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SP8 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 cryoprobe 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.^{5,6} Cryoneurolysis with CO₂ never reach temperature lower than minus 78 degrees Celcius as this is the boiling point of the gas. Thus, the nerve is safe-guarded against irreversible destruction, which occurs when the freezing exceeds minus 100 degrees Celcius.⁶

No serious or persistent adverse effects have been reported even after repeated cryoneurolysis.^{9,10} Clinical cryoneurolysis studies have been carried out on various cutaneous nerves. Most of these studies present data of pain relief with cryoneurolysis of cutaneous nerves – but the results are heterogeneous and flawed by high incidences of failure of pain relief.

The causes of failure are: (a) Lack of knowledge about specific cutaneous nerves and cutaneous nerve territories; (b) lack of direct visual ultrasonographic identification of true target nerve; (c) inaccuracy of needle tip placement exactly adjacent to the target nerve; (d) a very small diameter of the ice-ball capable of generating freezing below -20 degrees Celcius.

Conclusion In summary, persistent painful cutaneous neuropathy is frequent after surgery and trauma. However, the applicability of cryoneurolysis with CO₂ is limited by a range of technical problems.

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SP9 OPTIMAL PERIPHERAL NERVE BLOCKS FOR TOTAL KNEE ARTHROPLASTY – 2ND OPINION

TF Bendtsen. Aarhus University Hospital, Anaesthesiology, Aarhus, Denmark

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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 dexamethasone, and escape 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 nerves 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)

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