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Is There a Difference in Outcome of Total Joint Arthroplasty When Regional Versus General Anesthesia Are Used?

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Is there a difference in outcome of total joint arthroplasty when regional versus general anesthesia are used?

Response/Recommendation: The literature supports the notion that various perioperative complications are reduced when neuraxial anesthesia is used, with less evidence that long term outcomes are affected. We therefore recommend that regional anesthesia should be utilized whenever feasible, and when no contraindications are present.

Level of Evidence: Moderate.

Expert vote: Agree 85 (62%); disagree 10 (6%); abstain 4 (32%).

Rationale

Numerous articles on this topic have been published and range from mostly small single institutional prospective and retrospective studies, case series, meta-analyses and more recently large population-based evaluations. Large, randomized controlled studies are not available, likely due to their cost prohibitive size given the relatively low incidence of complication rates [1].

In summary, an overwhelming number of publications supports either equivalence or a benefit of regional (versus general) anesthesia in terms of perioperative outcomes. Virtually no data suggest the superiority of general versus regional anesthesia.

In two large reviews of the entire literature, the International Consensus on Anesthesia-Related Outcomes after Surgery concluded that the use of neuraxial anesthesia is recommended over the use of general anesthesia [2] and advocates for the use of peripheral nerve blocks [3] to reduce perioperative complications whenever feasible and when no contraindications exist.

Specifically, when analyzing data from 94 studies, neuraxial anesthesia was associated with lower odds or no difference in virtually all reported complications, except for urinary retention.

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For example, for total hip and knee arthroplasty, respectively the odds associated with neuraxial anesthesia were reduced for mortality (odds ratio [OR] 0.67, 95%, confidence interval [CI] 0.57 to 0.80; OR: 0.83, 95% CI: 0.60 to 1.15) pulmonary (OR 0.65, 95% CI: 0.52 to 0.80; OR: 0.69, 95% CI: 0.58 to 0.81), acute renal failure (OR 0.69, 95% CI: 0.59 to 0.81; OR: 0.73, 95% CI: 0.65 to 0.82), deep venous thrombosis (OR 0.52, 95% CI: 0.42 to 0.65; OR: 0.77, 95% CI: 0.64 to 0.93); infections (OR 0.73, 95% CI: 0.67 to 0.79; OR: 0.80, 95% CI: 0.76 to 0.85), and blood transfusion (OR 0.85, 95% CI: 0.82 to 0.89; OR: 0.84, 95% CI: 0.82 to 0.87).

The analysis of 122 studies on the use of peripheral nerve blocks revealed a reduction in the odds of various outcomes after total hip and knee arthroplasty, respectively including postoperative delirium (OR 0.30, 95% CI 0.17 to 0.53; OR 0.44, 95% CI 0.22 to 0.88), respiratory failure (OR 0.36, 95% CI 0.17 to 0.74; OR 0.37, 95% CI 0.18 to 0.75), cardiac complications (OR 0.84, 95% CI 0.76 to 0.93; OR 0.83, 95% CI 0.79 to 0.86), surgical site infections (OR 0.55 95% CI 0.47 to 0.64; OR 0.86 95% CI 0.80 to 0.91), thromboembolism (OR 0.74, 95% CI 0.58 to 0.96; OR 0.90, 95% CI 0.84 to 0.96) and blood transfusion (OR 0.84, 95% CI 0.83 to 0.86; OR 0.91, 95% CI 0.90 to 0.92).

A review of the literature since the publication of these guidelines supports these conclusions [4–11].

It must be noted that the mechanism of action by which these benefits are exerted, although speculative, maybe linked to the sympathectomy-induced improvement in circulation and control of blood pressure spikes, avoidance of airway instrumentation, decreased need for systemic, centrally active analgesics, anesthetics and sedatives among others. It has been argued that modern general anesthetic techniques can achieve these goals, but likely at higher cost and effort.

CRediT authorship contribution statement

Oliver Marín-Peña: Writing – review & editing, Supervision. **Lazaros A. Poultsides:** Writing – review & editing. **Fatih Yildiz:** Writing – review & editing, Validation, Conceptualization. **Mohammad Ali Enayatollahi:** Writing – review & editing, Validation. **Claudio Chillemi:** Writing – review & editing, Validation, Conceptualization. **Julian Costantini:** Writing – review & editing, Validation. **Quanjun Cui:** Writing – review & editing, Validation. **Stavros Memtsoudis:** Writing – original draft.

References

[1] Liu J, Wilson L, Poeran J, Fiasconaro M, Kim DH, Yang E, et al. Trends in total knee and hip arthroplasty recipients: a retrospective cohort study. Reg Anesth Pain Med 2019;44:854–9.
[2] Memtsoudis SG, Cozowicz C, Bekeris J, Bekere D, Liu J, Soffin EM, et al. Anaesthetic care of patients undergoing primary hip and knee arthroplasty: consensus recommendations from the International Consensus on Anaesthesia-Related Outcomes after Surgery group (ICAROS) based on a systematic review and meta-analysis. Br J Anaesth 2019;123:269–87.
[3] Memtsoudis SG, Cozowicz C, Bekeris J, Bekere D, Liu J, Soffin EM, et al. Peripheral nerve block anesthesia/analgesia for patients undergoing primary hip and knee arthroplasty: recommendations from the International Consensus on Anesthesia-Related Outcomes after Surgery (ICAROS) group based on a systematic review and meta-analysis of current literature. Reg Anesth Pain Med 2021;46:971–85.
[4] Oh TK, Song IA. Regional versus general anesthesia for total hip and knee arthroplasty: a nationwide retrospective cohort study. Reg Anesth Pain Med 2024:rapm-2024-105440 [Epub ahead of print].
[5] Lee S, Kim MK, Ahn E, Jung Y. Comparison of general and regional anesthesia on short-term complications in patients undergoing total knee arthroplasty: a retrospective study using national health insurance service-national sample cohort. Medicine (Baltimore) 2023;102:e33032.
[6] Issa M, Naja A, Ghanem A, Shayya S, Noufi P, Faddoul A, et al. Regional versus general anesthesia in knee arthroplasty in patients with different classes of BMI: a matched analysis of the NSQIP database. J Orthop Sci 2024;29:188–93.
[7] Matharu GS, Garriga C, Rangan A, Judge A. Does regional anesthesia reduce complications following total hip and knee replacement compared with general anesthesia? An analysis from the national joint registry for england, Wales, Northern Ireland and the Isle of Man. J Arthroplasty 2020;35:1521–1528.e1525.
[8] Khan IA, Noman R, Markatia N, Castro G, Rodriguez de la Vega P, Ruiz-Pelaez J. Comparing the Effects of general versus regional anesthesia on postoperative mortality in total and partial hip arthroplasty. Cureus 2021;13:e12462.
[9] Wang JC, Piple AS, Mayfield CK, Chung BC, Oakes DA, Gucev G, et al. Peripheral nerve block utilization is associated with decreased postoperative opioid consumption and shorter length of stay following total knee arthroplasty. Arthroplast Today 2023;20:101101.
[10] Heckmann ND, De A, Porter KR, Stambough JB. Spinal versus general anesthesia in total knee arthroplasty: are there differences in complication and readmission rates? J Arthroplasty 2023;38:673–679.e671.
[11] Li Z, Xu X, Zhuang Z, Lu J, Gao F, Jiang Q. Impact of spinal Anaesthesia versus general Anaesthesia on the incidence of surgical site infections after knee or hip arthroplasty: a meta-analysis. Int Wound J 2024;21:e14369.