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ANATOMICAL APPROACH OF SCIATIC NERVE W.S.R. TO "GRIDHRASI"

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ABSTRACT

Gridhrasi comes under *Vata Nanatamja vyadhi*. *Gridhrasi*, the name itself indicates the way of gait shown by the patient due to extreme pain, which resembles with, *Gridha* or Vulture. The most common disorder which affects the movement particularly in the most productive period of life is low back pain, out of which 40% of patients suffers from severe pain which comes under the umbrella of Sciatica-syndrome. With the development of a busy professional and social life, poor sitting posture, overexertion, jerky movements during travel and sports, an increase in the tendency to use computers, and an increase in body weight, the spinal column is put under excessive pressure, which is a major contributor to low back pain and sciatica. The illness indicated in *Ayurveda* has symptoms and signs that are similar to "Sciatica" in modern, contemporary medicine both. It is challenging to raise the affected limb due to this ailment. Additionally, *Gridhrasi* can be used to interpret all varieties of lumbar radicuolpathy. In this article an attempt has been made to review the Ayurvedic classical texts for the disease and also the anatomical detail about the sciatic nerve.

KEYWORDS: *Gridhrasi*, Sciatica, *Katti*, *Sphik.*

INTRODUCTION

The disease *Gridhrasi* affects movement and daily activities and is characterized by radiating pain and a predominance of disabilities. *Gridhrasi* is characterized by *Stambha* (stiffness), *Ruk* (pain), *Toda* (pricking pain), and *Spandana* (tingling sensation) that radiate from *Kati Pradesha* (low back) to *Prushtha* (back), *Janu* (knee joints), *Jangha* (calf muscles), and *Pada*

(dorso lateral aspect of feet), and may affect one side of the lower limbs or both lower limbs. Since ancient times, *Ayurveda* has recognized this illness and has given it the distinctive name *Gridhrasi Roga*. According to *Ayurveda, Gridhrasi* is one of the illnesses brought on by *Vata* vitiation, which is one of the primary *doshas* in the body and is in charge of its mobility and operation. *Gridhrasi* can occasionally result from both *Vata* and *Kapha* vitiation (*vata kaphaj*). The word itself is remarkable, as *Gridhrasi* indicates the gait that the patient presents with, due to the extreme pain experienced; which is similar to the gait of the *Gridha* (vulture).The injured lower leg is characterized as being in a contracted position and the other lower limb is described as being stretched, giving the gait of a vulture.

Etimology

'*Gridh*' is the *dhatu* which makes the word *'Gridhra'* from which the word *'Gridhrasi'* is derived. The person, who desires to eat the meat greedily, is denoted as *'Gridhra'* and the disease which occurs commonly in these persons is called *Gridhrasi.*

***Acharya charak* explained**

In *Gridhasi Nitamba* (gluteal region), *Kati* (lumber), *Prishtha* (Posterior to thigh), *Uru* (knee), *Jangha* (calf) and *Pada* (foot) are affected respectively. *Stambha* (stiffness), *Ruk* (Pain), *Toda* (pricking sensation) and *muhuspandanam* (tingling sensation) are found in *Vataj* type of *Gridhasi*, where as in *Vata-kaphaja* type of *Gridhasi Tandra*, *Gaurav* and *Arochaka* in addition of *Vataja* type are found.[1]

***Acharya sushruta* explained**

He explained it as 'A condition in which *Vata* invades the *kandaras* of the ankles and toes and produces *Kshepan* in thighs.[2]

***Acharya madhavakara* explained –** He has been mentioned two types of *Gridhras, Vataja* and *Vatakaphaja.*[3]

1. Vataja gridhasi

Vataja Gridhrasi is associated with symptoms like *Toda* (Pricking sensation), *Dehavakrata* (Bending of body), *Stambha* (stiffness) in *Uru* (knee), *Kati* (lumber), and *Sandhi* (joints) region.

2. *Vataj-Shleshmaja gridhasi*

Vatakaphaja Gridhrasi is precipitated due to *Agnimandha* (Indigestion) with symptoms like *Tandra* (Drowsiness), *Mukhapraseka* (Excessive salivation) and *Bhaktadvesha* (Anorexia).

On the basis of *Samanya-Nidan Gridhasi* is described as one of the eighty *Nanatmaja-Vyadhi* in *Ayurvedic* classics.[4] Besides association with *Aaharaj, Viharaj, Agantuja* and any factors *Vata* aggravating *Viharaj Nidana* are the most common cause of *Gridhasi. Rasa, Rakta, Mansa, Meda, Asthi and Majja dhatu* are affected in this disease. Hence *Nidana Parivarjan* is the appropriate treatment for this disease.

Sciatic nerve

The body's thickest nerve is the sciatic nerve. In its upper part, it forms a band about 2 cm wide. It originates in the pelvis and splits into the tibial and common peroneal nerves near the superior angle of the popliteal fossa.

Origin and Root value

The sacral plexus's greatest branch is this one. L4, 5, S1, 2, and 3 make up its root value. It consists of two parts: the common peroneal component and the tibial part. The ventral divisions of the anterior primary rami of L4, 5, 51, 2, and 3 make up the tibial portion. The anterior primary rami of L4, 5, S1, and 2 constitute the dorsal divisions of the common peroneal portion.

Course and Relations

In the pelvis: The nerve lies in front of the piriformis, under cover of its fascia.

In the gluteal region: The larger sciatic foramen, which is located below the piriformis, is where the sciatic nerve enters the gluteal region. It passes between the greater trochanter and the ischial tuberosity as it descends with a modest lateral convexity. It has the following relations in the gluteal region.

Superficial or posterior: Gluteus maximus

Deep or anterior:

a. Body of the ischium.
b. Tendon of the obturator internus with the gemelli.
c. Quadratus femoris, obturator externus.
d. The capsule of the hip joint.
e. The upper, transverse fibres of the adductor magnus.

Medial: Inferior gluteal nerve and vessels.

In the thigh: The sciatic nerve enters the back of the thigh at the lower border of the gluteus maximus. At the intersection of the upper two-thirds and lower one-third of the thigh, the popliteal fossa, where it goes vertically downward up to, is where it divides into the tibial and common peroneal nerves. It has the following relations in the thigh.

Superficial or posterior: The sciatic nerve is crossed by the long head of the biceps femoris.

Deep or anterior: The nerve lies on the adductor magnus.

Medial: The semimembranosus, and the semi- tendinosus.

Lateral: Biceps femoris.

The arteria nervi ischiadici, a little companion artery, travels alongside the sciatic nerve. It originates from the inferior gluteal artery. Before entering the substance of the sciatic nerve, the artery travels along it for a while.

Branches

The sciatic nerve produces a number of tiny motor muscular branches along its path through the posterior thigh that innervate the various thigh muscles.

The sciatic nerve comes to an end at the popliteal fossa, where it splits into two terminal branches:

- The tibial nerve
- Common fibular nerve (Peroneal nerve)

The tibial nerve follows the sciatic nerve's path as it descends through the back of the leg and stops at the heel of the foot. More specifically, the tibial nerve travels through the popliteal fossa's middle and lies underneath the soleus muscle's tendinous arch. Through the posterior leg compartment and the tarsal tunnel, it carries on in a neurovascular bundle. The tibial nerve splits into medial and lateral plantar nerves, which supply the majority of the foot muscles, as it reaches the foot.

The common fibular (peroneal) nerve runs laterally toward the head of the fibula in contrast to the tibial nerve. The nerve splits into the superficial fibular (peroneal) nerve and deep fibular (peroneal) nerve as it reaches the anterior compartment of the leg, which is located beneath the fibularis longus muscle. The medial aspect of the foot and the anterior compartment of the leg are supplied by the deep branch, whereas the lateral compartment of the leg is supplied by the superficial branch.

Innervation

The deep fibular (peroneal) nerve goes deep to the extensor digitorum longus and anterior to the interosseous membrane. It descends between the fibula and the superior section of the fibularis (peroneus) longus.

Motor innervations

The posterior thigh muscles' direct motor supply comes from the sciatic nerve via tiny muscular branches. Biceps femoris, semimembranosus, semitendinosus, and the ischial part of the adductor magnus are among these muscles. The muscles in the back of the leg and foot receive motor supply from the tibial nerve. The muscles of the anterior and lateral portions of the leg and foot are supplied by the common peroneal nerve, as are the gastrocnemius, soleus, plantaris, popliteus, flexor hallucis longus, and flexor digitorum longus. The tibialis anterior, extensor hallucis longus, extensor digitorum longus, and peroneus tertius are the muscles of the anterior aspect. Peroneus longus and peroneus brevis are the lateral leg muscles.

Sensory innervation

The sciatic nerve emits sensory branches that supply the majority of the lower limb with sensory input. The sciatic nerve first innervates the skin of the posterior thigh as it travels along its journey. The sensory supply is then continued by its terminal branches, which innervate the following areas: the lateral aspect of the leg, the dorsum of the foot, and the skin in between the first two toes; the tibial nerve innervates the foot's sole; and The medial and lateral sural nerves are made up of the tibial nerve and common peroneal nerve. These neurons give the calf and a little lateral area of the foot sensation.

Sciatica

Sciatica causes pain, tingling/numbness, weakness, and loss of reflexes in the lower back, buttocks, legs, and feet. Sometimes sciatica is caused by degenerative conditions, like arthritis—and lifestyle factors are at play, as well. Radiculopathy is a condition in which a nerve root in the spinal column is compressed. Sciatica is a type of lumbar (lower spine) radiculopathy in which the sciatic nerve is compressed.

Common causes of sciatica

- Intake of *Vata* aggravating edibles.
- Excess intake of dry, light and cold foods.
- Excess intake of pungent, bitter and astringent food.
- Heavy weight lifting, long walk, improper lie or sitting position.
- Suppression of urine, faeces etc.
- Falling or Injury etc.

Pain is aggravated due to compression in lower spine region caused by bulging disc or spinal stenosis.

Symptoms of sciatica

- Pain from hip area radiating to thigh, back and sacral region, popliteal area, calf muscles and foot.
- Pricking sensation in the parts along the path of sciatic nerve.
- Altered gait.
- Rarely stiffness or pulsations etc. are found.

Differential diagnosis

The condition should be differentiated from *Katigraha* (Ankylosing spondylitis), *Khanja*, *Pangu*, *Marmabhighata* at any of the *Kukundara* and *Nitamba Marma*.

If the pain is localized to sacroiliac joint it may be diagnosed as *Katigraha* a condition of ankylosing should be ruled out. *Khanja* and *Pangu* are characterized with weakness of lower limbs due to loss of motor power. *Khanja* affects any one limb and *Pangu* affects both. These conditions may not have any pain associated. *Kukundara Marmabhighata* is characterized by motor and sensory loss. *Nitamba Maramabhighata* is characterised with wasting of lower limbs.

Risk factor

➢ Age as sciatica

Growing older is one of the major risk factors for sciatica. With age, many issues can contribute to spine degeneration. Age-related changes can bring on sciatica due to changes in your intervertebral discs, bone spurs, and spinal stenosis.

- Around the age of 30, intervertebral disc degeneration typically begins.
- Spinal stenosis (Narrowing of the spine) usually first crops up in people older than 50.
- Arthritic changes in the spine, such as bone spurs, can develop after years of arthritis.
- Additionally, the discs themselves have begun their descent to vulnerability -- the older you get, the more resilience you've likely lost in your spinal discs.

Because of work, social, and sports activities, people between the ages of 30 and 50 have a higher likelihood of spine injury or other types of spine damage, which can lead to sciatica.

- A sedentary lifestyle

While injuries from activities can damage spine, sitting as a regular habit ups sciatica risk too. A big reason that sitting can lead to sciatica is that sitting compresses your spine and discs, which—depending on your spine condition—may irritate a spinal nerve root. Another reason is that sitting may put pressure on the sciatic nerve directly, as in the case of piriformis syndrome.

- Manual labor

Frequently lifting heavy loads and/or repeatedly twisting the spine is associated with disc herniation, which often results in lumbar radiculopathy. Another work-related risk factor is vibration, such as operating a jackhammer.

- Walkers and Runners

The two sports that are most likely to increase the risk for sciatica symptoms are walking and running. This is likely due to the repeated contraction of the piriformis muscle. During extended periods of walking and running, the piriformis muscle tightens to help you propel yourself forward. When the piriformis muscle becomes tight, it can cause irritation to the sciatic nerve, which runs under it.

- Other Groups: Pregnant Women, Diabetics

Obesity can increase the risk of sciatic due to physical pressure on the nerve. People with diabetes are prone to nerve damage, including damage to the sciatic nerve. And due to hormonal changes and changes in the position of the baby, the risk of sciatica is greatly increased during pregnancy as well.

Investigations

- ESR (Males 0-15 mm/h, Females - 0-20 mm/h) to rule out any inflammation.
- USG abdomen & pelvis- to rule out any visceral pathology or gynecological issues related to uterus and adnexa and PID, leading to low back pain and pain in lower limbs
- USG-KUB-To rule out renal calculi and obstructive lower urinary tract symptoms.
- CT Scan- For better assessment of bony canal
- MRI Lumbo-sacral with whole spine screening.

***Pathya - Apathya* (Diet and life style education)**

Pathya

Ahara: You might suggest a light Vatanuloman diet, which includes foods like *Shigru Shaka* (drumstick), brinjal, methi, jeerak, hingu, saindhava, yoosha, and mamsarasa, among others.

Vihara: Correct postures should be adopted when standing, sitting, or lifting weights. Additionally, acceptable *Yogasana* and *Abhyanga* should be practiced regularly. Urges in the bowel and bladder should be promptly addressed to.

Apathya

Ahara: A diet high in cold foods and beverages, stale food, and an excessive amount of chilly will aggravate *vata*.

Vihara: Constant exposure to cold, strenuous physical activity, soft furniture, and soft bedding.

Line of treatment

- *Nidana Parivarjana* should be the first line of treatment.
- *Shodhana Chikitsa - Virechana, Basti, Siravedha*
- *Shamana Chikitsa- Pachana, Snehana, Swedana* including various types *Pindasweda, Agnikarma, Balya.*
- External applications - *Abhyanga, Lepa, Katibasti, Katipichu*.
- *Rasayana Chikitsa* for *Asthi* and *Vata*
- Treatment according to *Doshik* involvement
- General line of treatment prescribed for *Vatavyadhi*

Drug	Dosage Form	Dose	Time of Administration	Anupana
Dashamoola	*Kwatha*	12-24 ml	Empty stomach/twice daily	-
Balarishta	*Arishta*	10-20 ml	After food/ twice daily	-
Sahachardi Taila/Bala Taila, Karpasasthyadi Taila, Dhanuntaram	*Taila*	Can be used for Basti.		
Vatagajankusha Rasa	*Gutika*	60-125 mg	Twice daily	*Madhu*
Vatavidhwansa Rosa	*Gutika*	60-125 mg	Twice daily	*Madhu*
Ekangaveera Rasa	*Gutika*	60-125 mg	Twice daily	*Madhu*
Sahacharadi Tail (Madhyama Paka)	*Taila*	10-15 drops	Once or twice a day for 1-2 weeks	*Sahachardi kashaya*

CONCLUSION

In addition to pain, sciatica makes it difficult to walk and has a bad effect on one's quality of life. It is a very painful condition where the pain emanates from the lumbar region and then radiates along the posterior lateral aspect of the thigh region, right down to the toes. It can be unilateral or bilateral based on the severity of the condition. This is what causes the difficulty in walking. Not all lower back pain is sciatica, but if not managed in a proper and timely manner will surely lead to it. *Gridhrasi* can be equated with the condition Sciatica syndrome in modern parlance, which occurs because of spinal nerve irritation and is characterized by pain in the distribution of sciatic nerve which begins from buttock and radiates downwards to the posterior aspect of thigh, calf and to the outer border of foot.

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