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Understanding Radiofrequency Ablation

Another option in your pain management arsenal.

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A step beyond basic pain management services, radiofrequency ablation employs high-frequency energy at a relatively low temperature to deactivate pain-generating nerves for a longer period of time than injections do. As recently as 15 years ago, this minimally invasive interventional technique was not frequently used, but many pain management physicians now block nerves through radiofrequency ablation on a daily basis to treat chronic neck and back pain as well as headaches, trigeminal neuralgia, reflex sympathetic dystrophy, sciatica, facet syndrome and sacroiliac joint dysfunction. Here's a look at the procedure.

How it works

Externally, radiofrequency ablation therapy resembles the administration of spinal joint or nerve injections. But instead of injecting anesthetic agents with a syringe, the physician is inserting a probe that directs radio waves at a targeted location.

The procedure is conducted under fluoroscopic guidance, following electrical stimulation to ensure that the proper nerve, and only the proper nerve, has been targeted. (Diagnostic injections of two different anesthetic agents, with two different lengths of pain relief, at two different times well in advance of ablation will also ensure the effectiveness of the planned procedure on the targeted nerves.)

A 3.5-inch to 6-inch wire electrode is inserted into an insulated hypodermic needle with an exposed distal 5mm or 10mm tip that acts as a monopolar electrode, and moved into position near pain-generating nerve endings in the spine or neck.

A radiofrequency generator unit connected to this probe creates a high-frequency alternating current, which is delivered through the probe into the tissue. A grounding pad placed at a distal site from the probe serves as a dispersive electrode, and the targeted nervous tissue is the resistor that completes the electrical circuit.

As the radiofrequency waves pass through the probe, they agitate the tissue molecules surrounding the tip. These vibrations create frictional heat of at least 42°C, effectively causing tissue death and temporarily destroying the painful nerves.

This therapy works in a very controlled, consistent manner. The ablation creates a football-shaped lesion around the probe, which grows to a certain size depending on the temperature generated — higher temperatures create larger lesions — and then stops.

The procedure is often performed at temperatures between 60°C and 90°C, depending on the nerve structure targeted. Since the probe heats the tissue by exciting the tissue molecules, not through the direct transfer of heat, you can set and monitor the temperature extremely accurately. To treat more than one level of nerves, remove and replace the probe, and then overlap the lesions.

Throughout the procedure, the physician frequently communicates with the consciously sedated patient, who's been anesthetized only at the area of insertion, to monitor its progress. That way, if a patient reports pain radiating down his arm or leg as the current (and generated heat) is increased, the physician can turn down the current, reposition the probe or abort the procedure so as not to damage untargeted areas, which could potentially result in permanent neurological injury.

Takes an hour, lasts a year

The procedure generally lasts about 30 minutes to 60 minutes, depending on the targeted structure. Cervical spine cases, for instance, can take about a half an hour, while lesioning an intervertebral disc can last up to an hour.

Radiofrequency therapy isn't a permanent solution, but it does provide considerably longer-lasting relief than the three or four months that injections offer. The duration of pain relief varies from patient to patient, but the nerves that are destroyed tend to regenerate over the course of a year or two.

And it offers a choice of options when the nerves have regenerated and the patient returns for further treatment. If the pain is of the same or a greater degree, another radiofrequency surgery might be warranted. If the pain has lessened, however, a return to injections may be the way to go.

No one knows for sure quite how radiofrequency therapy works. By that, I mean that there are two versions that arguably achieve similar pain-reduction results through different methods.

The traditional method described above uses temperatures of greater than 42°C to destroy nerves. But another method in recent years employs a pulsed current that doesn't surpass 40°C and doesn't destroy the nerves. Instead, its practitioners claim, it changes the physiology of nerves to "reset" the way they transmit information to the brain.

Pulsed radiofrequency techniques have courted some controversy. Skeptical pain specialists question their effectiveness and note small research samples, and the International Spine Intervention Society has cited a lack of supporting literature. As yet, traditional radiofrequency is the most often used of the two methods.

Considering the duration of its effects, one of the big advantages of radiofrequency ablation for pain management is its low incidence of complications and patients' rapid post-op recoveries. While some patients may feel some post-op pain, which often presents as a burning or tingling sensation at the treatment site, this can be controlled with medication until it resolves in three to five days.

In rare cases and among small numbers of patients, the treatment can result in neuropathic pain, in which patients suffer

hypersensitivity on certain areas of the skin, or in the development of a neuroma, in which nerve endings form a painful mass instead of regenerating to their previous formation.

You can avoid most bad outcomes by placing the probe meticulously. The use of fluoroscopic imaging, contrast enhancement and electrical stimulation to precisely target the pain-generating nerve as well as the judicious use of current and heat can prevent damage to other neurological structures nearby.

What you need

Most insurers in most states reimburse radiofrequency ablation for pain management, although some assign limits on which specialists can perform it. Its facility reimbursement under Medicare's recent payment system revision has remained relatively constant. The hospital outpatient prospective payment system offers a higher rate than the ASC list does. The 2009 Medicare ASC reimbursement rates for radiofrequency ablation are listed in the table by procedure and reflect national, not regional, rates. Multi-level and bilateral surgery adjustments apply.

If, after having done a pro forma on the case volume that it'll bring your surgery center and after determining that your schedule can block out the time to accommodate it, you're considering adding the procedure to your pain management services, there isn't too much equipment you'll need to purchase to get your physicians operating. A radiofrequency generator ranges in cost from $15,000 to $25,000. The sterilizable heating electrodes, which have a lifespan of about two years, cost about $1,500 to $2,000 apiece. The disposable, insulated needles through which the electrodes are placed cost $15 apiece. In addition, you'll need the drugs, spinal needles and syringes for the above-mentioned pre-procedure diagnostic injections, conscious sedation and intraoperative local anesthesia.

2009 ASC Medicare Reimbursement Rates for RF Ablation Procedures — Based on a Local Wage Index of 1.0000

RF ABLATION PROCEDURE	ASC CODES		
SPINE FACET JOINTS	**Initial Level**	**Additional Levels**	**Fluoroscopy**
Cervical Facet	64626 $452.39	64627 $212.55	77003-TC $39.23
Thoracic Facet	64626 $452.39	64627 $212.55	77003-TC $39.23
Lumbar Facet	64622 $452.39	64623 $307.09	77003-TC $39.23
Sacral Facet	64622 $452.39	64623 $307.09	77003-TC $39.23
SACROILIAC JOINT	**Unilateral**	**Bilateral**	**Fluoroscopy**
Sacroiliac Joint	64640 $102.07	64640-50 $153.11	77002-TC
SYMPATHETIC JOINT	**Unilateral**	**Bilateral**	**Fluoroscopy**
Sphenopalatine Ganglion	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Cervical Sympathetics	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Thoracic Sympathetics	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Lumbar Sympathetics	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Impar Ganglion	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Celiac Plexus	64680 $480.65	64680-50 $720.98	77002-TC $47.99
Superior Hypogastric Plexus	64681 $507.49	64681-50 $761.24	77002-TC $47.99
INTERVERTEBRAL DISC	**Initial Level**	**Additional Levels**	**Fluoroscopy**
Disc Peripheral Nerve (DPN)	64640 $102.07	64640-51 $153.11	77002-TC $47.99
PERIPHERAL NERVES	**Unilateral**	**Bilateral/Addition**	**Fluoroscopy**
Trigeminal Nerve	64600a $452.39	64600-50 $678.59	77002-TC $47.99

Trigeminal Nerve	64605b $452.39	64605-50 $678.59	77002-TC $47.99
Trigeminal Nerve	64610c $452.39	64610-50 $678.59	77002-TC $47.99
Occipital Nerve	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Iioinguinal Nerve	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Cluneal Nerve	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Intercostal Nerve	64620 $307.09	64620-51 $460.64	77002-TC $47.99
TEMPORAL MANDIBULAR	**Unilateral**	**Bilateral**	**Fluoroscopy**
Temporal Mandibular Joint	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Temporal Tendon	64640 $102.07	64640-50 $153.11	77002-TC $47.99
Stylomandibular Ligament	64640 $102.07	64640-50 $153.11	77002-TC $47.99

a = Supraorbital, infraorbital mental, or inferior alveolar nerves b = Second and third division at the foramen ovale
c = Second and third division at the foramen ovale with radiologic monitoring.