CRYONEUROLYSIS OF CUTANEOUS NERVES

TF Bendtsen, Aarhus University Hospital, Anaesthesiology, Aarhus, Denmark
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Severe, persistent neuropathic pain after surgery and trauma occurs as frequent as 10–50%.1,2 The pain is typically due to cutaneous neuropathy, which is due to injury of skin nerves.

Cryoneurolysis can be used to treat cutaneous neuropathy3: A double-barrel needle is inserted until the needle tip touches the target nerve. A few-mm-wide ice-ball is generated and interrupts the nerve fibers. The needle tip is cooled down to minus 60–80°C when using carbondioxide (CO2). The cryo-probe is a ‘closed circuit’.4

Cryoneurolysis with CO2 interrupts the axons and their myelin sheaths but leaves the connective tissue skeleton of the nerve intact securing normal neural regeneration.5 This relieves the neuropathic pain for 4–12 months.6,7 Cryoneurolysis with CO2 never reach temperature lower than minus 78 degrees Celsius as this is the boiling point of the gas. Thus, cryoneurolysis before total knee arthroplasty in patients with severe osteoarthritis for reduction of postoperative pain and opioid use in a single-center randomized controlled trial. J Arthroplasty 2020; Online ahead of print.

In summary, effective analgesia after TKA can be conducted by two different strategies:

(a) MMA + LIA + escape nerve blocks.
(b) MMA + nerve blocks (iPACK or PPB for the posterior innervation and proximal femoral triangle block for the anterior innervation)

REFERENCES


Total knee arthroplasty (TKA) generates moderate to severe pain especially the first postsurgical days – unless the pain is managed efficiently. Multimodal analgesia (MMA) and local anaesthetics can solve the pain problem the critical first 24 postsurgical hours.

The first step of efficient pain management after TKA is MMA: Paracetamol, NSAIDs, intravenous dexmethylasone, and escio opioid. The second step is local analgesics. That is mainly a choice between intraoperative local infiltration analgesia (LIA) by the surgeon or peripheral nerve blocks by the anaesthesiologist.

Complete anaesthesia of the genicular innervation would require nerve blockade of the femoral, obturator and sciatic nerves. The femoral nerve innervates the anterior knee region. The obturator and sciatic nerves innervate the posterior knee region.

Complete block of the three nerves would impede ambulation. A better strategy is analgesia of the relevant peripheral nerve branches.1

The posterior genicular innervation is due to the popliteal plexus (the posterior branch of the obturator nerve and the tibial nerve). It can be anaesthetized either by LIA or an iPACK block or a popliteal plexus block (PPB).

The most important branch of the femoral nerve for TKA is the medial vastus nerve that innervates the medial retinaculum and the capsule. In addition, the anterior femoral cutaneous and the infrapatellar saphenous nerve branch innervate the integumentum of the surgical incisional field. All these femoral nerve branches can be anaesthetized by a proximal femoral triangle block.2

The anterior inferomedial and inferolateral genicular innervation is due to tibial and peroneal nerve branches respectively. They are of occasional relevance for analgesia after TKA.

In summary, effective analgesia after TKA can be conducted by two different strategies:

(a) MMA + LIA + escape nerve blocks.
(b) MMA + nerve blocks (iPACK or PPB for the posterior innervation and proximal femoral triangle block for the anterior innervation)