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Emergence Agitation: Comparison of Paracetamol and Tramadol in Elective Surgery Patients

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ABSTRACT

Background: Post-operative emergence agitation is frequent and self-limiting but at times may present with violent behavior and may result in harm to both patients and caregivers. The objective of this research is to find the incidence of emergence agitation and to compare the effects of paracetamol and tramadol on emergence agitation.

Methods: A quasi experimental study was conducted in the Department of Anesthesiology, College of Medical Sciences, Bharatpur, Chitwan, Nepal over a period of three months. One hundred fifty ASA I and II patients aged 18 – 45 years old, posted for elective surgery under general anesthesia were included. Patients were assigned into two equal groups of 75 patients (n=75). At the end of the surgery, group A received inj. tramadol 1mg/kg, just when the surgeon starts skin closure and group B received 15 mg/kg Paracetamol. Time taken for extubation, shivering, Richmond agitation sedation scale (RASS) and sedation and Visual analogue scale (VAS) and need of rescue analgesics were recorded.

Results: In paracetamol group, reversal to extubation time was 8.75±3.0 minutes which was higher compared to 6.21±1.84 minutes in tramadol group. Prevalence of shivering was higher in paracetamol group. VAS score in paracetamol group was 5.28±1.03 compared to 4.33±0.82 in tramadol group. Frequency of need of rescue analgesia was higher in paracetamol group. In the immediate postoperative period, agitation was more common.

Conclusion: Use of tramadol before extubation reduces the incidence of postoperative emergence agitation, immediate postoperative pain and shivering.

Keywords: emergence; agitation; VAS; RASS.

INTRODUCTION

Agitation, confusion, disorientation and sometimes violent behavior observed in the immediate postoperative period is termed as emergence agitation (EA). It is usually self-limiting, but at times can lead to consequences such as self extubation, removal of catherters, removal of nasal packages, hemorrhage and fall injuries. It has reported incidence of 4.7% to 21.3%.[1-7] EA is confined to the emergence period as consciousness is restored unlike postoperative delirium.[8] Various pharmacological interventions have been tried with variety of conflicting results.[4-6,7,9-10] Use of short acting potent sedatives and analgesics in the immediate postoperative period will only prolong the state of general anesthesia and may not prevent the development of EA, can result in airway compromise and hemodynamic instability. Tramadol is a synthetic opioid with efficacy for moderate to severe acute and also reduces the incidence of postoperative shivering and cough.[11-14] Paracetamol is a non-opioid analgesic and antipyretic.[15]

METHODS

A hospital based quasi experimental study was conducted from 15th august 2023 to 10th November 2023 in the Department of Anesthesiology, College of Medical Sciences, Bharatpur, Chitwan, Nepal. Ethical approval was taken from institutional review committee (IRC),College of Medical Sciences. One hundred fifty ASA I and II patients aged 18–45 years old, posted for elective surgery under general anesthesia were included. Patients who were ASA more than II, aged less than 18 or more than 45 years and posted for emergency surgery were excluded from the study. Primary outcomes were the incidence of emergence agitation. Secondary outcomes were the efficacy of tramadol to prevent emergence agitation, immediate post-operative pain and shivering. Sample

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size calculation was based on the assumption that proportion of the population who developed emergence agitation in case and control is 0.26 and 0.50 as observed by lee et al.[18] With alpha error of 0.05, power of 80%, medium effect size (0.5), and equal participants (ratio =1), minimum sample size in each group was calculated to be 73.88. This study was conducted among 75 patients in each group. Therefore, the total sample size was taken as 150 in our study.

$$\text{Sample size} = \frac{r+1}{r} \times \frac{P*(1-p*)(Z\beta+Z\alpha/2)^2}{(P1-P2)^2}$$

P1=proportion of exposed cases= 14/52= 0.26

P2= proportion of exposed control=31/61=0.50

P*= average proportion exposed = (P1+P2)/2

r= ratio of case to control (1 for equal number of case and control)

Zβ= standard normal variate for power = for 80% power it is 0.84

Zα/2=standard normal variate for level of significance =at 5% type I error = 1.96

All the patients received general anesthesia according to departmental protocol. Patients were assigned into two equal groups of 75 patients (n=75). At the end of the surgery, group A received inj. tramadol 1mg/kg (not more than 50 mg) just when the surgeon starts skin closure and group B received 15 mg/kg Paracetamol (not more than 1 gram). All the participants in both groups received 4 mg ondensetron. Reversal of muscle relaxation was achieved using neostigmine with glycopyrrolate in all the patients. Time taken to extubate after reversal of neuromuscular bloackage was recorded. Shivering during and after extubation was graded and recorded. After extubation, Richmond agitation sedation scale (RASS) was used to grade agitation and sedation and Visual analogue scale (VAS) was used to measure pain at immediate postoperative period. When demanded or VAS more than six or more was managed with fentanyl 0.5 mcg kg, which was also recorded.

RESULTS

There were total of 150 participants in the study who were equally divided into two groups. The mean±SD of age in Paracetamol group was 33.19±8.04 years while in Tramadol group was 33.03±7.81 years (Table 1).

Table 1. Demographic characteristics of the respondent. (n=150)

Variables	Paracetamol group	Tramadol group
Age	33.19±8.04	33.03±7.81
Sex (M:F)	24:51:00	28:47:00
ASA (I:II)	53:22:00	49:26:00

The reversal to extubation time was longer in paracetamol group compared to tramadol group. The mean VAS scores were higher in paracetamol group when compared to tramadol group in the immediate postoperative period (Table 2).

Table 2. Reversal to extubation time and VAS Score. (n=150)

	Paracetamol	Tramadol
Reversal to extubation time (minute)	8.75±3.0	6.21±1.84
VAS score	5.28±1.03	4.33±0.82

In the immediate postoperative period, agitation was more common in paracetamol group and sedation was more common in tramadol group (Table 3).

Table 3. Comparison of RASS. (n=150)

Score	Paracetamol	Tramadol
	Frequency (%)	Frequency (%)
-4	2(2.7)	0
-3	7(9.3)	3(4)
-2	19(25.3)	0
-1	11(14.7)	10(13.3)
0	4(5.3)	8(19.7)
1	16(21.3)	18(24)
2	13(17.3)	22(29.3)
3	1(1.3)	12(16)
4	2(2.7)	2(2.7)

Prevalence of shivering was higher in paracetamol group. Frequency of need of rescue analgesia was higher in paracetamol group (Table 4).

Table 4. Shivering and Need of Rescue Analgesics. (n=150)

	Paracetamol	Tramadol
Shivering	29.30%	8%
Rescue Analgesic Needed	44%	9.30%

DISCUSSION

Prevalence of emergence agitation in the postoperative period is high. Though agitation is observed more frequently in pediatric patients, the incidence in adults has been reported at 4.7% or 21.3%.[16,6] In our study the prevalence of EA was 52% in paracetamol group and 17.3% in tramadol group. In one of the studies, it was observed that drowsiness was found to be higher in tramadol group.[17] In our study, we observed that agitation was more common in paracetamol group and sedation was more common in tramadol group. In adult patients undergoing nasal surgery, it is found that tramadol decreases the incidence of EA after sevoflurane anesthesia without delaying recovery or increasing the number of adverse events.[18] In our study, we observed that reversal to extubation time is earlier in tramadol group compared to paracetamol group. Despite understanding pathophysiology of postoperative pain and recognition of the problems associated, it is observed that routine treatment of postoperative pain is unsatisfactory. A comprehensive management of postoperative pain results in successful recovery.[19] In one of the studies, in the postoperative period, at baseline, mean VAS score in paracetamol group was 6.30±0.99 as compared to 6.20±1.30 in tramadol group.[20] In another study by they observed that onset of analgesia is faster in tramadol group thus significantly decreases VAS score from 15 min onward, and this was observed up to 3 h.[17] In paracetamol group, the onset of analgesia was slightly delayed. Pain scores significantly decreased only after 60 min, and this was observed up to 6 h and pain scores increased thereafter.[17] In our study, we also observed lower VAS scores in tramadol group compared to paracetamol group in the immediate postoperative period and need of rescue analgesics which was higher in paracetamol group in the immediate postoperative period. Post anaesthetic shivering is a common complication that occurs in up to 60% of patients recovering from general anaesthesia.[21] In one of the studies, they observed that in paracetamol receiving group, the incidence of shivering in recovery was significantly lower.[22] They concluded that, given the beneficial effects of paracetamol in post-operative shivering and pain reduction, it is recommended in patients undergoing surgery with general anesthesia. In another study , shivering was seen in 5 parturients (9.1%) in paracetamol group and 28 parturients (50.9%) in the saline group and concluded that the prophylactic use of intravenous paracetamol during surgery is effective for the prevention of postoperative shivering.[23] In a study, Tramadol was equivalent to pethidine to prevent significant shivering in 100% of the patients.[24] Similarly, in another study, they observed that there was significantly lower incidence in the tramadol-treated group than the group who did not receive tramadol.[25] In our study, we observed that incidence of shivering was significantly low in tramadol group.

CONCLUSIONS

Tramadol due to its quick onset of action and fewer side effects is better than intravenous paracetamol in the immediate postoperative period. Use of tramadol before extubation reduces the incidence of postoperative emergence agitation, shivering and need of rescue analgesics.

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REFERENCES

1. Jee YS, You HJ, Sung TY, et al. Effects of nefopam on emergence agitation after general anesthesia for nasal surgery: a prospective, randomized, and controlled trial. Medicine 2017;96:e8843. DOI: 10.1097/MD.0000000000008843
2. Kim HJ, Kim DK, Kim HY, et al. Risk factors of emergence agitation in adults undergoing general anesthesia for nasal surgery. ClinExpOtorhinolaryngol 2015;8:46–51. DOI: 10.3342/ceo.2015.8.1.46
3. Munk L, Andersen G, Moller AM. Post-anaesthetic emergence delirium in adults: incidence, predictors and consequences.

ActaAnaesthesiolScand 2016;60:1059–66. DOI: 10.1111/aas.12717

4. Kanaya A. Emergence agitation in children: risk factors, prevention, and treatment. J Anesth 2016;30:261–7. DOI: 10.1007/s00540-015-2098-5
5. Vlajkovic GP, Sindjelic RP. Emergence delirium in children: many questions, few answers. AnesthAnalg 2007;104:84–91. DOI: 10.1213/01.ane.0000250914.91881.a8
6. Yu D, Chai W, Sun X, et al. Emergence agitation in adults: risk factors in 2,000 patients. Can J Anaesth 2010;57:843–8. DOI: 10.1007/s12630-010-9338-9
7. Cohen IT, Hannallah RS, Hummer KA. The incidence of emergence agitation associated with desflurane anesthesia in children is reduced by fentanyl. AnesthAnalg 2001;93:88–91. DOI: 10.1097/00000539-200107000-00019
8. Tolly B, Waly A, Peterson G et al. Adult Emergence Agitation: A Veteran-Focused Narrative Review. Anesthesia & Analgesia 132(2):p 353-364, February 2021. | DOI: 10.1213/ANE.0000000000005211
9. Polat R, Peker K, Baran I, et al. Comparison between dexmedetomidine andremifentanil infusion in emergence agitation during recovery after nasal surgery: a randomized double-blind trial. Anaesthesist 2015;64: 740–6. DOI: 10.1007/s00101-015-0077-8
10. Rim JC, Kim JA, Hong JI, et al. Risk factors of emergence agitation after general anesthesia in adult patients. Anesth Pain Med 2016;11:410–6. DOI: 10.4097/kja.20097
11. Klotz U. Tramadol—the impact of its pharmacokinetic and pharmacodynamics properties on the clinical management of pain. Arzneimittelforschung 2003;53:681–7. DOI: 10.1055/s-0031-1299812
12. Shipton EA. Tramadol-present and future. Anaesth Intensive Care 2000;28:363–74. DOI: 10.1177/0310057X0002800403
13. De Witte J, Deloof T, De Veylder J, et al. Tramadol in the treatment of postanesthetic shivering. ActaAnaesthesiolScand 1997;41:506–10. DOI: 10.1111/j.1399-6576.1997.tb04732.x
14. Lin BF, Ju DT, Cherng CH, et al. Comparison between intraoperative fentanyl and tramadol to improve quality of emergence. J NeurosurgAnesthesiol 2012;24:127–32. DOI: 10.1097/ANA.0b013e31823c4a24
15. Graham GG, Scott KF. Mechanism of action of paracetamol. Am J Ther. 2005 Jan-Feb;12(1):46-55. DOI: 10.1097/00045391-200501000-00008
16. Lepouse C, Lautner CA, Liu L, Gomis P, Leon A. Emergence delirium in adults in the post-anaesthesia care unit. Br J Anaesth. 2006 Jun;96(6):747-53. DOI: 10.1093/bja/ael094
17. Manne VS, Gondi SR. Comparative study of the effect of intravenous paracetamol and tramadol in relieving of postoperative pain after general anesthesia in nephrectomy patients. Anesth Essays Res 2017;11:117-20. DOI: 10.4103/0259-1162.186619
18. Lee SJ, Choi SJ, In CB, Sung TY. Effects of Tramadol on emergence agitation after general anesthesia for nasal surgery: A retrospective cohort study. Medicine (Baltimore).2019 Mar;98 (10). DOI: 10.1097/MD.0000000000014763
19. Pesut B, Johnson J. Evaluation of an acute pain service. Can J Nurs Adm 1997;10:86-107. PMID: 9450414
20. Bandey S, Singh V. Comparison between IV Paracetamol and Tramadol for Postoperative Analgesia in Patients Undergoing Laparoscopic Cholecystectomy. J Clin Diagn Res. 2016;10(8):UC05-UC9. DOI: 10.7860/JCDR/2016/21021.8274
21. Joris J, Banache M, Bonnet F, Sessler DI, Lamy M. Clonidine and ketanserin both are effective treatment for postanesthetic shivering. Anesthesiology 1993; 79: 532–9. DOI: 10.1097/00000542-199309000-00017

22. Khalili G, Sajedi P, Alinaghian A. The effect of intravenous infusion of paracetamol before anesthesia induction on the core and peripheral temperature changes and post-operative shivering in patients undergoing general anesthesia. Adv Biomed Res 2014;3:89. DOI: 10.4103/2277-9175.128468
23. Gholami AS, Hadavi M. Prophylactic intravenous paracetamol for prevention of shivering after general anesthesia in elective cesarean section. J Obstet Anaesth Crit Care 2016;6:81-85. [DOI]
24. Mohta M, Kumari N, Tyagi A, Sethi AK, Agarwal D, Singh M. Tramadol for prevention of postanaesthetic shivering: a randomised double-blind comparison with pethidine. Anaesthesia. 2009 Feb;64(2):141-6. [DOI]
25. Nakagawa T, Hashimoto M, Hashimoto Y, Shirozu K, Hoka S. The effects of tramadol on postoperative shivering after sevoflurane and remifentanil anesthesia. BMC Anesthesiol. 2017 Jan 3;17(1):1. [DOI]

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