

## EDITORIAL

# The impact of anesthesia on postoperative outcomes: the effect of regional anesthesia on the incidence of surgical site infections



Surgical site infections (SSI) are a major contributor to morbidity and mortality in the postoperative care. Current data suggest that SSI are responsible for about 20% of all health-care-associated infections.<sup>1,2</sup> Importantly, deep surgical site infections are strongly associated with a prolonged hospitalization, significant increase in costs, and poor outcomes, representing a considerable burden for patients and healthcare systems.<sup>3</sup>

The overall management of SSI comprises prevention, adequate differential diagnosis, and appropriate early treatment as well a rigorous follow-up. Prevention of surgical infection relies on optimization of patient factors and use of a variety of evidence-based pharmacologic and nonpharmacologic measures. Clinical practice guidelines for perioperative antimicrobial prophylaxis are widely available and applied everywhere.<sup>4</sup> Nevertheless, SSI will continue to impact morbidity and mortality in both hospital and outpatient settings.

In the last few decades, regional anesthesia has gained momentum as an effective strategy to improve perioperative analgesia and potentially changing relevant postoperative outcomes. Previous studies suggested that regional anesthesia might minimize the risk of postoperative SSI and cancer recurrence, subsequently providing the benefits to both short- and long-term outcomes.<sup>5</sup> There is strong evidence that the avoidance of allogeneic blood transfusion and implementation of an adequate perioperative blood glucose control are all effective measures that reduce postoperative infection rates.<sup>6</sup> However, significant controversy exists regarding the effects of a high versus a low intraoperative fraction of inspired oxygen (FiO<sub>2</sub>) on postoperative SSI in adults undergoing general anesthesia. A recent systematic review has shown that a high FiO<sub>2</sub> did not improve outcomes including surgical site infections, length of stay, or mortality in patients undergoing general anesthesia for non-cardiac surgery.<sup>7</sup>

Previous findings have indicated that regional anesthesia may reduce postoperative infectious complications in several clinical settings. For instance, a recent meta-analysis

has shown that regional anesthesia is associated with a lower incidence of sepsis in vascular patients.<sup>8</sup> In orthopedic surgery, previous findings based on observational studies have supported the overall beneficial effects of regional anesthesia in decreasing the development of SSI after both knee and hip arthroplasties.<sup>9</sup> Additionally, a comprehensive systematic review has demonstrated that epidural analgesia reduced the odds of pneumonia after abdominal and thoracic surgery, although this benefit was weak in larger studies.<sup>10</sup> However, further studies were unable to show association of regional analgesia with postoperative infectious complications in abdominal surgeries.<sup>11,12</sup> In fact, considering all available evidence, clinical data underlying the potential role of regional anesthesia in reducing postoperative infectious complications is still controversial and further studies are warranted.

In this issue of the *Brazilian Journal of Anesthesiology*, an interesting, relevant and well-designed retrospective study from the Department of Outcomes Research at Cleveland Clinic provides new insights into the potential effects of regional anesthesia on postoperative infectious complications. In this study, Bajracharya et al.<sup>13</sup> compared the incidence of a composite of serious infections after colorectal surgery in patients who received postoperative regional analgesia (epidural or transversus abdominis plane blocks) or patient-controlled intravenous analgesia with opioids (IV-PCA). The outcome was defined as a composite of in-hospital serious infections, including intra-abdominal abscess, pelvic abscess, deep or organ-space SSI, clostridium difficile, pneumonia, or sepsis. In their analysis, authors matched 681 regional anesthesia patients to 2862 IV-PCA only patients based on propensity scores derived from potential confounding factors. This study suggests that regional analgesia is not significantly associated with a reduced incidence of postoperative serious infection (odds ratio: 1.14; 95% Confidence Interval 0.87–1.49). Of note, authors observed a weak association of postoperative opioid consumption with serious

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infectious complications. Interestingly, considering the use of epidural and systemic opiates, at least in this patient population, regional anesthesia did not reduce the total opioid dose administered to patients perioperatively. Conceivably, future prospective studies could implement more effective opioid-sparing strategies of regional anesthesia, investigating the potential benefits of this approach in the incidence of infections complications after surgery.

It is important to point out that the study design influences the results and hence the quality of the evidence produced. Ideally, determining the risk for each patient or groups of patients should integrate sample selection. The higher the patient's risk the greater the chance for a therapeutic intervention to show positive results (lower Number Needed to Treat). Patients at low or no risk are less likely to develop an outcome and therefore less likely to benefit from the intervention. This issue could have played a role in the negative findings observed by Bajracharia et al.<sup>13</sup> This is an important consideration to be made in the evaluation of the evidence produced by large observational studies, where additional efforts are needed to identify patients at higher risk of a specific clinical outcome.

Although the number of patients included in the study conducted by Bajracharia et al.<sup>13</sup> is expressive and undoubtedly the results obtained add relevant evidence to the field, a retrospective cohort study brings the inconvenience of multiple biases. It is important that the question raised by the study be evaluated from the perspective of a randomized and controlled trial, where such confounding factors could be minimized. Alternatively, the use of large databases and the technology present in several hospitals can help (albeit retrospectively) in the detection of factors associated with relevant outcomes.<sup>14</sup>

In summary, current evidence is still equivocal regarding the effects of anesthesia techniques and SSI. In this context, the study of Bajracharya et al.<sup>13</sup> reinforces the rationale that regional analgesia techniques should not be selected as a measure to reduce postoperative infections. However, clinical evidence is still growing in this area and new prospective clinical trials, observational studies and systematic reviews are still expected in the near future to further investigate the impact of anesthesia techniques, especially regional anesthesia, on important patient-centered outcomes such as SSI and other postoperative infectious complications.

## Conflicts of interest

The authors declare no conflicts of interest.

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