RESEARCH PAPER

Evaluation of time taken for Thoracic Epidural Catheterization without ultrasound: A Prospective Observational study of fifty Cases

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ABSTRACT
Epidural anaesthesia is an anaesthetic technique that is extensively used in surgery and pain control but there is still a difference in the time needed for its administration. This prospective observational study was conducted to find out the time taken for thoracic epidural catheterization without using ultrasound on fifty patients using a paramedian approach. The time from injection of local anaesthetic to catheter securing was recorded including attempts and passes. Participants' average age was 57.1 years and the average insertion duration was 257.6 seconds (around four minutes), which is significantly lower than the 15-30 minutes that were the usual literature described estimates. In 43 cases, the catheterization was accomplished on the first and 7 cases were in second attempt. On average, there were 1.3 passes for each successful catheterization and all catheters worked properly without any complication reported. The study suggests that by skilled practitioners the thoracic epidural catheterization might be performed in a much shorter time compared to what was done earlier. The study questions the routine use of ultrasound in normal cases. The study reports the paramedian technique as effective and estimates the chance for better perioperative outcomes. It is suggested that the findings be validated through further research.

Keywords: anaesthesia, epidural, classic technique, procedure time.

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INTRODUCTION

Epidural anaesthesia is a common anaesthetic modality not only in thoracic surgery but also in pain management; however, there is still significant variation in the time it takes to administer the technique especially catheterisation. Traditional estimates include 15-30 minutes for preparation and placement of the catheter. Getting the epidural space especially in the thoracic segment is difficult and time consuming even for experienced practioners. [1]. Still, our preliminary experience and informal questionnaires indicate that experienced anaesthesiologists commonly perform the procedure in about five minutes. This observation leads us to re-evaluate the time from local anaesthetic injection to when the catheter is secure. The current series reports on 50 consecutive patients who underwent thoracic epidural catheterization by one of us experienced in the procedure using a paramedian approach. Measuring the time to perform the procedure, number of attempts, and number of passes will provide information on the success rate and efficiency of this approach when no ultrasound guidance is used. Since patient safety was paramount, ethical considerations of fully informed consent were taken. Results of our study have important implications as there are no studies to date addressing the time needed to place a thoracic epidural catheter. We expect that the mean time of placing such a catheter is significantly below those reported in the literature, based on our experience, to help understand better the efficiency of procedures and best practices in anesthesia.

Case series

The technique of administering epidural anaesthesia is estimated to last 15-25 minutes, including preparation, procedure and catheter placement. The technique typically takes 10 minutes, with additional time required to secure the catheter and provide the initial dose. However, difficulties during insertion can prolong the process, with reports of durations of 30 minutes or longer in rare situations especially the space chosen is thoracic. According to the author's experience and a short survey of anaesthesiologists, the duration usually takes within five minutes. Hence, we decided to estimate the time taken

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from injection of local anaesthetic in thoracic interspinous space up to fixing the plaster. As this is a simple observation of what is being routinely done, there were no obvious ethical issues. An informed patient consent was taken from all participants. There is neither any extra intervention nor any special research in this observation. The observations were taken according to the principles of Helsinki. As thoracic catheterisation is described to take more time and difficult for beginners, the study was taken with experienced specialists. The primary aim was to find out the time from infiltration of local anaesthetic to plastering the catheter. The other objectives were the number of attempts and passes. Our technique was to push the loss of resistance syringe in simultaneously with the fingers doing tremulous movements. This removes the needle going in without tremulous movement. (video 1) By attempt means, the needle has come out and reinserted and by the term pass, it meant that the redirection without needle coming out of the skin. The first fifty eligible cases with thoracic epidural were continuously taken. In all the patients the paramedian technique was contemplated. The mean age was 57.1 ± 15.09 years -IQR (25-47) The mean weight was 74.7 ± 15.2 Kg with an IQR (64-84) Most of the cases were laparotomies, laparoscopic surgeries and spine instrumentations. The mean duration of insertion of epidural catheter in the thoracic space was 257.6 ± 49.90 seconds IQR (220-300). The time is explicitly around four minutes. An 18 G portex epidural catheter was used in all the cases. There were 21 males and 29 females. Catheterisation was done in seven cases in the second attempt and the remaining 43 in the first attempt. The number of passes were 3 in six patients, two in 14 and the rest with a single pass. All the catheters were working and the top ups were given in the perioperative period. There were no complications. All the catheters were inserted from T6 to T11 with majority below T8 without using ultrasound. All were removed after 48 hours and the procedure was uneventful in all the cases.

DISCUSSION

There are almost no studies which describe the timing to achieve the thoracic epidural space with or without the use of gadgets like ultrasound. We have showed that the mean time is 257 seconds which is less than 5 minutes. Lee et al have described the timing of needle insertion to be around 50 seconds with no clear mention of total timing. [2] Auyong et al described the timing of around 270 seconds to get the space and the extra time for catheterisation and fixing which is not mentioned. [3] Kim et al have described the identification of space in less than 3 minutes but there is no mention about catheterisation timings as there are described problems in inserting the catheter and blood aspiration.[4] These studies have mentioned the use of ultrasound and there is no mention about the time taken to make the probe ready for use. We inserted all catheters in lateral position only. We accept that all these cases were done by a senior anaesthesiologist. We assert that there is no such study like this. As this being an observational study of an established technique there were no ethical issues. We conclude that local anaesthetic infiltration to space identification and insertion of epidural catheter without ultrasound takes around four minutes in the thoracic space with minimal complications with majority of cases in the first attempt. The majority of cases were inserted between T8-9 and T9-10 and there were minimal cases of T6 and T7 interspaces. The observation is novel in that it contradicts existing data that the procedure takes 15-30 minutes.

To conclude, our research has proven that the average duration of thoracic epidural catheterization without ultrasound guidance is roughly 257 seconds or slightly less than five minutes. This result is in direct contradiction to previous studies, which placed the procedure time between 15-30 minutes. Most of the attempts were successful on the first attempt and very few complications occurred. The findings point to the paramedian approach used by skilled practitioners as efficient and possibly leading to better perioperative outcomes. Still, further investigation is needed to confirm these outcomes and to assess their impact on clinical practice.

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Informed patient consent – Yes

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