

Commentary: Role of alpha-2 agonists in regional ophthalmic anesthesia

Regional anesthesia is the most common mode of anesthesia used in ophthalmic surgical procedures. Among regional blocks, peribulbar anesthesia is the safest and most commonly used. However, in procedures with prolonged operating time such as vitreoretinal surgeries, repeated need for block supplementation and patient anxiety are a challenge. Adjuvants to peribulbar anesthetics such as hyaluronidase and adrenaline along with preoperative anxiolytics/sedatives have been tried to overcome these challenges.^[1] Alpha2 agonists are drugs that bind selectively to alpha2 adrenergic receptors in the central, peripheral, and autonomic nervous system as well as in vital organs and blood vessels. They produce dose-dependent analgesia, anxiolysis, and sedation without causing respiratory depression by acting on the G-protein-coupled alpha2 receptors.^[2]

Two main alpha2 agonists that are commercially available include clonidine and dexmedetomidine. Although neither of them is completely selective for alpha2 receptors, dexmedetomidine is 8–10 times more selective toward these receptors compared with clonidine. Dexmedetomidine has a higher avidity and affinity for alpha2 receptors, shorter elimination half-life, and higher clinical efficacy with a lesser side effect profile compared with clonidine.^[3] The study by Gujral *et al.* adds credence to the anxiolytic effect of dexmedetomidine which is coupled with hemodynamic safety in patients receiving peribulbar block for vitreoretinal surgery.^[4]

Clonidine was the first alpha2 agonist to be used as an adjuvant by Mjahed *et al.*, who found that its addition to

peribulbar block decreased intraocular pressure, enhanced anesthesia, akinesia, and intraoperative sedation.^[5] However, use of clonidine was associated with hemodynamic side effects such as bradycardia, arterial and orthostatic hypotension, rebound hypertension, and syncope. The long half-life of clonidine meant that the hemodynamic instability was not only seen intraoperatively but also for upto 8 h in the postoperative period.^[6] Dexmedetomidine, a newer alpha2 agonist, has shown potential with a better safety profile due to its higher selectivity and shorter half-life. Two recent studies have evaluated its efficacy and side effect profile when used as an adjunct to peribulbar block during vitreoretinal surgery.^[7,8] Ahmed *et al.*^[7] used 20 µg of dexmedetomidine along with lidocaine, bupivacaine, and hyaluronidase. They found faster onset of anesthesia, akinesia, increased duration of anesthesia, and increased patient sedation in comparison to a control group using normal saline. EL-Shmaa *et al.*^[8] compared two doses of dexmedetomidine – 15 and 30 µg – as adjuvants to routine peribulbar anesthetic agents. They also found similar results in terms of onset and duration of anesthesia in the dexmedetomidine groups compared with the control group. The two doses did not differ significantly in terms of their efficacy or side effect profile. This study in contrast did not find any difference in the time of onset of anesthesia between the study and the control group; however, the patient and surgeon comfort was significantly better with dexmedetomidine. This study is also unique in keeping the systemic stability as its primary outcome measure.^[4] No significant systemic side effects have been reported with either of the studies while using this drug in vitreoretinal surgeries.

There is increasing evidence that supports the use of dexmedetomidine as an adjunct to regional blocks for ophthalmic

anesthesia. This drug seems to be especially useful in cases with prolonged operating times such as complex vitreoretinal surgeries and for apprehensive patients. However, use of dexmedetomidine in patients with heart block, heart failure, renal/hepatic insufficiency, uncontrolled diabetes, obesity, and/or chronic obstructive pulmonary disease is contraindicated. Meticulous preoperative evaluation by the anesthesia team is thus essential before subjecting a patient to peribulbar block with dexmedetomidine as an additive. Establishment of standard preanesthetic evaluation and intraoperative monitoring protocols are needed before this drug gains popularity as an adjunct for regional anesthesia in ophthalmic surgery. Hence, further studies on the requirement of systemic monitoring during surgery and long-term safety profile of these agents are warranted.

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