

Gallbladder Dyskinesia: When to Operate?

Amir Hussain^{1*}

¹Consultant Surgeon, University Hospital Ayr, UK.

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Policy Article

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ABSTRACT

Gall bladder dyskinesia is a clinical condition, refers to presence of biliary pain in absence of gallstones. Current evaluation and management of this condition is controversial. This article explores the current evidence available in the evaluation and treatment of such patients with emphasis on selection of patients who would benefit from cholecystectomy.

Keywords: Gallbladder dyskinesia; gallbladder ejection fraction; cholecystectomy; functional gallbladder disorder.

1. INTRODUCTION

Gall Bladder dyskinesia also Known as chronic cholecystitis, Cystic duct syndrome, Gall bladder spasm or Functional gall bladder disorder. It is a clinical entity that refers to presence of right upper quadarant pain or symptoms of biliary colic in the absence of gallstones or sludge [1].

The true prevalence of gall bladder dyskinesia (GBD) is largely unknown. A large

epidemiological study estimated the prevalence of biliary pain in absence of gallstone to be about 2.4% [2]. An Italian study, which used ultrasound screening, found biliary pain without gallstone in 7.6% of men and about 20.7% of women [3,4].

Pathogenesis of gall bladder dyskinesia is unclear, but it is generally regarded as a gall bladder motility disorder. It may result from an initial metabolic disorder such as bile super-saturation or a primary motility disorder in the

*Corresponding author: E-mail: dramirhussain@yahoo.com;

absence of any abnormalities of bile composition [5,6].

2. DIAGNOSIS

GBD is a clinical condition and is a diagnosis of exclusion. The concept of biliary pain is also subject of varied interpretation by clinicians because many of symptoms can overlap with other gastrointestinal disorders, such as acid peptic disease, irritable bowel syndrome or other functional disorder [7].

Due to vague nature of presentation of gastrointestinal functional disorders, leads to development of the Rome Criteria. A group of international investigators in 1994 develop a consensus classification system for functional gastrointestinal disorders to provide a common foundation of reporting and research [8]. The clinical criteria for the diagnosis of GBD was updated for the second time in 2006 (Box 1).

3. EVALUATION OF PATIENTS WITH GBD

Patients with suspected GBD should be thoroughly investigated to exclude other causes of upper abdominal pain. Gastroscopy should be carried out to exclude acid peptic disease.

Coronary heart disease to be excluded where appropriate. Endoscopic ultrasound should be considered to detect microlithiasis. Thorboll et al [9] used endoscopic ultrasound to prospectively evaluate 35 patients with suspected GBD and

negative abdominal ultrasound examination. Stones were detected in 52.4% and confirmed on postoperative pathology in 87% of patients. If the patient have typical biliary pain and fulfill Rome III criteria and the other causes are excluded, then cholecystokinin stimulated cholescintigraphy (CCK-CS) should be carried out to assess whether patient would benefit from cholecystectomy.

4. CCK- CS

This test is used to estimate the Gall bladder ejection fraction (GBEF). Patient's with GBEF less than 35% to 40% are considered to have GBD and are more likely to respond to cholecystectomy [10,11].

Cholecystokinin (CCK) is a polypeptide secreted from the duodenal mucosa in response to meals especially fatty meal. It has numerous effects including contraction of gall bladder, relaxation of sphincter of Oddi, contraction of pylorus, inhibition of gastric emptying and relaxation of lower esophageal sphincter. It also stimulates secretion of hepatic bile and pancreatic enzyme.

The current definition of what constitute an abnormal GBEF is based on a small study of 40 asymptomatic volunteers who underwent CCK-CS. The mean ejection fraction was 74.5% +/- 12.2% and the pathologic ejection fraction was arbitrarily set at 40% (3 standard deviation below the mean) [12]. There is a considerable variability in the literature regarding the optimal technique.

Recurrent right upper quadrant or epigastric pain and all of the following:

- Pain last for 30 minutes or longer.
- Pain builds up to a steady state.
- Pain is severe enough to interrupt patient's daily activity or leads to an emergency department visit.
- Pain is not relieved by bowel movement, postural change, or antacids.
- Other conditions that would explain the symptoms are excluded.

Supportive Criteria:

Pain with one or more of the following:

- Nausea and vomiting, radiation to back or right sub-Scapular area, awakening from deep sleep due to pain.

Functional Gall bladder disorder:

- Fulfill above criteria
- Gall bladder present
- Normal Liver enzyme, Bilirubin and amylase/lipase.

Box 1. Rome III criteria for gall bladder dyskinesia

The variability exist whether Sinclide (CCK-analogue) or fatty meal was used, how much and how long it was infused. A standard technique include an overnight fast followed by intravenous injection of either 99mTc-diisopropyl-iminodiacetic acid (DISIDA) or 99mTc hepatic iminodiacetic acid (HIDA). The radio labeled tracer is excreted in the bile and flows in to the gall bladder. After 45-90 minutes baseline radioactivity is measured over gall bladder. A slow infusion of CCK is started (Sinclide 0.02 mg/Kg given over 30-60 minutes) [13]. This will stimulate gall bladder contraction leading to expulsion of the radiolabeled tracer. Following infusion of CCK radioactivity over gall bladder area is again measured and subtracted from base line activity.

Rapid infusion of CCK causes cramps and patients discomfort and gives highly variable results [10]. Slower infusion rate leads to less inter and intra subject variability and overall increases the mean GBEF compared to rapid infusion [14,15,16].

5. ROLE OF CHOLECYSTECTOMY IN GBD

A systematic review [17] attempted to evaluate the usefulness of GBEF for determining which patient will likely to benefit from cholecystectomy. It includes 23 studies with 1718 patients with suspected Gallbladder dyskinesia. 19 studies

concluded that calculation of GBEF was useful in predicting a response to cholecystectomy in patients with suspected GBD. However, authors noted that studies were of poor methodological quality, all but three of the studies were retrospective case series, and only one was randomized. One study retrospectively analyzed 345 patients with suspected GBD [18]. 195 patients had a low GBEF (> 35%) and 150 had normal GBEF (> 35). Among those with low GBEF, 110 of 113 patients treated with surgery (97%) had symptom improvement, compared with 13 of 82(16%) who were managed conservatively. Conversely, patients with normal GBEF did well with conservative management reporting symptom improvement in 130 of 139 patients [94%]. This study suggests that cholecystectomy is appropriate for patients with low GBEF. However, this study is limited by the fact that it is retrospective, leading to potential biases. Ponsky et al. [19] conducted a meta-analysis examining the effectiveness of cholecystectomy in patients with suspected GBD and GBEF of less than 40%. They included five studies involving 274 patients, 200 of whom underwent cholecystectomy. They reported that 98% of the patients had symptomatic improvement compared with 32% of patients without cholecystectomy. The authors determined that patients with biliary dyskinesia were 2.79 times more likely to experience symptomatic relief with surgery than without.

Table 1. Studies showing outcome following cholecystectomy in patients with gallbladder dyskinesia

Author	Type of study	No. Of patients	GBEF	Outcome
Di Baise JK et al. 2003 [17]	Systematic review- 23 studies, mostly retrospective	1718	—	Calculation of GBEF was useful in predicting a response to cholecystectomy.
Finl-Bennet D et al. 1991 [18]	Retrospective	345	< 35%	97% patients have symptomatic improvement following cholecystectomy.
Ponsky et al. 2005 [19]	Meta-analysis	274	< 40%	98% patients have symptomatic improvement following cholecystectomy.
Cochrane review-2009	Include 1 Randomized control trial	21	—	All patients in cholecystectomy group have symptomatic improvement. Authors recommend further studies.
Dave Rv et al. 2015 [21]	Retrospective	100	<35%	84% patients have symptomatic improvement following cholecystectomy.

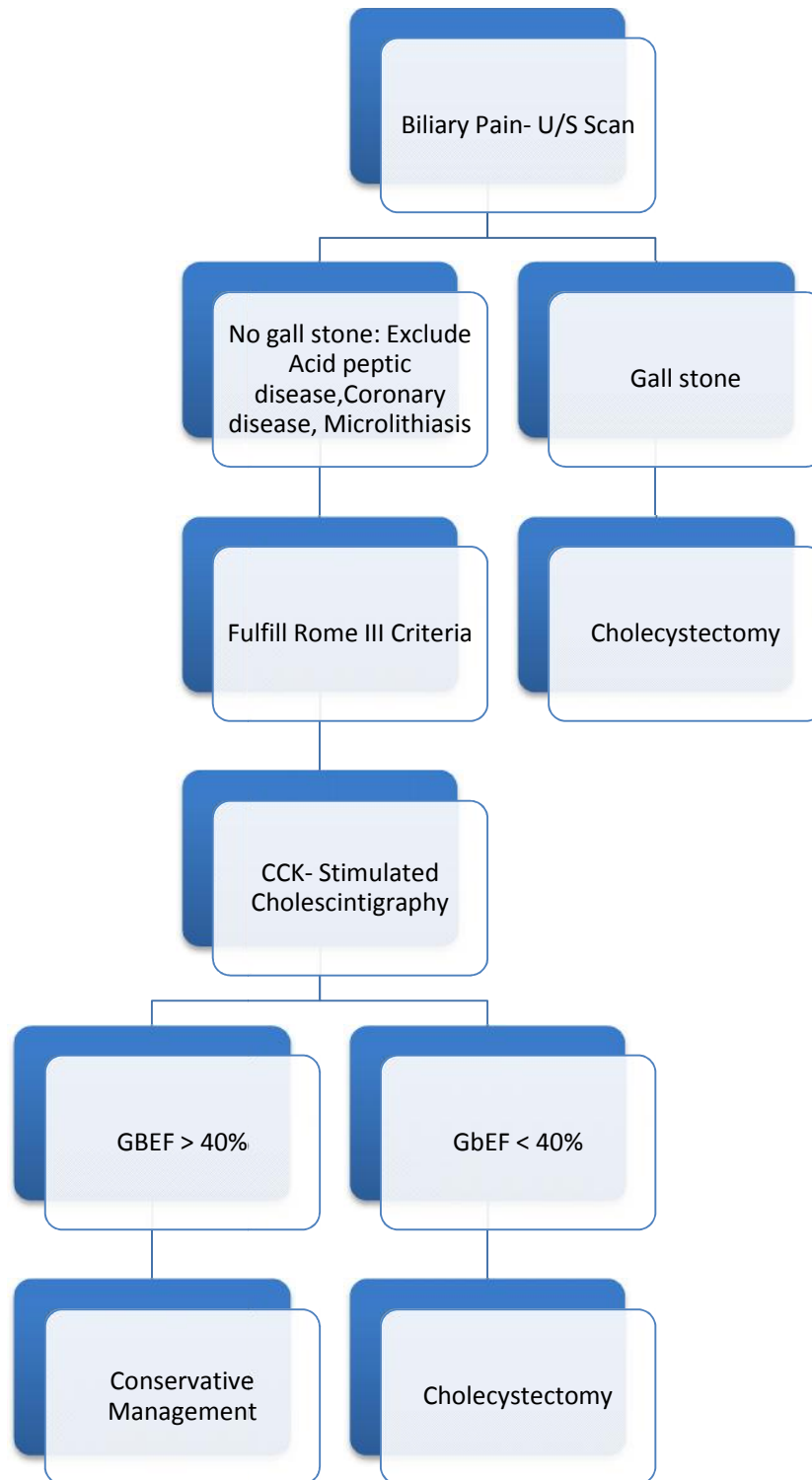


Fig. 1. Suggested algorithm for management of gallbladder dyskinesia

A Cochrane review published on this topic in 2009 [20], included only one trial with 21 patients randomized 11 to cholecystectomy and 10 to control. All patients in the cholecystectomy group and only one patient in the control group had symptomatic improvement in symptoms ($P=0.0001$) after a mean follow up period of 33.6 months. The reviewers concluded that the evidence of effectiveness of cholecystectomy in GBD is based on a single small trial at risk of bias. They recommended further good quality randomized control trials to confirm or reject the promising result.

Dave RV et al. [21] conducted a retrospective outcome study following laparoscopic cholecystectomy involving 100 patients with suspected GBD and positive CCK-CS (GBEF < 35%) with a median follow up of 12 months. They reported that 84% of the patients have symptomatic improvement and 52% have no residual pain. They concluded that a positive CCK-CS test is a useful functional diagnostic tool in patients with suspected GBD, with favorable outcome following surgery.

6. CONCLUSION

Symptomatic relief after laparoscopic cholecystectomy for gall stone disease is between 85% and 90%. The data for biliary dyskinesia is not as good and are of poor quality. They suggest that 65% to 70% of patients will be cured and 20% to 30% will improve with cholecystectomy. In patients with acalculous biliary pain approximately 60% to 80% will have abnormal GBEF on CCK-HIDA [22].

The patients with suspected biliary dyskinesia, which fulfills Rome III criteria, should undergo CCK stimulated cholescintigraphy. Those who have GBEF less than 35% to 40% should be offered cholecystectomy. Patients who have typical symptoms with GBEF greater than 40% present a challenge. They should be placed on a conservative treatment with symptomatic relief and observed for a period of time. The recommendation for cholecystectomy should be made on case-to-case basis with a frank and open discussion about limitation of our understanding of this disease process.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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