REGIONAL BLOCK ANALGESIA.

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[Received February 1, 1946.]

This is a plea for the consideration of the value of regional block analgesia in certain surgical conditions, with brief accounts of three illustrative cases.

Pentothal sodium has been widely used in recent years and has proved eminently satisfactory as an anaesthetic for the majority of war surgery; it has the advantages of portability, simplicity of administration and safety (in skilled hands). Furthermore, "local analgesia" is of little value where the injuries are multiple, as is commonly found. It is hoped nevertheless to show that on occasions regional analgesia can be an extremely useful method.

The following are claimed as advantages of the regional analgesia technique:—

1. There is minimal disturbance to the metabolism of the patient.
2. Irritation and depression of the respiratory tract are reduced.
3. The blood-pressure fall is minimal and shock is not increased; indeed, it is to be expected that some improvement may result owing to the shutting off of pain impulses to the brain. It may be noted here that the method is of especial value in cases of massive muscle damage which do not respond to resuscitative measures.
4. Relaxation in abdominal cases is exceptionally good.
5. A minimum of apparatus and equipment is required.

(A) CASES INVOLVING THE UPPER LIMB.

Here brachial plexus block is employed. This finds particular use in cases of compound fracture of the humerus, for the conscious patient can sit up for the application of a thoracobrachial plaster.

Technique (fig. 1).—The patient lies on his back with one pillow under the head, which is turned away from the affected side. The arm lies by the side and is pulled towards the feet to depress the point of the shoulder. 2 per cent "Novutox" has been customarily employed, but it is probable that 1 per cent would prove adequate. An intradermal weal is raised 1 cm. above the mid-point of the clavicle, just to the lateral aspect of the arch of the subclavian artery which should be palpated at this stage; as a further guide it may be added that the site of the weal corresponds usually to the point of disappearance of the external jugular vein.

A fine 8 cm. needle, without a syringe attached, is inserted through the intradermal weal in a direction, medially, caudally and posteriorly, aiming at the approximate position of the third thoracic spine. Contact should be made with the first rib on its upper and lateral surface. Having located the
first rib soundings are taken anteriorly along it with the point of the needle until the needle lies close to the subclavian artery as shown by transmitted pulsatory movement of the needle. It is then known that the anterior limit of the brachial plexus has been reached. Provided a fine needle is used and lateral movements of the needle point are avoided by moving the needle only longitudinally in its own axis, puncture of the artery, while undesirable, is unlikely to be of serious consequence.

If at any time during the sounding process paraesthesiae are felt in the hand, it may be presumed that the point of the needle lies within the plexus of nerves and, without moving the needle and after aspiration to make sure that the needle does not lie in a vessel, 15 c.c. of local anaesthetic are injected.

In any event, having located the anterior limit of the plexus as above described, local anaesthetic is injected (after the aspiration test) between the rib and the superficial fascia as the needle is withdrawn.

Further insertions of the needle and injections are made more posteriorly along the rib until a length of about 4 cm. of rib has been covered, in 4 or 5 stages. A total dose of 50 c.c. of anaesthetic solution is adequate.
CASE I.—A soldier was riding in a truck with his left arm hanging over the side, an oncoming vehicle struck his arm causing a severe smash injury of the forearm with gross disorganization of the elbow-joint. Shock was severe on admission one hour later and transfusion of 1 pint of plasma and 2 pints of blood was made, with some improvement after one hour and a half. Morphia $\frac{1}{4}$ grain had been given intravenously soon after injury. Omnopon $\frac{1}{8}$ grain and scopolamine $\frac{1}{12}$ grain were given intravenously as premedication; a brachial plexus block was carried out as above described and amputation was performed at the junction of the middle and lower thirds of the arm.

At the end of the operation the patient was asleep and his blood-pressure was then 120/80. He made an uninterrupted recovery.

(B) CASES INVOLVING THE LOWER LIMB.

Here the technique used is that of massive muscular infiltration; 200 c.c. of 0.5 per cent procaine are required.

Technique (fig. 2).—In the upper third of the thigh a solid transverse disc, including all tissues of the thigh—skin, subcutaneous tissue and muscle down to the bone—is infiltrated. The initial skin weal is made on the anterior aspect of the thigh and, using a fine 12 cm. needle the subsequent injections are made fanwise into the deeper tissues, until the whole cross section has been “soaked” uniformly. Care is especially necessary on the medial side of the thigh, in the region of the femoral vessels.

CASE II.—An Italian Civilian, aged 42, of very poor physique, being only five feet in height and having a very severe kyphosis due to an old tuberculous disease of the spine, was knocked off his motor cycle by a heavy lorry. His left leg was grossly mangled, the muscles of the calf were exposed and very severely damaged. There were compound, comminuted fractures of both bones of the knee-joint which was totally disorganized.

Resuscitation with plasma and blood transfusion was carried out for two hours, without response. The pulse was barely palpable and the blood-pressure was unreadable. The patient was obviously moribund and a desperate attempt to save his life by amputation under local analgesia was decided upon.

Premedication of Omnopon $\frac{1}{4}$ grain with scopolamine $\frac{1}{12}$ grain was given intravenously. A block analgesia was performed as above described and amputation was carried out through the thigh. At the end of the operation the quality of the pulse was much improved, his blood-pressure being 105/70.

The next day his condition was very good indeed and his survival seemed likely; unfortunately his condition later deteriorated and he died five days later with signs of paralytic ileus.
(C) Cases Involving the Abdomen.

It was felt that in these cases "sleep" plus a regional block would provide the most satisfactory technique.

The "sleep" is produced by minimal pentothal anaesthesia; in addition oxygen or nitrous oxide with plentiful oxygen may be given by inhalation. 0-5 per cent procaine is used for the infiltrations.

**Technique (fig. 3).**—(a) The patient lies in the dorsal position with his arms raised above his head. Induction of anaesthesia is made with a minimal dose of pentothal. The smallest possible doses are subsequently given to keep the patient asleep.

(b) The lower six intercostal nerves on each side are blocked in the mid-axillary line with 0-5 per cent procaine.

It is undesirable and often impossible to turn many battle casualties over and perform the intercostal block posteriorly. To block each intercostal nerve, weals are raised over the intercostal spaces in the mid-axillary line, using a fine hypodermic needle.

Using a 5 cm. needle with syringe attached, soundings are then taken across the lower border of each rib. Keeping the needle point moving across
the rib, 5 c.c. of solution are injected into the region of each intercostal nerve as it lies against the inferior aspect of the rib.

(c) 50 c.c. of solution are infiltrated into the muscles of the costo-iliac interval on each side. 20 c.c. are injected into the muscle internal to the anterior superior iliac spine on each side.

(d) Posterior splanchnic block by the Kappis method, though valuable in cold surgical cases, is not possible where there is difficulty in turning the patient over to get at his back.

Anterior splanchnic block (Braun) may be carried out by the surgeon after the abdomen is opened, 50 c.c. of solution being injected down on to the anterior aspect of the first lumbar vertebra. Where the patient is kept "asleep" however, as here described, blocking of the splanchnic nerves does not appear to be essential.

CASE III.—An officer wounded in the abdomen eight hours previously by an aerial bomb fragment reached the C.C.S. after a long journey. His condition was fair prior to operation: B.P. 110/60, pulse 110. He had had 2 pints of blood and 1 pint of plasma transfused, a second pint of plasma was running at the beginning of the operation. Premedication by omnopon ¼ grain and scopolamine ⅓ grain injected into the intravenous drip. 6 c.c. of 5 per cent pentothal sodium into the drip sufficed for the induction of anaesthesia. Oxygen from a Boyle's machine was administered by inhalation. A total of 17 c.c. of 5 per cent pentothal sodium was used throughout the operation.

A regional analgesia was then carried out as described above: no splanchnic block was performed. A long right paramedian incision was made, 8 holes in the small intestine were sutured, and a metallic fragment was removed. The surgeon commented on the superb relaxation, which he said resembled that obtained by a spinal anaesthetic.

The blood-pressure at the end of the operation was 115/70, the pulse-rate was 96.

Post-operatively intravenous saline was given continuously, gastric suction (Wangensteen) was instituted and an intramuscular penicillin drip was set up. The patient made an uninterrupted recovery.

CONCLUSION.

Whilst no originality is claimed for the techniques employed, the purpose of this paper is to draw attention to the value of regional block analgesia, a method which has proved useful on numerous occasions: three cases are quoted as examples.