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PHYSIOTHERAPY STRATEGY FOR PATIENT WITH HERNIATED DISC

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Abstract

Introduction : *Hernia Nucleus Pulposus* (HNP) is a condition that occurs due to biochemical changes in the spinal disc tissue. This change will cause rupture of the annulus fibrosus which makes the nucleus pulposus bulging (protrudes) towards the spinal canal which will put pressure on the nerve roots, causing symptoms in the form of neurological pain.

Case Presentation : Mrs. E is a 37-year-old housewife with low back pain due to disc herniation with a history of post chemotherapy for breast cancer. Pain is felt when the patient is undergoing treatment, pain is like being stabbed and radiates from the lower back to both legs and especially the right leg, numbness and weakness in the right leg

Management and Outcome : Treatments provided such as *infrared*, TENS, *stretching*, and *core stability exercise* performed 2 times a week for 4 weeks. The measuring instrument used is NRS, MMT, and Oswestry Disability Index.

Discussion : One type of exercise that can be done for patients with lumbar HNP is core stability exercises in the form of abdominal hollowing exercises, *prone lying*, prone on elbow, prone press-up, prone press up with overpressure which can be selected by taking into account the ability of the patient. Core stability exercise is an exercise that functions as a synergistic activation that contracts the trunk and pelvic stabilizer muscles, to improve the control of the neuromuscular system and the strength of the trunk muscles and to maintain spinal stability which functions to maintain body posture and optimize the patient to control the trunk position. Core stability performed by the patient is able to reduce pressure on the nucleus pulposus during the spine extension position, so that nerve clamping can be reduced and can reduce pain symptoms,

Conclusion : It can be concluded that in this case, the provision of physiotherapy programs in the form of infrared, TENS, stretching hamstrings, and core exercises performed 2 times a week for 4 weeks was able to reduce pain and improve functional ability in patients.

Keyword : physiotherapy, low back pain, herniated disc, pain, core stability



Introduction

As many as 60-80% of people at least have experienced low back pain in their life. HNP in the United States is 1 of the 10 most common diseases with prevalence ranging from 7.6-37% and found at the age of 45-60 years. Meanwhile, globally, the prevalence of HNP ranges from 1-2% of the population. The most common age is between 30-50 years, and is often found in the lumbar vertebrae. (Putri et al., 2017).

Low Back Pain is one of the health problems that are often complained of. LBP is essentially a complaint or symptom, not a specific disease. The causes of low back pain include musculoskeletal, visceral, vascular, psychogenic and nervous system problems. One of the causes that occur because there is a problem in the nervous system is Hernia Nucleus Pulposus (HNP). HNP is a condition that occurs due to biochemical changes in the spinal disc tissue. This change will cause rupture of the annulus fibrosus which makes the nucleus pulposus bulging (protrudes) towards the spinal canal (Ji et al., 2019).

HNP can occur when there is compression on the spine due to degenerative processes, trauma or posture errors. In the spinal compression process it will cause continuous disc compression and change the structure of the nucleus pulposus which causes a reduced ability to dampen the compression of the spine, so that there will be prolapse of the nucleus pulposus which will cause disc bulging and compress the nerve roots causing symptoms in the form of pain, paresthesia and weakness (LF, Franco et al., 2020)

The etiology or cause of the main HNP is due to a degenerative process. The degenerative process can occur due to age or due to other reasons, such as the presence of cancer cells, as narrated by the patient in this paper, these cancer cells cause metastasis in the spine which results in a degenerative process. When there is a degenerative process, it will cause the loss of proteoglycans in the spine. In addition to the degenerative process, the etiology of HNP can also occur due to gender factors, men are more at risk with a ratio of 2:1 to women, one's profession for example working in conditions of sitting too long, trauma and lifestyle (Pourahmadi et al., 2016)

Physiotherapy is a rehabilitation process that can be used to restore a person's quality of life. Physiotherapy efforts that can be given to the patient in this case are by administering IR, TENS, stretching and core stability.

Case description

Mrs. E is a 37-year-old housewife, complaining of pain for the first time in 3 months ago. The patient has a history of breast cancer and is currently on medication. Pain is felt when the patient is undergoing treatment, pain is like being stabbed and radiates from the lower back to both legs and especially the right leg, numbness and weakness in the right leg. The pain increases when the patient is from a standing position to a sitting or vice versa and a bent position. The patient has done an MRI with the results of compression in the lumbar 3 and there is bulging pressing on the nerve roots in the lumbar 2 to lumbar 5. The patient's goal of doing physiotherapy is to reduce pain, and improve functional ability because the patient has limited walking, which is having to use crutches due to pain. that is felt.



Method

This study had been approved by the Health Sciences Faculty, University Muhammadiyah of Surakarta (1292.9/C.8-III/FIK/VIII/2021)

Protocols and instrument

The patient underwent physiotherapy 2 times per week for 4 weeks. Each meeting duration is 60 minutes, starting with the provision of infrared and electrical stimulation to block pain and followed by exercise therapy as muscle strengthening.

Infrared given to the patient's lower back area that had previously been removed from the cloth with a distance of 50-75 cm for 10 minutes.

Electrical stimulation by placing a pad on the patient's lumbar or lower back area and the patient's right leg which had previously been palpated for the painful area. Start running TENS with intermittent mode, frequency 20 Hz, pulsed 100s and intensity adjusted to the excitatory threshold

Exercise The treatment given to this patient is by extending the hamstring muscle with hold and contract relax, because the patient with lumbar HNP will experience a shortening of the hamstring muscle, then proceed with core stability which can be increased in type and dose according to the patient's ability and is carried out from the easiest to the more difficult movements, the chosen exercise was modified from the previous protocol which showed improved lumbar function and reduced pain such as abdominal hollowing exercise for 8 counts of 10 reps, prone lying for 5 minutes, prone on elbow for 5 minutes, prone press-up (3 sets of 10 reps), prone press up with overpressure (10 sets of 30 seconds). Strengthening the deep abdominal muscles is effective for stabilizing the spine, especially the lumbar.

Outcome

Measurements were taken before and after being given a physiotherapy program for 4 weeks. Pain was measured using the NRS scale from 0-10, examination of muscle strength is evaluated using Manual Muscle Testing with a scale of 0 (no contraction or muscle tone at all) to 5 (able to fight gravity and able to fight maximum resistance), Straight Leg Raise is a fundamental measurement for patients with complaints of low back pain caused by nerve irritation with positive examination results in patients, measurement of functional activity using the Oswestry Disability Index which contains a questionnaire with 10 questions that must be answered by the patient which includes pain intensity, personal care, lifting, working, sitting, standing, sleeping, sex life, social life and traveling, rated from 0-5 with a maximum score of 50.

Table 1 pain assessment

Silent Pain	4
Tenderness (lumbar, gluteus, lateral upper leg)	6
Motion Pain (flexion, extension, side flexion of trunk, flexion of hip)	7



Table 2 examination of muscle strength with MMT

muscle group	MMT
Trunk flexors	3
Trunk extensors	3
Hip flexors	3
Hip extensors	3

Table 3 Measurement of Functional Activity with ODI

No	Domain	Mark
1	Painful	4
2	Self care	3
3	Lifting activity	3
4	Walk	4
5	Sit down	2
6	Stand up	2
7	Sleep	1
8	Sexual activity	3
9	Social life	2
10	Travel	1

50% yield (severe disability)

Interpretation of results: Pain is the main problem experienced, but can also experience significant problems with walking, personal care, social life, sexual activity and sleep. A detailed evaluation is required.

Result

After the patient ran the exercise program for 4 weeks there was a decrease in the NRS value, namely silent pain from 4 to 3, tenderness from 6 to 4, motion pain from 7 to 4. The value of muscle strength increased from MMT 3 to 4, for the SLR test on the right leg still showing positive results and there is an increase in functional ability with the ODI index, namely from a value of 50% to 24%, namely from severe disability to moderate disability.

Discussion

In this case study the author raises the case of a housewife aged 37 years who experience low back pain due to HNP after undergoing treatment for breast cancer. By doing pain testing with NRS, muscle strength using MMT, specific examination using *Straight Leg Raise* and functional ability with the ODI scale.

The first treatment for this patient was given infrared therapy and TENS. Infrared can be used as a prefix before doing the next type of therapy. With this heat, it will increase body



temperature which can result in a general increase in cell activity and blood flow, and can reduce inflammatory mediators such as histamine, prostaglandins and bradykinins, which in turn can increase tissue extensibility, reduce pain, promote healing of soft tissue lesions and reduce inflammation. improve joint ROM (Ngozi et al., 2015). TENS is a way of using electrical energy to stimulate the nervous system through the skin surface. TENS is able to activate complex neuronal which can reduce pain by activating large diameter afferent fibers. This afferent will send a message to the central nervous system to increase the analgesic effect, besides that TENS will also activate beta endorphins in the bloodstream and cerebrospinal fluid. When the analgesic effect in the body has been formed, it can reduce hyperalgesia so that pain can be reduced. (GT Vance et al., 2014). Research conducted by Hurlow et al (2012) concluded that TENS can be given to patients with cancer conditions to reduce pain.

Patients with HNP will experience muscle stiffness and shortening due to the manifestation of pain that causes the patient to not use the muscles optimally, one of which is the hamstring muscles. According to research conducted by Yang et al (2014) stretching is more effective for patients with lumbar HNP compared to traction, continuous lumbar traction and vertical traction. Stretching the hamstring muscles can affect the motion of the lumbar lordosis, increase the connective tissue in the body, increase flexibility, prevent contractures, improve muscle coordination and increase joint range of motion. (Sun et al., 2014).

Patients who have problems with the spine tend to experience a decrease in core muscle strength. One type of exercise that can be done for patients with lumbar HNP is core stability exercises in the form of abdominal hollowing exercises, *prone lying*, prone on elbow, prone press-up, prone press up with overpressure which can be selected by taking into account the ability of the patient. Core stability exercise is an exercise that functions as a synergistic activation that contracts the trunk and pelvic stabilizer muscles, to improve the control of the neuromuscular system and the strength of the trunk muscles and to maintain spinal stability which functions to maintain body posture and optimize the patient to control the trunk position. (Javadian et al., 2015). In addition, the core stability performed by the patient is able to reduce pressure on the nucleus pulposus during the spine extension position, so that nerve clamping can be reduced and can reduce pain symptoms,

Conclusion

It can be concluded that in this case, the provision of physiotherapy programs in the form of infrared, TENS, stretching hamstrings, and core exercises performed 2 times a week for 4 weeks was able to reduce pain and improve functional ability in patients.

References

- Al-horani, RA, Batainah, AS, Shamroukh, N., & Abumoh, MF (2020). McKenzie-type Exercises Improve the Functional Abilities of a Patient with Recurrent Herniated Discs : A Case Report. 49–53. <https://doi.org/10.2174/1875399X02013010049>
- GT Vance, C., Dailey L, D., A Rakel, B., & Sluka, K. (2014). Using TENS for pain control: the state of the evidence. *Pain Management*, 4(3), 197–209. <https://doi.org/10.2217/pmt.14.13>
- Hurlow, A., Bennett, MI, Robb, KA, Johnson, MI, Simpson, KH, & Oxberry, SG (2012). Transcutaneous electric nerve stimulation (TENS) for cancer pain in adults. *Cochrane Database of Systematic Reviews*, 2012(3). <https://doi.org/10.1002/14651858.CD006276.pub3>
- Javadian, Y., Akbari, M., Talebi, G., Taghipour Darzi, M., & Janmohammadi, N. (2015). Influence of core stability exercise on lumbar vertebral instability in patients presented with chronic low back pain: A randomized clinical trial. *Caspian Journal of Internal Medicine*, 6(2), 98–102.
- Ji Le, Y., Kim Ik, J., Bim Kim, H., Hyun Jeon, J., Kim, E., & Il Kim, Y. (2019). Cervical and Lumbar Herniated Nucleus Pulposus Resorption after Acupotomy with Integrative Korean Medicine Treatment: A Case Series of Two Patients. *Journal of Acupuncture Research*, 2(2), 107–112. <https://doi.org/10.13045/jar.2019.00031>
- L, F., Cicco, D., O, G., & Willhuber, C. (2020). Nucleus Pulposus Herniation. *Journal of Neurology*, 14.
- Ngozi Ojeniweh, O., Ezema Ikechukwu, C., Moris Anekwu, E., Augustine Amaeze, A., OlubANJI Olowe, O., & Chuba Okoye, G. (2015). Efficacy of six weeks infrared radiation therapy on chronic low back pain and functional disability in National Orthopedic Hospital, Enugu, south east, Nigeria. *Nigerian Health Journal*, 15(4), 155–160.
- Pourahmadi, MR, Taghipour, M., Ebrahimi Takamjani, I., Sanjari, MA, Mohseni-Bandpei, MA, & Keshtkar, AA (2016). Motor control exercise for symptomatic lumbar disc herniation: protocol for a systematic review and meta-analysis. *BMJ Open*, 6(9), e012426. <https://doi.org/10.1136/bmjopen-2016-012426>
- Putri Adisti, S., Yudiyanta, Subagya, & Angraini, R. (2017). Correlation Between Numeric Rating Scale With Increased Monocytes In Lumbar Nucleus Pulposus Hernia Patients. *Callosum Neurology*, 2(1), 40–48. <https://doi.org/10.29342/cnj.v1i1.6>
- Sun Yang, H., & Gyu Yoo, W. (2014). The effects of stretching with lumbar traction on VAS and Oswestry scales of patients with lumbar 4-5 herniated intervertebral discs. *Journal of Physical Therapy Science*, 2(7), 1049–1050. <https://doi.org/10.1589/jpts.26.1049>