

## **EDITORIAL VIEW**

# **Guidelines for management of inadvertent intrathecal injection of unwanted drugs**

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## **ABSTRACT**

In a busy operating suite, inadvertent wrong administration of drugs to the patients is a known problem. The most common route of administration is usually intravenous, but intrathecal route is not immune at all. The authors describe the frequency of this complication, the measures to prevent it, and the various methods being adopted to minimize the damage once it has occurred despite all precautions.

**Key words:** Intrathecal; Syringe swap; Guidelines; Spinal lavage

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Accidental intrathecal injection of an unwanted drug is a catastrophic incident in the anesthesia field. Unfortunately no unique clinical guideline for management of this event was proposed.

The inadvertent intrathecal administration of drugs and other substances can result in devastating neurological consequences. We found more than 41 case reports (1966 to September 2013) published in this field,<sup>1</sup> but there are no guidelines published in any anesthesia journal to manage this adverse event.

The neurotoxicity potency of substances is different, so the consequence of intrathecal administration of a wrong drug in these case reports varies from transient neurologic symptoms to permanent neurologic damage, and death. For example the accidental addition of 0.1ml chlorhexidine with local anesthetic was lead to neuronal damage.<sup>2</sup>

Hypotension after intrathecal injection of unwanted drug was reported in several cases. Perhaps a transient sympathetic block due to a change in neurons activity can cause hypotension after this situation.

After inadvertent intrathecal injection of potassium chloride an episode of hypertension was reported. The potentiating of the depolarization of sympathetic

neurons by potassium is thought to be the cause.<sup>3</sup>

After intrathecal injection of a wrong drug, immediate CSF drainage and early irrigation is proposed and good outcomes were reported.<sup>4</sup>

To avoid a higher spread of the wrong drug, aspiration of CSF must be done first, and then crystalloid solution must be injected in the intrathecal space. The aspiration of CSF and irrigation with crystalloid is better to do several times. Also it is better to perform the subarachnoid infusion of crystalloids from a higher space and aspiration of CSF from a lower space, to prevent upper spread of drug.

Kaiser et al. reported an occurrence headache after aspiration of 50 ml of CSF, so then he injected 50 ml normal saline for replacement of CSF.<sup>5</sup> So, for non-neurotoxic drugs, aspiration with smaller volumes in several times may be preferable.

Saline 0.9%, lactated Ringer's solution and Plasmalyte or other isotonic solution can be used for cerebrospinal fluid lavage, with the volume at least 150 ml. Using a 22-gauge needles for the spinal lavage who allows easier cerebrospinal fluid aspirations is preferable than thinner needles. Head-up position is also be proposed to minimize the amount of unwanted substance to stream

toward the brain.

O'Marcaigh et al. performed a ventriculolumbar perfusion with 240 ml of warmed isotonic saline through ventricular and lumbar catheters for 3 hours to remove a high dose of a major overdose of intrathecally administered methotrexate within 8 hours after administration. They reported a favorable outcome using this procedure and further supportive measures.<sup>6</sup> This method can also be used for other neurotoxic drugs.

To prevent the medication errors during the intrathecal administration of local anesthetics, Alam

MR proposed using spinal needle prefilled with the local anesthetic marketing in a single blister pack.<sup>7</sup> Also presentation of local anesthetic drugs with double sterile envelop by the manufacturers can minimize the rate of these errors.

In brief, after accidental intrathecal injection of an unwanted drug, if spinal lavage was applied, a better outcome was reported. A logical first step would be to remove cerebrospinal fluid as quickly as possible, and consider replacing the fluid with isotonic solutions.

**Conflict of interest:** Nil declared by the author

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