



ORTHO NEWSCAST



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Dear Doctor,
Greetings from Micro Labs. We are happy to bring you "Ortho Newscast" which contains latest and interesting news in the field of Orthopaedics.

This issue contains

- Significance of Nociceptin levels in synovial fluid of patients undergoing total knee arthroplasty.
- Radicular Pain Caused by Bilateral Lumbar Synovial Cyst – A case report.
- Synthetic melanin – A radioprotector

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team,
Micro Labs Limited



Significance of Nociceptin levels in synovial fluid of patients undergoing total knee arthroplasty.

Osteoarthritis is characterized by chronic joint pain associated with degeneration of the articular cartilage, synovitis, and local inflammation, leading to loss of function and pain.

Neuropeptides involved in peripheral neuroinflammation is nociceptin, a peptide related to the opioid class of substances. Nociceptin has both pro- and anti-inflammatory effects.

The presence of nociceptin in synovial fluid could imply a molecular role for the neuropeptide in the joint, both physiologically as well as pathophysiologically.

Goal of pilot study was to determine whether nociceptin was present in the synovial fluid of osteoarthritic knees.

Methods:

25 Patients aged 18-70 years undergoing primary total knee arthroplasty were included in the study.

Patients not hemodynamically stable, had undergone prior joint arthroplasty at the current surgical site, or had active infection of their knee joint were excluded from the study

Synovial fluid was aspirated from patients' operative knee joints and blood samples were obtained. Enzyme Immunoassay kit was used to test for nociceptin.

Nociceptin was detected in the synovial fluid and plasma of all patients.

A linear mixed-effects model was developed to account for the repeated measurements and baseline covariates. Least squares (adjusted) means were derived from the model to compare the sample types and to compare subgroups.

Results:

Pre procedure mean concentration of nociceptin in plasma was 45.2 ± 24.3 pg/ml , and 40.1 ± 20.6 pg/ml post tourniquet deflation.

The nociceptin concentration in synovial fluid was significantly lower than the nociceptin concentration in plasma, both pre-procedure and post-tourniquet deflation ($p = 0.002$ and $p = 0.016$ respectively).



Sample	Male nociceptin concentration (pg/ml)*	Female nociceptin concentration (pg/ml)*	p value
Pre-procedure (plasma)	60.5 ± 16.0	47.5 ± 18.6	0.035
Post-tourniquet release (plasma)	55.7 ± 14.3	42.2 ± 16.7	0.016
Synovial fluid	48.3 ± 20.7	26.0 ± 9.4	0.0008

Nociception concentration in both plasma and synovial fluid was significantly lower in females than males ($p = 0.012$).

Discussion:

Nociceptin in synovial fluid suggests a role for this molecule either in the physiology of the joint or the pathophysiology of OA. This may have diagnostic as well as therapeutic implications for the diagnosis and management of OA, including disease modification.

A connection exists between the peripheral nervous system and inflammatory joint degeneration. The process by which inflammation is influenced by the nervous system is known as neuroinflammation.

Neuropeptides involved in peripheral neuroinflammation is nociceptin. This neuropeptide has both pro- and antiinflammatory effects. Nociceptin is an endogenous nociceptin opioid receptor (NOP) agonist with similar structure to endogenous opioids.

Conclusion:

Nociception is present in synovial fluid and plasma of patients undergoing total knee arthroplasty. Hence there is a potential role for nociceptin in modulating inflammation in osteoarthritis.

Reference:

Verbeek et al. Nociceptin is present in synovial fluid of patients undergoing total knee arthroplasty *Journal of Orthopaedic Surgery and Research*. 2020; 15:266

Radicular Pain Caused by Bilateral Lumbar Synovial Cyst – A case report.

Spinal synovial cysts are an uncommon degenerative lesion of the spine. They are usually asymptomatic but they may also cause symptoms of variable severity. They are benign growths adjoining the facet joints that may induce low back pain, lumbar radiculopathy, and neurological deficit.

Current is a case of synovial cyst causing radicular pain.

Case presentation:

A 54-year-old female patient presented with spinal and radicular pain radiated to her left leg for a month. clinical exam showed both lumbar and radicular pain in her left leg without any motor loss, with hypoesthesia of the external side of her left leg and the dorsum of her left foot.

Dynamic radiographs demonstrated a 4mm instability at the L4-L5 level and a laminar inclination angle of 120° (it is the angle measured between the line that connects the top and bottom edges of the superior articular process and the line that connects the anterior cortex with the posterior cortex of the vertebral body).

CT study showed degenerative facet changes and vacuum phenomenon at the left L4-L5 level, with a 10° of facet tropism (difference between the right and left L4-L5 facet angle in an axial view) .

MR images showed moderated to severe disc degenerative changes at L4-L5/L5-S1, as well as lesions that were hypointense on the T1 sequence and hyperintense on the T2 and STIR sequences in both L4-L5 facet joints, compatible with bilateral synovial cysts, the largest being on the left, which relates to her radicular symptoms.

Patient got treated conservatively with physiotherapy sessions and analgesics. After six months due to poor response to the conservative management, she underwent cyst aspiration and infiltration of the facet joint, under radioscopy control in prone position using coronal and oblique planes of the left L4-L5 joints. A 22 G × 100mm spinal needle was used and, to ease joint access, the end of the needle was slightly bent.

A percutaneous aspiration was performed for the cyst, obtaining 3mm of a light liquid, followed by the infiltration of 2 cc of 2% mepivacaine and 2 cc of betamethasone.

After procedure, radicular symptoms improved almost up to their total disappearance, but lumbar pain remained.

After 1 year , the patient started having left radicular pain again and persisting lumbar pain, so surgical treatment was proposed.

With general anaesthesia and antibiotic prophylaxis, with the patient positioned in prone decubitus, a posterior approach was performed with the subperiosteal dissection of paravertebral muscles up to the tip of the transverse processes, a hybrid L4-S1 fusion, via left unilateral transforaminal (TLIF) with interbody polyether-ether-ketone (PEEK) implants, bilateral L4, L5 and S1 pedicle screws, and autologous bone from both the surgical field and the left posterior-superior iliac spine was performed.

Postoperative period was uneventful and after a five-year follow-up, the patient remains asymptomatic living a normal life with job reinsertion. The radiology study shows an adequate implant position, without signs of loosening, compatible with solid fusion.

Discussion:

Spinal synovial cysts arise from facet joints as a serous, mucoid, or haemorrhagic fluid collection, that projects beyond the joint limits.



Usually have a variable prevalence that goes from 1% in CT studies to a 2.2% as a casual finding during laminectomies , and to a 6.5% in MRI studies, being symptomatic in approximately half of the cases.

Most common symptom being Radicular pain, followed by lumbar pain, sensory deficit, neurogenic claudication, and paresis.

Excision of Cyst either endoscopic or open without fusion, may provide better results in patients without proven instability, but a degree of facetectomy may be necessary in order to prevent cyst relapsing.

Conclusion:

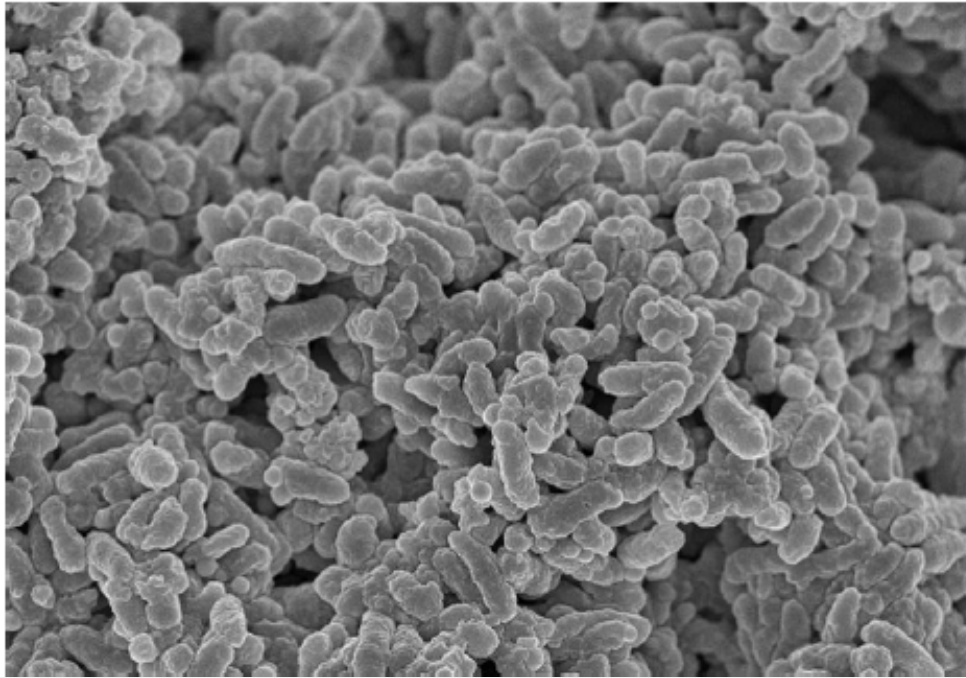
A case of spinal synovial cyst was successfully managed with surgery, optimal management for patients with symptomatic lumbar synovial cyst is individualised to achieve a favorable outcome.

Reference:

Picazo DR et al. An Unusual Case of Radicular Pain Caused by Bilateral Lumbar Synovial Cyst: A Case Report and Review of the Literature. Case Reports in Orthopedics. 2020; 8821332 : 1- 6 pages.

IN THE NEWS

Synthetic melanin – A radioprotector



Researchers have developed a new biomaterial, selenomelanin, that can help protect people from radiation. This new substance, chemically synthesized and produced by bacteria, helps protect cells from radiation more effectively than other forms of melanin.

In future, it may be used in sunscreens, medical treatments, or for long-term space flight as a radioprotective material.

In medical imaging, air travel, and space travel, there is often unwanted exposure to radiation.

Radioprotective materials are heavy, making transportation and use difficult and in many cases unfeasible.

Researchers have found selenomelanin protects skin cells from 6 gray of radiation, a level that is greater than the lethal dose for a human.

The cells maintained a normal cell cycle and overall did not die at a greater rate than controls that were not irradiated.

selenomelanin can also be produced with genetically engineered bacteria and were found to have radioprotective events.

Selenomelanin may also play an important role in how selenium is metabolized and distributed biologically. The researchers envision that selenomelanin could be used as a sunscreen or as a radioprotective material for air and space travel.



Reference:

Cao W et al. Selenomelanin: An Abiotic Selenium Analogue of Pheomelanin .J. Am. Chem. Soc. 2020 ;10.1021/jacs.0c05573.



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