

Sedation in the post-anaesthesia care unit

Andrius Macas¹,

Lina Andriuškevičiūtė²,

Jūratė Paltanavičiūtė²,

Ieva Slauzgalvytė²

¹Department of Anesthesiology
and Intensive Care,
Hospital of Lithuanian
University of Health Sciences
Kaunas Clinics

²Faculty of Medicine,
Medical Academy,
Lithuanian University of
Health Sciences, Lithuania

Background. Post-anaesthetic sedation is a common practice as it provides greater comfort and psychological stability for patients. Some specialists claim that sedation in the post-anaesthetic care unit (PACU) is applied too seldom due to several reasons. The goal of this study is to evaluate sedation in PACU in several aspects.

Materials and methods. A total of 299 patients admitted to the PACU after general, orthopedic-traumatologic or urologic surgical procedures were enrolled in this prospective study. The patients evaluated their quality of sleep and the worst intensity of pain experienced in PACU, which was assessed using the Numerical Rating Scale. Nurses evaluated sedation using the Motor Activity Assessment Scale and filled in the questionnaire about the importance of sedation.

Results. Statistically significant difference was observed in the quality of sleep between the patients sedated using benzodiazepines and opioids together and non-sedated patients ($p = 0.025$). There is no considerable difference in the statistics concerning the behavior of the patients. The patients prescribed only with opioids IV or IM, as well as the patients prescribed with opioids together with benzodiazepines, feel less intense pain compared to the non-sedated patients ($p = 0.016$, $p = 0.03$). According to the personnel, sedation is necessary in PACU. Half of them think that patients prescribed with opioids need additional sedation.

Conclusions. Sedation is necessary in PACU. This fact is evident in the statistically significant difference of comfort factors among the patients as well as in the opinion of the nursing personnel that spend most of the time communicating and caring about the comfort of the patients.

Key words: post-anaesthetic sedation, postoperative care, benzodiazepine, delirium, pain

INTRODUCTION

Post-anaesthetic sedation has been a common practice all over the world for many years. It pro-

vides greater comfort and psychological stability for patients.

Lack of sedation in this period may lead to postoperative agitation, anxiety, increased postoperative pain perception and prolonged stay in PACU (post-anaesthesia care unit), ICU (intensive care unit) and the hospital itself (1). It may also increase the risk of patient's self-injury (2) and complicate the provision of adequate patient care.

Correspondence to: Andrius Macas, Department of Anesthesiology and Intensive Care, Lithuanian University of Health Sciences, Eivenių 2, LT-50028 Kaunas, Lithuania.
E-mail: andrius.macas@kmuk.lt

There are opinions that benzodiazepines can reduce the need of opioid analgesics in the period of post-anaesthesia. Pain is a subjective experience, and stress, as well as psychological condition, cause more intense postoperative perception of pain (3). The study shows that patients who felt anxiety before the operation and expected to feel pain after the procedure experienced higher degree of pain (4, 5). The emphasis on forthcoming pain influences longer postoperative recovery, increases the need of painkillers and prolongs the period of hospitalization (3). Benzodiazepines have no analgesic effect, however, due to the anxiety relieving, tranquilising and muscle relaxing effect, they decrease the perception of pain and prevent from further pain caused by anxiety (6).

Some specialists claim that sedation in the post-anaesthetic ward is applied too seldom. Possible reasons are given below.

Groups of medications most commonly used for sedation can cause postoperative delirium. The researches have revealed that a method of anaesthesia (regional or general) and related medications do not influence postoperative delirium (7, 8). Opinions are diverse and the systematic review carried out by the authors on this issue does not indicate clearly that benzodiazepines could cause postoperative delirium (9). Postoperative delirium possibly caused by the usage of benzodiazepines depends on the dose: big doses provoke postoperative delirium more often compared with small doses (10). In some cases benzodiazepines are used for the treatment of postoperative delirium (11, 12). Opioids are referred to as the risk factor for delirium to appear. The systematic review carried out by the authors did not prove it categorically (9). The study showed that in case of severe pain the avoidance of opioids or prescription of small doses are related with higher risk of delirium (13).

Medications that are used for sedation can cause disorders of cognitive functions. It is difficult to evaluate objectively the impact on cognitive functions since pain itself as well as anxiety can have a negative effect. That is why it is complicated to assess the role of medications at this point (14). The short-term disorders of cognitive functions provoked by benzodiazepines include anterograde amnesia, fluency of speech, psychomotor speed, time of reaction, coordination and focus of attention, semantic memory, etc. It is difficult to com-

pare the results of the studies performed on this issue since different medications and techniques were used (15). Negative effects of big doses and long term usage of opioids on cognitive functions were mentioned in literature a long time ago (16). One-off doses or prescription of average or small doses for a very short period effect cognitive functions in a different way, depending on doses and different types of opioids (17). Some surveys point out that opioids can even improve cognitive functions (18).

The need for sedation in PACU is difficult to assess because there is no uniform sedation policy: there are no standardized recommendations for the use of specific scales or criteria, no recommendations for a targeted therapeutic level of sedation according to patient's specific needs and specific indications. The same problem arises in further assessment of the patient's level of sedation after the sedative medications have been appointed. In order to avoid complications due to over-sedation and negative impact on morbidity, mortality and functional recovery of a patient, a reliable tool to monitor sedation in PACU is essential (19), as over-sedation itself increases the risk of depressive symptoms, delirium and delusional memories (20). Therefore, the decision on whether a patient requires sedation or not, is more intuitive than objective and depends on the nurses' personal assessment, the level of experience and education they have, support or directions from other medical staff, the subjective understanding of reasonable comfort (21). There are some other no less significant factors that can affect both the frequency of sedation and sedation level, such as the staff's willingness to work in a quiet environment especially during the night shifts or the number of staff on duty (21). Another multicentre study showed that nurses take the agitated patients seriously, but they encounter difficulties in assessing the severity of the patient's condition and deciding whether they should inform the doctor that the patient requires sedation or should wait patiently (22). In this case nurses are the key personnel and their attitude and behaviour has a great impact on the process of administration of sedation (23).

The authors of the present study have taken a decision to carry out a research evaluating sedation in the postoperative ward in several aspects. The frequency of sedation and medications most often

used for sedation have been assessed. At the same time the quality of sleep, behavior and pain perception among sedated (using different methods) and non-sedated patients have been compared. And finally, the position of the personnel evaluating the postoperative sedation and its need has been ascertained.

MATERIALS AND METHODS

This prospective study was conducted during the period of 2 months (1 December 2011 – 31 January 2012) in post-anaesthesia care units (PACU) of General Surgery and Orthopaedic-Traumatology Departments, Hospital of Lithuanian University of Health Sciences Kaunas Clinics. Every patient admitted to PACU after general surgical, orthopaedic-traumatologic or urologic surgical procedures and who spent a night there was included in this prospective study. The general data about the patient (age, weight, medical history and diagnosis, type of surgery, ASA score, the date of surgery and the exact time of admission to PACU) were taken from the case-histories. In the morning patients themselves evaluated their quality of sleep and the worst intensity of pain experienced during their stay in PACU. In order to evaluate their quality of sleep patients had to choose one answer from the following: (a) I slept very well, (b) I slept fine, but I was awake for a couple of times during the night, (c) I slept badly, (d) I couldn't sleep at all.

The intensity of pain was assessed using the Numerical Rating Scale (NRS) (24). The nurses evaluated sedation using the Motor Activity Assessment Scale (MAAS) (25). Additionally, the nurses anonymously filled in the questionnaire about the importance of sedation in general in PACU. The questionnaire consisted of the following questions: (a) Does sedation play an important role in PACU? (Yes, No); (b) What are the most popular indications to sedate in PACU?

(c) Which sedative medications do you usually use in PACU? (d) Do the patients receiving opioids for analgesia need additional sedative? Statistical analysis was performed using SPSS 17.0. As the variables were not normally distributed, Kruskal-Wallis and Mann-Whitney U tests were used. $P < 0.05$ was considered to be a statistically significant difference. This study was approved by the Bioethics Centre of the Lithuanian University of Health Sciences (BC-MF-156).

RESULTS

A total of 299 patients were enrolled in the study: 153 women (51.2%) and 146 men (48.8%). The average age was 62.6 ± 14.9 years. According to the ASA score, patients were distributed as follows: I ASA – 24 patients (8%), II ASA – 143 patients (47.8%), III ASA – 111 patients (37.1%) and IV ASA – 21 patients (7%). According to medication used for sedation and the route of administration, patients were divided into 5 groups (see Table).

To determine if sleep quality, pain intensity by NRS and sedation score by MAAS differed significantly among all 5 groups, the non-parametric Kruskal-Wallis test was used. When comparing groups in pairs, the non-parametric Mann-Whitney test was used. The quality of sleep among all the groups did not differ significantly, however, comparing groups in pairs, there was a statistically significant difference between the 4th and 5th group ($p = 0.025$). Patient sedation by MAAS cannot be evaluated statistically, because in the Kruskal-Wallis test application it is required that all the values of the MAAS scale obtained at least 5 cases (see Figure).

Pain intensity by NRS was not statistically significantly different among all five groups, but comparing in pairs, there was a significant difference between the 3rd and 5th group ($p = 0.016$), 4th and 5th group ($p = 0.03$).

Table. 5 groups of patients according to medication used for sedation

Groups	Frequency	Percent
1 sedated only with benzodiazepines	5	1.7
2 sedated with opioids through epidural catheter	87	29.1
3 sedated with opioids IV or IM	146	48.8
4 sedated with opioids and benzodiazepines together	24	8.0
5 not sedated at all	37	12.4
Total	299	100.0

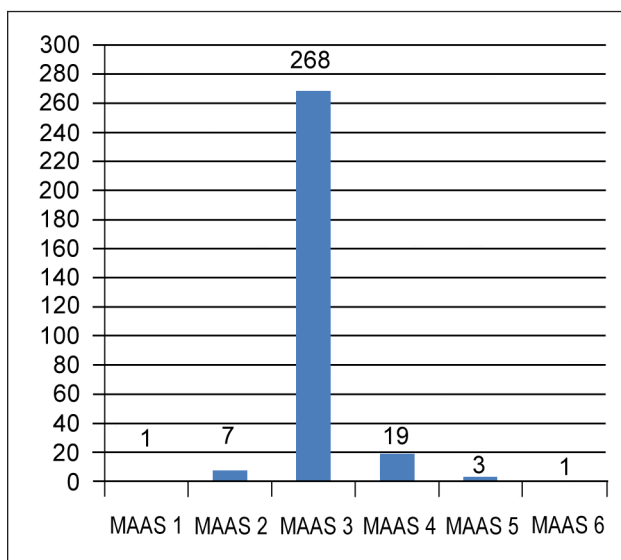


Figure. Values of the MASS scale

All 15 nurses, who filled in the questionnaire, thought that sedation was required. The most common causes of sedation, such as agitation was mentioned 12 times, insomnia 10 times and patient preference 8 times. The medications used to sedate according to frequency were as follows: diazepam was mentioned 14 times, midazolam 12 times, haloperidol 5 times, tiapridal 3 times. 2 nurses (13%) thought that patients who received opioids should be additionally sedated, 7 nurses (47%) thought that it was not necessary and 6 nurses (40%) thought that sometimes additional sedation was necessary.

DISCUSSION

Most of the patients in post-anaesthesia care units are sedated. Most common medications used for sedation, as described in literature, are benzodiazepines and opioids. Statistically significant difference can be observed in the quality of sleep between the patients sedated using benzodiazepines and opioids together and non-sedated patients. There is no considerable difference in the statistics concerning the behaviour of the groups of patients. The difference cannot be evaluated due to insufficient scope and uneven distribution. According to the data in the Figure, the values MAAS 1, MAAS 5 and MAAS 6 obtained less than 5 cases and the statistical analysis using the Kruskal-Wallis test could not be performed. The patients using only prescription opioids IV or IM, as well as the patients using prescription opioids together with benzodia-

zepines, feel less intense pain compared with the non-sedated patients. According to the personnel, sedation is necessary in the post-anaesthesia care unit. Half of them think that the patients that use prescribed opioids need additional sedation. Since nurses are an important element in the sedation chain, it would be reasonable to carry out a more thorough survey and evaluate their competence in this field and comprehension of sedation. Moreover, a research on possible disorders of cognitive functions in the post-anaesthesia care unit should also be carried out as there are very few studies on this issue. However, it is also important to estimate the over-sedation frequency in the post-anaesthesia care unit in order to improve the quality of sedation having in mind the reasons and relevance of the problem.

CONCLUSIONS

Sedation is necessary in PACU. This fact is evident in the statistically significant difference in comfort factors among the patients as well as in the opinion of the nursing personnel that spend most of the time communicating and caring of the comfort of the patients.

ACKNOWLEDGEMENTS

The authors are very grateful to the personnel working in post-anaesthesia care units of the General Surgery and Orthopaedic-Traumatology Departments, Hospital of Lithuanian University of Health Sciences Kaunas Clinics.

Received 23 July 2012

Accepted 1 August 2012

References

1. Gehlbach BK, Kress JP. Sedation in the intensive care unit. *Curr Opin Crit Care*. 2002; 8(4): 290–8.
2. Boulain T. Unplanned extubations in the adult intensive care unit: a prospective multicenter study. *Association des Reanimateurs du Centre-Ouest. Am J Respir Crit Care Med*. 1998; 157(4 Pt 1): 1131–7.
3. Keefe FJ, Rumble ME, Scipio CD, Giordano LA, Perri LM. Psychological aspects of persistent pain:

- current state of the science. *J Pain*. 2004; 5(4): 195–211.
4. Maggiras J, Locker D. Psychological factors and perceptions of pain associated with dental treatment. *Community Dent Oral Epidemiol*. 2002; 30(2): 151–9.
 5. Fukuda K, Hayashida M, Ikeda K, Koukita Y, Ichinohe T, Kaneko Y. Diversity of opioid requirements for postoperative pain control following oral surgery – is it affected by polymorphism of the mu-opioid receptor? *Anesth Prog*. 2010; 57(4): 145–9.
 6. Huffman JC, Stern TA. The use of benzodiazepines in the treatment of chest pain: a review of the literature. *J Emerg Med*. 2003; 25(4): 427–37.
 7. Slor CJ, de Jonghe JF, Vreeswijk R, Groot E, Ploeg TV, van Gool WA, et al. Anesthesia and post-operative delirium in older adults undergoing hip surgery. *J Am Geriatr Soc*. 2011; 59(7): 1313–9.
 8. Mason SE, Noel-Storr A, Ritchie CW. The impact of general and regional anesthesia on the incidence of post-operative cognitive dysfunction and post-operative delirium: a systematic review with meta-analysis. *J Alzheimers Dis*. 2010; 22 Suppl 3: 67–79.
 9. Clegg A, Young JB. Which medications to avoid in people at risk of delirium: a systematic review. *Age Ageing*. 2011; 40(1): 23–9.
 10. Marcantonio ER, Juarez G, Goldman L, Mangione CM, Ludwig LE, Lind L, et al. The relationship of postoperative delirium with psychoactive medications. *JAMA*. 1994; 272(19): 1518–22.
 11. Meagher DJ. Delirium: optimising management. *BMJ*. 2001; 322(7279): 144–9.
 12. Attard A, Ranjith G, Taylor D. Delirium and its treatment. *CNS Drugs*. 2008; 22(8): 631–44.
 13. Morrison RS, Magaziner J, Gilbert M, Koval KJ, McLaughlin MA, Orosz G, et al. Relationship between pain and opioid analgesics on the development of delirium following hip fracture. *J Gerontol A Biol Sci Med Sci*. 2003; 58(1): 76–81.
 14. Ersek M, Cherrier MM, Overman SS, Irving GA. The cognitive effects of opioids. *Pain Manag Nurs*. 2004; 5(2): 75–93.
 15. Barker MJ, Greenwood KM, Jackson M, Crowe SF. Cognitive effects of benzodiazepine use: a review. *Aust Psychol*. 2003; 38(3): 202–13.
 16. Lawlor PG. The panorama of opioid-related cognitive dysfunction in patients with cancer: a critical literature appraisal. *Cancer*. 2002; 94(6): 1836–53.
 17. Schoedel KA, McMorn S, Chakraborty B, Zerbe K, Sellers EM. Reduced cognitive and psychomotor impairment with extended-release oxymorphone versus controlled-release oxycodone. *Pain Physician*. 2010; 13(6): 561–73.
 18. O'Neill WM, Hanks GW, Simpson P, Fallon MT, Jenkins E, Wesnes K. The cognitive and psychomotor effects of morphine in healthy subjects: a randomized controlled trial of repeated (four) oral doses of dextropropoxyphene, morphine, lorazepam and placebo. *Pain*. 2000; 85(1–2): 209–15.
 19. De Gaudio AR, Rinaldi S. Sedation in PACU: indications, monitoring, complications. *Curr Drug Targets*. 2005; 6(7): 729–40.
 20. Ely EW, Shintani A, Truman B, Speroff T, Gordon SM, Harrell FE, et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA*. 2004; 291(14): 1753–62.
 21. O'Connor M, Bucknall T, Manias E. Sedation management in Australian and New Zealand intensive care units: doctors' and nurses' practices and opinions. *Am J Crit Care*. 2010; 19(3): 285–95.
 22. Herrero S, Mendoza N, Rodriguez MM, Mendoza D, Piney EG, Prieto AMS. Multicentre study about nurses' attitude to delirium patients. *Crit Care & Shock*. 2008; 11: 35–44.
 23. Guttormson JL, Chlan L, Weinert C, Savik K. Factors influencing nurse sedation practices with mechanically ventilated patients: a U. S. national survey. *Intensive Crit Care Nurs*. 2010; 26(1): 44–50.
 24. Bijur PE, Latimer CT, Gallagher EJ. Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. *Acad Emerg Med*. 2003; 10(4): 390–2.
 25. Devlin JW, Boleski G, Mlynarek M, Nerenz DR, Peterson E, Jankowski M, et al. Motor Activity Assessment Scale: a valid and reliable sedation scale for use with mechanically ventilated patients in an adult surgical intensive care unit. *Crit Care Med*. 1999; 27(7): 1271–5.

**Andrius Macas, Lina Andriuškevičiūtė,
Jūratė Paltanavičiūtė, Ieva Slauzgalvytė**

SEDACIJA POANESTETINĖJE PALATOJE

Santrauka

Įvadas. Poanestetinė sedacija dažnai taikoma medicininėje praktikoje siekiant pacientams suteikti daugiau komforto bei užtikrinti psichologinį stabilumą. Kai kurie specialistai teigia, jog sedacija poanestetinėje palatoje vis dar pernelyg reta. Šio tyrimo tikslas yra keliais aspektais įvertinti sedaciją poanestetinėse palatose.

Metodika. Prospektyviniame tyrime dalyvavo 299 pacientai, kurie po abdominalinių, ortopedinių-traumatologinių ar urologinių operacijų naktį praleido poanestetinėje palatoje. Buvo analizuojami pacientų anestezijos lapai, medikamentų paskyrimo lapai poanestetinėje palatoje, pacientai anketoje vertino savo miego kokybę, skausmo intensyvumą poanestetinėje palatoje pagal skaitinę analogų skalę (SAS), naktį budėjęs personalas vertino pacientų elgesį pagal MAAS (Motor Assessment Activity Scale) bei užpildė anketą apie sedacijos poreikį.

Rezultatai. Miego kokybė statistiškai reikšmingai skyrėsi tarp pacientų, kuriems buvo paskirti benzodiazepinai ir opioidai kartu, ir pacientų, kuriems sedacija netaikyta ($p = 0,025$), o abiejų grupių pacientų elgesys statistiškai patikimai nesiskyrė. Pacientų, kuriems paskirti tik opioidai *i/v* ar *i/m*, bei pacientų, kuriems paskirti opioidai kartu su benzodiazepiniais, skausmas buvo ne toks intensyvus, palyginti su tais, kuriems sedacija netaikyta ($p = 0,016$, $p = 0,03$). Personalo nuomone, sedacija poanestetinėje palatoje yra reikalinga. Pusė jų mano, kad opioidus gaunantiems pacientams reikalinga papildoma sedacija.

Išvados. Sedacijos svarbą poanestetinėje palatoje patvirtina tiek gautas statistiškai reikšmingas skirtumas tarp pacientų komfortui svarbių veiksnių, tiek ir slaugančiojo personalo, kuris daugiausia bendrauja su pacientais ir turi didelę įtaką jų komfortui, nuomonė.

Raktažodžiai: poanestetinė sedacija, pooperacinė priežiūra, benzodiazepinai, delyras, skausmas