Reducing propofol injection pain by pretreatment with tramadol and butorphanol: Are they safe?

Sir,

We read with interest the article entitled “Efficacy of tramadol and butorphanol pretreatment in reducing pain on propofol injection: A placebo-controlled randomized study” by Singh et al. [1] First, we would like to congratulate the authors for their rigorous scientific method. They have presented a very interesting topic, particularly for anesthesiologist. Most patients describe the first stage of their anesthesia as the most troubling part.

The authors conducted prospective, three groups, double-blind, randomized controlled trial on a total of ninety patients scheduled for elective surgery under general anesthesia with propofol. The control group (Group I) received an injection of normal saline 3 ml intravenously (IV). They compared the effect of two interventions on propofol injection pain (PIP) include injection of tramadol 50 mg (Group II) or butorphanol 1 mg IV (Group III). The outcome variables, PIP, were measured using a visual analog scale. Based on their results, the severity of PIP was significantly decreases in Group II and III in comparison to the control group. They reported no side effects for the pretreatment drugs.

Propofol, a common anesthetic agent for induction, often causes pain at injection site, particularly when injected into peripheral distal veins such as dorsum of the hands. The
prevalence of PIP has been reported differently in various studies from 28% to 90%. The exact mechanism for PIP is unclear. It has been demonstrated that injection of propofol irritates the internal layer of the venous, which in turn releases the inflammatory mediators such as bradykinin. These mediators dilate venules, increase its permeability and consequently, stimulate nociceptors and nerve endings.\[2-4\]

In this regard, Scott et al.\[5\] proposed the possible role of the plasma kallikrein–kinin system (KKS) to produce PIP. Based on these mechanisms, recently, several preventive and therapeutic methods have been recommended for reducing that pain including using the antecubital vein, cooling, warming or diluting the propofol solution, pretreatment with lidocaine, addition of lidocaine, concomitant administration of lidocaine with propofol, reducing the pH of propofol, use of thiopental, ephedrine, ondansetron, metoclopramide, nafamostat mesilate, opioids, ketamine, and so forth.\[2,6-8\]

The results of a systematic review, in 2000, revealed pretreatment with lidocaine as the most useful intervention for PIP reduction.\[8\] This result was confirmed in a more recent systematic review, in 2011, which suggested that lidocaine-propofol admixture is similar to pretreatment with lidocaine in term of PIP reduction.\[2\]

In these regards, we have some concerns regarding the study conclusion drawn by the authors. Considering the aforementioned mechanisms of action, can Tramadol and/or Butorphanol inhibit or modify the activity of the KKS system. In fact, since the systematic review, in 2000,\[8\] the pretreatment with lidocaine was widely adopted and still remains the choice of treatment for alleviating PIP due to the nerve ends paralyzing. Future studies should also determine the mechanism of action for their proposed intervention. As authors reported, a tourniquet was applied about 2 min. Although the location of securing the tourniquet is unclear, the safety of blood stasis following tourniquet needs critical attention. Therefore, the safe time and duration of securing the tourniquets warrant further research. As reported by authors, an IV line was secured in a peripheral vein on the dorsum of the hand. There is well-established evidence that claims about the pain of dorsum of the hand when injecting the propofol.\[9\]

The risk for extravasation and infiltration is increased when the dorsum vessels of the hand were used for injection. For the safety of patients, future PIP reductive interventions studies must consider other sites of IV access such as antecubital site. Several demographic and clinical factors affect the severity of PIP including the propofol solution pH, the younger age patients, a distal and/or proximal peripheral IV site, the pushing speed of solution into IV line, female gender, and so forth.\[3\] Singh et al. need to clearly elaborate on the methodology of controlling these variables or their effect on the findings of the study by multivariate analysis. There is a critical need to use the univariate and multivariate analyses in future researches to find out more factors contributing to the PIP.

Thus to conclude the study by Singh et al. is remarkable and examines significant issues of anesthesia. Certainly, more rigorous clinical trials are needed to understand the potential effects of opioids on pain reduction as well as to find the contributing factors to the PIP. We recommend that future trials will consider the mechanism of action, site of IV access, factors contributing to the PIP, patient gender, and age, procedure’s duration, and side effect when designing interventional modalities.

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Conflicts of interest
There are no conflicts of interest.

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Malfunction of adjustable pressure limiting valve

Sir,

It is mandatory to check the breathing system before the administration of anesthesia. In the modern machines, this check is done automatically by the machine as a preanesthesia checkout including a leak test.

The failure of anesthesia circuit intraoperatively can be a relatively rare event after automated checkout. Such incidences have been reported due to disconnection, breakage, or malfunction of any component of the circuit.

We report a complete manual ventilation failure due to temporary malfunctioning of adjustable pressure limiting (APL) valve.

We report a case conducted on Dräger Primus, where manual ventilation failed intraoperatively. As per the routine practice, the machine had cleared self-test before the anesthesia was conducted. Patient has undergone lumbar decompression under general anesthesia (induction: propofol 2 mg/kg and fentanyl 2 mcg/kg; muscle relaxation: rocuronium bromide 0.6 mg/kg; orotracheal intubation; maintenance: sevoflurane in oxygen anesthesia with controlled ventilation) in the prone position. Before the surgical closure, the surgeon requested for a Valsalva maneuver to check for the dural integrity. Hence, the ventilation was taken over on manual mode, and we tried to ventilate manually at a fresh gas flow of 1 L/min with APL closed at 20 cm of water. The reservoir bag did not fill, and hence we further increased the fresh gas flow (FGF) to 4 L/min and the APL was closed to 70 cm of water. The reservoir bag did not fill even with the closed valve which alerted us about the circuit leak. Meanwhile, the patient was again placed on controlled mode of ventilation. With the controlled mode, the patient was adequately ventilated without any circuit leak. While looking for the leak site, we found that the gas sample line was coiled around the APL valve, with a part of the line trapped between the control knob and the base of the APL valve. Thus, the APL valve was not closing completely to allow the reservoir bag to fill [Figure 1]. On controlled ventilation, the patient was getting ventilated as the APL valve is bypassed. After releasing the sample line, the APL valve could be closed, and we could manually ventilate the patient.

After thorough search of literature, we found that few such incidences have been reported where trapped temperature monitoring line [1] and CO₂ sample line [2] had caused malfunction of the APL valve in the Drager workstation. Kibelbek [1] reported two cases where trapped temperature cable or CO₂ sampling line below the APL valve caused its malfunction. Similarly, Vijayakumar et al. [2] reported the trapping of the CO₂ monitoring line below the APL valve causing the malfunction of the circuit. Kibelbek [1] suggested that this can be overcome by adding a skirt or lip to the APL knob extending over the base of the valve that may prevent foreign objects from becoming wedged between the knob and the base. Clark [3] and Karchner [4] of the Draeger Medical Inc. suggested the use of area beneath the breathing system mounting arm to route lines and cables to avoid such events. One can also use a boom arm that is provided as an accessory that can assist the user in cable management. He also highlighted the warning in the Operator’s Instruction Manual which mentions to route all lines and cables away from the APL valve knob to prevent interference.

We reported this case to convey that automated preanesthesia checkouts are not full proofs. The integrity and the...