Trauma Mon. 2018 November; 23(6):e64151. doi: 10.5812/traumamon.64151.

Published online 2018 June 25. **Research Article**

Choice of Anesthesia Technique in Elective Orthopedic Trauma Surgery Patients

Afsaneh Sadeghi [1], Mohammadreza Moshari [1] and Alireza Mirkheshti [1, *]

[1] Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

[*] *Corresponding author*: Alireza Mirkheshti, MD., Imam Hossein Medical Centre, Madani st. Tehran, IR Iran. Tel: +98-2177567840, Fax: +98-2177567840, E-mail: drmirkheshti@gmail.com

Received 2017 November 17; **Revised** 2018 March 01; **Accepted** 2018 May 05.

Abstract

Background: Anesthesiology plays a major role in developing preoperative patient care. As the field of anesthesiology improves, the options to apply better anesthetic procedures emerge. Furthermore, Neuraxial anesthesia increases the chances of better outcome for the patients. However, neuraxial anesthesia has not become yet the favorite choice of anesthesia method by all physicians and patients.

Objectives: The aim of present study was to assess elective orthopedic trauma patient's preference on the choice of anesthesia method and their primary reasons for their choices.

Methods: Overall, 170 adult patients underwent elective orthopedic surgery after encountering various orthopedic traumas. It is important to note that the patients entered the study in a prospective cross sectional manner during a period of six months. A structured questionnaire consisting of two parts was used to interview the patients. The first part included the demographic data and the preferred anesthesia technique and the reasons for supporting these techniques. The second part was designed to assess the level of knowledge regarding the anesthesia methods.

Results: Amongst 171 patients, 104 (60.8%) chose regional anesthesia (RA) in comparison to 67 (39.2%), who preferred general anesthesia (GA). The correlation between age and choice of anesthesia was significant (P = 0.001). Level of education did not affect the preferred choice of anesthesia (P = 0.651) nor the satisfaction score (P = 0.363). The satisfaction score with respect to received anesthesia was 9.29 $\pm$ 1.03 in the RA group and 8.7 $\pm$ 1.29 in the GA patients (P = 0.004).

Conclusions: The current findings suggested that regional anesthesia was the most preferred satisfactory technique among orthopedic patients, especially older patients.

Keywords: Patient Preference, Anesthesia, Orthopedic Surgery

1. Background

Anesthesiology is an improving specialty, which plays a major role in perioperative patient care. The important role of an expert anesthesiologist and use of different efficient types of anesthetic procedure are fully vivid in modern medical practice. As the field of anesthesiology improves, the anesthetic drugs and options to apply better anesthetic methods further emerges. Furthermore, the choice of anesthetic techniques can be expected to vary in different countries around the globe. This could probably be due to fewer requests of regional anesthesia in developing countries (1, 2). Neuraxial regional anesthesia has gained worldwide popularity for lower extremity orthopedic surgeries (3). It includes lower mortality rates, shorter hospital stays, decreased patient costs, and decreased in-hospital complications (4, 5). A great number of patients include the elderly, in whom the risk of cardiovascular and respiratory complications are relatively high. Neuraxial anesthesia improves surgery outcomes by improving postoperative pain control, decreasing intraoperative bleeding, and no need for intubation and artificial ventilation (6). However, Neuraxial anesthesia is not fully favored by all surgeons. A survey that was conducted in 2002, concluded that the two main reasons that regional anesthesia is not favored by surgeons includes delay in operating rooms and unpredictable success rate (7). Surgeon's choice of anesthesiology method has a great impact on patient's choice (8). On the other hand, patient refusal to go through regional anesthesia is an absolute contraindication and one should never coerce patients to go through the procedure against their will.

In some developing countries, it has been proven that multi-factor etiology, such as cultural differences, lack

of knowledge and having wrong information regarding the procedure are crucial in choosing or denying a particular anesthetic procedure. Moreover, occupation has been proven to be another factor in choosing a certain anesthetic procedure over another among females. In a group of females, who were candidates for cesarean section, homemakers were more likely to have less knowledge about anesthesia options (9). It should be safe to say that the influence of surgeons and anesthesiologists on patients' choice is much stronger than their friends and relatives (10). However, it has been documented that incidences of common fear vary widely among patient populations (11). Moreover, prior unpleasant regional anesthesia experiences, fear of postoperative backaches, and headaches might be some of the other reasons for choosing general anesthesia (12). In contrast with studies that have shown the major role of anesthesiologists and surgeons on the patients' anesthetic technique preference, there are some data about the superior role of personal experience of patients in choosing their favorite anesthesia method (13). The mentioned difference might be due to different kinds of people and various types of procedures. On the other hand, fear of hearing or seeing all the events during regional or neuraxial anesthesia in the operating room or perhaps feeling pain during the operation were some of the other factors that contributed to selection of general anesthesia by some patients (14). Considering all the aspects mentioned above, anesthesiologists are required to attend public education programs to further enhance their social skills in making better relations with their patients.

2. Objectives

The goal of the current study was to assess the preference of trauma patients, who only underwent elective orthopedic surgeries and did not have any problems with the anesthesia techniques. The correlation amongst age, gender, and education levels with preferred anesthesia method, knowledge about the anesthesia methods, patient satisfaction regarding the received anesthesia and the surgeons' preferred choice of anesthesia technique for their patients were considered as secondary outcomes. In the current study, the researchers assessed both the basic information of patients about anesthesia techniques before performing the surgery and their satisfaction about the procedure after receiving the surgery while they were recovering in the post anesthesia care unit.

3. Methods

After approval of the ethical committee of the hospital and verbal consent of patients, 171 adult patients undergoing elective orthopedic surgery in a prospective sectional manner entered the study, which was carried out in a six-month period. All patients had orthopedic trauma lesions with no other surgical or neurosurgical complications. Distribution of trauma pattern in patients was not uniform so that 105 patients (61.4%) had lower extremity trauma and 66 patients (38.6%) had upper extremity traumatic lesions. The patients, who had contraindications for regional anesthesia, lack of appropriate communication as a result of hearing loss, language barriers, and mental disorders were not subjects in the study. A structured questionnaire consisting of two parts was used to interview the patients. The first part consisted of information about gender, age, education, preferred anesthesia technique, and reasons to support the choices. The second part of the questionnaire included the level of knowledge regarding anesthesia methods (assessed by definitions that patients used about both general and regional anesthesia shown as weak, moderate and good), satisfaction regarding the received anesthesia, and surgeon's preferred anesthesia method.

A trained nurse interviewed patients according to the questionnaire and filled out the form before entering the operating room and visual analogue scale (VAS) (0 - 10) was used to assess the level of patient satisfaction in the post anesthesia care unit (PACU). A VAS that indicates the satisfaction of the patient is a horizontal line that is 10 cm long. At the beginning and at the end of the line, there are two descriptors representing both ends of satisfaction (i.e. no satisfaction and extreme satisfaction, which a person can experience). The patient's ranked satisfaction was shown by a vertical mark on the 10 cm line. The measurement in centimeter was converted to the same number of points ranging from 0 to 10. The question was "are you satisfied with your orthopedic procedure?"

3.1. Statistical Analysis

Data were analyzed by the statistical packages for social science, version 21 (SPSS Inc. Chicago, IL, USA). Quantitative variables, such as age and VAS satisfaction score were shown as mean and standard deviation. Frequency of qualitative variables, such as gender, level of education, preferred anesthesia method, and the supporting reasons were demonstrated by numbers and percentages. T test, Fisher's exact test, Chai-Square and Analysis of Variance (ANOVA) test were used to compare the variables between groups and $P < 0.05$ was considered statistically significant.

4. Results

A total of 171 patients ranging from 18 to 84 years old with ASA 1 and 2 undergoing lower extremity orthopedic surgery were interviewed in a period of six months. The variable of age was divided to three groups (< 30), between 30 and 60 years (30 to 60) and older than 60 years (> 60). Level of education was defined as illiterate, high school or below education, high school diploma, and university. Table 1 shows the demographic characteristic of the patients. Of 171 patients, 104 (60.8%) chose RA in comparison to 67 (39.2%), who preferred GA. The reasons to prefer RA was due to recommendation of surgeons and anesthesiologists in 53 (31%), positive experience of previous RA in 32 (18.7%), fear of not being able to gain consciousness in 16 (9.4%), longer duration of pain relief in 15 (8.8%), GA phobia in six (3.5%), self-study in four (2.3%), negative experience of previous GA in three (1.8%), and information from media in one (0.6%). Reasons for patients to choose GA were fear of feeling the surgical procedure in 33 (19.3%), having pain while under RA in 20 (11.7%), backache after RA in 18 (10.5%), hearing the voices in the operating room in 17 (9.9%), being awake under RA in 15 (8.8%), positive experience of previous GA in ning (5.3%), recommendation of surgeons in eight (4.7%), negative experience of previous RA in seven (4.1%), recommendation of anesthesiologists in four (2.3%), recommendation of relatives in four (2.3%), and history of severe headache in one (0.6%). No one in this group mentioned about self-study or media information. A significant correlation was found between age and choice of anesthesia (P = 0.001), and VAS score of satisfaction for received anesthesia (P = 0.03) are presented in Table 2. These findings suggest that as age increases, the patients prefers RA over GA and the rate of satisfaction also increases. However, there was no relationship between age and knowledge regarding preferred anesthesia techniques.

Regarding the gender variable, there were no differences in VAS scores of satisfaction (P = 0.208), choice of anesthesia technique (P = 0.947), and knowledge about anesthesia methods (P = 0.081). The other finding was the level of education, which mattered regarding anesthesia choices made (P = 0.651) or satisfaction VAS score (P = 0.363). The only significant correlation was found between education and knowledge on GA (P = 0.007).

In general, the VAS satisfaction of anesthesia was 9.14 $\pm$ 1.13 yet it was different among groups, who received RA (9.29 $\pm$ 1.03) and GA (8.7 $\pm$ 1.29) (P = 0.004). It seems that patients were more satisfied with RA in comparison with GA. According to patient testimonials, the surgeons preferred RA 141 (82.5%) over GA 30 (17.5%) in their surgeries.

Table 1. Demographic Characteristics of Patients

Variables	No. (%)
Gender	
Female	99 (57.9)
Male	72 (42.1)
Education	
Illiterate	14 (8.2)
High school or lower	61 (35.5)
High school diploma	56 (32.9)
University	40 (21.6)
Age, years	
< 30	37 (21.6)
30 - 60	58 (33.9)
> 60	76 (44.4)

5. Discussion

The current study showed that the patients, who were candidates for orthopedic trauma operations preferred regional anesthesia. In addition, recommendations of anesthesiologists and surgeons had a significant role on the patients' decision making. In the current study, older patients were more enthusiastic to have regional anesthesia and rate of their satisfaction about the procedure was greater than youngsters. Moreover, the researchers could not find any relationship between age and knowledge and choosing anesthesia techniques. Moreover, gender and level of education did not play a part in choosing the anesthesia method, VAS score of satisfaction, and even knowledge about regional anesthesia. The current study also showed that the patients, who had received regional anesthesia, were generally more satisfied than the patients, who received general anesthesia. With regards to the role of consultation in the patient selection of anesthesia, it is important to note that depending on various countries, the health care providers, who offer anesthesiology consultation are different. Furthermore, in some developing countries, a considerable numbers of patients did not have enough information about the role of anesthesiologists and in some cases, they did not even realize that anesthesia was administered by an anesthesiologist (15). In contrast, in developed countries, the majority of patients identified anesthesiologists as qualified health care providers and they believed that anesthesiologists had to monitor the entire surgery in the operating room (16). Consequently, depending on how knowledgeable patients are regarding the role of the surgeon or an anesthesiologist in a country, the significance of the physician's consultation role in choosing the anesthesiology method will vary. Hence, in the cur-

Table 2. Correlation Between Age and Choice of Anesthesia and Satisfaction About Anesthesia Visual Analogue Scale Score

Age	< 30	30 - 60	> 60	P Value
RA	14	33	57	0.001
GA	23	25	19	
VAS satisfaction	9.14 ± 1.13	8.84 ± 1.22	9.37 ± 1.04	0.03

Abbreviations: GA, general anesthesia RA, regional anesthesia.

rent study, the main reason to select regional anesthesia by the patients was due to the recommendation of surgeons and anesthesiologists.

Regarding the role of age in choosing a specific anesthesia method, there is greater evidence that points towards elder patients preferring to receive general anesthesia, solely based on the misconception about the safety of regional anesthesia. Furthermore, some elder patients chose general anesthesia based on the recommendation of their surgeons (8). In a study conducted by Naik (17), it was demonstrated that younger patients are generally more knowledgeable about anesthesia than the older group of patients. Some other studies also revealed that there was a reverse relationship between age and level of knowledge of patients. Moreover, it was proven that elder patients had generally less knowledge about anesthesia (18, 19). In the current study, it was noticed that elder patients had a greater tendency to receive regional anesthesia than younger patients and their levels of satisfaction were more prominent. These finding are probably due to elders' trust in their physicians' recommendations or perhaps fear of receiving regional anesthesiology among younger patients. Moreover, fear of not being able to regain consciousness among the geriatric population was another factor to that led to the preference of regional anesthesiology over general anesthesiology.

In some studies, the majority of patients, who denied receiving regional anesthesia were females, while in some other studies there was no correlation between gender and knowledge of anesthesia options (20-22). During the current study, considering that 57.9% of the patients' population were females, the researchers could not find any significant relationship between gender and preference of anesthesia techniques. Therefore, the difference between the effects of gender parameter in choosing anesthesia methods in miscellaneous studies might have depended on the type of surgery received and therefore it requires further studies.

Moreover, knowledge playing a part on patient's choice of specific method of anesthesia has been acknowledged by some studies (20). Jindal showed that there was little knowledge shared among the population of literate and illiterate patients regarding the preoperative role of anesthesiologists. Furthermore, both mentioned groups tended to demand explanations on the anesthesiology methods and were eager to see their anesthesiologist both before and after surgery (23). It has also been observed that major operation concerns were different among literate and illiterate patients. The illiterate population of patients were more likely to be concerned about not regaining consciousness (41%) and having pain (51%), whereas the literate population was mostly concerned with preoperative pain (67%) and intraoperative awareness (39%). It is important to point to the fact that the result of studies conducted on literate and illiterate group of patients was similar to studies previously performed in developing and developed countries. In addition, the role of surgeons to increase patient knowledge on anesthesia and their preferred method of anesthesia during an operation should be important factors in choosing specific anesthesia by both patients and surgeons (7, 24). Moreover, in the current study, the researchers were not able to find any significant relationship between literacy and tendency to choose a particular anesthesia method. Most of orthopedic patients in the current study insisted on having regional anesthesia rather than general anesthesia. Finally, the postoperative satisfaction of anesthesia among the patients depended on the age of the patient with no correlation with gender and literacy.

5.1. Conclusions

Regional anesthesia is a superior anesthesia technique that could be applied in many orthopedic trauma procedures. Furthermore, it needs to be introduced to patients, who neither are aware of the procedure nor are informed about its effects. At last, the role of surgeons and anesthesiologists to clarify the pros and cons of every anesthesia method before an operation is crucial.

Acknowledgments

The authors appreciate all nursing, anesthesia, and recovery personnel, who helped with conducting the current project.

Footnotes

Authors' Contribution: Afsaneh Sadeghi directed the study design, provided information, facilitated for statistical analysis and contributed to case collection and writing parts of the article. Mohammadreza Moshari contributed to case collection and supervising the flow of study. Alireza Mirkheshti participated in case collection, writing parts of the article and corresponding and submission process.

Conflict of Interests: There was no conflict of interest with any person or organization for running this study.

References

1. Okafor UV, Ezegwui HU, Ekwazi K. Trends of different forms of anaesthesia for caesarean section in South-eastern Nigeria. *J Obstet Gynaecol*. 2009;**29**(5):392–5. doi: 10.1080/01443610902932390. [PubMed: 19603315].
2. To WW, Quality Assurance Subcommittee in O, Gynaecology HAHK. A questionnaire survey on patients' attitudes towards epidural analgesia in labour. *Hong Kong Med J*. 2007;**13**(3):208–15. [PubMed: 17548909].
3. Khanduri KC. Regional Anaesthesia Techniques for Orthopaedic Surgery. *Med J Armed Forces India*. 2008;**64**(2):108–10. doi: 10.1016/S0377-1237(08)80048-2. [PubMed: 27408107]. [PubMed Central: PMC4921577].
4. Memtsoudis SG, Sun X, Chiu YL, Stundner O, Liu SS, Banerjee S, et al. Perioperative comparative effectiveness of anesthetic technique in orthopedic patients. *Anesthesiology*. 2013;**118**(5):1046–58. doi: 10.1097/ALN.0b013e318286061d. [PubMed: 23612126]. [PubMed Central: PMC3956038].
5. Neuman MD, Silber JH, Elkassabany NM, Ludwig JM, Fleisher LA. Comparative effectiveness of regional versus general anesthesia for hip fracture surgery in adults. *Anesthesiology*. 2012;**117**(1):72–92. doi: 10.1097/ALN.0b013e3182545e7c. [PubMed: 22713634].
6. Parker MJ, Handoll HH, Griffiths R. Anaesthesia for hip fracture surgery in adults. *Cochrane Database Syst Rev*. 2004;(4). CD000521. doi: 10.1002/14651858.CD000521.pub2. [PubMed: 15494999].
7. Oldman M, McCartney CJ, Leung A, Rawson R, Perlas A, Gadsden J, et al. A survey of orthopedic surgeons' attitudes and knowledge regarding regional anesthesia. *Anesth Analg*. 2004;**98**(5):1486–90. table of contents. [PubMed: 15105236].
8. Salam AA, Afshan G. Patient refusal for regional anesthesia in elderly orthopedic population: A cross-sectional survey at a tertiary care hospital. *J Anaesthesiol Clin Pharmacol*. 2016;**32**(1):94–8. doi: 10.4103/0970-9185.173372. [PubMed: 27006550]. [PubMed Central: PMC4784223].
9. Minhas MR, Kamal R, Afshan G, Raheel H. Knowledge, attitude and practice of parturients regarding Epidural Analgesia for labour in a university hospital in Karachi. *J Pak Med Assoc*. 2005;**55**(2):63–6. [PubMed: 15813631].
10. Ngan Kee WD, Hung VY, Roach VJ, Lau TK. A survey of factors influencing patients' choice of anaesthesia for caesarean section. *Aust N Z J Obstet Gynaecol*. 1997;**37**(3):300–3. [PubMed: 9325510].
11. Matthey P, Finucane BT, Finegan BA. The attitude of the general public towards preoperative assessment and risks associated with general anesthesia. *Can J Anaesth*. 2001;**48**(4):333–9. doi: 10.1007/BF03014959. [PubMed: 11339773].
12. Ahmad I, Afshan G. Knowledge and attitudes of Pakistani women towards anaesthesia techniques for caesarean section. *J Pak Med Assoc*. 2011;**61**(4):359–62. [PubMed: 21465973].
13. Mittal MK, Sethi AK, Tyagi A, Mohta M. Awareness about anesthesiologist and scope of anesthesiology in non-surgical patients and their attendants. *Indian J Anaesth*. 2005;**49**:492–8.
14. Dove P, Gilmour F, Weightman WM, Hocking G. Patient perceptions of regional anesthesia: influence of gender, recent anesthesia experience, and perioperative concerns. *Reg Anesth Pain Med*. 2011;**36**(4):332–5. doi: 10.1097/AAP.0b013e318217a89b. [PubMed: 21701266].
15. Naod B, Admasu W, Ahmed Y. Patients' Knowledge and Attitude towards Anesthesia in Tikur Anbesa Specialized Hospital. *Int J Anesth Res*. 2016;**4**(5):229–35.
16. Braun AR, Leslie K, Morgan C, Bugler S. Patients' knowledge of the qualifications and roles of anaesthetists. *Anaesth Intensive Care*. 2007;**35**(4):570–4. [PubMed: 18020077].
17. Naik RP. A study of patients perception about knowledge of anesthesia & anesthesiologist. *India J Anaesth*. 2002;**46**(1):26–30.
18. Shevde K, Panagopoulos G. A survey of 800 patients' knowledge, attitudes, and concerns regarding anesthesia. *Anesth Analg*. 1991;**73**(2):190–8. [PubMed: 1854034].
19. Osinaike BB, Dairo MD, Oyebamiji EO, Odesanya JO, Tanimowo A. Attitude of general public to risks associated with anaesthesia. *East Afr J Public Health*. 2007;**4**(1):40–2. [PubMed: 17907760].
20. Singla D, Mangla M. Patient's knowledge and perception of preanesthesia check-up in rural India. *Anesth Essays Res*. 2015;**9**(3):331–6. doi: 10.4103/0259-1162.158008. [PubMed: 26712969]. [PubMed Central: PMC4683480].
21. Gurunathan U, Jacob R. The public's perception of anaesthesiologists-Indian attitudes. *Indian J Anaesth*. 2004;**48**(15):40–6.
22. Sagun A, Birbicer H, Yapici G. Patients', who applied to the anesthesia clinic, perceptions and knowledge about anesthesia in Turkiye. *Saudi J Anaesth*. 2013;**7**(2):170–4. doi: 10.4103/1658-354X.114076. [PubMed: 23956718]. [PubMed Central: PMC3737694].
23. Jindal P, Khurana G, Bharadwaj A, Mallik S, Oberoi D. Current understanding of the literate versus illiterate patient's knowledge about anesthesiologists: A comparative study. *Anesth Essays Res*. 2013;**7**(1):58–64. doi: 10.4103/0259-1162.113994. [PubMed: 25885722]. [PubMed Central: PMC4173480].
24. Garg KL, Bala M, Bansal P. Preference of general anaesthesia or regional anaesthesia for appendicectomy among medical and paramedical staff in a rural hospital. *IOSR-JDMS*. 2016;**15**(10):13–5.