ABSTRACT
Laparoscopic cholecystectomy is most commonly performed minimal access surgery by general surgeons. But still, some post-operative patients are not getting relieved from their symptoms. Most retrospective studies show that presence of stone is mostly in the cystic duct or in the common bile duct and some also show the presence of cystic stump (1–1.5 cm). Most of the patients with complaints were thoroughly evaluated and subjected to completion cholecystectomy. These patients were followed-up from 6 months to 1 year and all patients were asymptomatic.

Keywords: Common bile duct stone, Gallbladder stone disease, Laparoscopic cholecystectomy, Remnant gallbladder, Stump cholecystitis.

INTRODUCTION
Erich Muhe performed the first laparoscopic cholecystectomy in 1982; he used a modified operating laparoscope and placed it at the umbilicus after establishing pneumoperitoneum. Laparoscopic cholecystectomy becomes the gold standard treatment for cholelithiasis in that era. In 1987, Philippe Mouret performed first video laparoscopic cholecystectomy by attaching a camera to his laparoscope. Various causes are described for the postoperative symptoms and together they are kept under one group known as postcholecystectomy syndrome. The remnants of the cystic duct or gallbladder in subtotal cholecystectomy has historically been implicated as the source of pain, nausea and vomiting in postcholecystectomy patients. An increase in choledochal pressure results in cystic stump distension, inflammation. Stone obstruction within remnants of the cystic duct or gallbladder and an increase in the sphincter of Oddi pressure have all served as causes of postcholecystectomy problems. The entire sphincteric system of the distal bile duct and the pancreatic duct is commonly referred to as the sphincter of Oddi.

Follow-up
Maximum patients followed-up while some have not even turned back. But followed-up patients were doing well.

MATERIALS AND METHODS
Data were collected retrospectively from 1991 to 2014 regarding postcholecystectomy syndrome in patients and after completion cholecystectomy they were relieved of symptoms. Out of these patients some were referred with common bile duct (CBD) calculus with gallbladder stump and some with cystic duct calculi as per their ultrasound reports (Table 1). There were also patients who suffered due to stump cholecystitis because of inadequate removal of gallbladder. Revision cholecystectomy was performed in all patients with symptoms even after cholecystectomy. In laparoscopic cholecystectomy, the optical port was introduced in the umbilical area, whereas in postoperative history first port was introduced through the palmer’s point to rule out adhesions. Nowadays, the port placement is on the basis of baseball diamond technique.

Port Positioning
- Camera port of size 10 mm was introduced in the umbilicus (Fig. 1).
- A 5 mm port was inserted below the costal margin in midclavicular line.
- Liver retractor of 5 mm was placed in mid to the anterior axillary line at the level of the umbilicus.

RESULTS
Among these patients, some patients had a direct radiological finding of calculi in the common bile duct and some were having both calculi in CBD and stump cholecystitis. All patients were not benefited with endoscopic retrograde cholangiogram, as the size of the calculi were large and proceeded with surgery. In some patients along with laparoscopic completion cholecystectomy, CBD exploration was also done. Those patients who underwent CBD exploration, intraoperative choledochoscopy was also performed and CBD closure was done after placing a stent.
Out of these patients, some were expected to have CBD obstruction (due to calculi) based on biochemical and radiological findings, but these patients turn out to be normal with CBD without stones and only with stump cholecystitis. In rest of the participants in this retrospective study after laparoscopic cholecystectomy symptoms may persists, but no evidence of CBD dilatation or CBD stone was found. All patients were relieved from their symptoms after completion cholecystectomy. The outcome of this study was that after completion cholecystectomy, patients became asymptomatic and adequate investigations, such as imagining modalities were carried out in selected

Table 1: Source of support

<table>
<thead>
<tr>
<th>Name of journals</th>
<th>Topic</th>
<th>Number of patients who came with stump cholecystitis in the study</th>
<th>Year of publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Minimal Access Surgery</td>
<td>Post-cholecystectomy syndrome: Role of cystic duct stump and re-intervention by laparoscopic surgery</td>
<td>7 patients underwent completion cholecystectomy</td>
<td>2008 July</td>
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<tr>
<td>PubMed</td>
<td>Cystic duct remnant and the post-cholecystectomy syndrome</td>
<td>4 patients</td>
<td>2004 January</td>
</tr>
<tr>
<td>Hepato-Pancreato-Biliary Surgery</td>
<td>Cystic duct syndrome and minimally invasive surgery [Article in Hungarian] Rozsos I, Magyaródí Z, Orbán P</td>
<td>8 patients over 7 years</td>
<td>1997 September</td>
</tr>
<tr>
<td>PubMed</td>
<td>Retained gallbladder/cystic duct remnant calculi as a cause of post cholecystectomy pain Walsh RM, Ponsky JL, Dumot J</td>
<td>7 patients</td>
<td>2002 January</td>
</tr>
<tr>
<td>Asian Journal of Endoscopic Surgeon</td>
<td>Laparoscopic completion cholecystectomy: A retrospective study of 40 cases Parmar AK, Khandelwal RG, Mathew MJ, Reddy PK</td>
<td>Studied in 40 patients</td>
<td>2012 December</td>
</tr>
</tbody>
</table>
cases to rule out the status of the CBD and cystic duct. The average time taken for the completion laparoscopic cholecystectomy was 1 to 1.5 hours.

**DISCUSSION**

Now, laparoscopic cholecystectomy is the gold standard treatment for gallbladder stone disease. Around 80 to 85% of patients become asymptomatic postoperatively but 15 to 20% of patients still persist with their prior symptoms. These symptoms were due to an increase in the choledochal pressure which results in cystic stump distension, inflammation and stone obstruction within the remnants of the cystic duct or gallbladder, recurrent biliary calculi. Length of the cystic duct more than 1 cm remaining post cholecystectomy can lead to stump cholecystitis with or without stones. The role of remnant cystic duct length was further studied by Rogy et al. in 322 patients undergoing bile duct operation after cholecystectomy and found that 35 patients (10.8%) were left with a cystic duct length of more than 1.5 cm. Out of these, 24 patients were having pathological findings besides the long stump like pancreatitis. Of the remaining, few had stones in the retained gallbladder, suture granuloma while other patients were having fistula between the remnant cystic duct and duodenum. In the end, only one patient was left with long cystic duct as the sole pathological finding. They concluded that cystic duct stump was hardly ever a cause of recurrent symptoms in itself and complete excision of cystic duct does not eliminate the existence of postcholecystectomy syndrome. Another study conducted by Walsh et al. revealed that retained calculi in gallbladder and cystic duct (Fig. 4A) can be the source of the postcholecystectomy syndrome. These problems can be prevented by:

- When the anatomy of calot’s triangle (Fig. 2) is unclear, blind dissection should not be proceeded (Fig. 3).

- When any doubt about the anatomy, a fundus first cholecystectomy dissection on gallbladder wall down to the cystic duct can be helpful.

- Bleeding adjacent to the calot’s triangle should be controlled by pressure and not by clipping or clamping.

- If the cystic duct is densely adherent to the CBD and there is possibility of Mirizzi syndrome, the infundibulum of the gall bladder should be opened, the stone should be removed and infundibulum oversewn.

- Always restrict the dissection within rouviere’s sulcus. But it is present in only 40% of patients.

In the field of minimal access surgery (MAS), one should always be aware of the chances of cystic duct stones as the major possibility of postcholecystectomy syndrome. So in selected cases, noninvasive investigations, such as magnetic resonance cholangiopancreatography (MRCP) can be considered to evaluate the biliary tree. Postcholecystectomy, the cystic stump was found embedded in scar tissue (Fig. 4) and it explored that laparoscopic technique was of high risk. But now with the most advanced instruments and with experienced surgeons even these can be operated laparoscopically. It has been said that now in these patients laparoscopic management is better. This concept of re-operating laparoscopically was supported by Chowbey et al, Clemente et al recently reported five patients who underwent reintervention after previous surgery of cholelithiasis. Their mean operative time was 42 minutes. They concluded that intervention may be required for patients with residual gallstones.

In this series of study, completion cholecystectomy with complementary CBD exploration was needed for some of the cases. We also conclude that for reintervention, laparoscopic approach was more beneficial.
CONCLUSION

We would like to highlight the importance of thorough identification of the calot’s triangle with the neck of gall bladder cystic duct and not to cross rouviere’s sulcus. Patients with persisting symptoms should be evaluated and reintervention should be considered. For reintervention, the laparoscopic mode is the most accurate one as the field of minimal access surgery is advancing. We would like to emphasise the importance of proper dissection and identification of gallbladder-cystic duct junction to completely remove the GB and prevent recurrent symptoms. Cystic duct stump calculi diagnosed on ultrasound as a cause of these symptoms may actually be in the remnant gallbladder, and requires re-operation for stump cholecystitis.8

REFERENCES