

Evaluation of aseptic technique used in interventional rheumatology: survey among Moroccan and Tunisian rheumatologists

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Abstract

The objective of our study was to evaluate the aseptic technique used in interventional rheumatology by Moroccan and Tunisian rheumatologists.

We performed an online survey among rheumatologists from Morocco and Tunisia. The questionnaire included 15 questions with single and multiple-choice answers and three open sections for free-text comments.

An online survey was prepared and sent to 380 rheumatologists. One hundred and four rheumatologists (27.36%) replied to the survey. More than half of the participants (56.7%) were from Tunisia and 43.3% were from Morocco. Interventional procedures on superficial joints were performed by all participants. Ultrasonography was used by 41.3% of respondents to guide interventional procedures. Regarding the aseptic precautions taken to avoid infection, the majority of participants used povidone iodine to clean the skin and only 8.7% wore a mask. Hand washing alone without gloves wearing was done by 19.2% of participants. 2.9% of participants reported a history of iatrogenic septic arthritis and the duration of practice was the only factor associated with its occurrence ($P=0.007$).

Our study showed that aseptic technique used during interventional rheumatologic procedures is heterogeneous. However, the majority of participants were aware of its necessity to avoid iatrogenic septic arthritis.

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Introduction

Septic arthritis is defined by the presence of pathogenic microorganisms in a joint cavity by direct inoculation or hematogenous spread.¹ It is an uncommon but life-threatening disease that may be induced by a breach in the aseptic technique, while performing an intra-articular procedure.² Intra-articular injections have become widespread all over the world, since their introduction into rheumatologic practice by Hollander in the 1950s.³ They are used for both diagnostic and therapeutic purposes. Intra-articular steroids and hyaluronic acid injections in patients with rheumatic diseases and osteoarthritis are becoming more and more frequent in current practice, for therapeutic purposes.³⁻⁵ However, they are not risk-free. Iatrogenic septic arthritis is a well-known complication of intra-articular procedures, although its risk is considered very low. Its prevalence is not clear and is estimated to affect 10-40 persons per 100,000 injections.⁶ The aseptic technique is an infection prevention method to maintain and maximize asepsis. The objective of the aseptic technique is to protect patients.⁷ Close attention must be paid to the technique while performing an interventional rheumatologic procedure. If the rules of asepsis are not respected, the consequences will be catastrophic for the patient who develops a iatrogenic life threatening septic arthritis and consequently for the physician who can face serious legal problems regarding his direct responsibility.² However, in the literature, data about specific precautions that should be taken to avoid iatrogenic septic arthritis are scarce.

The aim of our study was to evaluate the aseptic technique used in interventional rheumatology by Moroccan and Tunisian rheumatologists.

Materials and Methods

Study design and population

We undertook an online survey among Moroccan and Tunisian rheumatologists both in the private and public settings. This online survey was prepared and sent to 380 rheumatologists from Morocco and from Tunisia with some information about the objective of our study. We used the membership list of the *Moroccan Society of Rheumatology* to obtain the emails of Moroccan rheumatologists. Tunisian rheumatologists received the questionnaire by e-mail. All data were analyzed anonymously.

Data collection

We collected the data through the online survey tool *Google forms*. Data collection began in June 2018 and ended in December 2018.

Questionnaire form

The questionnaire included 15 questions with single and multiple-choice answers and three open sections for free-text comments (Appendix).

The survey included questions about the following items: country of origin, position (residency, private practice, and university bond), use of image guidance and/or landmark-based injection, physical locations in which injections were performed, number of procedures per week.

The questionnaire provided information about the aseptic technique used through questions like for example *which disinfectant do you use? or do you use a mask*.

Statistical analysis

The statistical analysis was performed using SPSS software, version 13.0. Normally distributed parameters were presented as mean \pm standard deviation (SD), and asymmetric parameters were expressed as median \pm interquartile range (IQR, defined as 25-75th percentiles). Qualitative data were presented as frequencies (number and percentage). The comparisons between groups were examined using the T student test for continuous variables with normal distribution and using the Chi squared test or Fischer's exact test for categorical variables.

Results

Interventional procedures

The online survey was sent to 230 rheumatologists from Morocco and 150 rheumatologists from Tunisia. We received 104 responses. The response rate was 19.56% for Moroccan rheumatologists and 39.33% for Tunisian rheumatologists. Of all the participants, 43.3% were from Morocco and 56.7% were from Tunisia. 19.2% were residents. The majority were in public practice (72.1%), whereas 27.9% were in private practice. Moreover, 43.3% had more than 10 years of experience in rheumatology practice. The median of interventional procedures was 5 [2-8] per week. All the participants performed interventional procedures on superficial

joints, whereas profound joint procedures and epidural injections were performed only by 19.2% and 14.4% of participants, respectively and periarticular injections by 86.5% of participants. Guided interventional procedures were performed by 50% of participants. Ultrasonography was the most widely used technique to guide interventional procedures and was used by 41.3% of respondents (Table 1). Half of the participants performed interventional procedures in the exam room.

Aseptic techniques in interventional procedures

Povidone iodine was the most used disinfectant (95.1%). A significant proportion used alcohol (32.6%). 44.2% reported the use of two disinfectants at the same time and 44.2% let the disinfectant dry after application. Wearing a mask was uncommon (8.65%). Regarding the use of gloves during interventional procedures, 19.2% washed their hands only and did not use gloves. The majority of respondents did not use a sterile towel to isolate the injection field (80.7%) and only 2.88% did not use sterile swabs (Table 2). Regarding ultrasound guided interventional procedures, 70% of participants cleaned the ultrasound probe and wire with a disinfectant and 52.6% used a probe protection. 85.4% respected the distance of 1 cm between the probe and the needle (Table 3). A complete aseptic technique (use of disinfectant, sterile gloves, sterile swabs and sterile towel) was used by 8.7% of participants. The others took some but not all precautions (Table 2). There was no significant difference between rheumatologists in private and public settings ($P=0.19$) or rheumatologists from Morocco and from Tunisia ($P=0.38$) for the full aseptic technique.

The majority of participants (80.4%) was 'yes' to the question 'Are you satisfied with your aseptic technique?'. The double no

Table 1. Demographic characteristics and interventional procedures of participants.

	Total participants
Origin country % (n)	
Morocco	43.3 (n=45)
Tunisia	56.7 (n=59)
Position % (n)	
Resident	19.2 (n=20)
Consultant rheumatologist	51 (n=53)
Professor	29.8 (n=31)
Sector % (n)	
Private	27.9 (n=29)
Public	72.1 (n=75)
Years of practice % (n)	
<5	38.5 (n=40)
5-10	18.3 (n=19)
10-20	25 (n=26)
>20	18.3 (n=19)
Location of interventional procedures % (n)	
Superficial joints	100 (n=104)
Profound joints	19.2 (n=20)
Periarticular	86.5 (n=90)
Epidural	14.4 (n=15)
Method used for interventional procedures % (n)	
Ultrasonography	41.3 (n=43)
Fluoroscopy	8.70 (n=9)
Landmark-based injection	87.5 (n=91)
Interventional procedures per week (median)	5 (2-8)

touch technique consisting in not touching either the needle or the skin was the most frequent reported in the survey (72%).

Iatrogenic septic arthritis

Only 2.9% of participants encountered a iatrogenic septic arthritis during their practice. The localization was not specified and the culture of synovial fluid was always negative.

Discussion

Iatrogenic septic arthritis is an infrequent complication of intra-articular injections, but its complications can be disastrous for the patient.⁸ The lack of aseptic precautions during an intra-articular injection is the main risk factor for this complication.⁸ This study is the first to evaluate the aseptic technique used by rheumatologists in two North African countries.

Table 2. Aseptic technique used in interventional rheumatology.

	Total participants
Which disinfectant do you use? % (n)	
Povidone iodine	95.1 (n=99)
Alcohol	32.6 (n=34)
Alcoholic povidone	3.80 (n=04)
Chlorhexidine	0.96 (n=01)
How many disinfectants do you use? % (n)	
One	54.8 (n=57)
Two	44.2 (n=46)
Do you wait for the disinfectant to dry? % (n)	
Yes	44.2 (n=46)
No	55.7 (n=58)
Do you wear a mask? % (n)	
Yes	8.65 (n=09)
No	91.3 (n=95)
Do you use sterile towels? % (n)	
Yes	19.2 (n=20)
No	80.7 (n=84)
Do you use gloves? % (n)	
No, Hand washing only	19.2 (n=20)
Yes, non-sterile gloves	16.3 (n=17)
Yes, sterile gloves	77.8 (n=81)
Do you use sterile swabs? % (n)	
Yes	97.1 (n=101)
No	2.88 (n=03)
Use of:	
Complete aseptic technique % (n)	8.65 (n=09)
Incomplete aseptic technique % (n)	91.3 (n=95)

There was an obvious difference among the participants in the type of disinfectant used. The most commonly used was povidone iodine (95.1%) followed by alcohol (32.6%). Charalambous *et al.*⁹ found that 57.6% of participants used alcohol-based swabs. It seems that there is no evidence of any major advantage of a disinfectant compared with the others in reducing the risk of iatrogenic septic arthritis.¹⁰ The Section of the French Rheumatology Society (SIRIS) recommends the use of either Betadine or alcohol or chlorhexidine.¹¹ In our study, 44.2% of the participants let the disinfectant dry. It is recommended to wait 2 minutes for betadine or chlorhexidine to dry and 30 seconds for the alcohol.¹²

Regarding the use of gloves, our study showed that most of participants used sterile gloves (77.8%). The SIRIS recommends the use of sterile gloves only for complex interventional procedures and biopsies. Hand washing with soap and hydroalcoholic solution is sufficient.¹¹

In our study, wearing a mask was not systematic. However, several studies reported iatrogenic septic arthritis due to oral flora, especially oral streptococci.^{13,14} Since those publications, the Association for Professionals in Infection Control and Epidemiology (APIC) updated their guidelines and recommended the use of a mask, when preparing and injecting any solution into an intracapsular space.¹⁵ The same recommendation was also issued by the SIRIS.¹¹ Wearing a mask in the recommendations of the SIRIS is compulsory for both the doctor and the patient, if he keeps talking to contain respiratory droplets.¹⁶

Sterile towels were used by 19.2% of participants. There are no available studies supporting the use of sterile towels.¹⁷ The SIRIS recommends their use for particular circumstances or patients at risk.¹⁶

Regarding the precautions taken while using ultrasonography to guide the intra-articular injection, the respect of 1 cm distance between the probe and the needle and the change of the needle at the slightest doubt of contact are the most important aseptic precautions.¹⁷ In our study, 85.4% of respondents respected this distance.

The use of ultrasound allows better visualisation of the lesion to be infiltrated, to inject the first time with less pain for the patient,¹⁸ and better precision which allows the product to be injected exactly where it is wanted. The disadvantage could be the risk of iatrogenic infection, if asepsis rules are not respected.

Iatrogenic septic arthritis was reported by 2.9% of the participants. The factor associated with its occurrence was the duration of the rheumatology practice ($P=0.007$). Indeed, these three participants had more than 20 years of experience in rheumatology practice. It seems that the most experienced rheumatologists skip the aseptic technique, whereas younger rheumatologists tend to adopt aseptic much more often.¹¹ However, in our study, we found no statistically significant difference for aseptic technique between young and senior rheumatologists ($P>0.05$). The cumulative number of rheumatologic procedures must also be taken into account. In our study, the three participants with a history of iatrogenic septic arthritis practiced more than six interventional rheumatologic procedures per week.

Table 3. Aseptic precautions taken while performing an interventional rheumatological procedure guided by ultrasonography.

	Total participants using ultrasonography (n=43)
Clean ultrasound probe and wire with disinfectant % (n)	65.1 (n=28)
Use probe protection % (n)	46.5 (n=20)
Use sterile gel % (n)	20.9 (n=09)
Keep distance of 1 cm between the probe and the needle	81.3 (n=35)

The most common pathogen is *Staphylococcus aureus*^{18,19} because of its high degree of selectivity for the synovial liquid.^{20,21} In our study, the culture was negative.

We might think that participants from the private sector would skip aseptic precautionary measures because of the additional cost that a full aseptic technique may generate. However, we found no difference between respondents from private practice and those from public practice ($P=0.19$).

A number of limitations to our research must be considered. The first one is related to the collection of data regarding the rheumatologist practice which was only based on a self-administrated questionnaire. However, this sample of participants gave us an insight about the aseptic technique used in two countries of North Africa, even though it was small.

The main strength of the study is in the valuable insight provided on the use of the aseptic technique in interventional procedures among rheumatologist of these two North African countries.

Conclusions

Although interventional rheumatology is booming, our study showed that some differences exist among Moroccan and Tunisian rheumatologists regarding the practice of aseptic technique (kind of disinfectant, use of sterile gloves, hand washing alone, precautions taken while performing an interventional procedure guided by ultrasonography). However, none of the participants took no precautions at all and 72% adopt the double no touch technique. In our study, the use of a mask was uncommon, but the literature review showed that it is necessary. Compliance with asepsis rules in interventional rheumatology is necessary to avoid iatrogenic septic arthritis and protect patients from infectious complications, which can be serious.

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