A COMPREHENSIVE REVIEW OF AETIOPATHOGENESIS OF SCIATICA OF IVDP ORIGIN-AN AYURVEDIC POINT OF VIEW

Dr. Nivil V. Joseph*¹ and Dr. Poornima Jalawadi²

¹Assistant Professor Dept. of PG Studies in Roga Nidana JSSAMC Mysore.
²Assistant Professor Dept. of PG Studies in Shalya Tantra JSSAMC Mysore.

*Corresponding Author: Dr. Nivil V. Joseph
Assistant Professor Dept. of PG Studies in Roga Nidana JSSAMC Mysore.

ABSTRACT

Background: Sciatica, a distinct cause for morbidity, is a cause for low back pain in the young and middle aged and refers to radiculopathy, involving either one or both of the lower extremities. IVDP of lumbar region, especially L4-5, L5-S1 region are the most important etiology for sciatica. IVDP as such is not explained directly in Ayurveda classics, but Gridhrasi is described as a disease with similar clinical presentation as that of Sciatica. The Vyadhyavastha of Gridhrasi can be assumed by various symptomatologies and it will coincide with the inflammatory or degenerative pathogenesis of sciatica. Materials and Methods: Various sources extending from classical Ayurveda samhitas, textbooks of contemporary medicine and e-sources were accessed to review the concepts of sciatica and Gridhrasi. Discussion: the Ayurvedic description of Gridhrasi matches the symptomatology of Sciatica such as pain starting in the Kati and descending to Nitamba, Uru, Janu, Jangha, Padam along with Stamba, Ruk and Toda. Sama avastha of gridhrasi may be attributed to inflammatory pathogenesis and pure vatika symptoms may be attributed to degenerative pathogenesis.

KEYWORDS: IVDP, Sciatica, pathogenesis, etiology, Nidana Panchaka, Gridhrasi, Vyadhyavast.

BACKGROUND

Low back pain due to lumbar disc prolapse is a major cause of morbidity throughout the world. Clinically significant sciatica due to lumbar disc prolapse occurs in 4-6% of the population.¹ The prevalence of sciatic symptoms reported in the literature varies considerably ranging from 1.6% in the general population to 43% in a selected working population. The burden of lumbar disc prolapse is of great importance in a developing country like India because of the increase in Jobs which require prolonged sitting in work stations in uncomfortable postures, continuous over exertion, jerky or jolting movements during travelling, excessive exercise or physical activities which enhances degeneration of disc etc creates undue pressure on the spine resulting in IVDP. Degeneration of intervertebral disc begins early in life as an indirect consequence of ageing. Prolapse of disc most often than not, occurs in the part of spine that is subjected to heaviest mechanical stress.² The severity of this syndrome is enormously variable, from a brief and trivial episode to a long and difficult illness that occasionally requires surgical intervention. It often occurs between the 4th and the 5th lumbar vertebrae or between the 5th lumbar vertebra and 1st sacral vertebra, and often in youth and the middle-aged of 30-50 years, with predominance in males. Most commonly identified risk factors associated with lumbar disc herniation includes young age, male gender, familial association, environmental factors, trauma and cigarette smoking.³

Sciatica refers to unilateral or bilateral pain, numbness or paraesthesia along the course of the sciatic nerve, with or without muscle weakness etc. In approximately 90% of the cases, sciatica is caused by a herniated disc resulting in sciatic nerve compression. A lumbar disc becomes prolapsed when the soft, jelly-like material that comprises the centre of the disc pushes through the fibrous shell and into the spinal column.

The symptomatology of Sciatica of lumbar disc herniation is similar to the disease Gridhrasi described in Ayurveda. Gridhrasi is one among the eighty Vata Nanatmaja Vyadhi(diseases of Vata origin) and the word literally reflect the gait of the patient afflicted with the condition which resembles the gait of gridhra⁴(vulture).

This article is intended to address the Roga Pariksha(examination of disease) aspects of Sciatica of lumbar disc herniation, through Nidana Panchaka of Ayurveda.

MATERIALS AND METHODS

Comprehensive and exhaustive literary review of classical Ayurveda treatises, textbooks of contemporary...
medicine, published articles from journals and e-sources of contemporary and traditional medicine along with authentic medical websites.

**Description of Sciatica and Gridhrasi**
Sciatic neuralgia or sciatica is defined as pain in the distribution of the sciatic nerve, perceived as pain along the distribution of sciatic nerve due to ectopic activation of nociceptive afferent fibres in the sciatic nerve or its roots.

**Historical Aspects**
The ancient Greeks used the term sciatica, to describe pains or ‘ischias’ felt around the hip or thigh. Hippocrates himself noted this as a condition affecting men between 40 and 60 years and observed that this lasted for about 40 days before resolving spontaneously.\(^5\)

Italian anatomist Domenico Cotugno wrote the first book on sciatica in 1764, where he distinguished sciatica as a neurological condition from low back pain and for many years it was known as Cotugno’s Disease.\(^6\) The intervertebral disc was first implicated as the etiology in sciatica in 20\(^{th}\) century.

**Gridhrasi** has been described in detail in all samhitas of Ayurveda. It is a disease characterized by Stambha, Toda, Ruk, Spandana, affecting Sphik, Kati and then radiating to posterior aspect of Uru(Thigh), Jana(Knee), Jangha(Calf) and Padai(foot).\(^7\)

The synonyms given for Gridhrasi are:
- **Ringhini**\(^8\): Used by vachaspati Misra, while commenting on Madhava Nidana, which, literally means displacement, according to Sabdakalpadruma. It may be inferred to indicate prolapse of intervertebral disc material.
- **Randhrini**\(^9\): This term indicates rupture or weakpoint.
- **Radhina**\(^10\): Given in Dipika and Gudartha Dipika commentary of Sangdharma Samhita which literally mean pressing, compressing etc.

Charaka explains Gridhrasi in Vatavyadhi and describes the symptomatology as pain starting in the Kati and descending to Nitamba, Uru, Jana, Jangha, Padam along with Stamba, Ruk and Toda in Vatika Gridhrasi and associated with Tanda, Gourava and Arochaka in Vatakaphaja Gridhrasi.\(^11\) Acharya Sushruta pointed out the role of Kandara dushti and Vata in the pathogenesis of the disease.

Vagbata has described Gridhrasi as pain in the low back radiating to the foot and described Khalli as a condition in which the pain in Gridhrasi becomes extreme.\(^12\) Madhava nidana has included Dehasya Pravakrata and Mukha Praseka also as associated symptoms. Yogaratnakar and chakrapani described Gridhrasi similar to Charaka.

**Aetiology of Gridhrasi and sciatica**
Gridhrasi has been described as a Vatavyadhi and hence the Nidana of Vatavyadhi can be considered as the Nidana of Gridhrasi and they are as given in table 1.

### Table 1: Compilation of possible etiology of Gridhrasi with their interpretation.

<table>
<thead>
<tr>
<th>Category of Hetu</th>
<th>Hetu</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ahara Hetu</strong></td>
<td>Atiraksha Ahara</td>
<td>Excessive dry food which is un-unctuos</td>
</tr>
<tr>
<td></td>
<td>Atiseeta Ahara</td>
<td>Excessive cold food</td>
</tr>
<tr>
<td></td>
<td>Alpa Asana</td>
<td>Intake of food in less than required quantity</td>
</tr>
<tr>
<td></td>
<td>Ati Lagha Ahara</td>
<td>Excessive use of light food, which is not nourishing</td>
</tr>
<tr>
<td></td>
<td>Ati Katu-Tikta-Kashaya Ahara</td>
<td>Excessive use of pungent, bitter, astringent foods</td>
</tr>
<tr>
<td></td>
<td>Asatmya Ahara</td>
<td>Intake of incompatible food</td>
</tr>
<tr>
<td></td>
<td>Virudha Ahara</td>
<td>Intake of mutually contradictory ahara</td>
</tr>
<tr>
<td><strong>Vihara Hetu</strong></td>
<td>Atiigarana</td>
<td>Excessive skipping of sleep, late sleeping habits</td>
</tr>
<tr>
<td></td>
<td>Atiyavyaya</td>
<td>Excessive coitus</td>
</tr>
<tr>
<td></td>
<td>Vishamachesta</td>
<td>Irregular and imbalanced posture and activities.</td>
</tr>
<tr>
<td></td>
<td>Dukhasanyya</td>
<td>Irregular sleeping postures</td>
</tr>
<tr>
<td></td>
<td>Divaswapna</td>
<td>Sleeping during day time</td>
</tr>
<tr>
<td></td>
<td>Bharavahana</td>
<td>Lifting weights</td>
</tr>
<tr>
<td></td>
<td>Vegarodha</td>
<td>Suppression of natural urges particularly mala, mutra and vata</td>
</tr>
<tr>
<td></td>
<td>Athichankramana</td>
<td>Excessive walking</td>
</tr>
<tr>
<td></td>
<td>Rathaticharya</td>
<td>Excessive travelling in jerky vehicles</td>
</tr>
<tr>
<td></td>
<td>Prapedana</td>
<td>Injury to back</td>
</tr>
<tr>
<td></td>
<td>Prapatana</td>
<td>Falling from heights</td>
</tr>
<tr>
<td></td>
<td>Abhigata</td>
<td>Injury to back</td>
</tr>
<tr>
<td><strong>Manasika Hetu</strong></td>
<td>Chinta</td>
<td>Excessive thinking</td>
</tr>
<tr>
<td></td>
<td>Soka</td>
<td>Grief</td>
</tr>
</tbody>
</table>
Disc herniation in the L4, L5, S1 region
- Spinal canal stenosis
- Spondylolisthesis
- Traumatic: in association with femur fracture, hip dislocation or fracture etc
- Malignancy: Metastatic, bone or soft tissue sarcoma, sciatric neuroma, Hemangioblastoma
- Infections: discitis, abscess etc
- Vascular compression: Abnormal pelvic venous plexi, gluteal artery pseudo aneurysm
- Bony compression: osteophyte-sacro-iliac zygapophyseal joint etc.
- Muscular: piriformis syndrome.
- Gynaecological conditions like uterine fibroid etc.

In Sciatica of IVDP origin, the causes of intervertebral disc may be explored and the causes of IVDP are as follows:

- The natural aging process which gradually weaken the intervertebral discs making them susceptible to rupture
- Spinal trauma — Injuries that result from a forceful blow to the spine can cause immediate disc herniation.
- Repetitive stress — sitting for prolonged periods or repeatedly lifting heavy objects while bending at the waist can cause a series of small tears to develop in a disc’s outer wall, tears that can worsen over time and lead to full disc herniation.
- Unhealthy body weight particularly in the abdominal region, can strain and damage the spinal components.
- Poor nutrition can deprive the intervertebral discs of the nutrients needed to remain supple and strong.
- Tobacco use
- Genetics

Pathogenesis of sciatica of IVDP origin and Gridhrasi
Intervertebral disc is composed of a central portion called the nucleus pulposus and an outer layer called annulus fibrosis comprised of concentric layers of intertwining annular bands. The annulus fibrosis is arranged in a specific pattern to balance the various forces acting on the spine while maintaining the flexibility. The strength and mobility of the disc is related to the proteoglycan and fluid content of the disc.

Most often than not, disc prolapsed is precipitated by a trauma or on imbalance in the forces and pressure exerted by various factors on the spine. Pre-existing degeneration in the form of Degenerative Disc Disease (DDD) is a major contributor for Disc prolapse. Disc degeneration due to mechanical stresses most commonly affects the L4-5 and L5-S1 regions. The degenerated discs undergo herniation even from lower pressures than normal discs.[14] The symptoms occur as a direct result of impingement of sciatic nerve by either herniation of nucleus pulposus through a mechanically weak annulus fibrosis or rupture of the annulus fibrosis itself. The degree of disease in the lumbar spine is characterized by the location of abnormal portion of the disc. Often the prolapsed nucleus pulposus induces an inflammatory response which leads to other symptoms in the area such as redness swelling etc.

Acharyas describe Gridhrasi as a Vatavyadhi which may result gradually from Vata Prakopa by Vata vitiating Ahara and Vihara or through an Agantu cause like Abhigata, Prapatana or Prapeedana to the low back region. Vata Prakopa in the form of Pakwasaya Gata Vata and Guda Gata Vata gradually cause Dhatukshaya in the Asthi and Sandhi of Kati Desha, afflicting the Kandara that passes along the Parshni to Pada Anguli leads to the manifestation of specific symptomatology of Gridhrasi. Marmabhadigata or abhigata to Kati Desha may directly cause affliction of the same Kandara but without the prior Vata Prakopa. Depending upon the Dosha involved in the pathogenesis, the symptoms may vary.

Purvarupa or prodrome is usually said as Avyakta in Vatavyadhi which would mean the prodromal symptoms would be non-specific or vague. However, it may be assumed that symptoms of Pakwasaya Gata Vata Kopa or Gudagata Vata Lakshana might be seen as the disease initially manifests with Vata Kopa in its primary abode, i.e, Pakwasaya.

The vague symptoms may range from mild back ache to pain during movements of spine.

Symptomatology of sciatica of IVDP origin and Gridhrasi
The typical clinical picture of disc herniation includes initial lumbalgia that may evolve to lumbar sciatica (generally after one week) and may finally persist as pure sciatica.[15]
• Pain: sharp, burning, stabbing pain radiating down the posterior or lateral aspect of the leg, to below the knee or along the course of the sciatic nerve, which may be unilateral or bilateral.
• Aggravation of leg pain with straining, coughing, and sneezing
• Numbness with or without tingling sensation in the legs, along the nerve.
• Pain with flexion, rotation, or prolonged sitting or standing and relieved in recumbent position. (Pain during lumbar flexion points to discogenic pain)
• Weakness in the leg and/or foot
• Bladder or bowel control may be affected in certain cases.
• Motor deficit with diminished reflexes may occur.
• Sensory deficits may manifest

On the basis of Dosha predominance, Gridhrasi may be classified as Vataja or Vata-Kaphaja and the symptomatologies are given below(Table 2).

<table>
<thead>
<tr>
<th>Vataja Gridhrasi</th>
<th>Vata-Kaphaja Gridhrasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruk(pain)</td>
<td>Symptomatology of Vataja Gridhrasi +</td>
</tr>
<tr>
<td>Toda (pricking pain)</td>
<td>Tandra (Lassitude)</td>
</tr>
<tr>
<td>Stambha (rigidity or stiffness)</td>
<td>Gourava (Heaviness of the body)</td>
</tr>
<tr>
<td>Spandana (Pulsatile Sensation)</td>
<td>Arochaka (Tastelessness)</td>
</tr>
<tr>
<td>Dehasya Pravakrata (exaggerated curvature of spine)</td>
<td>Staimityati (feeling as if wrapped in wet cloth, here, it would indicate stiffness of spine)</td>
</tr>
<tr>
<td>Chimichimayana (Tingling sensation)</td>
<td>Vahni Mardava (impaired digestion)</td>
</tr>
<tr>
<td>Gridhravat Gati (Gait like vulture, which here would mean antalgic gait)</td>
<td>Bhaktadvesha (anorexia)</td>
</tr>
<tr>
<td></td>
<td>Mukha Praseka (salivation)</td>
</tr>
</tbody>
</table>

The diseases sciatica has similarities to Gridhrasi in aetiological and symptomatological aspects and hence is described in detail. Understanding a disease (roga pariksha) will not be complete without examining the facets of Upashaya and Anupasaya. Puranashali, Godhuma, Masha, Taila, Ghrita, Kshira etc which does not produce Vata Kopa in Pakwasaya produces relief to gridhrasi, just like any other vata Vyadhi. Abhyanga, Swedana, Atapa Sevana, Guru Pravarana, Basti etc are effective in producing Vata Samana and will be beneficial to counter Dosha Dushti in Gridhrasi.

DISCUSSION

In human body locomotion is a much initiated and well coordinated activity under the control of nervous system. In Ayurveda activity of locomotion in all aspects is imparted by Vata, the unique Dosha which is the creator, conductor and enactor of all neurological commands. Koshtha is the primary abode of all Dosas and Pakwasaya is said to be the Shhana of Vata. Among the Pancha Vata, Vyana Vata is responsible for Gati, Prasarana, Akanjana, Utshepana etc.

Among the Vatas, Apana is the regulator of activities related with the autonomic regulation of voluntary motor system, sympathetic and parasympathetic divisions of visceral motor system, through the lower motor neurons that originate from lumbar and sacral segments of spinal cord and invested with the functions of defeacation, micturition, expulsion of foetus etc. Acharyas has opined that in the condition of vata Kopa in Pakwasaya, a range of conditions varying from mild Sula, Anaha, Antrakujana, Malarodha to diseases such as Vridhi, Arshas, Asmari and various other diseases of Adhakaya are mentioned. “Trika- Prishtha- Kateegraha” is the musculoskeletal symptomatology associated with Vata Kopa in its primary abode. This indicates that Vata Kopa at Pakwasaya has a direct relation with spinal diseases.

It can be seen that a synergistic relation exist between Kati and Pakwasaya Vata. When one is afflicted, other also get afflicted. When Vataprakopa occurs at Pakwasaya, Kateegraha manifests and it might get relieved with normalising Pakwasaya Vata. The Nija Samprapti of an intervertebral disc prolapse begins at Pakwasaya, which gradually cause disc dehydration, weakness of Sneya, Kandara and Asthi at spine, specifically lumbosacral region resulting in qualitative, quantitative, structural and functional changes, resulting in further Vata Kopa and Sleshaka Kapha Ksaya. This leads to Slahangathu and instability in the lumbar spine, making it prone to a Nimitta Karana in the form of even slight trauma (Agantuja).

In the case of Agantuja Nidana in the form of a fall or trauma hitting the spine, result in injury to the spine secondary to instant structural instability and protrusion of nucleus pulposes. Here, the dosha dushiti is secondary to Abhiguta (Kati Mrsma Abhiguta/Utpata).

Role of Kapha in the spine and intervertebral joints

The type of Kapha vested with the action of keeping Sandhi’s well lubricated and stable is Sleshaka Kapha. The Sleshaka Kapha has two aspects; the aspect which contributes to the integrity of bony joints and their smooth functioning and the second aspect is that allows smooth movement through-a range of physiological states and nourishes, lubricates and protects the Sandhi against injury and Sandhiichyuti (misalignment).

In Nija diseases of disc, the qualitative change in the Ap Mahabhuta, due to Vata Kopa, brings about Rookshata
and Ksaya to Sleshaka Kapha which render the disc unable to work across usual weight bearing mechanisms and make it prone to prolapse. In certain conditions, the Kapha formed from Sama Rasadhathu will be Sama in nature and there will be the generation of Ama in the Sandhi. The Sama Kapha might cause Srotorodha to Vyana Vata activity and may produce Sthamba, Gourava, Sotha and Soola in joints. It is said that Vata, when localised in the sakti in an extremely vitiated state, it afflicts the Kandaras extending from Sroni to Nakha Praroha and produces symptoms of Khanka or Pangu. These two conditions can be considered as the result of a complicated intervertebral disc herniation of lower limbs resulting in a lower motor lesion within a peripheral nerve producing decreased muscle tone, decreased reflexes in the affected area, atrophy and fasciculation.

IVDP as a disease is not mentioned in Ayurveda. Acharyas had designed chapter based on the symptomatology and not on the basis of nidanas or samprapti. Diseases with neuromuscular and skeletal symptomatology are considered under the chapter vatavyadhi, since vata is the dosha, which is concerned with initiation and execution of karmas related to locomotor system and nervous system. Disease in which movement become impaired or abolished comes under the spectrum of vata vyadhi. The similarities between sciatica and Gridhrali is given in table 3.

### Table 3: Similarities between Sciatica and Gridhrali.

<table>
<thead>
<tr>
<th>Sciatica of IVDP origin</th>
<th>Gridhrali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aetiological similarities</td>
<td></td>
</tr>
<tr>
<td>Trauma</td>
<td>Marmabhigata, prapatana, prapeedana</td>
</tr>
<tr>
<td>Degenerative Disc Disease</td>
<td>Dhatukshaya</td>
</tr>
<tr>
<td>Symptomatology</td>
<td></td>
</tr>
<tr>
<td>Sharp, burning, stabbing pain radiating along the pathway of sciatic nerve</td>
<td>Ruk along Sphik, Kati, Prishita, Uru, Janu, Jangha and Pada, which is the course of sciatic nerve.</td>
</tr>
<tr>
<td>Stiffness in the lumbar region</td>
<td>Sthamba</td>
</tr>
<tr>
<td>Cardinal feature is positive SLR test</td>
<td>Sakhiutkshepa Nigraha</td>
</tr>
<tr>
<td>Pulsations or fasciculation in muscles supplied</td>
<td>Maha Spandana</td>
</tr>
<tr>
<td>Sciatic scoliosis</td>
<td></td>
</tr>
<tr>
<td>Paraesthesia along the course of nerve root</td>
<td>Supthi, Chimichimayana.</td>
</tr>
</tbody>
</table>

### Samprapti ghataka of Sciatica of IVDP origin

- **Doshya** – Vata (Vyana, Apana), Kapha (Sleshaka)
- **Dushya** : Asthi, Majja and Kandara(Upadhatu)
- **Rogavastha** : Madhyama Rogamarga
- **Srotas** – Rasavaha, Ashthivaha, Majjavaha
- **Sroto Dusti Prakara** – Sanga, Margarvarodha
- **Udbhava** – Pakvashaya, Kati
- **Vyaktasthana- Kati, Adhahkaya(Parshnim Kandara)**
- **Rogavastha**: can have Samavastha(with redness, acute pain, swelling, heaviness of body, stiffness, impaired activity of Vata), and Niramavastha(with sensory, motor deficits, pain and paraesthesia).

Although the disease Gridhrali is caused by the morbidity of Vata Dosha (Vyana and Apana) with secondary involvement of Kapha Dosha, Vataja Gridhrali Lakshana will be seen predominantly and the management of the diseases should be aimed at improving Dhatu Bala and regulating Vata. In Gridhrali with Kapha predominance, Deepana, Pachana procedures should be done, prior to addressing Vata, to remove Margarodha.

Almost all signs and symptoms of Gridhrali resemble with Sciatica as described in contemporary medicine. Hence, Sciatica may be addressed and evaluated in the same way as Gridhrali.

Inflammatory and degenerative pathologies have been addressed by various researchers and clinicians in Sciatica and likewise depending upon the presentation, Vyadhyavastha may vary in Gridhrali also. If its thought along the lines of Sciatica, an acute Samavastha may be seen during the initial phase following a disc prolapse and will be characterised by severe pain(Ruk), redness(Raga), swelling(Sotha) etc which is not directly mentioned in Ayurveda classics. In chronic cases, where pure degeneration of disc co-exist, symptoms of pure Vata, as seen in Vataja Gridhrali might be seen.

### Conclusion

Sciatica has emerged as a common disease in the current era, owing to the various levels of stress and strain produced in the spine due to altered lifestyle such as regular travelling in vehicles for long, abnormal postures, indulging in Vata Prakopa Kara Ahara etc. Sciatica is symptomatically similar to Gridhrali and hence the management may be done in the lines of Vatasamana(Sneha, Sweda, Vasti) in Sciatica secondary to Degenerative Disc Disease (Dhatukshaya Janya Gridhrali) and Ruksha Purva Vatasamana Chikitsa in Sciatica without evidence of degeneration(Gridhrali due to Margarodha).
REFERENCES


