

The column in this issue is supplied by David R. Lionberger, M.D., an orthopedist and noted specialist in arthritis and joint replacement surgery at Houston Methodist Hospital. Dr. Lionberger earned both his B.A. and M.D. degrees from the University of Missouri at Columbia. He completed a general surgery internship and residency in orthopedic surgery at Baylor College of Medicine in Houston, Texas, and continued his training in arthritis and joint replacement surgery at Harvard Medical School.

## CARDIOVASCULAR CONSEQUENCES OF COMMON ORTHOPEDIC PROCEDURES

David R. Lionberger, M.D.

*Houston Methodist Hospital, Houston, Texas*

### Thromboembolic Prophylaxis

Thromboembolism is a major complication of orthopedic surgery and is associated with significant morbidity and mortality. In fact, the incidence of asymptomatic deep vein thrombosis in patients undergoing total hip and knee arthroplasty is estimated to be 20% to 40%.<sup>1</sup> Three basic treatment protocols are currently utilized. The first is rapid patient mobility to prevent blood sludging, the second is the use of sequential calf compression devices, and the third is chemical anticoagulation. In low-risk patients, the majority of total joint replacement surgeons prescribe aspirin use for 6 weeks; however, if the risk stratification indicates differently, anticoagulants such as Eliquis® are used since decreased organ function does not interfere with their metabolism. Injectable anticoagulants have virtually disappeared due to the ease of use of oral compounds. Likewise, warfarin and heparin are rarely used except in very limited instances.

### Postoperative Blood Loss, Anemia, and Blood Management

The past decade provided advancements not only in technique but also in the use of chemical agents designed to decrease postoperative hemorrhage. The most important addition has been tranexamic acid (TXA). While TXA began as an intravenous drug, it is now used intra-articularly following a total joint replacement. The advantage is that TXA results in decreased bleeding by preventing fibrinolysis, thereby interfering with the coagulation cascade and basic hematologic functions that could lead to stroke and cardiovascular abnormalities. Reduced tourniquet use and increased use of bipolar coagulation instruments to minimize hemorrhage during surgeries have lowered the transfusion expectation to less than 1%, down from 12% to 15% a decade ago.

### Auto-Donation

While the above measures have reduced expected blood loss, auto-donation also has seen a decline in use due in large part to TXA use. Even so, auto-donation may be considered in patients who are undergoing multiple operations in a short time frame and

are unable to regain hematologic balance. However, the risk of transfusion even with auto-donated blood has lessened the enthusiasm for this type of preoperative consideration.

### Prevention and Reduction of Infection

The most troublesome and least disseminated information on infection risk is the use of corticosteroids in the immediate proximity to total joint replacement. Most joint replacement surgeons avoided using corticosteroids within 2 months of surgery, but recent studies presented at the 2016 Annual Meeting of the American Academy of Orthopaedic Surgeons found an effect from these drugs when administered within 3 months of surgery. Recent government regulations require physicians to administer injections based on these guidelines in order to receive reimbursement for these procedures. Unfortunately, stopping corticosteroid use in patients to extend conservative care may limit their access to these types of orthopedic interventions.

The timing of antibiotics, obtaining preoperative nasal cultures to determine a patient's status as a staph carrier, the use of intraoperative chlorhexidine irrigation, and postoperative wound dressing bandages that are impregnated with silver nitrate have all had favorable reports in the effort to reduce postsurgical infection. Despite these efforts, the overall infection risk in orthopedic patients still runs about 1% to 2%.

### Suggested Reading:

1. Ciccone WJ 2nd, Fox PS, Neumyer M, Rubens D, Parrish WM, Pellegrini VD Jr. Ultrasound surveillance for asymptomatic deep venous thrombosis after total joint replacement. *J Bone Joint Surg Am.* 1998 Aug;80(8):1167-74.
2. Schairer WW, Nwachukwu BU, Mayman DJ, Lyman S, Jerabek SA. Preoperative Hip Injections Increase the Rate of Periprosthetic Infection After Total Hip Arthroplasty. *J Arthroplasty.* 2016 Sep;31(9 Suppl):166-9.
3. Al-Mulhim FA, Baragbah MA, Sadat-Ali M, Alomran AS, Azam Q. Prevalence of surgical site infection in orthopedic surgery: a 5-year analysis. *Int Surg.* 2014 May-Jun;99(3):264-8.