The American Journal of Surgery (2015) 210, 1140-1146

The American Journal of Surgery®

Southwestern Surgical Congress

An analysis of omitting biliary tract imaging in 668 subjects admitted to an acute care surgery service with biochemical evidence of choledocholithiasis

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KEYWORDS:
Choledocholithiasis;
ERCP;
Liver function tests;
Intraoperative cholangiogram

Abstract

BACKGROUND: No consensus exists for the timing and utility of biliary imaging in patients with preoperative concern for choledocholithiasis.

METHODS: Admissions to an acute care surgery service with evidence of choledocholithiasis undergoing same-admission cholecystectomy without preoperative or intraoperative imaging were identified. One-way analysis of variance on the log-transformed outcomes, with the Tukey-Kramer multiple comparison procedure, were used to compare means between groups.

RESULTS: A total of 668 patients with elevated but downtrending liver enzymes underwent cholecystectomy without preoperative or intraoperative imaging. Thirty-eight patients (5.7%) had postoperative biliary imaging, of whom 22 (3.3%) had definite choledocholithiasis. One case of postoperative cholangitis occurred which required readmission and endoscopic retrograde cholangiopancreatography with no long-term morbidity. Presenting liver enzymes were significantly higher in the group found to have retained stones postoperatively than those without retained stones.

CONCLUSIONS: Patients presenting with biochemical evidence of choledocholithiasis who downtrend preoperatively can be safely managed by cholecystectomy with omission of biliary tract imaging.

At present, there is no consensus on the management of choledocholithiasis. Preoperative, intraoperative, and postoperative clearance of the bile duct have all been described and are seen in clinical practice.[1,2] Advocates of preoperative imaging, including endoscopic retrograde cholangiopancreatography (ERCP) or magnetic resonance cholangiopancreatography (MRCP) cite the benefit of diagnosing a stone within the common duct, as well as the ability to remove the

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.

This original work has been presented from the podium at the 2015 Annual Meeting of the Southwestern Surgical Society.

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

0002-9610/$ - see front matter © 2015 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2015.06.031

stone using ERCP before cholecystectomy (CCY). Those who argue against this will point out the high rate of negative findings as well as the risks of the procedure itself.

Our group's acute care surgery(ACS) practice sees a high volume of choledocholithiasis at our urban safety net hospital. Our practice pattern has evolved to that of admitting patients with biochemical evidence of choledocholithiasis and trending their liver function tests. Those patients who then downtrend quickly are presumed to have passed their stone and are considered candidates for CCY without intraoperative cholangiography (IOC) and discharge home postoperatively. Our group sought to evaluate the safety of this practice.

Methods

This retrospective review was performed as part of a quality improvement project. Institutional review board approval was obtained before dissemination of these results as research. The study cohort consisted of those patients who had been admitted to our urban safety net hospital's ACS division with biochemical evidence of choledocholithiasis and who underwent same-admission CCY without undergoing preoperative or intraoperative imaging of their biliary tree between July 1, 2012 and December 31, 2013.

The management of patients with suspected choledocholithiasis is not protocolized on our institution's ACS service, but a dominant management pathway exists in which these patients are admitted and their liver enzymes trended. Generally, patients whose repeat laboratory values worsen are taken for preoperative endoscopic ultrasonography (EUS) and/or ERCP, whereas those whose 2nd set downtrend are taken for CCY. Patients whose laboratory values remain unchanged are handled in a variable manner at the discretion of the attending physician. IOC is performed selectively with the exception of 1 partner who practices it routinely. Patients chosen for IOC who are shown to have stones are generally taken for postoperative ERCP or, rarely, go on to have common bile duct exploration whether laparoscopic or open. No patients with imaged biliary tree stones are handled expectantly. For this study, trending of liver enzymes was defined as the comparison of admission liver enzyme tests and a 2nd set of preoperative tests. Trending occurs for up to 24 hours and usually only consists of obtaining a 2nd set of liver enzymes after the admission set.

If preoperative liver enzyme values had not normalized before CCY (in other words liver enzymes that were initially only mildly elevated but stable or downtrended without reaching normal levels), liver enzymes were assessed and trended for 24 hours postoperatively. If these liver enzymes trended upward, postoperative EUS and ERCP were performed to rule out suspected biliary obstruction. Postoperatively, those patients who did not have abnormal liver enzyme values or worsening symptoms indicative of biliary obstruction were discharged home.

For the purposes of this study, biochemical evidence of choledocholithiasis was defined as elevation of any of the following: aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase, total bilirubin (TBil), or lipase. Each choledocholithiasis outcome was log transformed to obtain a more normal distribution because of positive skewness. For demographics, 2 groups of patients were created: those in whom postoperative choledocholithiasis was found and those in whom it was not. For the purposes of liver enzyme analysis and outcomes, 3 patient groups were created because of the possible impact of lost follow-up on outcomes: (1) those in whom postoperative choledocholithiasis was not found and who had documented follow-up, (2) those in whom choledocholithiasis was not found and who were lost to follow-up, and (3) those in whom postoperative choledocholithiasis was found.

Patient demographics, laboratory data, outcomes, follow-up, and need for postoperative imaging and/or intervention were analyzed. Two group comparisons were made using Mann Whitney *U* test (continuous outcomes) and Fisher exact test (proportions). For comparisons of the 3 postoperative groups on each of the choledocholithiasis outcomes, a 1-way analysis of variance along with the Tukey-Kramer multiple comparison procedure was used. Furthermore, in a post hoc sensitivity analysis, the Kruskal-Wallis test, which is the nonparametric equivalent of the 1-way analysis of variance, was also used to compare the 3 postoperative groups on each of the choledocholithiasis outcomes. Statistical analyses were performed using SPSS, version 21.0.0.0 (SPSS Inc., Chicago, IL), and SAS, version 9.4 (SAS Institute Inc., Cary, NC). The level of significance for all tests was set at α value of .05 (2-tailed tests).

Results

Between July 2012 and December 2013, a total of 668 patients met criteria for enrollment and were included in the analysis. Demographics for those patients with and without documented retained stones can be found in Table 1.

The large majority of the cohort (94%, n = 630) had no postoperative imaging, either during their index admission or after follow-up when it occurred. Postoperatively, 38 patients (5.7%) had signs and symptoms which were suspicious for retained stones, including liver function tests that were elevated from pre-CCY values or complaints of pain that were similar in nature to those they experienced before operation. These 38 patients with suspicion for retained stones underwent postoperative diagnostic and/or therapeutic procedures which included EUS, ERCP, or MRCP alone or in combination. Of these 38 patients who underwent postoperative imaging, 22 (3.3% of the overall cohort) were found to have a retained common bile duct stone. Of the 22 patients with a retained stone, 10 (45.5%) were diagnosed during their index admission, and 12