

Southwestern Surgical Congress

# Establishing benchmarks for the management of elevated liver enzymes and/or dilated biliary trees in an urban safety net hospital: analysis of 915 subjects



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## KEYWORDS:

Choledocholithiasis;  
Safety net hospital;  
Benchmarking;  
Outcome reporting;  
Laparoscopic  
cholecystectomy

## Abstract

**BACKGROUND:** The push for public reporting of outcomes necessitates relevant benchmarks for disease states across different settings. This study establishes benchmarks for choledocholithiasis management in a safety net hospital setting.

**METHODS:** We reviewed all patients admitted to our acute care surgery service with biochemical evidence of choledocholithiasis who underwent same-admission cholecystectomy (CCY) between July 2012 and December 2013.

**RESULTS:** During this 18-month period, 915 patients were admitted with biochemical evidence of choledocholithiasis. Descriptive statistics for the cohort are provided, which include a 51% rate of obesity and 95% rate of pathologic cholecystitis. Conversion rates of 4% and complication rates of 6% were found. The majority had a CCY without biliary imaging (n = 630, 68.9%).

**CONCLUSIONS:** Relevant benchmarks are characterized, and results of a practice pattern of omitting pre- or intraoperative biliary tree imaging are described. These findings serve as a first benchmark of choledocholithiasis management for urban safety net hospitals.

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There were no relevant financial relationships or any sources of support in the form of grants, equipment, or drugs.

The authors declare no conflicts of interest.

Presented as an Oral Presentation at the Annual Meeting of the Southwestern Surgical Congress, April 2015, Monterey, CA.

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Manuscript received April 13, 2015; revised manuscript June 12, 2015

The effort to improve quality of patient care through public reporting of performance and outcomes has been shown to be successful at promoting further quality improvement activity at a hospital level.<sup>1</sup> With this push for public reporting there is a need for contextual benchmarks relevant to particular disease states and in various settings. Context is important because patients who seek care at safety net hospitals are frequently uninsured or underinsured, and therefore present at later stages of disease.

This more advanced pathology in turn puts them at risk for more adverse outcomes than insured patients seeking health care in the private realm.

There are few operations in general surgery more common than cholecystectomy (CCY) for gallstone pathology. Gallbladder disease has consistently been in the top 20 reasons for hospital admission through the emergency department and remains one of the most common diseases leading to surgical intervention, ultimately resulting in approximately 500,000 cholecystectomies annually in the United States.<sup>2,3</sup> Since the advent of laparoscopy, operation rates for gallbladder disease have climbed over the last decade. As surgeons have become comfortable with this operation, there has been a focus on streamlining patient care in the perioperative and postoperative setting, resulting in many cholecystectomies now being performed on an outpatient basis.

Currently, the treatment strategies for patients with presumed choledocholithiasis vary based on institutional and individual providers' preferences. Although there have been many studies examining the comparative efficacy and success of procedures such as endoscopic retrograde cholangiopancreatography (ERCP), intraoperative cholangiography (IOC), and common bile duct exploration (CBDE) in both diagnosis and management of biliary lithiasis, few studies have provided an overall picture of the demographics and outcomes for suspected choledocholithiasis in an urban safety net hospital.<sup>3-5</sup>

We undertook this descriptive study to begin to establish benchmarks related to the management of suspected choledocholithiasis in the setting of an urban, safety net hospital with a high annual volume of gallbladder disease. The characterization of demographic factors, procedures, and associated outcomes should serve as a first line effort at promoting both quality improvement and establishing necessary baselines for choledocholithiasis management.

## Methods

We performed a retrospective review of all patients presenting with suspected choledocholithiasis to our urban safety net hospital's acute care surgery (ACS) service between July 1, 2012 and December 31, 2013. Generally speaking, patients with suspected biliary disease are handled as follows at our institution. Those with clinical suspicion for cholecystitis due to fever, leukocytosis, gallbladder wall thickening on ultrasound, pericystic fluid, or Murphy's sign are admitted and undergo same-admission CCY. Similarly, those with evidence of choledocholithiasis such as elevated liver enzymes or a dilated common duct are admitted, as are those with intractable pain and nausea/vomiting. Patients already scheduled for surgery clinic evaluation who represent with recurrent biliary pain while awaiting their appointment are also admitted and undergo same-admission CCY. Finally, the

attending physician has the latitude to admit a patient who would be a candidate for outpatient CCY if he/she feels that the CCY can be performed expeditiously (ie, an admission at 2:00 am for a 7:00 am CCY). Patients not fitting any of these criteria are discharged with a follow-up appointment in the ACS clinic for outpatient CCY scheduling.

Inclusion criteria for this study consisted of patients who presented with biochemical evidence of choledocholithiasis or a dilated CBD on ultrasound with normal liver enzymes and who then underwent same-admission CCY. The study was conducted as a quality improvement project, and the Institutional Review Board subsequently approved its promulgation as a research project.

Clinical admission data were extracted from patient medical records including demographics, laboratory data, ultrasound and procedural findings, operative indications and technique, complications, and postoperative follow-up. The diagnosis of biliary stone-related gallbladder disease was made based on ultrasound criteria and confirmed through pathology studies. Sonographic gallbladder thickening was defined as having a wall thickness exceeding 3 mm. Biochemical evidence of choledocholithiasis was defined as having any elevation in liver enzymes. The abnormal cut-off values were as follows: aspartate aminotransferase greater than 35 U/L, alanine aminotransferase greater than 35 U/L, total bilirubin (TBili) greater than 1.3 mg/dL, lipase greater than 59 U/L, and amylase greater than 100 U/L. A dilated duct was defined as one of 8 mm or larger.

The management of patients with suspected choledocholithiasis is not protocolized on our institution's ACS service. A dominant management pathway for suspected choledocholithiasis does exist, however. Most of the partners in our group choose to admit these patients and trend their liver enzymes. Generally, patients whose repeat labs worsen are taken for preop endoscopic ultrasound (EUS) and/or ERCP, while those whose second set downtrend are taken for CCY. Patients whose labs remain unchanged are handled in a variable manner. IOC is performed selectively with the exception of one partner who practices it routinely. Patients whose IOC showed stones are generally taken for postop ERCP or, rarely, go on to have CBDE whether lap or open. No patients with imaged biliary tree stones are handled expectantly. Patients who present to the emergency department with concerns for cholangitis are not considered candidates for trending of liver enzymes and undergo emergent ERCP for obvious reasons. Trending of liver enzymes was defined as the comparison of admission liver enzyme tests and a second set of preoperative tests. If TBili levels did not rise, a simple CCY was done without preoperative EUS with or without ERCP, or IOC with or without CBDE. For patients in whom liver enzymes remained elevated, the decision between preoperative EUS and ERCP vs intraoperative IOC and CBDE was based on physician preference.

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