, but the surgeon misinterpreted (overlooked) the findings. The settlement cost varied from $30,000 to $1.3 million with an average of $221,000.

The following questions arose while reading these two articles:

Ethical issues

It is true that ductal injuries will always occur if we operate on the biliary system and we will probably never achieve a 0% incidence. However, all attempts should be made to decrease ductal injuries to a minimum. What should we learn from the last nine years to change our way of thinking or to make changes in practicing biliary surgery if it comes to LC? The first message is an ethical one. Are we informing the patient appropriately? There is no doubt that the incidence of ductal injuries was increased (by two to three times) since LC was introduced. Are we telling the patient that there will be less postoperative discomfort, shorter hospitalization stay, faster return to activities, but there is a
(slim) possibility that a significant complication with severe sequelae could occur more frequently as compared with an open operation? After an honest explanation of the pros and cons, should we not ask the patient about his or her choice? Patients are entitled to know that LC could have a higher complication rate, particularly with regard to ductal injuries.

### Intraoperative cholangiography

Intraoperative cholangiography has been debated since Mirizzi described it in 1933. I do not intend to go into endless pro and cons, but LC has changed the indications as well as the usefulness and importance of cholangiography. I understood the reluctance of the inpatient surgeons to wait 15–20 minutes to receive the two or three films when a large percentage is noninformative or technically unacceptable.

1. We embrace modern “high technology” quickly in working from a TV screen with a new remote surgical technique instead of the open exploration and naked eye vision. Approximately 30% of abdominal surgery is performed today with laparoscopy. We have difficulties in accepting that there are digitized fluoroscopes available in which one does not extend the operating time more than 5–10 minutes because the image is immediately visible. The digitized system improved the quality of the display (information) significantly. I cannot underscore the value (in 10% of cases) of discovering anomalies of surgical importance in a timely fashion. A good example is the short cystic duct. If this is not recognized, the normal caliber CBD is pulled laterally and is therefore tented. This can mislead the operator to misinterpret the so-called “cystic duct,” which is really a CBD, which will be double-clipped and transected. This appearance can be discovered immediately with fluorocholangiography (cholangio grasper proximity to the main duct). In 2% of cases, the short cystic duct can drain into the right hepatic duct or a spiral cystic duct crosses very near the common hepatic duct. Injuries can be avoided if attention is drawn in time to dangerous anomalies at the primary operation.

2. The problems are enhanced if the case is difficult or is an acute one where efforts made to clarify the anatomy in these cases are time-consuming. A cystic duct or cholecysto-cholangiogram could be of great help in identifying the structures. The cholangiogram will give you some hints. If you extend the operating room time only 10 minutes, the effort is worthwhile. Do not hesitate to convert—and still perform a cholangiogram.

3. If the injury is discovered by reading the films properly, this should indicate the need for immediate exploration. Surgeons who cannot read gross changes on a cholangiogram (for instance stop of contrast material or extravasation) should not operate on the biliary system. The patient is much better off if immediately operated upon than to be re-explored a few days later, attempting then to repair the injury in an abdomen with biliary peritonitis.

4. A large number or the majority of preoperative of ERCPs can be avoided if routine fluorocholangiography is employed. This endoscopic procedure has a morbidity, and entails a significant additional cost. There is only one indication for a preoperative ERC: the high-risk patient with a severe comorbid condition (septiemia, cholangitis, or jaundice), where ERC should be the first step.

5. The majority of surgeons abrogated the removal of CBD stones and refer it to the endoscopist for a second procedure with additional morbidity and mortality, not speaking about the cost. There is no excuse for a surgeon not acquiring the additional skill or the equipment. Cholecystolithiasis is a surgical disease. If performed laparoscopically, fluorocholangiography is obligatory, but this is a separate story.

6. There are also some lessons to be learned from the articles about the postoperative period. Only 10–20% of injuries are discovered during the primary operation. The majority are operated late because of severe symptoms (peritonitis, jaundice, etc.). Stricture formation can occur later (6–24–48 months) after the primary operation. The lesson is that if the patient on the first postoperative day has only vague symptoms, for instance, did not want to get out of bed in the morning, does not eat breakfast, does not feel 100%, this may indicate injury. Some routine laboratory examinations can be noninformative. The surgeon should immediately think of the possibility or try to exclude the presence of bile leak by ordering a Hida scan, and if positive, follow this with an emergent ERCP and immediate operation.

If a normal caliber duct is transected or an injury found in an infected abdomen, the surgeon should secure a tube in the proximal lumen of the transected duct and drain the bile in a container outside. Drain also the abdominal cavity. The surgeon wins time and can perform the repair under better conditions at a later stage—if the surgeon feels competent to do this special procedure—or he or she can refer the case to a tertiary center.

Another article of interest is one by Schäfer et al. [4], who made a retrospective analysis of 10,000 LCs with spilled stones. In 5.7%, this problem was discovered. It seems that in other studies it occurred more frequently. The complications of these events are abscess formation or, at a later stage, fistula formation. Therefore, all attempts should be made to recover spilled stones. Place the gallbladder in a bag during the pull-through maneuver, which could be another source. The authors discuss the indication for conversion, which should be considered if (large) or innumerable calculi are lost and are difficult to retrieve. The formation of abscesses in the author’s experience was low (0.08%), but can occur. Again the patient should be informed of this event and the problem should be explained to draw attention to it. If early symptoms should occur, the patient should immediately report this to the surgeon. There is no question that the recommendation to retrieve all stones—if possible—is advisable.

Dr. Marks et al. [2] reported an experimental study of the advantages of biliary stenting in cystic duct leakage without sphincterotomy. This study was performed in dogs and showed that those groups without sphincterotomy but only stented fared better than the group with sphincterotomy. Cystic stump leakage is unfortunately common after