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Case Report

Functional Recovery and Radiological Down-Staging through Ayurveda management in Bilateral Corticosteroid-Induced Femoral Head Avascular Necrosis: A Case Report

Amit A Paliwal[1], Vasudha G Asutkar[2]*, Shital R Rasane[3], Snehal G Pansare[4], Sanjay C Babar[5], Mahesh P Jadhav[6]

1. Professor, Department of Shalyatantra, Dr. D. Y. Patil College of Ayurved & Research Centre, Dr. D. Y. Patil Vidyapeeth (deemed to be University), Pimpri, Pune-411018. India.
2. Associate Professor, Department of Samhita Siddhant and Sanskrit, Bharati Vidyapeeth (Deemed to be University) College of Ayurved, Pune. India.
3. Professor, Department of Samhita Siddhant Evam Sanskrit, Dr. D. Y. Patil College of Ayurved and Research Centre, Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Pimpri, Pune-411018. India.
4. Assistant Professor, Department of Shalyatantra, Dr. D. Y. Patil College of Ayurved & Research Centre, Dr. D. Y. Patil Vidyapeeth (deemed to be University), Pimpri, Pune-411018. India.
5. Professor & Head of Department of Shalyatantra, Dr. D. Y. Patil College of Ayurved & Research Centre, Dr. D. Y. Patil Vidyapeeth (deemed to be University), Pimpri, Pune-411018. India.
6. Associate Professor, Department of Shalyatantra, Dr. D. Y. Patil College of Ayurved & Research Centre, Dr. D. Y. Patil Vidyapeeth (deemed to be University), Pimpri, Pune-411018. India.

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Abstract

Avascular necrosis (AVN) of the femoral head is a progressive ischemic condition that often requires surgical intervention. Corticosteroid therapy during COVID-19 has been linked to aggressive AVN in young adults. In Ayurveda, it corresponds to Asthimajjagata Vata, with classically recommended raktamokshana, basti, snehana–swedana, and rasayana treatments. A 32-year-old male presented with bilateral hip pain and restricted mobility, beginning few months after corticosteroid use during COVID-19 treatment. Patient was wheelchair-dependent, with VAS pain scores of 10/10 (right) and 9/10 (left). MRI (22/12/2024) confirmed bilateral femoral head AVN: right hip Stage III, Mitchell Class D; left hip Stage II, Mitchell Class A. (ICD-11 code FB81.XK9J.XA96S5). Bilateral total hip arthroplasty was advised, but patient declined. A multimodal Ayurvedic protocol, delivered in three 60-day cycles, included siravedha (therapeutic venesection), sequential basti (tikta-ksheera, yogabasti, matra basti), local snehana and swedana, and Panchatikta Ghrita Guggulu, Asthimajjapachaka Vati, Medopachaka Vati, Dashamoola Kwatha, and Asthiposhaka Vati orally. The rationale was to pacify vata, improve circulation, and strengthen bone and marrow. By six months, pain had reduced to 5/10 (right) and 2/10 (left), mobility was restored to independent walking, stair climbing, and hip range of motion markedly improved. Follow-up MRI (18/09/2025) showed bilateral down-staging to Stage II, Mitchell Class B, with reduced articular involvement and no collapse. No adverse events were noted. This case demonstrates a structured Ayurvedic regimen may relieve symptoms, restore function, and arrest progression in corticosteroid-induced AVN. Though not curative, it may serve as a valuable bridging option when surgery is deferred.

Keywords: Femoral head osteonecrosis, Corticosteroid-induced AVN, COVID-19 complications, Asthimajjagata Vata, Nonsurgical AVN management, Case Report

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Introduction

Non-traumatic Secondary Avascular Necrosis (AVN) of the femoral head (ICD-11: FB81.XK9J.XA96S5) is a progressive ischemic disorder characterized by interruption of the subchondral blood supply results in necrosis of bone tissue, collapse of the articular surface, and secondary osteoarthritis.(1) It commonly affects young and middle-aged adults. Often, surgical intervention such as total hip arthroplasty at an early age may be required. No epidemiological data are currently available on osteonecrosis of the femoral head in the Indian population. In the United States it is estimated that between 10,000 and 20,000 new cases are diagnosed annually.(2) Conservative approaches are not known to succeed in altering the natural progression of the disease.

*** Corresponding Author:**
Vasudha G Asutkar
Associate Professor, Department of Samhita Siddhant and Sanskrit, Bharati Vidyapeeth (Deemed to be University) College of Ayurved, Pune. India.
Email Id: vasudha.asutkar@bharatividyapeeth.edu

The known reported risk factors include chronic alcohol intake, cigarette smoking, trauma, haematological and metabolic disorders, and prolonged/high-dose corticosteroid therapy. During the COVID-19 pandemic, systemic corticosteroids like dexamethasone and methylprednisolone were widely used in severe cases. While lifesaving, their use has been linked to a surge in reports of rapidly progressive, frequently bilateral AVN of the hip in otherwise healthy individuals, often within months of infection.(3)

From Ayurvedic perspective, many clinical features of AVN resemble Asthimajjagata Vata (SAT Code AAE-11 & AAE 12)—a disorder characterized by the vitiation of vata within asthi (bone) and majja (marrow) tissues. The classical texts describe severe pain, stiffness, weakness, deformity, and loss of function, closely paralleling the modern presentation of AVN. Management strategies recommended for such conditions include raktamokshana (therapeutic bloodletting), a range of basti (medicated enema therapies), snehana (oleation), swedana (sudation), and internal Rasayana (rejuvenative formulations) to nourish depleted tissues.(4)

Given the limited efficacy of most conservative biomedical options, and with the rising incidence of corticosteroid-associated AVN after COVID-19, there is a need to explore safe and affordable alternatives. We present here a case of a 32 year-old male with corticosteroid-induced bilateral femoral head AVN following COVID-19 treatment, managed with a structured Ayurvedic multimodal protocol. Patient was advised bilateral THA, but was unwilling due to financial and other issues. The intention of this report is not to claim reversal of necrosis, but to report how timely application of Ayurvedic interventions may help in alleviating symptoms, saving tissue in acute stage, and potentially delaying the inevitable progression of the disease until definitive surgical options are required.

Case presentation

A 32-year-old male visited the outpatient department at Dr. D. Y. Patil College of Ayurved & Research Centre, Pimpri, Pune on 24/03/2024 with complaints of severe bilateral hip pain and progressive restriction of mobility. Previously, patient had been hospitalized for COVID-19 infection in December 2022. During this course, intravenous methylprednisolone for seven days followed by a tapering oral course for a further seven days were prescribed. The exact cumulative steroid dose could not be retrieved from available records, but the chronological association of steroid use with the onset of hip symptoms was noticeable. There was no history of alcohol consumption, cigarette smoking, or recreational drug use. The patient reported no relevant family history of musculoskeletal or metabolic disorders. Build was average with a height of 165 cm and weight of 64 kg, corresponding to a body mass index of 23.5 kg/m². No history of any long-term illness (prior to COVID-19) or any past surgery was reported.

The condition was correlated with Asthimajjagata Vata based on the involvement of Asthi and Majja dhatu manifested by severe pain, restriction of movement, difficulty in ambulation, and progressive functional impairment. The vascular insufficiency underlying avascular necrosis may be interpreted a srotorodha, resulting in impaired nourishment of Asthi-Majja dhatu and subsequent aggravation of Vata dosha, ultimately producing features described for Asthimajjagata Vata in the classical texts.(5)

Clinical Findings: On initial examination carried out on 24/03/2025, patient's general condition was stable. Temperature was 37.5°C, pulse 86 beats per minute, and blood pressure 130/90 mmHg. Respiratory and cardiovascular examinations were normal. Patient was conscious and well oriented. However, gait assessment revealed a noticeable antalgic pattern. The patient avoided weight bearing on the right side, resulting in an abnormal posture with a right pelvic tilt and compensatory trunk shift to the left. A mild lumbar convexity to the left was also noted. Pain was localized primarily to the right hip and was severe enough to affect daily functioning.

Range of motion of the hip joints was markedly restricted in supine position. On right side flexion was limited to 20°, extension to 10°, internal rotation to 10°, external rotation to 20°, and abduction to 10°. Adduction was completely absent. On left side, flexion was preserved up to 90°, extension up to 10°, internal rotation to 30°, external rotation to 40°, abduction to 40°, and adduction to 20°. Despite these relatively preserved movements, pain was experienced in all directions. The intensity of pain was recorded on the visual analogue scale (VAS) as 10/10 on right and 9/10 on left. The straight leg raising (SLR) test was restricted to 20° on the right and to 90° on the left. These baseline clinical findings are presented in Table 1, which summarizes the comparative limitations of both hips at first presentation.

Table 1. Baseline examination of bilateral hip joint

Parameter	Right hip	Left hip
Flexion	20°	90°
Extension	10°	10°
Internal rotation	10°	30°
External rotation	20°	40°
Abduction	10°	40°
Adduction	Absent	20°
Straight leg raise	20°	90°
VAS (0–10)	10	9

Diagnostic Imaging: The onset of hip pain occurred within a few months of the COVID-19 recovery. Initially evaluated by an orthopaedic surgeon, Magnetic resonance imaging (MRI) was done 22/12/2025. The report confirmed bilateral avascular necrosis of the femoral heads. The right hip was classified as Stage III according to the Arlet and Ficat system and Mitchell Class D with acute changes, 50% articular involvement and moderate effusion and collapse of bony cortex, while the left was Stage II, Mitchell Class A with less than 50% articular involvement (Fig.1). Bilateral total hip arthroplasty was advised, but the patient was not ready for surgical intervention due to financial constraints and personal reasons. Hence, Ayurveda intervention was initiated.

Baseline laboratory investigations were within normal limits. Differential diagnosis such as transient osteoporosis of the hip, septic arthritis, inflammatory arthropathy, and metabolic bone disease were considered less likely in view of the history, clinical features, and radiological findings.

Accordingly, diagnosis of bilateral femoral head avascular necrosis was established and coded as per ICD-11 morbidity classification: FB81 (osteonecrosis of bone) with XA96S5 (femoral head) XKJ9 (on both sides). From the Ayurvedic perspective, the condition was correlated with Asthimajjagata Vata (vata disorder localized to bone and marrow tissue) SAT Code AAE-11 & AAE12.

Figure 1: MRI done Prior to first OPD visit. S/o Secondary Bilateral AVN

Intervention: Since the patient was unwilling for surgery, structured multimodal Ayurvedic protocol was initiated. The treatment plan was designed as a 60-day cycle, repeated three times, amounting to six months of therapy in total. The major interventions included siravedha (therapeutic venesection), various forms of basti (medicated enemas), local snehana (oleation) and swedana (sudation) therapies, and selected oral herbal formulations. All procedures were carried out under necessary sterile precautions. Siravedha was selected as a form of Raktamokshana considering the predominance of severe pain, restriction of movement, and Vata manifestations. Sushruta advocates Siravyadha in various Vata Vyadhi including conditions affecting locomotion and the musculoskeletal system, thereby providing the classical basis for its use in the present case.(6) Tikta-Ksheera Basti was selected because classical Ayurvedic texts recommend Tikta dravyas processed with Ksheera in disorders involving Asthi dhatu depletion and aggravated Vata dosha. Owing to the Ashraya-Ashrayi Bhava relationship between Vata and Asthi, nourishment of Asthi dhatu is considered an important therapeutic strategy in Asthimajjagata Vata.(7)

The regimen began on 24/03/2025. Siravedha (therapeutic venesection) performed at right popliteal region using a 22-gauge scalp vein set. Approximately 5 mL of blood was removed, which produced immediate subjective relief of heaviness and pain. From Day 3 to Day 10, daily tikta-ksheera basti (medicated enema with decoctions of bitter herbs and milk) was administered in a volume of 750 mL using enema set and drip method. The decoction contained Guduchi (Tinospora cordifolia (Willd.) Miers ex Hook.f. & Thomson), Neem (Azadirachta indica A. Juss), Kantakari (Solanum surattense Burm.f.), Vasa (Adhatoda vasica Nees), Patol (Trichosanthes dioica Roxb.), prepared by mixing 16 times water and reducing over heat till 1/8th volume remained, then combined with equal quantity of milk.(8) Parallelly, local snehana with Bala Taila and pinda sweda with boluses of Shali rice, Masha or black gram (Phaseolus mungo Linn.), Bala (Sida cordifolia L.), and Ashwagandha (Withania somnifera (L.) Dunal) decoction dipped in warm milk were done daily for 10 to 15 minutes.(9)

On Day 15, siravedha was performed at the left popliteal region. From Days 18 to 25, a classical yogabasti cycle was administered, alternating anuvasana basti (unctuous enema with 80 mL Bala Taila and 40 mL Sahachar Taila) on alternate days and niruha basti (decoction enema with Erandamooladi kwatha 750 mL) on intervening days.(10) On Days 30 to 38, daily matra basti with 30 mL Bala Taila and 20 mL Sahachar Taila was given. Repeat siravedha procedures were performed on Days 28, 40, and 55 on alternating sides.

Throughout the treatment cycle, oral formulations were prescribed from Day 1 to Day 38. These included Dhootpapeshwar's Panchatikta Ghrita Guggulu (500 mg twice daily), BVG Life Science's Medopachaka Vati (500 mg thrice daily), BVG Life Science's Asthimajjapachaka Vati (500 mg thrice daily), and Dashamoola Kwatha (15 mL thrice daily). From Day 38 to Day 60, patient was maintained with Dhootpapeshwar's Asthiposhak Vati 500 mg BD. The cycle was repeated twice more, completing six months of therapy.

Outcomes: The patient showed steady improvement from being wheelchair-dependent at baseline to standing with support within two weeks, and by the end of six months he reported pain reduced to 2/10 on left and 5/10 on right with restored hip mobility, independent walking, squatting, and the ability to climb stairs.

These sequential improvements are summarized in Table 2, which depicts interventions with observed outcomes.

Table 2: Timeline of interventions and outcomes

Timepoint	Intervention(s)	VAS pain (R/L)	Hip flexion (R/L)	SLR (R/L)	Mobility
Baseline 24-03-2025	Siravedha right popliteal	10 / 9	20° / 90°	20° / 90°	Wheelchair-dependent
Day 10 03-04-2025	Tikta-Ksheera Basti + snehana–swedana	8 / 9	30° / 90°	30° / 100°	Standing with support
Day 15 08-04-2025	Siravedha left popliteal	8 / 8	40° / 100°	30° / 100°	Sitting with minimal pain
Day 28 21-04-2025	Completed Yogabasti cycle + siravedha right	7 / 8	50° / 100°	40° / 100°	Sitting comfortably
Day 40 03-05-2025	Matra Basti + siravedha left	7/ 6	60° / 110°	50° / 110°	Standing without support
Day 55 19-05-2025	Oral therapy + snehana–swedana + siravedha right	6 / 5	60° / 110°	70° / 120°	Standing with ease
End Cycle 2 (4 months) 19/07/2025	Entire regimen repeated	5 / 4	50° / 110°	80° / 120°	Walking with support
End Cycle 3 (6 months) 15/09/2025	Entire regimen repeated	5/ 2	90° / >120°	90° / >120°	Walking independently, climbing stairs

Figure 3: Depicts the changes in mobility of hip joint before and after treatment

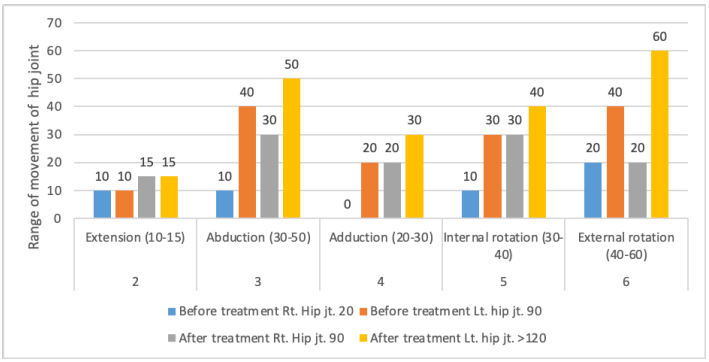
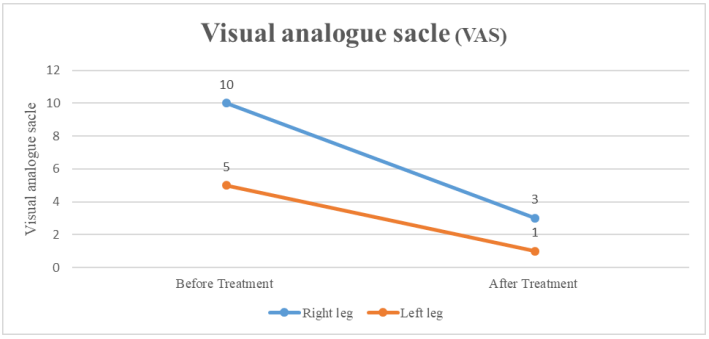


Figure 4: Depicts the reduction In VAS scores before and after treatment



At the end of six months repeat MRI was done on 18/09/2025. The imaging suggested bilateral avascular necrosis of femoral head (grade IIB with approximately 15-30% area involvement bilaterally). This entails significant reduction in articular surface involved, along with reduction in stage and class on the right side (from Stage III Class D to Stage II Class B) as per Arlet and Ficat system and Mitchell Classification. No evidence of collapse was noted bilaterally. Although diffuse edema within the head and neck of the right femur and moderate right hip joint effusion were still present on follow-up imaging, the extent of femoral head involvement had reduced from approximately 60% (right) and 50% (left) at baseline to 15–30% bilaterally.

Figure 4: MRI done after Treatment. Improvement seen in staging and involvement

No adverse events were noted during therapy. All procedures were performed under aseptic precautions. Compliance with the medicines therapies was excellent. Patient consistently reported symptomatic relief and expressed satisfaction with the ability to regain independence and delay surgery.

Written informed consent for publication of this case, including clinical photographs and MRI images, was obtained on 26/09/2025.

Discussion

The role of corticosteroids in the causation of avascular necrosis is well established. Their use promotes fat cell hypertrophy and abnormal lipid deposition in the marrow, which raises intraosseous pressure and compromises local circulation. Microvascular thrombosis and endothelial dysfunction add to this process, and together these cause ischemia and collapse of the femoral head (1). During the COVID-19 pandemic these risks have been amplified. The virus itself produces endothelial damage and a prothrombotic state. When this is coupled with corticosteroid therapy, the disease appears earlier and progresses more rapidly. Several series have described young adults developing bilateral hip necrosis within months of their COVID illness, many of them with no other risk factors (3).

From an Ayurvedic point of view, these clinical features resemble the description of Asthimajjagata vata. Sushruta describes that aggravated vata in these tissues leads to pain, weakness, deformity and functional loss (5). The srotodushti (obstruction of channels) that carry nutrition to the bone is also explained as a key event, and this correlates well with the modern understanding of impaired circulation and necrosis.

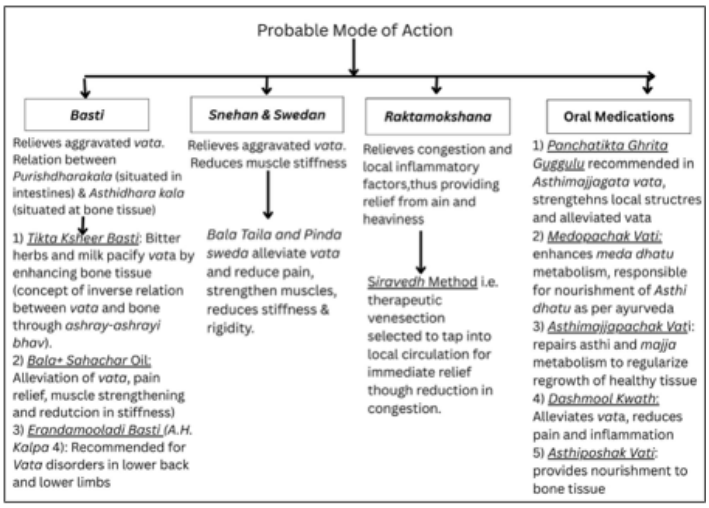
The approach followed in this case was therefore aimed at clearing local obstruction, pacifying vata, and strengthening asthi (bone) and majja (marrow). The repeated use of Siravedha was based on the Ayurvedic principle of Raktamokshana in Vata-dominant musculoskeletal disorders. Sushruta specifically advocates Siravyadha in various Vata Vyadhi affecting locomotion and limb function, providing the classical rationale for its repeated application in the present case(7). From a contemporary perspective, venesection may contribute to symptomatic improvement through reduction of local vascular congestion and modulation of inflammatory processes, although its exact role in avascular necrosis requires further investigation In practical terms, venesection reduces local engorgement and may improve microcirculation. The patient reported relief of heaviness and pain after each procedure, which supports this traditional reasoning.

In Ayurvedic classics, basti is considered as the most effective treatment for vata vyadhi (diseases caused by vata). Tikta-ksheera basti, which is decoction of bitter drugs with milk, was chosen to pacify vata and simultaneously nourish asthi dhatu. The theoretical basis for this is the principle of ashraya–ashrayi bhava (the inverse relation between vata and bone). In this condition, the bone is weakened and depleted, so supporting asthi indirectly controls vata (7,11). The use of yogabasti, a sequence combining anuvasana basti (unctuous enema) and niruha basti (decoction enema), is advised in long-standing vata disorders. Bala Taila and Sahachar Taila help in relieving stiffness and improving mobility, while Erandamooladi decoction is prescribed for disorders of the lower limbs. The matra basti (daily small-volume oil enema) served as a maintenance to keep vata vitiation in check and provide pain relief. Local snehana (oil massage) and swedana

(sudation) added further relief to muscle and joint stiffness and also addressed the secondary strain from abnormal gait (12).

The oral formulations were selected to complement these measures. Panchatikta Ghrita Guggulu is a classical preparation recommended for asthi-majjagata vyadhi (Bone & Marrow disorders).(13) The bitter herbs in this preparation pacify vata, and modern studies also suggest anti-inflammatory and osteogenic potential. Dashamoola Kwatha shows analgesic and anti-inflammatory effect. Medopachaka Vati was added to regulate lipid metabolism, in keeping with the understanding that proper transformation of meda dhatu supports bone formation. Asthimajjapachaka Vati was intended to strengthen bone and marrow metabolism and prevent further obstruction of channels(14). Asthiposhak Vati provided nutrient support to bone tissue.(15) Together, these medicines provided systemic support for the procedures.

Figure 5: Probable mode of action of the multimodal protocol



The overall outcome was noteworthy. The patient was wheelchair-bound with severe pain, and within six months he was walking with support, climbing stairs, and squatting. VAS Pain scores dropped to 5 on right and 2 on left, hip movements improved considerably, and sleep and daily activities were restored. Follow-up MRI demonstrated reduction in the extent of femoral head involvement and absence of further articular collapse, although persistent right-sided marrow edema and joint effusion were still noted. Considering that progression is usually relentless in corticosteroid-induced AVN, this reduction in involvement along with clinical improvement is important.

For this patient, the improvement was also meaningful in a socio-economic sense due to inability to consider immediate surgery. The Ayurvedic approach gave him relief and mobility and postponed the need for surgery. This aligns with earlier reports of benefit from raktamokshana, basti, and Rasayana therapies in musculoskeletal disorders, though evidence is still preliminary.(8) The reasoning also fits with the Ayurvedic idea of kala sharira, which describes how nourishment of bone is linked to the intestinal lining (purishadhara kala). By administering basti, bone health is supported through this deeper tissue connection. Administration of basti supports bone health due to this deeper tissue connection.(15)

However, there are limitations. This report describes a single patient with a six-month follow-up. Long-term sustainability is not known. Validated functional outcome measures such as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Harris Hip Score were not prospectively documented, which constitutes a limitation of the present report. Volumetric MRI analysis would have provided stronger evidence than just surface area estimates. Thus, the findings should be seen as hypothesis-generating, not confirmatory. This case emphasizes a valuable point, which is that an Ayurvedic multimodal regimen can provide substantial relief and functional improvement in corticosteroid-induced AVN. While complete reversal of necrosis is not possible, the progression was slowed, with improvement in acute tissue damage, and the quality of life improved. In settings where surgery is not feasible, such approaches may offer patients time and function. Larger and longer studies are needed to evaluate this potential more thoroughly.

Conclusion

This case documents a carefully curated Ayurvedic regimen which provided sustained pain relief, recovery of function, and radiological improvement in corticosteroid-induced bilateral AVN of the femoral head. Complete reversal was not achieved, but progression was arrested with down staging observed on right, allowing the patient to delay surgery until it becomes feasible. Such an approach may offer a valuable bridging option in similar clinical scenarios.

Ethical clearance: Written informed consent was obtained from patient.

Conflict of Interest: Nil

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