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Retrospective Study

Knowledge and attitudes of orthopaedic surgeons regarding prosthesis joint infection

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Aytekin MN *et al.* Knowledge and attitudes of orthopaedic surgeons

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Abstract

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BACKGROUND

Periprosthetic joint infection (PJI) is a critical complication after joint arthroplasty operation and increasing morbidity and mortality accompany this case. There have been several studies aimed at preventing PJI.

AIM

To research the knowledge level and attitudes of orthopedic surgeons who play a key role in both preventing and managing PJI.

METHODS

We have conducted a web-based survey in order to evaluate orthopedic surgeons' knowledge level about PJI and attitudes towards that. In this survey with 30 questions, the Likert scale has been used. Questions have been prepared based on "Proceedings of the International Consensus on Periprosthetic Joint Infection".

RESULTS

Two hundred and sixty-four surgeons participated in the survey. The average age is 44.8, and 173 participants (65.5%) have got more than 10 years of experience. We could not find a statistically significant relationship between the knowledge of a surgeon and years of experience. However, we found out that participants who work in training and research hospitals have got higher knowledge levels than the ones in the state hospitals. It has been noticed that surgeons' knowledge and attitudes regarding the duration of antibiotic therapy and urinary infections do not sort together.

CONCLUSION

Even though orthopedic surgeons have got enough knowledge about preventing and managing PJI, their attitudes might contradict their knowledge. Forward studies that examine the causes and solutions of contradictions between orthopedic surgeons' knowledge and attitudes are required.

Key Words: ¹Antibiotic prophylaxis; Periprosthetic joint infection; Prevention; Total joint arthroplasty; Turkey

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Core Tip: In this study, researching the knowledge level and attitudes of orthopedic surgeons who play a key role in both preventing and managing prosthesis joint infections (PJI) has been aimed.

INTRODUCTION

Total joint arthroplasty is the most frequently applied procedure in orthopedic surgery and the number is increasing as days pass. The number of arthroplasties is increasing in parallel with PJI^[1]. Periprosthetic joint infection (PJI) is a critical complication after joint arthroplasty operation and increasing morbidity and mortality accompany this case. PJI increases the cost of health services. Treatment of PJI is difficult and patients generally need to undergo more than one major operation and have antibiotic treatment in order to annihilate the infection. There have been several studies aimed at preventing PJI^[2,3].

Gram-positive bacterias are the most seen pathogens in infected orthopedic prostheses and 75% of the infections are formed by Staphylococcus. Mostly used antibiotics in Texas Jail Association (TJA) are cephalosporins and semi-synthetic penicillins. Routine prophylaxis is applied as a multi-cefazolin dose by many authors in clean surgical procedures including elective orthopedic surgeries. Most early postoperative infections are the result of intraoperative contamination of the surgical site^[3-5].

Guides about preventing PJI are published by ¹International Consensus Meeting, World Health Organization (WHO), and the Center for Disease Control and Prevention, and these guides are updated in parallel with the current progression^[6]. Orthopedic surgeons' accordance with these guides might differ depending on their knowledge level, experience, and working conditions. In this study examination of knowledge about, and attitudes toward preventing PJI of the orthopedic surgeons who work in Turkey has been aimed by means of a survey study.

MATERIALS AND METHODS

This study has been performed between January 2019 and March 2019. An online survey has been conducted with orthopedic surgeons who were registered in the Turkish Society of Orthopedics and Traumatology in 2019 and still perform hip arthroplasty. For this purpose, total questions have been prepared with the intent of providing an evaluation regarding orthopedic surgeons' knowledge about and attitudes towards PJI after joint

prostheses. Questions have been prepared based on "Proceedings of the International Consensus on Periprosthetic Joint Infection"^[7].

The survey consists of 30 questions that inquire about surgeons' demographical datum, work experiences, features of the institution where they work at the moment, annual arthroplasty numbers, and pre-surgical, intra-surgical, and post-surgical knowledge levels and attitudes regarding PJI. Demographic data and questions regarding surgeons' operations (attitudes of surgeons) take part in the first section of the survey. In the second section questions regarding how it should be done (knowledge) take part. In this survey, the Likert scale has been used. The study has been done in accordance with the principles of the Declaration of Helsinki.

Statistical analysis

Every data has been entered into IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, United States). In order to statistically evaluate datum, descriptive statistics, and analysis of variance (ANOVA), has been used. The significance level is defined as $P < 0.05$.

RESULTS

Two hundred and sixty-four surgeons participated in the survey. The average age is 44.8 ± 8.7 . 173 participants (65.5%) have got more than 10 years of experience and 162 participants (61.4%) have been performing more than 50 TJA operations in a year (Tables 1 and 2). Whereas most of the participants currently work in private hospitals (37.5%), participants who work in a state hospital were in a minority (24.6%) (Table 3).

Participants' answers to the questions that examine attitudes towards the PJI are in Table 4. 48.5% of the participants have stated that they give 2 gr of cefazolin to every patient for surgical prophylaxis in arthroplasty operations. While 28.4% of them have stated that they give 1 gr to every patient, 20.8% of them adjust the dosage according to the patient's weight (Table 5).

Only 1 out of the total 264 participants stated that he/she does not change gloves during operation (0.4%). Whereas 20.5% of the participants have stated that they change gloves 1 time during an arthroplasty operation, 53% of them have stated that they change gloves 2 times and 26.5% of them have stated that they change gloves 3 or more than 3 times. 54.9% of the participants have stated that they change their gloves when they are disintegrated yet the rest have stated that they do not change. While 54.2% of the participants have stated that they change their gloves after contact with cement, the rest have stated that they do not change. 38.6% of the participants stated that they change their gloves every 1 h while 9.5% change their gloves every 90 min. 59.5% of the participants have stated that they do perform irrigation and debridement to the persistent drainage that continues more than 1 wk after the prosthesis operation and while the rest have stated that they do not perform. 51.5% of the participants have stated that they do administer antibiotic treatment whereas the rest do not. 50.8% of the participants have stated that they do discontinue anticoagulants whereas the rest do not.

While all the participants have finished the first section of the survey, 192 of them (73%) finished the second section. Participants' answers to the questions that examine knowledge level in the second section are in Table 6.

As a result of ANOVA, it has been determined that the knowledge levels of participants do not differ in terms of the period of working as an orthopedics and traumatology specialist ($P = 0.483$) (Table 7).

As a result of the ANOVA, it has been determined that the knowledge levels of participants do not differ in terms of the number of performed operations per year ($P = 0.675$).

When the average knowledge levels ⁴ of the participants are examined according to the hospital types, it is seen that the knowledge level of those who work in training and research hospital (4.0403) is higher than the ones who work in state hospitals (3.6580).

As a result of ANOVA, it has been determined that the knowledge levels of participants do differ in terms of the type of hospital they currently work in ($P = 0.030$). In the post-hoc multi comparison test that has been done in order to define this difference

between which hospital types, it has been determined that there is a significant difference in knowledge levels between those who work in training and research hospitals and the ones who work in state hospitals (Table 8).

6 **DISCUSSION**

The most important outcome of this study is the determination of knowledge levels of doctors who participate in the study do not sort together with their operations. While the most popular answer is antibiotic therapy should not be continued longer than 24 h in mega-prosthesis operations, those, who have stated that they give antibiotic treatment longer than 24 h, are the most crowded group. In recent survey studies, it has been reported that most orthopedic surgeons in Turkey do not follow antibiotic prophylaxis for TJA and administer antibiotic treatment longer than 24 h. This recent study has shown that orthopedic surgeons in Turkey have got a good level of PJI knowledge and has shown that antibiotics are used longer than 24 h in operations by means of matching up with literature findings^[6,8]. In addition, it has been reported in the studies that 58% of the surgeons in Canada and 30% of the surgeons in Italy prefer antibiotic treatment that lasts longer than 24 h^[9,10]. There is proof that antibiotic prophylaxis that is longer than 24 h is unnecessary and probably increases bacteria resistance^[11]. We think that further studies are needed to determine why orthopedic surgeons in Turkey prefer antibiotic treatment that lasts longer than 24 h and search for a solution to that issue. Another example of knowledge and attitude contradiction in this study is about urinary infections subject. While the most popular answer is urine tests should be ordered, those, who have stated that they never order urine tests in clinical practice, are the most crowded group. With that being stated, according to up-to-date literature; while symptomatic urinary tract infection should be diagnosed and treated before PJI, routine tests and treatment are not suggested for asymptomatic bacteriuria since it has been reported that asymptomatic bacteriuria is not a risk factor for PJI. Routine tests and following treatment operations lead to unnecessary treatments^[12]. In the survey study by Çimen *et al*^[6], 59% of the participants perform a routine test prior to arthroplasty while 12% of them never do

perform it. Azboy *et al*^[8] have found in their survey study that almost everyone who performs an arthroplasty operation more than 20 times a month, orders routine urinary tests. These contradictory findings of urinary infections in our country might show that well-attended studies are required and we do not have standardization in our country.

Staphylococcus aureus (*S. aureus*) is the agent that mostly causes surgical site infections as in many infections^[13]. Nasal colonization of *S. aureus* is 25% and the risk of surgical site infection increases in nasal methicillin-resistant *S. aureus* (MRSA) carriers. In addition to this, the issue regarding whether an MRSA scan should be done or not before TJA has not reached a consensus^[10,14]. In this study, it has been noted ¹ that the majority of orthopedic surgeons in Turkey have not performed routine tests.

It has been shown that skin cleaning before PJR surgery decreases the rate of PJI and guidelines highly recommend skin cleaning before surgery. Chlorhexidine is reported as the most effective agent in this matter^[15]. Çimen *et al*^[6] have reported that ¹ half of the orthopedic surgeons in Turkey do not follow the recommendations related to skin cleaning before surgery. In the recent study, while 44% of the participants stated that they never do chlorhexidine bathing, 35% of them stated that they do it occasionally and 30% of them do it always.

In a survey study conducted in Canada, it has been reported that most of the participants use 1 gr of first-generation cephalosporin before PJA^[9]. Literature promotes 2 g of 1 generation intravenous cephalosporin dosage, which is higher, regarding antibiotic prophylaxis^[16]. Besides, the American national infection prevention guideline group has determined that dosage should be adjusted according to the weight of the patient^[11]. Almost half of the participants (48.5%) in this study have stated that they administer 2 gr of cefazolin.

Knowledge of the participants and attitudes regarding the subject of performing prophylaxis surgery in the second stage of the two-stage revision surgery and the subject of the patient's agent of prophylaxis involving the factor of previously isolated prosthesis infection have been consistent.

New algorithms are being presented to orthopedists related to complication protection, diagnosis, and treatment in PJA practices at regular intervals^[17]. However, different attitudes do emerge in applying these algorithms due to the factors such as experiences of orthopedics and opportunities given by the hospital they work in, which results in being discussed in studies^[6,8-10]. In the present study, it has been defined that there is a significant knowledge level difference between those who work in the training and research hospitals and those who work in the state hospitals. Those who work in training and research hospital has got a higher knowledge level. Discussing the guidelines that are created to prevent PJI and standardized protocols in courses and congresses in detail might help with raising awareness as well as forming documents in this field.

There have been some restrictions in this study. Even though the status of corporations is questioned, there has not been data concerning geographical distribution in Turkey. Moreover, our study is composed of two sections and 27% of the participants have not completed the second section.

CONCLUSION

Even though orthopedic surgeons have got enough knowledge about preventing and managing PJI, their attitudes might contradict their knowledge. Forward studies that examine the causes and solutions of contradictions between orthopedic surgeons' knowledge and attitudes are required.

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ARTICLE HIGHLIGHTS

Research background

Periprosthetic joint infection (PJI) is a critical complication after joint arthroplasty operation and increasing morbidity and mortality accompany this case. There have been several studies aimed at preventing PJI.

Research motivation

Treatment of PJI is difficult and patients generally need to undergo more than one major operation and have antibiotic treatment in order to annihilate the infection. And PJI increases the cost of health services.

Research objectives

In this study examination of knowledge about, and attitudes toward preventing PJI of the orthopedic surgeons who work in Turkey has been aimed by means of a survey study. A good understanding of orthopedic surgeons' knowledge and attitudes about preventing polyethylene (PEE) may guide new interventions to prevent PEE.

Research methods

It has been conducted a web-based 30-question survey in order to evaluate orthopedic surgeons' knowledge level about PJI and attitudes towards that.

Research results

The knowledge and practices of surgeons regarding the duration of antibiotic treatment and urinary infections in prosthesis operations are different in Turkey.

Research conclusions

This study has been shown that even though orthopedic surgeons have got enough knowledge about preventing and managing PJI, their attitudes might contradict their knowledge.

Research perspectives

The knowledge and attitudes of orthopedic surgeons may be different in practice. Forward studies that examine the causes and solutions of contradictions between orthopedic surgeons' knowledge and attitudes are required.

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