

Awareness of the ultrasound guided regional anaesthesia among anaesthesia residents in India: A questionnaire-based study

INTRODUCTION

Ultrasound guided regional anaesthesia (UGRA) is becoming increasingly popular, largely because of recent advances in technology that allows the operator to visualise neural structures. Most of the western institutions have regional anaesthesia curriculum especially with a focus on UGRA. A formal curriculum of UGRA may help residents in training to increase efficiency and reduce complications.

In spite of liberal availability of ultrasound (USG) in large academics institutes in developing countries, there is no formal curriculum for training. With the use of USG increasing further, it may be imperative to introduce UGRA curriculum. We conducted this study with an aim to evaluate the awareness of appropriate use of UGRA and thus the suggestion for curriculum formulation. This cross-sectional study was done to estimate the understanding of scanning technique and UGRA procedures among 3rd year anaesthesia residents. This study will also help understand whether the number of UGRA procedures performed in the institute had an impact on the residents' understanding of the sonoanatomy of blocks.

METHODS

After obtaining consent from institutional review board, institutions with formal anaesthesia training and using USG machines were approached. Questionnaires were distributed to anaesthesia residents. It included a total of 21 questions out of which 6 were general questions, 8 questions were related to scanning techniques and 7 questions regarding UGRA procedures. These last 15 questions were analysed for understanding the knowledge of UGRA. These included choice of probe, understanding of artifacts, differentiation of various structures on USG, understanding of sonoanatomy in upper and lower limb blocks and anatomical anomalies.

Residents who correctly answered 10 or more questions out of the 15 questions were assumed to have an adequate understanding of UGRA and this was taken as the correct response. Calculation of the required population size was done statistically by assuming the rate of the correct response to be 50%. A minimum of 100 residents needed to be interviewed. The results were tabulated and analysed statistically, except the first six general questions. Rate of the correct response and 95% confidence intervals were calculated. The association between various variables was calculated by applying the Fischer-exact test.

RESULTS

A total of 130 questionnaires were distributed. The response rate was 77%. All incompletely filled questionnaires were discarded, total 100 questionnaires were evaluated. The overall rate of the correct response (more than 10 questions correct) was 14% when compared to our initial estimate of 50%. This widened our 95% confidence intervals (7.1–21.2). None of the residents had UGRA curriculum in their department. There was a significant correlation between the total number of blocks performed per week and the number of blocks performed with USG ($P = 0.01$) [Table 1]. Totally 44 residents reported performance of 40 or more nerve blocks in their departments weekly. Out of these, 10 answered the questionnaire correctly [Table 2]. There was no significant relation between the total number of blocks per week and the rate of the correct response ($P = 0.112$). A positive correlation was found between

Table 1: Relation between the total number of blocks performed per week and those performed using ultrasound guidance

Total blocks	UGRA			Total
	<5	5-10	>10	
<10	0	0	0	0
10-19	6	2	0	8
20-29	6	8	0	14
30-39	4	22	8	34
≥40	0	6	38	44

The correlation was significant ($P=0.01$). UGRA: Ultrasound guided regional anaesthesia

Table 2: Relation between the total number of blocks performed per week and the rate of correct response

Total blocks	<10 (n=0)	10-19 (n=8)	20-29 (n=14)	30-39 (n=34)	>40 (n=44)
Correct response (n=14)	0	0	0	4	10

The correlation was not significant ($P=0.112$)

the number of UGRA procedures performed per week and rate of the correct response ($P = 0.006$). Out of 46 residents who claimed to perform 10 or more blocks with USG weekly, 12 answered the questionnaire correctly. On the other hand, out of 16 participants who performed less than 5 ultrasound guided blocks per week, none had correct response for the questionnaire.

Out of the total 68 residents who preferred peripheral nerve stimulator for nerve blocks, 10 used ultrasound along with peripheral nerve stimulator and rest 22 were comfortable with anatomical approach. Ten residents who preferred USG for blocks gave a correct response in their questionnaire. A strong positive correlation was found between people who were comfortable using USG for nerve blocks and the rate of correct response ($P = 0.001$). Out of the total, only 18% residents claimed to have attended a UGRA conference or accessed UGRA material online, and none of them gave a correct response. A negative correlation was found between people who attended conferences on UGRA and answering the questionnaire correctly ($P = 0.03$).

DISCUSSION

Ultrasound significantly improved the effectiveness, increased the ratio of successful blocks and reduced complications. Vienna study group has demonstrated that the USG guidance can significantly improve the quality of nerve blocks in almost all types of regional anaesthesia. In addition, complications such as intraneuronal and intravascular injection can be avoided.^[1]

Sites *et al.*^[2] concluded that anaesthesiology residents, with little or no USG experience, could rapidly learn and improve their speed and accuracy in performing a simulated interventional USG procedure. It has been seen that subjects advanced the needle even though it was not appropriately visualised in the USG beam. This can lead to iatrogenic injury in the clinical setting. Therefore, it is very important that the residents should have proper training for UGRA. A proper understanding of the USG scanning technique and understanding sonoanatomy is important.

There are multiple examples of other specialties and organizations that have defined their scope of practice for the use of USG. The American College of Emergency Physicians in 2001 issued a policy statement on emergency USG guidelines.^[3] The European Federation

of Societies for Ultrasound in Medicine and Biology has published minimum training recommendations for practice of medical USG.^[4] American Society of Regional Anaesthesia and Pain Medicine and the European Society of Regional Anaesthesia and Pain Therapy joint committee recommendations for education and training in UGRA have been introduced in 2009.^[5] These recommendations have been put forward to recommend to members and institutions the scope of practice, the teaching/learning curriculum, and the options for implementing the medical practice of UGRA. This type of a structured curriculum will help in understanding device operations, image optimisation, image interpretation and visualisation of needle injection and injection.

Our results show that the institutions where more number of blocks are performed use UGRA the most. Residents from institutes where USG is used frequently for regional anaesthesia provided more number of correct responses and it was more if more than 10 blocks were performed with USG, and was statistically significant. This could be because regular use of UGRA made residents more aware of sonoanatomy. In our study, only 18% of residents had access to any online material or attended any UGRA workshop. It was seen that none of these respondents could attend to more than 10 questions. This would also explain that routine use of UGRA probably was more beneficial than single exposure to a workshop.

The strength of our study was that the questionnaires distributed covered the core competencies and skill sets associated with UGRA. Our questions covered ability to visualize key landmark structures, identify nerves, confirm normal anatomy and recognize anatomical variations. A weakness of our study was that no comparison was possible with a cohort that had a structured UGRA curriculum. The comparison could have highlighted the importance of the UGRA in residency training programme and is possible only when recommendations are put forward for proper execution of UGRA in institutions at developing countries.

CONCLUSION

Institution training in the residency program for UGRA should be based on a formal curriculum; online access to the material and attending workshops may not improve the understanding of sonoanatomy of nerve blocks. In addition, a proper curriculum may also help in reducing complications.

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