MONITORING OF AXILLARY ARTERIAL PRESSURE IN A PATIENT WITH BUERGER'S DISEASE REQUIRING CLIPPING OF AN INTRACEREBRAL ANEURYSM

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CASE HISTORY
A 45-yr-old, 85-kg, previously healthy male patient was scheduled for clipping of an anterior communicating artery aneurysm diagnosed by CAT scan and arteriograms. The patient's main complaint was frequent headache, increasing in severity. He denied episodes of seizure, stroke or trauma; he had been a smoker for 20 years. The patient was known to have Buerger's disease and had undergone three surgical procedures during the previous 10 years: a right transmetatarsal amputation, an amputation of the right second and third fingers, and an aorto-bifemoral bypass with lumbar sympathectomy.

At the time of the pre-anaesthetic evaluation, the right dorsalis pedis pulse was noted to be absent. The other peripheral pulses were intact. Each radial artery was palpable, but diminished. Allen's test demonstrated poor collateral circulation in each hand.

Before the induction of anaesthesia, a continuous left brachial plexus blockade was performed using the axillary approach with a non-tapered 20-gauge, 32-mm Critikon catheter inserted tangentially to the skin. After paraesthesia was obtained, the stylet was removed and an extension tube filled with 0.5% bupivacaine was attached to the catheter and 30 ml of local anaesthetic injected. The catheter and tubing were taped securely. Fifteen minutes after the injection of the local anaesthetic, the patient experienced a sensation of "warmth" in the left hand. At this time, both ulnar and radial pulses were strong and the hand felt warmer. Venous dilatation was obvious and pin-prick sensitivity was diminished over the whole hand and arm. At this time, a left axillary artery catheter (20 gauge) was inserted percutaneously. The catheter was 12.7 cm in length and was obtained from a paediatric central venous pressure tray. The arterial catheter was attached to a transducer and the arterial pressure displayed on an oscilloscope.

After preoxygenation, anaesthesia was induced with thiopentone 400 mg i.v. followed immediately by pancuronium bromide 10 mg i.v. to facilitate tracheal intubation. Anaesthesia was maintained with nitrous oxide, oxygen, isoflurane and fentanyl. The operative procedure lasted 9 h and 30 min. Vital signs were stable throughout. The left hand was observed continuously to detect changes in colour or temperature. A warming blanket, heated in-circuit humidifier and heat lamp were used to maintain body temperature greater than 37 °C. Six hours after the initial brachial plexus blockade, a second administration of 0.25% bupivacaine 30 ml was given. The patient was transferred to the neurosurgical intensive care unit, with the brachial artery and brachial plexus block catheters in place. Both catheters were removed 28 h after insertion. The trachea was extubated the following day. No
additional brachial plexus blockade was performed and examination of the left arm and hand remained unremarkable. The patient recovered promptly and was discharged on the 6 day after operation, without sequelae.

DISCUSSION

The patient described emphasizes consideration of the risks and benefits of inserting an indwelling arterial line in a patient with known pathology of the arterial system. Buerger’s disease is a peculiar form of occlusive disorder of the peripheral arteries in young males. It is a disease which primarily affects the small- and medium-sized vessels of the extremities. The disease begins peripherally and reaches the forearm or infra-popliteal arteries within a short time after the onset of symptoms. Proximal extension of the arterial occlusion is infrequent. The aetiology of Buerger’s disease remains unknown. Tobacco seems to be a predominant associated factor and its contribution to the evolution of the disease in this patient is obvious (Bollinger et al., 1983; Shionoya, 1983).

Cerebrovascular involvement in Buerger’s disease is infrequent, but clinical and pathological evidence can occasionally be found (Drake, 1982). In this patient, it seemed to be coincidental.

Cold and trauma are associated with vasospasm and exacerbation of the disease process. During this operative procedure, we were successful in maintaining the patient’s rectal temperature at more than 37 °C with an electric warming blanket, heated in-circuit humidifier and warming lamp.

In patients with Buerger’s disease, arterial pressure is ideally monitored with a Doppler sensor. Arterial catheterization is not usually recommended. The value of Allen’s test is somewhat contested, but no patients with Buerger’s disease were included in a large previous study of 1699 patients (Slogoff, Keats and Arlund, 1983). However, because of the nature of this surgical procedure, intra-arterial monitoring was chosen as permitting better control of arterial pressure and the withdrawal of blood samples for frequent blood-gas analysis.

The risks of indwelling intra-arterial catheters are well known (Bedford and Wollman, 1973; Abadis and Ung, 1980). Permanent ischaemic injury, the most significant complication, is rare and usually associated with previous arterial injury, hypotension, use of a vasoactive agent, prolonged cannulation, left heart embolization or severe infection (Michaelson and Walsh, 1970; Matthews and Gibbons, 1971; Samaan, 1971; Brown et al., 1984).

Axillary arterial cannulation has a record of safety and was chosen for intra-arterial pressure monitoring because of the proximal location of the artery (Rosenblatt et al., 1979). It allowed the continuous monitoring of arterial pressure in this patient.

In the patient described, hypotension was of great concern. After discussion with the surgeon, the decision was made to use minimal reduction in arterial pressure during the clipping of the aneurysm. Therefore, mean arterial pressure was kept between 65 mm Hg and 70 mm Hg during the clipping of the aneurysm and allowed to increase to the patient’s normal mean of 80–85 mm Hg thereafter. The brachial plexus block was performed in this patient in order to protect the arm by increasing peripheral blood flow through a pharmacological sympathectomy (Selander, 1977). A continuous block was selected to provide an effect commensurate with the duration of surgery and the early postoperative period, and to minimize the dose of local anaesthetic required (Selander, 1977; Sada, Kobayaki and Murakami, 1983).

In summary, the management described illustrates that intra-arterial pressure monitoring can be performed in a patient with Buerger’s disease requiring intracranial aneurysm surgery. Success in the technique selected can be attributed to the brachial plexus block and resultant pharmacological sympathectomy, maintenance of core body temperature and selection of the axillary artery for cannulation.

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REFERENCES


