

Identifying Lateral Knee Pain Using Sodium Channel Blockers “Distally” at ankle.

Dr Satishchandra Gore¹, Smruti Gore²

1. MS FABMISS Senior Consultant Endoscopic Spine Surgeon Pune 2.B. Pharm. Pune

Abstract: Common complaint of lateral or para patellar knee pain seen in outpatient is sometimes perplexing. It is seen in younger age group may be labelled as chondromalacia, in midage seen as bursitis, tendinitis and aged group as osteoarthritis or related pain. We have seen a new symptom and sign group of lateral knee pain. We have devised a clinical test to diagnose and confirm this pain by new methodology based on gore sign.

I. Introduction

Knee pain is a common problem and has high incidence and prevalence in Indian population.¹ It is seen in close to 18 % population². Above incidence and prevalence study has been primarily related to osteoarthritis of knee. In literature knee pain, sometimes is called as black hole as there are multiple explanations and likely causes. The reliability of various methods and classification of knee pain is not studied well yet.³ In our clinical practice, we have observed a new knee pain syndrome that does not fit a classical osteoarthritis, or chondromalacia or tendinitis and bursitis. This pain is non-trauma, non-infective and non-ischemic and non-degenerative for the knee joint.

We have had experience of treating patients with sciatic pain due to disc herniations surgically under local anesthesia when they are awake and aware. This has given us a different perspective on pain origin.⁴ Classical sciatica mediated by L5 involvement many times presents as knee pain. Detailed account of sciatica new understanding is already published.⁵ The present study is to evaluate lateral knee pain and confirm if it is neuralgia and describe the new symptom group.

II. Material

A total of 60 patients were studied.

Age range 23 to 64.

Male 31 females 29.

Right knee more common than left.

Inclusion criteria:

The knee pain present on lateral aspect of knee. Pain felt along posterolateral aspect of knee

Pain along lateral edge of patella. Pain felt over lower anterior lateral edge of patella in a spot.

Pain associated with tingling and numbness in lateral knee and leg on sitting cross legged for more than 15 minutes. Pain associated with sensory symptoms locally or along the leg. Pain may be throbbing.

Pain may go along the lateral calf on walking or prolonged standing.

Pain not associated with any trauma, infection or vascular cause.

Inability to flex the knee fully and inability to sit with legs crossed.

Pain felt in from of discomfort felt on sitting cross legged on ground, enough to make the person feel that leg must be made straight within 10-15 minutes of sitting.

III. Method

Patients were clinically examined to assess trauma, infection, ischaemia or degenerative changes in knee as cause of pain. These patients were excluded from the study. The chosen patients were then subjected to modified clinical examination with special focus on involvement of the common peroneal nerve at knee and distally along the leg. Imaging studies were done for knee, but in spine in very few select patients only. We palpate the painful area and elicit tenderness of nerve at knee or behind the knee in popliteal fossa along common peroneal nerve. If the nerve was tender it was then palpated along leg up to ankle and its terminal part of deep peroneal nerve and sural nerve. The tender spot of the nerve at or around ankle was then injected with local anesthetic 2% plain lignocaine without adrenaline, 3 ml, and effect was seen after injection in 10 and 30 minutes. The volume injected was empirically decided.

IV. Results

Out of 60 patients 44 had the nerve tender at posterolateral part of popliteal fossa [common peroneal nerve]. It was found that in 84% patients the nerve was tender at ankle in area of deep peroneal nerve and in 30 % in area of sural nerve and 14 % in area of both nerves. The pain relief was noted for varying duration from 1 hour to 24 hours. It improved flexion mobility of knee where patient before injection was unable to flex the knee well beyond 20 degrees. The discomfort while sitting cross legged also reduced.

V. Discussion

Knee pain in lateral aspect at varied age is sometimes difficult to appreciate and diagnose. Once we rule out trauma, infection, ischaemia and degeneration at knee as the likely cause what remains probably is nerve mediated pain. Anatomically lateral knee is supplied by common peroneal nerve and its articular branches. These on lateral knee are superior, inferior and recurrent genicular nerves.⁶ Our understanding of pain and nerve mediated pain along knee in general is improved because of surgery of the disc under local anesthesia in awake and aware patient by transforaminal endoscopy⁷, by use of RF to treat chronic pain at knee by nerve denervation and ablation^{8,9}, by past studies in chondromalacia patella, lateral retinacular pain and its treatment, patellar mal alignment¹⁰⁻¹⁶, use of nerve blocks in knee replacement surgery and post-operative pain control¹⁷⁻¹⁸.

Our finding of tender common peroneal nerve at knee and its distal branch deep peroneal and its lateral terminal branch at ankle also tender is a new finding which we have reported previously in study of sciatica⁵. The injection of sodium channel blocker distally results in relief of pain for varying duration along the nerve involved in inflammation; that manifests as tenderness of the nerve. This may be taken as a test to identify the cause and the mechanism of the pain at knee as neuralgia. We used the physiological basis of nociceptor that it is a pseudo monopolar axon and using distal block we could relieve the pain immediately even though for a short duration enough to diagnose it. We have for the first time shown that injection of a sodium channel blocker distally and away from site of pain is effective in suppressing pain for a short duration. In clinical setting this may help in differentiating source of pain at lateral knee. This we want to term as reverse analgesia and distal block.

In some patients 18/60 it was found that nerve was not tender but patient on sitting cross legged got tingling over lateral knee and leg along distribution of L5 within 10 minutes or shorter duration. This finding of sensory symptoms on sitting cross legged in patients helped us propose that this is because of reduced stretch ability of nerve. We propose this as a new syndrome of pain at knee of nerve origin.

Sciatica has been noted as caused by mechanical causes or chemical priming of the nerve. The chemical cause can give tenderness of the nerve. Chemical cause can be detected by using tenderness of the nerve. This is known to be due to upregulation of sodium channels in the nerve. The nerve is a part of pseudomonopolar axon, “nociceptor” that behaves in similar way at both proximal [central] and distal [peripheral] end.

We generally use straight leg raising as indicative of mechanical compression of nerve. In sitting cross legged the nerve is stretched along its proximal course from greater sciatic notch to the knee. We feel that inability to sit with legs crossed in patients with knee pain may indicate a lack of stretch ability of the affected nerve. It is known that a mechanical compression of nerve root due to disc herniation can reduce blood supply when the root is stretched in vivo.¹⁹ This reduced blood supply may result in tingling and then numbness.

In Indian patients, we see group with tender nerve and group with decreased stretch ability of nerve indicated by inability to sit cross legged we may be able to differentially diagnose an inflamed and or a mechanically compressed and less stretch able nerve. This may help us in proper planning of treatment and better outcomes.

IN some of the asymptomatic patients we have noted tenderness of the nerve in a very mild way, this may be subthreshold effect of inflammation yet to manifest as pain. The question if this neuralgia is due to lumbar spine changes needs further study. Lumbar spine is very likely to be a site of pain generation as the dorsal root ganglia are situated at foramina of lumbar spine and may be experiencing chemical and mechanical changes with degeneration. Dorsal root ganglion covers a conical area of tissue apex at foramen and base on dermatome. This whole cone can be painful.²⁰ It is also noted that numbness and pain distribution is more useful for level diagnosis in upper lumbar disc related symptoms than objective neurological findings.^{21,22} In 4/60 patients had pain which started radiating along the leg and posterolateral aspect of knee on prolonged standing and walking. This may be due to added stenotic canal giving claudication.

VI. Limitations

we have not done a comparative study of asymptomatic patients in large number and if the nerve is tender in them? We have also not used any other agent to inject at distal end of the nerve apart from lignocaine 2%. we have used No other concentration of lignocaine. We have also restricted this study to clinical

assessment and not imaging correlation to keep it very brave crisp and relevant for primary care. Further detailed study is needed before this idea can be supported and validated for larger community use.

VII. Clinical relevance

Pain in lateral aspect of knee if not traumatic, infective or ischemic can be neuralgia. Reverse analgesia is based on physiological property of nociceptor being pseudo monopolar axon.²³ In clinical practice the sodium channel blocker can be safely used for diagnosis of lateral knee pain and relieving agonizing pain.

Author 1 has conceptualized the study and conducted it in clinic. Author 2 has done basic research on use of sodium channels and blockers in nerve mediated pain. Suggested the choice of sodium channel blockers.

References

- [1] Chopra A, Patil J, Bilampelly V, et al. 2001. Prevalence of rheumatic disease in rural population in Western India: A WHO-ILARCOPCORD study. *J Assoc Physicians India*; 49:240-6.
- [2] Muthunayanan L, Ramraj B, Russel JK. Prevalence of pain among rural adults seeking medical care through medical camps in Tamil Nadu. *Indian J Pain* 2015; 29:36-40
- [3] Kajbafvala M1, Ebrahimi-Takamjani I2, Salavati M3, Saeedi A4, Pourahmadi MR1, Ashnagar Z5, Shaterzadeh-Yazdi MJ6, Amiri A1. Intratester and intertester reliability of the movement system impairment-based classification for patients with knee pain. *Man Ther*. 2016 Aug 5; 26:117-124. doi: 10.1016/j.math.2016.07.014. [Epub ahead of print]
- [4] Yeung AT1, Gore S2. In-vivo Endoscopic Visualization of Patho-anatomy in Symptomatic Degenerative Conditions of the Lumbar Spine II: Intradiscal, Foraminal, and Central Canal Decompression. *SurgTechnol Int*. 2011 Dec;21: 299-319.
- [5] Gore S1, Nadkarni S2. Sciatica: detection and confirmation by new method. *Int J Spine Surg*. 2014 Dec 1;8. doi: 10.14444/1015. eCollection 2014.
- [6] Horner G1, Dellon AL. Innervation of the human knee joint and implications for surgery. *ClinOrthopRelat Res*. 1994 Apr;(301):221-6.
- [7] Gore S1, Yeung A2. The "inside out" transforaminal technique to treat lumbar spinal pain in an awake and aware patient under local anesthesia: results and a review of the literature. *Int J Spine Surg*. 2014 Dec 1;8. doi: 10.14444/1028. eCollection 2014.
- [8] Kesikburun S1, Yaşar E1, Uran A2, Adigüzel E2, Yılmaz B2. Ultrasound-Guided Genicular Nerve Pulsed Radiofrequency Treatment For Painful Knee Osteoarthritis: A Preliminary Report. *Pain Physician*. 2016 Jul;19(5): E751-9.
- [9] Choi WJ1, Hwang SJ, Song JG, Leem JG, Kang YU, Park PH, Shin JW. Radiofrequency treatment relieves chronic knee osteoarthritis pain: a double-blind randomized controlled trial. *Pain*. 2011 Mar;152(3):481-7. doi: 10.1016/j.pain.2010.09.029. Epub 2010 Nov 4.
- [10] Biedert RM, Sanchis-Alfonso V (2002) Sources of anterior knee pain. *Clin Sports Med* 21: 335-347
- [11] Dye SF, Staubli HU, Biedert RM, et al (1999) The mosaic of pathophysiology causing patellofemoral pain: therapeutic implications. *Operative Techniques in Sports Medicine* 7: 46-54
- [12] Fulkerson JP (1983) The etiology of patellofemoral pain in young active patients: a prospective study. *ClinOrthopRelat Res* 179:129-133
- [13] Insall J (1979) "Chondromalacia Patellae": Patellar malalignment syndrome. *OrthopClin North Am* 10: 117-127
- [14] Kasim N, Fulkerson JP (2000) Resection of clinically localized segments of painful retinaculum in the treatment of selected patients with anterior knee pain. *Am J Sports Med* 28: 811-814
- [15] Mori Y, Fujimoto A, Okumo H et al (1991) Lateral retinaculum release in adolescent patellofemoral disorders: its relationship to peripheral nerve injury in the lateral retinaculum. *Bull Hosp Jt Dis Orthop Inst* 51: 218-229 44
- [16] Naslund J (2006) Patellofemoral pain syndrome. Clinical and pathophysiological considerations. Thesis. KarolinskaInstitutet, Stockholm
- [17] Elmallah RK1, Cherian JJ1, Pierce TP1, Jauregui JJ1, Harwin SF2, Mont MA1. New and Common Perioperative Pain Management Techniques in Total Knee Arthroplasty. *J Knee Surg*. 2016 Feb;29(2):169-78. doi: 10.1055/s-0035-1549027. Epub 2015 Apr 18.
- [18] Xu J1, Chen XM, Ma CK, Wang XR. Peripheral nerve blocks for postoperative pain after major knee surgery. *Cochrane Database Syst Rev*. 2014;(12):CD010937. doi: 10.1002/14651858. CD010937.pub2. Epub 2014 Dec 11.
- [19] Kobayashi S1, Suzuki Y, Asai T, Yoshizawa H. Changes in nerve root motion and intradiscal blood flow during intraoperative femoral nerve stretch test. Report of four cases. *J Neurosurg*. 2003 Oct;99(3 Suppl):298-305.
- [20] Takahashi Y1, Chiba T, Kurokawa M, Aoki Y, Takahashi K, Yamagata M. Stereoscopic structure of sensory nerve fibers in the lumbar spine and related tissues. *Spine (Phila Pa 1976)*. 2003 May 1;28(9):871-80.
- [21] Kido T1, Okuyama K2, Chiba M2, Sasaki H2, Seki N2, Kamo K2, Miyakoshi N3, Shimada Y3. Clinical diagnosis of upper lumbar disc herniation: Pain and/or numbness distribution are more useful for appropriate level diagnosis. *J Orthop Sci*. 2016 Jul;21(4):419-24. doi: 10.1016/j.jos.2016.03.003. Epub 2016 Apr 2.
- [22] Tamir E1, Anekshtein Y, Melamed E, Halperin N, Mirovsky Y. Clinical presentation and anatomic position of L3-L4 disc herniation: a prospective and comparative study. *J Spinal Disord Tech*. 2004 Dec;17(6):467-9.
- [23] Allan I, Basbaum, et al. Cellular and Molecular Mechanisms of Pain. *Cell*. 2009 Oct 16;139(2):267-284.