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Original Research Article

Laparoscopic cholecystectomy in wall echo complex gall stone disease: a study

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ABSTRACT

Background: There are so many subtitles for difficult laproscopic cholecystectomy. Stone in the neck of gall bladder constitutes one of the entities. Wall echo complex is an ultrasound terminology used for cholelithiasis. It has three layers, first the pericholecystic fat between gallbladder and liver. Second layer consists of gall bladder wall. The third layer consists of echogenic stone itself. Wall echo complex is one of the entities which constitute difficult laproscopic cholecystectomy. Wall echo complex in the neck of the gall bladder is particularly difficult gall bladder where the conversion rates are high.
Methods: The study was conducted in Department of Surgery. Standard four port cholecystectomy was done in 50 patients. Wall echo complex in all these patients was reported by ultrasonologist. Difficulties in operating wall echo complex cholelithiasis consisted of dissection of neck of gall bladder due to adhesions and a sleeve of fat covering the calot's triangle. The difficulty of wall echo cholelithiasis was managed by opening the neck of gall bladder and evacuating the stones into a separate latex bag. By this procedure the difficult wall echo cholelithiasis was managed in all cases. Ligaclips were used for ligation of cystic duct, cystic artery and pericholecystic veins.
Results: The evacuation of stones from the neck of gall bladder led to an easy cholecystectomy in 46 patients while the four patients had conversion to open cholecystectomy.
Conclusions: Wall echo complex although an ultrasonologists entity but is a difficult gall bladder for laproscopic cholecystectomy.

Keywords: Cholelithiasis, Laparoscopic cholecystectomy, WES, Wall echo complex

INTRODUCTION

There are so many subtitles for difficult laparoscopic cholecystectomy. The definition of "difficult Laparoscopic cholecystectomy" is inconsistent.[1] The term difficult cholecystectomy refers to multiple technical intra-operative difficulties that increases the risk of complications and significantly prolongs the operating time. Difficult laparoscopic cholecystectomy is related to an increased incidence of conversion to open cholecystectomy, probably because the more difficult the operation, the greater the likelihood of conversion; although the level of difficulty may vary with the skill and experience of the surgeon.[2]

Moreover, studies have shown that there is a higher incidence of post-operative complications and longer hospital stay in converted patients when compared with both laparoscopic and open cholecystectomy group. The common causes for difficult cholecystectomy are dense adhesions, empyema of gall bladder, contracted gall bladder, contracted calot's triangle andrare anatomical

variants.[3] Ultrasound is investigation of choice for diagnosis of gall stone. Wall echo complex is a sonological terminology used for cholelithiasis. The wall echo complex is representative of gall bladder calculi. This wall echo complex triad can be present in contracted and non-contracted gall bladder. This wall echo complex is having three lines of demarcation. The first line is echogenic pericholecystic fat between liver and gall bladder wall. The second line is the hypoechoic gall bladder wall. The third line represents the echogenic stone itself with post acoustic shadow.[4]

Ultrasonography is the investigation of choice for identifying gall stone with wall echo complex. A combination of wall echo complex and contracted gall bladder may be seen. In a obese patient, there may be a sleeve of fat covering neck of gall bladder and callot's triangle along with wall echo complex. A stone filled phrygian cap or gall stone distal to a mucosal septum may be missed if mistaken for adjacent bowel. A mucosal fold located at junction of gall bladder body and infundibulum may simulate a polyp or calculus. This finding termed a junctional fold can be differentiated from wall echo complex.[5] Wall echo shadows being a diagnostic sign of cholelithiasis on ultrasonography, surgeons are not aware of the clinical implications of this sign for laparoscopic cholecystectomy. Wall echo shadow sign is most likely to produce the inflammation of gall bladder either acute cholecystitis or acute or acute on chronic cholecystitis. These repeated episodes of inflammation in gall bladder leads to contraction of gall bladder and confluence gall stones; producing wall echo shadow sign on ultrasonography. The presence of wall echo shadow sign may be a difficult laparoscopic cholecystectomy due to dense adhesions. There is contraction of calot's triangle due to inflammation and adhesion leading to difficulty in widening of calot's triangle and dissection in safety window. Wall echo shadow sign if present at neck or Hartmann's pouch of gall bladder can present in viewing the anatomical landmarks for safe cholecystectomy.[6]All these factors increase the incidence extra hepatic biliary injuries during laparoscopic cholecystectomy. The conversion to open cholecystectomy rate can increase because of difficulties during laparoscopic cholecystectomy. The study was planned with aim of evaluating a modified technique of standard four port laparoscopic cholecystectomy in patients with wall echo complex; and to study the difficulties during surgery, conversion to open cholecystectomy and postoperative complications.

METHODS

The study was conducted at Department of Surgery in patients admitted for cholecystectomy in 50 patients. All these patients had wall echo complex or WES sign on ultrasound. Wall echo complex or WES sign in all these patients was reported by ultrasonologist. Other investigations like haematological investigations were done in these patients. The pre anaesthetic check-up was done and ASA I – III having wall echo complex or WES sign were included in this study. Patients having ASA IV were excluded from study. Standard four port cholecystectomies was done in all the patients with low pressure carboxy peritoneum. The calot's triangle dissection first method was done in all the patients. Difficulties in operating wall echo complex or WES sign cholelithiasis consisted of dissection of neck of gall bladder due to adhesions and a sleeve of fat covering the calot's triangle. The difficulty of wall echo complex cholelithiasis was managed by opening the neck of gall bladder and evacuating the stones into a separate latex bag. By this procedure, the difficult wall echo complex or WES sign cholelithiasis was managed in all cases. Now it was very easy to pull the neck of gall bladder to widen the calot's triangle. The dissection in safety window was easy and identification of anatomical landmarks was possible. Ligaclips were used for ligation of cystic duct, cystic arteries and pericholic veins. The patient was allowed orally and discharged next morning. The gall bladder specimens were sent for histopathology.

RESULTS

The study group consisted of 50 patients, 45 patients were females and 5 patients were males. All the patients were of the age group 30 to 60 years. The ultrasound findings uniformly reported wall echo complex or WES sign in all the patients (Figure 1). The adjunct findings were contracted thick walled gall bladder in 24 patients. The thick gall bladder wall with pericholecystic oedema was reported in 14 patients suggestive of acute on chronic cholecystitis. The rest of 12 patients had no adjunct findings to wall echo complex. Multiple small gall stones compactly filling the whole of gall bladder were seen in 20 patients, in rest of 16 patients gall stones were present in neck; multiple stones in 6 patients, single large stone in 7 patients and one patients had three large stone faceted to each other forming a large single ball.

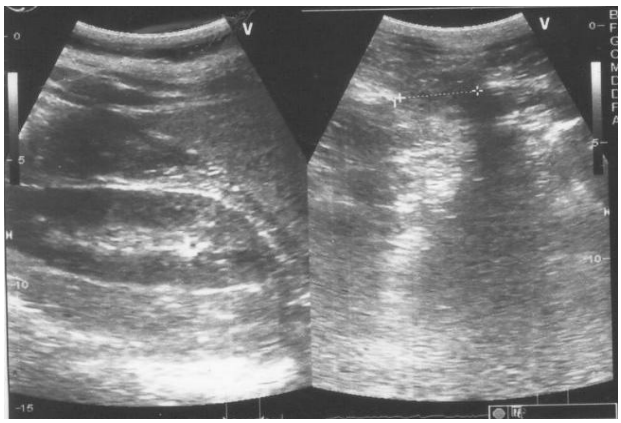

Figure 1: Wall echo complex on ultrasound.

All the patients who were having wall echo complex with pericholecystic oedema representing acute cholecystitis were treated with antibiotics. The cholecystectomy was planned after a gap of one and a half month. In these

patients laparoscopic cholecystectomy was done under general anaesthesia using standard four port technique. The operative findings were observed as follows in Table 1.

Table 1: Operative finding in WES sign cholelithiasis.

Operative findings	N (50)
Acute on chronic cholecystitis	04
Adhesions	10
Contracted gall bladder	20
Sleeve of fat	03
Single large calculus in neck	08
Contracted calot's triangle	03
Anatomical abnormalities	01
Pericholecysticoedema	01

The gall stones were evacuated in 14 patients in which wall echo complex or WES sign was present in neck of gall bladder. The evacuation of stone from neck of gall bladder led to an easy cholecystectomy in 46 patients, while the four patients had conversion to open cholecystectomy. So the conversion rate to open cholecystectomy was 8.0%. The obscure anatomy at calot's triangle was the reason for conversion in these four patients. These patients were operated as day surgery procedure and were discharged after 23 hours. All the patients had a very smooth postoperative course. There was no with postoperative infection. The histopathological report of gall bladder removed was consistent with acute and chronic cholecystitis.

DISCUSSION

The wall echo complex is a triad of signs (WES sign) consisting of gall bladder wall "W", echoes from gall stones seen beneath the wall "E", and post acoustic shadows "S". This wall echo complex can be seen in single large stone or multiple small stones filling the whole of gall bladder lumen. This appearance can mimic the intestine.[7]The wall echo shadow complex, an ultrasound finding if present can be said to be suggestive of cholelithiasis.[8]Non visualization of gall bladder but presence of posterior acoustic shadow makes diagnosis of cholecystitis difficult. The presence of wall echo shadow triad is associated with acute or chronic cholecystitis has been confirmed on histopathological examination of the gall bladder specimens after cholecystectomy.[8] There are no studies available correlating the wall echo complex sign on ultrasound with laparoscopic cholecystectomy findings and outcome.

Laparoscopic cholecystectomy was done in all the patients using standard four port technique. The findings observed on laparoscopic view recorded in Table 1 point that wall echo shadow complex can be a predictor of difficult cholecystectomy. Various other reasons for difficult cholecystectomy in this study are acute inflammation, adhesions, contracted gall bladder, contracted calot's triangle and single large calculus in neck of gall bladder.[10] Wall echo complex, an ultrasound entity which represents gall stone disease is associated with acute or chronic cholecystitis. These patients can have multiple episodes acute on chronic cholecystitis which leads to thickening of wall of gall bladder. Frequent hospital visits are done by these patients for acute cholecystitis. The residual bile in gall bladder is absorbed leading to contracted gall bladder. Hence a wall echo complex on ultrasound represents not only gall stone disease but a thick walled contracted gall bladder can be a difficult cholecystectomy for laparoscopic surgeon. The conversion to open cholecystectomy may be required frequently as compared to laparoscopic cholecystectomy for simple gall stone disease. In this study the conversion rate was 8.0% which is lower than the others.

With this technique of evacuating the gall stones from neck of gall bladder, the dissection in calot's triangle became easy. Anatomical landmarks in calot's triangle now could be easily identified paving the way to safe cholecystectomy.[11,12] If untreated, the wall echo complex is likely to form cholecystoduodenal fistula particularly if the calculi are present in the neck of gall bladder. This wall echo complex leads to inflammation, adhesion and erosion of duodenum.

There are no studies for correlation of wall echo complex gall stone disease and results of laparoscopic cholecystectomy. The laparoscopic surgeon should be aware of possible complication in patients of WES treated according to subclinical cholecystitis in every patient. In a retrospective study, 3701 ultrasound examination 55 were identified to have WES sign present. The intra operative findings in all the 55 patients were were abnormal. These abnormal findings included acute cholecystitis, chronic cholecystitis, dense adhesions due to inflammation, cystic duct stone, common bile duct stone and choledochodudenal fistula. The histopathological were also abnormal in all the patients.[13]

From this study we conclude that presence of wall echo complex or WES sign is diagnostic of cholelithiasis along with acute, chronic or subclinical cholecystitis. If this sign is present the surgeon doing laparoscopic cholecystectomy should be cautious to face difficulties. So the presence of WES sign on ultrasound has the significance of pointing towards difficult cholecystectomy.

CONCLUSION

Wall echo complex although an ultrasonologist entity but is a difficult gall bladder for laproscopic surgeons. This difficult laparoscopic cholecystectomy can be made easy by first removal of gall stone by incising gall bladder. The clinician should not feel easy while doing laproscopic cholecystectomy in wall echo complex.

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