ORIGINAL ARTICLE

Effect of Low versus High Dose Dexamethasone with Bupivacaine on Duration of Interscalene Block

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ABSTRACT

Aim: To compare the mean duration of post-operative analgesia in low versus high dose dexamethasone as an adjuvant to bupivacaine applied in interscelene block for shoulder surgery.
Methods: This Randomized control trial was done at the Department of Anesthesia & ICU, Jinnah Hospital Lahore for 6 months. 100 patients were scheduled for minor to moderate elective shoulder surgeries under interscelene block using 0.25% bupivacaine. They were allocated into two groups i.e. high dose (Group A) and low dose (Group B) dexamethasone as an adjuvant perineurially, with 0.25% bupivacaine in each group, based on random number tables. Mean duration of pain was assessed.
Results: One hundred (100) patients were included with mean age of 53.19 ± 7.018 ranged from 32 to 60 years of age. Mean duration of pain among our sampled population was 6.14 ± 1.639, ranged from 4 to 10. When we cross tabulated dexamethasone groups with duration of pain results came up non-significant on applying independent sample test (p=0.396) with mean of 6.00± 1.71hours in low dose and 6.28±1.57hoursin high dose. There was no effect of age, gender, smoking on this outcome difference.
Conclusion: It is concluded that there was no difference in mean duration of post-operative analgesia in low versus high dose dexamethasone as adjuvant to bupivacaine in interscelene block at current sample size.
Keywords: Post-operative analgesia, Dexamethasone, Bupivacaine, upper limb surgeries, Interscelene block

INTRODUCTION

Interscelene blocks are used for the surgeries of the upper limb including shoulder joint.[1, 2] It is a type of regional anesthesia which can be used in place of general anesthesia and is considered better.[3-5]Interscelene block can be performed with ultrasound guided, nerve stimulator and elicitation of paresthesia techniques. Ultrasound guided technique is better than nerve stimulator and elicitation of paresthesia techniques.[6] Various types of local anaesthetics for interscelene block have been used like bupivacaine, ropivacaine, xylocaine.Different types of adjuvants have been used in intersclene block to improve the onset, quality and duration of blocks i.e. adrenaline[7-9]**.**

Dexamethasone is steroid which have analgesic effects and anti-inflammatory effects, recently being used as adjuvant to the bupivacaine.[10, 11].The rationale of my study was to evaluate use of dexamethasone as an adjuvant in regional anesthesia to improve the quality of analgesia and set guidelines for future anesthesia with less pain and lesser post-operative analgesics intake. Also there was no local study available.

The objective of the study was to compare the mean duration of post-operative analgesia in low versus high dose dexamethasone as a perineurial adjuvant to bupivacaine in interscelene block for shoulder surgery.

MATERIALS &METHODS

This Randomized control trial was conducted in the Department of Anesthesia, Jinnah Hospital Lahore for a period of six months i.e. 7th July 2015 to 6th January 2016.

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Study Design:
Sample Size: Estimated sample size is 100 patients divided in tow groups (50 in each group) at 95% confidence level and90% power of study, takingduration of post-operative analgesia in both groups (21.6±2.4 h) vs (25.2±1.9 h) respectively in low dose and high dose dexamethasone.
Sampling Technique: Non probability Consecutive Sampling
Inclusion Criteria: Patients aged 18 to 60 years with ASA Class 1 and 2, undergoing elective minor to intermediatesurgeries of upper limb(shoulder surgery).
Exclusion Criteria

1. Patient refusal for regional anesthesia.
2. Surgeries of more than one site i.e. upper and lower limb.
3. Immunocompromised patients determined by history of steroid intake.
4. Patients with severe chronic obstructive disease (COPD).

Data collection: After approval from ethical committee and informed written consent 100 subjects fulfilling the inclusion criteria were included in the study. Patient's demographic data was recorded. Subjects were randomly divided into two groups by numbers i.e. Group A received bupivacaine with 8mg of dexamethasone while Group B received dexamethasone 4mg in addition to bupivacaine. Block was performed in operation theatre where provision of emergency medicine and general anesthesia were ensured. Consent for general anesthesia in case of failure of block or emergency was taken. Block was performed ultrasound and Nerve Stimulator guided after discussion with the surgeon and the patient. Efficacy of the block was checked and case was proceeded. Time of initiating the

block was noted and then in post-operative area patients were kept for motoring of the block and also post-operative pain using Visual analogue scale (VAS) every two hourly. It was determined subjectively by history of pain every 2 hours on Visual analogue scale (ranging from 1 to 10) for 12 hours post-operatively. A score ≥4 was labelled as end point and duration was measured in hours. All patients were given tablet Diclofenac 50mg thrice daily post operatively. Duration of post-operative analgesia was calculated and compared. Duration of surgery, history of current smoking and presence of diabetes were noted and used as effective modifiers. All data was filled on predesigned proforma.

Data was entered and analyzed in SPSS v. 17. Student t-test was applied to determine mean differences in duration of post-operative analgesia and operative time in both groups.

RESULTS

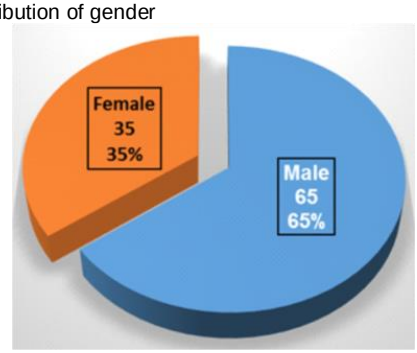
In our study population, 100 patients were included with mean age of 53.19 ± 7.018 ranged from 32 to 60 years of age. 35 patients (35%) were 50 years or above while 65 patients (65%) were below 50 years. Duration of surgery for 58 patients (58%) was below 30 minutes while for 42 patients (42%) it was between 31 to 60 minutes. In our sampled population, 41 patients were smoker and rest of 59 were non-smoker. Only 20 patients (20%) out of 100 were having diabetes. All the data is shown in table 1.35 patients (35%) were female while rest of 65 (65%) were male (figure. 1)

Table 1: Characteristics of patients

Characteristics	**N**
Age (years)	53.19±7.02
Age <50years	65
Age ≥50years	35
Gender	
Male	65
Female	35
Duration of surgery	
< 30 minutes	58
31 to 60 minutes	42
Smoking	41
Diabetes	20

N**:** Frequency of each parameter

Fig 1: Distribution of gender



Cross tabulation of multiple patient's parameters and low versus high dose dexamethasone groups showed non-significant results on independent sample test with their respective P-values (Table 3). Mean duration of pain among our sampled population was 6.14 ± 1.639 hours, ranged from 4 to 10 hours. When we analyzed dexamethasone group with respect to duration of post-operative pain, the results came up non-significant (p=0.396), with meanduration of6.00±1.71hoursin low dose and 6.28±1.57hours in high dose. (Table 2)

Table 2: Comparison of meanduration of pain in both groups

Post-operative analgesia	**Groups**		**P-Value**
	A. Low dose Dexamethasone	**B. High dose Dexamethasone**	
Mean Duration of Pain	6.00±1.71hours	6.28±1.57hours	0.3958

P-value = Insignificant

Table3. Showing the results of different parameters in both low and high dose dexamethasone groups.

Patient's Parameters	**Groups**		**P-value**
	Low dose	**High dose**	
Age<50years	6.29±1.69	5.87±1.74	0.71
Age≥50years	6.27±1.28	6.20±1.70	0.90
Male	5.79±1.57	5.89±1.56	0.778
Female	6.91±1.34	6.31±2.14	0.312
Duration of surgery <30 min	6.52±1.38	6.17±1.77	0.427
Duration of surgery 30-60 min	6.07±1.71	5.60±1.55	0.379
Smoker	6.39±1.41	5.40±1.65	0.072
Non-smoker	6.11±1.82	6.15±1.72	0.927
Diabetic	6.00±1.55	6.67±1.41	0.333
Non-diabetic	6.36±1.58	5.85±1.75	0.181

Complications: No significant complications has occurred as a result of the procedure (interscalene block), in both low and high dose dexamethasone groups.

DISCUSSION

Trend of surgeries under regional anesthesia is increasing day by day,especially nerve blocks, because only the operated area is being anaesthetized, early mobility of patients and more safer approach with less hemodynamic instability.[12] Problems associated with regional blocks are duration of analgesia and patient discomfort. This study evaluated the use of dexamethasone as an adjuvant in regional anesthesia in our setting as no local study has yet been conducted that will not only improve the quality of analgesia but also set guidelines for future surgeries and help patients to recuperate earlier with less pain and analgesic drugs requirement[13].

In our study, when we cross tabulated dexamethasone groups with respect to duration of post-operative pain, the results came up insignificant while applying independent sample test(p=0.396) with mean duration of 6.00 ± 1.71 hoursin low dose and 6.28±1.57hours in high dose. It implies that use of

perineurial high dose dexamethasone as adjuvant to bupivacaine in interscelene block for shoulder surgeries is similar to low dose dexamethasone. Although there was no difference in the demand of the post-operative break through analgesics requirement but yet the overall requirement were decreased in both of the groups.

Tandoc, et al., conducted his study using different doses ofdexamethasone as adjuvant to bupivacaine and control patients, “Group C,” who received no additive; low dose, “Group L,” who received additional dexamethasone 4 mg; and high dose, “Group H,” who received dexamethasone 8 mg in addition to 0.5% bupivacaine concluded that duration of analgesia was significantly prolonged in both Group L (21.6 ± 2.4 h) and Group H (25.2 ± 1.9 h) compared with Group C (13.3 ± 1.0 h) ($p < 0.05$).[14]

Interscalene brachial plexus anesthesia for shoulder surgery routinely includes sensory anesthesia of the fourth and fifth cervical nerves. The authors reasoned that some degree of diaphragm paralysis should result from interscalene blocks that produce surgical C3-C5 sensory anesthesia.[15]Many additional randomized trials have since been published.[16]

Zhang et al., found that the addition of perineural dexamethasone to bupivacaine for intercostal nerve block is an effective method to improve the duration of analgesia, thus ultimately reduce the need for analgesia and causes least side effects.[17]Ribeiro et al., also found that dexamethasone when given as an adjuvant to the local anaesthetic during brachial plexus blocks, it can significantly improve the duration of analgesia after a surgical procedure.[18]

Albrecht E et al., used the perineurial administration of dexamethasone of doses ranges from 4-10mg with local anaesthesthetics, for upper extremity blocks. They found no difference in prolongation of the block and analgesia with respect to different doses of dexamethasone.[19] Although some studies have shown the dexamethasone dose dependent prolongation of the postoperative analgesic effects.[20]

During our study one patient suffered from ipsilateral wrist drop involving radial nerve and up to some extent the sensory part of the median nerve. After nerve conduction studies it was ruled out that the patient’s problem was due surgical compression of the terminal nerves of the brachial plexus was rather a proximal damage of the nerve roots at the performed block level.

We used nerve stimulator for most of the procedure because of the limited access to ultrasound. This might be one of the reason that we failed to achieve more pronounced prolongation of the mean duration of the post-operative analgesia. Also another limitation was that surgeons were reluctant to proceed only with the interscalene block for major shoulder proceduresfor example rotator cuff repair. So we included mostly the procedures which could be manage through short post-operative period discharge criteria after resolution of the block effect. Which ranged from minor to intermediate shoulder procedures. As no local prior studies are available, so we could not compare the impact and power of the study with local trials.

CONCLUSION

It is concluded that there was no difference observed in mean duration of post-operative analgesia in low versus high dexamethasone as adjuvant to bupivacaine in interscelene block in our sample size. At current sample size we accept the null hypothesis of difference in mean duration of post-operative analgesia in high dose dexamethasone as compared to low dose dexamethasone when given as adjuvant to bupivacaine in inter scalene block. Also theuse of ultrasound is strictly advocated to perform any nerve block including interscalene block, in order to achieve better results and also prevent any untoward incidents.

Conflict of Interest: None to declare.

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