

Mirizzi syndrome: a new approach to an old problem

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Mirizzi syndrome (MS) is a rare complication of gallstone disease in which the common hepatic duct is obstructed by a stone impacted at Hartmann's pouch or cystic duct. McSherry and Csendes are the two commonly used systems to classify different types of MS. McSherry type I refers to the condition with external compression on common hepatic duct only, while type II results if a cholecystocholedochal fistula has formed. Csendes further expanded McSherry type II to type II, III and IV based on the extent of involvement of the bile duct circumference. Whenever there is coexisting cholecystoenteric fistula, it becomes a Csendes type V MS (1).

MS has been a diagnostic and therapeutic challenge to surgeons in past decades. The disease is well known to be difficult to obtain an accurate pre-operative diagnosis. Undiagnosed MS can be a nightmare to the operating surgeon as conventional laparoscopic cholecystectomy for MS is extremely difficult and is prone to bile duct injury. Even a pre-operative diagnosis of MS is successfully made, operation can still be difficult if a laparoscopic approach is adopted. That is the reason why Valderrama-Treviño *et al.* stated in their review article on MS that “*laparoscopic cholecystectomy for MS currently cannot be recommended as a standard procedure*” (2).

In a systemic review on laparoscopic treatment for MS, 10 series each consisted of at least 4 patients between 1989 and 2008 were identified (1). All together laparoscopic approach was attempted in 124 patients; the overall conversion rate was 41%. The complication rate and reoperation rates were 20% and 6% respectively. Mortality

occurred in 1 patient (0.8%) due to biliary peritonitis. The median hospital stay was 8 days (range, 3–13 days) as reported in 8 of the 10 studies. The feasibility of laparoscopic approach for MS is really doubtful given the high conversion rate. The complication rate is not low and hospital stay also appears long despite the minimally invasive approach.

However, thanks to the rapid advancement of surgical equipment and technical skill, surgical approach to many diseases also changes. Liver resection was only performed in open approach not until 1992 when the first laparoscopic hepatectomy was done. Now the number of cases of laparoscopic hepatectomy is increasing exponentially world while (3). Applied in the field of biliary tract surgery, new technology like high definition 3D laparoscopy and indocyanine green (ICG) fluorescence technique may help to delineate biliary tract anatomy and makes laparoscopic approach more feasible and safer (4). Another breakthrough is the use of surgical robot. Robot allows a magnified view and high dexterity of instruments making intracorporeal dissection and suturing much more efficiently. It appears incomplete without mentioning these new technologies by Valderrama-Treviño *et al.* when they reviewed the latest development in MS.

Successful management of MS depends not only on appropriate surgical treatment but also more importantly on correct pre-operative diagnosis. An accurate pre-operative diagnosis can make the operation well prepared, even in planned minimally invasive approach. Computed tomography or magnetic resonance imaging are important

to exclude carcinoma of gallbladder but endoscopic retrograde cholangiopancreatography (ERCP) is important for precise delineation of the biliary anatomy, removal of any concomitant common duct stone and placement of biliary stent. The stent is important to provide the landmark the location of common duct during operation and to protect bile leak after subtotal cholecystectomy. Gallbladder should be dissected out fundus first and incised near the Hartmann's pouch for the culprit stone extraction. Cholecystoenteric fistula is not uncommonly encountered but this can be taken down during mobilisation of the gallbladder and repair done on the duodenum or colon accordingly. Our center has adopted a new combined endoscopic and robotic approach for MS since 2012. Every patient with suspected or confirmed MS would undergo ERCP with biliary stenting before operation and robot was used during surgery to facilitate dissection and suturing. ERCP was repeated postoperatively to remove the biliary stent and any residual stone. This new approach was proved to be feasible and compared favourably with a historical group undergoing open surgery in terms of reduced blood loss and hospital stay (5). Up to now 16 cases were done with this approach in our center with promising result. There was no conversion to open approach, no mortality, complications occurred in two patients, one patient had collection at gallbladder fossa successfully treated with antibiotics and another patient had pseudomembranous colitis. The median hospital stay was only 4 days (range, 3–11 days) (unpublished data).

Similar combined approach has been adopted by another center from USA with equal success, though in their series, hepaticojejunostomy were needed in 3 out of 6 patients (6). On the other hand, a group from China adopted a similar combined approach, but instead of using robot they were able to perform a laparoscopic subtotal cholecystectomy in 49 patients and showed that the duration of hospital stay was significantly shorter than a historical cohort of open approach (7). Hence, with the aid of pre-operative ERCP

and advanced surgical technique, MS alone is no longer a contraindication for minimally invasive approach. Patients with MS should not be deprived of the advantages of minimally invasive surgery.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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