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Editorial
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Dexmedetomidine: an attractive adjunct to anesthesia

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Dexmedetomidine is a new alpha 2-adrenoceptor agonist approved for use as a sedative and analgesic in intensive care unit (ICU). Dexmedetomidine is seven to eight times more specific to the alpha-2 receptor than the partial agonist clonidine. In addition to its sedative properties, dexmedetomidine has opioid-sparing, anxiolytic, sympatholytic, and respiratory-preserving properties and provides superior hemodynamic stability compared with many sedative agents now in use [1]. Dexmedetomidine is widely used for sedation in the ICU because of its beneficial effects. A previous study showed that dexmedetomidine is associated with a shortened time to extubation and reduced prevalence of delirium in critically ill patients receiving mechanical ventilation [2,3]. A recent study reported that dexmedetomidine decreases the duration of mechanical ventilation and also enhances the rate of resolution of delirium in critically ill patients with agitated delirium [4].

The clinical applications of alpha 2-adrenergic agonists have been expanded in the field of anesthesia since they were first used as anti-hypertensive agents. Dexmedetomidine reduces the minimum alveolar concentration of inhalation anesthetics, reduces opioid requirement, and has anti-nociceptive effects on both somatic and visceral pain when used as an anesthetic adjunct administered via the neuraxial route [5]. Local injection of dexmedetomidine diminishes the neuropathic pain induced by spinal nerve ligation in animal models, and systemic administration of dexmedetomidine reduces post-thoracotomy pain syndrome after coronary artery bypass surgery [6,7]. A recent study showed that use of dexmedetomidine as a sedative in elderly patients receiving orthopedic surgery reduces postoperative agitation compared to propofol [8]. The favorable properties of dexmedetomidine, such as minimal respiratory depression, may provide protection against adverse respiratory events during anesthesia for awake craniotomy or awake intubation [9,10].

Many studies have demonstrated that dexmedetomidine has organ-protective effects in various anesthetic conditions. Previous studies have reported that the use of alpha 2-adrenergic agonists can reduce mortality and myocardial infarction in patients undergoing vascular surgery, and also provides a cardioprotective effect during cardiac surgery [11]. Dexmedetomidine preserves cerebral blood flow (CBF) and cerebral metabolic rate (CMR) coupling by dose-dependently reducing CBF and CMR in healthy humans [12]. Growing evidence suggests that dexmedetomidine confers neuroprotective effects in various experimental models, including hypoxia-induced ischemia, subarachnoid hemorrhage, and ischemia/reperfusion injury [13-15]. A recent clinical trial showed that continuous infusion of dexmedetomidine during cardiopulmonary bypass surgery decreases the incidence and severity of acute kidney injury [16].

Although the various beneficial properties of dexmedetomidine have expanded its clinical use in many areas, serious side effects, such as cardiac arrest, have been reported in several studies [17,18]. These reports suggest that dexmedetomidine should be used with caution in patients with certain conditions in which sympathetic function is suppressed or parasympathetic function is enhanced. Fujita et al. [19] reported that plasma dexmedetomidine concentration is correlated with the infusion dose in critically ill adult patients, but not in children < 2 years old admitted to the pediatric ICU [20]. These reports emphasize the need for close monitoring, individualized treatment, and dose adjustment to achieve the desired clinical response when administering dexmedetomidine. In conclusion, dexmedetomidine is a new alpha 2-adrenoceptor agonist with promising sedative and analgesic properties. The unique properties of dexmedetomidine, including anxiolytic and opioid-sparing properties and minimal respiratory depression, make it a very attractive drug in the fields of intensive care and anesthesia.

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