Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2014; 2(6H):3481-3483 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com **DOI:** 10.36347/sjams.2014.v02i06.127

Research Article

Effect of addition of Dexamethasone to Local Anaesthetic agent in Supra clavicular Brachial plexus block on Onset of action & Onset of sensory blockade parameters

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Abstract: Background & Method: This study conducted on 60 patients undergoing upper limb surgery lasting more than 90 minute were included in the study with an aim to study the Effect of addition of Dexamethasone to Local Anaesthetic agent in Supra clavicular Brachial plexus block on Onset of action & Onset of sensory blockade parameters. The elective surgical interventions were internal fixation of bones with plates and screws, excision of bone cysts, reconstructive and other surgeries involving upper limb.**Result:** The average age was 33.3710. ±97 yrs in-group A and 35.07±10.98 yrs in-group B. The average weights of the patients were 60.40±8.62 kgs in-group A and 63.339 ±48 in-group B respectively. Both groups had predominantly male patients, accounting for nearly 2/3 of the total study population in each group. There was no significant difference in age, weight and sex distribution. The average time of onset was 20.13±3.50 min in-group A and 15.57±2.31 min in-group B. The observed average onset of sensory blockade was 6.13±0.86 min in group A and 4.23±0.73 min in group B.**Conclusion:** The randomized study of Brachial plexus block with local anaesthetics, with and without Dexamethasone has revealed that postoperative analgesia has been found to be significantly prolonged in the Dexamethasone group and can be used safely**.**
Keywords: Dexamethasone, Anaesthetic, Supra clavicular& Brachial.
Study Designed: Observational Study.

INTRODUCTION

Cocaine was the first local anaesthetic extracted from Erythroxylon coca by Niemann. Carl Koller later brought into light the anaesthetic properties of Cocaine by insensitizing the frog's and rabbit's cornea with Cocaine [1]. In search of better local anaesthetic than Cocaine derivatives, which were labile, short acting, produced allergic reactions, the aminoamide derivatives were synthesized.

Lofgren and lundqvist in 1943 synthesized Lidocaine. It was brought into clinical practice by Gordh in 1947. Ekenstam pioneered the synthesis of chain of aminoamides Bupivacaine, Mepivacaine, and Ropivacaine. Bupivacaine, a long acting local anaesthetic was introduced in 1963 to clinical practice by Telivuo [2].

Brachial plexus was first blocked by William Stewart Halsted in 1884 using Cocaine. He blocked the nerve roots and separated the cords and nerves later. Crile disarticulated the shoulder joint by blocking nerve trunks under direct vision [3]. It was Hirschel in 1911 who described percutaneous technique for blocking plexus by making separate injections above and below the axillary artery using four inch needle directed towards the apex of axilla [4].

Brachial plexus provides the motor innervation and nearly all sensory supply of the upper limb. The plexus is formed by the anterior primary rami of fifth, sixth, seventh, eighth cervical and first thoracic nerves. Sometimes the plexus is derived mainly from fourth to eighth cervical nerve (prefixed plexus) or from sixth cervical nerve to second thoracic nerves (post fixed plexus). The components are designated according to their location as roots, trunks, divisions, cords and branches [5]. Roots after emerging from intervertabral foramina unite to form trunks between scalene muscles. Each trunk divides into anterior and posterior divisions. The divisions in combination form cords which surrounds the axillary artery [6].

MATERIAL & METHOD

60 patients admitted to a tertiary care teaching Hospital and Research center over a period of 6 months undergoing upper limb surgery lasting more than 90 minute were included in the study. The elective surgical interventions were internal fixation of bones with plates

and screws, excision of bone cysts, reconstructive and other surgeries involving upper limb.

Inclusion criteria:

- Patients with ASA1 and II physical status the age group of 18 to 60 years
- Male & female of both sex
- Patient height more than 150 cm
- Weight more than 55 kg.

Exclusion criteria:

- Patients with age less than 16 and greater than 60 year,
- Patients with coagulopathy or on anti coagulants;
- Patients with peripheral neuropathy;
- Patients with history of substance abuse, local cutaneous infections;
- Pregnant or lactating female patients;
- Renal failure,
- Hepatic failure,
- Patients with allergy to local anaesthetics, dexamethasone;
- ASA class III and IV patients,
- Uncooperative patients, patient refusing, uncoprative ;
- Patchy or inadequate Anaesthesia
- Diabetes / Glucose intolerance
- Peptic disease.
- Patients undergoing emergency surgical procedures.

RESULTS

Table-1: Pharmacology of Local Anaesthetics

	LIGNOCAINE	BUPIVACAINE
Physico-chemical properties		
Moleular weight	234	288
pKa	7.8	8.1
Partition coefficient (lipid solubility)	2.9	28
pH	5 to 6 without epinephrine 2 to 3 with epinephrine	4.5 to 5.5
Pharmacokinetics		
Onset of action	Rapid	Slow
Duration of action	60 to 120 min	240 to 480 min
Half life Alpha t1/2	1.0 min	2.7 min
Beta t ½	9.6 min	28 min
Gamma t ½	1.6 hrs	3.5 hrs
VDSS	91 ltrs	72 ltrs
Clearance	0.95 l/min	0.47 l/min
Metabolism	Oxidative de-alkylayion to Monoethylglycinexylidide	Aromatic hydrolysis, Ndealkylation, amide hydrolysis
Protein binding	70%	95%
Non ionized fraction	17 to 33%	11 to 24 %
Potency (Procaine)	2 times more	8 times more
Toxic dosage	3mg/kg without epinephrine (300 mgs max)	2.5 to 3 mgs/kg (175 mg max)
Toxic plasma concentration	>5 mcgs/m	>1.5 mcgs/ml
Preparations		
Infiltration	5 and 10 mg/ml solutions 10, 15,20mg/ml solutions	2.5mg/ml solution
Peripheral nerve blocks	10,15and 20mg/ml solutions	2.5mg and 5mg/ml solutions
Epidural	5mg/ml solutions	2.5, 5and 7.5 mg/ml
Spinal	2.0%Jelly, Viscous	5and 7.5mg/ml solutions
Topical	2.5%, 5% Ointment	

Table 2: Comparison of demographic parameters

Demographic parameters Mean ± SD	Group A (n=30)	Group B (n=30)	P value
Age in years	33.471±0.97	35.071±0.98	0.575
Weight in kg	60.408. ±62	63.339±48	0.215
Sex	Male=20 (66.7%)	Male=21 (70.0%)	0.781
	Female=10 (33.3%)	Female=9 (30.0%)	
Inference	Samples are age, sex and Weight matched with P>0.05		

The above table shows that the average age was 33.3710.±97 yrs in-group A and 35.07±10.98 yrs in-group B. The average weights of the patients were 60.40±8.62 kgs in-group A and 63.339 ±48 in-group B respectively. Both groups had predominantly male patients, accounting for nearly 2/3 of the total study population in each group. There was no significant difference in age, weight and sex distribution.

Table 3: Comparison of Study parameters between two groups

Study Parameter	Group A (n=30)		Group B (n=30)		P Value
	Mean	SD	Mean	SD	
Time of onset (Minutes)	20.13	3.50	15.57	2.31	<0.0001
Onset of sensory blockade (minutes)	6.13	0.86	4.23	0.73	<0.0001

In the above chart the average time of onset was 20.13±3.50 min in-group A and 15.57±2.31 min in-group B. The observed average onset of sensory blockade was 6.13±0.86 min in group A and 4.23±0.73 min in group B.

DISCUSSION

Varieties of receptors mediate nociception in peripheral sensory nerve fibers. The knowledge of these receptors has been used in the form of various adjuncts administered along with local anaesthetics. These adjuncts may not only prolong the analgesic duration but also thought to reduce the systemic analgesic consumption as well as their side effects [7]. To prolong perioperative analgesia various adjuncts such as opioids, clonidine, verapamil, neostigmine and tramadol have been tried. Although the role of dexamethasone as an adjunct has been debated over a long period, it is still in regular use. The objective of this study was to compare the analgesic efficacy with or with dexamethasone as adjuncts to local anaesthetics in brachial plexus block [8].

The study was a prospective, randomized, double blind study carried out at MYH Indore. Sixty patients belonging to ASA I and II physical status patients undergoing upper limb surgeries were included in the study. Patients were divided into two groups of thirty each.

Group A (n=30): Received brachial plexus block with 2% lignocaine with adrenaline at the dose of 14 ml and 0.5% bupivacaine 16ml to the solution.

Group B (n=30): Received brachial plexus block with 2% lignocaine with adrenaline 14 ml and 0.5% bupivacaine 16ml 2mg/kg along with dexamethasone 4mg into the solution.

In our study we observed that there was change in the time of onset of action and duration of analgesia between two groups [9]. The pH of the injected solution around the nerve would certainly influence the onset of action.

CONCLUSION

The randomized study of Brachial plexus block with local anaesthetics, with and without Dexamethasone has revealed that postoperative analgesia has been found to be significantly prolonged in the Dexamethasone group and can be used safely.

REFERENCES

1. Jeon DG, Kim W. Case series: ultrasound-guided supraclavicular block in 105 patients. Korean J Anesthesiol 2010 Mar; 58(3): 267-271.
2. Singh A, Gupta R, Vashisth M, Singh S, Kumari A, Aujla KS. Comparison of Effectiveness of Brachial Plexus Block by Supraclavicular and Axillary Approach Alone or in Combination. J AnaesthClinPharmacol 2010; 26(1): 31-34.
3. Yang CM, Kwon HU, Cho CK, et al. A comparison of infraclavicular and supraclavicular approaches to the brachial plexus using neurostimulation. Korean J Anesthesiol 2010 Mar; 58(3): 260-266.
4. Neal JM, Gerancher JC, Hebl JR, Ilfeld BM, et al. Upper Extremity Regional Anesthesia: RegAnesth Pain Med 2009; 34(2): 134-170.
5. Wakhlo R, Gupta V, Raina A, Gupta SD, Lahori VU. Supraclavicular Plexus Block: Effect of Adding Tramadol or Butorphanol as an Adjuncts to Local Anaesthetic on Motor and Sensory Block and Duration of Post-operative Analgesia. J AnaesthClinPharmacol 2009; 25(1): 17-20.
6. Splinter WM, Rhine EJ. Low-dose ondansetrone with dexamethasone more effectively decreases vomiting after strabismus surgery in children than does high-dose ondansetron. Anesthesiology 1998; 88: 72-5. JAFMC Bangladesh. Vol 7, No 1 (June) 2011
7. Taguchi H, Shingu K, Okuda H, Matsumoto H. Analgesia for pelvic and perineal cancer pain by intrathecal steroid injection. ActaAnaesthesiolScand 2002; 46: 190-3.
8. Kumar A, Battit GE, Froese AB, Long MC. Bilateral Cervical and thorasic epidural blockade complicating interscalene brachial plexus block report of two cases. Anesthesiology 1997; 35: 651.
9. Dupre LJ, Danel V, Legrand JJ, Stiegtitz P. Surface Landmarks for supraclavicular block of the brachial plexus. AnesthAnalg 1982; 61: 28.