

## CLINICAL VIGNETTE

# Functional Gallbladder Disorder

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### Introduction

Functional gallbladder disorder, commonly referred to as gallbladder or biliary dyskinesia, is a condition defined as classic biliary pain due to biliary dysmotility in the absence of gallstones or sludge. Identification and management is often done by the primary care physician with appropriate surgical intervention. The case presented below is that of a 32-year-old female who was diagnosed with and treated for functional gallbladder disorder.

### Case

A 32-year-old, otherwise healthy female, presented to her primary care physician for a one-year history of postprandial right upper quadrant pain. The pain occurred in episodes that lasted 30-45 minutes, resolved spontaneously, and was followed by mild residual soreness in the area. These episodes were increasing in frequency and severity over the past three months. The patient is a nurse practitioner, has one child, maintains a healthy diet and exercise regimen, and denies a history of smoking and alcohol use. No abnormalities were noted on vital signs, physical exam, and labs that included complete blood count, basic metabolic panel, liver function tests, amylase, lipase, H. pylori stool antigen, and FOBT. Transabdominal ultrasound was normal as was an esophagogastroduodenoscopy four months prior to this examination. A hepatobiliary iminodiacetic acid (HIDA) scan showed a gallbladder ejection fraction (GBEF) of 35%, and she underwent an elective cholecystectomy with full symptom resolution at one year postoperatively.

### Discussion

Functional gallbladder disorder, previously referred to as gallbladder dyskinesia, gallbladder spasm, acalculous biliary disease, chronic acalculous cholecystitis, chronic acalculous gallbladder dysfunction, and cystic duct syndrome, is the presence of biliary pain caused by a gallbladder motility abnormality in the absence of gallstones, sludge, microlithiasis, or microcrystal disease.<sup>1</sup>

Although the etiology is unclear, the presentation of functional gallbladder disorder mimics classic symptoms of biliary pain:

a severe discomfort in the right upper abdomen or epigastrium that may radiate to the back or right shoulder. Often beginning within one to two hours following a heavy meal, biliary colic is usually episodic and can be associated with sweating, shortness of breath, chest pain, nausea, and vomiting. Once the pain level peaks, it typically lasts approximately thirty minutes then slowly improves over several hours. Mild residual soreness to the area may persist over 24 hours.<sup>2</sup>

The diagnosis begins with the exclusion of other likely causes including functional dyspepsia, ischemic heart disease, sphincter of Oddi dysfunction, common bile duct obstruction, and peptic ulcer disease. Taking a detailed history of the pain, timing in relation to food intake, associated, alleviating, and aggravating factors is pivotal in identifying patients requiring further investigation.<sup>3</sup>

The Rome III criteria have been developed to assist physicians identify patients at risk for functional gallbladder disorder and who will need additional blood and imaging tests. Patients who do not meet all of the guideline criteria should be evaluated for other possible causes to their abdominal pain.<sup>1</sup>

**Table 1: Rome III criteria** - Episodes of pain in the right upper quadrant or epigastrium and all of the following:

Gallbladder is present
Normal liver enzymes, conjugated bilirubin, amylase, and lipase
Pain last $\geq$ 30 minutes
Recurrent episodes occur at different intervals (not daily)
Pain builds up to a steady level
Pain is severe enough to interrupt the patient's current activities or lead to a visit to a clinician or emergency room
Pain is not relieved by bowel movements, postural changes, or antacids
Other structural diseases that may explain the symptoms have been excluded

Patients with functional gallbladder disorder usually have normal complete blood cell counts, metabolic panels, pancreas and liver tests, including bilirubin.<sup>4</sup> No gallstones or

gallbladder sludge are seen on abdominal ultrasound, and no small gallbladder stones or microcrystal disease are found on endoscopic ultrasound and bile microscopy, respectively. If alternate causes to the abdominal pain have been excluded and the Rome III criteria have all been met, a cholecystokinin (CCK)-stimulated cholescintigraphy examination can be used to calculate the GBEF and potentially confirm the diagnosis.<sup>5</sup>

The CCK cholescintigraphy scan, also known as hepatobiliary iminodiacetic acid (HIDA) scan, is a nuclear imaging procedure in which a radioactive tracer, 99mTc-diisopropyl-iminodiacetic acid (DISICA) or 99mTc-hepatic iminodiacetic acid (HIDA), is bolused into an accessible vein, collected by the liver, excreted along with bile, and stored in the gallbladder. After approximately 45-90 minutes, baseline radioactivity is measured from the region of the gallbladder. When gallbladder radioactivity is maximal, a slow infusion of CCK is started to stimulate gallbladder contraction, which leads to the expulsion of the radiolabeled tracer. Following the CCK transfusion, the remaining radioactivity in the gallbladder is measured and compared to the baseline producing an ejection fraction percentage. Patients with GBEF less than 40% are highly likely to respond to a cholecystectomy, the currently accepted treatment for patients with functional gallbladder disorder.<sup>6</sup>

### **Conclusion**

Functional gallbladder pain is a diagnosis of exclusion that is considered in patients with typical biliary pain in the absence of gallstones or gallbladder sludge. The diagnosis is made using the Rome III criteria and by excluding any other likely causes. Typically blood work results are normal as is a transabdominal ultrasound. An abnormally low gallbladder ejection fraction of less than 40% on HIDA scan is helpful to identify appropriate surgical candidates for cholecystectomy. The diagnosis is then confirmed by a postoperative improvement in symptoms.

### **REFERENCES**

1. **Behar J, Corazziari E, Guelrud M, Hogan W, Sherman S, Toouli J.** Functional gallbladder and sphincter of oddi disorders. *Gastroenterology*. 2006 Apr;130(5):1498-509. Review. PubMed PMID: 16678563.
2. **Rigas B, Torosis J, McDougall CJ, Vener KJ, Spiro HM.** The circadian rhythm of biliary colic. *J Clin Gastroenterol*. 1990 Aug;12(4):409-14. PubMed PMID: 2398248.
3. **Kraag N, Thijs C, Knipschild P.** Dyspepsia--how noisy are gallstones? A meta-analysis of epidemiologic studies of biliary pain, dyspeptic symptoms, and food intolerance. *Scand J Gastroenterol*. 1995 May;30(5):411-21. PubMed PMID:7638565.

4. **Hansel SL, DiBaise JK.** Functional gallbladder disorder: gallbladder dyskinesia. *Gastroenterol Clin North Am*. 2010 Jun;39(2):369-79, x. doi: 10.1016/j.gtc.2010.02.002. Review. PubMed PMID: 20478492.
5. **Ziessman HA.** Cholecystokinin cholescintigraphy: victim of its own success? *J Nucl Med*. 1999 Dec;40(12):2038-42. PubMed PMID: 10616884.
6. **DiBaise JK, Richmond BK, Ziessman HA, Everson GT, Fanelli RD, Maurer AH, Ouyang A, Shamamian P, Simons RJ, Wall LA, Weida TJ, Tulchinsky M.** Cholecystokinin-cholescintigraphy in adults: consensus recommendations of an interdisciplinary panel. *Clin Nucl Med*. 2012 Jan;37(1):63-70. doi:10.1097/RLU.0b013e31823e26bb. PubMed PMID: 22157031.

*Submitted October 16, 2014*