

(Whitacre®) through a 16-gauge Tuohy needle (Portex®). Ten milligrams of plain bupivacaine were injected intrathecally for anesthesia and ropivacaine was infused continuously in the epidural catheter for postoperative analgesia. Subcutaneous enoxaparin (20 mg) was given on the first postoperative day. The patient did not complain of any headache and blood pressure remained normal. On the second postoperative day, the patient was found unconscious, biting her tongue.

A cerebral computed tomography scan revealed a recent frontal hematoma with subarachnoid hemorrhage. A conventional cerebral angiogram revealed no vascular abnormality. Twelve hours later, the patient recovered normal neurological function.

Several neurological complications have been described after spinal anesthesia (headache, hearing loss, and subdural hematoma). All these complications have been related to cerebrospinal fluid (CSF) leakage, leading to intracranial hypotension. Intracerebral hematoma has rarely been associated to spinal puncture except after procedures such as lumbar myelography.<sup>1</sup>

Arguments for coincidence are the lack of headache suggesting if any, a small CSF leakage, a known alcohol abuse and the possibility of spontaneous ICH or secondary to other causes (trauma, hypertensive crisis, alcohol withdrawal seizure).

Arguments for causative association are: no vascular abnormalities detected by extensive brain imaging, the time course of events compatible with a causative association, CSE technique increasing the risk of dural puncture and CSF leakage and the hemorrhagic suffusion compatible with a venous lesion secondary to CSF leakage.

In our opinion, in this case, a direct and univoque implication of the CSE as the unique cause of ICH is questionable.

A cause-effect association is difficult to demonstrate in very rare events. Mantia *et al.* discussed the possibility that ICH may be frequent after spinal anesthesia.<sup>2</sup> However, since then, only two cases of ICH associated with regional anesthesia have been published.<sup>3,4</sup> To date, considering the paucity of the literature relating spinal anesthesia to ICH, other risk factors must be discussed. Regional anesthesia is indeed "easy to blame" and the idea that any neurological complication is unequivocally due to the associated spinal anesthetic is misleading.

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## References

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## *Avoiding accidental iv injection*

To the Editor:

Mahajan<sup>1</sup> mentioned several means to reduce the accidental *iv* injection of drugs drawn up for administration by the epidural route. However, we believe that these measures would merely scratch the surface of the problem.

We do believe that the feel or pressure of the syringe plunger or the colour of the plunger to be too subtle a characteristic to be relied upon in everyday anesthetic practice. Surely, any examination into medical mishaps will soon reveal the quite remarkable capacity for a human to circumvent almost any safeguards against medical error. Surely one of the take-home messages from Favier *et al.*'s case report<sup>2</sup> is to reiterate once again the age-old adage that if you are not 100% certain about the contents of a syringe you should not administer it to anyone and discard it immediately. This goes far beyond the label on the syringe or its colour, but also concerns either drawing up the syringe yourself or having full confidence in the person who did so.

If we were truly serious about avoiding this problem, then the most effective solution would surely be to use an entirely different connection system for epidural catheters and epidural lines. One such example is the Vygon epidural infusion set (Vygon U.K. Ltd, Gloucestershire, England, UK) which incorporates a filter and easy lock adaptor with two syringes (5 mL and 20 mL) with a female Luer Lock (Figure A, B). Connecting a different syringe *i.e.*, one with a male end is thus rendered impossible.

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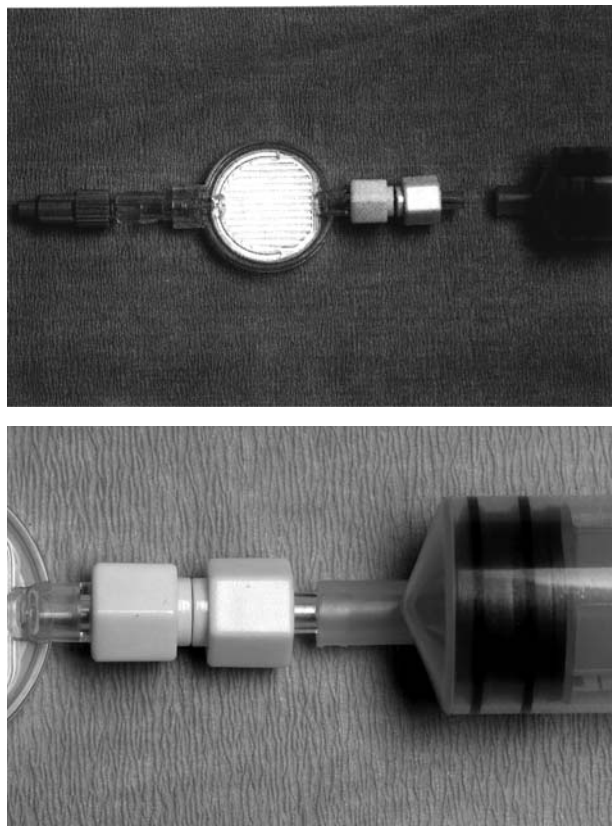


FIGURE A and B Vygon epidural infusion set with female Luer Lock connector.

### References

- 1 Mahajan R. Avoiding the accidental iv injection of local anesthetics (Letter). *Can J Anesth* 2003; 50: 1077–8.
- 2 Favier JC, Da Conceicao M, Fassassi M, Allanic L, Steiner T, Pitti R. Successful resuscitation of serious bupivacaine intoxication in a patient with pre-existing heart failure. *Can J Anesth* 2003; 50: 62–6.

### REPLY:

We would like to thank the authors for their interest in our correspondence and for making a couple of points to avoid the accidental iv administration of local anesthetics. We do concur with the authors that “to err is human” and applaud the novel innovation of the Vygon epidural infusion set incorporating an easy Luer adaptor with syringes with a female Luer Lock.

However, we don’t agree with the authors that colour is a too subtle characteristic to be relied upon. Prepackaged plastic syringes with distinct colour of the plunger with both horizontal and vertical flanges are available with Portex™ and B/Braun™ epidural sets.

Colour coding of the syringe labels is recommended by various trials and surveys as a visual alarm to avoid syringe swaps.<sup>1–3</sup> Although one can overlook or ignore the colour of small labels when in haste,<sup>4</sup> we firmly believe that there is far less chance of doing so with uniformly coloured plungers, especially when used routinely. However, a formal evaluation assessing the impact of syringes with distinct coloured plungers for epidural use is still awaited.

Prepackaged epidural sets are available without the loss of resistance plastic syringes. Glass syringes are routinely used for this purpose in our institution. If maintained scrupulously, these can be excellent.<sup>5</sup> Further, the weight of glass syringes is as discernible to the educated hand as is the colour to the eye.<sup>5</sup>

In conclusion, we would reiterate that the feel or pressure of syringe plungers or the colour of the plungers and weight of glass syringes will continue to be reliable safe guards against accidental iv injection of drugs intended for neuraxial administration. However, one can speculate that safety will increase further with the adoption of dedicated connection systems.

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### References

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### REPLY:

We can only agree with LaRosa et al. The solution proposed to avoid the accidental iv injection is effective ...for epidural catheters and lines. Unfortunately, this solution does not exist (in France) for dedicated nerve block needles (neurostimulation). This is why we use dedicated syringes (30 mL syringes in our institution) and specific labelling with grey colour labels (SODIS laboratories, Mulhouse, France).<sup>1</sup>