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September-October 2022
Volume 9 Number 5

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Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.1

Comparison Between two Supraglottic Airway Devices: Ambu AuraGain & Pro Seal LMA

Anjali Tripathi[1], Chandrika V Bhut[2]

How to cite this article:

Anjali Tripathi, Chandrika V Bhut/ Comparison Between two Supraglottic Airway Devices: Ambu AuraGain & Pro Seal LMA/Indian J Anesth Analg. 2022;9(5)219-222.

Abstract

Context:

Aims: To compare two supra glottic airway devices, Ambu auragain & proseal LMA in terms of their working performance & insertion characteristics during general anesthesia in patient undergoing elective laparoscopic surgery.

Settings and Design: After written informed consent, 60 patients of ASA I & II, aged 18 to 60 years, of either gender posted for laparoscopic surgery under general anesthesia were included in the study. Patients were divided into two groups of 30 patients each.

Methods and Material: In group A: airway was secured with Ambu Auragain & in group P: with Proseal LMA for general anesthesia. Working performance (in terms of oropharyngeal leak pressure) and insertion characteristics (insertion time, manipulations of device, number of attempts) were recorded at the time of induction. Haemodymanics (Heart rate, mean arterial blood pressure, SpO_2) & complications (if any) were recorded perioperatively.

Statistical Analysis used: Student t test for quantitative data & Chi square test for qualitative data.

Results: Oropharyngeal leak pressure was significantly higher & insertion time was significantly less in group A compared to group P ($P<0.0001$). There was no statistically significant difference in insertion characteristics, demographic data, haemodynamics, ease of orogastric tube & post operative complications in both the groups.

Conclusions: AmbuAuragain provides higher oropharyngeal leak pressure with lesser insertion time compared to ProSeal LMA.

Keywords: Ambu AuraGain; ProSeal LMA; Oropharyngeal leak pressure.

Key Messages: Ambu AuraGain is better 2nd generation supraglottic device in terms of working performance & insertion charecteristics.

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Received on: 26.05.2022

Accepted on: 28.06.2022

INTRODUCTION

General anesthesia require safe and open airway.[3] Till date, tracheal intubation is the gold standard method for maintaining a patent airway during general anesthesia.[4] However, this maneuver requires direct laryngoscopy by a skilled & trained person.[5] With advancement in anesthesia technique in airway management, it has been progressed from using an endotracheal tube to a supraglottic airway device because of ease and speed of insertion, improved hemodynamic stability, reduce anesthetic requirement and less airway related postoperative complication.[6,7] Wide variety of supraglottic airway devices available today which are employed to protect the airway in both elective as well as emergency situations.[8]

MATERIALS AND METHODS

After approval from the Institutional Review Board (IRB no. 924/2019) this prospective, randomized, single blind study was carried out in the Department of Anesthesiology, Govt. Medical College and Sir T hospital Bhavnagar. After detailed pre-anesthetic evaluation, systemic examination and routine investigation, 60 patients in the age group of 18-60 years posted for laparoscopic surgery with ASA grade I-II were selected for the study.

Patients were randomized using computer generated random number sequence method into 2 groups: group A (Ambu Auragain was inserted) and group P (Proseal laryngeal mask airway was inserted). Monitoring for heart rate, non-invasive blood pressure and peripheral oxygen saturation was established and baseline vital parameters were recorded. IV access was secured and patients were premedicated with Ondansetron 0.08 mg/ glycopyrrolate 0.04 mg/kg, Midazolam 0.02mg/ kg and Fentanyl 2mcg/kg intravenously 20 mins prior to surgery. In the operation theatre multi parameter was attached, vitals recorded just before the induction were taken as baseline values for the present study. Patients were shifted to operation theatre oxygenated with 100% oxygen for 5 min by face mask with Bains circuit. Patients were induced with Inj propofol 2-2.5mg/kg IV slowly till loss of eyelash reflex, jaw relaxation, absence of movements and apnea. Patients were ventilated with Bains circuit, Inj. Succinyl choline 2 mg/ kg was given, pt was observed for appearance & disappearance of fasciculations. Insertion of SGA was done according to group assigned to the patients either with Ambu AuraGain or ProSeal LMA. The size of SGA was selected as per manufacturer recommendation. Correct positioning of device was confirmed by bilateral chest movement. Anesthesia was maintained with oxygen, nitrous oxide, sevoflurane, IPPV and intermittent dose of injection vecuronium.

The insertion characteristics were recorded in terms of number of insertion attempt, time taken for insertion (picking up of airway device to successful ventilation of lung), manipulation after insertion and failed insertion. Ease of gastric tube insertion was noted in both the groups.

The Working performance: Oropharyngeal leak pressure was measured by closing the adjustable pressure limiting valve against 5l/min fresh gas flow and recording the airway pressure at equilibrium when air leak was heard in the oropharynx to a maximum airway pressure of 40 cm of H_2O.

After insertion of device, appropriate sized orogastric tube was lubricated and placed into the stomach through the gastric channel. Hemodynamic parameters like heart rate, blood pressure as well as percentage peripheral oxygen saturation (SpO_2) was recorded before, during and after induction with Ambu AuraGain/ ProSeal LMA insertion at 1, 5 ,10 (min) and after removal of the devices. After the fulfilment of the criteria of emergence, the SGA was removed after thorough oropharyngeal suction and examined for blood stain & patient was observed for laryngobronchospasm. Patients were asked for the sore throat in post operative period & if present was treated conservatively by decongestant.

RESULTS

Oropharyngeal leak pressure was significantly higher & insertion time was significantly less in group A compared to group P.

Table 1: Insertion characteristics of the device

Variable		Group-A Mean ± SD (n=30)		Group-P Mean ± SD (n=30)		P value
		N	%	N	%	
Insertion attempts	First	28	93.33	26	86.66	0.6707
	Second	02	6.67	04	13.33	
Manipulation require after insertion to improve ventilation		05	16.67	07	23.33	0.7480
Failed insertion		00	00	00	00	

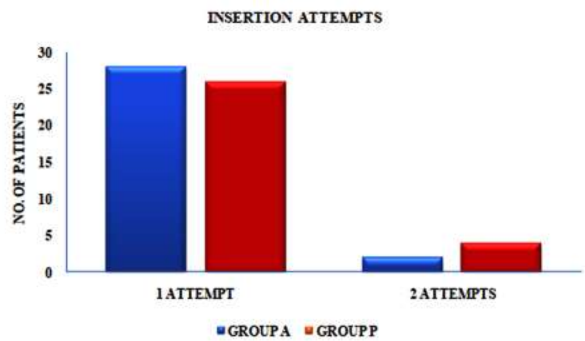
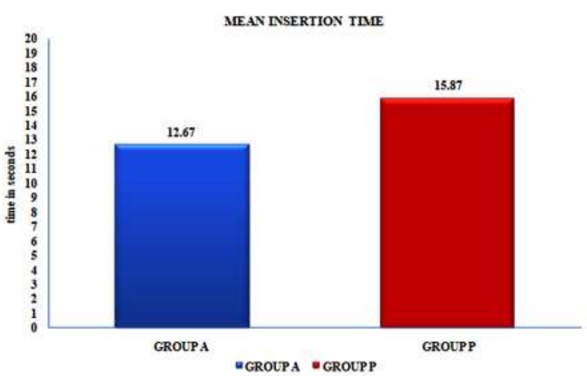


Table 2: Mean Insertion time of the device

Time	Group-A Mean ± SD (n-30)	Group-P Mean ± SD (n-30)	P Value
Duration (sec)	12.67 ±0.80	15.87 ± 1.35	<0.001



• The mean time of insertion was significantly less in group A as compared to group P. ($p<0.0001$)

Table 3: Orogastric tube insertion

Variable		Group A		Group B		P value
		N	%	N	%	
Ease of gastric tube insertion	Easy	27	90	23	76.67	0.299
	Difficult	03	10	07	23.33	

• Gastric tube could be inserted easily and successfully in more number of patients in group A than in group P but difference is not statistically significant. (P=0.299)

Table 4: Oropharyngeal leak pressures of the devices

Variable	Group-A Mean ± SD (n-30)	Group-P Mean ± SD (n-30)	P value
Oropharyngeal leak pressure (in cm h_2O)	26.033 ±+ 1.098	22.56 ± 1.006	<0.0001

DISCUSSION

The first insertion attempt was greater in group A as compared to group P but there was no statistical difference among the both groups (P >0.05). The airway manipulations were statistically insignificant between group A and group P. The mean time taken for insertion in group A is 12.76 ± 0.80 sec and group P is 15.87 ± 1.35 sec (P<0.05). AAU insertion was quicker than Proseal LMA and, AAU has clinically high first attempt insertion rate; it can be used for cardio pulmonary resuscitation. Oropharyngeal leak pressure is higher with group A (26.033±1.098) as compared to group P (22.56±1.006) (P value <0.05). Orogastric tube was inserted easily in both the groups.

• There was statistically significant difference in Oropharyngeal leak pressure between group A and group P with higher oropharyngeal leak pressure in group a than in group P. This indicates the better working performance of Ambu Auragain in comparison to Proseal LMA. (P <0.0001).

Table 5: Post-operative complications

Variable	Group-A	Group-P	P value
	N	N	
Laryngo bronchospasm	00	00	
Blood stain	00	01	1.00
Sore throat	02	03	1.00

The complications rate in both the groups of patients were comparable. There was no statistical significance (P>0.05).

There was an increase in heart rate and mean arterial blood pressure after removal of the device but it was not clinically significant and no patient required any pharmacological intervention. Changes in heart rate and mean arterial blood pressure at intervals of intra op and post op period between the two groups were statistically insignificant and hence were comparable.

There were no serious complications in either of the groups. Blood staining of device after removal was seen in one patient in group P. It was not seen in any of the patients in group A. Sore throat was complained by 2 patients in group A & 3 patients in group P. None of the patients experienced laryngo bronchospasm in the study.

CONCLUSION

We concluded the study "Comparison between two Supraglottic Airway Devices: Ambu AuraGain & ProSeal Laryngeal mask airway in patients undergoing elective laparoscopic surgery under general anesthesia: Randomised controlled trial" as follows:

- Ambu Auragain provides higher oropharyngeal leak pressure compared to Pro Seal LMA.
- Insertion time is less in Ambu Auragain compared to Pro Seal LMA.
- Other insertion characteristics & ease of orogastric tube insertion were comparable in both the groups.
- Haemodynamic parameters were stable in with both, Ambu AuraGain & Pro Seal LMA.
- No serious complications were observed in both the groups.

Thus, we concluded that Ambu AuraGain has better working performance as it provides higher Oropharyngeal leak pressure & less insertion time compared to Pro Seal LMA in laparoscopic surgery under general anesthesia.

Acknowledgement: I thank almighty, my guide & co-author Dr. Chandrika V Bhut for her constant support & guidance, my parents for their support & my subjects.

Conflict of Interest: NIL

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Original Article

Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.2

Comparative Study of Etomidate and Propofol for Induction of General Anesthesia

Pratima Prakash Gajakosh[1], S D Chauhan[2], V S Joshi[3], Sangita Agale[4]

How to cite this article:

Pratima Prakash Gajakosh, S D Chauhan, V S Joshi, et al.,/Comparative Study of Etomidate and Propofol for Induction of General Anesthesia/Indian J Anesth Analg. 2022;9(5)225-230.

Abstract

Background and Objectives: Induction of anesthesia is a critical part of anesthesia practice. Sudden hypotension, arrhythmias, and cardiovascular collapse are threatening complications following injection of induction agent in hemodynamically unstable patients. Present prospective randomized study is designed to compare propofol and etomidate for their effect on hemodynamics in patients undergoing general anesthesia.

Methods: Hundred ASA I and II patients of age group 18-60 years scheduled for elective surgical procedure under general anesthesia were randomly divided into two groups of 50 each receiving propofol (2 mg/kg) and etomidate (0.3 mg/kg) as an induction agent. Vital parameters at induction, laryngoscopy and thereafter recorded for comparison.

Results: Demographic variables were comparable in both the groups. Patients in etomidate group showed little change in mean arterial pressure (MAP) and heart rate (HR) compared to propofol ($p > 0.05$) from baseline value.

Conclusions: This study concludes that etomidate is a better agent for induction than propofol in view of hemodynamic stability.

Keywords: Etomidate; General anesthesia, Hemodynamic stability.

INTRODUCTION

An ideal induction agent for general anesthesia should have hemodynamic stability, minimal respiratory side effects and rapid clearance. Etomidate is a carboxylate imidazole containing compound characterized by hemodynamic stability, minimal respiratory depression and cerebral protective effects.[1] Its lack of effect on sympathetic nervous system, baroreceptor reflex regulatory system[1,2] and its effect of increased coronary perfusion even on patients with moderate cardiac dysfunction makes it an induction agent of choice in cardiac disease patients.[3-6] However, transient adrenocortical suppression, postoperative nausea and vomiting, myoclonus, pain on injection are the side effects.[1]

Propofol, 2,6-diisopropylphenol is most popular induction agent with its favourable characteristics of rapid andsmooth induction and recovery, decrease incidence of nausea and vomiting, etc.[1,2] While on other side decrease bloodpressure, dose dependent depression of ventilation, pain oninjection are the

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Received on: 29.06.2022

Accepted on: 30.07.2022

major drawbacks.[1,2]

This study is an attempt to compare haemodynamic parameters between Etomidate and Propofol and compare effect of Etomidate and Propofol on heart rate, systolic blood Pressure, diastolic blood pressure and mean arterial pressure.

METHODS

This prospective randomized double blind study is conducted on 100 patients of American Society of Anesthesiologist (ASA) grade I and II between 18 and 60 years of age of either sex, scheduled for elective surgical procedure under general anesthesia with endotracheal intubation. After approval from institutional ethical committee, written informed consent was obtained from all the patients. The total 100 patients were randomly assigned into 2 groups of 50 patients each according to a computer generated table of random numbers.

- Group A (n = 50): received Inj. Propofol 1% (2 mg/kg of bodyweight)
- Group B (n = 50): received Inj. Etomidate (0.3 mg/kg ofbody weight)

All patients were kept on fasting for at least six hours before the procedure. Once the patient is shifted to operation theatre, Intravenous access was secured with an 18G cannula. Patients were Monitored with Electrocardiography, Non Invasive Blood Pressure, Pulse oxymeter and End tidal carbon dioxide. Baseline readings taken.

Patient was premedicated with Glycopyrrolate 0.2 mg, inj. midazolam 0.02 mg/kg and ondansetron 0.08 mg/kg, inj. Fentanyl 2 mcg/kg, Intravenous 7 was injected ten minutes before induction and the patients were randomised into two groups, Group A and Group B for patients receiving Etomidate and Propofol respectively.

Induction of anesthesia was either with Propofol 2 mg/kg or Etomidate 0.3 mg /kg8, loss of eye lash reflexes was considered to be the end point. This was followed by injection succinyl choline 2mg/kg. ventilation was assisted manually using a face mask with N_2O and O_2. After the administration of muscle relaxant intubation was attempted by same anesthesiologist. Observation made for heart rate, systolic blood pressure and diastolic blood pressure post induction and 2 mins, 5 mins, 10 min, 20 min and 30 min after intubation. Once intubation is confirmed the patient was connected to bain`s circuit andintermittent positive airway pressure ventilation was continued until the completion of surgery with 66% N_2O and O_2 maintainance of anesthesia done by inhalational drug like Halothane/Isoflurane/Sevoflurane and intravenous muscle relaxant vecuronium / atracurium.

At the end of the surgery neuromuscular blockade was reversed by using intravenous neostigmine 0.05 mg/kg and glycopyrrolate 10 mcg/kg. The extubation was performed after the patient was fully awake.

STATISTICAL ANALYSIS

Collected data was entered into Microsoft excel spreadsheet. Continuous variable were presented as Mean SD. Categorical variables were expressed into frequency and percentages. Continuous variables were compared between Propofol and Etomidate at different time point by performing independent t-test. Effect of drugs of Propofol and Etomidate wascompared at different time point by performing Wilcoxon rank sum test for non normalized data. Categorical variables were compared between 3 group by performing chi-square test. $P<0.05$ was considered as statistical significance whereas a p value <0.001 was considered as highly significant. Statistical software STATA version 14.0 was used for dataanalysis.

RESULTS

Both groups were comparable in age, sex, weight and ASA physical status, with no statistically significant differences ($p > 0.05$) (Table 1). Pre-operative vitals (HR, SBP, DBP and MAP) were comparable in both groups with nostatistically significant differences ($p > 0.05$).

Table 1: Demographic characteristic of patients ($p > 0.05$).

Variable	Group A	Group B
Age (years) mean± SD	42.2±12.09	37±.12.43
Gender (Male: Female)	27:23	23:27
Weight (kg) mean± SD	62.48±7.77	60.08±7.71

Table 2: Comparison of Heart rate between Propofol and Etomidate at different time point.

Time	Group – A		Group - B		p-value
	Mean	SD	Mean	SD	
Basal	83.76	7.97	86.32	7.61	0.1040,NS
1 min After Induction	85.24	7.85	86.84	8.09	0.3194,NS
2 min after induction	93.32	7.51	90.8	7.85	0.1043,NS
5 min after induction	93.32	7.00	93.56	8.19	0.8752,NS
10 min after induction	85.96	7.90	88.42	7.29	0.1090,NS
20 min after induction	83.44	7.57	86.2	6.98	0.0612,NS
30 min after induction	83.84	7.73	86.28	6.83	0.0736,NS

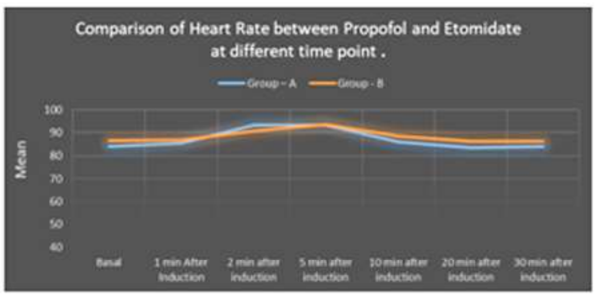

Fig. 1: Showing changes in HR at different time intervals between Group A and Group B.

The heart rate in group A was increased by 2 bpm after induction and in group B no change in HR after induction from baseline. After intubation heart rate increases in both groups but not statistically significant (p value >0.05).

Table 3: Comparison of Systolic blood pressure between Propofol and Etomidate at different time point.

Time	Group – A		Group - B		p-value
	Mean	SD	Mean	SD	
Basal	133	14.03	129.4	10.30	0.1469,NS
1 min After Induction	112.52	12.20	117.24	10.45	0.0007,HS
2 min after induction	115.8	11.29	122.64	12.92	0.0010,HS
5 min after induction	117.18	15.58	127.84	14.20	0.0352,S
10 min after induction	109.24	18.63	120.08	16.62	0.0028,HS
20 min after induction	110.28	14.58	117.70	16.24	0.0181,S
30 min after induction	111.28	14.67	118.18	19.56	0.0488,S

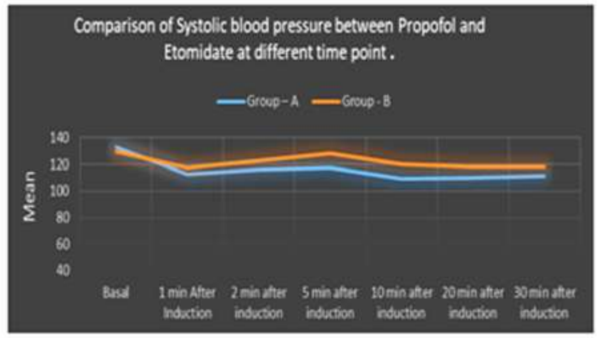

Fig. 2: Showing changes in Systolic Blood Pressure (SBP) at different time intervals between group A and group B.

The SBP in group A and group B decreased by 20.44 and 12.16 mm of Hg respectively after induction which is statistically significant. Two minute after intubation fall in SBP in group A by 17.2 and in group B by 6.76 mm of Hg with significant p-value. Changes in SBP between group A and Group B remains statistically significant at 5 mins, 10 mins, 20 mins and 30 mins after intubation.The fall in SBP is more with Group A than Group B. (p value<0.05).

Table 4: Comparison of Diastolic blood pressure between Propofol and Etomidate

Time	Group – A		Group - B		p-value
	Mean	SD	Mean	SD	
Basal	85.4	10.65	84.2	7.24	0.5117,NS
1 min After Induction	73.18	8.24	76.18	3.75	0.0212,S
2 min after `induction	75.98	11.93	82.28	11.52	0.0446,S
5 min after induction	72.48	8.78	75.36	7.27	0.1028,NS
10 min after induction	72.96	8.76	76.36	8.73	0.2464,NS
20 min after induction	72.76	9.30	75.22	6.56	0.1297,NS
30 min after induction	72.16	9.72	75.64	8.29	0.0544,NS

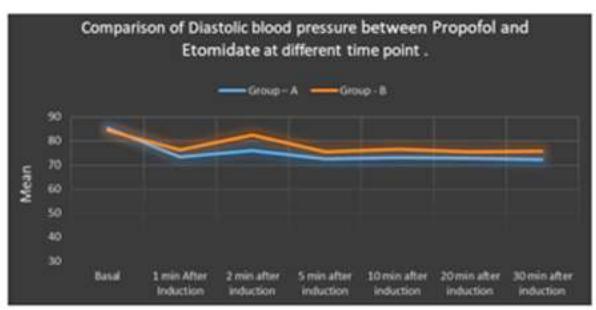

Fig. 3: Showing changes in Mean Diastolic Blood Pressure (DBP) at different time intervals between Group A and Group B.

The DBP in group A and group B decreased by 12.22 mm and 8 mm of Hg Respectively after induction with significant p-value. Two minute after intubation fall in DBP in group A by 9.42 and in group B by 1.92 mm of Hg which remains statistically significant. Changes in DBP in group A and group B, after 5 minutes of intubation starts settling with no statistically significant changes at 5min, 10 min, 20 min and 30 min after intubation. The fall in DBP after induction is more with Group A than Group B. (pvalue<0.05). At 5 mins, 10 mins, 20min, 30 min after intubation changes are not significant. (p value> 0.05).

Table 5: Comparison of Mean arterial pressure between Propofol and Etomidate

Time	Group – A		Group - B		p-value
	Mean	SD	Mean	SD	
Basal	101.26	11.16	99.26	7.02	0.2866,NS
1 min After Induction	86.29	6.04	89.86	3.41	0.0004, HS
2 min after `induction	89.25	7.88	95.73	5.19	<0.0001, HS
5 min after induction	87.38	8.68	92.85	7.47	0.0010, HS
10 min after induction	85.05	9.08	90.93	7.52	0.0007, HS
20 min after induction	85.27	9.25	89.38	6.06	0.0100, S
30 min after induction	85.2	9.63	89.84	6.54	0.0058, HS

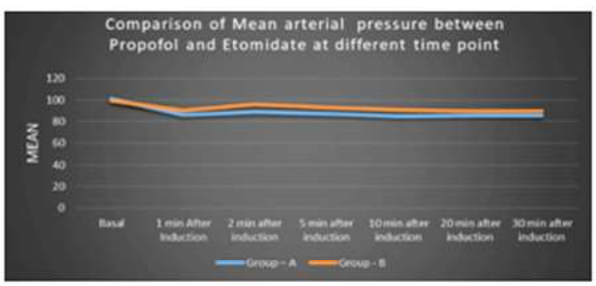

Fig. 4: Showing changes in Mean Arterial Pressure (MAP) at different time intervals between Group A and Group B.

The MAP in group A and group B decreased by 14.97 and 9.4 mm of Hg respectively after induction with significant p-value. Two minute after intubation fall in MAP in group A by 12.01 and in group B by 3.53 mm of Hg. Changes in MAP between group A and Group B remains statistically significant at 2 min, 5min, 10 min, 20min and 30 min after intubation. The significant fall in MAP is more with Group A thanGroup B. (p value <0.05).

DISCUSSION

The cardiovascular effects of Propofol have been evaluated after its use for induction and for maintenance of anesthesia. The most prominent effect of Propofol is a decrease in arterial blood pressure during induction of anesthesia.[9]

Heart rate does not change significantly after an induction dose of Propofol. Propofol either may reset or may inhibit the baroreflex, reducing the tachycardic response to hypotension.[2] The most common side effect during induction of anesthesia is hypotension, which is augmented by the concomitant administration of opioids.[10]

The properties of Etomidate include hemodynamic stability, minimal respiratory depression, cerebral protection, and pharmacokinetics enabling rapid recovery.[9]

Ram Kaushal et al (2015) study, baseline HR for Inj. Propofol group was 91.03±2.07 and for Etomidate group 80.66±23. After induction, HR with Propofol was 88.53±18.2 and for Etomidate group 80.6±12.92 with p-value<0.056 which is not significant. It shows fall in HR by 2 bpm with Propofol induction and no change in HR for Etomidate induction.

After intubation HR was 96.93±20.34 with Propofol induction and 85.83±23.53 with Etomidate induction with p-value= <0.0501 which is not significant. Similarly, 5 min after intubation results between 2 groups are not significant with p value 0.119.65.

After induction SBP with Propofol induction was 80.63±8.63 and for Etomidate group 98.5±14.73 with p-value<0.001. It shows fall in SBP in both groups but more with Propofol induction.

After intubation SBP was 86.53±15.65 with Propofol induction and 103.4±12.286 with Etomidate induction with p-value= <0.001 which is significant

Similarly, 5 min after intubation SBP was 95.86±3.51 for Propofol and 103.7±6.22 for Etomidate with p-value= <0.001, which is significant.

Baseline DBP for Inj. Propofol group was 73.93±11.41 and for Etomidate group 72.53±8.16.

After induction DBP with Propofol induction was 59.7±7.28 and for Etomidate group 69.4±8.2 with p-value=0.007. It shows fall in DBP in both groups but more with Propofol induction. This study finding is similar to our study finding after induction.[11]

After induction MAP with Propofol induction was 67.97±5.79 and for Etomidate group 80.54±9.39 with p-value<0.001. It shows fall in MAP in both groups but more with Propofol induction. After intubation MAP was 72.79±5.54 with Propofol induction and 82.07±7.09 with Etomidate induction with p-value= <0.001 which is significant. Similarly, 5 min after intubation MAP was 76.46±3.47 for Propofol and 82.05±3.92for Etomidate with p-value= <0.001, which is significant. This study finding is similar to our study finding.[11]

Anil K. Pandey et al (2012), study on, The Effects of Etomidate and Propofol Induction on Hemodynamic and Endocrine Response in Patients Undergoing Coronary Artery Bypass Graft Surgery on Cardiopulmonary Bypass. In their results at 5 min post induction, Heart rate (per min) for Etomidate (73.66 ± 16.36) and Propofol (75.46 ± 17.09) with P value = 0.77. Heart rate changes between two groups were not statistically significant with p -value >0.05, similar to our study.

At 5 min post induction, systolic blood pressure (mm of Hg) for Etomidate (120.2 ± 17.11) and Propofol (99.66 ± 10.86) with P value = 0.0005.

5 min post induction, diastolic blood pressure (mm of Hg) for Etomidate (72.66 ± 10.34) and Propofol (59.8 ± 8.92) with P value = 0.0011.

They found systolic blood pressure, the diastolic blood pressure, were significantly different the two groups at five minutes post induction and were statistically significantly, lower in the Propofol group.[12]

A. Criado et al (1980), noticed HR increased significantly after administration of Etomidate. Heart rate (beat/min) basal was 83.1. 3 minute after induction it was 91.5 and 10 minute after induction it was 87.5 that is increase in 8.4 and 4.4 bpm respectively. In our study there is no change in HR after induction with Etomidate.

They noticed 18 mmHg decrease in SBP, 10 mmHg decrease in MAP and 6 mmHg decrease in DBP after induction with Etomidate.

In our study also there is fall in systolic blood pressure and diastolic blood pressure after Propofol is more than Etomidate similar to above studies.[13]

Gooding JM (1979) gave 0.3 mg/kg of Etomidate to cardiac patients for noncardiac surgery resulted in almost no change in heart rate, MAP, mean pulmonary artery pressure, pulmonary capillary wedge pressure, central venous pressure, stroke volume, cardiac index, and pulmonary and systemic vascular resistance.[14]

CONCLUSION

We conclude that Etomidate provides more stable haemodynamic parameters (SBP, DBP and MAP) when used for induction of anesthesia whereas Propofol produced a significant fall in systolic and diastolic blood pressure and Mean arterial pressure after induction. Heart rate changes were not significant between the two groups.

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Original Article

Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.3

Comparison of Dexmedetomidine Versus Fentanyl as an Adjuvent to Epidural Ropivacaine in the Patient Undergoing Lower Limb, Lower Abdomen Surgery

Anuj Goyal[1], Chetan Shukla[2], Vijeta Khandelwal[3]

How to cite this article:

Anuj Goyal, Chetan Shukla, Vijeta Khandelwal/Comparison of Dexmedetomidine Versus Fentanyl as an Adjuvent to Epidural Ropivacaine in the Patient Undergoing Lower Limb, Lower Abdomen Surgery/Indian J Anesth Analg. 2022;9(5)233-237.

Abstract

Background: Ropivacaine, the pure S enantiomer of propivacaine, due to its less lipophilicity than bupivacaine does not produce cardiotoxicity or neurotoxicity and causes less motor blockade. Dexmedetomidine the newer selective alpha 2 adrenergic agonist has several advantages when given through epidural route as a neuraxial adjuvant.

Aim: To compare 0.75% Inj. Ropivacaine with Inj. Fentanyl and 0.75% Inj. Ropivacaine with Inj. Dexmedetomidine epidurally for the duration of analgesia, hemodynamic changes, degree of motor blockade and occurrence of side effects.

Materials and Methods: 60 patients undergoing lower limb, lower abdomen surgeries were randomized to two groups. Group RF (n=30) received 0.75% Inj. Ropivacaine 15 ml with Inj. Fentanyl 1 mcg/kg in 2 ml preparation. whereas Group RD (n=30) received 0.75% Inj. Ropivacaine 15 ml with Inj. Dexmedetomidine 1 mcg /kg in 2ml preparation. Quality of sensory block, motor block, pulse rate, blood pressure, pain assessment and any adverse outcome were noted.

Results: Dexmedetomidine fastens the onset of analgesia, prolongs the duration of analgesia thereby reducing the doses of rescue analgesics post operatively, improves the quality of motor blockade without aggravating changes in haemodynamic parameters and has less adverse effects.

Conclusion: We conclude that dexmedetomidine serves as a good neuraxial adjuvant when added to 0.75% ropivacaine in epidural anesthesia given for lower limb, lower abdomen surgery.

Keywords: Ropivacaine; Dexmedetomidine; Fentanyl; Neuraxial adjuvant.

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Received on: 24.04.2022

Accepted on: 28.05.2022

INTRODUCTION

Epidural anesthesia is the most commonly used technique for providing perioperative surgical anesthesia as well as postoperative analgesia in lower abdominal surgeries and lower limb surgeries. Epidural anesthesia reduces the surgical stress by blocking the nociceptive impulses from the operative site and also reduces the blood loss, improve respiration and bowel function and decreased incidence of deep vein thrombosis.[1,2]

Ropivacaine is a long acting local anesthetic agent with lower systemic toxicity. Ropivacaine has lowest potential risk of cardiotoxicity for accidental intravenous injection. Ropivacaine has lesser propensity of motor block during postoperative epidural analgesia.[3,4]

Opioids like fentanyl have been used traditionally as an adjunct for epidural administration in combination with a lower dose of local anesthetic to achieve the desired anesthetic effect.[5] Fentanyl, when added to ropivacaine in epidural, confers better analgesia and lesser systemic toxicity. Dexmedetomidine is a class of alpha-2 agonist which decreasing the sympathetic outflow and nor-epinephrin release causing sedative, anti-anxiety, analgesic, sympatholytic and haemodynamic effects.[6-8]

The purpose and aim of the present study was to compare fentanyl versus dexmedetomidine with 0.75% ropivacaine for epidural in lower limb, lower abdomen surgery.

MATERIALS AND METHODS

After obtaining institutional ethical committee's approval patient were explained about the anesthesia technique and written informed consent was taken. This randomized double blind study was conducted on sixty patient on ASA grade I & II, aged between 18 to 60 year age, who were to be operated for lower limb, lower abdomen surgery, of duration about 1 to 2 hours.

All patients in this study was subjected to thorough checkup. Complete general physical examination, investigation and ASA grading was done. The purpose and procedure was explained to the patients. Visual Analogue Score (VAS) for pain assessment was also explained to the patients. This double blind study was conducted on 60 patients who were randomly divided into 2 groups of 30 patients each:

Group RF (n=30): Patients were administered 15 ml ropivcaine 0.75%plus fentanyl (1mcg/kg) in 2 ml preparation.

Group RD (n=30): Patients were administered 15 ml ropivacaine 0.75% plus dexmedetomidine (1mcg/kg) in 2ml preparation.

After arrival of patient into operation theatre, routine monitoring of non-invasive blood pressure, heart rate, electrocardiogram (ECG), and pulse oximetry was started. An intravenous line was established with 18G cannula to preload the patient with Ringer lactate solution at rate of 10 ml.kg-1 before the initiation of epidural block. Under all aseptic condition, epidural anesthesia was administered in the sitting position at L 3-4 or L 4-5 interspace with an 18-G Tuohy needle by loss of resistance technique. With the bevel of the Tuohy needle in cephalic direction, an epidural catheter was inserted 5 cm into epidural space and secured. The position of catheter was checked by aspiration for blood or CSF. A test dose of 60 mg lidocaine containing 1:200,000 epinephrine, was administered to detect intrathecal or intravenous injection and patients turned to supine position. After 3 minutes the patients received study solution according to randomization schedule at rate of 3 ml/10 seconds by epidural catheter.

Intra operatively all the vital parameter were recorded at 1, 5, 10, 15, 20, 30, 40, 50, 60, 90, 120 minutes.

In the postoperative room, all the vitals and haemodynamic parameters were recorded at 0, 3, 6, 12, 18, 24 hrs. Postoperative pain was managed by top-up doses of 8 ml of 0.2% ropivacaine through epidural catheter.

The patients were interviewed after 1 day of surgery. The response of the patient to whole procedure was graded using three point scale.

1= Good

2= Fair

3= Poor

Statistical analysis was done using student t test and chi-square test. A p value < 0.05 was considered as significant.

RESULTS

The demographic data were comparable between the two groups (Table 1). The onsets of the sensory block and motor block were significantly earlier in group RD as compared to group RF (p value <0.05) (Table 1).

Table 1: Patients variables

Parameters	Group RD	Group RF
Age (years)	44.76±1 45.93	0.92 ±11.34
Weight (kg)	58.56±6. 32	59.03±6. 34
Sex (M:F)	9 : 21	12 : 18
Onset of sensory block (min)	9.83±1.93	11.36±2.15
Onset of motor block (min)	17.23±3.36	19.66 ±3.8
Duration of motor block (min)	276.56±19.41	189.33.33± 16.85
Duration of analgesia (min)	354.6 ±25.3	230.53±26. 49

Values are Mean±SD or number

Onset and peak of sensory & motor blockade was faster in group RD as compare to group RF. Duration of sensory & motor blockade was longer in group RD than in group RF. Prolonged duration of analgesia was observed in group RD than Group RF. In 24 hr post block period consumption of rescue analgesic was significantly lower in RD group than in group RF. Sedation was higher in group RD than group RF.

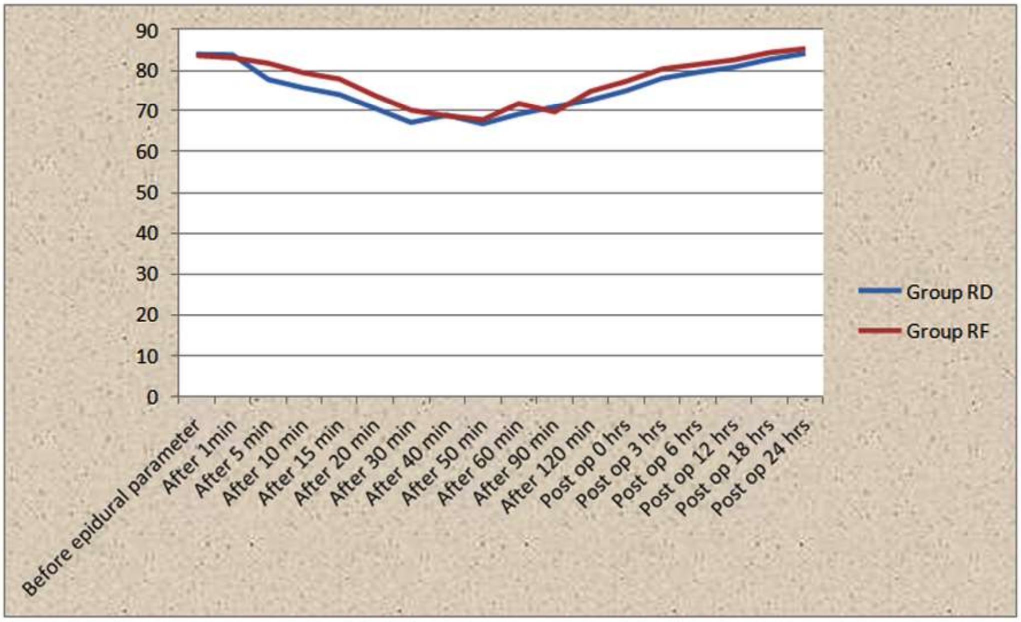

Fig. 1: Pulse rate per min.

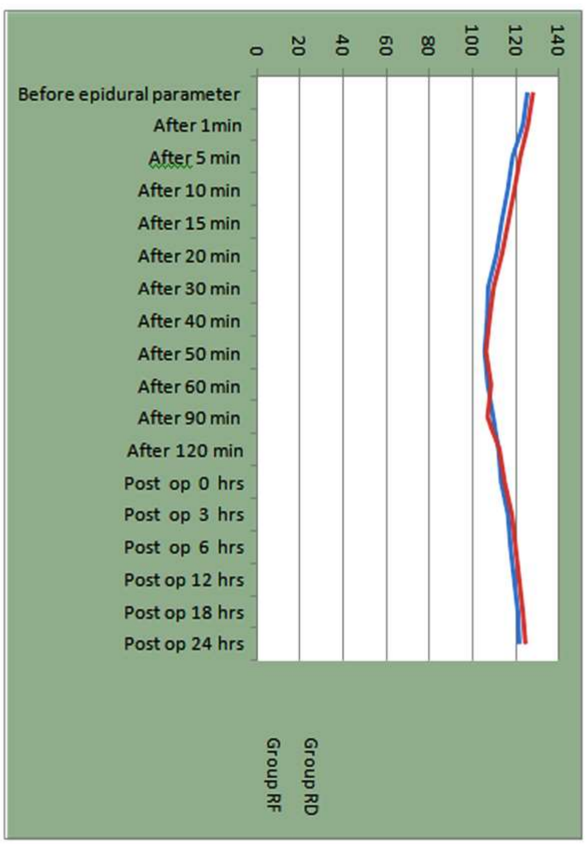

Fig. 2: Intra and post-operative mean Systolic blood pressure`(mmHg).

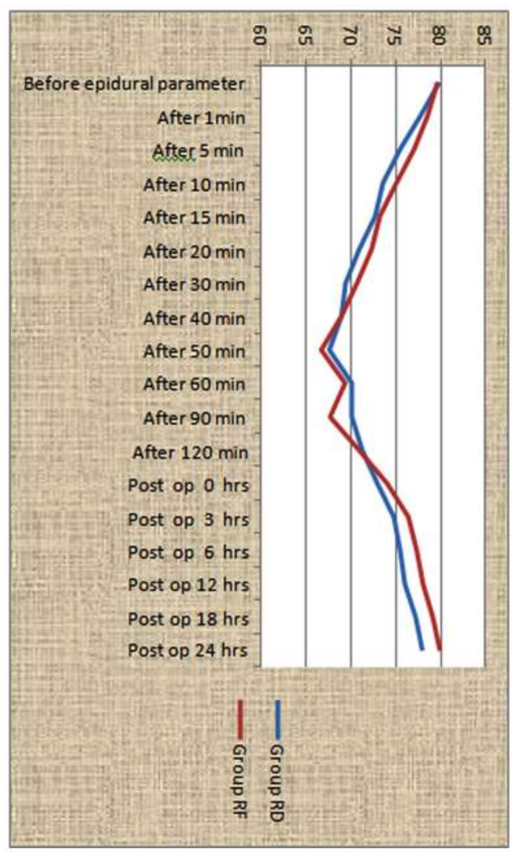

Fig. 3: 12 Intra and post-operative Diastolic blood pressure (mmHg).

The VAS score was more decreased and remained significantly at low level in group RD as compared to group RF after the block & difference was statistically significance (P<0.05), fall in pulse rate, SBP, DBP was much more in RD group than RF group and remained significantly low (P<0.05). Hemodynamical stability was seen in both groups but patients in group RD were more stable than group RF. No significant side effects or complications were seen in both groups.

Table 2: Intra-operative sedation scores

Sedation scale point	Group RD		Group RF	
	No. of Patients	Percentage	No. of Patients	Percentage
1	3	10	22	73.33333
2	12	40	5	16.66667
3	13	43.33333	3	10
4	2	6.666667	0	0
5	0	0	0	0
Total	30	100	30	100

Sedation score 3 was observed in 43.33% of patients in group RD in comparison of 10% of patients in group RF. Sedation score 1, was observed in 73.33% of patients in group RF in comparison of 10% of patients in group RD. The difference was significant statistically (p<0.05).

DISCUSSION

Epidural anesthesia is a central neuraxial block technique can be used as an anesthetic, as an analgesic adjuvant to general anesthesia and for post- operative analgesia involving the lower limbs, perineum, pelvis, abdomen and thorax.

Epidural administration of Alpha-2 adrenergic agonists is associated with sedation, analgesia, anxiolysis, hypnosis and sympatholysis. The faster onset of action of local anesthetics, rapid establishment of both sensory and motor blockade, prolonged duration of analgesia into the post-operative period, dose sparing action of local anesthetics and stable cardiovascular parameters makes these agents a very effective adjuvant in regional anesthesia.

All patients selected in the study belonged to age between 18 and 60 years. No statistically significant difference between the groups with regard to age (P=0.67)

There was even distribution of weight in the two groups no statistically significant difference between the groups with regard to weight (P=0.77

In our study 30% were male and 70% female in group-RD. There were 40% males and 60% females in group-RF.

Our study showed onset of sensory loss (T10) was faster in group RD than in group RF. The difference was statistically significant (P<0.05). These results coincide with the studies done by Gill RS et al (2016).[9]

In our study onset of complete motor blockage dexmedetomidine to ropivacaine result early onset of motor block as compared with fentanyl and the difference was statistically significant (P<0.05).

Duration of analgesia longer in group RD as compared to group RF (P < 0.001). The result of our study coincides with Shah PJ et al (2017)[10] and Gill RS et al (2016)[9] and Korat R et al (2017).[11]

Total duration of analgesia was longer in group RD (354.6± 25.3) as compared to group RF (230.56± 26.49). There was less requirement of dose of ropivacaine used over 24 hrs. In group RD as compared to group RF.

Mean duration of motor block in group RD was 276.56± 19.41 min and in group RF 189.33±16.85 min. The difference was highly statistically significant (P<0.001). The results of our study were in accordance with study done by Bajwa SS et al (2011)[12] who compared ropivacaine+ dexmedetomidine and ropivacaine + fentanyl administered epidurally also coincide with studies of Shah PJ al (2017).[10]

The results of our study clearly indicate the effectiveness of epidural dexmedetomidine as mean sedation scores were significantly higher as it produced profound sedation in 43.33% of patients. our study coincides with Bajwa SS et al (2011).[12] They found mean sedation scores in dexmedetomidine group much higher and statistically highly significant as compared with fentanyl group.

Fall in BP and PR was significantly higher in group RD in comparison to group RF and difference was statistically significant (P<0.05) up to 30 min. Vasopressor received by 6 patients in group RD and 1 patient in group RF due to hypotension.

The results of our study were in accordance with study done by Bajwa SS et al (2011)[12] who compared ropivacaine + dexmedetomidine and ropivacaine + fentanyl administered epidurally and found that both additives causes fall in blood pressure and heart rate but do not make patients haemodynamically unstable.

Results also coincide with studies of Gill RS et al (2016).[9] They found that maximum decrease of heart rate and MAP from base line at 30-35 min after the epidural injection of the drugs. Shah PJ et al (2017)[10], found that the fall in HR and mean SBP from baseline was significant at 5 min and 10 min interval after injecting epidural drug in boththe Groups ($p < 0.0001$).

Quality of analgesia was much better in patients who had dexmedetomidine as an adjuvant to ropivacaine as evident by early onset and prolonged duration of effective analgesia along with less requirements of rescue analgesics.

CONCLUSION

To conclude dexmedetonidine epidurally with ropivacaine significantly prolongs duration of sensory and motor blockade and duration of analgesia. Dexmedetomidine is a better adjuvant than fentanyl in epidural anesthesia as far as patient comfort, stable cardio-respiratory parameters, intra-operative and post-operative analgesia is concerned.

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Case Report

Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.4

Anesthetic Management of Bilateral Neck of Femur Fracture for Bilateral Hip Arthroplasty with CKD and Seizure Disorder

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How to cite this article:

Sai Yashaswini Gorle, N Kiran, Shri Eshwari, et. al./Anesthetic Management of Bilateral Neck of Femur Fracture for Bilateral hip Arthroplasty with Ckd and Seizure Disorder/Indian J Anesth Analg. 2022;9(5)239-241.

Abstract

In elderly hip fractures are common presentations which require surgical intervention. These patients have increased morbidity and mortality due to associated comorbidities like renal, cardiac, respiratory, endocrine or neural diseases. Chronic kidney disease is one of the common complications of long standing uncontrolled hypertension and diabetes mellitus. Patients with CKD are exposed to an increased risk for adverse outcomes and further perioperative injuries resulting from hemodynamic instability, hypovolemia, or drug toxicity, each of which has the potential to aggravate renal dysfunction, ultimately leading to end stage renal disease, and reduced long-term survival. It is estimated that there are approximately 7.85 million chronic renal failure patients in India.[1] Diabetes mellitus and hypertension reaching epidemic proportion in urban population and chronic kidney disease being inevitable in long standing untreated cases, providing anesthesia to patients with chronic kidney disease poses a challenge.

Case Report: A 48yr old male presented with bilateral neck of femur fracture following fall from height and was planned for bilateral hip arthroplasty. Patient is a known case of CKD on maintenance haemodialysis. He is also a known hypertensive, diabetic and seizure disorder on treatment. Patient has underwent epidural anesthesia.

Conclusion: We present a successful anesthetic management of a dwarf patient with bronchial asthma and hypothyroidism who underwent hysterectomy. We emphasize the risk of neurological injury while extending the neck during laryngoscopy for tracheal intubation due to anatomical abnormalities in these patients. A detailed pre anesthetic evaluation evaluation and planning is utmost important and the anesthetic technique has to be individualized based on the patients anatomical characterstics and associated co-morbidities.

Keywords: CKD; Spinal anesthesia; neck of femur fracture.

Key Messages: CKD has its own complications. Ongoing GA may cause further damage to kidney and aggravate metabolic acidosis, as metabolism of drugs is impaired. Spinal anesthesia may cause hypotension, which may cause ill effects on heart. Continuous spinal or epidural anesthesia can be used.

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Received on: 26.05.2022
Accepted on: 28.06.2022

INTRODUCTION

In elderly hip fractures are common presentations which require surgical intervention. These patients have increased morbidity and mortality due to associated comorbidities like renal, cardiac, respiratory, endocrine or neural diseases. Chronic kidney disease is one of the common complications of long standing uncontrolled hypertension and diabetes mellitus. Patients with CKD are exposed to an increased risk for adverse outcomes and further perioperative injuries resulting from hemodynamic instability, hypovolemia, or drug toxicity, each of which has the potential to aggravate renal dysfunction, ultimately leading to end-stage renal disease, and reduced long-term survival. Spinal anesthesia provides nerve blockade in a large part of the body during surgery with a smaller dose of local anesthetic and shorter surgery onset time. However, spinal anesthesia may lead to adverse haemodynamic changes, such as severe and prolonged hypotension in high-risk patients. Continuous spinal anesthesia (CSA) provides extending blockade during surgery and versatile pain management during the postoperative period via an indwelling catheter, allowing intermittent injection of local anesthetic into the subarachnoid space. Better cardiovascular stability, less local anesthetic requirement, better control of anesthesia level and lower risk of local anesthetic toxicity were reported in the CSA technique compared with a single dose spinal anesthesia technique.[3] We reported a high risk patient who underwent successful hip fracture surgery under CSA.

Case Report A 48 yr old male presented with bilateral neck of femur fracture following fall from height and was planned for bilateral hip arthroplasty. Patient is a known case of CKD on maintenance haemodialysis. He is also a known hypertensive, diabetic and seizure disorder on treatment. patient had history of breathlessness and reduced urine output since 3 days prior to fall.

On general physical examination patient was disoriented and tachypneic. He was pale and had bilateral pedal edema. His vital parameters were checked which revealed respiratory rate of 28/min, SpO_2 90% on room air. On respiratory auscultation bilateral crepts were present. He was resuscitated and was kept on bipap support for pulmonary edema.

Laboratory investigations were haemoglobin 7.6 gm/dL, platelets - 247,000/mm3, WBC–9000/mm3, Blood urea–96 mg /dL, serum creatinine 6, sodium-127, potassium–5.6, ECG showed sinus tachycardia with tall t waves 2decho showed–concentric LVH, trivial MR/AR, Trivial TR, Normal systolic function LVEF =60%, CXR showed kerley B lines and pulmonary congestion.

In preoperative evaluation patient had features of mild pedal edema. History of seizures was ruled out as there was no resting tachycardia, orthostatic hypotension, no variation of heart rate on deep breathing. His lab investigations were serum creatinine 6 milligram per deciliter (mg/dl), blood urea 108mg/dl, serum sodium 126mili equivalents per liter (mEq/L), serum potassium 5.3mEq/L, Rest of the investigations - complete blood count, coagulation profile, electro cardiogram (ECG) - Tall t waves, sinus tachycardia and echocardiography - concentric LVH. He was on medications Tablet clinidipine 10mg bd, prazosin 2.5 mg bd, metoprolol 25 mg bd, levipil 500 mg. Had a history of blood transfusion, his daily fluid intake was restricted to a total of 1.5 liters and his daily urine output was in between 1.5 to 1.7 liters., heart rate of 86 bpm: blood pressure of 116 /74 mm hg, respiratory rate of 22cpm and saturation of 94%.

Plan of Anesthesisa- Epidural anesthesia[1] Two 18 Gauge intra venous cannula was inserted in the right and left dorsum of hand and 500 cubic centimeters (cc) of 0.9% normal saline was used for preloading. Midline approach was adopted with patient in sitting position, L2-L3 inter space was entered and epidural space identified by loss of resistance to air. 2 (ml) glass syringe was connected and negative aspiration was confirmed for blood and cerebrospinal fluid. Epidural catheter inserted and fixed at 9 centimeter (cm) to skin. Space was confirmed by a test dose containing lidocaine with adrenaline 2%(1 in 2, 00, 000). A bolus injection of 10 cc bupivacaine 0.5% and 2 cc 100 microgram (µg) of fentanyl-a total of 12 cc injected in supine position, a sensory level till T8 was achieved. Monitoring- ECG, heart rate (HR), non-invasive blood pressure (NIBP), pulse oximeter, central venous pressure (CVP), urine output, random blood sugar and arterial blood gas monitoring were done (Total duration of surgery was 4 hour. Urine output intraop-410. Total fluids-normal saline 2000 ml Blood sugar was 87 mg/dl intra operatively. Plan A was to give epidural anesthesia and plan B is continuous spinal.

DISCUSSION

Regional anesthesia like epidural can also be considered I in these patients if coagulation profile is not deranged. In case of general anesthesia drug toxicity may be present due to altered drug clearance, most of the drugs could be nephrotoxic. EChronic kidney disease is defined as either a glomerular filtration rate (GFR) less than 60ml/min/1.73m2 for 3 months or a kidney damage leading to decrease in glomerular filtration rate present for 3 months or more. 2 Chronic kidney disease is divided into 5 stages. In a study which included pediatric age group, posted for renal transplantation the authors concluded that epidural anesthesia maintained good kidney function better than general anesthesia.[10] A study on patients with peri-operative kidney dysfunction posted for total hip replacement concluded that epidural anesthesia when carefully managed does not appear to predispose chronic kidney disease to acute renal failure.[3] Postoperative epidural opioid analgesia obviated the need for oral/parenteral analgesics and their effects on the compromised renal organ system. Proper understanding of organ system dysfunction, nature of surgical procedure, choice of anesthetic technique and maintenance of vital parameters in normal range perioperatively all contribute to successful management of patients with complex medical problems undergoing procedures. Although there are patients with chronic kidney disease for whom the benefits of general anesthesia outweigh the risks, regional anesthesia can be offered to select patients where general anesthesia carries more risks, but with a careful analysis of individual patients.[4]

CONCLUSION

Regional anesthesia avoids poly pharmacy and thus reduces the risk of patient needing hemodialysis in the immediate post-operative period and thus can be considered as anesthesia of choice for patients with chronic kidney disease.[5]

Conflict of Interest: NIL

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Case Report

Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.5

Total Hip Replacement in a Case of Ankylosing Spondylitis: Anesthetist's Preparedness

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How to cite this article:

Sakshi Kadian, Sharadha M, Praveen Talwar/Total Hip Replacement in a Case of Ankylosing Spondylitis:Anesthetist's Preparedness/Indian J Anesth Analg. 2022;9(5)243-245.

Abstract

Ankylosing Spondylitis is an autoimmune seronegative spondyloarthropathy which manifests as a relapsing remitting disease. Since the disease involves the spine, it becomes significant for anesthesiologists as ensuring airway control in general anesthesia, and regional neuraxial blockade becomes difficult. Hence the anesthesiologist should be prepared beforehand with the anesthesia plan and the backup plan if the primary plan fails. In this report, we highlight the anesthetic management of a 66 year-old male who was a known case of ankylosing spondylitis and was planned for a total hip replacement

Keywords: Ankylosing Spondylitis; Anesthesiology; Remission; Neuraxial blockade; Epidural anesthesia; Hip replacement.

INTRODUCTION

Ankylosing spondylitis, also known as Bechterew disease, is an autoimmune seronegative spondyloarthropathy. It manifests as periods of relapse of painful exacerbations ('flares') and periods of pain free remissions. It mainly involves the sacroiliac joint and vertebra, but peripheral arthritis and enthesitis can also be there. It is common in males with a high proportion carrying tissue type antigen HLA B27.[1] The clinical manifestations usually are backache, joint stiffness, and possibilities of spinal cord compression and atlantoaxial subluxation. When painful degenerative changes occur in the hip, total hip arthroplasty (THA) has been shown to alleviate pain and improve function in AS patients.[2] Due to the involvement of the spine, regional anesthesia with spinal or epidural technique is usually difficult in these patients. Also, securing the airway by tracheal intubation can be challenging because the stiff neck and temporomandibular joint involvement render it further difficult. We report anesthetic difficulties in a geriatric patient with ankylosing spondylitis and anesthetist preparedness to manage the same.

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Received on: 27.06.2022

Accepted on: 29.07.2022

CASE REPORT

A 66 year-old male presented with a complaint of pain in the right hip for the past two months. The pain started following an accidental fall due to slipping on the floor, leading to a fracture of the neck of the right femur. The pain was severe enough to restrict the patient's mobility. He had a history of cervical ankylosing spondylitis for the last

30 years, causing complete restriction of his neck movements. However, the patient was not on any DMARDs (Disease-modifying drugs). He also had hypertension for the last 15 years, for which he was taking amlodipine 10mg once daily. There was no other significant history. All the blood investigations were within normal limits. The cardiac evaluation was done to rule out any involvement and was found normal. Also, pulmonary function tests were done to rule out any restrictive pathology, and they were observed to be within normal limits. The patient was planned for a suitable total hip replacement. On radiological evaluation patient had a 'Bamboo spine", and all the cervical, thoracic and lumbar vertebrae were fused (Fig. 1). Thus we anticipated that inserting an epidural catheter for intraoperative and postoperative pain management would be difficult. Therefore we decided to keep general anesthesia with a definitive airway as the backup plan. On airway examination, the neck mobility was restricted (Fig. 2, 3); hence difficult endotracheal intubation was anticipated, and preparedness to manage it was done. The informed written consent was taken from the patient after discussing the anesthetic management plan for the surgery with risks explained in his local language. After confirming the fasting status, the patient was taken to the operation room on the day of surgery. We decided to attempt epidural catheter insertion, but as expected, we couldn't as the spine was completely fused. Then we decided to do awake endotracheal intubation. The patient was explained the same in the local language. The patient was rested on two pillows below the shoulders as he couldn't lie supine. We did bilateral superior laryngeal nerve block with 2 ml of 2% lignocaine and instilled 2 ml of 4% lignocaine intratracheally. Injection glycopyrrolate 0.2 mg intravenous (i.v) and fentanyl 40mcg i.v were given, and 100% oxygen was applied via nasal prongs at a rate of 8 litres/minute. We secured the airway with a fibreoptic bronchoscope on the first attempt. After confirming the endotracheal placement with end-tidal carbon dioxide and on auscultation, injection propofol 70mg, injection fentanyl 100mcg and 8mg of injection vecuronium i.v were given, and anesthesia was maintained with oxygen/air and sevoflurane. Proper padding of all the pressure points was done to prevent neurological injury. The intraoperative course was uneventful. Upon completion of the surgery, extubation was done after the patient gained full consciousness and had good airway reflexes. The postoperative period was uneventful.

Fig. 1: Xray of the lumbar spine and hip joints- shows 'Bamboo lumbar spine'.

Fig. 2: Xray of the cervical spine showing fusion of the spine

Fig. 3: Shows the fixed position of the neck of the patient

DISCUSSION

Ankylosing spondylitis is a chronic inflammatory disease for which patients usually present for joint replacement of knee or hip joints. The presence of syndesmophytes and enormous annular fibrous ossification leads to a classic 'bamboo spine appearance. Due to the ossification of ligaments, continuous bony bars lead to spinal rigidity. This is especially important to anesthesiologists as it hinders both the regional anesthetic techniques due to difficulty in epidural or spinal needle placement, especially in the midline; also for the general anesthesia since taking control with definitive airway devices is difficult as neck mobility is restricted in these patients owing to cervical spine involvement. Stiffness of the cervical spine, atlantooccipital, temporal-mandibular, and cricoarytenoid joints may cause problems with tracheal intubation.[3] Several anesthesia textbooks consider any form of anesthesia, whether general or regional, hazardous despite reports of the successful use of caudal epidural anesthesia.[4,5]

A strong association has been found between the genetic marker HLA-B27 and AS. The incidence of HLA-B27 is less than one per cent in the general population, whereas it is present in more than 85% of patients with AS.[4]

There could also be extraarticular involvement in AS significantly because cost over tebral involvement could restrict ventilation, thus reducing lung capacities. Hence all patients should have preoperative pulmonary function tests to determine their lung capacities and compliance. Other extraarticular involvement can involve ocular, cardiac, neurological and other systemic involvements like amyloidosis.

It is essential to look for central and peripheral neuropathies and provide proper cushioning of the pressure points to avoid any new peripheral nerve injury. Considering all these factors, it is essential to have the algorithm for an anesthetic plan beforehand. The determining factors which impact the decision like upper airway involvement, any restrictive lung disease due to AS, the cardiac status of the patient and the extent of spine fusion.

The first step of taking a patient to the operating table can be challenging for these patients, as they cannot lie supine if there is extensive spine involvement like this patient. In such cases, back support with multiple pillows is necessary. Since it was lower limb surgery and also due to the excruciating pain patient is expected to have, the regional anesthetic technique would have been the ideal plan. Still, the massive extent of spinal fusion hindered our plan. Regional anesthesia may be technically challenging owing to limited joints mobility and closed interspinous spaces, although ossification of the ligamentum flavum is uncommon in these patients.[6, 7, 8]

If the spine involvement is extensive, as in this patient, awake fibreoptic endotracheal intubation is the modality of choice as excessive cervical spine manipulation can cause spinal cord injury. But this needs the patient's cooperation and hence patient should be counselled and explained in detail all the steps. Another crucial part in this patient is monitoring the compliance of the lungs intraoperatively as it can alter the outcome if not appropriately managed.

CONCLUSION

To conclude, the anesthetic considerations that should be considered in patients with ankylosing spondylitis are anticipated difficult airway access, cardiovascular involvement, any preexisting neuropathies and difficulty in neuraxial anesthesia.

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Case Report

Indian Journal of Anesthesia and Analgesia
Volume 9 Number 5 September-October 2022
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.9522.6

Anesthetic Challengesin Ankylosing Spondylitis Patient with Multiple Comorbidities Posted for Surgery Under Neuronavigation

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How to cite this article:

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Abstract

Ankylosing spondylitisis a chronic, progressive autoimmune inflammatory disorderaffecting the musculoskeletal system, can have large spectrum of underlying comorbidities. The multisystem involvement with Ankylosing spondylitis and Parkinson's disease has its own characteristic involvement of organs. Here is a case report of association of Ankylosing Spondylitis and Parkinson'sdisease with multiple comorbidities involving various other systems and anesthetic management of the same when he was scheduled for thoracic spine surgery for D9-D10 fracture under neuro-navigation in a prone position.

Keywords: Ankylosing spondylitis; Parkinson's disease; Multiple comorbidities; spine surgery.

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic, progressive autoimmune inflammatory disorder affecting the musculoskeletal system. It is most common in males, with a high proportion carrying tissue type antigen HLA B27.[3] Progression of the disease results in the development of fused, immobile spine. Organs commonly affected by AS, other than the axial spine and joints include Heart, lungs, colon, and kidney.

Patients with Ankylosing Spondylitis and Parkinson's disease with multiple comorbidities present specific challenges to the anesthesiologist. The involvement of cervical spine by AS restricts the neck mobility and present with difficult airway. Cardiovascular complications are present in up to 3.5% of patients after 15 years of AS, and 10% after 30 years.[5] Involvement of pulmonary and cardiovascular systems and other autoimmune disease increases the anesthetic risk.

Parkinson's disease is a chronic, progressive neurodegenerative disorder. It affects approximately 3% of the population over 66 years of age. They often have postural instability, brittle and osteopenicbones[1], making positioning difficult. Upper airway abnormalities and Restrictive lung disease secondary to chest wall rigidity are often seen. Drugs used in anesthesia may interact with anti-parkinsonian medication making the perioperative anesthetic management challenging.

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Received on: 26.05.2022

Accepted on: 28.06.2022

Here we report a successfully managed case of elderly patient with Ankylosing Spondylitis and Parkinson's disease with multiple comorbidities such as Hypertension, Type 2 Diabetes Mellitus, Bronchial Asthma, Hypothyroidism and Coronary artery disease with stent in situ, diagnosed with D9-D10 thoracic spine fracture for Posterior Instrumentation and fixation under neuro-navigation in prone position.

CASE REPORT

A 62 year old male, ASA grade III had a history of fall and presented with back pain and difficulty in walking. He had history of Ankylosing spondylitis for 25 years with cervical Spondylitis and severe restricted neck movement and neck in fixed flexed position. He had history of Hypertension, Hypothyroidism, and type 2 Diabetes Mellitus on treatment. He also had Bronchial Asthma for 20 years, on salbutamol inhaler on and off and Coronary artery disease for which he had undergone Percutaneous Transluminal Coronary Angioplasty (PTCA) insertion. He was diagnosed with Parkinson's Disease 2 years back and on anti-parkinsonian medications for 5 months. MRI revealed cervical spondylitis with fusion of vertebra (Fig. 1) and the thoracic vertebra fracture at D9-D10 level (Fig. 2). The patient was diagnosed with D9-D10 burst fracture and was scheduled for posterior instrumentation and fixation under neuro-navigation in prone position.

Fig. 1: Showing saggital image of whole body spine depicting burst fracture of D9-D10 vertebra

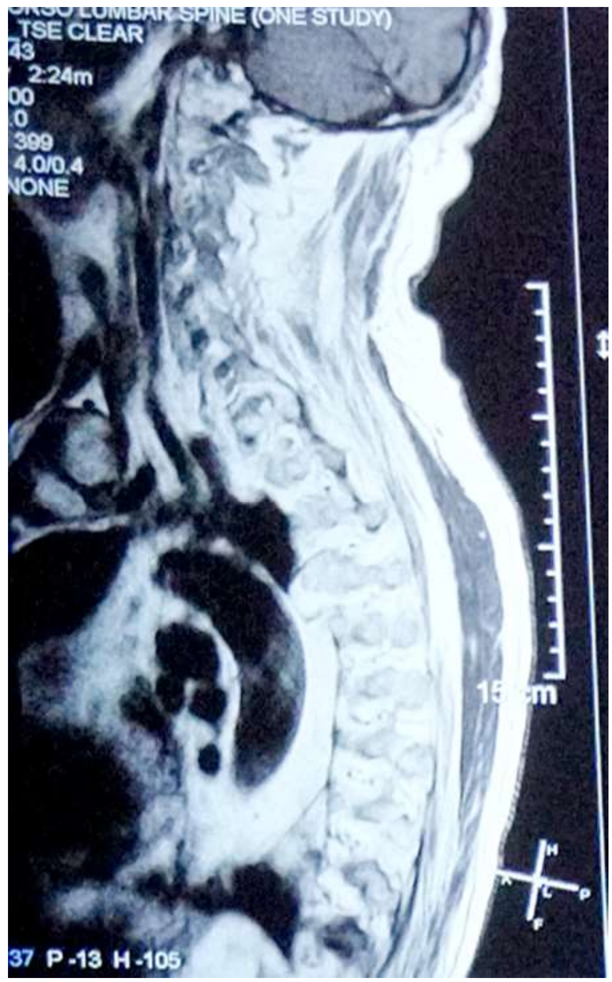

Fig. 2: Showing saggital image of cervical spine depicting loss of cervical lordosis

Preanesthetic Evaluation of the Airway revealed Mallampati class III, fixed flexion deformity of neck with loss of cervical and Lumbar lordosis with thoracic kyphosis. Patient cannot lie supine because of the fracture and the deformity of spine. Antiplatelet drug was discontinued.

On the day of surgery, preoperatively patient was nebulized with 4% lignocaine and inj glycopyrrolate given intramuscularly. Standard ASA monitoring attached and adequate preoxygenation done in the lateral position. Injection Fentanyl 2mcg/kg given, propofol 1-2mg/kg given in graded boluses to preserve spontaneous breathing. Bag mask Ventilation achieved successfully. After adequate plane of anesthesia, patient turned supine, and airway was secured with 8mm flexometallic Endotracheal tube by video laryngoscopy. The Cormack lehane grade was 1. Muscle relaxation given after intubation. Patient turned to prone position taking care of the cervical spine, thoracic spine fracture and brittle bones. Pressure points were adequately padded. Intravascular volume status closely monitored with intra-arterial blood pressure secured with 20G right radial artery cannulation.

Intraoperatively, patient had an episode of hypotension managed with fluid bolus. Patient was extubated when fully awake, obeying commands, adequate spontaneous breathing with return of airway reflexes. Patient shifted to Intensive Care Unit for further monitoring and medications was restarted. He was discharged after 1 week and follow up done.

DISCUSSION

Anesthetic challenges in management of the rare occurrence of Ankylosing spondylitis with Parkinson's disease and multiple comorbidities for spine surgery has not been reported, probably the first case report in literature. There is imposed array of difficulties ranging from technical difficulty of the surgery, logistic difficulty, airway hazards, positioning difficulty, multisystem involvement, and drug interactions.

The anesthetic considerations in AS are the degree of upper airway involvement, difficulty in positioning and systemic involvement of the disease. Careful positioning is imperative because of osteoporotic bones. Studies have shown that AS is associated with increased risk of depression, dementia and ischemic stroke which is seen in our case.[4] Restrictive lung disease and chest wall abnormalities make ventilation difficult. The presence of Bronchial Asthma increases the risk of bronchospasm during airway handling. Diabetes mellitus, Hypertension, Hypothyroidism, Coronary artery disease complicates the anesthetic management. Tachycardia, hypertension, and hypotension should be avoided.

Patients with AS existed an elevated risk of subsequent Parkinson's disease which is present in our case.[2] They have autonomic dysfunction, hence close monitoring of fluids, intravascular volume should be done. There is risk of orthostatic Hypotension, hence measurement of arterial pressure for postural variation should be done[8], which could not be assessed in our case. The levodopa should be continued without interruptions. Drugs causing hypertension such as ketamine and inhalational agents with arrhythmogenic potential should be avoided. Drugs like metoclopramide, phenothiazine avoided as they are known to precipitate symptoms of Parkinson's disease. MAO (Mono Amino Oxidase) inhibitors inhibit the metabolism of narcotics; hence the dose of narcotics should be reduced by 20-25% of usual dose. There is a risk of Serotonin syndrome with the concomitant use of meperidine, hence avoided.

Airway maneuvers like head tilt, chin lift, head extension was not possible due to severe cervical spondylitis and fixed flexed neck position. The consent for awake fiberoptic intubation was not given, hence proceeded with video laryngoscope under sedation. There is similar study on airway management.[7] A stack of rolls were kept below the head to align the oropharyngeal and laryngeal axis (Fig. 3). The plane of anesthesia must be adequate for airway handling. The osteoporotic bones complicate the surgical handling and instrumentation, making it technically difficult. Under neuro-navigation and intraoperative imaging, the anesthetic plane, sterility, and radiation exposure of the medical personnel should be addressed.[9]

CONCLUSION

Ankylosing spondylitis with Parkinson's disease and multiple comorbidities is more challenging to the anesthesiologist. Hence, In every plan for anesthesia, all necessary precautions should be undertaken and should consider a safe and alternative useful option for airway management and anesthetic management should be tailored accordingly to provide smooth recovery of the patient.

Conflicts of interest: None declared

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