G45: Does the type of administered anaesthesia (general vs. regional) influence the rate of SSI/PJI in major orthopaedic surgery?

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Response:

Yes. Patients receiving general anaesthesia (GA) during major orthopaedic surgery seems to have a higher rate of surgical site infections (SSI) and periprosthetic joint infections (PJI).

Strength of recommendation: Weak

Rationale:

We conducted a comprehensive systematic review to evaluate the effect of administered anaesthesia (general vs. regional) on the rate of SSI/PJI in major orthopaedic surgery.

Appropriate MESH terms were developed by the librarians to conduct a literature search in two databases Medline, Embase publications, then screened by two experts to identify 13 final publications for inclusion in the systematic review.

Many orthopaedic surgical procedures can be performed with either regional (RA) or general anaesthesia (GA). RA seems to reduce postoperative complications by minimizing sympathetic activation, inflammation, venous stasis, and the need for endotracheal intubation and positive pressure ventilation.[1-3] Postoperative complications, particularly SSIs, are a major concern in major orthopaedic surgery. SSIs after knee and hip arthroplasty can significantly worsen surgical outcomes, increasing both morbidity and mortality.[4]

In ten studies, the superiority of regional anaesthesia in reducing the risk of SSI and PJI in arthroplasty and trauma surgeries were highlighted.[5-14] However, two studies did not observe significant differences between the two anaesthesia methods.[15, 16]

A comprehensive registry study that included 779,491 patients who underwent total hip arthroplasty (THA) and total knee arthroplasty (TKA) found that regional anaesthesia was linked to a reduced risk of SSI, with odds ratios of 0.87 for THA and 0.84 for TKA.[8]

A systematic review comprising 15 studies demonstrated that patients receiving spinal anaesthesia were 23% less likely to develop postoperative SSIs compared to those who received general anaesthesia (OR: 0.77).[6]

An observational study involving 3,909 arthroplasties conducted by Scholten et al. showed an odds ratio for PJI of 2.0 (95% CI 1.0-3.7) for patients who had GA compared to those who received spinal anaesthesia matched by propensity scores.[5]

Another meta-analysis indicated that GA significantly raised the incidence of postoperative SSI compared to SA, with both unadjusted (OR: 0.77) and adjusted (OR: 0.84) analyses supporting this finding.[12]

A population-based study of 3,081 patients undergoing total hip or knee replacements reported that the odds of SSI for patients receiving GA were 2.21 times higher than those who underwent the procedures with spinal or epidural anaesthesia. This finding was consistent even after adjusting for age, sex, comorbidities, surgeon experience, and hospital teaching status.[11]

Not only GA is associated with an increased risk of SSI, the duration of anaesthesia itself is also considered an independent risk factor contributing to this increase.[13] Deep surgical site infections were notably less frequent in the regional anaesthesia group, with an odds ratio of 0.38 compared to the GA group.[14]

Finally, it was observed that regional anaesthesia not only lowers the risk of superficial infections but also significantly reduces the risk of systemic infections, including sepsis.[7]

In two separate studies focused on revision total knee arthroplasty, the risk of SSI was also found to be 1.43 and 1.32 times higher for patients under GA. [9, 10]

In ICM 2018, the evidences either favored neuraxial anaesthesia (NA) over general anaesthesia (GA) or showed no difference in reducing the surgical site infection (SSI) risks after THA/TKA. No evidence supporting GA and NA is strongly recommended when feasible.[17].

While two studies favored RA or reported no significant differences, the predominantly retrospective nature of the existing research highlights the need for high-quality prospective studies to validate these findings. Nonetheless, in the absence of evidence supporting GA and with a consistent trend favoring RA, regional anaesthesia should be prioritized as the anaesthetic method of choice for major orthopaedic procedures, whenever clinically feasible.

Conclusion

This analysis demonstrates that regional anaesthesia (RA) offers significant advantages over general anaesthesia (GA) in major orthopaedic surgeries, particularly in reducing the incidence of surgical site infections (SSI) and periprosthetic joint infections (PJI). The physiological benefits of RA, such as reduced sympathetic activation, minimized inflammation and lower systemic infection risks, make it a compelling choice.

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