Eastern Journal of Medicine 18 (2013) 58-63

Original Article

Knowns and unknowns about regional anesthesia techniques and local anesthetics

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Abstract. In this study, a questionnaire was used to obtain information about the ideas and experiences of doctors working as operating staff from several specialties in regards to regional anesthesia and local anesthetic drugs to determine the extent to which their knowledge corroborates these types of application and to obtain data for studies to fulfill the future needs of this field.

The questionnaire consisted of 18 questions about the use of regional anesthesia and local anesthetic drugs at the time of an operation at nearby hospitals.

In total, 109 doctors from 12 branches were included in this study. Although the preference of doctors regarding the selection of regional anesthesia as the first priority varied by field, this choice was not affected by variables such as age, being a research assistant or specialist and working in a state or private hospital. Doctors who were 25-30 years old had more information about local anesthetic drugs than doctors who were 40 years old and older, and this difference was significant.

Because doctors aged 40 years and older had less information about local anesthetic drugs among all the doctors studied, training doctors via postgraduate education about this subject would be a better decision.

Key words: Regional anesthesia, local anesthetic, doctors

1. Introduction

Regional anesthesia (RA) is a process involving the temporary loss of sensorimotor function formation (1). Although it is outdated, the popularity of RA techniques has increased with the definition of more effective techniques and discovery of new local anesthetic (LA) drugs that have fewer side effects (2-4). LA drugs are widely used by surgeons other than anesthetists. The knowledge about LA drugs and RA techniques of most doctors who work in surgery was observed to belong to the days when they were students or research assistants, and thus they forgot information about the effective dosage, side effects and especially toxicity treatments for these drugs. They also could not follow recent developments about LA drugs and RA techniques (5,6). Consequently, surgeons may occasionally resist the preferred RA techniques at the time of the anesthetic application. However, whether the reason for this resistance is the RA technique itself, insufficient knowledge about and inexperience with the LA drugs or misdirection by the patients is not obvious.

The aim of this study was to obtain information about the ideas and experiences of doctors working as operating room staff about LA drugs and RA techniques to determine the extent to which their knowledge corroborates these types of application and to offer an insight into studies that can fulfill the future needs of this field.

2. Materials and methods

This study was performed with anesthetists and doctors specializing in surgery after approval by the research ethics committee. These doctors performed operations with using RA techniques and/or LA drugs. The questionnaire focused on the doctors' knowledge and their individual experiences and behaviors.

This study was presented as an oral presentation in 16th National Congress of the Intensive Care, 25-29 April 2012, Antalya, Turkey.

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Received: 12.10.2012
Accepted: 04.04.2013

Table 1. Questioner Form

Dear colleagues;
We are aimed to investigate and learn knowledge, attitude and behavior of surgery based on their observations about regional anesthesia techniques and local anesthetics. We are kindly requesting you to answer questions written below presented for your attention.

1. Age: a) 25-30 b) 31-35 c) 36-40 d) over 40
2. Sex: a) Male b) Female
3. Position: a) Research Assistant b) Specialist
4. Hospital: a) University Hospital b) State Hospital
5. Branch:
6. Term of employment for this position:
a) 0–2 years b) 3–5 years c) 6–10 years d) More than 10 years
7. Choose the number of Regional Anesthesia techniques you deal with per month.
a) 0-10 b) 11-20 c) 21-40 d) More than 40
8. Designate 3 of regional anesthesia techniques you preferred most for your patients in terms of Frequency number.
( ) Topical anesthesia and infiltration anesthesia
( ) Intravenous regional anesthesia (IVRA)
( ) Peripheral nerve, ganglion and plexus blockages
( ) Central nerve blocks; Spinal and epidural, caudal anesthesia
9. Designate the advantages and disadvantages of Regional Anesthesia (RA) techniques you observed according to the frequency order.

Some advantages of RA	Some disadvantages of RA
( ) Good bleeding control	( ) Take up time
( ) Thromboembolism is less	( ) Causing patient anxiety
( ) Nausea-vomiting is less	( ) Patient waking consciousness
( ) Good patient satisfaction	( ) Not being successful all the time
( ) Good postoperative analgesia	( ) Delay on neurologic evaluation
( ) Less complication	( ) Patient demand to choose team
( ) Safer	( ) Limited efficiency time
( ) Low postoperative sedation	

10. Designate the complications you observe about RA techniques according to frequency order.

( ) Nausea-vomiting	( ) Post spinal headache
( ) Postoperative hypotension	( ) Urinary retention
( ) Lumbar pain	( ) Infection in place of injection, hematoma
( ) Peripheral nerve lesion	( ) Septic or antiseptic meningitis

11. Choose the number of RA techniques complications you deal with per month approximately.
a) 0-2 b) 3-5 c) 6-10 d) More than 10
12. Who do you choose as medic when complication developed for patients regional anesthesia applied?
a) Surgery b) Who applied RA c) Nurse d) Anesthesia specialist
13. Do you prefer RA technique for yourself?
a) Yes ……. b) No …….
14. Who do you prefer more to be applied RA technique?
a) Who is at the same branch b) Anesthesia Specialist
15. Designate the local anesthetics below you use in clinic you work according to frequency order.
( ) Lidocaine (Jetocain)
( ) Prilocaine (Cıtanest)
( ) Bupivacaine (Marcaine)
( ) Levobupivacaine (Chirocaine)
16. Answer the questions about anesthetics you use in clinic given in Table by marking alternatives appropriate for you.

Local Anesthetics Drug	Know well	Not sure
Local Anesthetics concentration		
Local Anesthetics side effects		
Local Anesthetics maximum doses		
Local Anesthetics side effects treatment		

17- Do you prefer addition of opium to local anesthetics in the course of infiltration anesthesia?
a) Yes, I do b) No, I do not c) No idea
18- Which of following techniques do you use generally to afford analgesia for patients? Designate according to frequency order?
( ) Paracetamol ( ) NSAI ( ) Opioid ( ) Opioid+NSAI ( ) Infiltration anesthesia
( ) Local Anesthetics+regional block

All is up, thank you.

The questionnaire comprised 18 questions: 7 questions about the doctors' demographic data and 11 questions to determine the background knowledge and experience of the doctors with RA and LA (Table 1). Ophthalmologists were concerned only about toxicity of LA drugs because there were no RA applications for that field.

Descriptive statistics were presented as counts and percentages. To test for the relationships between the groups, Pearson's chi-square test and Fisher's exact test (when the expected counts were less than five) were used for categorical variables. These statistical analyses were performed using the SPSS (ver: 13) statistical program and p-values of less than 0.05 were considered significant.

Table 2. Demographic data

	n=109
Sex (Male/Female)	86 (78.9%) / 23 (21.1%)
Foundation (University Hosp./State Hosp.)	68 (62.4%) / 41 (37.6%)
Position (Research Assist. / Specialist)	65 (59.6%) / 44 (40.4%)

3. Results

A total of 109 doctors from 12 branches were included in this study (Table 2). There was no difference between the age groups with respect to the RA number (p>0.05) (Table 3). The distribution of the doctor according to age is presented in Table 3. No difference was observed between specialists and research assistants or between working in a university hospital or in state hospital for the preferred frequency of the RA techniques used (p>0.05) (Table 3). Anesthetists preferred RA techniques the most among the branches (p=0.03). The preferred frequency of the RA techniques based on age has the same distribution (Table 4). The advantages, disadvantages and complications of RA techniques mentioned according to the doctors' experiences are shown in terms of frequency in Table 5, and the complication ratios for each RA technique are shown in Table 6.

The doctors believed that a treatment with a 50% complication rate depended on RA performed by anesthetists, with the proper distribution being 41.7% by the anesthetists applying the RA and the remaining 8.3% by the operating surgeons.

The question "Do you prefer to perform the RA technique yourself?" was answered YES by 88% of the doctors and NO by 12%, with 91.9% of male doctors and 72.7% of female doctors answering YES (p>0.05). In addition, all doctor groups preferred the RA to be performed by anesthetists, with 83.3% supporting RA by anesthetists and 16.7% by surgeons.

Among the LA drugs, lidocaine was the most frequently used (50%), followed by prilocaine (29.6%), bupivacaine (16.7%) and levobupivacaine (3.7%).

Doctors aged 25-30 years answered the questions about LA concentrations, side effect treatments and maximum dosage as "know well" significantly more often than doctors aged 40 years or older (Table 7). There were no significant differences observed for the other age groups. The most frequently chosen answer was "No idea" for infiltration and aesthesis regarding the idea of opioid addition to LA drugs (38.9%). The answer "I prefer" was selected by 34.2% of the specialists and 27.6% of the research assistants (p= 0.059).

For analgesic purposes, non-steroid anti-inflammatory drugs were preferred mostly (38.9%), followed by paracetamol (31.5%) and opioids (24.7%).

Table 3. Distribution of RA number per month according to group of ages and position

Age/ RA number	0-10	11-20	21-40	>40
25-30	19(17,4%)	9(8.3%)	12(11%)	6(5.5%)
31-35	16(14.7%)	8(7.3%)	10(9.2%)	6(5.5%)
36-40	5(4.6%)	4(3.7%)	2(1.8%)	2(1.8%)
>40	5(4.6%)	3(2.8%)	1(0.9%)	1(0.9%)
Res.As.Doc.	28(25. 7%)	12(11%)	16(14.7%)	9(8.3%)
Spec. Doc.	17(15.6%)	12(11%)	9(8.3%)	6(5.5%)

Table 4. Preference frequency of RA technique according to group of ages of doctors

		Topical and infilt. Anest.	IVRA	Peri. Nerve Block	Central Nerve Block
25-30	1.Frequency	28(60.9%)	0(0%)	2(4.3%)	16(34.8%)
	2.Frequency	26(61.9%)	7(16.7%)	3(7.1%)	10(14.3%)
	3.Frequency	8(27.5%)	10(34.5%)	6(20.7%)	5(17.2%)
31-35	1.Frequency	21(52.5%)	2(5%)	3(7.5%)	14(35%)
	2.Frequency	20(54.6%)	8(21.1%)	3(7.9%)	9(16.4%)
	3.Frequency	14(43.8%)	3(9.4%)	8(25%)	7(21.9%)
36-40	1.Frequency	5(38.5%)	1(7.7%)	1(7.7%)	6(46.2%)
	2.Frequency	6(46.1%)	3(23.1%)	1(7.7%)	3(23.1%)
	3.Frequency	6(63.7%)	1(9.1%)	2(18.2%)	1(9.1%)
>40	1.Frequency	5(50%)	0(0%)	0(0%)	5(50%)
	2.Frequency	5(50%)	1(10%)	2(20%)	2(20%)
	3.Frequency	7(70%)	0(0%)	3(30%)	0(0%)

Table 5. Advantages, disadvantages and complication ratios of doctors according to frequency order

RA technique	1. Frequency	2. Frequency	3.Frequency
Advantages	Good patient satisfaction 28(29.5%)	Less complication 22(23.2%)	Good bleeding control 18(18.9%)
Disadvantages	Take up time 31 (32.6%)	Not being successful all the time 29(31.2%)	Patient anxiety reaction (causing patient anxiety) 20(22.2%)
Complications	Post spinal Headache 33(36.7%)	Postoperative hypotension 20(23.3%)	Lumbar pain 18 (21.7%)

Table 6. Number of complication per month based on RA techniques

Number of complication per month	
0-2	74 (68.5%)
3-5	23 (21.3%)
6-10	10 (9.3%)
>10	1 (0.9%)

4. Discussion

Although RA techniques have been known for many years, they could not be performed at the frequency desired. Although there are many reasons, one of the important reasons is that doctors who specialize in surgery directed patients to receive general anesthesia due to the lack of enough information about RA techniques. Patients are only focused on the operative procedure and act according to the surgical guidance received during the preoperative session because the patients are in communication with the surgeon more than with the anesthetist. Therefore, patients may not have enough information about the anesthesia method which is used. A patient gets to know the anesthetist or about the anesthesia application when he/she comes to the anesthesiology clinic or operating table (5,7). Therefore, the knowledge and experience of the surgeon is important for educating the patients about the selection of the anesthetic method. In a study performed among orthopedic doctors, anesthesia selection was determined according to the patient's choice by 48% of the doctors, with 84% of those patients preferring RA (5). In this study, the doctor's age affected the anesthesia selection, with younger doctors preferring RA (1). In contrast, in this study, there was no significant difference with respect to the RA preference due to the age or sex of the doctors. Furthermore, the RA techniques were preferred not only by university hospitals

Table 7. Ratio of LA concentrations in terms of ages (group of age), LA side effects, maximum dosage and side effect treatments

		Know well	Not sure	No idea
25-30	LA concentration (p=0.002)	60.9%	34.8%	4.3%
	LA side effects (p=0.064)	36.9%	56.5%	6.5%
	Maximum dosage (p=0.007)	80.4%	17.4%	22%
	Side effects treatment (p=0.018)	73.9%	23.9%	2.2%
31-35	LA concentration	42.5%	55%	2.5%
	LA side effects	35%	57.5%	7.5%
	Maximum dosage	65%	27.5%	7.5%
	Side effects treatment	60%	37.5%	2.5%
36-40	LA concentration	23.1%	46.2%	30.8%
	LA side effects	15.4%	69.2%	15.4%
	Maximum dosage	57.2%	46.2%	7.7%
	Side effects treatment	30.8%	53.8%	15.4%
>40	LA concentration	0%	77.8%	22.2%
	LA side effects	0%	88.9%	11.1%
	Maximum dosage	11.1%	88.9%	0%
	Side effects treatment	22.2%	55.6%	22.2%

but also state hospitals to the same extent. In this study, anesthetists preferred RA with a rate of 6.4% more than surgeons. The explanation for the recent increase in the attention paid to RA techniques is the higher preference for these anesthesia techniques by anesthetists.

A study showed that the advantages of RA techniques include causing less pain, being safer and causing less postoperative nausea/vomiting (5). In another study, “less sedation”, “safe” and “less complications” were highlighted as the advantages (6). Because doctors did not select “good bleeding control” and “less thromboembolic risk” as answers, they were designated as having unsatisfactory knowledge about that subject. In contrast to those studies, in this study, doctors stated the advantages of RA techniques were good patient satisfaction, low complications and good bleeding control.

The disadvantages of RA were given as “long lasting process”, “process failure” and causing “patient anxiety” in one study and as “delay on operation”, “increase in anxiety” and “patient awareness” in another study (5,6). In this study, similar to others, the ideas of doctors about the disadvantages of RA were “lack of time”, “not being successful all the time” and “patient anxiety reaction” in the order of frequency. To avoid from these disadvantages, the application of RA techniques was proposed to be performed in another room out of the surgical room by a different anesthetist team and, in the event of failure, to be supported by peripheral blocks and infiltration anesthesia, avoiding general anesthesia (5). In addition to these suggestions, we believe that there are solutions, such as shortening the start time via an LA with an early onset of action, increasing the process time by providing additional dosages via catheter and administering sedation to the patient during and after the intervention to reduce anxiety.

We did not find any articles about RA complications involving doctors in the literature. Herein, we observed that doctors encountered few complications based on the RA techniques and that “post spinal headache” was the first phrase they thought of when complications were mentioned. Actually, post spinal headache is well known to be a preventable complication. These results indicate that the preferred frequency of RA techniques was not associated with age, sex, and workplace (e.g., state or university hospital) and that the reason for the low number of complications encountered per month is increases in attention, knowledge and experience regarding the RA techniques.

Akçaboy et al. (8) stated that doctors prefer “general anesthesia” for themselves more than for the patients. However, 91.9% of male and 72.7% of female doctors participating in this study stated that they preferred RA techniques for themselves. The reason that fewer females preferred RA is their awareness of the associated anxiety. Başaranoğlu et al. (9) reported that the

most preferred LAs are lidocaine, prilocaine and bupivacaine, which the same order was observed in this study.

A study investigating the complications of LA drugs among doctors reported that anesthetists (59.3%) encountered more LA toxicity than other doctors (9). This situation is explained by the excessive use of LA drugs by anesthetists compared with other doctors and by the anesthetists being well educated about the toxicity symptoms. In the same study, 50.7% of doctors answered the question about LA drug dosages as "know well", whereas 51.4% and 52.1% were "Not sure" about the maximum dosage and the appropriate treatment for toxicity, respectively (9). In this study regarding the question about LA toxicity, 36.9% of young doctors answered "know well", and 88.9% of doctors aged 40 years and older answered "Not sure". The reason for this difference may be because the older doctors were not aware of less toxic LAs that have become used recently or of updated information regarding LA toxicity. As far as we are concerned, informative meetings to be held regularly and training doctors via postgraduate education about this subject will help to eliminate this problem. LA drugs are combined with other drugs to extend their efficiency. Adrenaline, opioids, clonidine, bicarbonate, dexmedetomidine and ketamine are some of the drugs that extend the efficiency and duration of LA drugs without increasing the required amount (10-13). In this group, adrenaline was chosen mostly by the doctors, and the doctor did not know as much about the other drugs, with 38.9% answering "no idea" about the addition of opioids to LA drugs.

In conclusion, there was no significant relationship between the preferred frequency of RA techniques and variables such as age, sex, position (i.e., research assistant or specialist) and workplace (i.e., state or private hospital) of doctors working in the field of surgery. However, given the insufficient background knowledge of doctors about LA toxicity and their belief that RA complications are encountered infrequently, we conclude that regular meetings about these subjects will increase the frequency of using for RA techniques and help doctors better identify complications.

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