KJP The Korean Journal of Pain
| Original Article |
Korean J Pain 2017 October; Vol. 30, No. 4: 287-295
pISSN 2005-9159 eISSN 2093-0569
https://doi.org/10.3344/kjp.2017.30.4.287

State of education regarding ultrasound-guided interventions during pain fellowships in Korea: a survey of recent fellows

[1]Department of Anesthesiology and Pain Medicine, Presbyterian Hospital, Jeonju, [2]Department of Anesthesiology and Pain Medicine, Kyungpook National University Medical Center, School of Medicine, Kyungpook National University, Daegu, [3]Department of Anesthesiology and Pain Medicine, Pusan National University Yangsan Hospital, School of Medicine, Pusan National University, Yangsan, [4]Mac Pain Clinic, Seoul, [5]Department of Anesthesiology and Pain Medicine, Samsung Medical Center, School of Medicine, Sungkyunkwan University, Seoul, [6]Department of Anesthesiology and Pain Medicine, Seoul National University Bundang Hospital, Seongnam, [7]Department of Anesthesiology and Pain Medicine, Ajou University Hospital, Suwon, [8]Department of Anesthesiology and Pain Medicine, Keimyung University Dongsan Medical Center, School of Medicine, Keimyung University, Daegu, [9]Department of Anesthesiology and Pain Medicine, Wonkwang University Hospital, School of Medicine, Wonkwang University, Wonkwang Institute of Scinece, Iksan, [10]Committee on Ultrasound in Pain Medicine, Korean Pain Society, Seoul, Korea

Hyung Tae Kim[1,10], Sae Young Kim[2,10], Gyung Jo Byun[3,10], Byung Chul Shin[4,10], Jin Young Lee[5,10], Eun Joo Choi[6,10], Jong Bum Choi[7,10], Ji Hee Hong[8,10], Seung Won Choi[9], and Yeon Dong Kim[9,10]

Background: Recently, the use of ultrasound (US) techniques in regional anesthesia and pain medicine has increased significantly. However, the current extent of training in the use of US-guided pain management procedures in Korea remains unknown. The purpose of the present study was to assess the current state of US training provided during Korean Pain Society (KPS) pain fellowship programs through the comparative analysis between training hospitals.

Methods: We conducted an anonymous survey of 51 pain physicians who had completed KPS fellowships in 2017. Items pertained to current US practices and education, as well as the types of techniques and amount of experience with US-guided pain management procedures. Responses were compared based on the tier of the training hospital.

Results: Among the 51 respondents, 14 received training at first- and second-tier hospitals (Group A), while 37 received training at third-tier hospitals (Group B). The mean total duration of pain training during the 1-year fellowship was 7.4 months in Group A and 8.4 months in Group B. Our analysis revealed that 36% and 40% of respondents in Groups A and B received dedicated US training, respectively. Most respondents underwent US training in patient-care settings under the supervision of attending physicians. Cervical root, stellate ganglion, piriformis, and lumbar plexus blocks were more commonly performed by Group B than by Group A ($P < 0.05$).

Conclusions: Instruction regarding US-guided pain management interventions varied among fellowship training hospitals, highlighting the need for the development of educational standards that mandate a minimum number of US-guided nerve blocks or injections during fellowships in interventional pain management. **(Korean J Pain 2017; 30: 287-95)**

Key Words: Education; Fellowship; Injections; Lumbar plexus; Nerve block; Neuronavigation; Pain management; Piriformis muscle; Spinal nerve root; Spine; Training; Ultrasound.

Received August 16, 2017. Revised September 17, 2017. Accepted September 19, 2017.
Correspondence to: Yeon Dong Kim
Department of Anesthesiology and Pain Medicine, Wonkwang University Hospital, 895 Muwangro, Iksan 54538, Korea
Tel: +82-63-859-1562, Fax: +82-63-857-5472, E-mail: kydpain@hanmail.net

INTRODUCTION

Recently, the use of ultrasound (US) during pain management interventions has increased exponentially due to several advantages over other techniques, such as improved safety, portability, cost-effectiveness, and reduced exposure to radiation [1].

US has proven especially useful for differentiating among acute injury, chronic disease, and normal anatomic variations within the musculoskeletal system. Furthermore, US is non-invasive, and can be used to facilitate the delivery of nerve blocks and soft tissue injections. Despite such advantages, US-based interventions are limited by the skill of the operator, which is dependent on proper instruction and sufficient practice/experience. Consequently, recent research has focused on the development of specific educational curricula for specialties in which US is frequently utilized. While a few such studies have focused on the field of pain management [2,3], no reports have discussed the application of such curricula in Korea.

Therefore, the present study aimed to assess the current state of US training in fellowship programs of the Korean Pain Society (KPS) through comparative analysis between training hospitals.

MATERIALS AND METHODS

In February of 2017, we conducted an anonymous survey of 51 pain physicians who had completed a KPS fellowship program. The duration of most fellowship programs was 12 months (11.64 ± 0.77 m). The questionnaire was developed in conjunction with recommendations provided by members of the KPS Committee on US in Pain Medicine. The training hospitals at which KPS fellowships were completed were classified as first-, second-, and third-tier hospitals. This was based on the number of points, which were the sum of the number for outpatients, inpatients, and consulting patients treated annually. As a result, those with fewer than 3,000 points were classified as first-tier, those with from 3,000 to 6,000 points were considered second-tier, and those with more than 6,000 points as third-tier training hospitals. Survey respondents were categorized into two groups, as follows: Group A, graduates of programs conducted at first- and second-tier training hospitals; Group B, graduates of programs conducted at third-tier training hospitals.

The survey consisted of 12 questions regarding current US practices and education during pain management fellowships. Respondents of each group were asked to provide information regarding the type and duration of training in pain management procedures, as well as the presence of US equipment in each pain clinic, methods of US training, techniques, and their overall experience in performing US-guided procedures in pain management settings.

Additional questions regarding fluoroscopy-guided injections were included within the original questions to obtain further information. The rate of US utilization and types of procedures performed in clinical practice for each body part, which was classified based on bodily regions were as follows: cranial, cervical, thoracic, lumbar, or sympathetic/peripheral injection were compared between the two groups. The survey contents are referenced in **Appendix 1**.

Statistical analyses were performed using SPSS version 17 (SPSS Inc., Chicago, IL, USA). Mean differences were analyzed using independent Samples t-tests and descriptive statistics. Descriptive data are expressed as frequencies and percentages. Categorical data were analyzed using chi-square tests. The level of statistical significance was set at $P < 0.05$.

RESULTS

In 2017, there were 55 training hospitals with KPS pain

Table 1. Characteristics of Respondents

	Numbers of hospital classified by KPS (n = 55, year of 2017)	Number of fellows responded in this study (n = 51)	
1st-tier training hospital	2	3	
2nd-tier training hospital	17	11	Group A (n = 14)
3rd-tier training hospital	36	37	Group B (n = 37)

KPS: The Korean Pain Society.

management fellowships: 2 in first-tier hospitals, 17 in second-tier hospitals, and 36 in third-tier hospitals. The number of respondents from the included participants were 3 in first-tier hospitals, 11 in second-tier hospitals, and 37 in third-tier hospitals (**Table 1**).

The types of work performed during each pain management fellowship were as follows: In Groups A and B, 21.4% (n = 3) and 37.8% (n = 10) of respondents performed only work associated with pain management via a pain clinic, respectively. Other participants had undergone combined training in anesthesia and pain medicine, or had completed rotations focused on several areas of pain medicine (**Fig. 1**). All respondents reported that US equipment had been available in their respective pain clinics, with the exception of one respondent in Group B.

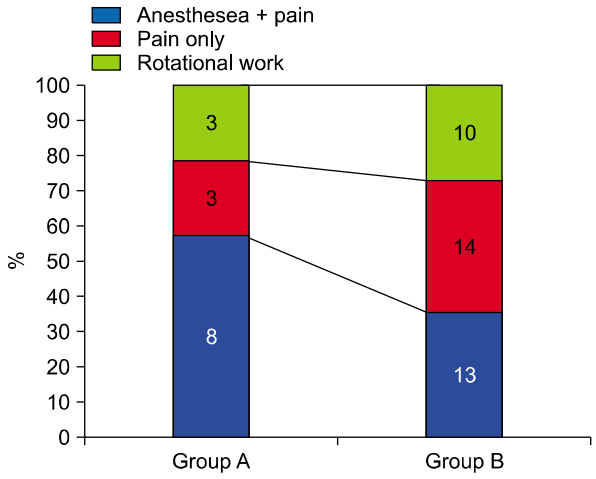

Fig. 1. Types of work during pain fellowships. Number of respondents are expressed in each group.

The duration of pain management training during the fellowship program varied from 5 months to 12 months in both groups (**Table 2**). In Group A, dedicated US training was provided for 36% (n = 5) of respondents, ranging from 1–3 months in 14% (n = 2) of respondents. In Group B, dedicated US training was provided for 40% (n = 15) of respondents, ranging from 1–3 months in 19% (n = 7) and > 3 months in 16% (n = 6) of respondents (**Fig. 2**).

Although training methods varied, no significant differences were observed between the two groups based under the supervision of experienced clinicians (P = 0.150), by the journal or textbook (P = 0.202), and phantom or model-based training (P = 0.080). Additional training methods included cadaver-based training, online assessments, and educational workshops conducted by the KPS (**Fig. 3**).

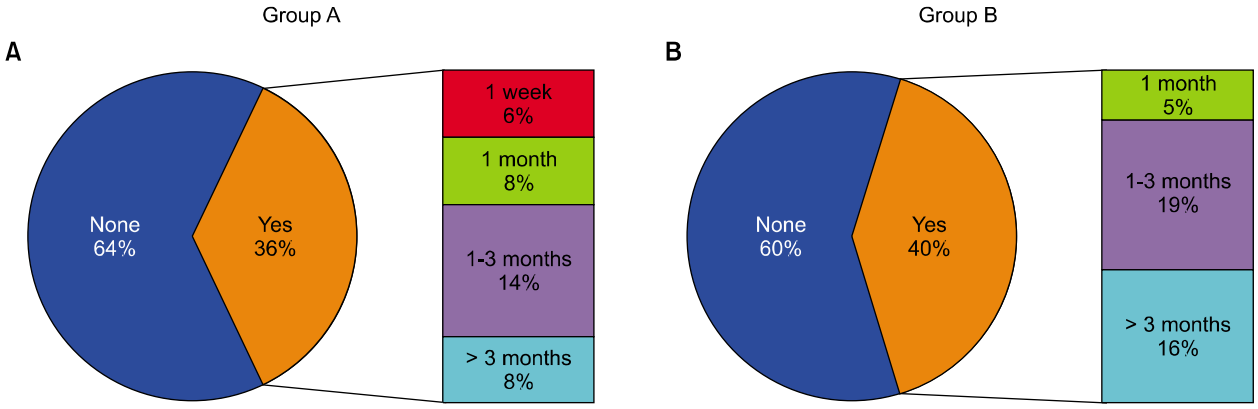

Fig. 2. Dedicated training duration regarding ultrasound-guided procedures.

Table 2. Duration of Pain Management Training during Pain Fellowships

	5 m	6 m	7 m	8 m	10 m	12 m
Group A (n = 14)	0	10	0	1	0	3
Group B (n = 37)	1	19	1	1	1	14
Total (n = 51)	1 (1.0%)	29 (56.8%)	1 (1.0%)	2 (3.9%)	1 (1,0%)	17 (33.3%)

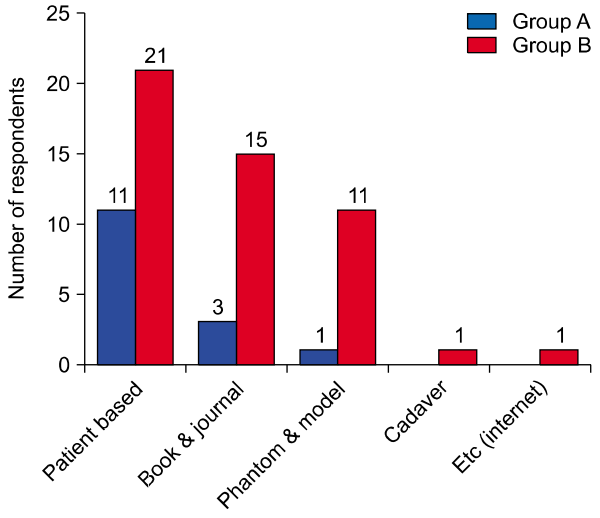

Fig. 3. Methods of training duration for ultrasound-guided procedures. Number of respondents are expressed in each group.

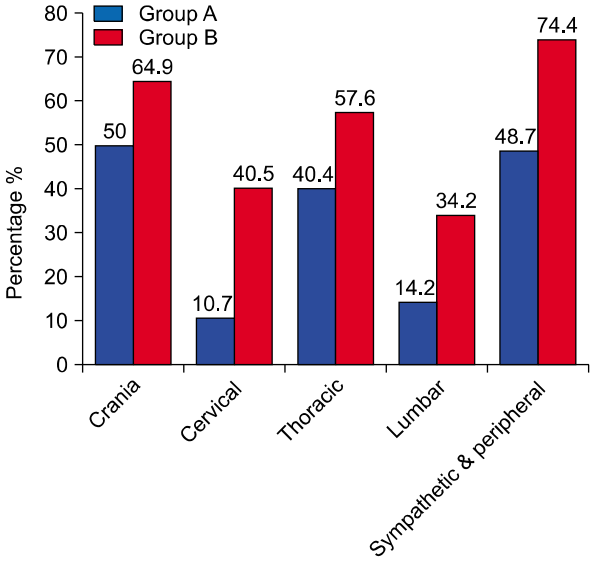

Fig. 4. Percentage of clinical experience performing ultrasound-guided techniques in each region of the body.

We further analyzed differences in the level of experience with common pain management procedures, which were classified based on bodily regions. The rates of each procedure for each bodily region within each group are presented in **Fig. 4** and **Table 3**. Our results indicated that respondents received the greatest amount of training for cranial and sympathetic/peripheral nerve blocks. In Group A, more than 50% of respondents reported clinical experience was only with cranial procedures, while in Group B respondents had experience with cranial, sympathetic, and peripheral injections. In each procedure, both groups had similar levels of experience with greater and lesser occipital nerve blocks, facial nerve blocks, intercostal nerve blocks, stellate ganglion blocks, femoral nerve blocks, ilio-hypogastric, and ilioinguinal nerve blocks, trigger point injections, knee and shoulder joint injections, acromioclavicular joint injections, and knee/shoulder bursa injections with more than 50% having clinical experiences.

However, statistically significant differences in the amount of clinical experience were observed between the two groups with regard to the following: cervical root blocks, lumbar plexus blocks, stellate ganglion blocks, ilio-hypogastric and ilioinguinal nerve blocks, sacroiliac joint injections, acromioclavicular joint injections, and piriformis injections ($P < 0.05$).

DISCUSSION

In Korea, pain is regarded as the most common reason for seeking medical treatment, affecting approximately 30% of individuals at some point during their lifetime [4]. However, most patients remain underserved and often fail to obtain adequate relief from pain. Recently, the management of pain using US-guided techniques has increased due to its relative advantages for evaluating structures of the musculoskeletal and nervous system in a timely and cost-effective manner. Indeed, the use of US for interventional techniques continues to increase, especially for procedures involving the axial structure of spine and other peripheral part of the body. Moreover, previous studies have indicated that US guidance for pain management procedures is safer and more effective than guidance based on anatomic landmarks, nerve stimulation, and fluoroscopy [5].

In a meta-analysis of 41 case series and five randomized trials, Bhatia and Brull [6], demonstrated that US is safer for performing injections at the cervical nerve root, cervical sympathetic trunk, suprascapular nerve, and pudendal nerve, when compared with traditional techniques. Moreover, the authors observed that US was effective for performing lumbar nerve root blocks, greater occipital nerve blocks, suprascapular nerve blocks, intercostal nerve blocks, and lateral femoral cutaneous nerve blocks.

Table 3. Frequency of Ultrasound-guided Procedures during Pain Fellowships

	Group A (n = 14)	Group B (n = 37)	*P* value
Cranial			
Greater & lesser occipital nerve block	10 (76.9%)	33 (89.2%)	0.273
Facial nerve block (SONB, IONB, Mental)	8 (61.5%)	27 (73.0%)	0.439
Trigeminal nerve block	3 (23.1%)	12 (32.4%)	0.527
Cervical			
Cervical root block*	0 (0%)	10 (27.0%)	0.036
Medial branch block	3 (23.1%)	20 (54.1%)	0.054
Thoracic			
Medial branch block	2 (15.4%)	6 (16.2%)	0.944
Paravertebral block	4 (30.8%)	23 (62.2%)	0.051
Intercostal nerve block	11 (84.6%)	35 (94.6%)	0.254
Lumbar			
Lumbar spinal root block	0 (0%)	3 (8.1%)	0.290
Transforaminal epidural block	1 (7.7%)	1 (2.7%)	0.430
Medial branch block	2 (15.4%)	15 (40.5%)	0.100
Facet joint injection	1 (7.7%)	12 (32.4%)	0.080
Lumbar plexus block*	2 (15.4%)	24 (64.9%)	0.002
Caudal epidural injection	6 (46.2%)	21 (56.8%)	0.509
Sympathetic & Peripheral injection			
Stellate ganglion block*	9 (69.2%)	35 (94.6%)	0.015
Femoral nerve block	11 (84.6%)	32 (86.5%)	0.867
Iliohypogastric & Ilioinguinal nerve block*	5 (53.8%)	26 (70.3%)	0.042
Pudendal nerve block	1 (7.7%)	11 (29.7%)	0.100
Trigger point injection	9 (69.2%)	30 (81.1%)	0.375
Sacroiliac joint injection*	1 (7.7%)	18 (48.6%)	0.009
Knee & Shoulder joint injection	10 (76.9%)	29 (78.4%)	0.913
Acromioclavicular joint injection*	7 (53.8%)	31 (83.8%)	0.030
Shoulder & knee bursa injection	10 (76.9%)	34 (91.9%)	0.153
Piriformis injection*	6 (46.2%)	31 (83.8%)	0.008
TAP block	6 (46.2%)	26 (70.3%)	0.119

*$P < 0.05$, SONB: supraorbital nerve block, IONB: infraorbital nerve block, TAP: transversus abdominis plane block.

However, the authors concluded that there is insufficient data to support the efficacy of the technique at present. In a systematic review of randomized controlled trials, Choi and Brull [7] compared US guidance with traditional nerve localization techniques for interventional management of acute pain and pain-related outcomes, reporting that US guidance was not inferior to traditional nerve block techniques for any outcome. However, Choi and Brull [7] concluded that there is insufficient evidence to determine the efficacy of US guidance on acute pain and pain-related outcomes relative to traditional nerve block techniques for interventional pain management.

Although the evidence regarding the use of US in pain management remains controversial, US-guided pain management is an evolving subspecialty in the field of pain medicine. Indeed, several studies support the use of US-guided techniques, as such techniques can decrease the volume of local anesthetics and related side effects, reduce the time required to perform nerve block procedures, and reduce the risk of nerve injury and inadvertent intravascular injection [8-10]. Moreover, US-guided techniques allow pain physicians to perform neve blocks or injections on deep structures in patients with obesity or regions affected by degenerative conditions/prior surgery. In addition, US-guided procedures can be performed in patients with relative contraindications for other guidance techniques (e.g., anticoagulant use, which increases the risk of excessive bleeding) under careful monitoring [11-13].

However, US is limited by the skill of the operator, the lack of evidence regarding neuraxial procedures, and the steep learning curve required to attain proficiency. Moreover, the resolution of US is limited at deep anatomical structures, particularly in patients with obesity, in whom artifacts may mimic signs of pathological conditions [14]. Thus, both novice pain physicians and those experienced in fluoroscopy will find it necessary to undertake specialized training to acquire proficiency before they can optimally integrate US into their clinical practices.

Interventional pain medicine is evolving as a distinct discipline that requires specialized knowledge and expertise. The introduction of new interventional techniques, such as US guidance, highlights the need for appropriate training in the relevant procedures to ensure both success and patient safety. Although continuing medical educational workshops or conferences may help to facilitate the learning process and skill development, such modalities are often limited in breadth, depth, and training duration. Thus, education regarding US techniques during KPS pain management fellowships is critical.

While residencies or fellowships conducted by anesthesiology and pain medicine departments aim to establish competency pertaining to patient care and pain management procedures, there are currently no core curricula designed to meet the special learning objectives associated with US-guided interventional procedures in Korea. Indeed, our data revealed that US-guided interventions are uncommon during the fellowship period, with the exception of greater and lesser occipital nerve blocks, stellate ganglion blocks, femoral nerve blocks, trigger point injections, and injections of the knee or shoulder joint/bursa. Moreover, less than 50% of respondents in each group reported clinical experience in performing US-guided cervical, thoracic, and lumbar procedures.

As spinal pain represents the most common disease entity in Korea [15], further training regarding spinal procedures should be provided during the fellowship program to ensure appropriate application, and reduce the risk of complications due to operator error. Furthermore, as new US-guided interventional techniques are introduced into clinical practice, fellowship programs should ensure that physicians have been properly trained to implement these techniques safely and effectively. Caudal epidural injections, lumbar plexus blocks, lumbar medial branch blocks, sacroiliac joint injections, and cervical root blocks are an integral part of training as they are a promising part of the interventional techniques for the management of spinal pain, in which US is a capable substitute for fluoroscopy. There is also rapidly growing interest in US as evidenced by the surging number of publications discussing it [14].

The present study possesses some limitations of note. First, data regarding clinical experience with US-guided interventions were only based on subjective responses. While the high response rate decreases the overall bias associated with non-response, some bias may have remained. In addition, we were unable to analyze the accuracy, quality, and proficiency of US training due to limitations associated with the questionnaire design. As future advancements in pain interventions are dependent on the quality of education and training, further studies regarding the status of US education are required [16].

In conclusion, the present study is the first to examine current educational practices associated with US-guided pain management techniques in Korea. It showed the diversity of education and training in US in the management of pain by each hospital. Most of them still showed lack of experiences during the training period. Therefore, our findings highlight the need for the development of educational standards that mandate a minimum number of US-guided nerve blocks or injections during fellowships in interventional pain management. Educational curriculum including a minimum number of procedures and duration of experience with US-guided techniques during the fellowship period, to ensure excellence in independent practice, will increase knowledge of and familiarity with US techniques among fellows. Ongoing surveys for the estimation of educational status by the KPS is also needed.

In both the residency and fellowship programs, training, competency, and proficiency requirements include both didactic and experiential components in US education. Proper understanding of the relevant techniques and application of evidence-based approaches for US-guided pain interventions may improve the overall efficacy of treatment by excellent pain physicians through standardized education.

ACKNOWLEDGEMENTS

This work was carried out by the Committee on Ultrasound in Pain Medicine, 2017 KPS. We would like to express our gratitude to the 2017 KPS fellows for their considerable assistance in this survey.

REFERENCES

1. Jeon YH. Easier and safer regional anesthesia and peripheral nerve block under ultrasound guidance. Korean J Pain 2016; 29: 1–2.
2. Conway JA, Adhikary SD, Giampetro D, Stolzenberg D. A survey of ultrasound training in U.S. and Canadian chronic pain fellowship programs. Pain Med 2015; 16: 1923–9.
3. Asaad BO, Reinsel RA, DeVeaux E, Moten H, Durkin B. A survey on teaching ultrasound–guided chronic pain procedures in pain medicine fellowship programs. Pain Physician 2014; 17: E681–9.
4. Shin SM. Prevalence and trends of pain associated with chronic diseases and personal out–of–pocket medical expenditures in Korea. Korean J Pain 2017; 30: 142–50.
5. Hopkins PM. Ultrasound guidance as a gold standard in regional anaesthesia. Br J Anaesth 2007; 98: 299–301.
6. Bhatia A, Brull R. Review article: is ultrasound guidance advantageous for interventional pain management? A systematic review of chronic pain outcomes. Anesth Analg 2013; 117: 236–51.
7. Choi S, Brull R. Is ultrasound guidance advantageous for interventional pain management? A review of acute pain outcomes. Anesth Analg 2011; 113: 596–604.
8. Gelfand HJ, Ouanes JP, Lesley MR, Ko PS, Murphy JD, Sumida SM, et al. Analgesic efficacy of ultrasound–guided regional anesthesia: a meta–analysis. J Clin Anesth 2011; 23: 90–6.
9. Chin KJ, Chan V. Ultrasound–guided peripheral nerve blockade. Curr Opin Anaesthesiol 2008; 21: 624–31.
10. Abrahams MS, Aziz MF, Fu RF, Horn JL. Ultrasound guidance compared with electrical neurostimulation for peripheral nerve block: a systematic review and meta–analysis of randomized controlled trials. Br J Anaesth 2009; 102: 408–17.
11. Sites BD, Beach ML, Chinn CD, Redborg KE, Gallagher JD. A comparison of sensory and motor loss after a femoral nerve block conducted with ultrasound versus ultrasound and nerve stimulation. Reg Anesth Pain Med 2009; 34: 508–13.
12. Assmann N, McCartney CJ, Tumber PS, Chan VW. Ultrasound guidance for brachial plexus localization and catheter insertion after complete forearm amputation. Reg Anesth Pain Med 2007; 32: 93.
13. Ferraro LH, Tardelli MA, Yamashita AM, Cardone JD, Kishi JM. Ultrasound–guided femoral and sciatic nerve blocks in an anticoagulated patient. Case reports. Rev Bras Anestesiol 2010; 60: 422–8.
14. Narouze SN. Ultrasound–guided interventional procedures in pain management: evidence–based medicine. Reg Anesth Pain Med 2010; 35: S55–8.
15. Kim YD, Moon HS. Review of medical dispute cases in the pain management in Korea: a medical malpractice liability insurance database study. Korean J Pain 2015; 28: 254–64.
16. Smith HM, Kopp SL, Jacob AK, Torsher LC, Hebl JR. Designing and implementing a comprehensive learner–centered regional anesthesia curriculum. Reg Anesth Pain Med 2009; 34: 88–94.

Appendix 1

This questionnaire is thoroughly investigated as an anonymous name, and it will be helpful if you answer candidly for the educational condition of the juniors and the development of pain medicine.

1. What is the tier of your fellowship training hospital?
   ☐ First tier hospital ☐ Second tier hospital ☐ Third tier hospital

2. What is the type of works between anesthesia and pain management during the fellowship training?
   ☐ Combined with anesthesia work ☐ Only pain clinic work ☐ monthly rotated (anesthesia, pain)
   2-1 How long is the period of training regarding pain management during fellowship program?
   - ( ) months

3. Is there a separately assigned time schedule for outpatient clinic with fellow during fellowship program?
   ☐ YES. ☐ NO.
   → If checked Yes, How many times a week? : ( ) times

4. Is there an US machine available immediately in your training hospital of own?
   ☐ Yes. ☐ No.

5. Is there an Fluoroscopy machine available immediately in your training hospital of own?
   ☐ Yes. ☐ No.

6. Did you have a separate period of training for fluoroscopy intervention during your fellowship program?
   ☐ Yes. ☐ No.
   6-1 If checked Yes, how long was it?
   ☐ 1 week ☐ 1 month ☐ 1-3 months ☐ more than 3 months

7. What is the main method of training for fluoroscopy intervention?
   ☐ Patient based supervised by attending ☐ Education with colleagues or other seniors
   ☐ Text, Journal, Conference based ☐ Cadaver based
   ☐ Phatom or live model based ☐ etc ( )

8. Did you have a separate period of training for US guided intervention during your fellowship program?
   ☐ Yes. ☐ No.
   8-1. If checked Yes, how long was it?
   ☐ 1 week ☐ 1 month ☐ 1~3 months ☐ more than 3 months

9. What is the main method of training for US guided intervention?
   ☐ Patient based supervised by attending ☐ Education with colleagues or other seniors
   ☐ Text, Journal, Conference based ☐ Cadaver based
   ☐ Phatom or live model based ☐ etc ( )

10. Check if you have any experience during the previous US guided injection or fluoroscopic guided injection.

☐ Please check with US and Fluoroscopy only if you have experience.			
Crania		US Guided	Fluoroscopy Guided
	Greater & Lesser occipital nerve block	☐	☐
	Facial nerve block (SONB, IONB, Mental)	☐	☐
	Trigeminal nerve block	☐	☐
Cervical			
	Cervical root block	☐	☐
	Medial branch block	☐	☐
Thoracic			
	Medial branch block	☐	☐
	Paravertebral block	☐	☐
	Intercostal nerve block	☐	☐
Lumbar			
	Lumbar Spinal Root block	☐	☐
	Transforaminal Epidural Injection	☐	☐
	Medial Branch Blocks	☐	☐
	Facet Joint Injection	☐	☐
	Lumbar Plexus block	☐	☐
	Caudal epidural injection	☐	☐
Sympathetic & Peripheral Nerve			
	Stellate ganglion block	☐	☐
	Femoral nerve block	☐	☐
	Illiohypogastric & Illioinguinal nerve block	☐	☐
	Pudendal nerve block	☐	☐
	Trigger point injection	☐	☐
	Sacroiliac joint injection	☐	☐
	Knee & Shoulder joint injection	☐	☐
	Acromioclavicular joint injection	☐	☐
	Shoulder & knee bursa injection	☐	☐
	Piriformis injection	☐	☐
	TAP block	☐	☐

11. The current Korean Pain Society fellowship Program is one-year course. How do you think about ideal period for training?

☐ 6 months ☐ 1 year ☐ 18 months ☐ 2 years ☐ more than 2 years

12. What is your future careers after finishing fellowship program?

☐ employed physician ☐ private practicing physician ☐ university physician ☐ etc

-Thank you for respond survey- Committee on Ultrasound Pain Medicine by KPS 2017