

## 6. CHOLELITHIASIS

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Background information for this review was obtained by performing a MEDLINE search for English language review articles on the topic of cholelithiasis for the years 1990 to 1997. A focused search on the topic of diagnosis of cholelithiasis was also carried out. In addition, the summary of the NIH consensus conference on gallstones and laparoscopic cholecystectomy (1993) was reviewed. This document, along with the American College of Physicians' "Guidelines for the Treatment of Gallstones" and the accompanying background paper (Ransohoff, 1993) form the primary sources of information used in developing this chapter.

### **IMPORTANCE**

Gallstone disease is common. Approximately 10 to 15 percent of the adult population in the United States has gallstones, and about one million new cases are diagnosed annually (NIH, 1993). By the age of 75, an estimated 35 percent of women and 20 percent of men have developed gallstones (ACP, 1993). Gallstones are more common in women, and are associated with parity (number of pregnancies), obesity, rapid weight loss, age and ethnicity (NIH, 1993). As a result of gallstones, approximately 600,000 cholecystectomies are performed annually in the US. The annual overall cost associated with this condition has been estimated at more than five billion dollars (NIH, 1993).

Most cases of gallstones remain asymptomatic. The most common symptom associated with gallstones is biliary pain. Complications from gallstones include acute cholecystitis, gallstone pancreatitis, common bile duct obstruction, ascending cholangitis, gallstone ileus or (rarely) gallbladder cancer. Death from gallstones is uncommon, accounting for approximately 5,000 deaths per year in the US. These deaths are usually in the elderly and caused by biliary complications and the associated treatment (Ransohoff, 1993).

## **SCREENING**

No specific recommendations regarding screening for gallstones in asymptomatic individuals were identified from the literature search.

## **DIAGNOSIS**

Gallstones are generally diagnosed by ultrasound, or less commonly by oral cholecystography or plain x-ray. In an asymptomatic individual, they may be discovered incidentally at the time of laparotomy for another condition, or at the time of imaging for another indication. Ultrasound is a non-invasive, sensitive and specific method of diagnosing gallstones (ACP, 1988). Because the treatment of gallstones is guided by the presence or absence of symptoms (see below), the determination of whether an individual's symptoms are related to the gallstones, or the gallstones are an incidental finding in someone with non-biliary symptoms, is an important element of diagnosis. However, we did not find any diagnostic algorithms or decision rules which allow the clinician to accurately differentiate biliary from non-biliary symptoms in the person with gallstones.

## **TREATMENT**

Treatment for gallstones can include expectant management, non-surgical therapy to "dissolve" the stones while leaving the gallbladder intact, and cholecystectomy via laparoscopy or laparotomy. Non-surgical therapy includes oral bile acids, direct instillation of contact solvents into the gallbladder, and extracorporeal shock wave lithotripsy (ESWL) plus oral bile acid therapy. None of these methods is currently widely used in the US (Ransohoff, 1993). Oral bile acid therapy effectively dissolves stones in individuals with small stones made up primarily of cholesterol. However, therapy takes up to two years to complete, and gallstones recur in approximately 50 percent of patients (Schoenfield, 1993). Direct instillation of contact solvent into the gallbladder is an experimental therapy, and involves repeated instillations by an interventional radiologist. ESWL uses acoustic shock waves to break up the gallstones into small pieces, which are further dissolved and passed with the use of oral bile acid therapy. This therapy is primarily effective in individuals with a solitary

gallstone less than 2 cm in diameter, or approximately 12 percent of patients having surgery for gallstones (Ransohoff, 1993). Ninety percent of patients with a single stone treated with ESWL and oral bile acids will have complete dissolution of stones after one year. Thirty percent of those treated will have a recurrence of pain, but gallstone complications following lithotripsy are rare.

Surgical treatment of gallstones has traditionally been carried out via laparotomy. This operation is considered safe and effective, and the standard against which newer therapies should be measured (NIH, 1993). Mortality rates from open cholecystectomy are generally low, but vary depending on the age of the patient and whether or not the surgery is carried out for prophylaxis or in the presence of a biliary tract complication. Mortality rates for women are approximately half of those for men. Mortality rates for prophylactic open cholecystectomy (following pain or in those without symptoms) range from 0.05 percent for a 30 year old woman to 6.1 percent for an 80 year old man. For open cholecystectomy following a biliary complication, the range increases to 0.2 to 24.6 percent (Ransohoff, 1993). There are no good estimates of morbidity following open cholecystectomy; however, common bile duct injury is the most serious complication, and occurs in approximately 0.1 to 0.2 percent of cases (Ransohoff, 1993).

In the last decade, laparoscopic cholecystectomy has become increasingly popular. This method uses four small incisions in the abdominal wall, and is generally associated with less pain and quicker recovery of function for patients. Estimates of mortality from large studies are not yet available, but mortality appears to be low. Common bile duct injury may be more common with laparoscopic cholecystectomy than with open cholecystectomy (Ransohoff, 1993).

Ransohoff et al. (1993) developed a model which describes the trade-offs of treatment versus expectant management of gallstones, depending on the likelihood of a patient developing complications in the future and of mortality from those complications. For this study, the authors reviewed the literature and summarized the probabilities of recurring symptoms, complications, and death for patients with asymptomatic and symptomatic gallstones.

Individuals who have a complication of gallstone disease (including acute cholecystitis, acute pancreatitis, common bile duct stones, cholangitis, or gallstone ileus) have a 30 percent chance of developing another complication within three months if not treated with cholecystectomy. Prompt cholecystectomy following one of these complications is effective in preventing recurrent complications. Early surgery is avoided if the patient's condition contraindicates surgery (Ransohoff 1993, NIH 1993) (Indicator 1).

Among individuals with asymptomatic gallstones, the rate of development of any symptom or complication is approximately one to four percent per year (Ransohoff, 1993; NIH, 1993). In addition to the low incidence of pain or complications, natural history studies show that the majority of those who do develop a problem will present initially with pain. Those who do develop a complication will almost always have a preceding episode of biliary pain (NIH, 1993), making intervention at the time of the initial symptom as low risk as a cholecystectomy done in an asymptomatic individual. The modeling study demonstrated small gains or minimal loss of life expectancy (depending on methodology) when expectant management is used for individuals with asymptomatic gallstones. Both the NIH and the American College of Physicians guideline recommend that expectant management be used for individuals with asymptomatic gallstones (ACP, 1993; NIH, 1993) (Indicator 2).

Patients with symptomatic gallstones are at increased risk for developing complications of gallstone disease. Pain recurs in approximately 40 percent of individuals per year, although 30 percent will have no further episodes of pain over a ten year period. The rate of biliary complications is one to two percent per year in persons with symptomatic gallstones. The modeling study demonstrated significant loss of life expectancy for individuals with symptomatic gallstones treated with expectant management, as compared to cholecystectomy (from 63 days loss of life expectancy for a 30 year old man to 104 days for a 50 year old woman). Given this result, cholecystectomy for individuals with symptomatic gallstones is warranted, although patients may opt for expectant management if they choose to incur the risk of recurrent pain

or biliary complication (Ransohoff, 1993). The NIH consensus states that "...most symptomatic patients should be treated" (Indicator 3).

#### **FOLLOW-UP**

No specific recommendations regarding follow-up of individuals with asymptomatic gallstones were identified from the literature search. Gallstones do not generally resolve spontaneously once they appear, and the number of gallstones per se does not change the management from non-surgical to surgical in the absence of symptoms. Therefore, repeated imaging of the gallbladder in the absence of symptoms does not appear to be warranted.

## REFERENCES

American College of Physicians. 1993. Guidelines for the Treatment of Gallstones. *Archives of Internal Medicine* 119 (7): 620-622.

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Ransohoff DF and Gracie WA. 1993. Treatment of gallstones. *Archives of Internal Medicine* 119 (7): 606-619.

Schoenfield LJ and Marks JW. April 1993. Oral and Contact Dissolution of Gallstones. *American Journal of Surgery* 165: 427-430.

**RECOMMENDED QUALITY INDICATORS FOR CHOLELITHIASIS**

The following indicators apply to men and women age 18 and older.

Indicator	Quality of Evidence	Literature	Benefits	Comments
<b>Treatment</b>				
1. Patients who are diagnosed with a complication of gallstones <sup>1</sup> should receive a cholecystectomy within one month of the complication, unless the medical record states that they are not a surgical candidate.	II-2 <sup>2</sup> , III	NIH, 1993; Ransohoff, 1993	Avoid morbidity and mortality from complications of gallstones.	“Prompt” cholecystectomy is generally recommended after a complication. The one month time period is arbitrary. Laparoscopic or open cholecystectomy may be used.
2. If a patient undergoes cholecystectomy for gallstones, one of the following should be documented within the 6 months prior to surgery: <ul style="list-style-type: none"> <li>• biliary pain;</li> <li>• complications from gallstone.<sup>1</sup></li> </ul>	II-2 <sup>2</sup>	Ransohoff, 1993; NIH, 1993	Avoid morbidity and mortality from unnecessary cholecystectomy.	This indicator applies to both laparoscopic or open cholecyst-ectomy. The six month time period is arbitrary.
3. Patients who are diagnosed with biliary pain <sup>3</sup> should be offered cholecystectomy within 6 months of the symptoms, unless the medical record states that they are not a surgical candidate.	II-2 <sup>2</sup>	Ransohoff, 1993; NIH, 1993	Avoid morbidity and mortality from complications of gallstones.	Patient may choose not to accept therapy. The 6 month time period is arbitrary.

Definitions and Examples

<sup>1</sup> Complications from gallstones include: acute cholecystitis, acute gallstone pancreatitis, gallstone ileus, cholangitis and common bile duct obstruction.

<sup>2</sup> Refers to those cohort studies used to develop probabilities for the Ransohoff modeling study (1993).

<sup>3</sup> A patient is considered to have biliary pain if the medical record indicates a diagnosis of “biliary pain,” or if the medical record indicates “probable biliary pain” and a diagnostic study confirms the presence of gallstones within two months of the notation of pain.

Quality of Evidence Codes

- I RCT
- II-1 Nonrandomized controlled trials
- II-2 Cohort or case analysis
- II-3 Multiple time series
- III Opinions or descriptive studies