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COMPARISON ANALYSIS OF DEXAMETHASONE AND TRAMADOL AS ADJUVANT TO LEVOBUPIVACAINE IN SUPRACLAVICULAR BLOCK

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Abstract:
Background: The supraclavicular approach of the brachial plexus has a high success rate including blockade of the ulnar and musculocutaneous nerve, which are often missed during interscalene and axillary approach. The present study evaluated and compared dexamethasone and tramadol as adjuvant to levobupivacaine in supraclavicular block.
Materials & Methods: The present study was conducted on 50 patients of American Society of Anaesthesiologists (ASA) grade I and II of age group 18 - 60 years of either sex. Patients were divided into 2 group of 25 each. Group I in which 30 ml of 0.5% levobupivacaine hydrochloride plus 2 ml tramadol (100mg) was used. Group II in which 30 ml of 0.5% Levobupivacaine hydrochloride plus 2 ml dexamethasone (8 mg) was used. A through clinical examination was performed. Sensory and motor block was assessed.
Results: Duration of sensory block in group I was 12.81hours and in group II was 15.34 hours, motor block was 14.24 hours in group I and 17.51 hours in group II. Duration of surgery was 114.2 hours in group I and 110.5 hours in group II. Duration of analgesia was 17.12 hours in group I and 19.16 hours in group II. The difference was significant (P< 0.05).
Conclusion: Authors found that dexamethasone is a better adjuvant than tramadol when added to levobupivacaine in supraclavicular brachial plexus block.
Key words: Dexamethasone, Tramadol, Levobupivacaine

Introduction

Anaesthesia, defined as a loss of sensation with or without loss of consciousness, can be effectively achieved with a wide range of drugs with very diverse chemical structures.1 The list of such compounds includes not only the classic anesthetic agents, such as the general and local anesthetics, but also many central nervous system (CNS) depressants, such as analgesics, sedative, hypnotics (barbiturates and benzodiazepines), anticonvulsants, and skeletal muscle relaxants.1 Although various mechanisms of action are attributed to these agents, ultimately they all produce their anesthetic actions by interfering with conduction in sensory neurons and sometimes also motor neurons.2 The supraclavicular approach of the brachial plexus has a high success rate including blockade of the ulnar and musculocutaneous nerve, which are often missed during interscalene and axillary approach. Levobupivacaine exerts its pharmacological action through reversible blockade of neuronal sodium channels. Myelinated nerves are blocked through exposure at the nodes of Ranvier more readily than unmyelinated nerves.3 Recently dexamethasone has been studied as a local anaesthetic adjuvant for peripheral nerve block. As a perineural adjuvant the safety profile of dexamethasone is promising. No trial reported neurotoxicity attributable to dexamethasone. Its addition with bupivacaine in brachial plexus block has been studied in the past suggesting varying results.5 Tramadol used with local anaesthetics inhibits the reuptake of serotonin from nerve endings and potentiates the block effects. The local effect of dexamethasone or other adjuvants on the nerve remains unclear and local neurotoxicity should be ruled out.5 The present study evaluated and compared dexamethasone and tramadol as adjuvant to levobupivacaine in supraclavicular block.

MATERIALS & METHODS

The present study was conducted in the department of Anesthesia. It comprised of 50 patients of American Society of Anaesthesiologists (ASA) grade I and II of age group 18 - 60 years of either sex scheduled to undergo surgery of the forearm or hand under supraclavicular brachial plexus block with levobupivacaine with addition of dexamethasone and dexmedetomidine as adjutants were included. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study.

General information such as name, age, gender etc. was recorded. Patients were divided into 2 group of 25 each. The US-guided SBPB was performed with 2% lidocaine 15 mL plus either dexamethasone 8 mg (2 mL; dexamethasone Group) or tramadol 100 mg (2 mL; tramadol Group) or normal saline 2 mL (Saline Group) Group I in which 30 ml of 0.5% levobupivacaine hydrochloride plus 2 ml tramadol (100mg) was used. Group II in which 30 ml of 0.5% Levobupivacaine hydrochloride plus 2 ml dexamethasone (8 mg) was used. A through clinical examination was performed. Sensory and motor block was assessed. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	0.5%	0.5%
	levobupivacaine	Levobupivacaine
	Hydrochloride plus 2ml	hydrochloride plus 2 ml
	ml tramadol	dexamethasone
Number	25	25

Table I shows that group I in which 30 ml of 0.5% levobupivacaine hydrochloride plus 2 ml tramadol (100mg) was used. Group II in which 30 ml of 0.5% Levobupivacaine hydrochloride plus 2 ml dexamethasone (8 mg) was used

Graph: I Comparison of parameters in both groups

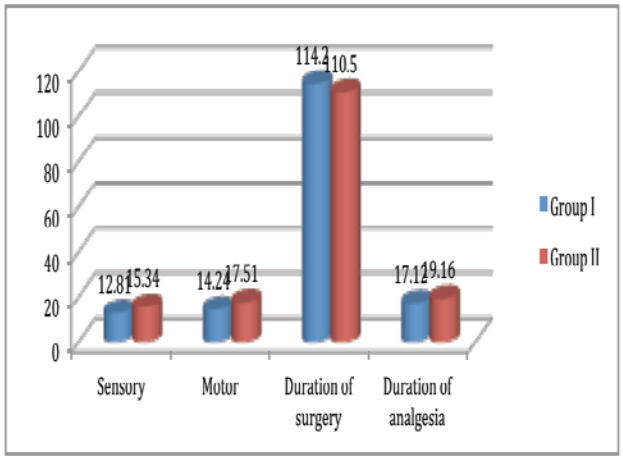

Table II Comparison of parameters in both groups

Parameters	Group I	Group II	P value
Sensory	12.81	15.34	0.01
Motor	14.24	17.51	0.02
Duration of surgery	114.2	110.5	0.91
Duration of analgesia	17.12	19.16	0.01

Table II, graph I shows that duration of sensory block in group I was 12.81 hours and in group II was 15.34 hours, motor block was 14.24 hours in group I and 17.51 hours in group II. Duration of surgery was 114.2 hours in group I and 110.5 hours in group II. Duration of analgesia was 17.12 hours in group I and 19.16 hours in group II. The difference was significant (P< 0.05).

DISCUSSION

Different drugs like opioids, naloxone, clonidine, midazolam, dexmedetomidine, epinephrine and recently dexamethasone have been used as adjuvant with local anaesthetic agents in brachial plexus block to achieve quick, dense and prolonged block. Morphine, pethidine, butorphenol are associated with side effects like heavy sedation, respiratory depression and psychomimetic effects.6 Tramadol has a low affinity for opioid receptors. It acts as a selective μ-receptor agonist, but also binds weakly to kappa and delta receptors. Non-opioid mechanism is by monoaminergic pathway. It inhibits noradrenaline and 5-hydroxy tryptamine (serotonin) neuronal reuptake and facilitates serotonin release.

The two enantiomers of tramadol i.e., tramadol (+) and tramadol (-) have complementary and synergistic anti-nociceptive interaction.7 The present study evaluated and compared dexamethasone and tramadol as adjuvant to levobupivacaine in supraclavicular block. In present study, group I in which 30 ml of 0.5% levobupivacaine hydrochloride plus 2 ml tramadol (100mg) was used. Group II in which 30 ml of 0.5% Levobupivacaine hydrochloride plus 2 ml dexamethasone (8 mg) was used. Chatopadhyay et al8 in their study a total of sixty patients in the age group of 18-65 years randomly allocated in two groups of thirty patients each. In group 1, patients received 30ml of 0.5% isobaric levobupivacaine with 2ml of isotonic sodium chloride. In group 2 patients received 8mg (2ml) dexamethasone in addition to 30ml of 0.5% isobaric

levobupivacaine. The results showed that the onset of sensory and motor block were faster in group 2 (P<0.05). The duration of sensory and motor block were significantly longer in group 2 (P<0.05). VAS score at 12 hours were significantly lower in group 2 (P<0.05). None of the patients had bradycardia, hypotension or any other side effects. Dexamethasone added to levobupivacaine for supraclavicular brachial plexus block reduces the time to onset of sensory and motor blockage and prolongs the duration of analgesia. We found that duration of sensory block in group I was 12.81 hours and in group II was 15.34 hours, motor block was 14.24 hours in group I and 17.51 hours in group II. Duration of surgery was 114.2 hours in group I and 110.5 hours in group II. Duration of analgesia was 17.12hours in group I and 19.16 hours in group II. Meitei et al9 in their study included fifty adult patients undergoing below elbow surgeries of upper limb under nerve stimulator guided supraclavicular brachial plexus block. Group-I (Dexamethasone) patients received 36 ml of mixture of 2% lignocaine plus adrenaline (20ml), 0.5% bupivacaine (15ml) with dexamethasone 4mg (1ml). Group-II (saline) patients received 36 ml of mixture of 2% lignocaine plus adrenaline (20ml), 0.5% bupivacaine (15ml) with saline (1 ml). There was significantly faster onset of sensory blockade and prolonged duration of analgesia in the dexamethasone group than the saline group. Alarasan et al10 in their study found that the onset of sensory and motor block was significantly earlier in dexamethasone group (10.36 ± 1.99 and 12 ± 1.64 minutes) compared to control group (12.9 ± 2.23 and 18.03 ± 2.41) minutes. The duration of sensory and motor block was significantly prolonged in dexamethasone group (366 ± 28.11 and 337.33± 28.75) minutes compared to control group (242.66 ± 26.38and 213 ± 26.80) minutes. The VAS score was significantly lower in dexamethasone group after 210 minutes.

CONCLUSION

Authors found that dexamethasone is a better adjuvant than tramadol when added to levobupivacaine in supraclavicular brachial plexus block.

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