

Clinical and Educational Article

The para-sartorial compartments (PASC) block: a new approach to the femoral triangle block for complete analgesia of the anterior knee

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The adductor canal block is an effective motor-sparing technique for managing postoperative analgesia after total knee replacement (TKR) [1]. However, because only the saphenous nerve is blocked, the adductor canal block only covers the inferior part of the surgical incision, supplied by the infrapatellar branch of the saphenous nerve.

The TKR incision can be divided into three parts [2]. The inferior third is innervated by the saphenous nerve, which can be blocked by an adductor canal block or a femoral triangle block. The middle third is innervated by the nerve to vastus medialis and the medial femoral cutaneous nerve, which can be reached only by the femoral triangle block. The upper third is innervated by the intermediate femoral cutaneous nerve, which can be blocked superficially to the sartorius muscle, about 10 cm distally to the inguinal ligament. The femoral triangle block has been demonstrated to be an effective analgesic block which does not cause motor impairment, although the nerve to vastus medialis is blocked [3]. Based on this anatomical concept and on the results of a recent study [4], we reasoned that blocking both the medial and intermediate femoral cutaneous nerves, collectively known as the 'anterior femoral cutaneous nerves', may result in complete analgesia of the anterior part of the knee. Therefore, we recently started to perform an intermediate femoral cutaneous nerve block combined with a femoral triangle block and have found that this results in good postoperative analgesia with maintenance of motor function following TKR. Although the intermediate femoral cutaneous nerve runs in a different anatomical compartment to the saphenous nerve, nerve to vastus medialis and medial femoral cutaneous nerve, which are inside the femoral triangle, all of these nerves lie near to the sartorius muscle. We have developed an approach to perform both a femoral triangle block and intermediate femoral cutaneous nerve block via a single needle entry point and using the same ultrasound window, which we have named the 'para-sartorial compartments' (PASC) block.

The ultrasound probe is first placed on the medial aspect of the thigh, at the midpoint between the base of the patella and the anterior superior iliac spine. The apex of the femoral triangle (Fig. 1a) is identified by the visualisation of the adductor longus muscle medially and sartorius laterally. The ultrasound probe is then moved cranially until the intermediate femoral cutaneous nerve appears on the supralateral aspect of the sartorius muscle, in a duplicature of the fascia lata. (Fig. 1b). The PASC block is performed via a lateral-to-medial puncture with local anaesthetic injected in three different compartments (Fig. 1c). The first injection is performed inside the femoral triangle (intra-canalicular compartment), lateral to the femoral artery and characterised by a periarterial and subsartorial spread. The local anaesthetic volume here should be limited to 10 ml to avoid spread to the femoral nerve [5]. The needle is then withdrawn and another 10 ml local anaesthetic infiltrated into the subsartorial compartment. Finally, the needle is withdrawn again for the last injection of 10 ml local anaesthetic at the level of the intermediate femoral cutaneous nerve, above the sartorius muscle (suprasartorial compartment).

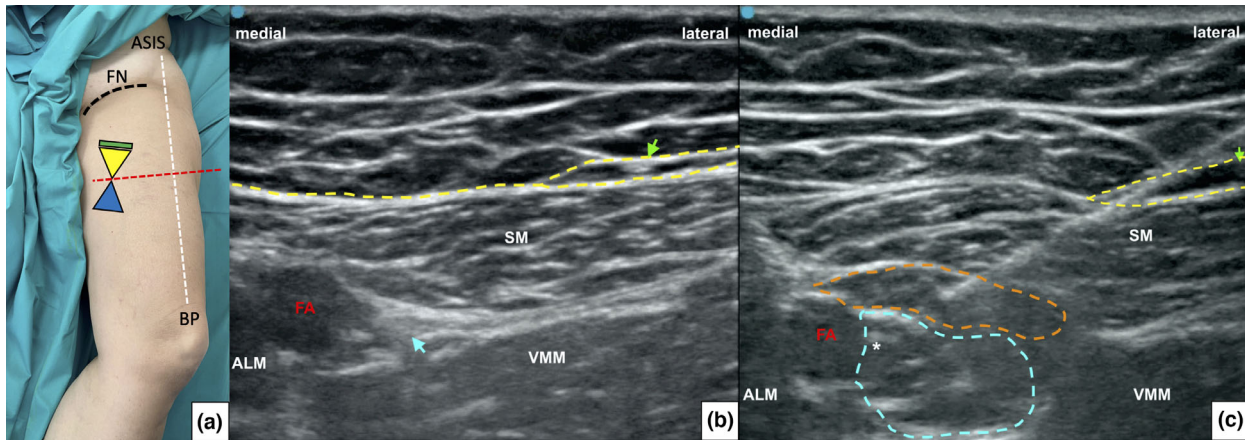


Figure 1 The para-sartorial compartments (PASC) block. (a) The ultrasound probe is first placed on the medial aspect of the thigh, at the level of the midpoint (red dashed line) between the base of the patella (BP) and the anterior superior iliac spine (ASIS). This point usually coincides with the distal end of the femoral triangle (yellow triangle) and the beginning of the adductor canal (blue triangle). The ultrasound probe is moved cranially until the intermediate femoral cutaneous nerve is visualised above the sartorius muscle (SM). The green rectangle represents the ideal probe position. The black dashed line (FN) indicates the femoral crease, where the femoral nerve is traditionally blocked. (b) Ultrasound view of intermediate femoral cutaneous nerve (green arrow) at the level of proximal femoral triangle (blue arrow), above the SM, vastus medialis muscle (VMM) and adductor longus muscle (ALM). (c) The needle tip (white asterisk) is placed inside the femoral triangle and first injection is performed, producing spread within the intracanal compartment (blue dashed line). Subsequently, the needle is withdrawn, and local anaesthetic injected into the subsartorial compartment (orange dashed line). Finally, the needle is withdrawn again to perform the last injection in the suprasartorial compartment (yellow dashed line) to block the intermediate femoral cutaneous nerve

We first used this technique to manage a case of severe postoperative pain following TKR. A 58-year-old patient developed severe knee pain 1 h after TKR performed under spinal anaesthetic. The PASC block was performed in the post-anaesthesia care unit with a total volume of 25 ml ropivacaine 0.5%. Thirty minutes after performing the block, the patient's numerical pain rating scale improved from 9/11 to 2/11, and the patient was able to flex the knee, experiencing only a residual mild posterior pain. Moreover, a loss of sensitivity was recorded in both the supra- and infrapatellar areas. We believe the PASC block has great potential in knee surgery, but future studies are required to validate the analgesic and motor-sparing efficacy of this new approach.

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