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COMPARISON OF 0.5% ISOBARIC ROPIVACAINE 3ml AND 0.75% ISOBARIC ROPIVACAINE 3ml GIVEN INTRATHECALLY, IN TERMS OF CLINICAL EFFICACY AND MOTOR BLOCKADE IN KNEE ARTHROSCOPIC PROCEDURES.

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ABSTRACT: Ropivacaine is an enantiomerically pure ('S' Enantiomer) amino amide new local Anesthetic,⁽¹⁾ producing decreased degree of motor block in heavily myelinated (Motor) fibres and faster onset of block in lightly myelinated (Sensory) fibres i.e., greater differential effect. Hence well suited to orthopaedic surgeries because a good sensory motor dissociation may facilitate early rehabilitation. Its pure left isomer and 3 dimensional structure, decreased lipid solubility has less toxic effects on CNS & CVS system. **CONTEXT:** Regional anaesthesia is noted for its simplicity, safety and effectiveness. Anaesthesia with an efficient block, having least onset time and which can be prolonged with least complications is one of challenges faced by anaesthesiologist. Sub-arachnoid block is well known for its definitivity. **AIM:** To compare the onset and duration of 2 different concentrations of Ropivacaine i.e., 0.5% 3ml (15mg) Isobaric Ropivacaine and 0.75% 3ml (22.5mg) isobaric Ropivacaine given intrathecally for subarachnoid block in knee arthroscopy surgeries.⁽⁶⁾

INTRODUCTION: Ropivacaine was introduced in 1997. It is effective, long acting agent devoid of serious side effects when used for infiltration anaesthesia, peripheral and central neural block. Ropivacaine produces slower onset, short duration less intense motor block than same concentration of Bupivacaine.⁽²⁾ It is relatively new amid type long acting, pure 'S' Enantiomer of Bupivacaine mainly used for surgery and post-operative pain relief. It is isotonic, isobaric, aqueous solution, free from preservative. Its PKa is 8.1.⁽¹⁰⁾

It produces reversible blockade of impulse propagation along nerve fibres by preventing the inward movement of sodium ions through the cell membrane. If excessive amounts reaches the systemic circulation signs and symptoms of toxicity may appear, emanating from C.N.S and C.V.S. CVS: CNS is 2:0.⁽¹⁰⁾

Ropivacaine is homologous chemically with Bupivacaine and mepivacaine. It is similar to 'S' Enantiomer of bupivacaine except that a propyl group is present in place of butyl group on the piperidine ring, tertiary nitrogen atom.

MATERIAL AND METHODS:

Type of study: Double blind randomized study.

Subjects: Patients undergoing elective knee arthroscopic surgeries under subarachnoid block.

ASA: Grade I and II.

AGE: 20-50 years either gender.

WEIGHT: 50-70 Kg.

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EXCLUSIVE CRITERIA:

1. Pts. with H/o HTN, DM, CVA, Neurological diseases.
2. Pts. on anti-hypertensive drugs, cardiac drugs
3. Hepatic & Renal diseases.

PROCEDURE: After ethical committee approval, informed written consent from patient taken, pre-operative PR, BP, SpO₂ recorded. Standard protocol for regional anesthesia (Subarachnoid) block was observed. 50 patients received 0.5% 3ml (15mg) of isobaric Ropivacaine intrathecally i.e., Group I. 50 patients received 0.75% 3ml (22.5mg) of isobaric Ropivacaine intrathecally in sitting position at L2-L3 inter space with 25G spinal needle in midline.⁽³⁾ Patients were made supine and following parameters assessed.⁽⁵⁾

PARAMETERS:

- Time of onset of sensory level tested by pin prick.⁽³⁾
- Time of onset of motor block in minutes using modified Bromage scale.⁽³⁾
- Time to achieve maximum sensory block.
- Time to achieve maximum motor block upto T8 segment. Motor block was assessed in hip, knee and ankle joints.
- Duration of sensory block assessed by 2 segment recession.
- Time for home readiness as tested by regain of micturition reflex and ability to walk.
- Changes in Pulse rate, Systolic and Diastolic Blood pressure (NIBP), percentage saturation of oxygen (SpO₂) were recorded using Multichannel monitor (Datexohmeda) every 1 minute for 5 minutes, every 3 mins till 30 minutes, every 5 mins till 1 hour, every 15 mins till 2hrs during the study.⁽⁵⁾

STATISTICAL ANALYSIS					
SPINAL ANAESTHESIA CHARACTERISTICS OF ISOBARIC ROPIVACAINE IN 2 DIFFERENT CONCENTRATIONS					
GROUP I : 0.5% 3ml GROUP II : 0.75% 3ml					
SNO	VARIABLES	GROUP	NO. OF PTS	TIME IN MINUTES	P VALUE
1	Onset of sensory block	I	50	2.75 +/- 0.4	< 0.035
		II	50	3.2 +/- 0.8	
2	Onset of motor block	I	50	5.25 +/- 0.4	< 0.0001
		II	50	7.1 +/- 0.9	
3	Onset of max. sensory block	I	50	6.5 +/- 1.3	< 0.004
		II	50	7.5 +/- 0.5	
4	Onset of max. motor block	I	50	11.05 +/- 1.6	< 0.0001
		II	50	13.15 +/- 1.8	
5	Duration of block	I	50	119 +/- 12.5	< 0.0001
		II	50	205 +/- 31.7	
6	Time for home readiness	I	50	155 +/- 31.3	< 0.0001
		II	50	225 +/- 31.7	
7	% of motor block	I	50	92% +/- 3.2%	
		II	50	98% +/- 1.7%	

Fig. 1

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Fig. 2

Fig. 3

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Fig. 4

Fig. 5

RESULTS:

- There were significant changes in all the variables studied during the procedure with P value < 0.05.
- No significant changes in BP; PR; SPO₂ were recorded in both groups except that 1 patient in Group II developed Bradycardia and 1 patient each in both groups developed 10% decrease in blood pressure.

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- Percentage of motor block was lower in Group I than Group II with 6% difference in quality block.

CONCLUSION: Group II patients who received ropivacaine 0.75% 3ml (22.5mg) given for subarachnoid block for knee arthroscopic showed longer duration of action and good motor blockade than Group I patients. Thus 0.75% 3ml of Isobaric Ropivacaine intrathecally is ideal for knee arthroscopic procedures with early home readiness and greater margin of safety with reduced toxic potential.⁽²⁾

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