

Antishivering premedication: Can it improve outcome?

Shivering is a common perioperative problem following general as well as neuraxial anesthesia. The incidence during neuraxial anesthesia is as high as after general anesthesia. In a sample of 21 studies analyzed by Crowley and Buggy, the median incidence of neuraxial anesthesia-related shivering in control groups was 55%.^[1] The high incidence of postspinal shivering is mainly related to hypothermia occurring during the intraoperative period. There is vasodilatation and loss of thermoregulatory vasoconstriction below the level of spinal block, resulting in a greater heat loss from the body surface. This is associated with internal redistribution of heat from the core to the peripheral compartment of the body.^[2]

Shivering is associated with many adverse consequences, e.g. patient discomfort, increased workload on respiratory and cardiovascular systems resulting in marked increase in oxygen consumption and carbon dioxide production, increase in intracranial and intraocular pressures, difficulty in monitoring and interference with surgical care. Various nonpharmacological and pharmacological methods have been used to prevent and treat shivering. Although a large number of drugs have been tried for this purpose, a recent metaanalysis of randomized controlled trials on antishivering medications concluded that clonidine, meperidine, tramadol, ketamine and nefopam were the most frequently reported and efficacious pharmacological interventions.^[3]

All the antishivering drugs are usually administered intravenously. However, oral preparations of clonidine and tramadol are cheap and easily available.

Clonidine, an alfa-2 agonist drug, easily crosses the blood brain barrier due to its high lipid solubility and thus acts at spinal as well as supraspinal sites in the central nervous system.^[4] Besides its antihypertensive, analgesic and sedative properties, it also has good efficacy as an antishivering agent. It exerts its antishivering effect at three levels: At the hypothalamus by decreasing the thermoregulatory threshold

for shivering; at the pons by reducing spontaneous firing in the locus caeruleus; and at the level of the spinal cord by activating alfa-2 receptors, which release dynorphine, norepinephrine and acetylcholine.^[4]

Tramadol is an atypical centrally acting opioid, acting mainly through mu receptors with minimal action on kappa and delta receptors. It also causes inhibition of reuptake of noradrenaline and serotonin. It is a good analgesic for treating postoperative pain. Intravenous tramadol has a well-established antishivering effect; however, it may be associated with side-effects like nausea and vomiting. It should be used with caution in patients with a history of convulsions and porphyria and those taking antidepressants.

Many studies are available in the literature that have compared IV clonidine and tramadol for management of postspinal shivering with variable results.^[5,6] Oral clonidine 150 µg has been earlier found to be efficacious in preventing shivering during spinal anesthesia for urological surgery by many workers.^[2,4,7] However, tramadol has not been used via the oral route for the management of shivering.

In this issue, Tewari *et al.* have compared the prophylactic efficacy of oral clonidine 150 µg and tramadol 50 mg for preventing shivering in geriatric patients undergoing transurethral resection of prostate (TURP) under subarachnoid block.^[8] They observed a comparable effect of both these drugs in decreasing the incidence, intensity and duration of shivering. They did not report any significant increase in the incidence of side-effects with either of the two drugs.

Although antishivering medications are quite effective for both treatment and prevention of shivering, it appears logical to prevent this problem rather than treat it once it develops, at least in high-risk patients. Geriatric patients undergoing TURP constitute one such high-risk group. Besides the high incidence of hypothermia and shivering associated with neuraxial anesthesia, continuous bladder irrigation with cold fluids adds to the problem. The impact on geriatric patients' health becomes more significant as many of these patients have co-morbid conditions and a lower cardiorespiratory reserve. There may be adverse effects related to the procedure itself. Moreover, the marked increase in oxygen consumption due to shivering can have detrimental effects. Myocardial function may be further compromised in patients who already have limited reserve or known coronary artery disease.^[5]

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Thus, after excluding contraindications, oral clonidine or tramadol can be administered along with premedication to reduce the incidence of perioperative shivering during neuraxial anesthesia, especially in high-risk patients. However, it is important to note that use of tramadol may result in a higher chance of developing nausea and vomiting. Although some studies have not seen any increase in these side-effects,^[5] others have reported a very high incidence of nausea and vomiting after the use of tramadol.^[6,9] Avoidance of one perioperative complication should not give rise to another. Hence, patients receiving IV or oral tramadol should be given an antiemetic drug along with it for overall improvement in outcome. And, not to forget, beside using antishivering medications, all efforts should be made to maintain normothermia during neuraxial anesthesia.

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