


# Effects of Propofol, Low and High Doses of Remimazolam on Hemodynamic and Inflammatory Response in Laparoscopic Surgery [Response to Letter]

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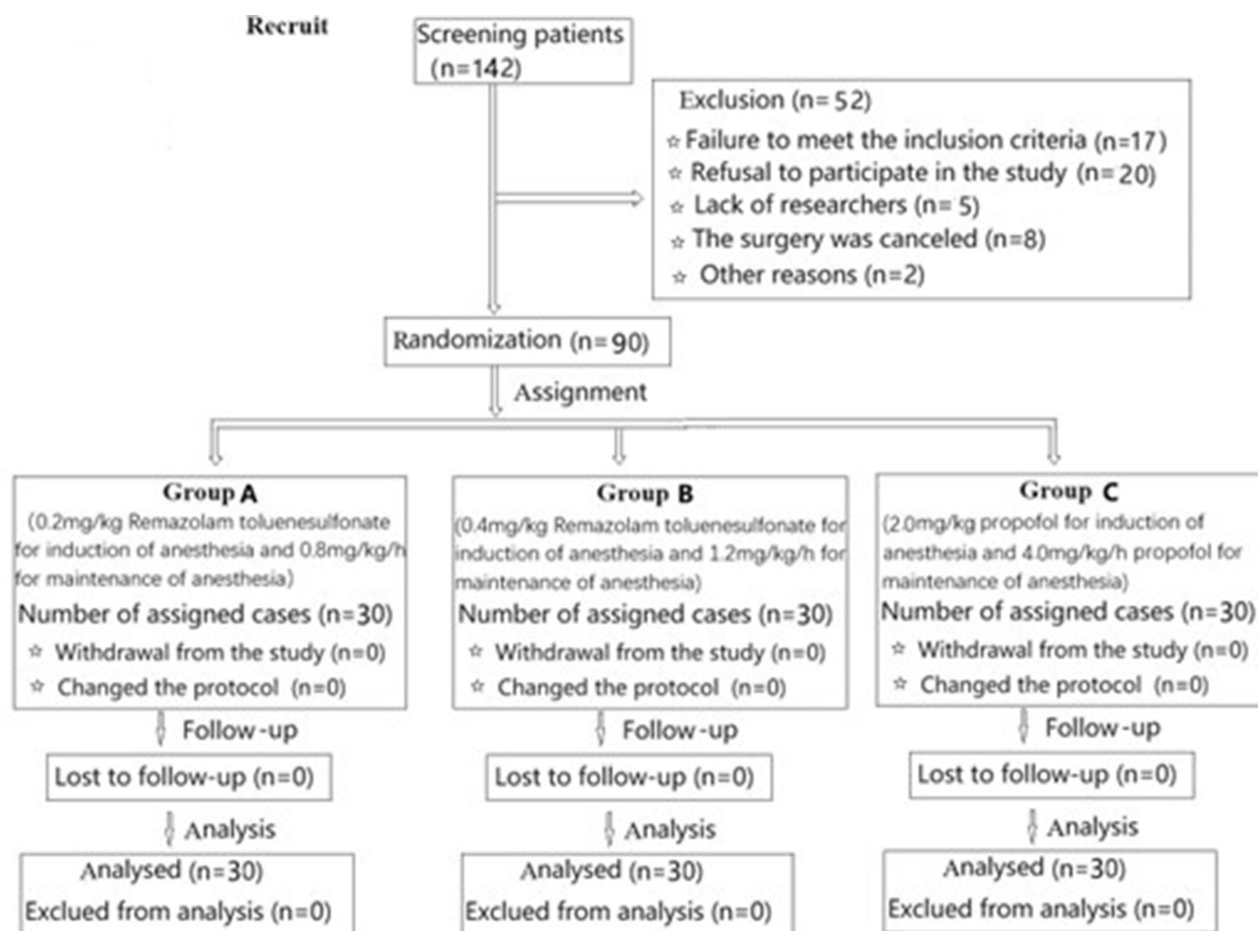
## Dear editor

We appreciate the interest and comments from Guanyu Yang and Qinjun Chu from Zhengzhou Central Hospital Affiliated to Zhengzhou University on our article titled “Effects of Propofol, Low and High Doses of Remimazolam on Hemodynamic and Inflammatory Response in Laparoscopic Surgery”.<sup>1</sup> Below is our response to their feedback.

We completely agree with the authors’ emphasis on the importance of following the CONSORT guidelines. We acknowledge that our initial flowchart was overly simplified and failed to illustrate the patient selection process. Therefore, we have revised the flowchart (Figure 1) to include the complete process, which is shown below.

In this study, the sample size was determined based on the SAA, CRP, PCT, and IL-6 levels at the T1 and T2 time points in a preliminary study involving 30 patients (10 in each group). The formula for estimating the sample size was  $n = (Z_{1-\alpha/2} \cdot Z_{1-\beta} \cdot \sqrt{k \cdot \sigma^2})^2 / (\mu_{\max} - \mu_{\min})^2$ . For SAA at the T1 time point, 23 cases are needed per group, and at the T2 time point, 22 cases are needed per group. For CRP at the T1 time point, 26 cases are needed per group, while at the T2 time point, 22 cases are needed per group. For PCT at the T1 time point, demands 29 cases are needed per group, while at the T2 time point, 30 cases are needed per group. For IL-6 at the T1 time point, necessitates 25 cases are needed per group, and at the T2 time point, 27 cases are needed per group. To ensure robust statistical power, the final sample size was set to the highest estimated number across all parameters and time points, which was 30 cases per group.

We agree that the surgical procedures may influence the effects of different doses of remimazolam and propofol on the inflammatory responses in patients undergoing laparoscopic surgery. This is indeed a topic worth exploring. In cardiac surgery, the administration of higher doses of anesthetics is often necessary, which is closely related to the need for sternotomy and extracorporeal circulation,<sup>2</sup> while these procedures are substantial traumas for patients, potentially leading to increased inflammatory responses and more severe pain. However, evidence suggests that, except for cardiac surgery, the amount of anesthetics used in thoracic and abdominal surgeries does not significantly correlate with postoperative pain scores.<sup>3</sup> Pain is positively correlated with inflammatory responses.<sup>4</sup> Therefore, we speculate that, except for cardiac surgery, the trauma and inflammatory responses in thoracic and abdominal surgeries may not vary greatly, and the required doses of anesthetics and pain scores may not differ significantly. Since all patients underwent gynecological, general, and urological surgeries following standard procedures, we compared the types of surgeries, the duration of surgery (which is positively correlated with the inflammatory response), and the dosages of sufentanil and remifentanil (which are administered based on surgical trauma) among the three groups to assess the possible effects. The results, as presented in Tables 1 and 4,<sup>1</sup> indicated no significant differences in these parameters among the groups.



**Figure 1** Schematic illustration of the randomized trial design, including enrollment, intervention allocation, and analysis.

Although we all agree that low doses of anesthetics may cause less suppression of hemodynamics,<sup>5</sup> remimazolam tosylate is a novel anesthetic, whose hemodynamic impact at various dosages, relative to the conventional anesthetic propofol, is not well understood by our team. Therefore, in our study, we designed a propofol group as the conventional anesthetic, and two groups with low and high doses of remimazolam tosylate, to fully understand the pharmacological characteristics and clinical efficacy of remimazolam tosylate, thus informing its optimal use in clinical settings. In the study, we observed that low-dose remimazolam, as well as the conventional dose of propofol and high-dose remimazolam, all demonstrated the ability to reduce the frequency and dosage of vasopressors used. Therefore, we do not assert that low-dose remimazolam is superior to high-dose remimazolam in this regard.

## Disclosure

The authors report no conflicts of interest in this communication.

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