

before induction was 130/70 torr, with a pulse rate of 60 beats/min. Anesthesia was induced with thiopental, 500 mg, in divided doses, and intubation of the trachea was facilitated with succinylcholine, 100 mg. Anesthesia was maintained with nitrous oxide: oxygen (3:2 l/min) and enflurane, to 2 per cent. During the operation, the lungs were mechanically ventilated at a tidal volume of 800 ml and a rate of 10/min. There were episodes during the operation in which blood pressure decreased 20–30 torr in response to sudden blood loss or repositioning the patient in the head-up position. However, pulse rate did not alter during these episodes and remained 50–60 beats/min throughout. Apart from this, anesthesia and operation were uneventful. There was a 1,200-ml blood loss, but blood was replaced at the time; the operation lasted five hours. Bradycardia persisted in the immediate postoperative period, and heart rate decreased to as low as 45 beats/min. This proved to be refractory to atropine, 0.4 mg, iv. Use of a beta agonist, such as isoproterenol, to accelerate heart rate was judged unwarranted, since the patient manifested no adverse effect of the bradycardia. The patient inadvertently omitted the timolol eye drops for four days postoperatively, during which period pulse rate increased to 80–100 beats/min. There was no other cause for this relative tachycardia. Reinstitution of the timolol eye drops resulted in reversion to a rate of 60 beats/min.

DISCUSSION

Timolol is a nonselective β -adrenergic blocking agent which lacks local anesthetic and intrinsic stimulant activities.⁶ The onset of maximal reduction in intraocular pressure occurs about four hours following conjunctival administration and persists for 12–24 hours after a single dose.⁷ Its use in the treatment of glaucoma was particularly welcome owing to the lack of systemic effect⁷ when it was administered locally in an ophthalmic solution. However, this study examined only the effects after a single administration and has now been challenged by the sporadic findings of unwanted systemic effects from sustained topical administration.⁸ Furthermore, the manufacturers have

included a warning concerning the use of timolol in patients with underlying bronchospastic disease, since there are several reports of worsening bronchospasm occurring within two days of administration of timolol eye drops.[‡] Having excluded various perioperative causes of sinus bradycardia on clinical grounds, we suspect that timolol maleate caused a β -adrenergic block due to systemic absorption. Thus, both β_1 - and β_2 -adrenergic systemic blockade effects have been seen with the use of local application of timolol.

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Hairline Cracks in Epidural Needles

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To perform a lumbar epidural block in obstetrics, a reusable Crawford 18-gauge, thin-wall, stainless-steel needle was selected (Becton Dickinson Cat. #1304). Following the usual skin preparation, draping, and infiltration of the skin and superficial tissues with local anesthetic, the tip of the needle was

inserted from a paramedian approach into the ligamentum flavum. A 10-ml glass control syringe containing saline solution was attached to the needle in order to facilitate identification of the epidural space by a "loss of resistance." When resistance to the injection of saline solution could not be perceived, the needle was withdrawn to the subcutaneous tissue and reinserted into the ligamentum flavum a second time. Again, no resistance to saline injection was felt. The needle was completely withdrawn and examined. It was found to have a series of hairline cracks,

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barely visible to the naked eye, running longitudinally parallel to one another in the shaft of the needle (fig. 1). A second needle was selected and the block was performed uneventfully.

Examination of the departmental stock of reusable Crawford 18-gauge thin-wall, stainless-steel needles disclosed a second needle that had two parallel cracks at the distal end of its shaft, resulting in small fragments of metal peeling away from the tip (fig. 2).

DISCUSSION

I believe there are a number of potential hazards associated with the defective needles described. 1) Weakening of the shaft of the needle could cause frank breakage deep to the skin. 2) Small metallic fragments such as those seen in figure 2 could be lost into subcutaneous tissue. 3) Leakage of fluid or air into the superficial tissues of the back might result in a failure to appreciate a "loss of resistance." 4) Jagged or irregular surfaces on the tip or the shaft of the needle could cause damage to spinal nerves and epidural catheters threaded through the defective needle. This might result in catheter laceration with leakage of local anesthetic solution outside the epidural space or complete "shearing off" of the catheter at the needle tip.

Careful inspection of reusable needles during each cleaning process is recommended. Since damage, as in the case of the first needle reported, can be almost microscopic, it is suggested that the inspection include attempted injection through the needle with the stylette removed and the tip occluded. Such a procedure should easily identify even hairline cracks. Repetition of this procedure immediately prior to use of the needle by the anesthesiologist would be an additional safeguard.

Any needle that has been bent during use should be discarded, since such bending will contribute to structural weakness.¹ Defects in epidural needles such as those reported here have not been previously described.¹⁻⁴ The manufacturer of these needles has

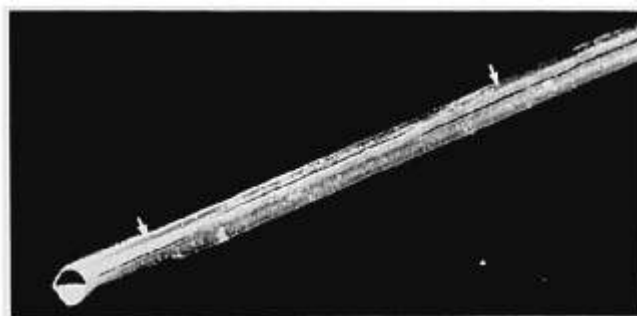


FIG. 1. Magnified view of Crawford 18-gauge thin-wall stainless-steel epidural needle. Arrows point to two of several hairline cracks in the needle shaft.

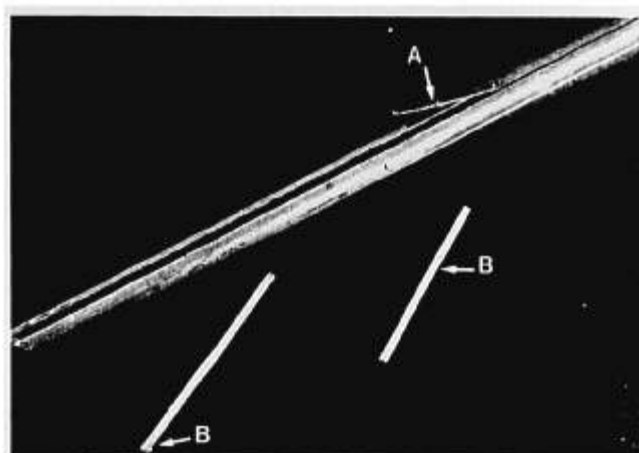


FIG. 2. Magnified view of a second epidural needle. Strip of metal (A) between two parallel cracks has peeled away from shaft. Small metallic fragments (B) have become detached from the needle.

confirmed the defects and is currently evaluating them in its manufacturing and quality-control facilities.

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