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Original Article

Evaluation of Different Local Anesthetic Solutions for Extradural Anaesthesia in Elective Caesarean Section- A Comparative Study

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***ABSTRACT*:**

Introduction- The introduction of more concentrated solutions of bupivacaine and etidocaine has been reported to provide a more rapid onset of sensory and motor blockade with better analgesia during labour.The present study was conducted to compare the efficacy of bupivaciane, combination of bupivacaine with adrenaline and lignocaine and adrenaline in caesarean sections. **Materials & Methods-** The present study was conducted in the department of Gynaecology and Obstectrics on 60 women underwent elective caesarean section under extradural anaesthesia. Patients were divided into 3 groups of 20 each. Group I received 0.5% bupivacaine plain (B), group II received 0.5% bupivacaine with 1:200000 adrenaline (B + A) and group III received 2% lignocaine with 1:200 000 adrenaline (L + A).Parameters such as pain, need for extra solutions and quality of block were compared. **Results-** Group I had 20 patients (0.5% bupivacaine plain (B), group II had 20 patients (0.5% bupivacaine with 1:200000 adrenaline (B + A) and group III had 20 patients (2% lignocaine with 1:200 000 adrenaline (L + A). The difference was non- significant (P- 1).Pain was mild in group I (2), group II (1) and group III (8), moderate in group I (4), group II (1) and group III (6) and none in group I (14), group II (18) and group III (6). The difference was significant (P- 0.05).1 patient in group I and group II required IV fentanyl. 3 patients in group I and group II and 7 in group III required etradural diamorphine, 1 patient in group I required entonox and 1 in group received topical lignocaine. The difference was significant (P< 0.05).Quality of block was excellent in group I (13), group II (13) and group III (10), very good in group I (4), group II (7) and group III (6), good in group I (2), group II (0) and group III (2) and fair in group I (1), group II (0) and group III (2). The difference was significant (P< 0.05). **Conclusion-** Mixture of bupivacaine and lignocaine provided an excellent alternative to bupivacaine alone, and was superior to 2% lignocaine with adrenaline for elective Caesarean section. By reducing the dose of bupivacaine used, the combination may reduce the risk of cardiotoxicity.

Key words-Bupivacaine, Caesarean, Lignocaine.

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INTRODUCTION

The use of lumbar extradural anaesthesia for lower uterine segment Caesarean section has become commonplace. The introduction of more concentrated solutions of bupivacaine and etidocaine has been reported to provide a more rapid onset of sensory and motor blockade with better analgesia during labour.[1]

Many aspects of perioperative care have evolved to improve outcome in obstetrics. Currently, anesthestic-associated obstetric mortality has decreased to seventh on the list of causes for maternal mortality and remains at rates of 1–3 maternal deaths per million maternities in both the USA and UK. Maternal mortality decreased significantly during the first half of the 20th century. Further reduction in obstetric mortality was seen after 1980 and is attributed to the increase in neuraxial anesthesia for Cesarean delivery, improved safety of neuraxial technique, as well as algorithms and airway devices to improve safety of general anesthesia.[2]

Extradural anaesthesia is a popular technique for Caesarean section and is preferred to general anaesthesia by many patients. Its use has been advocated as the technique of choice in the latest report on maternal deaths as it avoids the risks of general anaesthesia. Paramount amongst the requirements of extradural anaesthesia is maternal and fetal safety, followed closely by reliability of the block. The ideal

agent would produce a block of rapid onset, good quality and adequate duration, with a minimum of toxic effects to mother or baby. Plain 0.5% bupivacaine solution has been the standard agent for Caesarean section in the U.K. for many years, but the addition of 1:200000 adrenaline has been shown to improve the efficacy of the block and to prolong its duration of action. Reynolds, Hargrove and Wyman[3]showed that the addition of adrenaline reduced the maternal plasma concentration of bupivacaine during labour, although this was not the finding of Wilson and colleagues[4] at Caesarean section. Lignocaine 2% has been used widely. The present study was conducted to compare the efficacy of bupivaciane, combination of bupivacaine with adrenaline and lignocaine and adrenaline in caesarean sections.

MATERIALS & METHODS

The present study was conducted in the department of Gynaecology and Obstectrics. It included 60 women underwent elective caesarean section under extradural anaesthesia. All were informed regarding the study and written consent was obtained. Ethical clearance was taken before starting the study.

General information such as name, age, gender etc was noted. Patients were divided into 3 groups of 20 each. Group I received 0.5% bupivacaine plain (B), group II received 0.5% bupivacaine with 1:200000 adrenaline (B + A) and group III received 2% lignocaine with 1:200 000 adrenaline (L + A).

All solutions were used at room temperature, and there was no attempt to adjust the pH. A maximum of 40 ml of test solution was available to each patient. Parameters such as pain, need for extra solutions and complications were compared. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Group I (0.5% bupivacaine plain)	Group II (0.5% bupivacaine with adrenaline)	Group III 2% lignocaine with adrenaline	P value
20	20	20	1

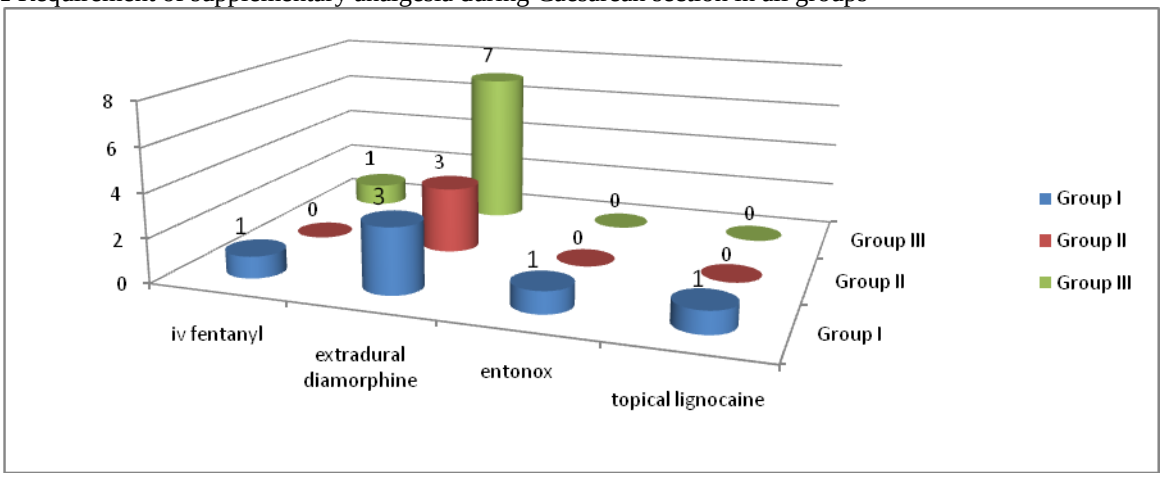
Table I shows that Group I had 20 patients (0.5% bupivacaine plain (B), group II had 20 patients (0.5% bupivacaine with 1:200000 adrenaline (B + A) and group III had 20 patients (2% lignocaine with 1:200 000 adrenaline (L + A). The difference was non- significant (P- 1).

Table II Assessment of pain in all groups

	Group I	Group II	Group III	P value
None	14	18	6	0.05
Mild	2	1	8	
Moderate	4	1	6	
Severe	0	0	0	

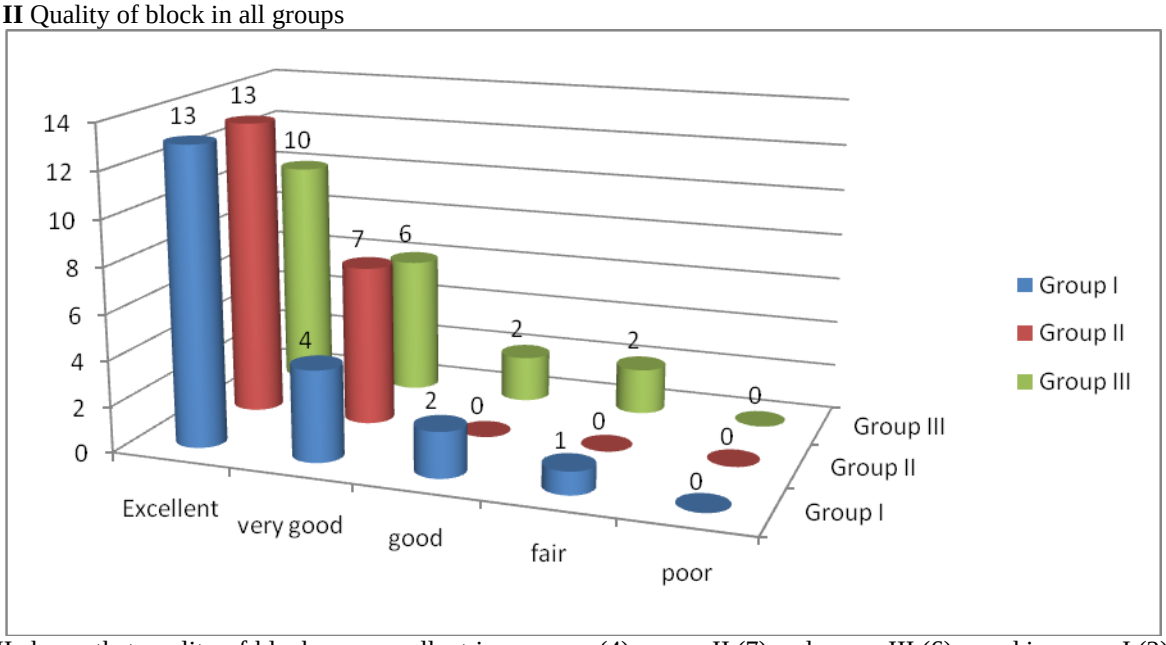
Table II shows that pain was mild in group I (2), group II (1) and group III (8), moderate in group I (4), group II (1) and group III (6) and none in group I (14), group II (18) and group III (6). The difference was significant (P- 0.05).

Graph I Requirement of supplementary analgesia during Caesarean section in all groups



Graph I shows that 1 patient in group I and group II required iv fentanyl. 3 patients in group I and group II and 7 in group III required extradural diamorphine, 1 patient in group I required entonox and 1 in group received topical lignocaine. The difference was significant (P< 0.05).

Graph II Quality of block in all groups



Graph II shows that quality of block was excellent in group I (13), group II (13) and group III (10), very good in group I (4), group II (7) and group III (6), good in group I (2), group II (0) and group III (2) and fair in group I (1), group II (0) and group III (2). The difference was significant (P< 0.05).

DISCUSSION

Mixtures of local anaesthetic agents have beenused for several years in non-obstetric practice, toutilize the beneficial properties of both agents. Inaddition, reducing the dose of bupivacaine mayreduce the risk of its cardiotoxicity. Mixtures of bupivacaine and lignocaine have been used in non-obstetric situations with varied results. Magee, Sweet and Holland[5] showed in surgical patients that the mixture produced sensory block of more rapid onset than that of bupivacaine alone. However, Seow and colleagues[6] found that, when solutions with adrenaline were used, the mixture produced marked motor block but there was no difference in onset times of sensory block compared with the individual agents.

In this study, pain was mild in group I (2), group II (1) and group III (8), moderate in group I (4), group II (1) and group III (6) and none in group I (14), group II (18) and group III (6). This is in agreement with Albright et al.[7]

We found that 1 patient in group I and group II required iv fentanyl. 3 patients in group I and group II and 7 in group III required extradural diamorphine, 1 patient in group I required entonox and 1 in group received topical lignocaine. This is similar to Datta et al.[8]

We observed that quality of block was excellent in group I (13), group II (13) and group III (10), very good in group I (4), group II (7) and group III (6), good in group I (2), group II (0) and group III (2) and fair in group I (1), group II (0) and group III (2). This is in agreement with Yang et al.[9]

Reiz and Nath[10] showed that bupivacaine was four times more potent than lignocaine in depressing myocardial contractility in pigs, but 16 times more potent in prolonging the QRS interval, which is a frequent antecedent of fatal ventricular fibrillation. Interestingly, lignocaine has been used successfully in cats to treat bupivacaine-induced ventricular arrhythmias. The toxicity of mixtures of amide local anaesthetics is poorly understood, and animal work suggests that it may be additive. However, De Jong and Bonin[11] showed that the addition of lignocaine to bupivacaine widened the window between the CD60 and the LD60, and concluded that convulsions from a bupivacaine-lignocaine mixture were less likely to terminate fatally than if bupivacaine were given alone.

CONCLUSION

Mixture of bupivacaine and lignocaine provided an excellent alternative to bupivacaine alone, and was superior to 2% lignocaine with adrenaline for elective Caesarean section. By reducing the dose of bupivacaine used, the combination may reduce the risk of cardiotoxicity.

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