INTRAVENOUS REGIONAL ANAESTHESIA IN CHILDREN

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SUMMARY

Fifty children, aged 3–12 yr, received intravenous regional anaesthesia for the treatment of either simple forearm fractures or elbow injuries. The technique obviated delays in treatment and allowed the child to be discharged from hospital immediately after treatment. There were no complications resulting from anaesthesia, but there was one anaesthetic failure.

The technique of intravenous regional anaesthesia is used widely and successfully in the treatment of injuries to the arm and hand in adults (Adams, Dealy and Kenmore, 1964; Sorbie and Chacha, 1965; Dunbar and Mazze, 1967). However, the technique is not popular in the United Kingdom for the treatment of children, in spite of favourable reports from elsewhere (Gingrich, 1967; Carrell and Eyring, 1971). This report demonstrates the effective use of the technique in a group of 50 children.

PATIENTS AND METHODS

Forty-six children with forearm fractures, two children with supracondylar fractures and two children with elbow dislocations were treated. The age range was 3–12 yr (mean 8 yr). Each child was interviewed, with his or her parents, in the Casualty Department, and the procedure was explained. While the parent comforted the child, a single-cuff pneumatic tourniquet was placed on the upper arm. The systolic arterial pressure and the heart rate were recorded. A "Butterfly" (Abbott) (size 19–25 gauge) needle was inserted into a dorsal hand vein or suitable peripheral arm vein and the arm was elevated. To minimize handling of the injured limb, no attempt was made to exsanguinate it by other methods. The cuff was inflated to approximately 50 mm Hg above the measured systolic pressure. Lignocaine 0.5% 10–30 ml was then injected according to age (table I).

The volume of lignocaine injected was calculated from the child's weight predicted from age rather than from the actual weight. In each group, the volume corresponded to a maximum dose of 4 mg/kg, thus allowing a safety margin for an underweight child and eliminating the possibility of an overdose in an overweight child (Scott et al., 1972).

The quality of anaesthesia was graded as:

1. Complete, when the manipulation was achieved with no discomfort.
2. Partial, when the manipulation was accompanied by some discomfort.
3. Failed, when anaesthesia was inadequate for the manipulation, and general anaesthesia had to be employed.

The following information was recorded also:

(a) The time taken to achieve effective anaesthesia after completion of the injection.
(b) The duration of anaesthesia after release of the tourniquet.
(c) The total tourniquet time.
(d) Complications attributable to the release of local anaesthetic agent into the circulation.

| Table I. Volume of lignocaine 0.5% used in each age group |
|-----------------|--------|
| Age (yr) | Dose (ml) |
| 3–4 | 10–15 |
| 5–7 | 15–20 |
| 8–10 | 20–25 |
| 11–12 | 25–30 |

RESULTS

There were no technical problems associated with the administration of the anaesthetic agent. Anaesthesia was complete in 47 patients, partial in two patients and failed in one patient. The mean time from completion of the injection to adequate anaesthesia was 3.5 min (range 1.5–8 min). The time for full recovery from anaesthesia after release of the tourniquet varied between 2 and 5 min (mean 4 min). The longest tourniquet time was 18 min and none of the
children complained of tourniquet pain. No complications occurred after release of the tourniquet and there were no other complications.

DISCUSSION

In this study, intravenous regional anaesthesia was used routinely and with success, in a children’s casualty department, to reduce simple forearm fractures and elbow dislocations. A lack of co-operation from these children was anticipated, but, when time was taken to explain the procedure and a parent was present, no undue difficulty was experienced. The quality of anaesthesia was excellent and the failure rate was low. The cause of the one failure was not clear but the child subsequently had an uneventful general anaesthesia.

Tourniquet pain may occur during prolonged procedures and requires a two-cuff technique (Holmes, 1963). This technique was not necessary during this study as the longest tourniquet time was 18 min.

The absence of complications after release of the tourniquet, such as dizziness, convulsions, bradycardia and hypertension (Kennedy et al., 1965), is similar to the experience of Carrell and Eyring (1971) and no other complications were noted.

This method obviated the inevitable delays associated with the administration of general anaesthesia in the presence of a full stomach, and prompt treatment was given to a group of children who were both frightened and in pain as a result of their injury. In conclusion, therefore, this technique is considered to be safe, effective and convenient for children and could be considered more often as the first choice anaesthetic technique in suitable cases.

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REFERENCES