Acute cholecystitis

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Only 20 – 30% of patients with gallstones have symptoms and the probability of a patient with silent gallstones developing biliary-related pain is 1-2%, while the risk of developing a serious complication (e.g. empyema, perforation, peritonitis etc.) is less than 0.1% per year. Imaging techniques are important in establishing the diagnosis and evaluating the patient. Laparoscopic cholecystectomy (LC) is the golden standard for the management of symptomatic gallstones and there are two surgical treatment options: early cholecystectomy (same hospital admission) and interval (delayed) cholecystectomy (6-8 weeks after resolution of acute attack). Early LC has medical and socioeconomic advantages over interval LC. LC can be undertaken for the majority of patients with AC and in some high-risk groups the postoperative mortality can even be reduced. LC in AC is associated with longer operating time, a higher rate of conversion and bile damage. Early diagnosis and early operation can prevent the development of complications associated with AC.

Key words: gallstones, pain, laparoscopic cholecystectomy

Gallstones are found in about 10% of the adult population in the West in both sexes with peak prevalence in the sixth decade. Only 20 – 30% of patients with gallstones have symptoms and the probability of a patient with silent gallstones developing biliary-related pain is 1-2%, while the risk of developing a serious complication (e.g. empyema, perforation, peritonitis etc.) is less than 0.1% per year. Laparoscopic cholecystectomy (LC) is the golden standard for the management of symptomatic gallstones and since it was introduced the cholecystectomy rate has increased worldwide 10-20%. Between 10-30% of patients undergoing cholecystectomy present with acute cholecystitis (AC). The feasibility and safety of LC in AC has a topic of debate for the past decade.

Acute calculous cholecystitis accounts for 90–95% of cases. The attack develops when a gallstone obstructs the cystic duct causing trauma to the mucosa and mucosal damage through the release of phospholipases that convert lecithin to lyssolecithin. Lyssolecithin facilitates further mucosal damage and inflammatory mediators are released. In the initial phase of AC the inflammation is not the result of bacterial infection of the stagnant bile. Cultures of gall-bladder bile are positive in only 15 – 30% of samples obtained during open cholecystectomy and in only 3% for LC. Bacterial infection occurs during later stages of the disease. With conservative treatment, due to distention caused by inflammatory exudates, the stone is dislodged and spontaneous decompression of the gallbladder via the cystic duct results in resolution of the inflammation. This favorable outcome occurs in some 80% of patients, while in 20% of (mostly elderly) patients inflammation progresses and results in severe complications. A small percent of patients with AC do not have gallstones. The majority of patients with acute acalculous cholecystitis (AAC) are usually critically ill and have biliary sludge.

The diagnosis of AC is usually not difficult. The clinical presentation depends on the severity of the underlying disease and the time elapsed since onset of AC. Sudden and severe pain in the right hypochondrium which may radiate to the right or inter-scapular region is usually the first symptom of AC. Some patients relate the onset of AC to a fatty meal while others have a history of less severe similar episodes in the past. Nausea and vomiting are present in the early stages and patients usually cease oral intake of food and liquids in fear of provoking symptoms. On initial examination the patient is frequently febrile (<38.5°C), distressed, with tenderness and rigidity in the RUQ. Murphy's sign is pathognomonic. Physical examination reveals a palpable RUQ mass in 20-30% of patients with established AC, caused most frequently by a percholeystic phlegmon, empyema, abscess and less frequently...
ently a gallbladder carcinoma. Jaundice is infrequent. Jaundice can be caused by CBD stones, cholangitis, partial compression of the CHD by inflammatory edema around an impacted stone (Mirizzi syndrome type I). Laboratory tests are usually nonspecific. Most patients will have leukocytosis with some marginal abnormalities of liver function tests. A raised serum bilirubin and alkaline phosphatase level is suggestive, but does not necessarily indicate ductal stones. In the presence of jaundice further investigation is necessary (ERCP, MRCP). It is sometimes necessary to exclude perforated peptic ulcer, pancreatitis, appendicitis, nephrolithiasis, myocardial infarction and viral hepatitis in order to establish the correct diagnosis.10,12

Imaging techniques are important in establishing the diagnosis and evaluating the patient.13,14 Plain abdominal X-ray examination is not very useful. Only calcified gallstones will be detected (10-20% patients) and gas in the GB and pericholecystic tissue caused by emphysematous cholecystis is present in advanced cases only. Ultrasound examination (US) is the most important imaging procedure in the diagnosis of AC. It is readily available, noninvasive, easy and rapid to perform, repeatable and inexpensive. US examination provides additional information about the liver, biliary tree, pancreas and adjacent structures. Sonographic features of AC are: GB calculi or sludge, thickened GB wall, pericholecystic edema and a positive Murphy’s sign. US can detect free air under the diaphragm.15 Power Doppler US imaging may yield better diagnostic accuracy of AC.16,17,20 US is not very useful in the diagnosis of acalculous cholecystitis.18 Gallbladder scintiscanning (HIDA, PIPID-A) can confirm a nonfunctioning gallbladder and it is regarded as the most accurate test for establishing the diagnosis of AC with or without gallstones22,23. In the presence of gangrenous cholecystitis or gallbladder perforation pericholecystic isotope uptake is a valuable secondary diagnostic sign.24,25 Intravenous cholangiography has no real value in the diagnosis of AC, while CT and NMR are indicated only in complicated cases.20,27 The diagnosis should be confirmed 12 – 24 hours after admission.

Initial management of AC is along the usual guidelines: fasting, intravenous fluid and electrolyte replacement, nasogastric suction, parenteral analgesia and systemic antibiotics. Most surgeons administer antibiotics because of risk of progression to empyema and abscess with septic complications. The merit of antibiotic prophylaxis of wound infection in AC is questionable.26,27

The timing of surgery has been a topic of debate for the past several decades. Indications for urgent surgery have been established:

a. deterioration in the patient’s general condition (sepsis),

b. deterioration of physical signs,

c. evidence of generalized peritonitis,

d. presence of gas in the GB lumen or pericholecystic tissue and

e. intestinal obstruction. It is uncertain whether the trend that an increasing proportion of patients is operated on an emergency basis for complications of AC that has been observed in the 1980-1990 period still holds.26,29 Since the introduction of LC more patients are operated on an elective basis especially in the aged group. There are two surgical treatment options:

a. early cholecystectomy (same hospital admission) and

b. interval (delayed) cholecystectomy (6-8 weeks after resolution of acute attack). In the prelaparoscopic era, prospective randomized studies demonstrated that the outcome of patients undergoing early open cholecystectomy within 7 days of the onset of symptoms was superior to delayed interval cholecystectomy. Patients got well sooner, the hospital stay was shorter, the risk of recurrent bouts of acute cholecystitis and pancreatitis was obviated, no additional hospital admission was necessary and absence from work was shorter.26,33 The doxicastic fear that urgent cholecystectomy is hazardous has not withstood the test of time and it is known that persistent inflammation can lead to fibrosis and scarring if surgery is delayed.34 Some surgeons still favor OC for AC over LC. LC has been established as the treatment of choice for acute cholecystitis.35,36 Two randomized trials comparing early vs. delayed LC for AC have demonstrated similar results indicating that early LC has medical and socioeconomic advantages over interval LC.35,36,41 The conversion rate (15-25%) for AC and operating time are significantly higher than that for elective LC.35,43 Factors associated with conversion and complications of LC have been studied in relation to elective cholecystectomy,34,38 as well as to AC.36,43,44,46 Older patients, history of previous biliary disease, nonpalpable gallbladder, leucocytes and gangrenous gallbladder are associated with higher conversion rates.36,46,47,49,50 Male gender, elevated WBC, elevated serum bilirubin and large bile stones were found to be associated with higher complication rates.50 Obesity was a risk factor for wound infection. Duration of symptoms prior to LC correlated with both the conversion rate and the rate of complications.40,46,51 LC performed within 72 h of onset of symptoms had a lower conversion rate, shorter operative time and faster convalescence in one study51 and lower conversion rate, lower complication rate and shorter hospital stay in another.46 Similar results were obtained when comparing a group of patients operated within 4 days and after 4 of onset of symptoms.6,52 A similar association between delay in surgery and conversion from LC to OC was demonstrated.53 A delay in surgery of 49-96 h from the onset of symptoms was associated with the lowest conversion and complication rates. Factors associated with the need to convert a LC for AC have limited predictive power.46,54 LC during the acute phase of AC compared to LC at a later stage, following recovery from the acute stage (interval procedure), was associated with a longer operative time and prolonged hospital stay, although conversion and complication rates were comparable.43,55 Patients with comorbidity were more frequently converted than patients with no comorbidity.54 When considered as a group, male gender, age over 60 years, duration of disease > 18,000 cell, and advanced cholecystitis were indicative of a difficult LC with a high probability of conversion (40%).54 The decision to
convert is reached only during LC, regardless of preoperative prognostic factors. In the presence of obscured anatomy the decision to continue with LC should be reached only if an experienced team is performing the operation and the team is ready to convert at anytime thereafter. An early decision to convert is far better than persistence with a difficult operation that is not making progress and will eventually lead to enforced conversion due to operative complications.

Performing LC for AC requires sound judgment. Trocars are inserted in the usual manner and the procedure is started with exploratory laparoscopy. The pathological condition of the gallbladder needs to be carefully assessed which may require meticulous dissection of adherent tissues. Accessibility of the structures in Calot's triangle has to be assessed. A large, distended, inflamed gallbladder is difficult to grasp and it may be necessary to aspirate the gallbladder. If large stones in Hartman's pouch cannot be dislodged or a Mirizzi syndrome is suspected the operation may prove complex and problematic. The need to convert should be reconsidered at this point. If adequate exposure for a safe dissection with identification of all the relevant structures is not feasible it is best to convert. Fundus first dissection in expert hands may prove to be an alternative for difficult cases. The role of minicholecystectomy for AC is a matter of debate. The procedure uses standard operating technique through a small 5.0 cm incision with various technical modifications and aids. Although the majority of surgeons do not consider micro and minicholecystectomy as a viable option to LC in AC, there are authors that consider it to be a cheaper and safer alternative for selected cases. Minicholecystectomy is in general associated with shorter hospital stay and earlier return to work than OC through an unrestricted abdominal incision (>8 cm). Many techniques of partial cholecystectomy have been described. The essence of the procedure is a fundus resection and leaving part of the gallbladder so as not to disturb the elements in Calot's triangle or leaving the posterior wall of the gallbladder in situ to avoid a difficult dissection. Suction drainage is mandatory. Many authors indicate that this could be a salvage procedure for difficult cholecystectomy in AC. Cholecystostomy has been frequently used for very ill patients in the first half of the past century. The merits of cholecystostomy are well recognized today. It is a temporizing procedure that alleviates symptoms and helps prevent sepsis. The diseased gallbladder is left in situ with a 50% probability of producing gallstones again within 5 years after the procedure. Frequently, after initial cholecystostomy, if the patient sufficiently improves, interval cholecystectomy can be done. Cholecystostomy still has a role in the management of patients who are unfit for surgery because of comorbid disease (ASA IV) or old age. Cholecystostomy is a simple quick procedure that can be carried out surgically (open or laparoscopic) or percutaneously (US or CT guidance). In 70 - 75% of patients a favorable response is achieved within 72 h of percutaneous cholecystostomy. Some 10% of patients have complications (displacement of the catheter, sepsis and bile leakage). There are reports that after the gallbladder has been completely cleared of stones adhesive obliteration can obviate the need for subsequent cholecystectomy.

The use of intraoperative cholangiography (IOC) in LC for AC is controversial. The introduction of LC was associated with increasing reliance on ERCP to image the CBD and a decrease in the use of IOC. Routine IOC prolongs operative time especially in LC for AC but maintains the operator's technical expertise. In a survey of German hospitals routine IOC was done in only 6%, selective in 49% and not at all in 43% of hospitals. Selective use of IOC in LC for AC can reduce the number of routine IOC by at least 60%. The exact role of IOC in AC is hard to determine since patients operated for AC are more frequently jaundiced. Nevertheless, when IOC is done it must ensure visualization of the entire biliary tree without compromising the ducts. The success rate of LC in cases of acute cholecystitis is slightly higher when IOUS is used as an aid to dissection and some authors suggest its routine use.

Some forms of AC deserve special consideration. Acute emphysematous cholecystitis (AEC) is a severe and frequently fulminant form of AC which is usually, but not always, acalculous. It is a disease of the elderly population, more frequently affecting men and especially diabetics. The causative agents are mixed infections (Coliforms, Streptococci and gas producing Clostridia). Plain abdominal films, the mainstay of the diagnosis in the past, are nowadays regarded as insensitive and capable of detecting only severe and advanced disease. Diagnosis can be established by US and CT. Complications include gangrene, free perforation and peritonitis. Emergency cholecystectomy is reserved for patients with severe disease.

AIDS patients are susceptible to AC and cholangitis. Acalculous cholangitis is frequent when the infecting agent is Cryptosporidium and Cytomegalovirus. LC or open cholecystectomy can be performed with significant but acceptable morbidity and low mortality. Laparoscopic rather than open cholecystectomy should be the surgical procedure of choice in AIDS patients especially if the CD4 count is <200. Acute acalculous cholecystitis (AAC) accounts for 2 - 15% of all cases with AC. Acute cholecystitis can develop without gallstones in critically ill or injured patients. The development of AAC is not limited to surgical or injured patients or to patients in the intensive care unit. Diabetes, malignant disease, abdominal vasculitis, congestive heart failure, cholesterol embolization, and shock or cardiac arrest has been associated with acute acalculous cholecystitis. Children may also be affected, especially after a viral illness. The pathogenesis of AAC is complex. Ischemia and reperfusion injury appear to be the central mechanisms, but bile stasis, opioid therapy, positive-pressure ventilation, and total parenteral nutrition have all been implicated. AAC occurs in 0.2% of surgical intensive care admissions and is associated with a high incidence of gangrene (60%). The mortality in this critically
ill group is high and averages 40%. The clinical presentation is indistinguishable from patients with acute calculous cholecystitis. The diagnosis is often missed by US examination. A decreased gallbladder ejection fraction is a preoperative indicator for AAC. Laparoscopy is suggested as an early diagnostic procedure in these patients, followed by cholecystectomy if there is objective laparoscopic evidence of cholecystitis.

LC has a low morbidity and may be life saving during the early stages of AAC. It is not indicated in gangrene or perforation of the gallbladder. Early diagnosis and prompt surgical intervention have significantly decreased the morality of this form of AC. Diagnosis of AAC is not always straightforward. Ultrasound is not reliable for the diagnosis of AAC in critically ill and trauma patients. Morphine or cholecystokinin cholecintigraphy has the highest sensitivity (90-98%) followed by CT (67%). Outcome depends on the condition of the patient (severity of the critical illness if present), early diagnosis and emergency cholecystectomy.

AC in the elderly population is more frequent nowadays and it is associated with a higher postoperative morbidity and mortality rate. There is frequently a delay in diagnosis, co-morbid disease is present and AC is associated with serious complications in a large proportion of patients. In patients over 85 years old operated for gallstones >60% are high risk (ASA III), >40% have complications of gallstones and 15% have CBD stones. Nevertheless, LC can be done in these patients with acceptable morbidity and mortality. CBD stones and bile duct exploration are significant risk factors. The results of LC in patients aged 65 to 69 years are comparable with those reported in younger patients. Patients older than 70 years have a 2-fold increase in complicated biliary tract disease and conversion rates, but a low mortality rate (2%). Laparoscopic cholecystectomy is a safe procedure for AC in elderly patients, resulting in fewer complications and shorter hospital stay than open cholecystectomy. Elderly patients with cholelithiasis are more likely to present with an acute complication of gallstone disease such as acute cholecystitis (AC), gallstone pancreatitis (GSP), or common bile duct stones (CBDs). Elderly patients with uncomplicated gallstone disease appear to be excellent candidates for LC. LC should be considered before complicated disease develops. Conversely, early conversion or planned open cholecystectomy may be warranted in the elderly presenting with acute complications of cholelithiasis. LC in elderly patients with AC is safe and effective and restores them to the best possible quality of life with the lowest cost to them physiologically.

The poor outcome in this group of patients can be minimized by early diagnosis, prompt surgical intervention (preferably LC), appropriate and on time initiated antibiotic therapy and obligatory chemoprophylaxis against thromboembolic disease (combined modality). AC in children is infrequent.

In conclusion: the management of AC has been revolutionized with the introduction of LC. LC can be undertaken for the majority of patients with AC and in some high risk groups the postoperative mortality can even be reduced. LC in AC is associated with longer operating time, a higher rate of conversion and bile damage. Early diagnosis and early operation can prevent the development of complications associated with AC.

REZIME

Samo 20%/30% bolosnika sa kamenom u žući ima simptome a verovatnoća da bolesnik dobije boleove je 1%, dok je rizik od pojave ozbiljnih komplikacija (empirem, perforacij, peritonitis i dr.) je manja od 0,1% godišnje. Vizualizacione tehnike su važne u donošenju dijagnoze i evaluacije bolesnika. Laparoskopska holecistektomija (LC) je "zlatni standard" a u rešavanju kamenu u žući i postoje dva hirurška načina rana holecistektomija i odložena holecistektomija (6-8 nedelja posle akutnog napada) Rana LC ima medicinsku i ekonomsku prednost u odnosu na odloženu LC. Za većinu bolesnika sa AC kao i one sa povećanim rizikom postopektivni mortalitet može biti i smanjen. LC u AC je povezan sa produženim vremenom operacije, većim procentom moguće konverzije i otećenja bilijarnih puteva. Rana dijagnoza i rana operacija mogu sprečiti pojavu komplikacija udruženih sa AC.

Ključne reči: kamen, bol, laparoskopska holecistektomija

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