COMPARISON OF DEXMEDETOMIDINE AND MIDAZOLAM FOR SEDATION AND ANALGESIA DURING SEPTOPLASTY UNDER MONITORED ANESTHESIA CARE

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ABSTRACT

Objective: To compare dexmedetomidine and midazolam for effective sedation and pain relief during monitored anesthesia care for septoplasty using ramsay sedation scale and visual analogue scale.

Study Design: Prospective observational study.

Place and Duration of Study: Anesthesia Department, Combined Military Hospital Malir, from May 2019 to Jul 2019.

Methodology: After ethical committee approval, 100 patients were recruited and divided in two groups to undergo septoplasty under local anesthesia. Group1 received dexmedetomidine 1 microgram/kg intravenously given over Five minute followed by 0.5 micrograms/kg/hr. Group 2 received midazolam 0.06 mg/kg intravenously slowly followed by 0.01mg/kg/hr. Sedation was titrated with ramsay sedation scale. The target end point was patient having ramsay sedation scale 3 by the end of 10 minutes. Rescue sedation was given in patients having ramsay sedation scale <3. Intraoperative pain was assessed using visual analogue scale. Visual analogue scale target value was <6. Rescue analgesia was given if visual analogue scale >5.

Results: Mean ramsay sedation scale was significantly high in group-1 (2.6 ± 0.48) as compared to group-2 (2.18 ± 0.54) with a *p*-value of 0.008. Intra-operative rescue sedation was provided in significantly less number of patients in group-1 18 (36%) as compared to group-2 35 (70%) with a *p*-value of 0.009. Visual analogue scale was also significantly less in group-1 (2.4 ± 1.4) than in group-2 (3.2 ± 1.6) with a *p*-value of 0.017. Intra-operative rescue analgesia was also required in significantly lesser number of patients in group-1 13 (26%) than group-2 27 (54%) with a *p*-value of 0.007.

Conclusion: This study proved that dexmedetomidine is superior to midazolam for providing sedation and analgesia.

Keywords: Dexmedetomidine, Midazolam, Monitored anesthesia care, Sedation.

INTRODUCTION

Monitored anesthesia care (MAC) is a form of anesthesia in which local anesthetic procedures are augmented with certain drugs for anxiolysis, hypnosis, analgesia and amnesia. This form of combination anesthesia results in less physiological disturbances decreased intra-operative bleeding and rapid recovery as compared to general anesthesia. It is cost-effective as well[1-3].

The drugs which are commonly used for MAC are benzodiazapines, opioids, dexmedetomidine and propofol. Midazolam a benzodiazepine has elimination half life of 1.5-2.5 hours resulting in prolonged sedation. Dexmedetomidine an increasingly used drug is a selective alpha-2 agonist with better analgesic properties, less respiratory depression and decreases opioid requirements during surgery. It has a short distribution half-life of about 6 minutes and a terminal elimination half-life of approximately 2 hours which makes it a good choice for MAC[4-6].

Septoplasty is a surgical procedure done to correct a deviated nasal septum. The procedure is done by excision and realignment of part of the bone and cartilage in the nasal cavity. It can be done under general or local anesthesia[7-10].

Limited word has been done for the use of intravenous dexmedetomidine for MAC as

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a substitute to standard midazolam sedation. Therefore, this study was carried out at anesthesia department CMH Malir Cantt Karachi to compare the effectiveness of intravenous dexmedetomidine versus midazolam for sedation and analgesia during MAC for septoplasty.

To compare the two drugs for effective sedation. ramsay sedation scale (RSS) (table-I) was used whereas for effective pain relief visual analogue scale (VAS) (fig-1)[10] was used.

METHODOLOGY

It is a prospective observational study. This study was conducted in Anesthesia department CMH Malir 2019, from 1st May 2019 to 31st July 2019. 100 patients were selected following non-probability consecutive sampling technique. Inclusion criteria for patients for this study included age range 18-45 years of either gender, American Society of Anesthesia (ASA) Score of 1. Exclusion criteria included patients with ASA score >1, patients allergic to trial drug (on history) and patients unwilling to participate in the study.

After ethical committee approval, 100 patients aged between 18 years to 45 years of age with ASA-1 status were recruited to undergo septoplasty under local anesthesia. Patients were divided into two groups randomly. Group-1 received injection dexmedetomidine 1 microgram /kg intravenously over 5 minutes followed by 0.5 micrograms/kg/hr. Group-2 received bolus dose of injection midazolam 0.06 mg/kg intravenously slowly followed by 0.01mg/kg/hr. Sedation was titrated with RSS. The RSS 3 was chosen as target end point by the end of 10 minutes. Rescue sedation was given in patients having RSS less than 3. Rescue sedation was provided with intravenous bolus of 0.25 mg/kg propofol. During procedure pain was assessed using VAS. The target value of VAS was points less than 5. Rescue analgesia was given if VAS was >5, analgesia was provided with intravenous bolus of tramadol 50 mg.

Table-I: Ramsay sedation scale.

Score	Response
1	Anxious or restless or both
2	Cooperative, orientated and tranquil
3	Responding to commands
4	Brisk response to stimulus
5	Sluggish response to stimulus
6	No response to stimulus

The results were analyzed by using SPSS version 21. Percentages and frequencies were calculated for categorical variables like RSS and gender while standard deviation and mean were calculated for continuous variables like age. The RSS and VAS scores were compared using chi square test.

Table-II: Comparison between dexmedetomidine and midazolam scoring on RSS and VAS (n=50).

	Groups		
	Dexmedetomidine	**Midazolam**	***p*-value**
Ramsay sedation scale			
Anxious, agitated, restless (%)	3 (6)	9 (18)	
Eyes open, cooperative, oriented, tranquil (%)	14 (28)	23 (46)	0.008
Responds (Opens eyes) only to command, light touch, normal tone of voice (%)	33 (66)	18 (36)	
Mean ± SD	2.6 ± 0.48	2.18 ± 0.54	
Intra-operative rescue sedation (if RSS<3) n(%)	18 (36)	35 (70)	0.009
Visual Analogue Scale			
No Pain (0)	4 (8)	1 (2)	
Mild (1-3)	38 (76)	29 (58)	
Moderate (4-5)	8 (16)	20 (40)	0.017
Mean (SD)	2.4 (1.4)	3.2 (1.6)	
Intra-operative rescue analgesia (if VAS>3) n(%)	13 (26)	27 (54)	0.007

RESULTS

Total of 100 patients were selected in this study and divided in group 1 and 2. 61 (61%) patients were male and 39 (39%) were female. The male to female ratio of the patients was 1:0.63. Mean age of the patients in group-1 was 25.9 ± 4.9 years where as in group-2 it was 25.9 ± 5.4 years.

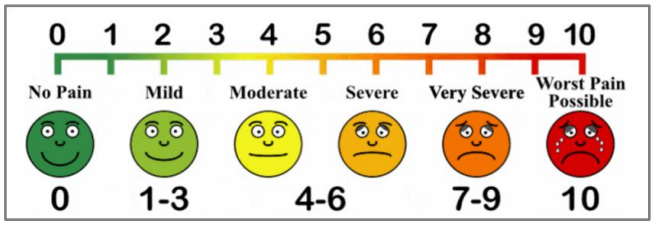

Figure-1: Visual analogue scale.

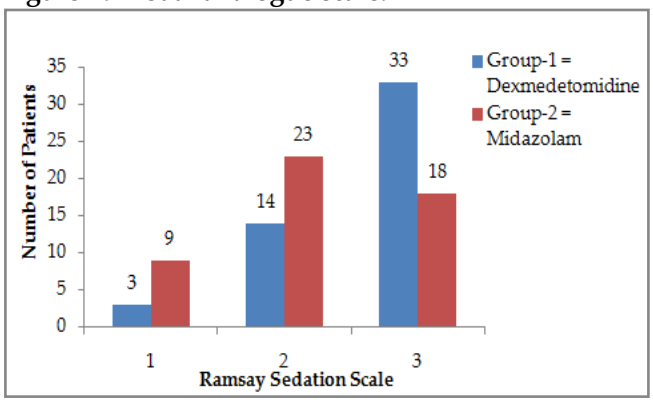

Figure-2: Frequency distribution of ramsay sedation scale in study groups.

p-value = 0.008 (Significant)

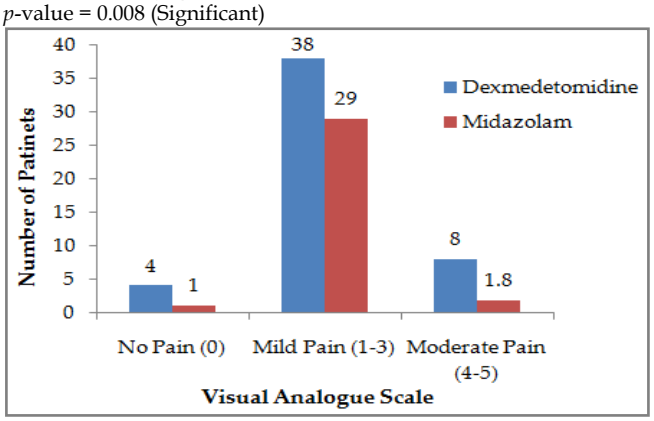

Figure-3: Frequency distribution of visual ana-logue scale.

p-value = 0.017 (Significant)

Mean RSS was significantly high in group-1 (2.6 ± 0.48) as compared to group-2 (2.18 ± 0.54) with a *p*-value of 0.008. Intra-operative rescue sedation was provided in significantly less number of patients in group-1 18 (36%) as compared to group-2 35 (70%) with a *p*-value of 0.009.

VAS score was also significantly less in group-1 (2.4 ± 1.4) than in group-2 (3.2 ± 1.6) with a *p*-value of 0.017. Intra-operative rescue analgesia was also required in significantly less number of patients in group-1, 13 (26%) than group-2, 27 (54%) with a *p*-value of 0.007 (table-II, fig-2 & 3).

DISCUSSION

MAC is emerging as a special modality by virtue of which, procedures that required over-night stay of patients in hospital are now performed safely as outpatient cases. It combines intravenous sedation, anxiolysis and analgesia with local anesthetic infiltration or nerve blocks. Several combinations of drugs have been used for MAC including midazolam, dexmedetomidine, clonidine, fentanyl, propofol and several others. During MAC patient's vitals are constantly monitored to assess pain and level of sedation. Procedures done commonly under MAC include endoscopy, dental procedures, ENT surgeries, bronchoscopy, and eye surgeries[11,12].

Dexmedetomidine is a selective α2-adrenergic agonist that can be used for anxiolysis, sedation, and analgesia. It blunts the sympathetic response to surgical stimulus and other stress. At high doses it loses its selectivity for α2-adrenergic receptors and also stimulates α1-adrenergic receptors. Adverse effects include bradycardia, hypotension, heart block, nausea and vomiting.

Most commonly, dexmedetomidine was used for procedural sedation (e.g. during awake craniotomy procedures or fiberoptic intubation), ICU sedation (e.g. ventilated patients recovering from cardiac surgery), or as a supplement to general anesthesia to reduce the need for intra-operative opioids or to reduce the likelihood of emergence delirium (most often in children) after an inhalation anesthetic. Typically, intravenous dexmedetomidine sedation in awake adults is initiated with a 1 mcg/kg loading dose given over 5 to 10 minutes followed by a maintenance infusion of 0.2 to 1.4 mcg/kg/h. It is rapidly

gaining popularity as sedative in MAC because of its analgesic properties, "cooperative sedation," and lack of respiratory depression, providing better patient satisfaction and decreased opioid requirements.

Dexmedetomidine can be effectively used for sedation and procedures done under MAC. It has been safely used for ENT surgeries like functional endoscopic sinus surgery[12,13].

Midazolam[14] is a benzodiazepine. It is commonly used for anesthesia, procedural sedation, hypnosis and anxiolysis. It is also used for the acute management of seizures as well.

Adverse effects of midazolam include, confusion, headache, blurred vision, rashes, thrombophlebitis, nausea and vomiting, slurred speech, agitation, involuntary muscle movements, muscle rigidity, hiccups, tenderness, confusion, pruritis, impaired coordination, loss of reflexes, respiratory depression and coma.

In our study we compared the sedative and analgesic effects of intravenous dexmedetomidine and midazolam during MAC in cases of septoplasty conducted under local anesthesia.

During our study it was observed that mean RSS was significantly high in patients given dexmedetomidine than in patients given midazolam. Similar results were observed in studies conducted by Pauranik *et al*[12], Dere *et al*[15] and Alhashemi *et al*[16]. In contrast to this, studies conducted by Karaaslan *et al*[17] and Demiraran *et al*[18] showed that there was no significant differences between the dexmedetomidine and midazolam in regards to RSS.

In our study we observed that the mean VAS scores were significantly lower in group-1 than in group-2. Contrary to our observation, study conducted by Üstün *et al*[19] and Jakob *et al*[20] showed no significant difference in respect to VAS between two drugs.

CONCLUSION

It has been proved in our study that dexmedetomidine is superior to midazolam for providing sedation and analgesia in septoplasty cases done under MAC.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Das S, Ghosh S. Monitored anesthesia care: An overview. J Anaesthesiol Clini Pharmacol 2015; 31(1): 27-29.
2. Adams MA, Prenovost KM, Dominitz JA, Holleman RG, Kerr EA, Saini SD, et al. 465 National trends in utilization of monitored anesthesia care for outpatient gastrointestinal endoscopy in the veterans health administration. Gastroenterol 2016; 150(4): S102.
3. Pani S, Cagino J, Feustel P, Musuku SR, Raja A, Bruno N, et al. Patient selection and outcomes of transfemoral transcatheter aortic valve replacement performed with monitored anesthesia care versus general anesthesia. J Cardiothorac Vasc Anesth 2017; 31(6): 2049-54.
4. Mandal M, Chattopadhyay S, Banerjee S, Bagchi T, Sarkar B, Ranjan BS. Is dexmedetomidine better than midazolam for monitored anaesthesia care during inguinal herniorrhaphy? A comparative study. J Evolution Med Dental Sci 2016; 5(51): 3295-98.
5. Parikh DA, Kolli SN, Karnik HS, Lele SS, Tendolkar BA. A prospective randomized double-blind study comparing dexmedetomidine vs. combination of midazolam-fentanyl for tympanoplasty surgery under monitored anesthesia care. J Anaesthesiol Clini Pharma 2013; 29(2): 173-78.
6. St-Pierre P, Tanoubi I, Verdonck O, Fortier L, Richebé P, Côté I, et al. Dexmedetomidine versus remifentanil for monitored anesthesia care during endobronchial ultrasound-guided transbronchial needle aspiration. Anesth Analg 2019; 128(1): 98-106.
7. Mantz J, Josserand J, Hamada S. Dexmedetomidine: new insights. Eur J Anaesthesiol 2011; 28(1): 3-6.
8. Ali L, Alam W, Ali U. Dexmedetomidine for acute postoperative analgesia in patients undergoing laparotomy. Pak Armed Forces Med J 2019; 69(5): 934-38.
9. Kim KN, Lee HJ, Kim SY, Kim JY. Combined use of dexmedetomidine and propofol in monitored anesthesia care: a randomized controlled study. BMC Anesthesilogy 2017; 17(1): 34-38.
10. Vakil E, Sarkiss M, Ost D, Vial MR, Casal RF, Eapen GA, et al. Safety of monitored anesthesia care using propofol-based sedation for pleuroscopy. Respiration 2018; 95(1): 1-7.
11. Sedation scales. (n.d.). Retrieved from https://www.aic.cuhk.edu.hk / web8/sedation%20scale.htm
12. Pauranik R, Sachdeva S. Midazolam versus dexmedetomidine for sedation in ENT surgeries under local anaesthesia. A prospective randomised double blind study. Intl J Sci Res 2019; 8(1): 3-5.
13. Upendranath I, Amarnath RK, Bais DS, MSK. Comparison of dexmedetomidine with fentanyl for sedation in tympanoplasty (ENT surgeries) done under monitored anaesthesia care. Int J Evid Based Healthc 2016; 3(16): 638-44.
14. Netzel CL, Abd-Elsayed A. Benzodiazepines. Pain 2019; 1(1): 289-92.
15. Dere K, Sucullu I, Budak ET, Yeyen S, Filiz AI, Ozkan S, et al. A comparison of dexmedetomidine versus midazolam for sedation, pain and hemodynamic control, during colonoscopy under conscious sedation. Eur J Anaesthesiol 2010; 27(7): 648-52.

16. Alhashemi JA. Dexmedetomidine vs midazolam for monitored anaesthesia care during cataract surgery. Br J Anaesth 2006; 96(6): 722-26.
17. Karaaslan K, Yilmaz F, Gulcu N, Nolak C. Comparison of dexmedetomidine and midazolam for monitored anesthesia care combined with tramadol via patient-controlled analgesia in endoscopic nasal surgery: A prospective, randomized, double-blind, clinical study. Curr Therapeu Res 2007; 68(2): 69-81.
18. Demiraran Y, Korkut E, Tamer A, Yorulmaz I, Kocaman B, Sezen G, et al. The comparison of dexmedetomidine and midazolam used for sedation of patients during upper endoscopy: A prospective, randomized study. Canadian Can J Gastroenterol 2007; 21(1): 25-29.
19. Üstün Y, Gündüz M, Erdoğan Ö, Benlïdayi ME. Dexmedetomidine versus midazolam in outpatient third molar surgery. J Oral Maxill Surg 2006; 64(9): 1353-58.
20. Jakob SM, Ruokonen E, Grounds RM. Dexmedetomidine vs midazolam or propofol for sedation during prolonged mechanical ventilation: two randomized controlled trials. J Am Med Assoc 2012; 307(11): 1151-60.