Summary
Laparoscopic cholecystectomy has established itself as the gold standard for gallstone diseases. A retrospective study of author's personal series of 6500 cases of laparoscopic cholecystectomy is presented in this article. For better comfort of the patients, preoperative counseling, peroperative flat position, low CO₂ pressure, use of intraperitoneal Bupivacaine, antiemetic and a water-proof dressing, all proved to be useful. In difficult cases dissection with a fine tipped hook designed by the author reduced the conversion rate to a minimum. Subtotal amputation of the gallbladder was helpful in a number of extremely difficult cases to avoid bile duct injury. In a clean field with use of a peanut dissection, 2x2 gauze piece, change of traction angles, helped to safeguard the common bile duct. Intracorporeal suturing and knotting remains necessary skill to deal with complicated cases. In this series a large number of cases were done using three 5 mm ports and one 10 mm port and 1850 cases were done by needlescopic (micropuncture) technique using 3mm instruments. Reduction in the length of epigastric incision and delivering the gallbladder through the umbilical port proved to be cosmetically more acceptable.

Introduction
On 15th June, 1882, Dr. Carl Johan Langenbuch, a German Surgeon, performed the first Cholecystectomy on a 42-year-old man. Almost more than 100 years later in 1987 Dr. Philip Mouret of Lyon, France, did the first laparoscopic cholecystectomy, which was accepted and admired by the scientific community. This revolutionized the whole surgical arena. Today laparoscopic cholecystectomy is widely accepted as gold standard for removal of the gall bladder.

Now that the procedure has been established, surgeons are endeavoring to define the limits of laparoscopic approach, the new principles of this procedure and long-term effect on the patients. We need to review the old standards and principles of surgery in view of this new development. This article reviews 6400 cases of laparoscopic cholecystectomy done by the author.

Patients and methods
Between May 1993 and May 2002, 6500 patients underwent laparoscopic cholecystectomy by the author. All the cases were performed at different hospitals of Bangladesh except two cases, which were performed in two different workshops in India. In the early part of the series, acute cases with previous surgery were not done. But since 1994 an all-go policy was adopted. Lapchole was not done for the patients with cholelithiasis with common bile duct (CBD) stone who needed open surgery. Average age was 42 years and the age range was 8 to 93 years. Presence of gallstone was confirmed by ultrasonography. Oral cholecystography was not done in majority of the cases. Liver function tests (LFT) were done for all cases along with surface antigen for hepatitis B virus, chest x-ray, ECG, and blood sugar estimation. Endoscopic retrograde cholangio pancreatography (ERCP) was done when serum bilirubin was raised along with raised Alkaline Phosphatase or when stone in the common bile duct (CBD) was suspected by the ultrasonologist. Cholecystectomy was done for polyp of the gallbladder in 56 cases. All others were for gall stones, where 21% of the cases were acute cholecystitis and 2% chronic empyema of the gallbladder. Additional

1. Dr. H. Kabir Chowdhury, MBBS, FCPS (Surgery), Professor and Head, Department of Surgery, Chief, Minimally Invasive Surgery Centre, BIRDEM, Dhaka
surgery was done when necessary in addition to the cholecystectomy, like hysterectomy, ligation of the fallopian tube, appendicectomy, CBD exploration, ovarian cyst puncture, ovarian cystectomy and liver biopsy.

At the moment of abdominal Puncture during Lapchol & Intra abdominal organs were seen during Lapchol

Standard four-ports technique (with two 10 mm. and two 5 mm. ports) was performed in most of the cases. Since 1997, three 5 mm. and one 10 mm. ports technique was employed and 1300 cases were done. Since July 1999, micropuncture technique was introduced, using 3 mm. instruments and in the series 1850 cases were done. All the operations were performed with the surgeon standing on the left side of the patient except in three cases of situs inverses. Patient's position was reverse trendelenburg with right tilt in the earlier part of the series and later, since 1998, flat position was mostly maintained. Intra-abdominal pressure was maintained mostly in between 8 and 10 mm. of Hg. Author prefers dissection with a special needle tipped hook, designed by the author using monopolar current, which proved to be extremely useful in difficult dissections. Titanium clips were used mostly, but in wide cystic duct and in acutely inflamed cases catgut tie with intra-abdominal knotting was applied.

For specimen retrieval where needed a bag was made out of the surgical gloves and for stone retrieval thumb part of the surgical gloves was used.

In patients with suspected CBD stones, preoperative ERCP and stone extraction was performed and cholecystectomy was done soon afterwards. In all cases the laparoscopic procedure was explained to the patients and informed consent was obtained. Use of analgesia was minimum. In all cases wound was closed with steristrip. Patients received a NSAID suppository just after induction except where contraindicated and at the end of surgery intraperitonel insufflation of 10 ml of 5% Bupivicaine done in addition to infiltration of local analgesic at the incision site. Patients also received single dose of 1 gm of cephradine just before induction. During recovery they were given antiemetic injection routinely. Post operatively 85% of the patients did not require any other analgesic. Patients were allowed liquid diet 6 hours post operatively and then normal meal was allowed. A waterproof dressing was used routinely to allow shower after 12 -18 hours of surgery. Most of the patients started normal life within 5-7 days after surgery.

**Results**

The mean operating time was 18 min. Conversion rate was 8% in the first 50 cases, then 3.5% in the first 600 cases, and 1.7% in first 1270 cases. Among the last 1600 cases only 12 cases were converted due to extremely difficult dissection after acute cholecystitis within 2-3 weeks and suspected malignancies.

The anatomical variations encountered were: agenessis of gallbladder, situs inversus totalis, sinistrotro position of the gallbladder, cystic duct from the right hepatic duct, absent cystic duct, along with many variations of the cystic artery. In 38 cases, where cystic duct was taken up due to an impacted stone and dense adhesion formed with CBD and infundibulum, callots' triangle dissection was dangerous, subtotal amputation of the gallbladder was performed. Author developed this special technique, where at the mid-body level of the gallbladder a plane was created between the gallbladder and the liver. Then a piece catgut was passed to tie the gallbladder to avoid soiling of the field with bile, pus or stones when an incision is made above the impacted stone. After removing the stone gallbladder separated and the remnant was closed with intracorporeal suturing. Posterior wall of the gallbladder was left and cauterizes in 16 cases; cholecystoduodenal
fistula was encountered in 18 cases where 11 cases were completed laparoscopically. Incidence of acute cholecystitis was 21% and empyema gallbladder 9%. In 57 patients there were previous upper abdominal surgery. Incidental carcinoma of the gallbladder was found in 67% cases.

Bile duct was injured in 3 cases in early part of the series, where in 2 repairs could be done laparoscopically and one needed conversion. Only one case was converted to control bleeding. Postoperative bile peritonitis was encountered in one case, which needed laparotomy after 8 days of surgery. There were 17 cases of incisional hernia in the umbilical port and umbilical wound infection was encountered in less than 6% cases. Hospital stay was less than 24 hours in 85% cases. In the whole series there were no mortality.

**Discussion**

Several studies worldwide has confirmed the advantages of laparoscopic cholecystectomy and placed this procedure as the gold standard for gall stone disease\(^2,4,6\). Hospital stay, which could be less than 24 hours, minimum pain-where strong analgesic are not required, minimum scar, which is as small as 3.5- 4 mm., resuming early activity, which could be even 3-4 days, are all major advantages of this procedure. This large series by a single surgeon has definitely shown that complications are minimum in comparison to open surgery. CBD injury, which is one of the dreadful complications of cholecystectomy, was shown higher in many of these series\(^6\). This dictates the requirement of developing training techniques and dispersing knowledge of the experts among the beginners.

To reduce the mortality and morbidity of laparoscopic cholecystectomy some of the newer principles of this technology can be discussed. Mis-identification of CBD as cystic duct is one of the most hazardous situations\(^6\). To avoid this, one in his early learning curve should not continue dissection with the difficult cases, in case of any doubt, and acute cases should be avoided. Most of the difficult cases are encountered 1 week to 6 weeks after and acute cholecystitis with pain, fever and leukocytosis. Before clipping the cystic duct, few points should be considered: If the duct looks wide, if it seems to be continuous with the structure going behind the duodenum, and if, on medial dissection, the area looks empty, then one should not clip this structure and it is most likely the CBD. It is also important to stay close to the gallbladder but initial survey to identify the bluish structure and mapping the area knowing the cystic duct-CBD junction without much dissection helps the surgeon to work more confidently. At this stage, releasing the traction under vision helps to identify the true junction. And lastly, it is very much helpful to have low threshold for conversation in first few hundred cases.

Preoperative assessment of difficult cases can be done by taking detail history of any recent pain with fever and leukocytosis, ultrasonography may show thick-walled gallbladder with pericholecystic oedema, a large stone may be seen impacted in the infundibulum. Oral cholecystogram is no more an important investigation for gallstone disease. A nonvisualized gallbladder, a gallbladder with multiple large stones or a contracted gallbladder on ultrasonography, could come out as very simple and easy for dissection. Therefore, the author's policy from the very beginning was to look at the organ first before discarding the cases for laparoscopic cholecystectomy from the preserved videos surgical technique used in the series was reviewed. Following are some of the important points: (a) Use of fine tip hook with very little exposed metal to perform fine dissection, (b) Peanut dissection and use of a small gauze piece (c) Subtotal amputation of gallbladder, (d) changing traction angles to get a new view and new plane of dissection, (e) To maintain a clean field as much as possible by taking care of the first drop of blood, (f) intracorporeal suturing and tying, and lastly, (g) considering the fact that a difficult laparoscopic cholecystectomy when converted becomes a difficult open cholecystectomy, so why not
continue laparoscopically if safety can be assured.

**Conclusion**
Because of its outstanding low morbidity, less hospital stay and excellent cosmetic results, laparoscopic cholecystectomy is clearly the treatment of choice for gall stone diseases. Three 5mm. and one 10mm. port can become the new gold standard and for those surgeons who are comfortable with 3mm instruments micropuncture (Needlescopic) surgery will be more beneficial to their patients. We need to review the old standards and principles of surgery in view of this new development. Use of newer dissection techniques proved to be helpful in reducing conversion rate and increasing safety. Author found it extremely helpful to review the recorded cases time to time, which helps in improving dissection technique. Attending workshops and observing surgery done by experts also effects improvement 7. However, it is also important to have low threshold for conversion in early part of the learning curve. Thus laparoscopic cholecystectomy remains a safe procedure, as long as the surgeon selects the patients according to his ability and measure to be taken in prevention of complications is number one priority.

**References**