



# Patient satisfaction with regional anesthesia in orthopedic surgery

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## Abbreviations:

BMI – body mass index  
IONV – intraoperative nausea and vomiting  
PONV – postoperative nausea and vomiting

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## Abstract

**Background and Purpose:** The patient satisfaction with perioperative care and anesthesia is important indicator of the quality of the health care system. The evaluation of the patient's satisfaction is a necessity, and the continuous improvement of a quality is important in anesthesia nowadays. It is important to identify the reasons and the risk factors for patients dissatisfaction with anesthesiologic procedures. We conducted this study to assess determinants of regional anesthesia on patient satisfaction.

**Materials and Methods:** This was a prospective observational study which included 164 patients older than 18 years undergoing some orthopedic procedures in regional anesthesia. We noted basic characteristics of patients, important perioperative events and on the following day patients completed a specific questionnaire.

**Results:** Most patients (152/164) were satisfied or very satisfied with the regional anesthesia. Only 11 patients were unsatisfied, and the most common reasons for dissatisfaction were urinary retention, PONV, the multiple puncture attempts and the pain on the puncture site. About 95% patients would receive regional anesthesia again and recommend this kind of anesthesia to the others. We found statistically significant percent (12%) of increasing satisfaction in previously unsatisfied patients ( $p < 0,001$ ).

**Conclusion:** Although, the satisfaction with regional anesthesia in orthopedic surgery in our institution is generally high, there are some factors which can influence on dissatisfaction rate. It is important to identify, monitor and modify them with aim of increasing the overall satisfaction rate.

## INTRODUCTION

The patient satisfaction with perioperative care and anesthesia is important indicator of quality of health care system (1). Patients' satisfaction affects the outcome of health care and the use of health-care services (2). Many hospitals and different health care organizations frequently use patient satisfaction ratings as an integral part of marketing and bench marketing of services. Continuous improvement in quality is important part in all kinds of anesthesia and evaluation of patient satisfaction is a necessity nowadays. It is important to identify the reasons and the risk factors for patients' dissatisfaction with anesthesiologic procedures. Many factors contribute to patient satisfaction, including possibility of choosing the kind of anesthesia, interpersonal relationships, competence of health professionals and a patient's own expectations and preferences (3). Most patients expect uneventful anes-

thetia, but nevertheless, recovery from anesthesia is sometimes complicated by residual sedation, pain, nausea, vomiting or different major and minor complaints (3, 4). These unwished events significantly affects total patient's satisfaction.

Regional anesthesia is becoming a major trend nowadays in many types of surgeries due to many potential benefits. During procedure patient remains conscious with spontaneous respiration and preserved reflexes and aspiration of gastric content is unlikely. Reduction in surgical stress, better postoperative analgesia, and earlier discharge for outpatients and less expense are also valuable advantages. Regional anesthesia and analgesia undoubtedly can improve clinically oriented outcomes (5).

There are many studies in the field of anesthesia about patient satisfaction, but most of them are restricted on general anesthesia. The effect and factors of regional anesthesia on patient satisfaction did not satisfactory demonstrate, so we conducted this study to asses determinants of regional anesthesia on patient satisfaction. The aim of this study was to evaluate patients' satisfaction with previous (regional) anesthesia and to determine predictors associated with unwillingness to have regional anesthesia again in the case of future surgery.

## MATERIALS AND METHODS

This was a prospective observational study approved by the University Hospital Osijek Research Ethics Committee. Written informed consent was obtained from each patient. The study population included 164 patients older than 18 years undergoing some orthopedic procedures in regional anesthesia, namely spinal or epidural anesthesia or peripheral nerve blocks. All regional blocks were used as the primary anesthetic technique. We excluded the patients with neurological disorders, psychological diseases, coagulation defects, unlettered patients and those who didn't understand the questions. Also, exclusion criteria were the conversion to general anesthesia or uncompleted data sheet.

This study was conducted by collecting pre-operative, intra-operative and post-operative data on a constructed data sheet divided in three parts. Prior to block administration, attending anesthesiologist entered patient's personal data (age, sex, weight, height, BMI, previous anesthesia experience) in the first part of data sheet. Information about actual regional anesthesia technique (grade of the performer, patient's position during the operation, type of block, the needle size, number of attempts) and intraoperative adverse reactions (need for additional sedation and analgesia, nausea/vomiting, hypotensia or conversion to general anesthesia) were noted in the second part of data sheet by the same investigator at the end of surgery. On the following day, a nurse not belonging to the surgical area and not aware of the anesthesia technique

gave third part of data sheet, i.e. a questionnaire to the patient. A questionnaire contain 13 questions about early experiences with anesthesia, satisfaction or dissatisfaction with actual regional anesthesia, willingness to accept regional anesthesia again and about recommendation this kind of anesthesia to the other persons.

Statistical analyses were performed using SPSS software (version 20.0, SPSS Inc, IL, USA). Data normality distribution was tested by Smirnov-Kolmogorov test. Frequency or arithmetic mean and standard deviation were calculated for all data. The difference of numerical variables was analyzed using Student's t-test. Comparison of categorical variables was made with Chi-square test.  $P < 0.05$  was considered statistically significant.

## RESULTS

A study population includes 164 patients, and 18 patients were excluded from the study. The Table 1 shows demographic data of the study population. Previous experiences with anesthesia had 76% (121/164) patients, mostly general anesthesia (60%), central neuraxial block (29%) or peripheral nerve block (6%). Seven patients didn't remember an anesthesia technique. In this population, 81% of patients (99/121) were satisfied or very satisfied with former anesthesia procedures and only 8 of 121 patients were totally unsatisfied.

Characteristics of actual regional anesthesia technique are described in Table 2. Most of patients (95%) replied that the technique of regional anesthesia was good or very good explained before application. The main reason for choosing a regional anesthesia was the recommendation of attending anesthesiologist in 70% cases. Remaining reasons were: fear of unconsciousness (11%), expectance of less pain after operation (31%), wish to see and hear during operation (22%), wish to eat and drink earlier after procedure (20%), the other people said that is regional anesthesia better than general (19%) or from media became informed that is regional anesthesia better choice (8%). Most of patients (152/164) were satisfied or very

**TABLE 1**  
Demographic characteristics of the study population.

| Variable                 |                       |
|--------------------------|-----------------------|
| Sex (M/F)                | 77/87                 |
| Age (yrs)                | 47.2±16.75 (18-82)    |
| Height (cm)              | 171±9.5(150-197)      |
| Weight (kg)              | 79.9±14.9(52-130)     |
| BMI (kg/m <sup>2</sup> ) | 23.3±3.92 (15.9-36.1) |

BMI-body mass index

**TABLE 2**

Characteristics of the actual regional anesthesia.

| Variable                    | N(%)    |
|-----------------------------|---------|
| Provider                    |         |
| Specialist                  | 138(84) |
| Resident                    | 26(16)  |
| Type of block               |         |
| Lumbosacral spinal/epidural | 121(74) |
| Interscalene block          | 18(11)  |
| Supraclavicular block       | 3(2)    |
| Axillar block               | 15(9)   |
| Femoral block               | 1(1)    |
| Popliteal block             | 4(2)    |
| Femoropopliteal block       | 2(1)    |
| Number of attempts          |         |
| 1                           | 129(79) |
| 2                           | 24(15)  |
| ≥3                          | 11(6)   |
| Needle size                 |         |
| 22 G                        | 11(6)   |
| 25 G                        | 91(56)  |
| 27 G                        | 27(38)  |

satisfied with actual regional anesthesia and just 11 patients were unsatisfied.

The reasons of satisfaction or dissatisfaction with actual regional anesthesia are described in Table 3. Prevailing part of satisfied patients is conspicuous from two reasons, i.e. approximately 95% patients have willingness to have regional anesthesia again and would recommend regional anesthesia to the others. Also, we found statistically significant percent (12%) of increasing satisfaction in previously unsatisfied patients with regional anesthesia ( $\chi^2 = 16,806$ ,  $p < 0,001$ ). Table 4 shows correlation between some variables and satisfaction with regional block.

Need for additional sedation was found in 37% patients, mostly with midazolam 2-5 mg. Also, little portion of patients (23/164) had a need for additional analgesia during surgery, generally with little doses of fentanyl (25-100 mcg). Adverse reactions during surgery were very rare, IONV (intraoperative nausea and vomiting) in only 2 cases and hypotension in 6 patients. Conversion in general anesthesia was done in 3 patients who are excluded from research.

## DISCUSSION

Patient satisfaction is an important indicator of health care outcome and evaluation of the quality in anesthesiology (6, 7). We conducted this study to show characteristics and predictors of satisfaction with regional anesthesia among the patients underwent some orthopedic proce-

dures. The main outcome in our research was willingness to accept regional anesthesia again in the future.

In this study we found the high rate (93%) of satisfaction with regional anesthesia and the rate of absolute dissatisfaction was very low (1%). Most former studies in regional anesthesia also reported high levels of satisfaction. Rhee *et al.* found on 1191 patients underwent spinal

**TABLE 3**

Reasons of satisfaction or dissatisfaction with the actual regional anesthesia.

|   | N(%)    |
|---|---------|
| <b>Reasons of satisfaction</b>  |         |
| Consciousness during surgery  | 88(58)  |
| No pain and sensations during surgery   | 135(89) |
| No pain early after surgery   | 82(54)  |
| Ability to eat and drink early after anesthesia   | 56(37)  |
| Ability to phone early after anesthesia   | 97(64)  |
| <b>Reasons of dissatisfaction</b>   |         |
| Higher number of punctures  | 4 (23)  |
| Pain during block performing  | 2(17)   |
| Uncomfortable position during block performing  | 0(0)    |
| Pain during surgery   | 0(0)    |
| Consciousness during surgery  | 1(8)    |
| IONV  | 1(8)    |
| Headache after anesthesia   | 2(17)   |
| PONV  | 6(50)   |
| Pain at the puncture site, paresthesias, disorders of sensation and motor activity after anesthesia | 2(17)   |
| Pain early after surgery  | 1(8)    |
| Urinary retention   | 7(58)   |
| Recommendation for laying after spinal anesthesia   | 7(58)   |

IONV – intraoperative nausea and vomiting; PONV – postoperative nausea and vomiting

**TABLE 4**

Correlation between some factors and satisfaction with regional block.

| Variables                                | $\chi^2$ | p     |
|--|----------|-------|
| Sex                                      | 2.434    | 0.119 |
| Age                                      | 0.297    | 0.862 |
| BMI                                      | 0.601    | 0.741 |
| Presence of pain at the puncture site    | 5.115    | 0.024 |
| Provider's experience                    | 0.561    | 0.454 |
| Number of puncture attempts              | 3.133    | 0.077 |
| Position during surgery                  | 3.390    | 0.335 |
| Explanation of anesthesia procedure      | 11.205   | 0.001 |
| Application of sedatives during surgery  | 0.131    | 0.717 |
| Application of analgesics during surgery | 0.366    | 0.545 |

$p \leq 0.05$ ; BMI – body mass index

anesthesia in different types of surgery also high level (96.3%) of satisfaction and 96.8% patients would accept spinal anesthesia in the future (8). Jjala *et al.* demonstrated that 88.4% patients were satisfied with regional anesthesia in orthopedic surgery (9). In a study of 246 women, Siddiqi *et Jafri* found high level of satisfaction (81.4%), and the desire to opt for spinal anesthesia in the future (53.7%) among patients receiving spinal anesthesia for cesarean section (10). In Kouki *et al.*'s Greek study on subpopulation of 63 surgical patients underwent to regional anesthesia, 98.4% described anesthesia procedure as good or excellent. Also, 85.7% of patients with regional anesthesia would like to receive the same anesthetic regimen again in the future (11). As it showed in most of studies, level of satisfaction with regional anesthesia was satisfactory high, but this rate can be overestimated because patients like to please medical staff and to meet social expectations by replying satisfied (8,10).

The main reasons of dissatisfaction in our study were the recommendation for laying after spinal anesthesia, urinary retention, PONV and higher number of punctures. Our study supports the results of a few former studies. Rhee *et al.* also found that PONV and postoperative backache were predictable factors for dissatisfaction with spinal anesthesia. Also, likewise to our study, they showed no statistical correlation between satisfaction and age, sex, experience of anesthesiologist, IONV, hypotension and intraoperative application of sedatives and analgesics (8). A study conducted by Sindhvananda *et al.* revealed that post-dural puncture headache, itching and PONV were predictors of dissatisfaction (12). Likewise, the main cause of discomfort from regional anesthesia in the study by Bhattarai *et al.* was reported to be the immobility of lower limbs (13). In our study, just two unsatisfied patients marked the immobility of limb as a reason for dissatisfaction.

Statistical comparison between groups of satisfied and unsatisfied patient in our investigation showed no difference in satisfaction scores according to sex, age, BMI, experience of anesthesiologist, number of attempts, position during surgery, IONV, hypotension and intraoperative application of sedatives and analgesics. We found statistical correlation between presence of pain at the puncture site, quality of the procedure explanation and patient satisfaction. Thereby, patients with no pain were more satisfied regarding to those with pain at the puncture site, mostly backache ( $\chi^2 = 5.115$ ,  $p = 0.024$ ). In the study of Siddiqi and Jafri, the patients with lower satisfaction scores with spinal anesthesia complained of a higher frequency and severity of backache (10). Choi *et al.* demonstrated postoperative backache as a risk factor associated with refusing spinal anesthesia in the future (14). Also, Rhee *et al.* found the postoperative backache was one of predictable factors for dissatisfaction with spinal anesthesia (8). However, the study of Schwabe and Hopf showed that the backache after spinal anesthesia was not

associated with patient's characteristics or technical factors, and apart from preexisting back pain (15). Appropriate selection patients for regional anesthesia, reducing the number of puncture attempts, usage of small needles and skilled anesthesiologist could contribute to better satisfaction.

Furthermore, rate of satisfied patients in our study was higher when the quality of explanation of the regional anesthesia procedure was better ( $\chi^2 = 11.205$ ,  $p = 0.001$ ). Also, we found that the main reason for choosing the regional anesthesia by patients was the good recommendation for this technique by attending anesthesiologist in 70% cases. Caljouw *et al.* found that better informed patients also ranked staff-patient relationship higher, and that the information provision and staff-patient relationship are the major determinants for patient satisfaction with perioperative care (16). Dharmalingam *et Zainuddin* showed on the 200 spinal anesthetics for caesarean section that all the patients were satisfied with the complete explanations provided by the trained personal regarding applicable anesthesia methods (17). In another study, Kouki *et al.* found that the interaction with the anesthesiologist during the intraoperative and immediate postoperative period was the most important element of patient satisfaction for all patients, regardless of the type of anesthesia performed (11). Also, Capuzzo *et al.* concluded that kindness/regard of caregivers" along with "information given by the anesthetist" and "feeling safe" were good indicators for predicting patient satisfaction (18).

Our study may have several limitations. First, we didn't use a standardized protocol for performing regional anesthesia and treatment of intraoperative and postoperative adverse effects which can affect on the satisfaction level. Also, our questionnaire wasn't standardized according to most relevant questionnaires in the field of satisfaction with perioperative medicine and anesthesia. We considered that this questionnaire is very easy to understand for most of patients regardless of the level of their education. Third, patients completed the questionnaire second day after surgery when some complications (e.g. postdural puncture headache, neurological sequellae) were not displayed yet. All these limitations could affect on satisfaction and especially on refusal rates for regional anesthesia in the future.

## CONCLUSION

Assessment of patient satisfaction is associated with multiple factors. Satisfaction with regional anesthesia in orthopedic surgery in our institution was generally high. Our study demonstrates that some variables are significant predictors of good satisfaction with regional anesthesia. The presence of some postoperative conditions (i.e. urinary retention, PONV, lying after spinal anesthesia) significantly contribute to patient's dissatisfaction with

regional anesthesia. Fortunately, some of them can be corrected. Intraoperative application of drugs against PONV in risk population, one-time urinary catheterization, skilled anesthesiologist and use of very small needles could minimize these negative conditions and contribute to better satisfaction. Also, good explanation of the procedure and participation in decision making during pre-anesthetic visit should be the parts of anesthetic plan. Finally, the staff has to identify, monitor and modify the factors which may improve overall patients' satisfaction with regional anesthesia.

## REFERENCES

- HALL J A, DORNAN M E 1988 What patients like about their medical care and how often they are asked. A meta-analysis of the satisfaction literature. *Soc Sci Med* 27: 935-9
- DOERING E R 1983 Factors influencing inpatient satisfaction with care. *Q Rev Bull* 9(10): 291-9
- MYLES P S, WILLIAMS D L, HENDRATA M, ANDERSON H, WEEKS A M 2000 Patient satisfaction after anaesthesia and surgery: results of a prospective survey of 10,811 patients. *Br J Anaesth* 84(1): 6-10
- MYLES P S, HUNT J O, MOLONEY J T 1997 Postoperative 'minor' complications. Comparison between men and women. *Anaesthesia* 52: 300-6
- WILLSCHKE H, MARHOFER P 2011 Does regional anaesthesia really improve outcome? *Br. J. Anaesth* 107(1): 90-5
- CAPUZZO M, ALVISI R 2008 Is it possible to measure and improve patient satisfaction with anesthesia? *Anesthesiol Clin* 26(4): 613-26
- FUNG D, COHEN M M 1988 Measuring patient satisfaction with anesthesia care: a review of current methodology. *Anesth Analg* 87(5): 1089-98
- RHEE W J, CHUNG C J, LIM Y H, LEE K H, LEE S C 2010 Factors in patient dissatisfaction and refusal regarding spinal anesthesia. *Korean J Anesthesiol* 59(4): 260-4
- JLALA H A, CALJOUW M A, BEDFORTH N M, HARDMAN J G 2010 Patient satisfaction with perioperative care among patients having orthopedic surgery in a university hospital. *Local Reg Anesth* 3: 49-55
- SIDDIQI R, JAFRI S A 2009 Maternal satisfaction after spinal anaesthesia for cesarean deliveries. *J Coll Physicians Surg Pak* 19: 77-80
- KOUKI P, MATSOTA P, CHRISTODOULAKI K, KOMPOTI M, LOIZOU M, KARAMANIS P, PANDAZI A, KOSTOPANAGIOTOU G 2012 Greek surgical patients' satisfaction related to perioperative anesthetic services in an academic institute. *Patient Prefer Adherence* 6: 569-78
- SINDHVANANDA W, LEELANUKROM R, RODANANT O, SRIPRAJITTICHAI P 2004 Maternal satisfaction to epidural and spinal anesthesia for cesarean section. *J Med Assoc Thai* 87(6): 628-35
- BHATTARAI B, RAHMAN T R, SAH B P, SINGH S N 2005 Central neural blocks: a quality assessment of anaesthesia in gynaecological surgeries. *Nepal Med Coll J* 7(2): 93-6
- CHOI J G, IN J Y, SHIN H I 2008 Analysis of factors related to patient refusal of spinal anesthesia. *Korean J Anesthesiol* 56: 156-61
- SCHWABE K, HOPF H B 2001 Persistent back pain after spinal anesthesia in the non-obstetric setting: incidence and predisposing factors. *Br J Anaesth* 86: 535-9
- CALJOUW M A, VAN BEUZekom M, BOER F 2008 Patient's satisfaction with perioperative care: development, validation, and application of a questionnaire. *Br J Anaesth.* 100(5): 637-44
- DHARMALINGAM T K, ZAINUDDIN N A A 2013 Survey on Maternal Satisfaction in Receiving Spinal Anaesthesia for Caesarean Section. *Malays J Med Sci* 20(3): 51-4
- CAPUZZO M, LANDI F, BASSANI A, GRASSI L, VOLTA C A, ALVISI R 2005 Emotional and interpersonal factors are most important for patient satisfaction. *Acta Anaesthesiol Scand* 49(6): 735-42