

CORR Insights®: Child-Pugh Class B or C Liver Disease Increases the Risk of Early Mortality in Patients With Hepatitis C Undergoing Elective Total Joint Arthroplasty Regardless of Treatment Status

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Where Are We Now?

Patients with hepatitis C virus (HCV) appear to be at risk of serious complications after elective orthopaedic surgery, so an increasing amount of research has sought to reduce that risk using preoperative treatment with interferon or direct-acting antivirals. Sustained negative viral load is linked to minimizing

postoperative mechanical complications, particularly periprosthetic joint infection [4, 12]. The authors of an article in this month's *Clinical Orthopaedics and Related Research*® [2] earlier published a multicenter study finding that patients treated with antiviral therapy before arthroplasty were less likely to experience periprosthetic joint infection at 90 days and 1 year after surgery [3]. Because HCV is a prevalent and important pathogen, this information can help surgeons to reduce the risk of serious complications in a large group of patients.

Although periprosthetic joint infection is very important, death after surgery is obviously even more so. The authors of a study in this month's *CORR*® [2] found only one study that investigated postsurgical mortality in a mixed population of patients (those having orthopaedic, cardiovascular, and digestive surgery) who had the diagnosis of cirrhosis [14]. Patients undergoing orthopaedic surgery were only a small minority of patients in that study (14% subset of the 107 patients studied), and even that group was a mixed bag of elective and emergency procedures of

the upper and lower extremities. Having more specific information on this topic would help surgeons to counsel patients fairly about the risks and benefits of elective total joint arthroplasty (TJA) in the setting of potentially severe liver disease; before the paper by Cichos et al. [2], the association between liver cirrhosis of increasing severity (according to the Child-Pugh classification) and death after arthroplasty has not been well-described.

Cichos et al. [2] determined that among patients with HCV undergoing elective TJA, more-severe liver damage (Child-Pugh Class B or C) was the sole factor that was independently associated with an increased odds of death shortly after surgery. The authors point out that postoperative mortality in patients with HCV undergoing general surgery has been well correlated with the severity of liver disease, as represented by the Child-Pugh classification or the Model for End-Stage Liver Disease score. Mortality can reach up to 82% in patients with Child-Pugh Class C [11]. But this was a new finding where arthroplasty is concerned.


Nevertheless, patients with HCV and Child-Pugh Class B or C liver disease with severe osteoarthritis or avascular necrosis may seek arthroplasty [5]. Moreover, nonelective

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arthroplasty in this patient population may be indicated in the setting of fracture. In these cases, surgeons need the information to counsel patients on their individual risk with respect to postoperative mortality so the patient can make an informed, mutual decision with their surgeon on whether to proceed.

Therefore, surgeons should counsel patients specifically about mortality risk when choosing whether to proceed with arthroplasty. Similarly, referral for multimodal nonoperative treatments such as peripheral nerve blocks, assistive devices, and formal pain management strategies are a strong consideration for patients with cirrhosis and arthritis.

Where Do We Need To Go?

The findings of this study support the notion that patients with HCV and Child-Pugh Class B or C have an ultra-high-risk state with respect to 2-year mortality after TJA. Moreover, key patient characteristics such as liver function, cirrhosis, age, Model for End-Stage Liver Disease level, HCV treatment, and viral load status were not associated with the risk of death in patients with cirrhosis who underwent arthroplasty. Another study found that the mean survival length after liver transplantation in patients with Child-Pugh Class C was only 475 days [7]. Therefore, referral for transplantation before arthroplasty, although possible, may not be a feasible option for these patients. Despite the high risk of mortality in these patients, a competing-risk analysis on mortality without arthroplasty may shed light on whether arthroplasty itself impacts the final outcome. Similarly, patients with cirrhosis are at risk of complications after

arthroplasty [10, 13]. The current study [2] does not clarify whether these patients should expect to benefit from arthroplasty as much as patients without cirrhosis.

Nonmodifiable risk factors have been identified as key reasons for exceeding target cost in bundled-payment arthroplasty models [15]. The authors of the current study point out that the actual cause of death in these patients was not determined in their investigation [2]. Likewise, whether the cause of death was directly related to surgery, caused by the liver disease, or was a function of other interacting comorbid conditions remains unclear. Future studies that clarify whether the cause of death in these patients stems from orthopaedic complications versus other health concerns would assist surgeons and patients in their decision-making on whether to pursue arthroplasty.

But most importantly, patients and surgeons need to be educated about the poor prognosis and decreased life expectancy in patients with cirrhosis in this context. And it's not just deaths; even patients with compensated cirrhosis have increased rates of revision, infection, and revision 1 year after hip arthroplasty [13]. Among patients undergoing TKA, severe complications such as encephalopathy, fracture, and infection are common among patients with compensated cirrhosis [1], although patients with milder cirrhosis (Child-Pugh Class A) have fewer complications than patients with Class B and C liver disease do [10]. Patients with Child-Pugh Class B and C cirrhosis have what is considered uncompensated liver disease; if a surgeon is going to operate on a patient with cirrhosis of that severity, it's important to work with a gastroenterologist or acute care specialist, who may be able to improve that patient's health before

elective (and perhaps even emergency) surgery [6, 8, 9].

How Do We Get There?

From a research standpoint, additional investigation is needed to determine whether mortality and complications could be avoided in patients with Child-Pugh Class B, comparing them with patients with Child-Pugh Class C disease. The authors [2] mention that patients with Child-Pugh Class B vary considerably in terms of liver function and comorbidities. In other words, the categorical analysis of Class A, B, or C cirrhosis may not be sufficiently detailed for measuring risk in patients undergoing arthroplasty. If there is a difference in prognosis or management between patients with Class B disease and those with Class C disease, we need to know this. Future evaluations of cirrhosis to identify the patients at the least risk might be helpful to patients and providers alike. Similarly, a competing-risk analysis of complications such as infection versus mortality would help patients to understand their risk of dying after surgery and help surgeons understand the odds of a major postoperative complication in these sick patients. Administrative databases such as the National Inpatient Sample or American College of Surgeons National Surgical Quality Improvement Program could be used to clarify the risk of death versus infection or revision. However, they would be limited to inpatient or 30-day mortality, respectively.

Because of high mortality rates in patients with cirrhosis who undergo arthroplasty, a unified approach to offer acceptable nonoperative treatments in patients at high risk of complications or death is needed. The authors of the current study [2] urge caution and emphasize

alternative and multimodal nonoperative treatments for these patients.

How do we educate surgeons and patients about the risks of mortality in patients with HCV and cirrhosis? A national taskforce or practice guideline on arthroplasty in the setting of HCV and cirrhosis would help raise awareness among surgeons and help incorporate the findings of this paper into everyday practice. Simultaneously, a taskforce to develop guidelines for the nonsurgical management of arthritis in patients deemed too risky for elective arthroplasty would help patients decide which treatments are appropriate for them.

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