AN UNUSUAL COMPLICATION OF BRACHIAL PLEXUS SHEATH CANNULATION

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SUMMARY

A 20-gauge cannula placed via an interscalene approach in the left brachial plexus sheath of a healthy 18-yr-old male was used inadvertently for injection of 20 ml of antibiotic solution, despite clear labelling of the cannula and painful protest from the patient. The patient suffered no neurological sequelae. The treatment, possible causes and steps to avoid similar incidents are described.

KEY WORDS


In recent years at our hospital, traumatic amputations involving the upper limbs have been undertaken using a combination of regional and general anaesthetic techniques. One of the recognized rare complications of this technique is inappropriate injection of solutions other than local anaesthetics [1].

We describe the injection of flucloxacillin 10 ml around the brachial plexus in a patient who had a 20-gauge i.v. cannula left in the brachial plexus sheath after surgery.

CASE REPORT

An 18-yr-old male was transferred to the plastic surgery unit following traumatic amputation of his left thumb. The injury was of a rotation avulsion type, with complete amputation of the thumb and a vertical fracture through the proximal phalanx. The accident happened 8 h before transfer and during that time there was warm ischaemia for 3 h and cold ischaemia for 5 h. After assessment, the patient was transferred to the operating theatre for re-implantation. In order to improve blood flow to the limb and for post-operative pain relief, a 20-gauge cannula was inserted via an interscalene approach into the left brachial plexus sheath with the aid of a peripheral nerve stimulator. Forty millilitre of 0.5% bupivacaine with adrenaline 1:400000 was injected. General anaesthesia was induced with thiopentone and neuromuscular block produced with suxamethonium followed by pancuronium; the lungs were ventilated with 60 % nitrous oxide and isoflurane in oxygen. Surgery lasted 5 h and was uneventful; the thumb was re-implanted successfully and revascularized with a vein graft from the forearm. Flucloxacillin 500 mg i.v. was commenced at 6-h intervals. Before the patient was transferred to the ward, the brachial plexus cannula was labelled clearly (fig. 1).

The following day, the patient was returned to theatre for exploration, as the thumb had become cyanosed. The arm was anaesthetized with bupi-
vacaine via the in situ cannula. A thrombus was removed from the vein graft. The patient was transferred to the ward with the brachial plexus cannula in situ. During the night, the house officer on duty was called to administer i.v. antibiotics. He dissolved flucloxacillin 500 mg in sterile water 10 ml and injected this into the brachial plexus cannula. The patient complained of tingling and pain in his shoulder during the injection. The following morning the staff nurse on duty realized the house officer’s mistake and informed the surgical and anaesthetic teams. Twenty millilitre of normal saline with 0.25% bupivacaine 20 ml were injected into the brachial plexus sheath to dilute any remaining antibiotic, as recommended by Tuohy and MacEvilly [1]. When the local anaesthesia had worn off, neurological examination of the arm was carried out. This was normal. During the next few days, the condition of the thumb deteriorated because of graft thrombosis, and it was amputated. Follow-up by the Anaesthetic Department was continued for 1 month. No adverse sequelles were noted.

**DISCUSSION**

Flucloxacillin sodium is formulated in a white powder for dissolving in 2 ml of sterile water. The antibiotic and the high sodium content of the solution may be irritant to neural tissue. In a literature search, we found no reference to accidental injection of this antibiotic solution into the brachial plexus. There are, however, several reports of inappropriate injections into the brachial plexus sheath, arteries and the extradural space [1, 2].

Active management to prevent potentially harmful effects includes [1]:

1. Dilution of the injected substance by isotonic saline.
2. Injection of bupivacaine to provide analgesia and vasodilatation, which enhances absorption of the antibiotic.
3. Injection of hyaluronidase has been described to aid dispersal and hasten absorption of antibiotic [1]. This was not undertaken in our patient because we wished to minimize the amount of foreign material injected around the neurovascular bundle.

4. Stellate ganglion block has been recommended when vascular damage is suspected, in order to improve blood flow to the limb [1, 3]. We did not consider this necessary in our patient, as a brachial plexus block was already present for postoperative analgesia and to maximize blood flow to the limb.

5. Dexamethasone is thought to minimize tissue destruction after inadvertent injection of thiopentone [1]. We were concerned mainly with direct injury to the neural plexus, rather than widespread tissue damage, and therefore did not believe that steroids would be useful.

6. Symptomatic measures such as bed rest and elevation of the limb and analgesics.

This incident may have been prevented if we had used an extradural catheter rather than an i.v. cannula. We believe that blood should be aspirated from i.v. cannulae or catheters placed in either the internal jugular or subclavian vein before injection of foreign substances.

We hope that the report of this case may promote greater vigilance in labelling and use of catheters and cannulae used for local anaesthetic purposes.

**REFERENCES**