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DEXAMETHASONE (8MG) AS AN ADJUVANT WITH BUPIVACAINE (0.5%) IN EPIDURAL ANAESTHESIA FOR LOWER LIMB SURGERY - A COMPARATIVE STUDY OF 60 CASES

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ABSTRACT

INTRODUCTION: Surgical Anaesthesia and perioperative Analgesia delivered through an indwelling epidural catheter is a safe and effective method for management of Perioperative pain. We planned to evaluate addition of dexamethasone 8 mg (2cc) to bupivacaine 0.5% plain(16cc) in epidural block in patients undergoing lower limb surgery to study sensory and motor blockade characteristics, postoperative analgesia and side effect profile.

METHOD & MATERIAL: All patients were divided into two groups-group BD(n=30), inj.Bupivacaine (0.5%) plain 16 ml with 2 ml Dexamethasone (8mg) via epidural catheter and Group B(n=30) Inj. Bupivacaine (0.5%) plain 16 ml with 2 ml normal saline via epidural catheter. Assessment of peri-operative pain was evaluated by using visual analogue scale .

RESULT: Intraoperative pulse rate, systolic blood pressure, diastolic blood pressure and mean blood pressure changes in both Groups show no significant difference. The onset of sensory and motor block was earlier, duration of sensory and motor block was longer, duration of analgesia was longer in Group BD than Group B. There was statistical difference between onset and duration of sensory and motor block between two groups. None of the patients in both the groups required epidural top up dose or show any complications.

CONCLUSION: Addition of dexamethasone (8mg) to Bupivacaine 0.5% plain (16ml) when given epidurally influence the sensory and motor block by shortening the onset time, early peak effect and prolonging the duration of surgical anaesthesia and prolonged analgesia without affecting the other parameters and no complications perioperatively.

KEYWORDS : Dexamethasone, Bupivacaine, Epidural Anaesthesia, Lower Limb Surgery

INTRODUCTION

Uncontrolled perioperative pain may potentiate some of pathophy si ologies and increase morbidity and mortality for patients. [1] Atten uation of Perioperative pain may decrease perioperative morbidity and mortality. Surgical Anaesthesia and perioperative Analgesia delivered through an indwelling epidural catheter is a safe and effective method for management of Perioperative pain.[2] Increasing the duration of local anesthetic action is often desirable because it prolongs analgesia. Dexamethasone is a high-potency, long-acting glucocorticoid with little mineralocorticoid effect that has been used for prophylaxis of postoperative nausea. [3] Dexamethasone microspheres have been found to prolong the block duration in animal and human studies.[4,5]

Since 1952, Steroids were widely used epidurally for postoperative pain relief. Callery, Iveta et al (2008) and Sistla et al (2008) individually acknowledged the beneficial effects of steroids with regard to decreasing pain, nausea and vomiting following surgical trauma. Steroids have powerful anti-inflammatory as well as analgesic property. They relieve pain by reducing inflammation and blocking transmission in nociceptive C-fibers and by suppressing ectopic neural discharge. [6] Dexamethasone, a synthetic glucocorticoid has highly potent anti-inflammatory property without mineralocorticoid activity. It is also found to be safer and devoid of potential side effects.[6]

Wang et al. (1998) gave dexamethasone epidurally after multiple epidural needle insertion. Thomas et al. (2006) showed preoperative epidural administration of dexamethasone 5mg, with or without bupivacaine, reduced postoperative pain and morphine consumption following laparoscopic cholecystectomy. [7] With this background, we planned to evaluate addition of dexamethasone 8 mg (2cc) to bupivacaine 0.5% plain(16cc) in epidural block in patients undergoing lower limb surgery to study sensory and motor blockade characteristics, postoperative analgesia and side effect profile.

MATERIALS AND METHODS

After institutional research ethical committee approval & obtaining an informed written consent, 60 patients were included in a randomized prospective controlled comparative clinical study for planned lower limb surgeries in our hospital. All patients were divided into two groups-group BD(n=30) and Group B(n=30)

1) GROUP BD= inj.Bupivacaine (0.5%) plain 16 ml with 2 ml Dexamethasone (8mg) via epidural catheter
2) GROUP B= Inj. Bupivacaine (0.5%) plain 16 ml with 2 ml normal saline via epidural catheter

INCLUSION CRITERIA

1. Patients scheduled for lower limb surgeries.
2. ASA Physical status I to III
3. Age group 18 to 65 years of either sex of average height and weight

EXCLUSION CRITERIA

1. Patients' refusal
2. Uncooperative patients / Not able to understand pain assessment test
3. Patients with history of drug allergy
4. Drug addict / Patient on long term steroid therapy
5. Pregnancy
6. Known case of TB/Peptic ulcer/Chronic inflammatory disease/Obesity
7. Any absolute contraindication for epidural anaesthesia

- Bleeding disorder
- Anatomical abnormality of the spine
- Local sepsis around spine
- Psychiatric illness
- Neurological deficits

All patients were thoroughly assessed day before surgery and screened for any associated medical illness. Routine investigations were carried out and documented. Patients were also assessed for vitals. Thorough systemic examination was done in every patient. Airway assessment was done by Malampatti grading. Lumbar spine examination was done in every patient. This assessment is done **in their respective wards and appropriate advice was given if any, on the day before surgery. Informed written consent was taken. They were also explained about assessment of pain with the help of Visual Analogue Scale.** Under all aseptic and antiseptic precautions lumbar epidural was performed with 18 G touhy epidural needle at the lumbar L3-L4 interspace using loss of resistance technique via a midline approach. Epidural catheter inserted through epidural needle after confirmation of epidural space, then epidural catheter fixed properly after giving test dose with 3 ml of 1.5% preservative free lidocaine with 1:200,000 epinephrine. After that Patients were given bolus dose of drug via epidural catheter according to group allotment in supine position.

Assessment of peri-operative pain was evaluated by using VAS (visual analogue scale) with Grade 0 (no pain) to 10 (worst pain). All patients were explained about VAS score. Analgesia was considered satisfactory if the VAS score was <=4. If score was > 4, analgesia was judged unsatisfactory and rescue analgesia was administered in the

form of Inj. Bupivacaine (0.125%) plain 10 ml with Inj. Tramadol 1 mg/kg via epidural catheter.

OBSERVATION AND RESULTS

STASTICAL ANALYSIS

The results of study were tabulated & stastically compared. All the results were analyzed statistically with Microsoft excel and Chi square test was used for qualitative data. For rest of the quantitative data student unpaired t test was used $p<0.05$ was considered as significant & $p<0.001$ was considered as highly significant.

AGE, WEIGHT, DURATION OF SURGERY AND SEX

Table 1

	Group BD	Group B	p value	Significance
Age (years)	35.7±14.1	40.5±14.05	0.19	NS
Weight(kg)	65.76±10.41	62.83±9.91	0.62	NS
Duration of surgery (minutes)	121.5±30.09	116±26.98	0.45	NS
Sex (m/f)	24:6	24:6	-	-

HEART RATE

Table 2

	BD	B	T value	p value	Significance
Just before induction	99.46±7.42	99.2±8.76	0.09	0.92	NS
Just after induction	100.66±9.48	98.4±9.1	0.94	0.34	NS
5 min	98.3±7.94	96.6±9.1	0.75	0.45	NS
10 min	97.26±9.13	94.1±8.95	1.37	0.17	NS
15 min	95.13±8.9	91.1±8.30	1.82	0.07	NS
30 min	94.9±7.6	92.3±5.96	1.46	0.14	NS
60 min	93±5.57	92±6	0.66	0.50	NS
90 min	92.3±6.1	91.1±6.3	0.75	0.45	NS
120 min	92.5±4.36	90.6±6.39	1.02	0.31	NS
150 min	92±4.56	91.7±9.93	0.06	0.94	NS

SYSTOLIC BLOOD PRESSURE (SBP)

Table 3

	BD	B	T value	p value	Significance
Just before induction	126.33±7.07	131.5±12.1	-2.04	0.04	NS
Just after induction	124.4±11.03	129.8±11.32	-1.89	0.06	NS
5 min	122.8±8.56	122.5±9.35	0.14	0.88	NS
10 min	121.46±8.85	121.2±8.81	0.11	0.90	NS
15 min	120.8±7.76	121.4±9.09	-0.27	0.78	NS
30 min	121.4±7.44	120.6±9.02	0.37	0.70	NS
60 min	120.2±7.64	120.1±8.64	0.18	0.85	NS
90 min	119.4±7.30	120.1±8.31	-0.10	0.91	NS
120 min	120.1±7.48	121.7±8.56	-0.67	0.50	NS
150 min	120.7±7.39	119.5±8.46	0.32	0.74	NS

DIASTOLIC BLOOD PRESSURE (DBP)

Table 4

	BD	B	T value	p value	Significance
Just before induction	78.8±3.95	80.5±3.4	-1.82	0.07	NS
Just after induction	79.4±4.54	80.2±3.55	-1.03	0.30	NS
5 min	78.9±3.41	79.47±5.0	-0.85	0.39	NS
10 min	77.53±5.27	79.1±4.35	-1.28	0.20	NS
15 min	78.2±3.33	79.5±4.15	-1.36	0.17	NS
30 min	79.5±7.65	79.3±4.34	0.12	0.90	NS
60 min	78±3.30	79.1±4.80	-1.0	0.32	NS
90 min	77.8±3.48	79.2±4.32	-1.0	0.32	NS
120 min	77.7±3.64	79.6±4.51	-1.38	0.17	NS
150 min	77.4±4.39	80.5±6.90	-1.09	0.29	NS

MEAN ARTERIAL BLOOD PRESSURE (MAP)

Table 5

	BD	B	T value	p value	Significance
Just before induction	96.6±4.5	97.6±5.9	-2.16	0.03	NS
Just after induction	94.4±6.15	96.8±5.67	-1.56	0.12	NS
5 min	93.5±4.89	98.8±6.02	-0.42	0.67	NS
10 min	92.17±6.09	93.1±5.21	-0.66	0.50	NS
15 min	92.4±4.2	93.5±5.29	-0.91	0.36	NS
30 min	92.3±4.8.	93.1±5.28	-0.59	0.55	NS
60 min	89±4.30	92.8±5.20	-0.46	0.64	NS
90 min	91.71±4.34	92.48±5.2	-0.60	0.54	NS
120 min	91.86±4.6	93.6± 5.2	-1.05	0.30	NS
150 min	91.87±5.15	93.5±6.73	-0.57	0.57	NS

Intraoperative pulse rate, systolic blood pressure, diastolic blood pressure and mean blood pressure changes in both Group BD and Group B show no significant difference in both groups.

CHARACTERISTIC OF SENSORY AND MOTOR BLOCK, DURATION OF ANALGESIA

Table 6

	Time in minutes	Group BD	Group B	T value	p value	Significance
sensory block	Onset	2.96±1.0	5.23±1.75	-6.09	1.9E-07	S
	Peak	6.83± 2.45	12.83 ±2.52	-9.34	3.5E-13	S
	Duration	373±49	242±31.45	12.32	1.3E-16	S
motor block	Onset	5.86±3.4	10.31±3.4	-4.21	0.0002	S
	Peak	10.66 ±5.37	19.66± 7.6	-4.07	0.0005	S
	Duration	254.4±39.79	188±26.51	6.32	2.3E-07	S
Duration of analgesia	Time in minutes	670 ± 84.60	436 ± 40.7	13.64	4.9E-17	S

The onset of sensory and motor block was earlier in Group BD than Group B. The duration of sensory and motor block was longer in Group BD as compared to Group B. There was statistical difference between onset and duration of sensory and motor block between two groups. None of the patients in both the groups required epidural top up dose. None of the patients in both the groups show any complications perioperatively.

Duration of analgesia was longer in Group BD (670 min) than Group B (436 min) with statistically significant difference.

DISCUSSION

Corticosteroids may have a local effect on the nerve and the dexamethasone effect may be related to this action.[72] Some authors believe that analgesic properties of corticosteroids are the result of their systemic effect.[73] We used a dose of 8 mg dexamethasone. Adverse effects with a single dose of dexamethasone, are probably extremely rare and minor in nature and previous studies have demonstrated that short-term (24 hours) use of dexamethasone was safe.[10,11]

In our study sensory onset in group BD is 2.96±1.0, which is faster than in group B which is 5.23±1.75 minutes with $p<0.001$.

In our study sensory blockade peak in group BD is 6.83±2.45 ,which is faster than in group B which is 12.83±2.52 minutes with $p<0.001$.

In our study sensory blockade duration in group BD is 373±49, which is longer than in group B which is 242±31.45 minutes with $p<0.001$.

In our study motor blockade onset in group BD is 5.86±3.4, which is faster than in group B which is 10.31±3.4 minutes with $p<0.001$.

In our study motor blockade peak in group BD is 10.66±5.37 ,which is faster than in group B which is 19.66±7.6 minutes with $p<0.001$.

In our study motor blockade duration in group BD is 254.4±39.79, which is longer than in group B which is 188±26.51 minutes with $p<0.001$.

In our study analgesia duration in group BD is 670±84.60, which is longer than in group B which is 436±40.7 minutes with $p<0.001$. All these parameters are comparable with Pinalben et al (2015) [12] and M.R.Razavizadeh et al (2017) study result. [13]

In our study no any patients in both the Groups developed hypotension unlike Movafegh et al (2005) who had reported hypotension in 3 patients [14]. In our study no any patients in both the Groups developed bradycardia. No complications happened to any patients of both the groups till they were discharged from our hospital.

CONCLUSION

Addition of DEXAMETHASONE (8mg) to Bupivacaine 0.5% plain (16ml) when given epidurally influence the sensory and motor block by shortening the onset time, early peak effect and prolonging the duration of surgical anaesthesia and prolonged analgesia without affecting the other parameters and no complications perioperatively.

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