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Editorial
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An introduction to the various role of dexmedetomidine

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Dexmedetomidine is an alpha2 agonist with sedative, analgesic, and sympatholytic effects [1]. In 1999, the US Food and Drug Administration approved it as a sedative for mechanically ventilated patients in intensive care units. In 2008, its use was extended to specific procedures outside the operating room. In addition to the above indications, several studies and case reports have suggested a variety of applications. Although the official guidelines do not include its use for pediatric patients, recent trials have reported its effectiveness and benefits in this population.

Recent applications of dexmedetomidine include as an adjunct to general anesthesia to attenuate the stress of intubation [2], to reduce anesthetics for maintenance and postoperative analgesics [3], and to induce smooth emergence [4]. When used as an adjuvant to regional anesthesia or a nerve block, dexmedetomidine improves the quality and duration of anesthesia [5,6]. The current volume of the *Korean Journal of Anesthesiology* presents an interesting clinical study [7] and a case report [8] about the off-label use of dexmedetomidine.

Gupta et al. [7] describe dexmedetomidine infusion as an adjuvant to general anesthesia for radical mastectomy that enabled better visibility of the surgical field. Some types of surgery require hypotensive anesthesia to improve the surgical field. However, Gupta et al. show that the systemic blood pressure was not decreased significantly, while providing a better surgical view. In this respect, the reported effect of dexmedetomidine provides additional background regarding its use in such operations. In fact, several researchers have used dexmedetomidine to improve the view in endoscopic sinus surgery. Kim et al. [9] reported that a continuous infusion of dexmedetomidine provides a surgical field view and hemodynamic stability similar to that of the target-controlled infusion of remifentanil. In endoscopic sinus surgery, dexmedetomidine provided better hemodynamic stability and operative field visibility than nitroglycerin-induced hypotension [10].

As an adjuvant to general anesthesia, dexmedetomidine provides additional benefits of reducing the dose of inhalation agent and opioid analgesics [9,10], improving the quality of recovery, decreasing postoperative nausea and vomiting [9,11], and enhancing postoperative gastrointestinal motility [12]. Gupta et al. [7] also show that dexmedetomidine infusion allows significant reductions in the amounts of isoflurane and intraoperative fentanyl required, while maintaining the targeted blood pressure. The recovery from anesthesia was also significantly smoother than that without dexmedetomidine. These effects are important for operating conditions requiring high anesthetic concentrations and opioids, especially in patients with less tolerance.

The case report by Kim et al. [8] emphasizes the plausibility of dexmedetomidine replacing the repeated use of propofol for pediatric patients. Conventionally, midazolam, propofol, and ketamine have been administered as sedatives for pediatric patients. However, the adverse effects of pediatric sedation, like respiratory depression, are serious concerns that may necessitate endotracheal intubation [13]. Kim et al. [8] reported on repetitive infusion of dexmedetomidine on more than 20 occasions in two children who underwent radiation therapy with only a minimal risk of respiratory depression. However, the required infusion rate was higher than the recommended dosage for adequate sedation in adults, and needed to be increased in the repeated sessions. Interestingly, a recent animal study has shown that dexmedetomidine has a neuroprotective effect on developing rat brains [14]. The use of higher doses and rapid infusion of dexmedetomidine has caused bradycardia and hypotension in several patients. In this respect, the lack of adverse hemodynamic

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side effects reported by Kim et al. are intriguing. They might be in line with recent reports on pediatric patients in whom a bolus injection was acceptable with hemodynamic responses [15].

In addition to the reports in this volume [7,8], there are numerous applications of dexmedetomidine in anesthesia [16]. Further studies are necessary to examine the interesting role of dexmedetomidine in all types of anesthesia and sedative procedures for the benefit of our patients.

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