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Case Report

Complete resolution of lumbar disc sequestration with Ayurveda management: A case report

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ABSTRACT

Lumbar disc herniation (LDH) is the most common spinal disorder among which disc sequestration is a severe type where the herniated disc fragment migrates and is completely separated from the parent disc. A 46-year-old female patient with severe lower back pain radiating to right lower limb, disability, and numbness in the affected extremity came to *Panchakarma* O.P.D of our hospital. She was a chronic case of disc sequestration where her symptoms were severely aggravated after a sudden jolt felt on her lower back while traveling on a motorcycle. The patient's Oswestry disability index (ODI) score was 90 % which indicates a bed-bound condition and even Schobar's test indicated a severe reduction in lumbar flexion capability. MRI showed postero-central herniation with disc sequestration at L5-S1 caused compression on the subarachnoid space and traversing S1 nerve roots. She was treated according to Ayurveda treatment principles and underwent *Panchakarma* like medicated enema (*Basti*) and fomentation of a lumbosacral region with oil (*Kati Basti*). She also received different oral medications on successive follow-ups. After 6 months of Ayurveda treatment, the patient showed remission in lower back pain (LBP), radiculopathy, and numbness. Her ODI score was reduced to 6 %. The MRI repeated post-treatment showed complete interval resolution of disc sequestration and no neurological compression was observed.

1. Introduction

Lumbar disc herniation (LDH) is common among spinal pathologies, which can lead to LBP and radiculopathies [1,2]. Herniated discs are categorized into bulging, protrusion, extrusion, and sequestration, according to the type and shape of the lesion [3]. The present case is of sequestration which is the severest form of LDH. Most LDH patients can be treated successfully by conservative management and surgical intervention as indicated for major neurological impairments or progressive neurological deficit conservative therapies [4–6]. Several studies report spontaneous LDH regression by conservative treatments. Large cohort studies namely Maine lumbar spine study [7], spine patient outcome research trial (SPORT) [8], and The Hague spine intervention prognostic study group [9] reported that early surgery achieves more rapid remission of LDH symptoms than conservative treatment but, in long run, outcomes become gradually identical to conservative care. Many other studies have obtained similar outcomes consistently [10, 11]. But the overall failure rate of lumbar spine surgery was estimated to be 10–46 % [12].

Despite severe radiating LBP, and minor neurological deficits like numbness in the lower extremity, this case was managed with Ayurveda treatment principles with a successful outcome. Ayurveda treatment showed a significant reduction not only in clinical symptoms but also resorption of sequestrated disc components observed in post-treatment MRI.

2. Patient information

A 46-year-old female patient presented with complaints of severe lower back pain radiating to right lower limb, along with numbness and

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tingling (date 12/10/2020). The patient was unable to walk unassisted due to pain and was brought to the O.P.D. in a wheelchair. She stated that the symptoms had been present since two and a half years but that the intensity of pain and radiculopathy had increased severely a day earlier due to a sudden jolt while traveling on a motorcycle. History revealed that, in December 2017, she experienced LBP and mild radiating pain in her right lower extremity, especially while walking and riding a bike. She then visited local orthopaedic hospital, where, based on MRI findings, she was advised to take bed rest and physiotherapy for the next 3 months, and was advised to undergo surgery if her symptoms persisted. After 3 months, her symptoms had resolved. However, over the next 2 years, there was an occasional relapse of severe LBP attacks. At that time, she frequently took NSAIDs and physiotherapy, but she didn't receive satisfactory relief. In October 2020, she felt a sudden jolt in her lower back during a ride when the motorcycle veered into a ditch on a road. After that, her condition worsened, and she approached our hospital for further management.

3. Clinical findings

Clinical examination exhibited tenderness at the last 2 lumbar vertebrae and sacral region along with severe stiffness of paraspinal muscles. The straight leg raise (SLR) test was positive for the right lower limb at 60°. Schober's test showed a lumbar flexion difference of <2 cm which indicated a severe reduction in normal lumbar flexion capability [13]. Neurological examination revealed a gross reduction in dermatome activity below the right ankle joint at the plantar area. All other neurological functions like bowel and bladder controls were intact. The Oswestry disability index (ODI) [14] of the patient was 90 %.

4. Diagnostic assessment

MRI whole spine screening done on 15/12/2017 revealed postero-central herniation with disc sequestration at the level of L5-S1 that caused compression on the subarachnoid space and traversing nerve roots. A sagittal view of the T2-weighted image showed the extent of sequestrated disc material in a caudal direction (Fig. 1). Axial view T2-weighted image showed the exact extent of compression over the subarachnoid space and traversing S1 nerve roots by sequestrated disc (Right > Left) (Fig. 2). Michigan State University (MSU) classification is a simple and reliable method to objectively measure lumbar disc herniation on MRI of this patient. According to MSU classification, it is grade 3-A disc herniation with the most impact on nerve compression [15].

Ayurveda diagnosis of this condition is correlated under the umbrella of the disease *Gridhrasi* (~sciatica). In *Charaka Samhita,* the classic description begins with pain in the hip region, followed by involvement of the *Kati* (lumbar region), *Prishta* (back), *Uru* (thigh), *Janu* (knee), *Jangha* (leg), and *Pada* (feet). In this disease, *Stambha* (stiffness) and *Spandana* (pulsatory sensation) along the path may accompany the pain (CS.CS.28/56) [16] *Sakthikshepanigraha* (restriction in lower-limb upward lifting) is also a cardinal symptom of *Gridhrasi.* Presently this restriction in upward lifting of the lower limb is quantified by the SLR test. *Acharya Susruta* has outlined the radicular nature of the disease as the loss of motor functions occurring in the ankle (*Pashni*) and toes due to *Vata dosha* vitiation. This kind of impaired neurological dermatome activity is present in this case below the ankle joint (SS.NS.01/74) [17].

Thus, this case is diagnosed as *Gridhrasi* which is the most obstinate disorder and one among 80 types of *Vataja Nanatmaja Vyadhis* (CS. SU.20/11) [18].

5. Therapeutic interventions

The patient received oral herbo-mineral preparations during the course of the treatment. She was prescribed oral medicines viz. *Rasna Saptaka Kashaya*, *Mahayogaraj Guggulu* (250 mg), and *Trayodashang Guggulu* (500 mg), freshly prepared *Erandamoola kwath*, *Mahavata Vidhwansaka Rasa* (125mg), and *Sahacharadi kashaya*. Follow-up of each oral medication was after 15 days. Advised medication, their dosage, and durations are mentioned in Table 1.

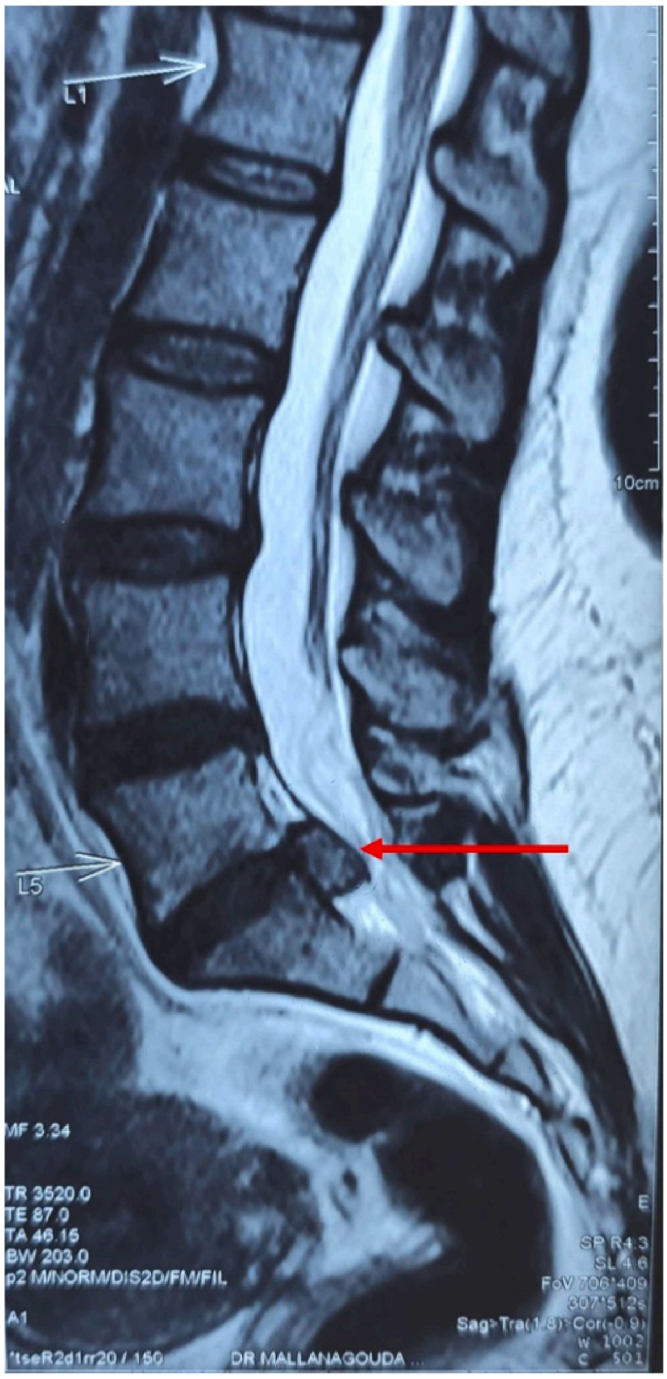

Fig. 1. The red arrow in sagittal view of the T2-weighted image shows the extent of sequestrated disc material in a caudal direction.

The patient also received *Panchakarma* therapy which included a medicated enema (*Basti)* and *Kati Basti*. Medicated enema of oil (*Anuvasana Basti*) was given with 50 ml *Balaguduchyadi Taila*. Medicated enema of decoction (*Niruha Basti)* contained, a paste of 80 ml jaggery (*Guda)*, 5 g rock salt (*Saindhava Lavana*) 60 ml medicated oil (*Sneha*) *Balaguduchyadi Taila*. 10 g fine powders (*Kalka Churnas*) of *Guduchi* (*Tinospora cordifolia*), *Rasna* (*Alpinia galanga*), and *Punarnava* (*Boerhavia diffusa*) were taken. The 300 ml decoction (*Kashaya*) was made of

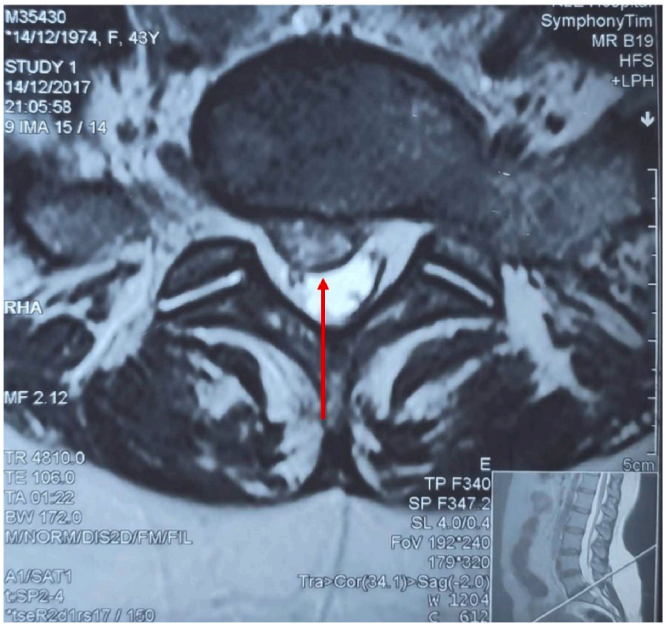

Fig. 2. The red arrow in axial T2-weighted image shows the exact extent of compression over the subarachnoid space and traversing nerve roots by sequestrated disc.

Erandamoola (*Ricinus communis*). Lastly 50 ml each of cow's urine (*Gomutra*) and a paste of. tamarind (Tamarindus indica) were added. *Anuvasana Basti* was always given after lunch and *Niruha Basti* was administered in the morning empty stomach. Two courses of enema therapy were given. Each course of enema was of a total of seven *Anuvasana* and six *Niruha Bastis*. *Kati Basti* was given with *Vishagarbha Taila*. Three courses of *Kati Basti* each of 7 days were done. The *Panchakarma* treatment plan and duration are mentioned in Table 2. She was advised to take rest and avoid exertion, traveling, and lifting heavy weights.

6. Follow up and outcome

The timeline of follow-ups and outcomes are mentioned in Table 3.

After observing significant MRI changes, the patient was very satisfied with the course of treatment and was advised to return for a follow-up if the low back pain or radiculopathy recurred. On 22/04/2021, she returned to the hospital with one of her relatives for their *Panchakarma* O.P.D. consultation. She had no recurrence of the low back pain or radiculopathy issues at the time. Despite this fact that we examined her to ensure that she was perfectly fine. The SLR and Schober's tests were negative.

7. Discussion

The present case involved disc sequestration, which is a severe form of lumbar disc herniation (LDH). Based on MRI findings and clinical features, surgical intervention was recommended for the patient. Conservative treatment of LDH has a much lower risk of complications than surgery and is preferred by majority of the patients [19]. There are many studies conducted for treatment aspects of various lumbar disc herniations with conservative management, especially with physiotherapy along with pre-and post-radiological investigations. However, there are very few Ayurveda treatment studies published on the successful management of severe LDH with radiological evidence. This case report highlights the treatment protocol planned for the disc sequestration with complete correction of pathology on the basis of MRI findings and clinical symptoms. The treatment was planned based on previous clinical experience in the treatment of similar and related disc herniations.

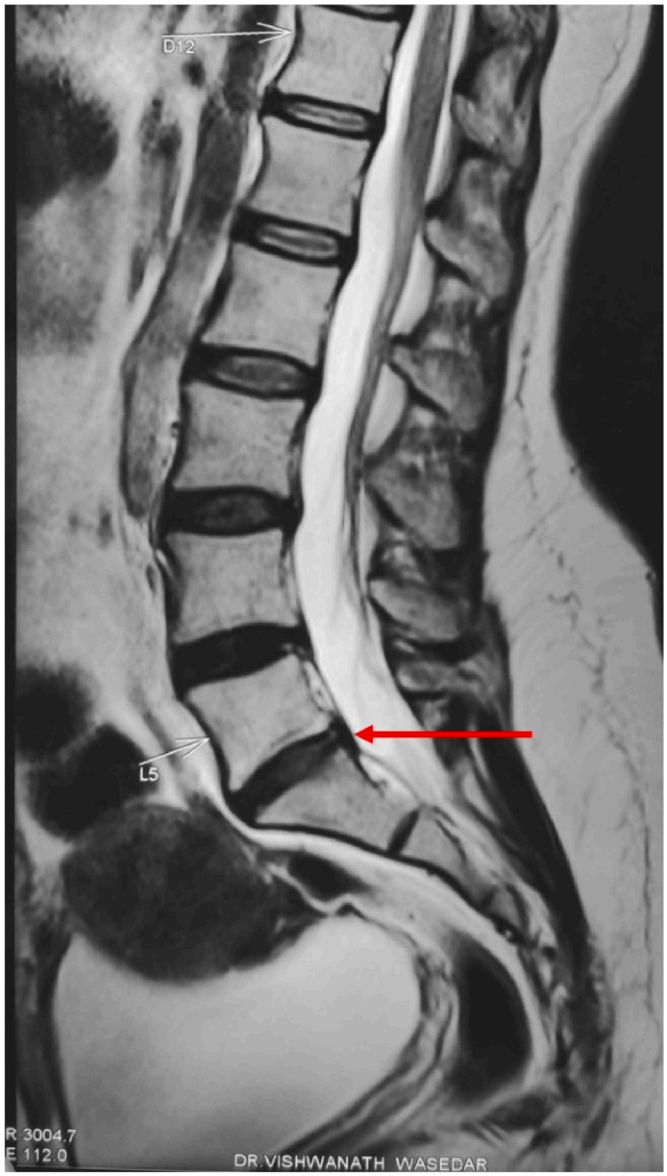

Fig. 3. The red arrow in sagittal view of the T2-weighted image shows complete interval resolution of L5-S1 disc sequestration.

However, the base of the treatment plan was the principles explained in Ayurveda treaties. The *Charaka Samhita* and *Shushruta Samhita's* traditional descriptions of *Gridhrasi* demonstrate that these ancient scholars had a precise understanding of radicular pain and neurological deficits involving a specific region and pattern of nerve distribution.

Several mechanisms have been explained for the resorption of LDH, namely – neovascularization, phagocytosis by an immune response [20], [-22] and gradual dehydration and shrinkage by apoptosis [23]. It has been explained that several molecular mediators are involved in the neovascularization of LDH, such as transforming growth factor TNF-α that can promote the expression of vascular endothelial growth factor (VEGF), that plays a crucial role in the formation of new blood vessels. Studies confirmed that these mediators are present in human LDH tissue [24,25]. Many Ayurveda drugs and formulations that are used in a medicated enema, *Kati Basti*, and oral medication contain such molecular mediators to promote neovascularization in LDH. For example, *Guduchi* (*Tinospora cordifolia*) increases VEGF which is essential for angiogenesis [26]. Phagocytosis by macrophages was observed more often in disc sequestration type than in other LDH [27]. *Guduchi* has *Vedanasthapana* and *Vatahara* action. It has *Tikta Rasa, Snigdha,* and

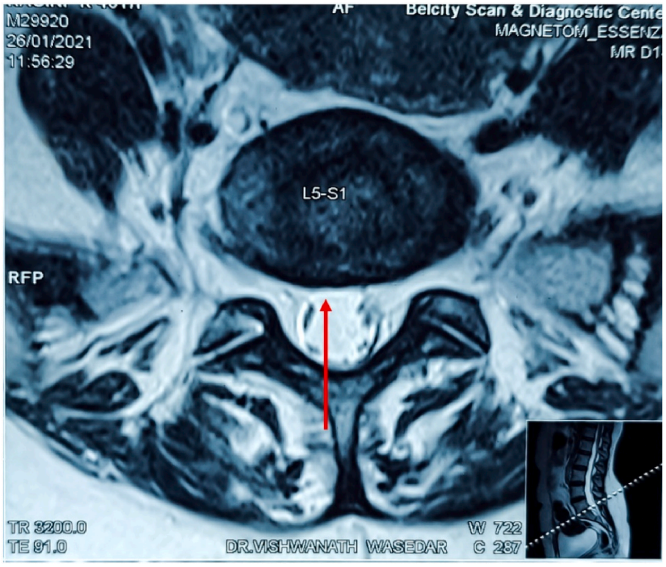

Fig. 4. The red arrow in axial view of the T2-weighted image shows complete interval resolution of L5-S1 disc sequestration and no significant neurologic compression.

Table 1
Treatment schedule of oral medications.

Sr	Duration	Oral Medications
1.	12/10/2020 To 26/10/2020	1. *Rasna Saptaka Kashaya* 10 ml thrice daily with water after food 2. *Mahayogaraj Guggulu* (250 mg) 1 tab thrice daily with water after food 3. *Trayodashang Guggulu* (500 mg) 1 tab thrice daily with water after food
2.	28/10/2020 To 11/11/2020	1. *Erandamoola kwath* (freshly prepared) 50 ml twice daily after food 2. *Mahayogaraj Guggulu* (250 mg) 1 tab thrice daily with water after food 3. *Trayodashang Guggulu* (500 mg) 1 tab thrice daily with water after food
3.	12/11/2020 To 25/11/2020	1. *Erandamoola kwath* (freshly prepared) 50 ml twice daily after food 2. *Mahayogaraj Guggulu* (250 mg) 1 tab thrice daily with water after food 3. *Mahavata Vidhwansaka Rasa* (125mg) 1 tab thrice daily with water after food
4.	25/11/2020 To 12/12/2020	Same as above
5.	14/12/2020 To 28/12/2020	1. *Erandamoola kwath* (freshly prepared) 50 ml twice daily after food 2. *Mahavata Vidhwansaka Rasa* (125mg) 1 tab thrice daily with water after food
6.	30/12/2020 To 15/01/2021	1. *Sahacharadi kashaya* 10 ml thrice daily with water after food

Ushna Gunas which stimulate the *Dhatvagni* and provide nutrition to the *Dhatus* by *Madhura Vipaka.* [28].

Eranda (*Ricinus communis*) is a potent anti-inflammatory drug and showed increased scavenging activity in macrophage cell membranes [29]. *Eranda* (*Ricinus communis*), *Guduchi* (*Tinospora cordifolia*), and *Punarnava* (*Boerhavia diffusa*) showed apoptotic activity in various studies [30–32]. *Punarnava* has *Kapha Vata Hara, Shothahara,* and *Rasayana* property due to *Ushna Virya* [33].

Rasna (*Alpinia galanga*) also has potential analgesic and anti-inflammatory activity. *Rasna* contributes to the downregulation of T-cell surface markers (CD8+/CD4+) and intracellular T helper cell 1 (IL-2 and interferon-gamma) cytokines [34]. *Chincha* (*Tamarindus indica*) used in medicated enema has strong anti-inflammatory and analgesic

Table 2
Panchakarma treatment schedule.

Sr	Duration	*Panchakarma* treatment
1.	13/10/2020 To 18/10/2020	1. *Anuvasana Basti* (AB) was given with 50 ml *Balaguduchyadi Taila* 2. *Niruha Basti* (NB) - 80 ml paste of jaggery (*Guda*), 5 g rock salt (*Saindhava Lavana*), 60 ml medicated oil (*Sneha*) *Balaguduchyadi Taila.* *Kalka Churnas* 10 g each of *Guduchi* (*Tinospora cordifolia*), *Rasna* (*Alpinia galanga*), and *Punarnava* (*Boerhavia diffusa*). *Kashaya* - 300 ml *Erandamoola* (*Ricinus communis*), 50 ml cow's urine (*Gomutra*), 50 ml paste of *Chincha* (*Tamarindus indica*).
	13/10 AB	14/10 NB AB	15/10 NB AB	15/10 NB AB	16/10 NB AB	17/10 NB AB	18/10 NB AB
		3. *Kati Basti* with *Vishagarbha Taila.* (maximum 30 min duration)
2.	19/11/2020 To 25/11/2020	Same as above
3.	14/12/2020 To 20/12/2020	4. *Kati Basti* with *Vishagarbha Taila.* (maximum 30 min duration)

properties which inhibit the release of prostaglandins and give a diclofenac-like effect [35]. According to the classics *Chincha* has *Kapha-Vatahara*, *Shothahara*, and *Shulahara* properties (SS. SU.46/159–160, BH·NI.203-204) [36,37].

Cow urine (*Gomutra*) is a proven bio-enhancer [38] thus, it increases the efficacy of other drugs in a medicated enema. Medicated enemas and oil enemas are used in colorectal drug delivery that can increase local tissue drug concentrations without systemic exposure to large drug doses and allow for greater drug bioavailability [39]. *Kati Basti* performs hot fomentation of the affected area which causes local heat production. This heat stimulates sensory nerve endings and results in vasodilation. Vasodilation increases local blood flow and helps to migrate neutrophils into the tissue through the capillary wall (diapedesis) to remove inflammatory cytokines which reduce pain and inflammation [40]. Thus, *Panchakarma* procedures act on all possible mechanisms to regress disc sequestration as mentioned above, and play a vital role in the management.

Oral medicines were planned on the basis of their properties and their direct indication for the disease *Gridhrasi* (~sciatica) in Ayurveda texts. Several studies were conducted to ensure the efficacy of these herbo-mineral preparations in sciatica caused by various disc pathologies.

A detailed pharmacological study supports the therapeutic claim of *Trayodashang Guggulu* as a potent anti-inflammatory agent in the Ayurvedic system of medicine and validates its use in painful inflammatory conditions such as sciatica [41].

Aampachana and Vatanulomana properties of the ingredients of *Trayodashanga Guggulu* help in relieving *Kapha Dosha Avarana* (obstruction of *Vata* due to *Kapha Dosha*) and *Vata Dosha* elimination (BR.26/98–101) [42].

Mahayogaraj Guggulu is used in Ayurveda practice in many conditions and has analgesic, anti-inflammatory, and neuroprotective effects. According to the classics it acts on *Asti-Sandhi-Majjagata Vata* and also does *Amapachana* [43].

According to Saper et al. [44], it is said to have unacceptably high metallic content, but many studies have proven the safety of this drug [45]. The patient also had a complete blood count, liver, and renal function test during and after several follow-ups, which was within normal limits. *Rasna Saptaka Kashaya* is commonly used in various inflammatory conditions and several studies were conducted to prove its efficacy in conditions like *Gridhrasi* (~sciatica). It is having a *Vata Shamaka* and *Amapachaka* properties. The drug in *Kashaya* like *Aragwadha* (*Cassia fistula*) is *Kapha Dosha Hara* and acts as *Mridu Virechaka*

Table 3
Timeline of follow-ups and outcomes.

Sr.	Date	Complaints	Clinical Examination
A 46-year-old female patient had a history of recurrent LBP and radiculopathy in the right lower extremity for two and a half years. (First attack of LBP along with mild radiating pain in the right leg in December 2017) MRI Spine on 15/12/2017 revealed postero-central herniation with disc sequestration at the level of L5-S1 caused compression on the subarachnoid space and traversing S1 nerve roots. (Right > Left)			
1.	12/ 10/ 2020	Attack of LBP radiating towards right leg along with numbness and tingling. (Intensity was severe than previous episodes) Unable to stand and walk unassisted. History of sudden jolt on low back while traveling one day before.	SLR Right leg - 60°, SLR left leg - 90° Schober's test: lumbar flexion difference <2 cm. ODI - 90 %. Tenderness at L4, L5, S1 level with Severe paraspinal muscle stiffness. Gross reduction in dermatome activity below the right ankle joint.
2.	18/ 10/ 2020	Mild reduction in LBP and able to walk 10 min longer than before but with assistance. Mild reduction in radiculopathy and paraesthesia.	SLR Right leg - 70°, SLR left leg - 90° Schober's test: lumbar flexion difference <2 cm. Reduction in tenderness at L4, L5, S1 level paraspinal muscle stiffness Mild improvement in dermatome activity.
3.	28/ 10/ 2020	Able to walk 15 min longer than before but with assistance. Same intensity of radiculopathy and paraesthesia as before.	SLR Right leg - 80°, SLR left leg - 90° Schober's test: lumbar flexion difference - 3 cm. ODI - 76 %.
4.	13/ 11/ 2020	Able to walk unassisted for 10 min. Gross reduction in paraesthesia and muscle stiffness.	SLR Right leg - 80°, SLR left leg - 90° Schober's test: lumbar flexion difference- 3 cm. ODI - 76 %. No tenderness at L4, L5, S1 level Gross reduction in paraspinal muscle stiffness Significant improvement in dermatome activity
5.	25/ 11/ 2020	She could walk for 15–20 min without support, an much faster than before. Gross reduction in LBP and radiculopathy. Complete reduction in numbness and tingling.	SLR Right leg – painful at 90°, SLR left leg - 90° Schober's test - lumbar flexion difference - 4 cm. ODI - 56 %.
6.	14/ 12/ 2020	Total remission of radiculopathy. Mild LBP. Walking unassisted for more than 30 min.	SLR Right leg – moderately painful at 90°, SLR left leg - 90° Schober's test - lumbar flexion difference - 5 cm. ODI - 30 %.
7.	30/ 12/ 2020	Occasional LBP while climbing stairs otherwise complete reduction in LBP.	SLR Right leg – over 90° without pain, SLR left leg - 90° Schober's test - Negative (lumbar flexion difference - 6 cm) ODI - 14 %.
8.	15/ 01/ 2021	Performing her usual walking, sitting, and standing as a normal individual without any difficulty. No symptoms were observed.	ODI – 6 %.

MRI lumbar spine on 26/01/2021 revealed complete interval resolution of L5-S1 disc sequestration and there was no significant neurologic compression was observed in both sagittal (Fig. 3) and axial view (Fig. 4) T2-weighted images.

(mild laxative) which helps in *Vata Anulomana.* [46].

The properties of other main ingredients of this *Kashaya* including *Rasna, Guduchi, Punarnava, Eranda,* etc. are already discussed above. *Sahacharadi Kashaya* has the property of improving *Deha Gati* (movement of body parts) in *Pavan Pidita Rogi* (suffering from *Vata Dosha* vitiation). This *Kashaya* has *Vatahara*, *Brumhana*, and *Pachana* properties (AH.CS.21/67–69) [47].

After this Ayurveda treatment, the patient showed remission of clinical symptoms after 3 months. The ODI score of 90 % gradually reduced and reached 6 %. Even severe lumbar flexion difference (estimated by Schobar's test) gradually decreased and then normalized during the course of Ayurveda treatment. The MRI after treatment also showed complete resolution of disc sequestration.

Demonstrating the efficacy of Ayurveda treatment in such conditions with radiological evidence will add value and can build confidence in Ayurveda practitioners for managing different LDHs. To determine the precise therapeutic significance of such LDH cases, radiological evaluation is required during each stage of treatment. Further evaluation of *Ayurveda* treatment principles in various LDHs on large samples is necessary.

8. Conclusion

The case of a severe acute attack of LBP and radiculopathy from a chronic LDH in the form of sequestration was successfully treated with *Panchakarma* and Ayurveda oral medications. After treatment, the patient had a significant reduction in clinical symptoms and post-treatment MRI showed remission of disc sequestration. ODI score which was 90 % before treatment dropped gradually and reached 6 %. The lumbar flexion was gradually increased after treatment, and the Schober's test, which had been showing a severe reduction in lumbar flexion capability, turned negative. Therefore, this case report suggests that even severe forms of LDH can be well managed by Ayurveda treatment principles.

Patient's perspective

The patient was satisfied after taking the Ayurveda treatment and was really surprised to see the changes in post-treatment MRI reports. Her clinical symptoms were significantly reduced in a span of six months of the treatment so she was confidently engaging in her routine work. This Ayurveda treatment protocol helped her to improve her quality of life physically and mentally as she was suffering from debility for a long time.

Informed consent

Informed consent of the patient was taken for intervention as well as reporting the case for publication.

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None.

Author contributions

Vishwanath Wasedar: Conceptualization, Methodology, Data Collection, Validation, Formal analysis, Data Curation, Writing-Review and Editing, Visualization, Resources, Supervision. **Bhagyesh Pangam**: Conceptualization, Methodology, Data Collection, Data Curation, Writing- Original draft, Supervision, Visualization. **Sarang Shete**: Conceptualization, Resources, Validation, Writing-Review and Editing, Formal analysis. **Vinay Belaval**: Writing-Review and Editing, Resources, Validation, Investigation.

Declaration of generative AI and AI-assisted technologies in the writing process

No generative AI or AI-assisted tools were used during writing the manuscript.

Declaration of competing interest

None.

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