

Comparison of Recovery Profile of Male and Female Patients Receiving General Anaesthesia for Elective Ear, Nose and Throat Surgical Procedures

Lipika Baliarsing¹, Mangesh Gore², Sumeet Gajbhar³

ABSTRACT

Introduction: In Postoperative period patient's quality of recovery from anaesthesia forms major component for patient to be discharged from hospital. Conventionally, Aldrete scoring system is used to evaluate quality of recovery. But we tried to evaluate using Quality of Recovery-40 as it encompasses physical as well as psychological recovery of patient.

Material and Methods: 100 American Society of Anaesthesiology grade I and II patients undergoing surgeries for ear, nose, and throat were included. 24 Hours after discontinuation of anaesthesia they were evaluated for quality of recovery using Quality of Recovery-40 score. Observations were analysed between male and female patients.

Results: Comparison of Quality of Recovery score between both the study groups showed a mean value of 183.74 for males with a standard deviation of 5.54 and that for females was 172.08 with a standard deviation of 6.97. This showed statistical significance between the two study groups (p value < 0.05). Hence males showed a better Quality of Recovery -40 score as compared to females.

Conclusion: Sex is an independent factor influencing recovery after anaesthesia. The Quality of Recovery - 40 score in females was less as compared to males suggesting poor quality of recovery in females 24 hours postoperatively. This shows that all dimensions of recovery were affected in females as compared to males. The female sex hormones progesterone and oestrogen may be contributing to these sex-related differences.

Keywords: Quality of Recovery-40, Recovery profile Female versus male

INTRODUCTION

In clinical practice, patient coming out of the influence of anaesthetics is measured in terms of consciousness, reflexes and autonomic functions and other adverse events like pain, nausea and vomiting.^{1,2} All these factors contribute to quality of recovery.

Aldrete scoring system is used extensively as measure of quality of recovery.³ Poor quality of recovery frequently prolongs the duration of stay in recovery room and delays discharge from hospital. These have significant implication for resource utilization. The purpose of our study is to compare recovery profile in males and females undergoing elective ear, nose and throat surgeries under general anaesthesia using Quality of Recovery-40 (QoR-40).

QoR-40 is a good objective measure of quality of recovery. The QoR-40 encompasses five dimensions physical comfort, emotional state, physical independence, psychological support, and feeling of being pain free.^{4,5}

Work done by scientists in recent past showed that the hormones like oestrogen and progesterone are responsible for higher values

in Bi-Spectral Index (BIS) for same dosages under anaesthesia and early recovery from anaesthesia when compared between males and females. Therefore we chose to evaluate recovery profile between male and female patients.⁶

We chose patients undergoing Ear Nose Throat surgeries who require very safe and sound recovery as airway gets invariably shared by surgeons and anaesthesiologist with very limited possibility of airway being normal preoperatively. Upper respiratory tract infections are common and that postoperative nausea and vomiting are frequent causatives delaying sound recovery of patient. Ear surgery may cause post-operative dizziness (vertigo), nausea and vomiting as inner ear is intimately involved with a sense of balance.⁷

Nasal and sinus surgeries carries the risk of bleeding into the airway and aspiration of blood. Swallowed blood after emergence will increase the risk of postoperative nausea and vomiting. Aim of the study was to compare quality of recovery between male and female patients using QoR-40 scoring system.

MATERIAL AND METHODS

Accordingly 100 ASA grade I patients undergoing ENT surgeries under general anaesthesia; lasting for 120 to 160 minutes were included for study. They were divided into male and female groups.

Patients with ASA grade II onwards, age below 18 and above 60, were excluded from study. Patients on any drugs acting on CNS like antidepressants, tranquilisers etc. and alcoholics were also excluded.

Sample size was calculated with help of difference in mean method and sample size is found to be 50 per group at 80% power and 95% confidence interval.

Study Procedure

After obtaining permission from institutional ethics committee and written, informed valid consent from the patient they were attached to monitors like Electrocardiography (ECG), pulse-oximetry (SPO₂), Non-invasive blood pressure (NIBP). All the patients were premeditated with Inj. Glycopyrrolate 0.02 mg/kg, inj. Midazolam 0.03 mg/kg, inj. fentanyl 2 ug/kg.

¹Professor, ²Assistant Professor, ³Resident, Department of Anaesthesiology, Topiwala National Medical College and B.Y.L. Nair Charitable Hospital, Mumbai-08, Maharashtra, India

Corresponding author: Dr. Mangesh Suresh Gore, 11, Bima Chhaya CHS, M.P.Road, Mulund (EAST), Mumbai-400081, India

How to cite this article: Lipika Baliarsing, Mangesh Gore, Sumeet Gajbhar. Comparison of recovery profile of male and female patients receiving general anaesthesia for elective ear, nose and throat surgical procedures. International Journal of Contemporary Medical Research 2016;3(7):2041-2044.

Vital parameters were recorded before and after giving pre-medication and at five minutes interval thereafter till patient gets shifted out of operating room. All the patients were induced with inj.pentothal 5 mg/kg and inj.vecuronium 0.08 to 0.1 mg/kg was used to facilitate tracheal intubation. Anaesthesia was maintained using sevoflurane. At the end of surgery trachea was extubated after reversing the patient with inj.glycopyrrolate 0.08 mg/kg and inj.neostigmine 0.05 mg/kg and patient satisfying extubation criterion. Analgesia was managed by the attending anaesthesiologist as per his/her discretion.

After the end of the surgical procedure, the patients were taken to the post-anaesthesia care unit (PACU). 24 Hours post operatively, patient's quality of recovery was assessed using the quality of recovery -40 (QoR- 40) score. The questions were administered by the observer and answers recorded on proforma sheet. Patients were asked to give a verbal response to questions. They were asked to grade their responses on a scale of 1 to 5, 1 being worst and 5 being the best.

STATISTICAL ANALYSIS

After data collection, data entry was done in Excel. Data analysis is done with the help of SPSS Software version 15 and Sigma plot Ver. 11. Quantitative data is presented with the help of Mean, Standard Deviation, Median and IQR (Interquartile range).

Comparison between study groups is done with the help of Unpaired T test or Mann-Whitney. *P* value less than 0.05 is taken as significant level.

RESULTS

When five components of the QoR-40 were taken into consideration individually viz.Psychological support, emotional state, physical comfort, physical_independence and pain profile, males are found to be better in each of them as compared to female patients.

Comparison of QoR score between both the study groups showed a mean value of 183.74 for males with a standard deviation of 5.54 and that for females was 172.08 with a standard deviation of 6.97. This showed statistical significance between the two study groups (*p* value < 0.05). Hence males showed a better QoR -40 score as compared to females (Figure-1).

Now we compared the various dimension of QoR - 40 questionnaire, the first parameter being the emotional state of patients. The mean score for emotional well-being for males was 42.9 with a standard deviation of 1.2 and that for females was 40.72 with a standard deviation of 2. This shows statistical significance between the two study groups (*p* value<0.05). Hence males exhibited a better emotional well-being 24 hours postoperatively (Figure-2).

Psychological support score showed a mean value of 33.40 for males with a standard deviation of 1.28 and that for females was 32.3 with a standard deviation of 1.40. This shows statistical significance between the psychological scores of the study groups (*p* value <0.05). Males showed better psychological support scores as compared to females 24 post operatively after general anaesthesia (Figure-3).

Next parameter is physical comfort score which showed a mean value of 56.34 in males with a standard deviation of 2.02 and that for females was 52.02 with a standard deviation of 2.85. This shows statistical significance for physical comfort between

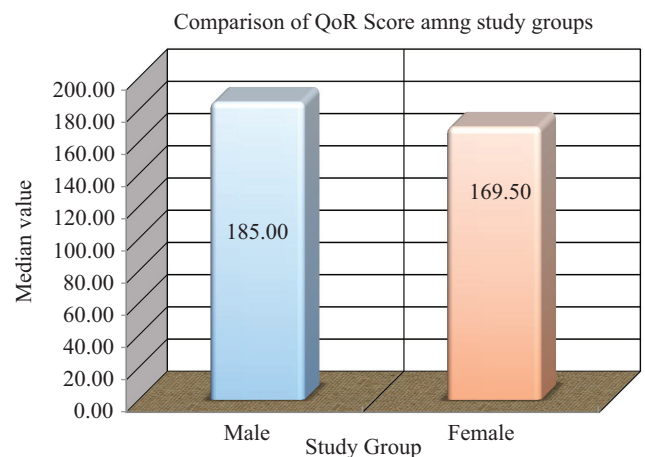


Figure-1: Comparison of QoR-40 score between both the study groups

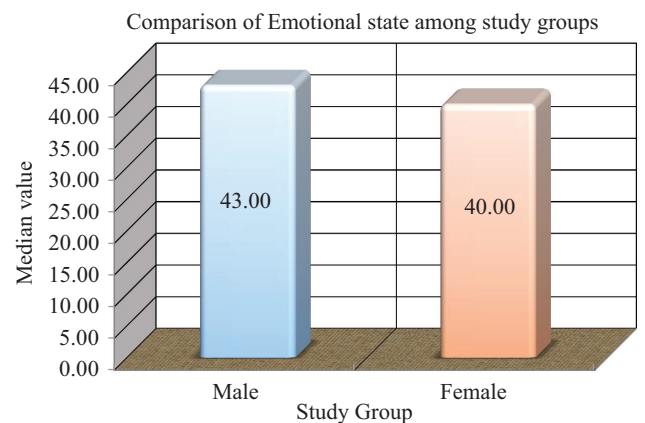


Figure-2: Comparison of emotional state among study groups

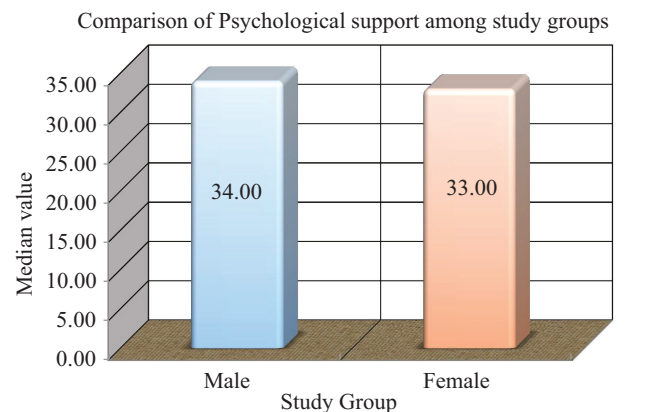


Figure-3: Comparison of Psychological support score among study groups.

the two study groups (*p* value <0.05). This demonstrated that males experience a better level of physical comfort as compared to females (Figure-4).

The next parameter is physical independence which showed a mean value of 23.54 for males with a standard deviation of 1.03 and that for females was 22.70 with a standard deviation of 1.45. This showed statistical significance between the two study groups (*p* value <0.05) with males showing better physical comfort scores as compared to females (Figure-5).

The pain profile of the two study groups showed that males had a mean value of 27.56 with a standard deviation of 1.42 and that for females was 24.34 with a standard deviation of 1.9. This showed a statistical significance (*p* value < 0.05) between the

two study groups. This showed that males exhibited a better pain profile as compared to females (Figure-6).

DISCUSSION

Patient sex is an independent factor influencing both responsiveness to general anaesthesia and recovery after anaesthesia.⁸ Anaesthesia for ear, nose and throat (ENT) surgeries encompasses a range of operations varying in duration, severity and complexity. Problems are likely to occur in nose, larynx and pharynx surgeries in which airway has to be shared between the surgeon and the anaesthetist.⁹ Advantages of general anaesthesia in ear, nose and throat surgeries is that it prevents coughing, movements and straining by the patient. It provides a safe and unobstructed airway. Postoperative nausea

and vomiting are causatives affecting sound recovery of patients undergoing ear, nose and throat surgeries.⁸

Women seem to have poor post-operative quality of recovery and higher pain scores were observed which were consistent with previous studies.^{8,10,11} Postoperative recovery has been evaluated traditionally using a variety of psychological, physical and economic end-points.^{8,1,12} There is no gold standard for a measuring post-operative quality of recovery. We chose to use quality of recovery 40 questionnaire which has a good construct validity and reliability.^{4,5,13,14}

24 hours postoperatively patients were asked about their well-being by emphasizing on the questions from the QoR-40 questionnaire.^{4,8} The QoR-40 encompasses most aspects of a good quality of recovery after surgery and anaesthesia, consisting of five dimensions (physical comfort, emotional state, physical independence, psychological support, and feeling of being pain free).^{4,5,13} Response of the patient was tested under each of the above mentioned dimensions.

The mean score for emotional state in our study group patients for males was 42.9 ± 1.2 and that for females was 40.72 ± 2.0 . This shows statistical significance between the two study groups (p value < 0.05). Hence males exhibited a better emotional well-being 24 hours postoperatively.^{8,10,11,15} This findings were consistent with study done by Taenzer AH et al,¹⁰ Myles PS,⁸ and by F. F. Buchanan.⁶

Psychological support score showed a mean value of 33.40 ± 1.28 for males and that for females was 32.3 ± 1.4 . This shows statistical significance between the psychological scores of the study groups (p value < 0.05). Thus, males showed better psychological support scores as compared to females 24 post operatively after general anaesthesia.^{8,10,11} This finding is consistent with literature from Buchanan et al in year 2011 who demonstrated poorer quality of psychological support in females as compared to males.¹⁵

Physical comfort score which showed a mean value of 56.34 ± 2.02 in males and that for females was 52.02 ± 2.85 . This shows statistical significance for physical comfort between the two study groups (p value < 0.05). This demonstrated that males experience a better level of physical comfort as compared to females.¹⁵ This finding was also consistent with study done by Buchanan et al in year 2011. Similar findings were also published by Taenzer AH, Clark C and Curry CS in year 2000. The physical independence which showed a mean value of 23.54 ± 1.03 and that for females was 22.70 ± 1.45 . This showed statistical significance between the two study groups (p value < 0.05) with males showing better physical support scores as compared to females.¹⁵

The pain profile of the two study groups showed that males had a mean value of 27.56 ± 1.42 and that for females was 24.34 ± 1.9 . This showed a statistical significance (p value < 0.05) between the two study groups. This showed that males exhibited a better pain profile as compared to females.^{8,10,6,15}

These findings are consistent with study of F. F. Buchanan, P. S. Myles and F. Cicuttini. Similar findings were also established by Myles PS, Hunt JO and Moloney JT. Thus we found that the overall rate and quality of recovery from general anaesthesia for women was poorer than that of men.^{8,10,11,15}

In our study comparison of QoR-40 score between both the study groups showed a mean value of 183.74 ± 5.54 and that for

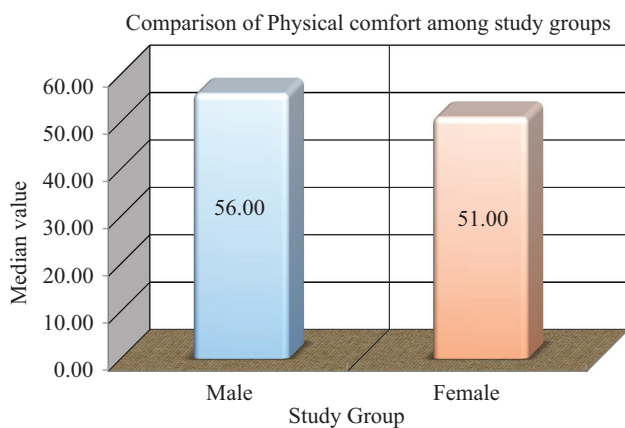


Figure-4: Comparison of Physical comfort score among study groups.

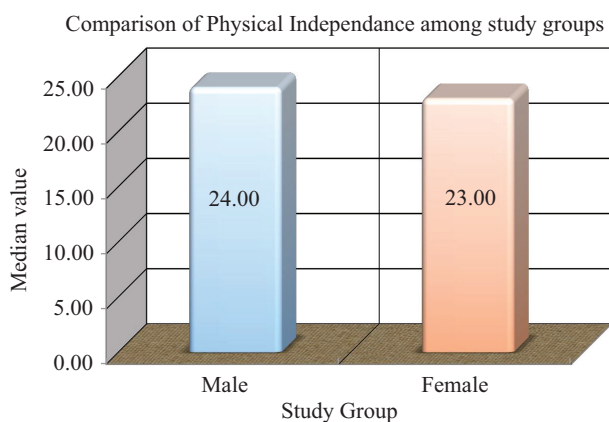


Figure-5: Comparison of Physical independence among study groups

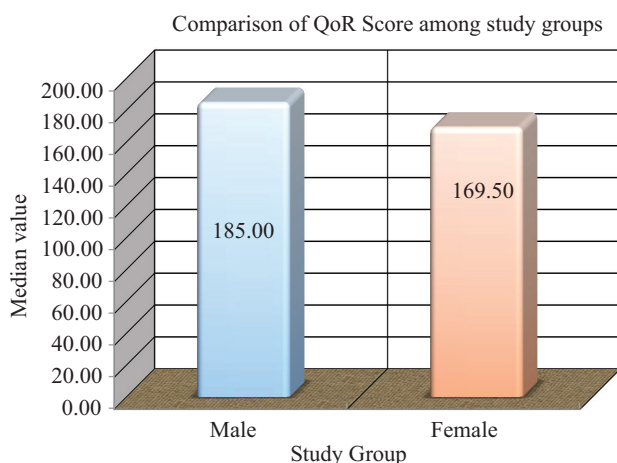


Figure-6: Comparison of pain among study groups.

females was 172.08 ± 6.97 . This showed statistical significance between the two study groups (p value < 0.05). Hence, males showed a better QoR -40 score as compared to females.¹⁵ These findings are consistent with study of F. F. Buchanan, P. S. Myles and F. Cicuttini.^{6,15}

Thus, we found that patient sex is an independent factor influencing recovery after anaesthesia. Our findings are consistent with earlier studies using volatile anaesthetics in animal models and human volunteers.^{16,17}

Oestrogen, progesterone, and androgen receptors have been identified in mammalian brain and possess actions distinct from reproductive behaviour and function.¹⁸ Progesterone and its metabolites, in particular, have hypnotic effects that are thought to occur via direct action on the GABA receptor complex.^{17,18} Merryman W, Boiman R, Barnes L and Rothchild in 1954 in their article progesterone 'anaesthesia' in human demonstrated sedative effects of 21 hydroxypregnane-3:20-dione sodium succinate. Estrogen, however, has the opposite effect by suppressing GABA receptor-mediated inhibition.^{17,19} Unlike progesterone, oestrogen increases excitatory transmission at NMDA-type glutamate receptors, increasing NMDA receptor density in the hippocampus²⁰ and increasing the binding of glutamate to NMDA receptors.²¹

Sex-based differences in nociception could explain the differences in both the depth of anaesthesia and recovery from anaesthesia. This suggests differences in the neuronal activity involved in pain perception between sexes.²² Oestrogen and progesterone are thought to play a role by influencing excitability in both the brain and spinal cord.²³ As the state of general anaesthesia appears to be dependent on drug effects at different receptor types in the brain and spinal cord, it is possible that altered modulation of these receptors by sex steroid hormones could explain some of the sex-related differences seen during and after general anaesthesia and surgery.

CONCLUSION

Patient sex is an independent factor influencing both state of general anaesthesia and recovery from general anaesthesia. Women wakeup faster from general anaesthesia than men. The overall quality of recovery was poor in females as compared to males 24 hours post operatively after general anaesthesia in elective ear, nose and throat surgeries as demonstrated by less QoR - 40 score in females. All dimensions of QoR -40 score were affected more in females

REFERENCES

1. Lee A, Lum ME. Measuring anaesthetic outcomes. *Anaesth Intensive Care*. 1996;24:685-93.
2. Cohen MM, Duncan PG, DeBoer DP, Tweed WA. The post-operative interview: assessing risk factors for nausea and vomiting. *Anaesth Analg*. 1994;78:7-16.
3. Aldrete, J. Antonio, Kroulik, Diane. A Postanesthetic Recovery Score. *IARS*. 1970;49:924-934.
4. P.S. Myles, B.Weitkamp, K. Jones, J.Melick, S.Hensen. Validity and reliability of a postoperative quality of recovery score. QoR-40. *British journal of Anaesthesia*. 2000;84:11-15.
5. McDowell I, Newell C. *Measuring Health: a Guide to Rating Scales and Questionnaires*. New york: Oxford University Press, 1987.
6. Buchanan FF, Myles PS, Leslie K, Forbes A, Cicuttini F.

Gender and recovery after general anaesthesia combined with neuromuscular blocking drugs. *Anesth Analg*. 2006;102:291-7.

7. Jellish WS, Owen K, Edelstein S, Fluder E, Leonetti JP. Standard anesthetic technique for middle ear surgical procedures: A comparison of desflurane and sevoflurane. *Otolaryngol Head Neck Surg*. 2005;133:269-74.
8. Myles PS, Hunt JO, Moloney JT. Postoperative 'minor' complications. Comparison between men and women. *Anaesthesia*. 1997;52:300-6.
9. Marc Allan Feldman and Anil Patel. *Anaesthesia for eye, ear, nose and throat surgery*, Miller's anaesthesia seventh edition, pg 2357-2385.
10. Taenzer AH, Clark C, Curry CS. Gender affects report of pain and function after arthroscopic anterior cruciate ligament reconstruction. *Anaesthesiology*. 2000;93:670-5.
11. Harmon D, O'Connor P, Gleasa O, Gardiner J. Menstrual cycle irregularity and the incidence of nausea and vomiting after laparoscopy. *Anaesthesia*. 2000;55:1164-7.
12. Warden JC, Borton CL, Horan BF. Mortality associated with anaesthesia in New South Wales, 1984 - 1990. *Med J Aust*. 1994;161:585-93.
13. Kirshner B, Guyatt G. A methodological framework for assessing health indices. *J Chronic Dis*. 1985;30:917-25.
14. Gill TM, Feinstein AR. A critical appraisal of the quality of the quality-of-life measurements. *JAMA*. 1994;272:619-26.
15. F. F. Buchanan¹, P. S. Myles and F. Cicuttini. Effect of patient sex on general anaesthesia and recovery. *British Journal of Anaesthesia*. 2011;106:832-9.
16. Datta S, Migliozzi RP, Flanagan HL, Krieger N. Chronically administered progesterone decreases halothane requirements in rabbits. *Anesth Analg*. 1989;68:46-50.
17. Manber R, Armitage R. Sex, steroids and sleep: a review. *Sleep*. 1999;22:540-55.
18. Pfaff DW, McEwen BS. Actions of oestrogens and progestins on nerve cells. *Science*. 1983;219:808-14.
19. Gee KW, Bolger MB, Brinton RE, Coirini H, McEwen BS. Steroid modulation of the chloride ionophore in rat brain: structure-activity requirements, regional dependence and mechanisms of action. *J Pharmacol Exp Ther*. 1988;246:803-12.
20. McEwen BS, Alves SE. Oestrogen actions in the central nervous system. *Endocr Rev*. 1999;20:299-307.
21. Rudick CN, Woolley CS. Estradiol induces a phasic Fos response in the hippocampal CA1 and CA3 regions of adult female rats. *Hippocampus*. 2000;10:274-83.
22. Woolley CS, Weiland NG, McEwen BS, Schwartzkroin PA. Estradiol increases the sensitivity of hippocampal CA1 pyramidal cells to NMDA-receptor mediated synaptic input: correlation with dendritic spine density. *J Neurosci*. 1997;17:1848-59.
23. Woolley CS, Schwartzkroin PA. Hormonal effects on the brain. *Epilepsia*. 1998;39:S2-S8.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 26-05-2016; **Published online:** 30-06-2016