Comparison between Using Bupivacaine 0.5% and Bupivacaine with Sodium Bicarbonate 8.4 % in Thoracic Epidural Anesthesia for Laparoscopic Cholecystectomy

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Abstract

Background: Thoracic epidural anesthesia for LC is a satisfactory alternative technique in selected cases, therefore aim of current study was compare the deference between using of bupivacaine 0.5% at one and bupivacaine 0.5%. With sodium Bicarbonate 8.4 %. The differences we deal with there are onset of action. Duration of action, Potency, and the occurrence of complications. We report the sex, Age and smoking to see we these factors can affecting the study ornot.

Patients and Method: The sample contain 2 groups of patient each group involved 20 patent with deferent age and sex. Group A receive Bupivacaine 0.5% 12ml alone for thoracic epidural anesthesia at level of T6 for laparoscopic. Cholecystectomy while ingroup B, we give Bupivacaine 0.5% 12ml with sodium bicarbonate 8.4 % 5ml (420mg) for the same operation at the same level of injection. In both groups we put the epidural catheter for addition of more dose of Bupivacaine and the mixture if the action of drug is finish and for the postoperative pain management after the operation.

Keywords: *Bupivacaine;sodium bicarbonate; thoracic epidural anesthesia; laparoscopic cholecystectomy.*

Introduction

Traditionally laparoscopic choli cystectomy is done under general anesthesia, but recently there is a growing interest to get it conducted under central neuraxial blockade[1,2]. We conducted a clinical study comprising bupivacaine 0.5% alone or a combination of bupivacaine and sodium bicarbonate (420 mg/5ml of 8.4% sol) in thoracic epidural anesthesia for laparoscopic cholecystectomy (LC) the aim is to see whether there is deference in onset of actin, Potency, Duration of action and occurrence of any complication during procedure.

Epidural anesthesia was considered safe for laparoscopic cholecystectomy without associated respiratory depression as the respiratory control mechanism remains intact to allow the patients to adjust their minute ventilation. Moreover, the respiratory changes are less evident in awaken patients under regional anesthesia and patients maintain an unchanged end tidal carbon dioxide[3].

The benefit of TEA not only for patient with respiratory diseases but also for management of postoperative pain where we can connect the epidural catheter with patient control analgesia (PCA)[4].

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Patients and Method

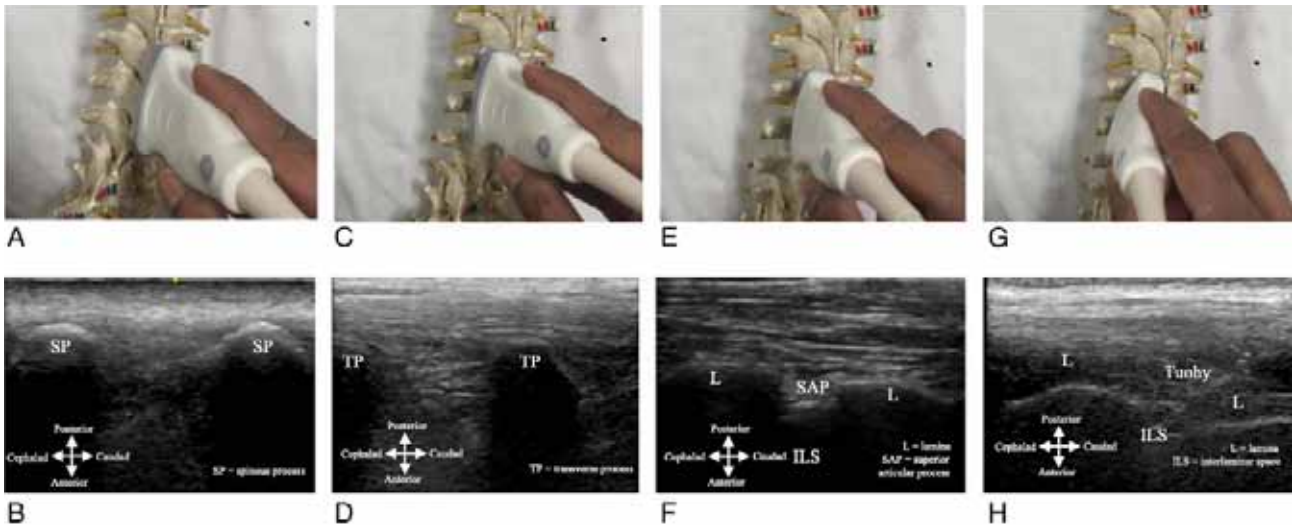
The epidural anesthesia can be done by two method as traditional or classic method and by Ultrasonograplaly.

A. Traditional method

Preparations: An epidural must be performed in a work area that is equipped for airway management and resuscitation. Facilities for monitoring blood pressure and heart rate must be available. It is advisable to obtain informed consent prior to performing an epidural in the same way a before any other invasive procedure. Laboratory assessment are necessary like fasting blood sugar. Blood urea and creatinine, coagulopathy (PT, PTT, BT, INR), also history of anticoagulant therapy. ECG and chest x-ray should be done as routine tests. I.v.line should be inserted before procedure with loading of circulation with 500ml crystalloid fluid.

Procedure: Patient put in sitting or lateral position. Good sterilization of the site of injection; we anesthetized the site of injection by 3ml bupivacaine or xylocaine with syringe 18g needle. After 2min., we introduce the touhyneedle gently till we reach the ligamentum flavum where we fell a resistance. At this point, we should apply the loss of resistance technique either by air or by saline in syringe. Once the loss of resistance feel, the advance of touhy needle should be stopped. Then the epidural catheter can be inserted in appropriate distance while the touhy needle removed gently. Then the catheter fixed properly. After that the anesthesia can be begine by pushing of anesthetic agent. We start with testing dose (3ml) and waiting for 3min. and monitor the patent for any signs or symptoms of allergy from the anesthetic agent can be given.

Epidural anesthesia by ultrasound guide: All the preparations and laboratory tests are the same including the positioning and sterilization of the patient. Here, the insertion of the touhy needle will done under the direct vision of the ultrasonography which make the procedure easier, safe and less time consuming. Ultrasound imaging was completed using a GE LOGIQe 9L linear probe, 8 to 10 MHz. After the determining of the thoracic level using us technique of locating the 12th rib and tracking cephalad, us probe was placed in the longitudinal plane on the midline of the patient back to visualize the thoracic spinous processes. As is our standard of care, the T8-T9 interspace was most commonly chosen for placement of the thoracic epidural. Although discretion was allowed for variations in surgical incision site and technique. Once the appropriate interspace was localized, a para- median sagittal transverse process view was obtained by moving the probe 2cm lateral to visualize the corresponding transverse processes. Which appear as successive hyperechoic domes. Maintaining the Para- median sagittal orientation, The probe was moved 1cm medial for the articular process view. Where the superior articular process of the inferior vertebrae could be seen. The parameter sagittal oblique view was obtained by turning the cephalad and of the probe medially with a concurrent medial tilt until the superior or articular process of the targeted interlaminar space could no longer visualized. Further tilting motions of the probe were made to optimize the gap in between the laminae which represent to note that with our us probe and technique the epidural space was not visualized. This is a critical point especially at a depth greater than 4 cm. Once the targeted interlaminar space was identified the intended needle entery site at the skin was infiltered with 2% lidocaine. A 17 gaugetouhy needle was inserted from the caudal end of the probe and advance under real time us assistance using an in- plane approach to the interlaminar space until the tip of the touhy needle was safely directed to the distance of the previously visualized superior articular process of the inferior lamina. No attempt was made to deliberately contact the lamina with the needle. Once the touhy was visually localized in the previously mention position. The needle was advance until the epidural space was identified with LOR to air because the needle tip could not visualize at all time under us at these depths. The epidural catheter was advance such that 4cm remained in the epidural space.



Finger 1: For the spinous process view of the thoracic spine, the US probe should be orientated longitudinally along the midline of the thoracic spine (A) so that successive spinous processes can be seen on US (B). For the paramedian sagittal transverse process view, the US probe is moved 2 to 3 cm lateral from the spinous process (C). Successive hyperechoic domes with fingerlike shadowing or "trident sign" represent the transverse processes (D). For the paramedian sagittal articular process view, the probe is moved 1 cmmedially (E). The superior articular process of the inferior vertebra can be seen along with the corresponding laminae (F). The paramedian sagittal oblique view can be obtained by turning the cephalad end of the probe medially with a slight medial tilt (G) to optimize the view of the interlaminar space seen in (H), where the Tuohy needle is advanced under direct visualization

Results

Table 1: Statistical measures for both groups of patients.

Groups	Measurements	Potency	Onset	Duration
A *(Marcaine 0.5% alone)*	P value	0.0359	-	-
	STD	0.0743	00:03:30	00:29:46
	Mean	0.3133	00:18:00	03:08:28
B (Marcaine 0.5% with Sodium bicarbonate 8.4%)	P value	0.0359	-	-
	STD	0.0743	00:03:55	00:45:49
	Mean	0.2467	00:17:51	02:47:36

Table 2: Group (A) data of patients that were studied with Marcaine 0.5% alone.

Case	Time	Effect Time	Potency	End time	Duration	Complications	Sex	Age	Smoking
1	11:03:00 AM	11:18:00 AM	0.30	2:49:00 PM	3:31:00 AM	N	F	32	N
2	10:10:00 AM	10:31:00 AM	0.40	1:52:00 PM	3:21:00 AM	N	F	62	N
3	10:42:00 AM	11:02:00 AM	0.40	2:33:00 PM	3:31:00 AM	N	M	50	Y
4	9:56:00 AM	10:15:00 AM	0.30	1:13:00 PM	2:58:00 AM	N	F	66	N
5	8:30:00 AM	8:41:00 AM	0.20	12:13:00 PM	3:32:00 AM	N	F	61	N
6	11:10:00 AM	11:30:00 AM	0.30	2:36:00 PM	3:06:00 AM	N	M	41	Y
7	10:36:00 AM	10:55:00 AM	0.40	1:32:00 PM	2:37:00 AM	N	M	48	N
8	9:32:00 AM	9:46:00 AM	0.30	12:13:00 PM	2:27:00 AM	N	F	38	N

Case	Time	Effect Time	Potency	End time	Duration	Complications	Sex	Age	Smoking
9	1:30:00 PM	1:44:00 PM	0.40	4:03:00 PM	2:19:00 AM	N	F	68	Y
10	10:13:00 AM	10:31:00 AM	0.30	1:09:00 PM	2:38:00 AM	N	F	62	N
11	9:33:00 AM	9:56:00 AM	0.40	12:32:00 PM	2:36:00 AM	N	F	49	N
12	11:11:00 AM	11:25:00 AM	0.20	3:02:00 PM	3:37:00 AM	N	M	70	Y
13	12:10:00 PM	12:31:00 PM	0.30	4:10:00 PM	3:39:00 AM	N	M	52	Y
14	10:02:00 AM	10:22:00 AM	0.30	1:58:00 PM	3:36:00 AM	N	M	64	Y
15	12:10:00 PM	12:31:00 PM	0.20	4:10:00 PM	3:39:00 AM	N	F	68	N

Table 3: Group (B) data of patients that were studied with Marcaine 0.5% and Sodium bicarbonate 8.4%.

Case	Time	Effect Time	Potency	End time	Duration	Complications	Sex	Age	Smoking
1	11:12:00 AM	11:22:00 AM	0.30	2:10:00 PM	2:48:00 AM	N	F	66	N
2	10:13:00 AM	10:26:00 AM	0.20	1:55:00 PM	3:29:00 AM	N	F	55	N
3	11:02:00 AM	11:25:00 AM	0.20	1:50:00 PM	2:25:00 AM	N	M	61	Y
4	9:10:00 AM	9:23:00 AM	0.30	12:40:00 PM	3:17:00 AM	N	M	72	Y
5	9:35:00 AM	9:56:00 AM	0.30	12:31:00 PM	2:35:00 AM	N	M	62	N
6	10:05:00 AM	10:25:00 AM	0.10	12:50:00 PM	2:25:00 AM	N	F	66	N
7	11:11:00 AM	11:31:00 AM	0.30	2:01:00 PM	2:30:00 AM	N	F	32	N
8	9:45:00 AM	10:03:00 AM	0.40	12:12:00 PM	2:09:00 AM	N	M	39	Y
9	10:20:00 AM	10:33:00 AM	0.20	1:22:00 PM	2:49:00 AM	N	F	46	Y
10	9:09:00 AM	9:31:00 AM	0.30	1:02:00 PM	3:31:00 AM	N	F	58	N
11	11:32:00 AM	11:48:00 AM	0.20	1:55:00 PM	2:07:00 AM	N	M	40	Y
12	10:31:00 AM	10:50:00 AM	0.20	2:10:00 PM	3:20:00 AM	N	M	49	Y
13	9:09:00 AM	9:29:00 AM	0.20	2:11:00 PM	4:42:00 AM	N	F	48	N
14	11:32:00 AM	11:51:00 AM	0.30	1:32:00 PM	1:41:00 AM	N	F	65	N
15	10:31:00 AM	10:52:00 AM	0.20	12:58:00 PM	2:06:00 AM	N	M	62	Y

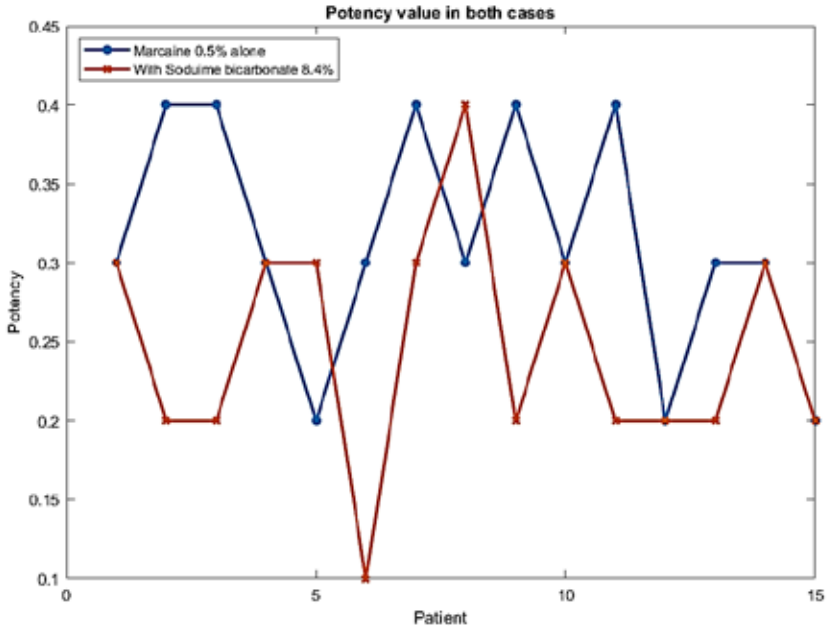


Fig 1: The amount of Potency that was used in both groups

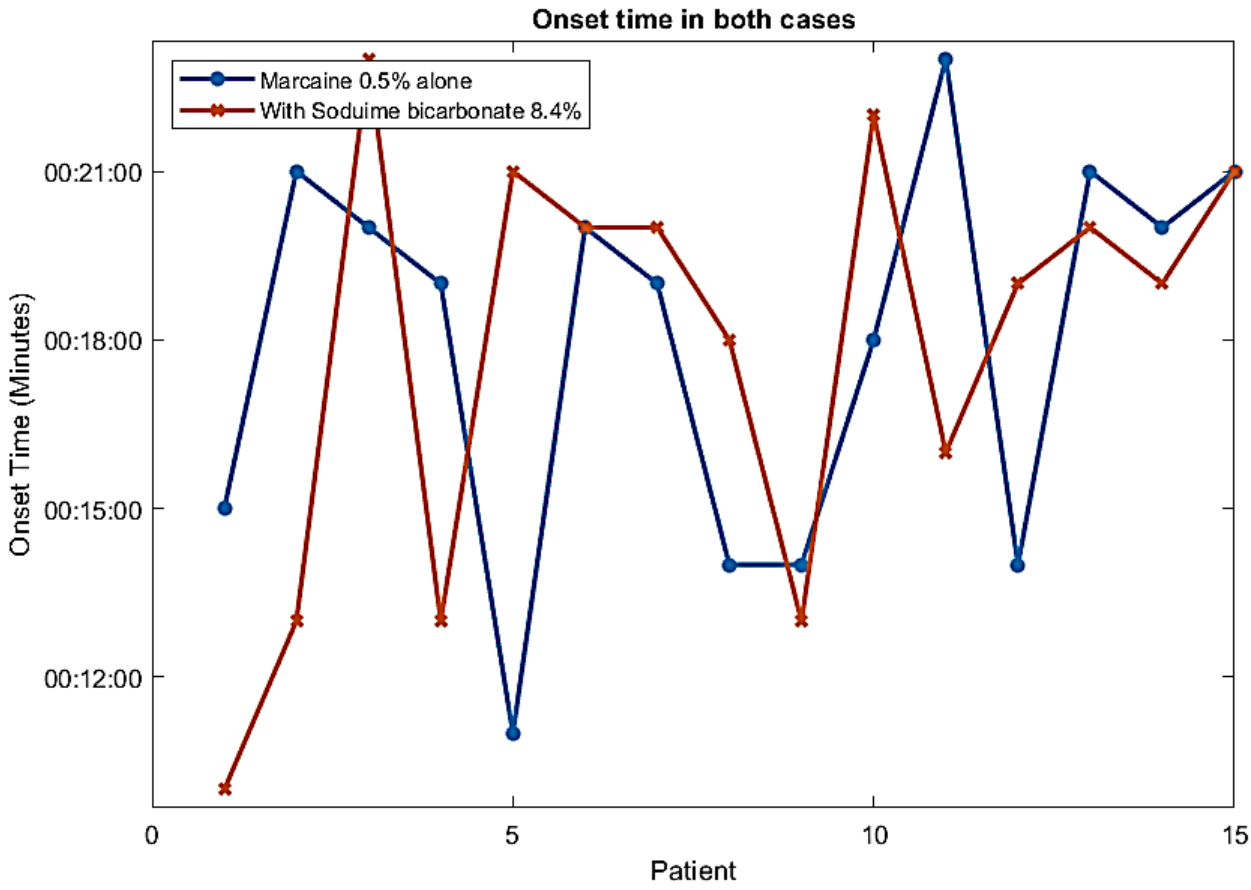


Fig 2: The Onset time in both groups

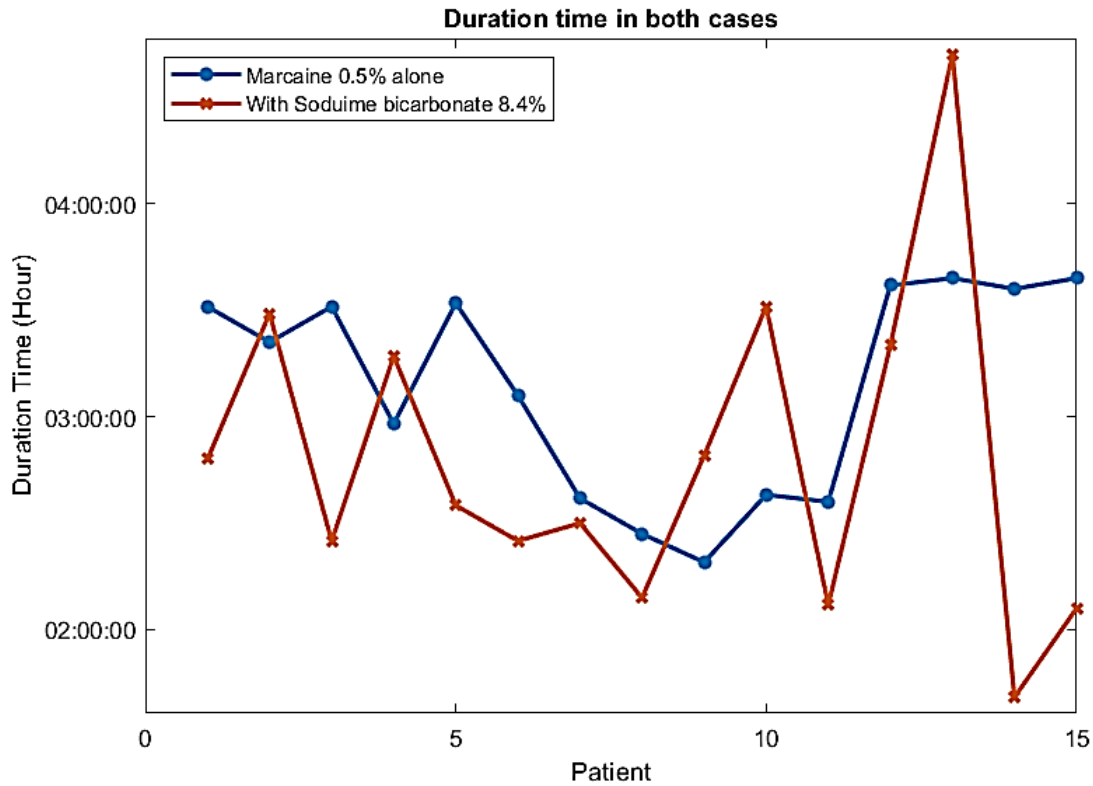


Fig 3: The Duration time in both groups

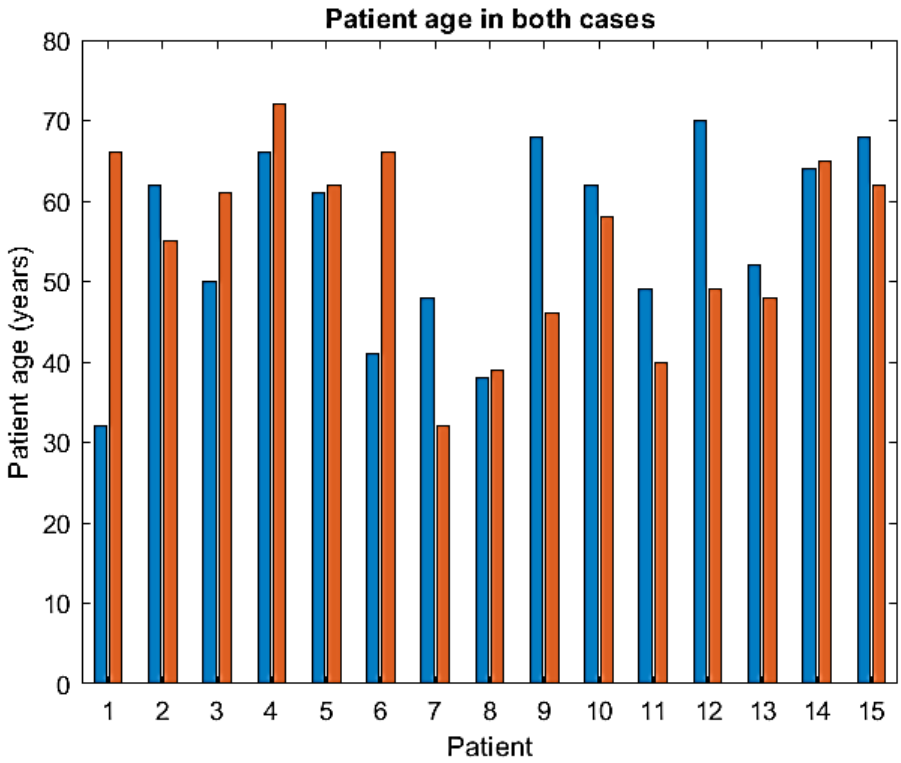


Fig 4: The Patient Age in both groups

Discussion

In this study, we take two groups of patients with different ages and sex contain 20 patients for each group. We did thoracic epidural anesthesia with ultrasound guide at T6 level for Laparoscopic cholecystectomy in group A we used Marcaine 0.5 % 12 ml only while in group B we used Marcaine 0.5 % 12 ml plus sodium bicarbonate 8.4 % 5 ml. we compare 2groups for the onset of anesthesia, Duration of action, Potency of anesthesia and occurrence of complications. In fact,For all patient we used thoracic epidural anesthesia at T6 level as anesthesia during operation and analgesia for postoperative pain. We didn't add general anesthesia for any patient but we used the adjuvant drugs for decrease the anxiety of patients like fentany l 50 mg plus midazolam 3 mg i.v. All the operations are lasting 40 min to 1.10 hr. for the surgical procedure. Ghodki *et al*. gave intrathecal clonidine besides bupivacaine in spinal anesthesia for LC which provided prolonged postoperative analgesia and sedation besides relief of shoulder pain[5].whilst Rademaker *et al*. used continuous thoracic epidural for LC and found that metabolic endocrine response was attenuated and postoperative pain was also less[6].

Conclusion

During this study, we find that there was no difference in onset of anesthesia potency of anesthesia and duration of action of agent between group A and B. in fact there was a very little shortness in onset of anesthesia which is not significant. In addition to that, no complications are reported during this study in both groups.

Conflict of Interest: None

Source of Findings: None

Ethical Clearance: from hospitals and patients

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