Is barbotage in central neuraxial blockade a ritual habit or an evidence-based technique?

Barbotage refers to the repeated aspiration and re-injection of CSF following injection of local anaesthetic into the intrathecal space, and its practice varies among anaesthetists. This article reviews the evidence for and against this practice to alter block dynamics following intrathecal injection reserved for spinal anaesthesia.

Introduction

Barbotage consists of repeatedly withdrawing and re-injecting CSF during the injection of a local anaesthetic solution in the intrathecal space to provide spinal anaesthesia. The practice is believed to create currents within the subarachnoid space that increase or speed up the dispersal of local anaesthetics. The exact method or volume of re-injectate may vary, but it exceeds the quantity of CSF usually withdrawn to confirm the needle's intrathecal position. With barbotage, the injection of local anaesthetic is preceded and interspersed with repeated aspiration of CSF, commonly 0.5 ml, reaching total re-injectate volumes of between 1.6 and 3.25 ml, which equates to 1–2% of the estimated total CSF volume in adults. Its use is described in combination with the use of both hyperbaric and isobaric local anaesthetics.

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Barbotage should be used

The effect of barbotage in terms of cephalad spread, onset, duration, intensity and regression of analgesia, and motor block has been appraised in several randomised controlled trials. One study showed that the practice procures a higher dermatomal distribution of analgesia with hyperbaric tetracaine (Janik et al, 1989), and three studies highlighted a shorter time for analgesia to reach the highest dermatome (Janik et al, 1989; Schröder et al, 1990; Balasubramanian, 2017). In one study, time to reach the highest dermatome with heavy bupivacaine was nearly halved at 4.88 minutes vs 9.65 minutes in the control group without barbotage (Balasubramanian, 2017). Such difference could be clinically significant in certain settings, such as emergency caesarean sections. The onset of motor block also appears to be reduced with barbotage, while the intensity of the block is increased, as measured with the Bromage score (Janik et al, 1989; Schröder et al, 1990; Balasubramanian, 2017). The regression of both analgesia and motor block are slightly quicker with barbotage. In terms of safety, no study reported a higher incidence of complete spinal block with barbotage.

Barbotage should not be used

Other randomised controlled trials using isobaric tetracaine or bupivacaine have found either no difference or a reduced cephalad dermatomal distribution with barbotage (Levin et al, 1981; Nightingale, 1983). The practice is also considered to increase the need to use vasopressors because of a higher incidence of arterial hypotension (Balasubramanian, 2017). No study has examined barbotage's effect on the spread of commonly used intrathecal opiates, such as fentanyl and morphine, or other analgesics such as selective partial agonists for alpha-2 adrenergic receptors. Moreover, all studies were small, as each included fewer than 100 patients overall. Patients were generally at low surgical risk, thus were not an accurate representation of the general population that undergoes spinal anaesthesia for surgery. The exact method of barbotage also differed between trials, notably in terms of the volume of re-injectate. There is great heterogeneity between studies and the differences observed in some randomised controlled trials could be driven by confounders which are difficult to completely mitigate, such as speed of injection or patients' anatomical

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characteristics. Blinding is also inherently limited and did not include the clinician performing the spinal anaesthetic, hence bringing a risk of bias. Furthermore, there is a lack of recent data appraising the use of barbotage, as all studies except one are over 30 years old.

Conclusions

There is insufficient evidence to support the widespread use of barbotage in central neuraxial blockade. Further studies are needed, particularly to ascertain whether the practice can safely reduce the time to action of analgesia in women undergoing urgent caesarean section.

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