Section: Anaesthesia

Original Research Article

TO COMPARE THE EFFICACY OF USING VIDEOLARYNGOSCOPE AGAINST AIRTRAQ LARYNGOSCOPE FOR INTUBATION IN PATIENTS BY SIMULATING CERVICAL STABILISATION

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Abstract

Background: Airway management is a crucial responsibility of the anesthesiologists. During direct laryngoscopy, proper positioning of the head and neck is essential for optimal laryngeal visualisation which requires flexion of cervical spine and extension of the atlanto-occipital joint for the alignment of oral, pharyngeal and laryngeal axes. This position is also known as sniffing position. **Materials and Methods:** The study was carried out at Mount. Zion Medical College, Chayalode, Adoor, and includes 50 adult patients belonging to ASA physical status I and II, Aged 18–50 years, of either sex. Patients will be randomly allocated into two equal groups (25 patients each) using the closed envelope method: Group A: 25 patients will receive general anaesthesia with endotracheal intubation using Airtraq laryngoscope. Group V: 25 patients will receive general anaesthesia with endotracheal intubation using Video Laryngoscopy. After obtaining local Ethics Committee approval and informed written consent from each patient, all patients will be properly assessed preoperatively. **Results:** This prospective, randomized, single blind (subject), case controlled study compared the intubating conditions with Airtraq laryngoscope and Macintosh laryngoscope and evaluated the advantages and safety, effective airway time, airway trauma and hemodynamic response. All data were collected and tabulated. 50 patients were randomly selected and included in this study. Twenty five patients were randomly assigned to undergo tracheal intubation with Airtraq laryngoscope (group A) and twenty five underwent tracheal intubation with Video Laryngoscopy (group VL). Mean age, sex distribution and Body Mass Index of the patients in both the group were compared and there were no statistically significant differences between the groups. **Conclusion:** In conclusion, the Airtraq laryngoscope offers a new approach to tracheal intubation of patients with anticipated and unanticipated difficult airway. The Airtraq reduced the difficulty of tracheal intubation and the degree of hemodynamic stimulation compared with the Macintosh laryngoscope. These findings demonstrate the efficacy of the Airtraq in many clinically relevant contexts and adds to the evolving body of knowledge regarding this potentially useful device.

INTRODUCTION

Airway management is a crucial responsibility of the anesthesiologists. During direct laryngoscopy, proper positioning of the head and neck is essential for optimal laryngeal visualisation which requires flexion of cervical spine and extension of the atlanto-occipital joint for the alignment of oral, pharyngeal and laryngeal axes. This position is also known as sniffing position.[1]

In patients with cervical spine injury, airway management poses a bigger challenge due to risk of neurological damage related to neck movements; thus manual-in-line stabilisation is commonly applied to minimise neck movement during tracheal intubation. Such immobilisation can render intubation under direct laryngoscopy more difficult.[2] Difficulties in airway management increases the risk of hypoxia, which can also lead to devastating neurological outcomes. These issues have prompted the development of number of alternatives to Macintosh laryngoscope such as Videolaryngoscopes, fiberoptic larngoscopy, Airtraq®, etc. These laryngoscopes do not require the alignment of pharyngeal, laryngeal and oral axis and thus do not require sniffing position.[3]

Video laryngoscopes comprises a Macintosh blade connected to a video unit. The familiarity of the Macintosh blade, and the ability to use the videolaryngoscope as a direct or indirect laryngoscope, may be advantageous. (VLs) have been shown to enhance intubation success rates of tracheal intubation, in patients with difficult airways and hence have a definite role in difficult airway management.[4]

The Airtraq optical laryngoscope (AOL) improves the view of the larynx and outperforms the Macintosh for accuracy, success, response time, and number of attempts to intubate, both in normal and difficult airways. It was designed using optic laryngoscopy technology, which lacks some of the useful features of videolaryngoscopy.[5]

This study is being designed to determine the effectiveness of Videolaryngoscope when compared with Airtraq laryngoscope when performing tracheal intubation in adult patients using manual-in-line stabilisation simulating cervical spine injury.

Primary Objective

To compare the efficacy of using Videolaryngoscope against Airtraq laryngoscope for intubation in patients by artificially simulating cervical stabilization (manual in-line stabilization and/or application of a cervical collar to limit mouth opening and neck movement)

To compare the ease and success rate of intubation with Videolaryngoscopy as assessed by

a. total intubation time
b. number of attempts

Secondary Objective

To compare the glottic view, need for external laryngeal manoeuvres, hemodynamic changes and airway morbidity in the two groups.

MATERIALS AND METHODS

The study was carried out at Mount. Zion Medical College, Chayalode, Adoor and includes 50 adult patients belonging to

a. ASA physical status I and II
b. Aged 18–50 years, of either sex scheduled for elective surgery under general anaesthesia with endotracheal intubation.

Patients included in the study will have the following airway criteria

1. Modified Mallampati classes I, II, III & IV
2. Modified Cormack- lehane grades I, II, III & IV

Patients will be randomly allocated into two equal groups (25 patients each) using the closed envelope method:

Group A: 25 patients will receive general anaesthesia with endotracheal intubation using Airtraq laryngoscope.

Group V: 25 patients will receive general anaesthesia with endotracheal intubation using Video Laryngoscopy.

After obtaining local Ethics Committee approval and informed written consent from each patient, all patients will be properly assessed preoperatively.

The patients with cervical spine injury often require the use of semi-rigid cervical collar or manual in-line stabilization to prevent neck movements, which may lead to poor laryngeal view on direct laryngoscopy and lead to difficulty with intubation. In this study, as we hope to simulate similar difficult airway scenario for cervical spine immobilization, we will be providing manual in-line stabilisation and also fixing a cervical collar to further restrict mobilisation.

On arrival to the operating room, patients will be connected to the standard monitors, including ECG, noninvasive arterial blood pressure and pulse oximeter. They will all be subjected to the same anaesthetic protocol. Pre-oxygenation with 100% oxygen for 3 minutes will be done. Induction will be performed using midazolam 0.03mg/kg, fentanyl 1µg/kg and propofol 1.5–2mg/kg. The pillow will be removed, and the neck immobilized using MILS applied by an experienced individual holding the sides of the neck and the mastoid processes, thus preventing flexion/extension or rotational movement of the head and neck.

Orotracheal intubation is facilitated with vecuronium 0.1 mg/kg, following which orotracheal intubation is performed using the selected intubation device for each group with the endotracheal tube after ensuring full muscle relaxation.

Trachea will be intubated using an appropriate sized endotracheal tube. Placement of ETT should be confirmed by bilateral chest auscultation and EtCO2 waveform and tube will be secured.

Haemodynamic variables such as SBP, DBP, and HR will be documented at first, third and fifth minute following endotracheal intubation.

Assessment of laryngoscopy and intubation procedure

1. Number of trials to successful intubation.
2. Manoeuvres during laryngoscopy.

A. BURP manoeuvre ‘backward, upward, rightward and posterior external laryngeal pressure’.

B. Using an intubating stylet in the second trial of laryngoscopy.

3. Endotracheal tube insertion time will be calculated from the time of introducing the laryngoscope blade through the patient’s mouth until successful intubation confirmed by the normal capnogram waveform.
4. Success/failure rate.

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5. Complications like airway injury, bronchospasm, technical failure of the videolaryngoscope, or a reduction of oxygen saturation below 90%.

RESULTS

This prospective, randomized, single blind (subject), case controlled study compared the intubating conditions with Airtraq laryngoscope and Macintosh laryngoscope and evaluated the advantages and safety, effective airway time, airway trauma and hemodynamic response. All data were collected and tabulated.

50 patients were randomly selected and included in this study. Twenty five patients were randomly assigned to undergo tracheal intubation with Airtraq laryngoscope (group A) and twenty five underwent tracheal intubation with Video Laryngoscopy (group VL). Mean age, sex distribution and Body Mass Index of the patients in both the group were compared and there were no statistically significant differences between the groups.

Table 1: Age and BMI comparison

Parameter	Group A (AirtraQ)		Group V Video Laryngoscopy		P Value
	Mean	SD	Mean	SD	
Age in years	36.63	13.91	37.4	12.82	0.825
BMI	25.302	4.375	24.66	3.37	0.527

Table 2: gender distribution

Parameter assessed	Group	N	Mean	SD	P Value
Duration	Group A (AirtraQ)	25	11.03	6.071	<0.0001
	Group V Video Laryngoscopy	25	17.2	5.047	

Table 4: Preinduction

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	83.03	12.944	0.144
	Group V Video Laryngoscopy	25	88.73	16.613	
Systolic BP	Group A (AirtraQ	25	120.50	15.431	0.126
	Group V Video Laryngoscopy	25	127.20	17.878	
Diastolic BP	Group A (AirtraQ	25	79.20	9.792	0.118
	Group V Video Laryngoscopy	25	83.13	12.889	
MAP	Group A (AirtraQ	25	93	11.277	0.166
	Group V Video Laryngoscopy	25	97.63	14.129	
Spo2	Group A (AirtraQ	25	100	0	-
	Group V Video Laryngoscopy	25	100	0	

Table 5: Preintubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	86.87	10.734	0.556
	Group V Video Laryngoscopy	25	88.83	14.697	
Systolic BP	Group A (AirtraQ	25	111.50	15.13	0.405
	Group V Video Laryngoscopy	25	115.13	18.25	
Diastolic BP	Group A (AirtraQ	25	74.17	11.61	0.921
	Group V Video Laryngoscopy	25	73.87	11.57	
MAP	Group A (AirtraQ	25	86.57	12.22	0.749
	Group V Video Laryngoscopy	25	87.67	13.47	
Spo2	Group A (AirtraQ	25	100	0	-
	Group V Video Laryngoscopy	25	100	0	

Table 6: 1 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	102.07	17.648	0.001
	Group V Video Laryngoscopy	25	116.43	14.115	
Systolic BP	Group A (AirtraQ	25	129.00	18.118	
	Group V Video	25	150.80	18.430	

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	Laryngoscopy				0.001
Diastolic BP	Group A (AirtraQ	25	88.67	11.842	
	Group V Video Laryngoscopy	25	100.50	13.354	0.001
MAP	Group A (AirtraQ	25	102.03	13.520	
	Group V Video Laryngoscopy	25	117.30	14.707	<0.001
Spo2	Group A (AirtraQ	25	99.90	.548	0.001
	Group V Video Laryngoscopy	25	99.80	.761	

Table 7: 3 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	92.30	14.003	0.004
	Group V Video Laryngoscopy	25	103.40	14.483	
Systolic BP	Group A (AirtraQ	25	120.43	16.913	0.006
	Group V Video Laryngoscopy	25	133.57	18.578	
Diastolic BP	Group A (AirtraQ	25	80.83	11.546	0.018
	Group V Video Laryngoscopy	25	88.43	12.506	
MAP	Group A (AirtraQ	25	94.07	12.881	0.008
	Group V Video Laryngoscopy	25	103.60	14.036	
Spo2	Group A (AirtraQ	25	100	.000	
	Group V Video Laryngoscopy	25	99.97	.183	0.312

Table 8: 5 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	84.80	10.506	
	Group V Video Laryngoscopy	25	90.30	13.899	0.089
Systolic BP	Group A (AirtraQ	25	112.73	12.188	
	Group V Video Laryngoscopy	25	120.70	15.825	0.033
Diastolic BP	Group A (AirtraQ	25	75.07	10.123	0.435
	Group V Video Laryngoscopy	25	77.20	10.867	
MAP	Group A (AirtraQ	25	87.53	10.644	
	Group V Video Laryngoscopy	25	91.70	12.349	0.167
Spo2	Group A (AirtraQ	25	100	0	
	Group V Video Laryngoscopy	25	100	0	-

Table 9: Airway Trauma

Group	Trauma		P value
	Yes	No	
Group A (AirtraQ)	1 (6.67)	24(93.33%)	0.64
Group V Video Laryngoscopy	2 (10%)	23 (90%)	

Table 10: Operator grading

Operator grading	Group		P Value
	Group A (AirtraQ)	Group V Video Laryngoscopy	
1	23 (93.33%)	16 (66.67%)	0.033
2	1 (3.33%)	6 (23.33%)	
3	1 (3.33%)	3(10%)	
4	0(0%)	0(0%)	
5	0(0%)	0(0%)	

DISCUSSION

Expert airway management is an essential skill of an Anaesthesiologist.

Difficulties with tracheal intubation are mostly caused by difficult direct laryngoscopy with impaired view to the vocal cords. Unfortunately, despite all the information

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currently available, no single factor reliably predicts these difficulties.[6]

Consequently, many difficult intubations will not be recognized until after induction of anaesthesia. Unanticipated difficult intubation can lead to critical situations, especially in those patients who are at risk for gastric regurgitation, who are difficult to ventilate by mask or who have limited cardiopulmonary reserves.

When a person is in supine position and head in neutral position, the laryngeal axis is almost horizontal. The pharyngeal axis is approximately 30-450 from the horizontal axis and the oral axis almost perpendicular to the laryngeal axis.[7]

Successful direct laryngoscopy for the exposure of the glottis opening requires the alignment of oral, pharyngeal and laryngeal axes. Elevation of head about 10 cm with pads below the occiput aligns the laryngeal and pharyngeal axes.[8]

It was generally easy to insert the Airtraq laryngoscope, to obtain a full view of the glottis, and to intubate the trachea without major complications. In this device, the tracheal tube can be attached to the side of the blade and the tip of the tube is visible on the viewfinder. Once the glottis was positioned in the centre of the viewfinder, it was easy to advance the tube into the trachea.

There was one difficulty though. Inserting the Airtraq too close to the glottis will only allow the initial posterior movement of the tube and result in a failure to intubate. The ‘back and up manoeuvre’ which involves withdrawing the device away from the glottis and lifting the device up before attempting to intubate helps to overcome this problem.[9]

The mean time to intubate with the Airtraq group was 11.03 seconds and in the Macintosh group it was 17.2 seconds and it was found to be statistically significant when computed with Levene’s test for equality of variances.[10]

In the test conducted by Chrisen Maharaj et al in Ireland in live patients it was 20.3 seconds with Macintosh and 13.2 seconds with the Airtraq laryngoscopes.

CONCLUSION

In conclusion, the Airtraq laryngoscope offers a new approach to tracheal intubation of patients with anticipated and unanticipated difficult airway. The Airtraq reduced the difficulty of tracheal intubation and the degree of hemodynamic stimulation compared with the Macintosh laryngoscope. These findings demonstrate the efficacy of the Airtraq in many clinically relevant contexts and adds to the evolving body of knowledge regarding this potentially useful device.

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Section: Anaesthesia

Original Research Article

PROSPECTIVE CONTROLLED STUDY OF FIELD BLOCK ANAESTHESIA FOR UNILATERAL INGUINAL HERNIA REPAIR WITH 0.5% BUPIVACAINE AND DEXMEDETOMIDINE VERSUS 0.375% ROPIVACAINE AND DEXMEDETOMIDINE

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Abstract

Background: Hernia is the word derived from Greek words "Herons" an offshoot or bulge. It is defined by Sir Astley Cooper (1804) as "protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity. The performed choice of anaesthesia for all adult inguinal hernia repair is local, it is safe, simple, effective, and economical, without anaesthetic side effects. Furthermore local anaesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically inhibits build of local nociceptive molecules and therefore, there is better pain control in the postoperative period. **Materials and Methods:** This was a randomized, prospective comparative clinical study conducted in the Department of Anesthesiology. Age between 30 and 60 years and only male cases, American Society of Anesthesiologists (ASA I and II) cases, weight 40-65 kg, elective surgeries (inguinal hernioplasty) were included. Patient refusal, known allergy, coagulopathy, patient on β blockers, long-term analgesic therapy, drugs which are known to interact with study drugs. **Results:** The two groups were matched in respect of their demographic characteristics such as age and weight. The baseline clinical variables such as ASA grade, pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), were matched between the two groups (Table 1). The baseline PR, SBP, and DBP were matched and shown in Table 3. The mean PRs between the two groups were not statistically significant (86.9 ± 8.9 ≈ 84.5 ± 9.3 and P > 0.05). The mean SBPs between the two groups were not statistically significant (121.3 ± 8.3 ≈ 120.3 ± 5.9 and P > 0.05). The mean DBPs between the two groups were not statistically significant (78.6 ± 4.4 ≈ 79.3 ± 2.6 and P > 0.05) (Table 2). **Conclusion:** Ropivacaine is a newer ideal, comfortable safe anesthetic of choice for field block in inguinal hernia surgery cases, ASA I and II and by adding dexmedetomidine, we get a prolongation of analgesia when compared with bupivacaine and dexmedetomidine.

INTRODUCTION

Hernia is the word derived from Greek words "Herons" an offshoot or bulge. It is defined by Sir Astley Cooper (1804) as "protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity.[1] The performed choice of anaesthesia for all adult inguinal hernia repair is local, it is safe, simple, effective, and economical, without anaesthetic side effects. Further more local anaesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically inhibits build of local nociceptive molecules and therefore, there is better pain control in the postoperative period.[2]

Hernia repair can be performed under spinal, epidural, general and inguinal field block. Field block for inguinal hernia repair is the most cost-effective anaesthetic technique for out patients undergoing unilateral inguinal herniorrhaphy with respect to speed of recovery.[3] patient comfort and associated incremental costs. These are not provided into a satisfactory level by the commonly employed techniques, such as general anaesthesia (GA) or centrineuraxial blockade.[4,5] Hence to meet the above requirements the present study of field block for inguinal hernia repair is undertaken.

Objectives

- To evaluate the advantages of this field block for inguinal hernia repair.
- To study the duration and quality of analgesia by using 0.5% bupivacaine and dexmedetomidine versus 0.375% ropivacaine and dexmedetomidine.
- To study effects of inguinal field block with respect to speed of recovery & patients comfort.
- Other side effects pertaining to the inguinal field block.

MATERIALS AND METHODS

This was a randomized, prospective comparative clinical study conducted in the Department of Anesthesiology

Inclusion Criteria

Age between 30 and 60 years and only male cases, American Society of Anesthesiologists (ASA I and II) cases, weight 40-65 kg, elective surgeries (inguinal hernioplasty).

Exclusion Criteria

Patient refusal, known allergy, coagulopathy, patient on β blockers, long-term analgesic therapy, drugs which are known to interact with study drugs.

Field block administration of drug mixture: Group 1 administered with 0.5% Bupivacaine and Dexmedetomidine and Group 2 administered with 0.375% Ropivacaine and Dexmedetomidine.

RESULTS

The two groups were matched in respect of their demographic characteristics such as age and weight. The baseline clinical variables such as ASA grade, pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), sensory, and motor block were matched between the two groups (Table 1).

The two groups were not significantly differed in respect of their mean ages (45.1 ± 8.6 = 45.0 ± 4.9). Similarly, they were also not significantly differed between the mean weights of two groups (51.3 ± 5.3 ≈ 49.6 ± 4.0 and P > 0.05) (Table 1).

The baseline PR, SBP, and DBP were matched and shown in Table 3. The mean PRs between the two groups were not statistically significant (86.9 ± 8.9 ≈ 84.5 ± 9.3 and P > 0.05). The mean SBPs between the two groups were not statistically significant (121.3 ± 8.3 ≈ 120.3 ± 5.9 and P > 0.05). The mean DBPs between the two groups were not statistically significant (78.6 ± 4.4 ≈ 79.3 ± 2.6 and P > 0.05) (Table 2).

Table 1: Comparison of age between 2 groups

Age in years	N (%)	
	Group 1	Group 2
30-39	20 (34.5)	10 (17.2)
40-49	12 (20.7)	34 (58.6)
50-59	26 (44.8)	14 (24.2)
Total	58 (100)	58 (100)
Mean ± SD	45.6±8.3	45.0±4.8

Table 2: Comparison of base line PR, SBP, and DBP between two groups

Variables	Mean ± SD		P Value
	Group 1	Group 2	
Pulse rate	86.9±8.9	84.5±9.3	>0.05
SBP	121.3±8.3	120.3±5.9	>0.05
DBP	78.6±4.4	79.3±2.6	>0.05

Table 3: Comparison of ASA grade between two groups

ASA Grade (American Society of Anesthesiologists)	Group 1	Group 2	P Value
I	50	52	>0.05
II	8	6	
Total	58	58	

Table 4: Comparison of pulse rate at different interval between the two groups

Intervals	Mean ± SD		P Value
	Group 1	Group 2	
3 min	91.8±13.8	92.0±13.5	>0.05
6 min	89.3±13.7	83.4±12.9	>0.05
15 min	79.8±14.4	75±17.2	>0.05

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30 min	81.1±12.8	76.9±14.3	>0.05
1 h	82±9.0	81.1±5.2	>0.05
2 h	86.3±103	83.9±7.3	>0.05
4 h	113.6±9.0	89.8±8.0	<0.0001
8 h	107.2±7.3	112.3±11.3	<0.05

Table 5: Comparison of SBP at different interval between the two groups

Intervals	Mean ± SD		P Value
	Group 1	Group 2	
3 min	121.4±9.8	120.5±6.8	>0.05
6 min	118.9±8.6	115.2±4.2	>0.05
15 min	111.9±10.1	108.8±1.9	>0.05
30 min	109.0±9.7	106.8±2.7	>0.05
1 h	111.2±6.2	109.5±2.5	>0.05
2 h	112.5±5.7	113.9±4.5	>0.05
4 h	128.3±4.9	114.7±4.0	<0.0001
8 h	117.4±5.6	128.9±5.0	<0.05

Table 6: Comparison of DBP at different interval between the two groups

Intervals	Mean ± SD		P Value
	Group 1	Group 2	
3 min	77.2±7.0	76.9±5.4	>0.05
6 min	75.5±6.9	76.6±4.8	>0.05
15 min	70±7.6	70±0.0	>0.05
30 min	71±6.6	66.6±4.8	>0.05
1 h	69.7±4.9	69.7±1.8	>0.05
2 h	70.4±4.4	73.1±4.7	>0.05
4 h	78.4±7.4	73.1±4.7	<0.0001
8 h	73.0±6.1	83.4±4.8	<0.05

Table 7: Comparison of rescue analgesia between two groups

Variable	Mean ± SD		P Value
	Group 1	Group 2	
Rescue analgesia	217.2±17.5	453.2±20.2	<0.0001

DISCUSSION

Field block is a simple, frequently used technique which provides very effective analgesia in lower abdominal surgeries. Ropivacaine is a newer drug with a more safety margin with reduced risk of cardiotoxicity. Dexmedetomidine is an α2 agonist which is very much used nowadays as an additive with local anesthetics. It gives intraoperative and post-operative analgesia.[6] Moreover, it is devoid of opioid side effects but may produce sedation, bradycardia, and hypotension..[7] In our study in Group 2 patients out of 29 patients 2 patients were developed bradycardia with hypotension, they required atropine and ephedrine. Al-Ghanem et al. have reported the use of dexmedetomidine to be associated with decrease in heart rate and blood pressure.[6] No patients have developed any nausea or vomiting in both groups. But in Group 2, patients were free of anxiety and they were comfortable.[8] Both groups did not require any sedation intraoperatively. [9] Yaksh and Reddy studied that a powerful analgesia can be produced by selectively activating adrenergic, opiate, and baclofenergic receptor systems in the fieldcord.[10]

CONCLUSION

Ropivacaine is a newer ideal, comfortable safe anesthetic of choice for field blocks in inguinal hernia surgery cases, ASA I and II and by adding dexmedetomidine, we get a prolongation of analgesia when compared with bupivacaine and dexmedetomidine.

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