SCIATIC NERVE BLOCK BY THE ANTERIOR APPROACH FOR OPERATIONS ON THE LOWER EXTREMITY

F. MAGORA, B. PESSACHOVITCH AND I. SHOHAM

SUMMARY

Sciatic nerve block using the anterior approach is described, together with an account of the authors' experience with the technique in 44 patients.

This is a report of peripheral nerve anaesthesia including local anaesthetic block of the sciatic nerve by the anterior approach, a technique which we have used during the past 18 months for operations on the lower limb. The technique is relatively new, having been described first by Beck (1963) and later by Adriani (1967, 1970). However, only a few series using this technique have been described in the literature (Beck, 1963).

PATIENTS AND METHODS

Forty-four patients, 35 men and 9 women, aged 16-83 years, received peripheral nerve block anaesthesia (table Ia). In 18 patients the surgery was above the knee and included amputation, extraction of a pin, meniscectomy, patellectomy, embolectomy and exploration of the knee. These patients received a combination of sciatic, femoral, femoro-cutaneous and obturator nerve blocks. The remaining 26 patients had operations below the knee which included amputation, osteotomy, correction of halux valgus, repair of an open fracture, closed reduction, transplant of the tibial nerve for the treatment of peroneal paralysis; and for these only sciatic and femoral nerve blocks were used. The operations lasted from less than 1 hour to up to 4 hours (table Ib).

The femoral, femoro-cutaneous and obturator nerve blocks were performed according to the techniques described by Moore (1967). The sciatic nerve was blocked by the anterior approach, as described by Beck (1963). This nerve block is performed with the patient in the supine position. The landmarks are the inguinal ligament, a line parallel to it extended medially on the thigh from the tuberosity of the greater trochanter, and a line descending at 90° from the junction of the inner and middle thirds of the inguinal ligament. The junction of this line with the line parallel to the inguinal ligament is the point of entry of the needle (fig. 1). The needle is introduced perpendicular to the skin until it encounters the femur. The needle is then withdrawn and redirected medially, 4-6 cm deeper. A 10-ml syringe filled with air is attached to the needle and the resistance to the injection of air noted. Some resistance is present when the needle is within the muscles, but no resistance is felt once the needle has reached the neurovascular space of the sciatic nerve (fig. 2).

Each patient was premedicated with diazepam (10-20 mg) or Thalamonal (2 ml) given by the intramuscular or intravenous route. Diazepam 5-10 mg and/or pethidine 15-25 mg were injected i.v. as necessary to keep the patient asleep during the operation.

The local anaesthetic injected in the majority of patients was a mixture of equal amounts of 0.5% bupivacaine hydrochloride and 1.5% lignocaine hydrochloride, with adrenaline 1:400,000. In the first 10 patients amethocaine 0.2% was used instead of bupivacaine. The success of the block was determined 16-20 min after injection. 15-20 ml of anaesthetic solution was injected i.v. as necessary to keep the patient asleep during the operation.

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Table I
(A) 44 lower limb nerve blocks: age and sex of the patients.

<table>
<thead>
<tr>
<th>Age range</th>
<th>F</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>under 31</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>31-40</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>41-50</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>51-60</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>61-70</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>71-78</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(B) Site and duration of the operations.

<table>
<thead>
<tr>
<th>Duration in hours</th>
<th>Above knee</th>
<th>Below knee</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>1-2</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>2-3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3-4</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
used. At no time was more than 100 ml of the mixture injected.

Before performing the sciatic block for surgery, we learned to localize the sciatic nerve by the anterior approach on cadaver limbs, using the same anatomical landmarks as in the patient and also using the loss of resistance test for localization. Placement of the needle was accurate in the majority of attempts on the cadaver. In 6 patients the localization was confirmed by electrical nerve stimulation, which usually produced contraction of the plantar flexor muscles. A 6-inch Angiocath needle, insulated by the covering plastic material, was used for this purpose. This needle is more traumatic and more difficult to introduce than a metal needle and thus the technique is more time-consuming. However, after we were convinced of the accuracy of localization by the loss of resistance technique, we abandoned the electrical test and for the remaining patients we used a 6-inch 18-gauge thin wall needle with an internal diameter of 16 gauge. A needle of this type, with a large lumen, facilitates the loss of resistance test.

RESULTS
Good analgesia for up to 4 hours was obtained in 31 patients. The results were classified as “fair” in 7 patients. In 6 patients no analgesia was produced and the operation was performed under general anaesthesia. The result was considered “good” when there was no pain during the operation and “fair” when pain was felt at some stage during the operation, necessitating supplementary doses of diazepam or pethidine. There were no major complications associated with the use of local anaesthesia. In 2 patients a generalized tremor occurred and in some patients tachycardia and a transient small decrease in blood pressure were observed.

DISCUSSION
These results are less successful than those of Beck (1963) who reported a series of 52 anterior sciatic nerve blocks; he had 3 patients with partial anaesthesia and only 2 failures, while in our 44 patients there were 7 patients with partial anaesthesia (“fair”) and 6 failures (“poor”). It is to be stressed that, because it was our aim to learn and to apply the technique of nerve blocks of the lower limb as often as possible, we included patients and operations who would not normally have been selected for local anaesthesia. In addition, the blocks were performed by a number of anaesthetists, none of whom had any previous training with this method.

The generalized tremor observed in 2 patients was probably the result of the large amount of local anaesthetic used. The dose required for the four blocks approaches the maximum recommended for each of the agents used. The absence of more serious complications may have been the result of the use of diazepam as premedication. De Jong
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(1970) has shown in the cat that diazepam raises the threshold to convulsions induced by local anaesthetic agents.

Three case reports of successful peripheral nerve block anaesthesia are presented.

CASE 1.
A male patient, aged 60 years, with concussion required a closed reduction of a fractured ankle. The procedure was performed under sciatic and femoral nerve block anaesthesia to facilitate regular clinical assessment of his intracranial condition. The operation lasted 210 min on account of numerous attempts at reducing the fracture, the need for several X-ray pictures and the eventual summoning of a senior surgeon to assess the results. Nevertheless, the conditions were satisfactory throughout.

CASE 2.
A male patient, aged 72 years, required an above-knee amputation of the right leg because of diabetic gangrene. He had a right hemiplegia, chronic obstructive lung disease and bilateral bronchopneumonia. On examination, he was dyspneic, the oral temperature was 39.8 °C, the pulse rate was 124/min and the arterial pressure 100/60 mm Hg. The blood glucose concentration was 175 mg/100 ml, blood urea 37 mg/100 ml, potassium 5.4 m.equiv./l. The arterial Po2 was 155 mm Hg (he was receiving O2 by nasal catheter), the Pco2 was 40 mm Hg and the pH 7.37. The anaesthesia of choice was considered to be a peripheral nerve block. To ensure accurate localization of the sciatic nerve, a nerve stimulator was used and good anaesthesia was achieved.

CASE 3.
A lady, aged 68 years, with diabetic gangrene of the leg, chronic congestive heart failure, atrial fibrillation and chronic pulmonary disease, required an above-knee amputation. She was cyanosed while sitting, very obese and stuporous. The oral temperature was 38.5 °C, the peripheral pulse rate was 100/min and the arterial pressure was 140/95 mm Hg. A successful peripheral block and the subsequent surgery were performed in the semi-recumbent position.

The anterior approach for the sciatic block has two main advantages. First, it permits the injection to be given in the supine instead of in the lateral position. This is to be preferred where changes in position are difficult and painful for patients with disease of the leg. Difficulties may be avoided also in patients immobilized in a plaster cast, in those who are stuporous or perhaps disabled by congestive heart failure or severe chronic pulmonary disease.

Second, the loss of resistance test provides reliable localization of the nerve. Anaesthetists familiar with this test from its use in epidural analgesic techniques rapidly learn to distinguish between the loss of resistance felt in the space occupied by the sciatic nerve as opposed to the slight resistance of the muscle tissue which immediately precedes it. Third, since no change in position is required and no paresthesiae are elicited, the patient can be given sedation by injection.

REFERENCES

SOCIETE BELGE D’ANESTHESIE ET DE REANIMATION
A ONE-DAY SYMPOSIUM on “Modern Intravenous Anaesthetics”, MAY 18, 1974

Further information can be obtained from:
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