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The landmark technique remains a safe alternative to ultrasound guidance for performing a fascia iliacus block: A cadaveric study

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Introduction

Regional anaesthesia and nerve blocks are a vital part of modern anaesthesia. They can be used on their own, as part of a general anaesthetic or post-operatively as an adjunct to standard analgesia.

A commonly used nerve block is the fascia iliacus block.[3] This can be used in the emergency department as an effective form of pain relief for femoral fractures.

Classically the landmark technique was used, this involves infiltration of local anaesthetic in relation to fixed bony landmarks. However, with the advent of affordable portable ultrasound machines, ultrasound (USS) guided techniques have become more commonplace. This allows for more accurate placement of the block using a reduced volume of local anaesthetic.[1,2]

Usage of USS for regional blocks has been found to be safe and effective. USS guided regional blockade is provided almost solely by anaesthetists and anaesthetic trainees. Blocks performed by non-anaesthetic trainees (for example emergency medicine trainees in accident and emergency departments or orthopaedic trainees) are generally done using the landmark technique.[6,7] This technique can be used effectively by doctors who do not possess the necessary ultrasound skills. [7]

We used a cadaveric model to assess the safety and potential efficacy of the landmark technique for fascia iliacus nerve blocks.

Method

A single ninety year cadaver donated to the Laboratory of human anatomy of the University of Glasgow was used for the study. Local ethical approval was granted.

The cadaver was prepared and pre-dissected as described later. A single right sided fascia iliacus block was administered by an anaesthetist not directly affiliated with the project using the landmark technique. Blue india ink was used instead of an anaesthetic agent.

Preparation

The cadaver was prepared using standard embalming techniques and then dissected along fascial planes in the following manner.

A superficial skin incision was made on the right limb from the anterior superior iliac spine (ASIS) to the pubic tubercle, along the line of the inguinal ligament. A vertical incision was then made laterally along the line between the anterior and posterior surfaces of the thigh, finishing just above the knee joint. The lower end of the incision was then extended medially, finishing at the

medial border of the thigh. Starting laterally, a large skin flap was dissected and turned medially to hinge on the medial border of the thigh. Subcutaneous fat and fascia lata were then dissected together and turned medially as a second flap. This was then closed and sutured for the experimental part to begin. This was done so there would be minimal disruption of the tissues post infiltration of anaesthetic.

Infiltration

The block was introduced using the following landmarks. A line was drawn between the ASIS and pubic tubercle. This line was then divided into thirds and a 18 French Gauge spinal needle was introduced at ninety degrees perpendicularly at 2cm below the point at the junction between the lateral third and the medial third.

The anaesthetist felt for the first click followed by the loss of resistance as the point for instilling the block. When he was satisfied the tip was in the correct position 20ml of India ink mixed with 10% latex was used and left for 10 days to set.

Inspection

Subsequently the flap was re-opened to investigate the spread of the India Ink. The abdomen was also opened and carefully inspected for any sign of ink.

Photographs were taken using a Nikon Coolpix 955 digital camera. Images were viewed digitally using Jasc Paintshop Pro (Version 7.04) and stored as .jpeg images.

Part of the femoral nerve was excised with a small fragment of muscle en-block from the area where the Femoral nerve was crossing into the right iliac fossa The tissue was then routinely processed for histology.

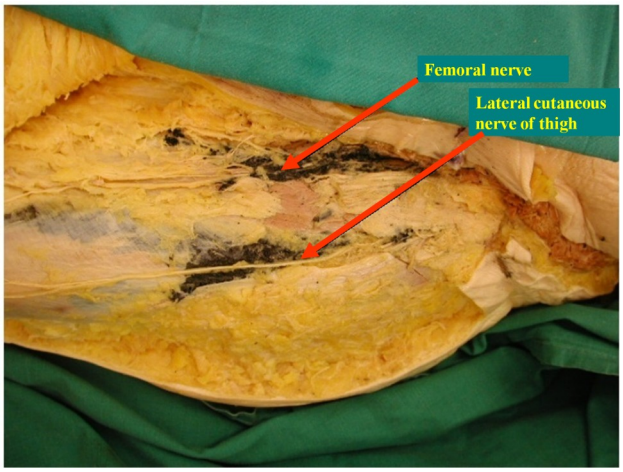

***Figure 1**: Dissection of thigh. Note the black discolouration in the plane*

Results

Examination of the abdomen did not show any Ink into the abdominal cavity. Dissection of the thigh showed the ink travelling in columns cranially to caudally, covering the femoral and lateral cutaneous nerve of thigh (see figure 1). The ink was contained exclusively in this plane. No sign of vascular or nerve injury was noted at the time of inspection.

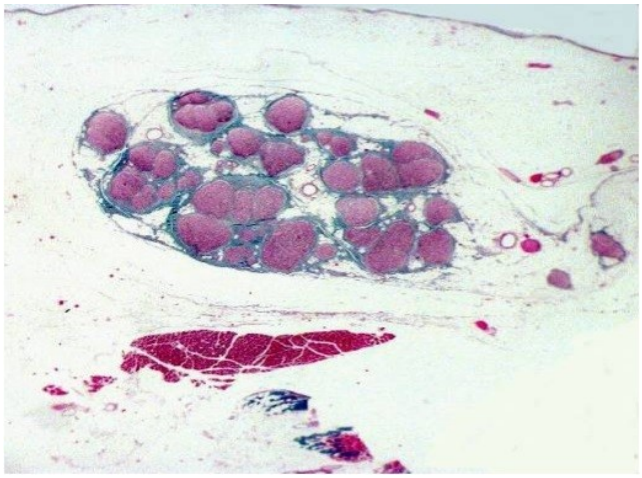

***Figure 2**: Histological specimen of thigh dissection. Femoral Nerve centre (pink), covered in ink*

Histological examination showed satisfactory covering of the femoral nerve with the india ink as seen in figure 2. The femoral nerve which appears pink was immersed in dark ink at the microscopic level.

Discussion

There has only been one randomized control trial comparing ultrasound versus the landmark technique for fascia iliacus blocks[4] (non-cadeveric). This study found that there was increased sensory loss with the use of the ultrasound guided method.

However less technical equipment and ultrasound skill is required to use the landmark technique and can be used in the emergency setting as a preoperative adjunct to pain relief prior to surgery.

Our study shows that the landmark technique can be an effective alternative to using ultrasound guidance where this is not available and in experienced hands. We would advocate that persons performing fascia Iliacus blocks should become competent at using both ultrasound guidance and landmark techniques to use in instances where ultrasound facilities are not readily available.

While studies have used similar methods to ours to describe new methods of fascia iliacus blocks, [5] we have shown in our study is that this classical method is still safe and our method of evaluating the spread of the

block suggests that it is likely to be effective. A study with non-anaesthetic staff involved to perform the infiltration will useful to further validate its use role in the emergency setting.

Conclusion

While we do not recommend the landmark technique over the USS technique, we conclude that the landmark technique for performing a fascia iliacus block is safe in experienced hands. However repeating this study with non-anaesthetic staff would be useful to evaluate efficacy when performed by non-anaesthetic personnel.

Competing Interests: None declared.

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