

Extended Axillary Block (E. A. B.)

Natan WEKSLER, Diego KESSLER and Leon OVADIA

(Key words: axillary, block)

The brachial plexus block is a useful technique for surgery of the upper limbs.

After Kulenkampff's pioneer work¹, the supraclavicular approach became widely used. However, pneumothorax occurs in 1 to 6% of the cases and limits its use².

The axillary approach is a good and safe alternative for brachial plexus block. Nevertheless, this technique is associated with less than 90% success rate³.

With the purpose to increase the success rate we add an interscalene injection of local anesthetic to a perivascular axillary block performed as described by Winnie⁴.

We compare, herein, the conventional axillary block (C.A.B.) with the extended (conventional + interscalene) axillary block (E.A.B.) regarding success and complication rates.

Method

66 ASA I and II patients undergoing surgery (orthopedic, vascular and plastic) of the upper limbs were scheduled for the present study. In 32 patients (group I), C.A.B. was performed using 60 ml of a standard anesthetic solution. The injection was perivascular, as high as possible in the axilla, with digital compression closely behind the needle to prevent distal flow⁴ (fig. 1).

In the remained 34 (group II) and additional interscalenic injection, as described by Winnie⁵ of 20 ml of the



Fig. 1. The axillary injection made as high as possible in the axilla.

The full line represents the axillary artery and the dotted one crosses it at the highest point in the axilla.

standard anesthetic solution at the Chassaignac's tubercule level was administered after the conventional axillary block performed with 40 ml of our local anesthetic solution (E.A.B.) (fig. 2).

The standard anesthetic solution contained 2.5 mg of bupivacaine and 10 mg of lidocaine for each ml. Epinephrine 1:200.000 was added in order to prolong the anesthetic action.

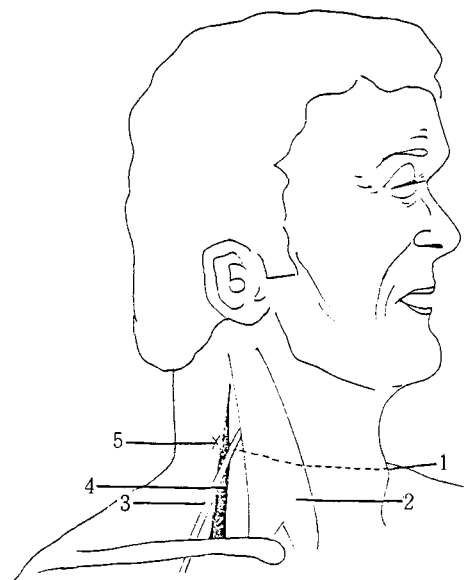
Both groups were similar in age, sex and type of surgery. The need for general anesthesia to execute the surgery stated the failure of the block. The statistical study was made using the "Z" test for comparison of two percentages based on two large samples.

Results

4 patients (12.65%) in group I needed additional general anesthesia, compared to

Department of Anesthesiology, Hillel Yaffe Memorial Hospital, Hadera, Israel

Address reprint requests to Dr. Weksler: Department of Anesthesiology, Hillel Yaffe Memorial Hospital, Hadera, Israel



1. cricoid cartilage
2. sternocleidomastoid muscle
3. external jugularis
4. interscalenic groove
5. chassaignac's tubercle

Fig. 2.

none in group II ($P < 0.01$).

1 patient in group II developed Horner's syndrome after the interscalenic injection ($P > 0.01$).

No systemic toxic reaction, local hematomas or persistent paresthesias were observed among our patients.

Discussion

The axillary approach for brachial plexus block analgesia was first described by Hirschel⁶. His technique consisted of deposition of the local anesthetic at the level of the plexus trunks just above the first rib. Reding⁷ in 1921 described the axillary approach and the brachial plexus sheath.

In 1958 Burnham⁸, introduced the perivascular axillary approach as presently known.

The success rate of axillary block is less than 90% as found by Plevak and coworkers³. This unsatisfactory success rate

is due to failure of the musculocutaneous nerve blockade, which leaves the plexus sheath before the axilla.

In order to increase the success rate we add an interscalenic local anesthetic injection at the Chassaignac's tubercle level. The analgesia achieved in the C.A.B. group was sufficient to perform the surgery in 87.35% of the patients compared to 100% in the E.A.B. group. This difference was statistically significant ($P < 0.01$).

The incidence of complications was similar in both groups. Although large volumes of local anesthetics were used, as proposed by De Jong⁹, the total dose was lower than the toxic doses postulated by Moore and coworkers¹⁰.

The high success rate and the lack of serious complications, make us to recommend the extended axillary block as a safe and trustworthy method for brachial plexus anesthesia.

References

1. Kulenkampff D: Die Anaesthesierung des plexus brachialis. *Zentralbl F Chir* 38:1337-1350, 1911
2. Winnie AP, Collins VJ: The subclavian technique of brachial plexus anesthesia. *Anesthesiology* 25:353-363, 1964
3. Plevak DJ, Linstromberg JW, Danielson DR: Paresthesia Vs nonparesthesia—the axillary block. *Anesthesiology* 59:A 216, 1983
4. Winnie AP: Recent advances in regional anesthesia. *Surg Clin North Am* 54:861-892, 1975
5. Winnie AP: Interscalene Brachial Block. *Anesth & Analg* 49:455-466, 1970
6. Hirschel G: Die Anaesthesierung des plexus Brachialis bei Operationen an der oberen Extremitat. *Munchen Med Wschr* 58:1555-1556, 1911
7. Reding M: Nouvelle methode D'anesthesie du membre superieur. *Presse Med* 29:294, 1921
8. Burnham PJ: Regional block of the great nerves of the upper arm. *Anesthesiology* 19:281-284, 1958
9. De Jong RH: Axillary block of the brachial plexus. *Anesthesiology* 22:215-225, 1961

10. Moore DC, Bridenbagh LD, Thompson GE, Balfour RI, Horton WG: Factors determining dosages of amide-type local anesthetic drugs. *Anesthesiology* 47:263-268, 1977