

## Patient satisfaction in middle ear surgery under monitored anaesthesia care

Maya Lama<sup>1</sup>, Rohini Sigdel<sup>1</sup>, Sanish Gurung<sup>1</sup>, Krishna Bogati<sup>2</sup>, Bibek Ranjit<sup>2</sup>

<sup>1</sup>Department of Anaesthesia, Pokhara Academy of Health Sciences (PAHS), Pokhara

<sup>2</sup>Department of Anaesthesia, Green Pastures Hospital and Rehabilitation, Ear Centre

### Correspondence :

Dr. Maya Lama  
Pokhara Academy of Health Sciences (PAHS),  
Pokhara, Nepal  
Email: maya\_lama16@yahoo.com

Article received : 6th Mar. 2018

Article accepted : 1st July 2018

### ABSTRACT

**Background:** Monitored anaesthesia care is a specific anaesthesia service for diagnostic or therapeutic procedures performed under local anaesthesia along with sedation and analgesia titrated to a level with the provision to convert into general anaesthesia when required. We conducted a retrospective study to determine patient satisfaction in middle ear surgery under monitored anaesthesia care.

**Materials and Methods:** The number of patients undergoing middle ear surgery under monitored anaesthesia care, over a period of one year were included. They received sedation with midazolam 0.02 mg/kg and fentanyl 1 mcg/kg along with local anaesthetic infiltration. Patient's satisfaction was measured using a five point Likert scale. Intraoperative pain, nausea, vomiting and other discomforts were inquired.

**Results:** The total number of patients was 64. Fifty-one patients (79.7%) were satisfied, 10 were neutral (15.6%) and 3 patients (4.7%) were dissatisfied with the technique. Earache (4.7%), followed by dizziness (3.1%) and bodyache (3.1%) were the most common cause of discomfort. Nausea occurred in 6 patients (9.4%) and vomiting in 5 patients (7.8%).

**Conclusion:** Middle ear surgeries can be performed under monitored anaesthesia care with good patient satisfaction.

**Key Words:** Satisfaction; middle ear surgery; monitored anaesthesia care

### INTRODUCTION

According to American Society of Anaesthesiologists, monitored anaesthesia care (MAC) is a specific anaesthesia service for diagnostic and therapeutic procedures performed under local anaesthesia along with sedation and analgesia titrated to a level that preserves spontaneous breathing and airway reflexes.<sup>1</sup> The three basic components of MAC includes safe conscious sedation, measures to allay patient's anxiety and effective pain control.<sup>2</sup> MAC is essentially an anaesthesiologist led service with skill to rescue airway or convert to general anaesthesia if the need arises.<sup>1</sup> This unique aspect of anaesthesia service

distinguishes it from moderate sedation/ analgesia or conscious sedation.<sup>3</sup> Over the years, middle ear surgeries are being performed successfully under local anaesthesia with sedation. Some have conducted it as a part of monitored anaesthesia care while others as conscious sedation.<sup>4-7</sup> Middle ear surgeries were being performed under local anaesthesia as it was considered to have several advantages over general anaesthesia like unavailability of trained anaesthesiologist, lack of adequate or functional anaesthesia equipment, prolonged recovery time, cost and morbidity of general anaesthesia.<sup>8</sup>

The rationale of conducting this study was to evaluate patient satisfaction during middle ear surgeries performed under monitored anaesthesia care. The use of local anaesthesia with sedation in the presence of an anaesthesiologist will enhance patient safety and satisfaction. In addition, there is reduced intraoperative bleeding, avoidance of tracheal intubation, reduced postoperative nausea and vomiting and early mobilization.

## MATERIALS AND METHODS

This was a single centered retrospective study carried out in Ear Centre of Green Pastures Hospital and Rehabilitation Centre (GPH). Approval from the Research Ethics Committee of GPH, ear centre was obtained and the study was carried out in the operation theatre of GPH over a period of one year (31st March 2017 to 1st April 2018).

Inclusion criteria was ASA I/II consenting patients undergoing middle ear surgery aged 15-60 years under monitored anaesthesia care. Patients with known sensitivity to local anaesthetic drug lignocaine and bupivacaine, pregnant and lactating females were excluded. Patients on pain medications and those with history of use of any opioid or sedative medications in the week prior to surgery were also excluded. Written informed consent was taken from the patients after explaining about the anaesthetic technique. The patients were assessed one day prior to surgery and were kept nil per oral for eight hours. In the operating room, 18 Gauge intravenous cannula was secured in forearm and monitors were attached. Monitoring included electrocardiogram, non-invasive blood pressure, pulse oximeter, heart rate, respiratory rate. All patients were supplemented with oxygen via nasal cannula. Patients were given injection dexamethasone 8 mg intravenously followed by injection midazolam 0.02 mg/kg and fentanyl 1 mcg/kg intravenously. We used the above mentioned dose as a supplement to local anaesthesia.

Mixture of injection 2% lignocaine with adrenaline 1: 80,000 and 0.5% bupivacaine 1: 80,000 was used in the volume of 12-16 ml. 1:80000 bupivacaine is not available in our hospital setup, hence It was prepared by mixing 250 mcg of adrenaline to 20 ml 0.5% bupivacaine. Local anaesthetic was infiltrated in a "V" shaped manner in the post auricular region and in the

four quadrants in the external auditory canal at the junction of bony and cartilaginous area.

Throughout the surgery the patients were monitored and assessed for pain and discomfort. Pain was assessed using verbal rating scale (VRS) which ranged from 0-10. Zero was considered as no pain whereas 1-3 was considered as mild pain, 4-6 as moderate pain and 7-10 as severe pain. Injection fentanyl 0.5 mcg/kg was topped up if the patient complained of moderate to severe pain with or without addition of ketamine 0.25 mg/kg. Injection propofol was titrated to patient's comfort if required. Injection ondansetron 4 mg was given intravenously to all patients for nausea and vomiting intraoperatively.

At the end of the surgery, the patients were shifted to postoperative ward and monitored regularly. The patients were interviewed after 3 hours with questionnaire regarding pain, nausea, vomiting, other discomforts, overall patient's satisfaction and the preference for similar anaesthetic technique for similar type of procedure in the future. The patient satisfaction score was assessed using five point Likert Scale which includes very satisfied, quite satisfied, neutral, quite dissatisfied and very dissatisfied. Quite satisfied and very satisfied was taken as satisfied and quite dissatisfied and very dissatisfied was taken as dissatisfied. Patients were also inquired about other discomforts they perceived during surgery.

All the data were analyzed using SPSS version 20.0 (SPSS Chicago, IL, USA). Continuous data (age) was expressed as mean and range, while categorical data were expressed as number (percentage).

## RESULTS

A total of 64 patients were included in our study, among which 29 were male and 35 were female. The mean age of patients in our study was 30.38 years. Minimum age was 15 years and maximum age was 60 years.

Our study was conducted in patients who were scheduled to undergo different types of middle ear surgery as shown in table 1. The most common type of middle ear surgery performed in our study patients was tympanoplasty. (32.8%)

78.1% of patients experienced mild pain during the surgery. (Table 2) Injection fentanyl at a dose of 0.5 mcg/kg was given to 10 patients who complained of moderate to severe pain during surgery.

**Table 1:** Various types of middle ear surgeries

Types of surgery	No. of patients	Percentage
1. Tympanoplasty	21	32.8
2. Myringoplasty	15	23.4
3. Tympanoplasty + Ossiculoplasty	10	15.6
4. Tympanoplasty + Canalplasty	5	7.8
5. Stapedotomy	4	6.3
6. Myringoplasty + Canalplasty	2	3.1
7. Tympanoplasty + Canalplasty + Ossiculoplasty	2	3.1
8. Tympanoplasty + Ossiculoplasty + Atticotomy	2	3.1
9. Tympanoplasty + Ossiculoplasty + Meatoplasty	1	1.6
10. Tympanoplasty + Atticotomy	1	1.6
11. Myringoplasty + Ossiculoplasty	1	1.6

**Table 2:** Assessment of pain during surgery using VRS

Grades of pain	Frequency	Percentage
Mild	50	78.1
Moderate	8	12.5
Severe	2	3.1
None	4	6.3

Patient's satisfaction during surgery is shown in table 3. Most of the patients (79.7%) were satisfied with local anaesthesia during middle ear surgery.

**Table 3:** Patient satisfaction

Grades of satisfaction	Frequency	Percentage
Very satisfied	23	35.9
Quite satisfied	28	43.8
Neutral	10	15.6
Quite dissatisfied	3	4.7
Very dissatisfied	0	0

The incidence of nausea during middle ear surgery in our patients was 9.4% and that of vomiting was 7.8%. Our patients were also inquired about any other discomfort noted during surgery. (Table 4)

The patients were also asked about their preference for similar anaesthetic technique for middle ear surgery in the future. Sixty-one patients (95.3%) preferred to have middle ear surgery under similar

anaesthetic technique in future if needed, while only 3 patients (4.7%) denied. None of the patients had any respiratory complications and need for conversion to general anaesthesia.

**Table 4:** Other discomforts

	Discomforts	Frequency	Percentage
1.	Earache	3	4.7
2.	Dizziness	2	3.1
3.	Bodyache	2	3.1
4.	Headache	1	1.6
5.	Dizziness + bodyache	1	1.6
6.	Dizziness + noise during surgery	1	1.6

## DISCUSSION

We had total number of sixty-four patients undergoing middle ear surgeries with tympanoplasty (32.8%) being the most common procedure. Over the past few decades, in view of patient safety, unavailability of anaesthesiologist and to reduce general anaesthesia related morbidity, 8 middle ear surgeries are being performed under local anaesthesia with sedation with reasonable patient satisfaction.<sup>6,7</sup>

In our study, we used monitored anaesthesia care as many other authors.<sup>4,5,9,10</sup> Parikh D et al compared dexmedetomidine bolus followed by infusion with injection midazolam plus fentanyl bolus followed by normal saline infusion to evaluate patient satisfaction score and effectiveness of analgesia and sedation.<sup>9</sup> Abdellatif et al compared dexmedetomidine infusion with midazolam infusion for sedation in middle ear surgery under local anaesthesia to see effect on surgical field and patient satisfaction.<sup>4</sup> Lee et al and Edussuriya et al have used combination of midazolam with remifentanyl and midazolam with pethidine.<sup>5,10</sup> However, we used injection midazolam 0.02 mg/kg and fentanyl 1 mcg/kg bolus initially prior to local anaesthetic injection, followed by injection fentanyl 0.5 mcg/kg if required.

The overall patient satisfaction was 79.7% in our study which is similar to study done by Parajuli et al where they have used injection meperidine and promethazine intramuscular 45 minutes prior to local anaesthetic infiltration.<sup>7</sup> Abdellatif et al and Parikh D et al have shown better patient satisfaction with dexmedetomidine group rather than midazolam alone or midazolam-fentanyl group.<sup>4,9</sup> Dexmedetomidine along with its analgesic property has been shown to be an effective baseline sedative for MAC for a broad

range of surgical procedures providing better patient satisfaction, less respiratory depression and opioid requirement.<sup>11</sup> Due to cost concern and unavailability we were not able to use dexmedetomidine as a sedative agent which would probably have increased patient satisfaction in our study as well.

Thota et al compared fentanyl-propofol with fentanyl-midazolam for sedation score and surgeons and patient satisfaction in middle ear surgeries which revealed no significant difference.<sup>12</sup> Similarly, Benedik et al compared propofol with midazolam infusion for sedation in middle ear surgeries which showed better sedation score with propofol.<sup>13</sup> However, we did not use any sedation score like Ramsay sedation score or Bispectral index monitoring to titrate the drug like in other studies.<sup>9,12,13</sup>

We used mixture of injection 2% lignocaine with adrenaline 1:80000 and 0.5% bupivacaine 1:80000 in the volume of 12-16 ml. In some studies they have used injection lignocaine 2% with adrenaline 1:200,000.<sup>4,9,12</sup> A study done by Gessler et al revealed equivalent vasoconstrictor effect of 1:200,000 epinephrine compared to higher doses of 1:100,000 and 1:50,000.<sup>14</sup> Singh S has used 0.5% bupivacaine with adrenaline 1:200,000.<sup>15</sup> The use of bupivacaine may have the advantage of prolonged duration of action. Pain experienced by the patients intraoperatively were assessed using verbal rating scale and classified as mild, moderate, severe and none. Seventy-eight percent of patients experienced mild pain during surgery which did not require supplementation with fentanyl bolus. The incidence of nausea and vomiting in patients undergoing middle ear surgeries under general anaesthesia ranges from 62-80% without the use of prophylactic antiemetic.<sup>16</sup> The risk remains high even with use of local anaesthesia under sedation.

In our study there was nausea in 9.4% of patients whereas 7.8% of patients had vomiting inspite of use of dual antiemetic prophylaxis with dexamethasone and ondansetron. Hence, it shows quite a high incidence of nausea/vomiting in middle ear surgeries even with local anaesthesia under sedation. Like in many other studies, earache (4.7%), followed by dizziness (3.1%) and bodyache (3.1%) were most common cause of discomfort in our patients when inquired postoperatively.<sup>6,7</sup>

Sixty-one patients (95.3%) preferred to have middle ear surgery under local anaesthesia with similar anaesthetic technique in future. In other studies, 91.1% and 86% of patients were willing to undergo similar procedure under local anaesthesia with sedation in future.<sup>13,7</sup>

### LIMITATIONS

In our study, we had a small sample size with no control group which could have eliminated the possibility to compare the different parameters like satisfaction, pain score, duration of analgesia. In our study we did not measure the level of intraoperative sedation using standard tools like Ramsay Sedation Score, BIS Score, which could have been useful to titrate drugs according to level of sedation.

### CONCLUSION

Middle ear surgeries can be performed under monitored anaesthesia care with advantage of avoiding general anaesthesia, reducing time and cost. With proper patient selection, high rate of patient satisfaction can be achieved. Monitored anaesthesia care requires the presence of qualified anaesthesiologist at all the time and it should be distinguished from moderate sedation/analgesia or conscious sedation.

### REFERENCES

1. Das S, Ghosh S. Monitored anaesthesia care: An overview. *J Anaesthesiol Clin Pharmacol*. 2015;31(1):27–9.
2. Ghisi D, Fanelli A, Tosi M, Nuzzi M, Fanelli G. Monitored anaesthesia care. *Minerva Anesthesiol*. 2005;71:533–8.
3. ASA. Distinguishing Monitored Anaesthesia Care (“MAC”) from Moderate Sedation/Analgesia (Conscious Sedation). Available from <http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/distinguishing-monitored-anaesthesia-care-from-moderate-sedation-analgesia.pdf>.
4. Abdellatif AA, Elkabarity RH, Hamdy TAE. Dexmedetomidine vs midazolam sedation in middle ear surgery under local anaesthesia: Effect on surgical field and patient satisfaction. *Egypt J Anaesth [Internet]*. 2012;28(2):117–23.
5. Lee JJ, Lee JH. Middle-ear surgery under sedation: Comparison of midazolam alone or midazolam with remifentanyl. *J Laryngol Otol*. 2011;125(6):561–6.
6. Sarmiento KMDA, Tomita S. Retroauricular tympanoplasty and tympanomastoidectomy under local anaesthesia and sedation. *Acta Otolaryngol*. 2009;129(7):726–8.

7. Parajuli R, Shrivastav RP, Bhattarai H. Patients ' Satisfaction in Modified Radical Mastoidectomy Done Under Local Anaesthesia for Squamous Type of Chronic Otitis Media. *Glob J Oto* 2017;3(5): 555-624.
8. Fagan J. Open Access Atlas of Otolaryngology , Head & Neck Operative Surgery. *Atlas Otolaryngol, Head Neck Oper Surg* [Internet]. 2008;(Figure 1):1–12. Available from: [www.entdev.uct.ac.za](http://www.entdev.uct.ac.za)
9. Parikh D, Kolli S, Karnik H, Lele S, Tendolkar B. A prospective randomized double-blind study comparing dexmedetomidine vs. combination of midazolam-fentanyl for tympanoplasty surgery under monitored anaesthesia care. *J Anaesthesiol Clin Pharmacol* [Internet]. 2013;29(2):173.
10. Edussuriya B, Goonasekera C, Rajapakse M. Middle ear surgery under local anaesthesia and sedation. *Ceylon Med* [Internet]. 1997;(July 1997). Available from:[https://www.researchgate.net/profile/Chulananda\\_Goonasekera/publication/13963651\\_Middle\\_ear\\_surgery\\_under\\_local\\_anaesthesia\\_and\\_sedation/links/565dc20208aeafc2aac889c8.pdf](https://www.researchgate.net/profile/Chulananda_Goonasekera/publication/13963651_Middle_ear_surgery_under_local_anaesthesia_and_sedation/links/565dc20208aeafc2aac889c8.pdf)
11. Candiotti KA, Bergese SD, Bokesch PM, Feldman MA, Wisemandle W, Bekker AY. Monitored anaesthesia care with dexmedetomidine: A prospective, randomized, double-blind, multicenter trial. *Anesth Analg*. 2010;110(1):47–56.
12. Thota RS, Ambardekar M, Likhate P. Conscious sedation for middle ear surgeries: A comparison between fentanyl-propofol and fentanyl-midazolam infusion. *Saudi J Anaesth* [Internet]. 2015;9(2):117–21. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25829896><http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4374213>
13. Benedik Janez MA. Sedation for middle ear surgery: prospective clinical trial comparing propofol and midazolam. *Cent Eur J Med*. 2008;3(4):487–93.
14. Gessler EM, Hart AKE, Dunlevy TM, Greinwald JH. Optimal concentration of epinephrine for vasoconstriction in ear surgery. *Laryngoscope*. 2001;111(10):1687–90.
15. Singh S. Study of tympanomastoidectomy under local anaesthesia using bupivacaine. *Indian J Otolaryngol Head Neck Surg*. 1995;2(2):144–6.
16. Liang S, Irwin MG. Review of Anaesthesia for Middle Ear Surgery. *Anesthesiol Clin* [Internet]. 2010;28(3):519–28. Available from: <http://dx.doi.org/10.1016/j.anclin.2010.07.009>