Radiofrequency ablation of genicular nerves for knee pain

Clinical Policy ID: CCP.1335

Recent review date: 5/2023

Next review date: 10/2024

Policy contains: Diagnostic genicular nerve block; genicular nerve block; osteoarthritis; radiofrequency ablation.

First Choice VIP Care Plus has developed clinical policies to assist with making coverage determinations. First Choice VIP Care Plus' clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of "medically necessary," and the specific facts of the particular situation are considered by First Choice VIP Care Plus when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. First Choice VIP Care Plus' clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. First Choice VIP Care Plus' clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, First Choice VIP Care Plus will update its clinical policies as necessary. First Choice VIP Care Plus' clinical policies are not guarantees of payment.

Coverage policy

Radiofrequency ablation of the genicular nerve for chronic knee pain is investigational/not clinically proven and, therefore, not medically necessary.

Diagnostic nerve block of the genicular nerve for chronic knee pain is investigational/not clinically proven and, therefore, not medically necessary.

Limitations

No limitations were identified during the writing of this policy.

Alternative covered services

Routine patient evaluation and management by a network health care provider.

Background

The knee consists of the lower femur, upper tibia, and the patella wrapped in articular cartilage that protects, cushions, and absorbs shock as the joint bends and straightens. Time, trauma, and overuse contributes to a

degeneration of these structures causing arthritic inflammation and pain. Osteoarthritis is the most common type of knee arthritis, usually develops slowly, and results in bone rubbing against bone (American Academy of Orthopedic Surgeons, 2021a).

Pain from osteoarthritis of the knee is often effectively managed with pharmacological or non-pharmacological treatments (Jones, 2015). When conservative therapy fails, options include surgery (e.g., arthroscopy or total knee arthroplasty). Genicular nerve neurolysis is a second-line therapy on its own or as an adjunct to arthroplasty.

Genicular nerve block has traditionally been performed via local anesthetic with or without corticosteroid injection of the superolateral, superomedial, and inferomedial branches of the nerves around the knee joint. Radiofrequency ablation, also known as radiofrequency neurotomy, is a commonly used intervention to treat pain from an innervated structure. It was historically used successfully for lumbar and cervical facet joints in the spine but it has expanded to peripheral structures, as well. Radiofrequency neurotomy of the major or periarticular nerve supply or intra-articular branches innervating the knee has been proposed as a treatment for osteoarthritic knee pain (Lee, 2021).

Findings

Current guidelines acknowledge the potential role of radiofrequency denervation in treating osteoarthritic knee pain but temper recommendations based on limitations of the evidence. According to the American Academy of Orthopaedic Surgeons, denervation therapy may reduce pain and improve function in patients with symptomatic knee osteoarthritis. The supportive evidence came from one or more “low” quality studies with consistent findings or evidence from a single “moderate” quality study recommending for or against the intervention. The strength of recommendation was downgraded from “moderate” to “limited” due to major quality concerns (American Academy of Orthopaedic Surgeons, 2021b).

According to an American Society of Pain and Neuroscience best practice summary, radiofrequency ablative technologies used for nociceptive sensory pain of the knee have been shown to be effective for the relief of chronic osteoarthritic induced pain as well as post-op pain in limited randomized and nonrandomized studies. Additional research on demographic factors, optimal patient selection and timing, and, especially, long-term outcomes associated with chronic knee pain is needed (Lee, 2021).

A review was conducted of 12 studies of anterior knee joint innervation and six studies of posterior innervation to examine if radiofrequency ablation techniques could completely denervate the knee joint and, therefore, reduce the pain. Although the number of anterior and posterior articular branches with their respective nerve innervators could be isolated and identified, there was still a lack of precise anatomic targets on fluoroscopy and ultrasound for radiofrequency ablation or a diagnostic knee block, although participants achieved an effective reduction in pain (Roberts, 2020).

A systematic review/meta-analysis of eight studies (n = 256) of patients with chronic osteoarthritis pain in the knee treated with ultrasound-guided radiofrequency ablation revealed that targeting the genicular nerve achieved better pain relief than intra-articular or sciatic nerve. Authors identify several limitations in the study, including inability to analyze long-term effectiveness of the treatment in these patients (Huang, 2020).

A systematic review of 33 studies, including 13 randomized controlled trials (n = 1,512) patients found radiofrequency ablation for knee pain from osteoarthritis was alleviated three to 12 months after baseline. In six studies, the proportion of patients with > 50% pain relief were 65.5% and 19.3% for treatment and control groups. Of ten studies, eight reported significant patient satisfaction. Only nine of 29 studies reported adverse effects, and these were considered minor (Ajrawat, 2020).

A systematic review/meta-analysis of 12 studies (n = 841) showed that radiofrequency ablation on the genicular nerve was associated with an improvement in knee pain, starting at one week and lasting through six months. This procedure was more effective than intra-articular pulsed radiofrequency ablation for reducing knee pain, but rarely improves knee joint function (Hong, 2019).

A systematic review of 19 studies (four of which were randomized) of mitigation of chronic knee pain concluded radiofrequency ablation was promising and efficacious after observing significant short- and long-term pain reductions (Orhurhu, 2019).

A systematic review (Gupta, 2017) analyzed radiofrequency ablation by conventional, pulsed, or cooled radiofrequency technique to relieve chronic knee pain. Most of the seventeen included publications described studies assessing treatment of the genicular nerves or an intra-articular approach. Different therapeutic approaches to targeting the genicular nerve (conventional, pulsed, or cooled) or an intra-articular approach produced no certain advantage. While most studies reported positive outcomes, ongoing concerns regarding the quality and procedural aspects of the included studies limit the ability to draw conclusions.

A systematic review (Bhatia, 2016) noted 13 reports on ablative or pulsed radiofrequency treatments of innervation of the knee joint. A high success rate of these procedures in relieving chronic pain of the knee joint was reported at one to 12 months after the procedures; however, only two of the publications were randomized controlled trials. There was evidence for improvement in function and a lack of serious adverse events of radiofrequency treatments. Randomized controlled trials of high methodological quality are required to further elaborate the role of these interventions in this population.

An analysis of 265 patients with a > 30% decrease in average knee pain scores for at least three months at three medical centers found radiofrequency ablation of the genicular nerves had a positive response of 61.1%. Larger electrode size, repeated lesions, having > 80% pain relief during the prognostic block, not being on opioids, having no coexisting psychiatric condition, having a lower baseline pain score, and having > three nerves targeted had especially high rates of positive outcomes and can be factors in patient selection (Chen, 2021).

In 2023, we updated the references, deleted older references, and added one new systematic review of nine studies that found moderate-quality evidence supporting the effectiveness of fluoroscopically-guided genicular radiofrequency ablation for reducing pain associated with knee osteoarthritis in the short term. The six-month success rates (for 50% or greater pain relief) after radiofrequency ablation ranged from 49% to 74%. Compared to intra-articular steroid injection or hyaluronic acid injection, the probability of success was 4.5 times higher and 1.8 times higher with radiofrequency ablation, respectively (Fogarty, 2022). No policy changes are warranted.

References

On February 21, 2023, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were “genicular nerve,” “nerve block,” “diagnostic genicular nerve block,” and “pain management.” We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

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Policy updates

9/2017: initial review date and clinical policy effective date: 10/2017

11/2018: updated references. Policy number changed to CCP.1335.

10/2019: Policy references updated.

4/2020: Policy references updated. The policy originally addressed diagnostic nerve block and radiofrequency ablation of the genicular nerve. We added the topic of genicular nerve block for pain.

5/2021: Policy references updated.

5/2022: Policy references updated.

5/2023: Policy references updated.