Authors: Seung Beom Han, Martin Sarungi, David Wallace, Woo Young Jang, Jae-Hyuck Choi, Xisheng Weng

QUESTION 4: Is there a role for the administration of erythropoietin, hemotinics or other agents for patients with orthopaedic infections?

RECOMMENDATION: Yes. Erythropoietin used preoperatively in infected revision arthroplasty results in higher preoperative hemoglobin levels and lower allogeneic transfusion rates without compromising eradication of infection.

LEVEL OF EVIDENCE: Moderate

DELEGATE VOTE: Agree: 82%, Disagree: 9%, Abstain: 9% (Super Majority, Strong Consensus)

RATIONALE

The use of erythropoietin to reduce transfusion requirements in primary arthroplasty is widely known, although as transfusion rates have decreased, the cost-effectiveness of this treatment has been questioned [1]. Similarly, the effect of tranexamic acid in reducing transfusion requirement has been firmly established in primary arthroplasty [2], however much less is known about the effects of these agents in the case of orthopaedic infection. Although a recent paper has suggested that transfusion alone is not a risk factor for infection, the incidence of infection seems associated with other factors predictive of transfusion such as complexity or preoperative anemia, with all cause revision exhibiting much higher transfusion rates than primary arthroplasty [3]. As concurrent infection precludes autogenic transfusion, allogenic transfusion becomes the most common method of treating postoperative anemic, which carries with it inherent risk.

Only two case control studies have been found studying the effect of erythropoietin in infected arthroplasty, one in revision hip and one in revision knee for infection [4,5]. Both studies use an Epoetin alpha 40,000 unit dose administered between first- and second-stage revision, with different administration regimes. In both cases, transfusion rate and pre-reimplantation hemoglobin were used as primary end-points and both studies showed significant improvements in both metrics, without any noticeable increase in complications. It is notable, however, that both studies are at least 15 years old with no obvious follow-up work, since.

Several studies in the early 2000s examined the effects of the ani-fibrinolytic Aprotinin in the reduction of bleeding in studies including orthopaedic surgery for infection [6–8]. However, despite its effectiveness and widespread use in cardiothoracic surgery, Aprotinin was withdrawn from the market in 2008 due to concerns over increased mortality and renal failure. In light of this, the effects of Aprotinin have not been reviewed.

The beneficial effect of tranexamic (TXA) acid has been extensively reviewed in arthroplasty, but little research exists for patients with orthopaedic infections [9]. Only one small retrospective review examined the effects of topical TXA on infected arthroplasty patients undergoing two-stage revision. Those treated with TXA had lower hemoglobin droops and lower transfusion rates, with no increase in complications than those treated without TXA. However, it is not possible to form definitive conclusions from only one small retrospective study.

Only two studies were found examining the effects of erythropoietin in orthopaedic infections. Both case-control series indicate reduced transfusion rates and improved hemoglobin before re-implantation in two-stage revision for infection [4,5]. It must be noted that both studies are historic, with debatable relevance of comparing practice in the early 1990s (the time of the control cohorts) with contemporary care. However, the compelling success of these studies suggests that further investigation is required.

We note that a somewhat similar question from the 2013 International Consensus Meeting (ICM) resulted in strong consensus towards treatment of anemia with iron with or without erythropoietin to reduce the risk of transfusion. However, for this question the evidence is different from the 2013 ICM question. The current available literature does not appear to strongly support the same conclusion, primarily because the previously-referenced studies did not focus on infected cases [10,11].

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