



THE AGA KHAN UNIVERSITY

eCommons@AKU

---

Department of Surgery

Department of Surgery

---

August 2012

# Mechanical complications following acute myocardial infarction

Awais Ashfaq  
*Aga Khan University*

Hasanat Sharif  
*Aga Khan University, [hasnat.sharif@aku.edu](mailto:hasnat.sharif@aku.edu)*

Follow this and additional works at: [https://ecommons.aku.edu/pakistan\\_fhs\\_mc\\_surg\\_surg](https://ecommons.aku.edu/pakistan_fhs_mc_surg_surg)

 Part of the [Surgery Commons](#)

---

## Recommended Citation

Ashfaq, A., Sharif, H. (2012). Mechanical complications following acute myocardial infarction. *Journal of Pakistan Medical Association*, 62(8), 861-865.

**Available at:** [https://ecommons.aku.edu/pakistan\\_fhs\\_mc\\_surg\\_surg/719](https://ecommons.aku.edu/pakistan_fhs_mc_surg_surg/719)

## MANAGEMENT OUTCOME OF RESIDUAL COMMON BILE DUCT STONES AT AGA KHAN UNIVERSITY HOSPITAL

Muhammad Rizwan Khan, Sameera Naureen, Dildar Hussain, Rizwan Azami

Department of Surgery, The Aga Khan University Hospital, Karachi.

**Background:** The frequency of residual common bile duct (CBD) stones in patients with previous cholecystectomy ranges from 2-10%, and a minimally invasive approach is generally recommended for these patients. This study reviews the experience in the management of residual CBD stones at the Aga Khan University Hospital. **Methods:** All adult patients diagnosed to have residual CBD stones, from 1993 to 2001, were identified and analyzed in terms of the treatment modality utilized and its associated complications. The role of endoscopic sphincterotomy was particularly analyzed in our set-up. **Results:** The study population consisted of 66 patients. The mean age was 52 (range:18-84 years) years with a female to male ratio of 51:15. The primary mode of management consisted of endoscopic sphincterotomy in 61 patients (92.5%). The initial clearance rate for these patients was 75%, while the remaining 25% required ancillary procedures to achieve a complete clearance. Procedure related complications were observed in 17 (28%) patients, with zero mortality. The other 5 patients (7.5%) underwent an open choledochotomy as a primary procedure with no further complications. **Conclusions:** Endoscopic sphincterotomy is the most frequent treatment modality used for the management of residual CBD stones at our hospital. Although initial success rate seems low, the fact that endoscopic sphincterotomy is a less invasive procedure justifies its preferential utilization. The study does not compare the results of endoscopic management with open surgery, as the number of patients managed by open choledochotomy is very small.

**Keywords:** Common bile duct stones, Retained common bile duct stones, Endoscopic sphincterotomy, Endoscopic retrograde cholangiopancreatography

### INTRODUCTION

In the era prior to minimally invasive surgery, open choledochotomy was the gold standard in the management of common bile duct (CBD) stones of patients undergoing cholecystectomy for gallstones.<sup>1</sup> The introduction of endoscopic sphincterotomy (ES) in 1974 revolutionized the management of CBD stones, especially of retained calculi. The technique was primarily introduced for retained stones,<sup>2</sup> but with increasing experience, it has been successfully used in 90% to 95% of patients in certain series as a primary procedure, without any need for re-operation.<sup>3</sup> Despite such impressive results, a number of prospective, randomized trials comparing open choledochotomy with pre-operative ES and subsequent open cholecystectomy failed to demonstrate any significant benefit.<sup>2,3</sup> Consequently, preoperative ES for choledocholithiasis never became a common practice until the introduction of laparoscopic techniques.

The introduction and worldwide acceptance of laparoscopic cholecystectomy has revolutionized the management of CBD stones. Initially, a preoperative cholangiogram (POC) was routinely performed during laparoscopic cholecystectomy to identify incidental CBD stones, and to delineate the biliary anatomy in an attempt to prevent iatrogenic biliary injuries,<sup>4,5</sup> but most of the recent literature supports the use of selective POC due to increase in

cost, operating time, and false positive or negative results associated with the procedure.<sup>6</sup> Similarly, even when there is a high index of suspicion, a routine pre-operative endoscopic retrograde cholangio-pancreaticography (ERCP) in patients undergoing laparoscopic cholecystectomy, has been found to be associated with a significant number of negative attempts.<sup>7,8</sup>

Consequently, having used all the pre-operative biochemical and radiological modalities, the incidence of residual CBD stones ranges from 2% to 10% in different series.<sup>9,10</sup> Despite limitations, most experts agree that patients with residual CBD stones who have previously undergone cholecystectomy should be managed by non-operative techniques and re-exploration reserved for selected cases only.<sup>11</sup>

This study reviews the experience in the management of residual CBD stones at the Aga Khan University Hospital (AKUH), which is a tertiary care teaching hospital in Karachi, Pakistan. Apart from open surgery, the options of both endoscopic and percutaneous (radiological) management of CBD stones are available at this hospital. In the absence of a T-tube, our initial approach is to manage these patients with endoscopic techniques; and therefore, the role of endoscopic sphincterotomy was particularly analyzed in our set-up.

## MATERIAL AND METHODS

All adult patients diagnosed to have residual CBD stones after a previous cholecystectomy, from January 1993 to December 2001, were identified using ICD-9-CM (International Classification of Diseases – 9 – Clinical Modification) coding system of diseases. The data was collected from the medical records, and the main variables included demographic features, presentation, treatment modality utilized for each patient, stone clearance, procedure related morbidity and mortality, and length of hospital stay. The patients who were previously managed at other hospitals, and subsequently presented to our institution, were excluded from the study.

The ‘stone clearance’ was defined as the clearance status of the common bile duct defined in the completion cholangiogram after each procedure. The number of ancillary procedures required to achieve a complete clearance was also considered. *Morbidity* related to both systemic and biliary complications of the procedure, and *mortality* was defined as any death occurring within 30 days of the procedure.

As majority of patients in our study were managed by ES, it was not possible to compare the results of ES with open surgery. The frequencies were calculated by using the SPSS (Statistical Package for Social Sciences) software package (version 11.5) for data analysis.

## RESULTS

A total of 72 patients presented to AKUH with residual CBD stones during the study period. Of these, 6 patients were initially managed at other hospitals and were excluded from the study. The remaining 66 patients constituted the study population, and their charts were analyzed in detail. The mean age of the patients was 52 years (range: 18 - 84 years). The majority of patients were females, and the female to male ratio was 51:15. The median duration of symptoms before diagnosis was 34 weeks. The mode of presentation includes abdominal pain in 34 patients (51.5%), obstructive jaundice in 15 patients (22.7%), acute cholangitis in 13 patients (19.6%), and acute pancreatitis in 4 patients (6%).

Thirty-four patients (51.5%) were identified to have a solitary stone, while the remaining 32 patients (48.5%) had multiple calculi. The mean size of the largest stone was 1.3 centimeters (range: 0.5 to 3 cms). All the stones were located in the common bile duct, except one case where the stone was present in the common hepatic duct.

Five patients were managed by open choledochotomy as the primary procedure. The

reasons for choosing open surgery as a primary procedure in these patients included multiple stones in 2 patients, and large sized stone (>2 cms) in 3 patients. A complete clearance was achieved in all the patients at the end of the open procedure with no postoperative complications.

The other 61 patients underwent ES as the primary procedure, and the initial clearance was achieved in 46 patients (75%). The remaining 15 patients (25%) had a residual stone and required an ancillary procedure to achieve a complete clearance. The reasons for failure are shown in Table 1.

The ancillary procedures consisted of open choledochotomy in 9 (15%) patients. The procedure was successful in 7 patients, while 2 patients were identified to have residual stones on T-tube cholangiogram, and were managed by percutaneous extraction through the T-tube tract. Six patients (10%) were subjected to a repeat ES as an ancillary procedure; clearance was achieved in 2 cases after the second attempt and in another 2 patients after the third attempt. The remaining 2 patients were subjected to the extracorporeal shockwave lithotripsy (ESWL); it was successful in one patient, while the second patient was subjected to open choledochotomy to achieve a complete clearance.

Procedure related complications were observed in 17 (28%) patients, as shown in Table 2. All the patients were managed conservatively and recovered completely. One patient developed wound infection, while another had myocardial infarction after open choledochotomy as an ancillary procedure. There was no procedure related mortality.

**Table-1: Reasons for failure of initial endoscopic sphincterotomy in 15 patients**

Reasons for failure	Patients (%)
Large size of the stone	6 (40%)
Technical difficulty in cannulation	3 (20%)
Periampullary diverticulum	2 (13%)
Impacted stone in cystic duct remnant	1 (6%)
Patient unable to tolerate the procedure	2 (13%)
Not documented	1 (6%)

**Table-2: Complications of endoscopic sphincterotomy in 17 (28%) patients**

Complications	Patients (%)
Mild acute pancreatitis	11 (18%)
Acute cholangitis	4 (6.5%)
Hemorrhage from duodenal papilla	2 (3.2%)

The mean length of hospital stay was 6 days (range: 1 to 28 days), and the mean follow up duration was 12 months (range: 3 to 38 months). Three patients developed recurrent stones in the follow up period, and were subjected to a repeat ES.

This was successful in one patient, and the other two patients ultimately underwent open surgery to achieve clearance.

## DISCUSSION

The incidence of residual CBD stones in different series ranges from 2% to 10%;<sup>9,10</sup> and despite significant advances in endoscopic, percutaneous and laparoscopic techniques, they continue to present a management challenge to the surgeons, gastroenterologists and radiologists. There is, however, a general consensus that if the gallbladder has been removed previously, an endoscopic extraction of CBD stones is the preferred approach.<sup>11</sup> We follow the same principle at our hospital and in the absence of a T-tube, the first line of management for residual stones is endoscopic stone extraction.

Endoscopic sphincterotomy is a well established procedure for treating residual CBD stones; and when performed by an expert, ES is highly successful and carries a low incidence of complications. Schmitt and colleagues<sup>12</sup> have recently reported a success rate of 100% in the removal of retained stones after laparoscopic cholecystectomy. More recently, Fiore and co-workers<sup>13</sup> also reported a 100% success rate in 6 patients in whom the bile duct was not successfully cleared laparoscopically. Overall, the rate of successful cannulation, and the ability to clear the bile duct of stones, ranges from 85% to 92% in different series from experienced centers.<sup>14</sup> Some of these patients with larger stones may also require ESWL (extracorporeal shock wave lithotripsy) or laser techniques.<sup>1</sup> In addition, a small percentage of patients who have had a previous Billroth II gastrectomy, or when ERCP fails to achieve CBD clearance due to technical problems, may require an open procedure.<sup>15,16</sup>

In our series, the initial success rate for ES was 75%, and the reasons for failure have already been mentioned. This clearance rate is lower when compared to results from specialized centers, as mentioned above. It might be related to the lack of availability of additional sophisticated facilities, like mechanical or electrohydraulic lithotripsy and pulsed laser techniques, at our hospital at the time of study. Other factor might be an overall low volume of patients with CBD stones managed at our hospital. A few studies from other low volume centers have shown similar results. A study from India comparing endoscopic versus surgical management of CBD stones noted that the clearance rate with ES was 42% compared with 93.5% with open choledochotomy.<sup>17</sup> Another non-randomized study comparing ES with CBD exploration identified that the success rate with an average of 1.5 endoscopic sphincterotomies was

61% compared with 88% in the open surgery group.<sup>18</sup> A multi-center randomized trial from France also revealed a low initial clearance and high morbidity when compared with open surgery in patients with an intact gallbladder.<sup>19</sup>

The rate of procedure-related complications in our study was also higher as compared to figures in international literature.<sup>18,20</sup> Despite scrutiny, it was difficult to have any plausible explanation, though this might also be related to an overall low volume of patients with CBD stones managed at our hospital. But all the complications were self-limiting, and the patients recovered completely without any need for surgical intervention; resulting in zero hospital mortality.

This study does not compare the results of endoscopic management with open surgery, as the number of patients managed by open choledochotomy is very small. But, despite limitations, this study supports the use of ES in patients diagnosed to have common bile duct stones after a previous cholecystectomy. Although initial success rate is low, the fact that ES is a less invasive procedure justifies its preferential utilization. However, the patient must be informed that successful ES may require multiple visits to the endoscopy suite, or an ancillary procedure to achieve a complete clearance.

## REFERENCES

1. Pitt AH. Role of Choledochotomy in the Treatment of Choledocholithiasis. *Am J Surg* 1993;170:483-6.
2. Stain SC, Cohen H, Tsuishoysha M, Donovan AJ. Choledocholithiasis: Endoscopic Sphincterotomy or Common Bile Duct Exploration. *Ann Surg* 1991;213:627-34.
3. Nauhaus H. Prospective Evaluation of the use of endoscopic retrograde cholangiography prior to laparoscopic cholecystectomy. *Endoscopy* 1992;24(9):745-9.
4. Ludwig K, Bernhardt J, Steffen H, Lorenz D. Contribution of intraoperative cholangiography to incidence and outcome of common bile duct injuries during laparoscopic cholecystectomy. *Surg Endosc* 2002;16(7):1098-1104.
5. Flum DR, Koepsell T, Heagerty P, Sinanan M, Dellinger EP. Common bile duct injury during laparoscopic cholecystectomy and the use of intraoperative cholangiography: adverse outcome or preventable error? *Arch Surg* 2001;136(11):1287-92.
6. Thornton DJ, Robertson A, Alexander DJ. Laparoscopic cholecystectomy without routine intraoperative cholangiography does not result in significant problems related to retained stones. *Surg Endosc* 2002;16(4):592-5.
7. Neuhaus G. Prospective evaluation of the use of endoscopic retrograde cholangiography prior to laparoscopic cholecystectomy. *Endoscopy* 1992;24:745-9.
8. Graham SM. Laparoscopic cholecystectomy and common bile duct stones. *Ann Surg* 1993;218:61-7.
9. Braghetto I, Debandi A, Korn O, Bastias J. Long-term follow up after laparoscopic cholecystectomy without routine intraoperative cholangiography. *Surg Laparosc Endosc* 1998;8(5):349-52.
10. Vezakis A, Davides D, Ammori B, Martin IG, Larvin M, McMahon MJ. Intraoperative cholangiography during

- laparoscopic cholecystectomy. Surg Endosc 2000;14(12):1118-22.
11. Csendes A. World progress in Surgery: Common bile duct stones – Introduction. World J Surg 1998;22(11):1113.
  12. Schmitt CM, Baillie J, Cotton PB. ERCP following laparoscopic cholecystectomy: A safe and effective way to manage CBD stones and complications. HPB Surgery 1995;8:187-92.
  13. Fiore NF, Ledniczky G, Wiebke EA, Broadie TA, Pruitt AI, Goulet RJ et al. An analysis of perioperative cholangiography in one thousand laparoscopic cholecystectomies. Surgery 1997;122:817-23.
  14. Rosenthal RJ, Rossi RL, Martin RF. Options and strategies for the management of choledocholithiasis. World J Surg 1998;22:1125-32.
  15. Jafri SMW. Approach to the difficult common bile duct stone. Pakistan J Gastroenterol 1995;9(2):11-4.
  16. Phillips EH, Rosenthal RJ, Carroll BJ, Fallas MJ. Laparoscopic transcystic common bile duct exploration. Surg Endosc 1994;8:1389-94.
  17. Kapoor R, Pradeep R, Sikora SS, Saxena R, Kapoor VK, Kaushik SP. Appraisal of surgical and endoscopic management of choledocholithiasis. Aust N Z J Surg 1994;64(9):599-603.
  18. Johnson AS, Ferrara JJ, Steinberg SM, Gassen GM, Hollier LH, Flint LM. The role of endoscopic retrograde cholangiopancreatography: sphincterotomy versus common bile duct exploration as a primary technique in the management of choledocholithiasis. Am Surg 1993;59(2):78-84.
  19. Suc B, Escat J, Cherqui D, Fourtanier G, Hay JM, Fingerhut A, et al. Surgery vs endoscopy as primary treatment in symptomatic patients with suspected common bile duct stones: a multicenter randomized trial. French Association for Surgical Research. Arch Surg 1998;133(7):702-8.
  20. Kharat J, Kchaou-Ouakaa A, Bel-Hadj N, Gargouri D, Kochlef A, Romani M, et al. Endoscopic treatment of residual lithiasis. 661 cases. Tunis Med 2005;83(1):13-7.

---

**Address For Correspondence:**

**Dr Muhammad Rizwan Khan**, A-22, Empire Centre, Main Rashid Minhas Road, Gulistan-e-Johar, Karachi.

Email: [drrizwankhan@hotmail.com](mailto:drrizwankhan@hotmail.com)