INADVERTENT INJECTION OF THIOPENTONE TO THE BRACHIAL PLEXUS SHEATH
A case report

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SUMMARY
Fifteen millilitre of 2.5% thiopentone was accidentally injected via the axillary route to the brachial plexus sheath of a fit 17-yr-old male. Mild discomfort was experienced during the injection. Immediate treatment included injection of normal saline 40 ml and 1% lignocaine with adrenaline (1:200 000) 40 ml to the sheath. A stellate ganglion block was also performed and dexamethasone administered i.v. The patient experienced moderate local pain and tenderness during the subsequent 3 days, but no neurological or vascular sequelae. Guidelines for the prevention and treatment of this mishap are suggested.

A rarely described hazard of local anaesthesia is the inadvertent injection of solutions other than the intended local anaesthetic. A patient is reported in whom a solution of 2.5% thiopentone was injected around the brachial plexus. This was followed by an uneventful and complete recovery.

CASE REPORT
A fit 17-yr-old male, weighing 62 kg, was to undergo surgery to the left thumb. A brachial plexus block by the axillary perivascular approach was planned (Winnie, 1974).

Two 20-ml disposable syringes were filled with a solution of 1% lignocaine with adrenaline 1:200 000 and placed unlabelled in an area used to prepare drugs for local and general anaesthesia. The sheath was entered with ease using a 23-gauge needle attached to an extension set (MacEvilly, 1980). Paraesthesiae were not elicited and confirmation of the position of the needle in the sheath was obtained by the characteristic feel of penetrating the sheath and by oscillations of the needle on the axillary artery. Following aspiration, 15 ml of solution was slowly injected. The patient complained of mild pain at the site during the early part of the injection, but this was not considered unusual at the time. However, when the discomfort persisted, it was realized that the solution being injected was 2.5% thiopentone, prepared earlier for another patient. Forty millilitres of the prepared local anaesthetic solution was injected and the needle withdrawn from the sheath. Five minutes later the axillary sheath was again entered and 40 ml of 0.9% sodium chloride injected to dilute the thiopentone. A left stellate ganglion block was also performed using 0.25% bupivacaine 15 ml injected by a paratracheal approach (Atkinson, Rushman and Lee, 1977). Successful motor, sensory and sympathetic blockade occurred, but the planned surgery was postponed, dexamethasone 8 mg administered i.v. and the arm elevated.

Four hours later the patient has some paraesthesiae in the fingers and motor function had returned to normal. He was discharged later that day after complete recovery and advised to contact the hospital should he experience any untoward symptoms.

When the patient was readmitted 2 days later, he reported having had moderate pain and tenderness in the axilla since discharge. There was no sensory or motor abnormality on examination and the planned surgery was carried out under general anaesthesia. The axillary discomfort had disappeared on discharge the following day. The patient was seen by one of us (S. A. T.) 4 weeks later and again there was no deficit.

DISCUSSION
Thiopentone is cytotoxic (Buckspan et al., 1978) and has been known to cause tissue damage when administered by a variety of routes. Thrombosis...
and thrombophlebitis can result from i.v. injection (Hutton and Hall, 1957; Hästagca et al., 1966; O'Donnell, Hewitt and Dundee, 1969) and the varying degrees of damage, from pain to gangrene of a portion of a limb, that may occur after intra-arterial injection are widely appreciated (Van Der Post, 1942; Macintosh and Heyworth, 1943; Cohen, 1948; Stone and Donnelly, 1961; Engler et al., 1967; Klatte, Brooks and Rahmy 1969; Lynas and Bissett, 1969; Albo et al., 1970; Ready, 1972; Dundee and Wyant, 1974). In addition, subcutaneous injection can result in tissue necrosis (Davies, 1966, 1971, 1979) which may require skin graft (Gaze, 1978; Coote and Abeysiri, 1979) and isolated damage to nerve and muscle can occur (Davies, 1966, 1971, 1979), particularly to the median nerve (Pask and Robson, 1954). A notable feature in many of these reports is a latent period of up to 2 weeks after injection before the appearance of any tissue damage.

In view of the known proximal spread of solutions in the axillary sheath (Winnie et al., 1979), there was immediate concern in this case about widespread neurolytic damage. Vascular damage from the injection of thiopentone around the axillary artery was also possible.

There is no previous report of accidental injection of thiopentone around the brachial plexus. A single case report of accidental extradural injection has been described (Forestner and Raj, 1975) which was treated by dilution and recovered with no neurological damage. The brachial plexus perivascular space is analogous to the extradural space in that there is a plexus of nerves surrounded by a fascial sheath and a similar outcome could be anticipated after injection of thiopentone to either space.

Active management must be taken after misplaced injection has occurred because of potential tissue damage by thiopentone solutions. We would suggest the following measures:

1. **Dilution of injected solution by isotonic saline or dextrose solution.**
2. **Injection of local anaesthetic solution (without adrenaline) to provide further dilution and also to induce local hyperaemia and hasten absorption of thiopentone.**
3. **Although not given in this case, injection of hyaluronidase into the area may aid the dispersal and more rapid absorption of solution.**
4. **Systemic or local steroids have been shown to minimize tissue destruction by thiopentone (Buckspan et al., 1978) and should be administered.**
5. **If vascular damage is suspected, sympathetic blockade by brachial plexus or stellate ganglion block should be considered.**
6. **Symptomatic measures include elevating and resting the limb and analgesics as required.**

There are a number of specific measures which may be taken for the future prevention of this type of mishap. A separate sterile tray for regional procedures would reduce the risk of drugs intended for i.v. use being accidentally injected elsewhere and would also encourage a more careful technique by the operator. The need for careful preparation and labelling of solutions for injection must be emphasized. Adhesive tape or self-adhesive labels on which are printed frequently used anaesthetic drugs are now widely available and can be wall-mounted to facilitate their use (Carrie, 1975; Dunkin, 1978). The use of glass-barrel syringes for all regional blocks has also been recommended (Kennedy, 1980). Finally, all injections of local anaesthetic agents should be made slowly, holding frequent conversation with the patient during the injection to elicit any unusual symptoms that may arise.

The reporting of mishaps such as described should be encouraged, since they serve as useful reminders of the constant vigilance required of all anaesthetists. In addition, wider knowledge of their natural history can lead to a more rational approach to therapy when such events do occur.

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**REFERENCES**


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