





Complications include systemic toxicity if drug leaks into circulation due to failure of tourniquet or premature deflation apart from tourniquet palsy and rarely compartment syndrome<sup>10-12</sup>.

All the patients included in this study were assessed preoperatively clinically and with routine laboratory investigations. ECG if indicated was also done. Intravenous line was established on normal limb. Intravenous Valium (10mg) was given in anxious patients. Vital parameters were monitored throughout the procedure. Single cuff pneumatic tourniquet was used one of the veins on the dorsum of injured hand or forearm was cannulated using intravenous cannula<sup>13</sup>, after exsanguination tourniquet was applied the cuff inflated to 100-150 mmHg above the systolic BP, check for the absence of radial pulse<sup>14,15</sup>.

0.5% xylocaine, prepared according to patient's weight, usual dose being 40 ml, total dose not exceeding 4-6 mg/ kg, injected slowly and the time of injection was recorded<sup>16,17</sup>. After 5 minutes another tourniquet was applied distal to the first one and proximal was released. After completion of procedure but not before 30 minutes, tourniquet was gradually released. Most of the procedures around elbow and distal to it including surgery and close manipulation can be undertaken. It does require a little training and monitoring during procedure. It can be used for emergency as well as elective situations, this also decreases work load of anesthesia department and frustration of the surgeon, and furthermore the patients and relatives are spared of the waiting for long time in emergency situations.

This study was undertaken to evaluate efficacy and safety of Bier's block in upper limb orthopedic surgery in our setup.

## METHODS:

This descriptive study was conducted from January 2016 to December 2016 at the Department of Orthopedic Surgery Peoples University of Medical & Health Sciences (PUMHS) Nawabshah, on 50 patients above the age of 15 years of either sex. Patients unfit for general anesthesia and patients those requiring elective and emergency procedures around elbow and distally were included in this study. Patients below the age of 15 years, those with history of hypersensitivity to xylocaine, and infective focus

on ipsilateral limbs were excluded from this study. All the information about the patients bio data, injury pattern, operation performed and complications were obtained on a predesigned proforma, an informed consent was also obtained from each patient.

## Analysis:

The efficacy of Bier's block anesthesia in upper limb surgery has been measured in terms of age, sex, duration of surgical procedure, duration of Bier's block and post-operative complications.

## RESULTS:

A total of 50 patients were studied, out of these 37(74%) were males and 13(26%) were females. The age range from 15 years to 65 years, average being 30 years. The duration of Bier's block ranged from 30 minutes to 60 minutes with average being 45 minutes, whereas the duration of the surgical procedure varied from 20 minutes to 60 minutes, average being 40 minutes. The 50 patients in this study included, 10(20%) patients declared unfit for general anesthesia; of these 10 patients, 02(20%) had recently suffered from myocardial infarction, 03(30%) had unstable angina whereas 05(50%) had uncontrolled diabetes mellitus. The procedures performed are listed in table-1.

Peroperative side effects noticed included, transient rise of pulse in 6(12%) patients, rise of systolic blood pressure  $\pm$  10mmHg in 3(6%) patients, tourniquet pain for initial 10 minutes in 4(8%) patients. One patient developed transient tourniquet palsy which recovered in 8 weeks, none of the patients developed systemic side effects or compartment syndrome; none required discontinuation of procedure or change over to another form of anesthesia.

## DISCUSSION:

Bier's block (IVRA) is a well-established method of anesthesia and is widely used in emergency situation. Being regional anesthesia it avoided the complications of general or spinal anesthesia, and can be safely used in patients who are unfit for general or spinal anesthesia<sup>6</sup>. In emergency situations surgery can be undertaken immediately without delay as it does not require patients to be empty stomach<sup>18</sup>.



Table No. I Procedures done under Bier's block

Procedures	No. of Patients, N=50(%)
1) Open reduction and internal fixation of fracture	30(60%)
a) Distal Radius	16(32%)
b) Olecranon	5(10%)
c) Monteggia	2(4%)
d) Galeazzi	2(4%)
e) Open reduction of MCPJ	2(4%)
f) Radial head excision	3(6%)
2) Skin grafting	2(4%)
3) Excision of ganglion	4(8%)
4) Tendon Surgery	3(6%)
5) Ulnar nerve transposition	1(2%)
6) Wound debridement	6(12%)
7) Miscellaneous	4(8%)

This study was conducted to evaluate efficacy of Bier's block for various orthopedic and trauma procedures and to train residents. Due to heavy work load most of the patients requiring emergency surgery cannot be operated promptly as anesthetist were busy with some other department and surgery has to be delayed unnecessarily. This study confirmed that it is a very good and effective method of anesthesia and most of the procedures can be done without exposing the patients to risks of general anesthesia. Apart from tourniquet palsy in one patient, which recovered completely, no major complication was noted and minor side effects can be overcome by prior sedation of patient. If the procedure is expected to last longer than 60 minutes than Bupivacaine may be used. For dilution of Xylocaine, distilled water should be used, as iatrogenic compartment syndrome was reported by Mabee et al, when hypertonic saline was inadvertently used as Xylocaine diluent<sup>19</sup>.

Apart from surgical procedure, Bier's block can be used for close manipulation and reduction of fracture and dislocation. Most of the procedures were done as day care surgery and patients did not required admission thereby reducing expenditure for patients<sup>20</sup>. Dunlop et al also concluded that Bier's block is ideally suited to day care surgery with no deaths, minimal morbidity and high success rate<sup>21</sup>.

According to an Australian study<sup>22</sup>, Bier's block is used in 67% of Australian emergency

departments, with response rate of 97%. They reported that it is a popular, reliable, relatively safe and aesthetic anesthesia technique to use in emergency situation.

#### CONCLUSION:

Bier's block (IVRA) is a safe, effective, economical, easy, and reliable technique of anaesthesia and should be used more frequently with low complication rate if used carefully.

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