A Simple Treatment for a Widespread Problem

Chronic hip joint pain is a common problem among adults of advanced age. Radiofrequency (RF) is a non-surgical and non-narcotic treatment option for those who are not candidates for invasive surgery. Cosman devices are indicated for use in RF heat lesioning of peripheral nerve tissue for the treatment of pain.

Treat Multiple Nerves at the Same Time

Treating multiple nerves at the same time with conventional RF electrodes saves time and reduces costs. Cosman’s G4 generator can operate up to four electrodes using thermal or pulsed RF, and monopolar or bipolar RF.

Large Ablations Using Cosman Cannula

A physician can adjust ablation size by selection of cannula size and generator settings. Ablation width can approach or exceed 10 mm using conventional monopolar or bipolar RF.

Average ablation width W, length L, and depth D are assessed by color change in fresh bovine liver ex vivo. Ex vivo lesions may differ from clinical lesions. Bipolar ablation shown in two cross sections with tip spacing s.

Selection of generator settings, cannula dimensions and position, and all aspects of patient treatment are the sole responsibility of the administering physician.
<table>
<thead>
<tr>
<th>Study</th>
<th>No. of Patients: Treatment Details</th>
<th>Pathology Types</th>
<th>Results</th>
<th>Adverse Events</th>
<th>Notes</th>
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<tr>
<td>Chaibin et al³</td>
<td>1: TRF femoral and obturator bilateral, 80°C for 6 seconds. 22 gauge 5 mm active tip.</td>
<td>OA</td>
<td>P: 80% reduction at 3 months F: M: N/A</td>
<td>None</td>
<td>Ultrasound and fluoro guidance. Used sensory and motor stimulation. Selected based on time limited response to bursa and joint injections. Patient continued anticoagulation.</td>
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<tr>
<td>Rivera et al³</td>
<td>17: TRF femoral and obturator branches, 90°C for 90 seconds. 22 gauge 5 mm active tip.</td>
<td>OA, post THA, post girdlestone</td>
<td>P: 30% avg reduction at 6 months, 8 patients &gt;50% relief F: Improved Harris Hip and WOMAC scores M: N/A</td>
<td>3 Transient hematomas</td>
<td>Diagnostic blocks (3 cc). Inserted needle medial or lateral to femoral artery for obturator. 5 mm active tip. Sensory and motor stimulation used. Switched to Locher¹¹ method during course of study.</td>
</tr>
<tr>
<td>Wu and Groner⁴</td>
<td>2: PRF femoral and obturator branches, 45°C for 120 seconds. 22 gauge 10 mm active tip.</td>
<td>FHN, post THA</td>
<td>P: 50% to 60% reduction at 3-4 months F: Improved ambulation M: N/A</td>
<td>None</td>
<td>Diagnostic blocks (0.5 cc to 1 cc). Sensory stimulation.</td>
</tr>
<tr>
<td>Shin et al⁸</td>
<td>1: Femoral and obturator branch TRF.</td>
<td>Metastasis</td>
<td>P: 50% reduction</td>
<td>None</td>
<td>Korean Language.</td>
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<tr>
<td>Malik et al⁶</td>
<td>4: Femoral and obturator, TRF 75°C to 80°C for 90 seconds. Cannula size not reported.</td>
<td>OA, FHN, metastasis</td>
<td>P: 30% to 70% NRS at 3 months F: Improved ¾ pt M: Reduced ½ pt</td>
<td>Thigh numbness, 1 patient</td>
<td>AP approach. Diagnostic blocks (1 cc LA).</td>
</tr>
<tr>
<td>Kawaguchi et al⁷</td>
<td>14: Obturator and/or femoral branch, TRF 75°C to 80°C for 90 seconds. Cannula size not reported.</td>
<td>OA, metastasis, DL</td>
<td>P: 50% relief, 86% patients avg 4.2 months (1-11 months) F,M: N/A</td>
<td>None</td>
<td>Suggested pain location predicted articular nerve involved, no block for femoral component. Volume for IA or obturator diagnostic block.</td>
</tr>
<tr>
<td>Fukui et al⁸</td>
<td>1: Femoral and obturator branch TRF 90°C for 180 seconds. 22 gauge 4 mm active tip.</td>
<td>OA, infection</td>
<td>P: 70% relief until 4 months; pain increased at 6 months F: Improved walking with cane M: Stopped use until 6 months</td>
<td>None</td>
<td>Diagnostic blocks with contrast (3 cc LA). Sensory stimulation. Obturator cannula walked to obturator canal from superior pubic ramus. Introduced idea of cryoanalgesia for denervation of articular branches. Procedure not repeated because overall pain reduced.</td>
</tr>
<tr>
<td>Akatov and Dreval⁹</td>
<td>13 (15 hips): Obturator nerve proper, TRF 80°C for 120 seconds.</td>
<td>OA</td>
<td>Increased range of motion in 9 patients, remainder of results not clear. Followed for up to 3 years.</td>
<td>Sensory loss in all but one patient.</td>
<td>Needle technique not well described. Unclear if live fluoro used. Additional treatment for myofascial pain in 3 patients. Unclear if diagnostic blocks used, but 2 cc to 3 cc of LA injected prior to lesion to ensure pain resolved.</td>
</tr>
</tbody>
</table>

**Glossary:**

- AS - Ankylosing spondylitis
- DL - Dislocation (congenital or trauma)
- F - Functional improvement
- FHN - Head necrosis (AVN, trauma, Legg-Calve-Perthes)
- IA - Intra-articular
- LA - Local anesthetic
- M - Medication reduction
- NRS - Numerical rating score
- OA - Osteoarthritis
- P - Pain reduction
- post THA - Post total hip arthroplasty
- PRF - Pulsed radiofrequency
- RA - Rheumatoid arthritis
- TRF - Thermal radiofrequency

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Conventional RF Hip Procedure

1. The patient is placed in supine position on an x-ray fluoroscopy table. The surgical site is prepared for aseptic technique, and the skin is numbed at the cannula insertion sites using local anesthetic.

2. Aseptic technique and fluoroscopic guidance are used throughout cannula placement and during treatment.

3. The sensory branch of the obturator nerve innervating the hip joint is targeted for ablation as follows. The femoral artery is located by palpation. An RF cannula is inserted 3 cm lateral to the femoral artery, forming a 70° angle with the sagittal plane and a 20° angle with the transverse plane to avoid blood vessels. Using fluoroscopic guidance, the cannula tip is placed at the site below the inferior junction between the ischium and the pubis.

4. With the patient awake, cannula position is confirmed by requiring a response to Sensory stimulation (50 Hz, 1 msec) at less than 0.7 Volts. To prevent inactivation of motor nerves, increasing levels of Motor stimulation (2 Hz, 1 msec) at less than 0.9 Volts is applied to exclude muscle contractions.

5. After ruling out intravascular placement, lidocaine (1 cc of 1%) is injected through the cannula.

6. A temperature-sensing RF electrode is inserted into the cannula, and radiofrequency is applied for the desired time and temperature. The patient is continuously monitored for signs of discomfort.

7. The sensory branch of the femoral nerve innervating the hip joint is targeted as follows. An RF cannula is inserted via an anterolateral approach with the tip below the inferior anterior iliac spine near the anterolateral margin of the hip joint. Steps 4-6 are repeated.

8. Following RF procedure, the cannula is withdrawn and a bandage is placed over the skin insertion site.

References


