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The novel Obturator Fascia Compartment block: a technical report

Herein, through a case-based technical report, it is explained the novel and straightforward Obturator Fascia Compartment (OFC) block to target the pudendal nerve (PN) at the Alcock’s Canal Level, and also, eventually, the nerve to the obturator internus (NOI) using a superficial fascial block. The OFC block has the potential to anesthetize the proximal rami of the pudendal nerve (PN) due to cranial spread of the local anesthetic underneath the Obturator Fascia (Fig 1 A-C).

A written informed consent to publication was obtained from the patient. In the OFC block technique, the patient is placed in lateral decubitus with the thighs 90° flexed. After observing the ischial tuberosity (IT), with the probe positioned transversally, but oriented cranially (pointing towards the patient head): the sacrotuberous ligament (STL) is visualized covering the IT medially being the inferior edge (thinner portion) of the gluteus maximus visualized superficially to the ligament (the STL runs from the IT to its medial/upper insertion in the sacrum). As mentioned the gemelli muscles are not observed in this view, being not a confounding factor in opposition to other approaches at the obturator foramen level. (Fig. A-C)

An injection is then performed, inserting the needle from the lateral side in the vicinity of the IT and advancing the needle caudal-cranially, to target the medial/superior surface to the Obturator Internus Muscle (OIM). The needle advances tangentially to STL in its superficial (distal) third; this maneuver facilitates the dissection beneath the obturator fascia, that is visualized running deeply and cranially (the OIM visualized in a short axis view below the STL).

In terms of ultrasound visualization the local anesthetic is visualized dispersing easily within the Alcock’s canal due to textile arrangement of its walls (a single layer of the obturator fascia). (Fig. A, B)

The image (Fig.1 A, B) is from a patient, aged 66 years old, that had been submitted to a vulvectomy, in the context of oncologic disease, that was under considerably distress caused by intense pain at the Post-anesthetic Care Unit, despite the administration of significant intravenous analgesia (morphine 8 mg intravenously (IV); paracetamol 1g IV, metamizol 2g IV, ketorolac 30 mg IV, magnesium sulphate 2g IV, Ketamine 15 mg IV, tramadol 150 mg IV). After the block immediate pain relief was achieved (the pre-block numeric rate pain scale was 9 out of 10). Under conventional analgesia (paracetamol 1g every 8 hours IV, metamizol 2g every 12 hours IV, tramadol 100mg every 8 hours IV and ketorolac every 8 hours) the patient had always a numeric
pain rating scale score inferior to 2 in post-operative day one. The patient reported numbness and thermal sensitive alterations in the perineal region during 12 hours (8 mL of ropivacaine 0.5% were used per side).

In proctologic procedures, due to the proximal emergence of the inferior rectal nerve a proximal PN block is needed. The transperineal techniques reach the branches to the genitals such as the dorsal penis/clitoris or dorsal labial nerves for instance, but spare inferior rectal nerves and several perineal nerve rami. A transvaginal technique, that uses only landmarks as guidance, may cause discomfort and may eventually fail. [1]

The proximal ultrasound-guided technique at the level of the ischial spine relies on the identification of the ischial spine and the sacrospinous ligament (SSL) (deep structures) immediately caudal to the piriform muscle and cranial to the OIM; the injection is done after the identification of neurovascular structures, but intrapelvic organs can be easily inadvertently punctured due to the lack of muscular layers underneath the SSL. [1]

Bendtsen et al described the pudendal nerve block at the entrance of the Alcock’s canal to anesthetize all 3 branches of the PN before it ramifies in the ischioanal fossa. [1] The authors indicate an roadmap to target the PN at this level by following from cranially to caudally the margin of the hip bone sonographically along the 1) greater sciatic notch, 2) the ischial spine, and 3) the lesser sciatic notch, although it is undertaken in a deep, thick and round gluteal region where changes in the ultrasound image occur dramatically with only minor probe adjustments.

According to my best knowledge, PN block has been described at the obturator foramen level only in cadaveric specimens, to approach the PN from the lateral side, as such avoiding to cross the ischiorectal fossa, but once again the goal is still a perineural injection around milimetric structures within the Alcock’s canal. [2] Some difficulties are presented with this approach, the major one is the identification of the OIM and the obturator fascia, beneath the thick gluteus maximus, and the need to place the patient in prone position. [2]

The OIM belongs to the external hip rotator muscular group, being its only component than covers posteriorly the obturator foramen (the superior and inferior gemelli muscles arise from the posterior surface of superior ramus of the ischium, running laterally). [3]

The obturator fascia splits up to form the Alcock’s canal, which encloses the pudendal vessels and the PN when they cross over the surface the OIM. [4,5] Of note, distally the obturator fascia will get attached to the STL. [4,5] The PN anesthesia is achieved without the need of the identification of the Alcock canal, which can be better visualized ultrasonographically after the OFC injection.
On the other hand, great variability exists in pudendal nerve anatomy, being the OFC block a tool to increase the success and democratize the PN block [4,5] by reducing the occurrence of unsuccessful injections in the ischiorectal fossa in the vicinity of the Alcock’s canal (Fig. 1 A-C). On the other hand the pudendal block is ineffective in the transobturator tape procedure for female urinary incontinence, as the cranial portion of the vagina is innervated by the uterovaginal nerves from the hypogastric plexus, nevertheless a source of post-operative pain are the afferences from the obturator fascia and the OIM that are crossed by the surgical tape that can be blocked by using the OFC block.

The OFC block may be helpful in adult and pediatric patients for urologic, proctologic, and gynecologic surgeries.
References


Fig A: Ultrasound image showing the relevant sonoanatomy for the performance of the Obturator Fascia Compartment block. The relevant structures are identified.

Fig B: Ultrasound image showing the injection during the Obturator Fascia Compartment Block. The local anesthetic is injected superficially beneath the Obturator Fascia, it spreads cranially and penetrates within the Alcock’s Canal, splitting its contents. In this image the Alcock’s canal is visualized in its oblique / long axis. After the injection is easier to effectively and clearly observe the Alcock’s canal and its contents (pudendal nerve, pudendal vessels).
Fig C: Schematic image showing the relevant anatomy for the Obturator Fascia Compartment block. Needle advances from caudal to cranial. The obturator fascia is not represented. It covers medially/posteriorly the Obturator Internus Muscle.

Abbreviations: IT - ischial tuberosity; AC – Alcock’s canal; OF – obturator fascia; OIM – obturator internus muscle; LA – local anesthetic; IP – injection point; OFor – obturator foramen; IRF – ischiorectal fossa; IRN – inferior rectal nerve; PN – pudendal nerve; S – sacrum; SP – pubic symphysis; NOI – Nerve to the obturator internus; IB – ischial bone; STL – sacrotuberous ligament; IPA – internal pudendal artery; GMM – gluteus maximus muscle.