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RESEARCH ARTICLE

A COMPARATIVE STUDY OF BIERS BLOCK USING LIGNOCAINE & LIGNOCAINE WITH DEXMEDETOMIDINE

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Abstract

Background: Intravenous regional anaesthesia (IVRA) using Bier's Block is a simple and effective technique for short-duration surgeries of the upper limb. Lignocaine is a commonly used local anesthetic for IVRA. Adding dexmedetomidine, an α-2 adrenergic agonist, has shown potential benefits in enhancing analgesia and reducing anesthetic requirements.

Objectives: This study aims to compare the effects of IVRA using 0.5% lignocaine alone versus 0.5% lignocaine with dexmedetomidine in upper limb surgeries, focusing on sensory and motor block onset, postoperative analgesia, and sedation levels.

Methods:A prospective,randomized,single blinded study was conducte d with 60 patients (ASA I & II, aged 18-65 years) undergoing upper limb surgeries of less than 45 minutes. Patients were divided into:

1.Group L: 0.5% lignocaine (40cc)

2.Group LD: 0.5% lignocaine + dexmedetomidine (1 mcg/kg)

Onset and duration of sensory and motor block, need for rescue analgesia, postoperative sedation, and visual analogue scale (VAS) scores were evaluated. Statistical analysis was performed using SPSS v23.

Results: Patients in Group LD showed a significantly shorter onset time for sensory and motor block. The mean time for rescue analgesia was significantly prolonged in Group LD (379.6 ± 33.49 min) compared to Group L (102.3 ± 6.63 min) ($p < 0.001$). Postoperative VAS scores were significantly lower in Group LD (3.15 ± 0.39) versus Group L (5.43 ± 0.41) ($p < 0.001$). Sedation scores were higher in Group LD.

Conclusion: Dexmedetomidine as an adjuvant to lignocaine in IVRA significantly enhances sensory and motor blockade, prolongs analgesia, and improves sedation without significant side effects. It is a valuable addition to Bier's Block for upper limb surgeries.

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Introduction:-

Intravenous regional anaesthesia (IVRA) was first described by August Bier in 1908. It is widely used for short-duration upper limb surgeries due to its simplicity and reliability. Lignocaine remains the most frequently used local anesthetic in IVRA. However, it has limitations such as inadequate postoperative analgesia, tourniquet pain, and time limitations.

Dexmedetomidine, an **α-**2 adrenergic receptor agonist, has gained interest for its sedative, analgesic, and sympatholytic properties. It has been hypothesized that dexmedetomidine, when added to lignocaine, can improve the efficacy of IVRA by enhancing intraoperative and postoperative analgesia while reducing anesthetic requirements.

This study aims to evaluate the effect of adding dexmedetomidine to lignocaine for IVRA in upper limb surgeries.

Materials and Methods:-

Study Design and Population:

1. **Design:** Prospective, randomized, single-blinded study.
2. **Sample Size:** 60 patients (ASA I & II, age 18-65 years, either sex).
3. **Study Duration:** August 2015 - May 2016.
4. **Study Setting:** Department of Anaesthesia, Shadan Institute of Medical Sciences.
5. **Ethical Clearance:** Approved by the institutional ethics committee.

Inclusion Criteria:

1. Patients undergoing elective upper limb surgery (<45 min duration).
2. ASA I & II.
3. Normal baseline ECG rhythm.

Exclusion Criteria:

1. Allergy to lignocaine or dexmedetomidine.
2. Sickle cell disease.
3. Peripheral vascular disease (Raynaud's phenomenon).
4. Uncontrolled hypertension, diabetes mellitus, or ischemic heart disease.

Intervention:

Patients were randomly assigned into two groups:

1. **Group L:** 0.5% lignocaine (40cc).
2. **Group LD:** 0.5% lignocaine + dexmedetomidine (1 mcg/kg). Parameters measured included:

a. Onset of sensory loss.
b. Onset of motor loss.
c. Duration of motor block recovery.
d. Need for rescue analgesia.
e. Postoperative sedation.
f. Visual analogue scale (VAS) score for pain.

Statistical analysis was conducted using **SPSS v23**, with a significance level set at $p < 0.05$.

Results:-

Demographics:

Parameter	Group L (Mean ± SD)	Group LD (Mean ± SD)	P-value
Age (years)	32.37 ± 10.9	33.7 ± 11.8	0.78
Weight (kg)	68.7 ± 6.6	69.3 ± 7.3	0.82

Sensory and Motor Block Onset:

Parameter	Group L (Mean ± SD)	Group LD (Mean ± SD)	P-value
Sensory Loss (min)	6.3 ± 1.10	4.2 ± 0.89	<0.001
Motor Loss (min)	15.2 ± 3.30	13.2 ± 2.49	<0.001

Postoperative Parameters:

Parameter	Group L (Mean ± SD)	Group LD (Mean ± SD)	P-value
Rescue Analgesia Time (min)	102.3 ± 6.63	379.6 ± 33.49	<0.001
Sedation Score	1.64 ± 0.42	2.32 ± 0.43	<0.001
VAS Score	5.43 ± 0.41	3.15 ± 0.39	<0.001

Findings:-

Sensory and motor block onset was significantly quicker in Group LD. Patients in Group LD required significantly later rescue analgesia, had lower postoperative VAS scores, and experienced higher sedation levels.

Discussion:-

1. Addition of dexmedetomidine to lignocaine in IVRA significantly
2. shortened the onset of sensory and motor blockade.
3. Duration of postoperative analgesia was significantly prolonged in Group LD.
4. VAS scores were significantly lower in Group LD at 6 hours postoperatively.
5. Sedation scores were higher in Group LD, improving patient comfort without significant adverse effects.
6. No hemodynamic instability or major complications were observed in either group.

Conclusion:-

Dexmedetomidine, as an adjuvant to lignocaine in IVRA, significantly enhances the quality of anesthesia by:

1. Shortening sensory and motor block onset time.
2. Prolonging postoperative analgesia.
3. Reducing the need for rescue analgesia.
4. Improving sedation levels without adverse effects.

It is a valuable addition to Bier's Block for upper limb surgeries.