

Bier's block: A Case Report

Kalpana Kharbuja,^{a,c} Mahesh Sharma,^{a,c} Nil Raj Sharma^{b,c}

ABSTRACT:

Introduction: Intravenous Regional Anesthesia (IVRA) has been first described in 1908 by the German surgeon August KG Bier. Although the technique was convenient to perform and effective in giving surgical anesthesia, the recent plexus block techniques have largely replaced the "Bier's block" instantly because of time limitations and safety considerations of IVRA. Throughout the years, modifications in procedure and new pharmacologic adjuvants have shown to prevent toxic reactions to anesthetics and mitigate limitations of IVRA, still IVRA can be preferred as choice of anesthesia for short procedures. **Case Report:** We present a case of 86 yr old male who was operated for radius fracture after a fall injury under Bier's Block or IVRA technique. **Conclusion:** IVRA can be the choice of anesthesia for short procedures because of rapid onset of anesthesia, easy administration and cheaper cost with special considerations on its side effects, complications which can be the outcome of technical errors.

Keywords: intravenous anesthesia • nerve block • plexus block • regional

INTRODUCTION:

In August 1908, KG Bier, Professor of Surgery at Berlin, first described a technique in which a local anesthetic solution (procaine) was administered intravenously into a limb with the arterial blood supply occluded by a tourniquet.¹ Although the technique was easy to perform, providing a quite rapid onset of surgical anesthesia and an acceptable muscular relaxation; time limitations and safety considerations remained as a matter paramount importance. On the other hand, more reliable and safe plexus block techniques was introduced in clinical practice few years later which largely replaced the "Bier's block"

Nevertheless, IVRA has not been completely abandoned (e.g., Herreros recommended in 1946 the use of IVRA on the battlefield and international symposia on IVRA have been held in 1966 and 1979).^{2,3} Also, the new procedures and pharmacologic adjuvants has been introduced to prevent toxic reactions to the anesthetic solution and mitigate limitations of IVRA. The current study was a reported case of two days old right distal radius fracture acquired after a fall which was corrected with closed reduction with K wire fixation using external fixation all performed under the IVRA technique (Bier's block).

CASE REPORT:

An 86-year-old patient presented in Emergency Department with two days old closed comminuted right distal radius fracture with alleged history of fall injury. He was planned for closed reduction with K-wire fixation with external fixator. Medical history included chronic hypertension for last 10 years. He was under enalapril 2.5 mg with hypertension under control for last four years. There was no known allergy history to local anesthesia. On examination, he was averagely nourished with pulse

a - Lecturer,

b - Professor and Head

c - Department of Anesthesiology and Critical Care
Lumbini Medical College Teaching Hospital, Palpa, Nepal

Corresponding Author:

Dr. Mahesh Sharma

e-mail: maheshsharmalmc2@gmail.com

How to cite this article:

Kharbuja K, Shrama M, Sharma NR. Bier's block: a case report. Journal of Lumbini Medical College, 2015;3(1):23-4. doi: 10.22502/jlmc.v3i1.65.

rate: 68 bpm, blood pressure of 140/90 mm Hg and respiratory rate (RR) of 14 per min. All other systemic examinations were within normal limits. Airway examination revealed modified mallampati class III, adequate mouth opening and neck extension. The blood investigations were normal. Informed consent was taken. He was premedicated with lorazepam two mg tablet and pantoprazole 40 mg tablet. On the day of surgery, in operating table standard monitors were applied. Baseline vitals were recorded and under aseptic precaution 18 gauge venous access was taken on left dorsum of hand, opposite to block side for intravenous fluid managements. A double pneumatic tourniquet was placed on padding layer of soft cloth with proximal cuff high on upper arm. 18 GZ cannula was inserted in right dorsum of hand and cannula was flushed with normal saline before capping. The entire arm was elevated for two minutes for passive exsanguinations. Then upper Esmarch bandage was wrapped around arm spirally from hand to distal cuff of double tourniquet to exsanguinate extremity completely. Then proximal cuff was inflated 100 mm Hg above systolic pressure. Ten milliliters of plain 2% local anaesthesia was diluted to 40 ml and injected via cannula. Arm was lowered to table after injection and iv cannula from anesthetized side was removed and pressure was quickly applied over puncture site in sterile manner. Distal cuff was deflated within 10 minutes. Total duration of surgery was around 40 minutes. Hemodynamic parameters remained stable with systolic blood pressure (SBP) 130-150 mm Hg, diastolic blood pressure (DBP) 80-100 mm Hg, heart rate (HR) 82-98 bpm, SPO₂ 96-99%. Postoperative period was uneventful.

DISCUSSION:

Injection of local anesthesia into venous system of the extremity previously exsanguinated and isolated from the central circulation, with tourniquet application, is involved in IVRA and is called Bier's block. IVRA is easy to administrate, its overall cost is low, it is applicable to all age groups, the onset of surgical anesthesia is quite rapid, and after the tourniquet (a device introduced for limb amputation by war surgeons) is released, normal sensation and motor power return rapidly.⁴ Short elective surgical procedures (< 90 min) can be performed on the hand and the forearm, usually on soft tissues. While in case of an emergency bone fractures, this technique can be utilized for surgery,

even in children.^{5,6} Reduction or manipulation of fractures, ganglionectomies, carpal tunnel syndrome, Dupuytren's contractures, complex regional pain syndrome (CRPS) can be done under this block.

The preferred drug for the Bier's block is prilocaine which is the drug of choice while lidocaine (0.5% diluted to 40 ml), Nysora (2%, 15-20 ml) can also be used. It is essential that plain noradrenaline containing solutions are used. Bupivacaine should never be used for Bier's block.

IVRA contraindications include patient's refusal, allergy to local anesthetic, infection, a personal history of seizures, peripheral neurologic diseases, cardiac arrhythmias, A-V shunt, conditions precluding exsanguination and/or the use of an ischaemic tourniquet, e.g. scleroderma, Raynaud's disease, tumors, increased intracranial pressure, sickle cell disease (possible), deep vein thrombosis or thrombophlebitis, vascular insufficiency. Complication as hematoma, systemic side effect of local anaesthesia, engorgement of extremity and ecchymosis can be observed with this procedure.

CONCLUSION:

Even after the development of many new techniques, IVRA still is a good choice of anaesthesia for short procedures because of rapid onset, easy administration, and low cost.

REFERENCES:

1. Bier A. Uber einen neuen weg lokalanästhesie an den gliedmassen zu erzugen. *Ann Klin Chir.* 1908;86:1007-16.
2. Colberne EC. The bier block for intravenous regional anesthesia: technique and literature review. *Anesth Analg.* 1970;49:935-40.
3. Herreros LG. Regional anesthesia for the intravenous route. *Anesthesiology.* 1946;7:558.
4. Laffin J. *Combat surgeons.* 2 ed. Phoenix mill (gloucestershire): sutton publishing Ltd;1999.
5. Carrel ED, eyring EJ. Intravenous regional anesthesia for childhood fractures. *J Trauma* 1971;11:301-5.
6. Fitzgerald B. Intravenous anaesthesia in children. *Br J Anaesth.* 1976;48:485-486.