Evaluating Diagnostic Markers to Predict Acute Cholecystitis.

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Accepted on 25 October, 2021

Introduction

Acute Cholecystitis (AC) affects an estimated 20 million patients annually in the United States. The standard of care for treatment is latively straight forward, often times ambulatory Laparoscopic Cholecystectomy (LC). However, in critically ill patients the risk of general anesthesia and a surgical cholecystectomy is often prohibitive. Instead, placement of Percutaneous Cholecystostomy (PC) is preferable. Percutaneous Cholecystostomies can serve as either a definitive procedure or bridging therapy until the patient is clinically stable for a surgical cholecystectomy. During the course of an ICU stay, patients can develop classic signs and symptoms that are attributed to acute cholecystitis standard clinical, laboratory and radiological markers used to diagnose acute cholecystitis are by default and perhaps incorrectly, used to justify PC placement in this unique patient population.

The purpose of our study was to establish evidence-based criteria for placement of PC in critically ill patients with a non-biliary diagnosis on admission. Our goal was to evaluate diagnostic markers for acute cholecystitis and the need for a PC in ICU patients, as opposed to defining criteria for PC placement in patients who were critically ill from their gallbladder disease. Our hypothesis was that the "classic" markers of acute cholecystitis including right upper quadrant pain, elevated WBC and ultrasound findings of gallbladder wall thickening have low-diagnostic yield in the intensive care unit patient population. We further postulated that relying on classic markers results in an over-diagnosis of acute cholecystitis and unnecessary PC placement. By establishing evidence-based criteria for placement of percutaneous cholecystostomy tubes we hope to prevent unnecessary testing and procedures

Patients presenting with acute cholecystitis have established algorithms for diagnosis and treatment. However, development of biliary disease in critically ill patients may present atypically and therefore require a modified management approach. We retrospectively reviewed 62 critically ill patients who underwent PC placement at our institution and evaluated the clinical, radiological and diagnostic markers used to arrive at the diagnosis of acute cholecystitis. Our hypothesis was that the standard markers used to diagnose acute cholecystitis in non-critically ill patients were not diagnostic of this disease process in the critically ill patient population. To our knowledge, this is the first study specifically looking at predictive value of diagnostic markers for acute cholecystitis in intensive care unit patients without a primary biliary diagnosis

The Tokyo Guidelines were an attempt to establish evidence-based criteria for the diagnosis of acute cholecystitis based on the presence of clinical symptoms, signs of systemic infection, and positive radiographic findings on ultrasound, Computed Tomography (CT) or Hepatobiliary (HIDA) scan. The defined clinical symptoms of AC include right upper quadrant pain, or tenderness and a positive Murphy's sign (cessation of inspiration with deep palpation in the right upper quadrant). Objective markers included an elevated White Blood Cell (WBC) count, fever or an elevated C-Reactive Protein (CRP) as well as imaging findings of AC. Characteristic findings on ultrasound or CT include gallbladder wall thickening and the presence of peri-cholecystic fluid or gallstones. An alternative diagnostic test is the Hepatobiliary scan. Hepatobiliary (HIDA) in which an ejection fraction <35% or non-visualization of the cystic duct and gallbladder after a defined time period is considered diagnostic of acute cholecystitis. while Hepatobiliary (HIDA) scans have a positive predictive value and negative predictive value of >90%, severe comorbidities, especially hepatic disease, can frequently cause false positives, rendering the test less sensitive in critically ill patients. Additionally, Hepatobiliary (HIDA) scans are not bedside procedures and therefore may be impractical to administer to critically ill patients, particularly if they are ventilator-dependent and cannot be transported safely from the intensive care unit setting for imaging.

In our study, patients largely underwent RUQ ultrasounds followed by Hepatobiliary (HIDA) scans to confirm acute cholecystitis. CT scans were not included within the study because they were rarely performed in our studied patient population (n=3). Therefore positive predictive value and negative predictive value of CT scans cannot be commented on based on our available data.

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Citation: *Wei Wei. Evaluating Diagnostic Markers to Predict Acute Cholecystitis. J Trauma Crit Care 2021;5(5):12.*