

Intravenous Regional Analgesia for Hand Surgery in Leprosy*

R. H. THANGARAJ

*The Leprosy Mission
Philadelphia Leprosy Hospital, Salur, A.P., India*

Introduction

The production of surgical analgesia in the limbs by intravenous injection of a local anaesthetic, was introduced by Bier (1908). The procedure involves exsanguination of the extremity by elevation and compression, and the application of a tourniquet. The anaesthetic solution, which is injected into the vein, diffuses into the tissue and blocks the nerve endings.

Technique

A sphygmomanometer cuff is placed high on the upper arm of the limb to be operated on, and the hand is prepared and draped. A Mitchell's needle is then introduced into a prominent vein on the dorsum of the hand, the arm is elevated for 5 min, and if necessary the extremity is exsanguinated with a sterile Esmarch bandage. The sphygmomanometer cuff is inflated to a pressure of 220 mmHg, and 15 ml of 1% Xylocaine solution is injected through the needle. We prefer Xylocaine solution to procaine because it seems to diffuse more easily across the endothelium. Some anaesthetists apply two tourniquets on the arm in an attempt to avoid discomfort, since the pressure of the tourniquet is felt by the patient after about 50 min. At the end of the operation the tourniquet is released intermittently in order to allow the drug from the exsanguinated area to enter the systemic circulation slowly. Too rapid a release may produce a generalized response resulting from flooding of the tissues with anaesthetic solution.

During the past 5 years, of the 1472 operations performed on the hand at this institution, regional anaesthesia was used in 1124 cases; 80% of the operations were for tendon transplantation, and the remainder were for fractures and other injuries. Plantaris tendon required as graft for tendon transplant was removed under Trilene anaesthesia. Four wrist fusions, and several reductions of fractures of the forearm bones, both open and closed, were also performed under intravenous regional anaesthesia. Since the anaesthesia lasts for about 15 min after the tourniquet is deflated, this was done before the skin sutures were inserted.

With good technique, 100% success rate is achieved; our failures were due to a leaking tourniquet. Out of this large series, systemic response has occurred on a few occasions only. In one case the patient developed convulsions and

* Accepted for publication 6 December, 1971.

hypotension as the tourniquet was deflated 5 min after the injection. He was given 2 ml of Thiopental intravenously (100 mg) to control the convulsions, together with 8 mg of Dexamethasone and inhalations of oxygen; he remained disorientated for over 1 h after recovering.

Four patients developed hypotension, but this was of a degree that did not require treatment. If the forearm is not exsanguinated sufficiently the venous pooling of blood may hamper the surgeon.

In persons over 12 years of age, we have used a 1% solution, instead of 0.5% of Lignocaine to produce intense analgesia in the forearm. No systemic response was observed after releasing the tourniquet suddenly after 40 min. The low incidence of central nervous system and cardiovascular effects is, according to Knapp and Weinberg (1967), due to the rapid tissue uptake of the drug from the blood. Mazze & Dunbar (1966) have shown in man that with intravenous regional anaesthesia the plasma concentration of the drug is actually less than with conventional axillary block. Foldes *et al.* (1960) also found that the blood levels of the drug after release of the tourniquet were much lower than those associated with central nervous system toxicity.

This technique is particularly useful in hospitals like ours where the surgeon has to work single-handed. It is simple and safe, and with a good tourniquet and proper exsanguination of the extremity complete analgesia is achieved.

References

- Bier, A. (1908). Über einen neuen Weg Localanästhesie an den Gliedmassen zu erzeugen. *Arch. klin. Chir.* 86, 1007.
- Földes, F. F., Molloy, R., McNall, P. G. and Koukal, L. R. (1960). Comparison of toxicity of intravenously given local anesthetic agents in man. *J. Am. med. Ass.* 172, 1493.
- Goodman, S. and Gilman, A. (1968). *The Pharmacological Basis of Therapeutics*, 4th ed. New York: Macmillans.
- Knapp, R. B. and Weinberg, M. (1967). Drug distribution following intravenous regional anaesthesia. *J. Am. med. Ass.* 199, 760.
- Mazze, R. I. and Dunbar, R. W. (1966). Plasma lidocaine concentrations after caudal, lumbar, epidural, and axillary block and intravenous regional anaesthesia. *Anaesthesiology* 27, 574.