***CORR* Insights®: Symptomatic Pulmonary Embolus After Joint Arthroplasty: Stratification of Risk Factors**

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Where Are We Now?

Choosing the most appropriate treatment to minimize potential harm, along with evaluating the risk-benefit ratios of treatments we use, remain key issues in daily practice for healthcare practitioners. This is particularly true when using prophylaxis to prevent postoperative symptomatic venous thromboembolism in patients undergoing major orthopaedic surgery. The observed decreases in postoperative symptomatic venous thromboembolism risk are related to the development of effective prophylactic approaches. For patients undergoing major orthopaedic surgery, the cumulative occurrence rates of postoperative symptomatic venous thromboembolism measured up to 35

days postsurgery have decreased from 4.3% without prophylaxis (1.5% for pulmonary embolism and 2.8% for deep vein thrombosis) to 1.8% in patients receiving low-molecular weight-heparin [3] (0.55% for pulmonary embolism and 1.25% for deep vein thrombosis). However, these treatments can cause clinically important complications, such as bleeding, hematoma, infections [3, 6, 9]. Consequently, the study by Parvizi and colleagues examines ways to minimize the risk-benefit ratio among a subgroup of patients with potentially low-risk of venous thromboembolism.

Where Do We Need to Go?

The purpose of a venous thromboembolism prophylaxis practice guideline is to recommend the most appropriate treatment for a series of high-risk surgical procedures for each relevant patient subgroup. The risk of unpreventable venous thromboembolism, occurring despite the proper use of best evidence prophylaxis, defines the baseline risk of venous thromboembolism. Based on the 2007 American Academy of Orthopedic Surgeons (AAOS) guideline [8], Parvizi et al. used aspirin or warfarin as the reference standard prophylaxis for patients undergoing total joint arthroplasty. However, substantial differences exist between the AAOS guidelines and the 2009 American College for Chest Physicians (ACCP) guidelines [2]. For patients undergoing total joint arthroplasty, the AAOS recommendation of prophylaxis with aspirin or warfarin was based on poor quality (Grade C) evidence from case-controlled studies (Level III). The ACCP guidelines recommend a low molecular weight heparin, indirect factors IIa/Xa inhibitors, or adjusted doses of warfarin based on

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good quality evidence (Grade A), and supported by consistent findings from randomized controlled trials (Level I). The AAOS and ACCP guidelines fail to offer a uniform definition of outcome measurement for venous thromboembolism [3, 6, 9].

How Do We Get There?

The AAOS and ACCP guidelines provide different recommendations based on different definitions for outcome measurement, as well as different grades, levels, and types of studies. Which guideline offers the most clinically relevant definition: the symptomatic pulmonary embolism (AAOS), or the combination of both symptomatic pulmonary embolism and deep vein thrombosis (ACCP)? Pulmonary embolism alone is not sufficient in estimating the harm caused by thromboembolism. Deep vein thrombosis is also a potentially difficult complication to diagnose — some are considered asymptomatic, while others will cause symptoms, both acutely and perhaps even years later.

As we look at recommendations derived from the AAOS and the ACCP, questions emerge. Are observational studies with control groups suitable, or should guidelines rely purely on randomized trials? According to Feinstein [4], observational designs can help guide recommendations when it is not possible to conduct randomized clinical trials [7]. Similarly, systematic reviews are becoming increasingly important, but these, too, depend on how we grade the evidence. The same evidence and recommendation could be graded as “II-2, B”, “C+, 1”, or “strong evidence, strongly recommended” [5] depending on which system is used, and this can hamper our efforts in systematically reviewing the literature, as well as in creating clinical guidelines. The Grading of Recommendations Assessment, Development and Evaluation methodologies working group [5] developed a specific approach to grading quality of evidence and strength of recommendations [1]. This tool can help prevent errors, and should be used to assess the most appropriate recommendations, and consequently, the related baseline risk of venous thromboembolism in studies like Parvizi et al.

In order to make best use of clinical guidelines, we must have the ability to verify that those guidelines have been crafted using sound methodological approaches. Risk-benefit ratios and risk-stratification approaches like those offered by Parvizi and colleagues can help us do this.

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