

Management of avascular necrosis of femoral head - A case study

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Abstract

Introduction: Avascular Necrosis (AVN) of femoral head is the collapse of femur head subsequent to transient or permanent loss of blood supply to the femoral head. On the basis of symptoms it can be correlated to Asthi-Majjagata Vata. A 34 year old female, with complaints of weakness of left lower limb and restricted movements of bilateral hip joints aggravated since one year was treated with Guggulu Tiktaka Ghrita Ksheera Basti.

Aim and objective: To evaluate the efficacy of Guggulu Tiktaka Ghrita Ksheera Basti in the management of avascular necrosis of femur head.

Methodology: Guggulu Tiktaka Ghrita(80ml) with Goksheera (300ml) was given as Niruha Basti and a combination of Guggulu Tiktaka Ghrita (80ml) and Gandha Taila (10ml) was given as Anuvasan Basti in Karma Basti pattern.

Results and Discussion: Patient, who was not able to walk without a single crutch was able to walk without support for small stretches with mild limping and slight pain. There was a loss of 5.5kg in a span of 45 days. Guggulu Tiktaka Ksheera Basti possibly aided in strengthening of subchondral bone of the femoral head. The loss of body weight in turn reduced load on the femoral head. Both these factors produced symptomatic improvement in the patient.

Keywords

Avascular necrosis of Femoral head, Asthi-majjagata vata, Guggulu tiktaka ghrita ksheera basti, Gandha taila

Introduction

Avascular Necrosis (AVN) of femoral head is due to transient or permanent loss of blood supply to femoral head leading to bone collapse, flattening of femur head and secondary osteoarthritis. It produces considerable deformity and disability in the productive age group.

AVN happens mostly in young and middle aged people. In India, about 16,000 people develop this condition each year. It is a common cause for hip arthroplasty¹. There is a 55% probability that the contralateral hip may also be affected in the next two years². It can be due to traumatic or non-traumatic causes. Traumatic causes

include fracture of femur head. Non-traumatic causes include altered metabolism due to a primary disease or alcohol intake or due to steroid medication³.

The bone necrosis is believed to happen in two phases: 1) stage of ischemia and 2) stage of regeneration. The first stage of ischemia is a silent phase where blood supply to the bone is interrupted but no bone depletion occurs. Hence, X-ray will be normal. MRI may be helpful to identify early bone marrow depletion.

Once the dead bone receives blood supply (revascularisation), Mesenchymal Stem Cells (MSCs) migrate to the necrotic area, they multiply and differentiate into osteoblasts ultimately producing the weakened appositional subchondral bone. This newly laid bone may not be able to hold the cartilage above and ultimately collapse. Thus adult hips will ultimately end in osteoarthritis³.

Based on radiological findings, The Ficat and Arlet Staging System⁴ differentiates AVN of Femur Head into 4 stages (Table 1).

This classification system is based on radiological findings and doesn't consider the extent of degeneration. Knowing the size of lesion, location of lesion in the femoral head and presence of bone marrow oedema in proximal femur determines the prognosis².

In asymptomatic lesions, protected weight bearing is resorted until it becomes symptomatic. In stage 1 and 2 lesions hyperbaric oxygen therapy is found effective. Surgical treatments are either femoral head preserving techniques like core decompression with or without non vascularised bone graft, vascularised bone graft, rotational osteotomy, tantalum rods or hip replacement⁵.

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According to Ayurveda, AVN of femoral head can be correlated to Asthi-Majjagata Vata due to presence of pain in Sakthi and Sandhi Shula (deep pain in groin; often referred to ipsilateral buttock and knee), limited range of motion of hip joint, Teevra Balakshaya (symptoms worsening with weight bearing), Asthi Saushirya, Satata Ruja (continuous pain) and Asvapna (insomnia due to persistent pain) ⁶.

Case report

A thirty-four year old female, approached the Outpatient Department of Shalya Tantra, SDM College of Ayurveda and Hospital, Hassan with complaints of weakness of left leg and restricted movements of both hip joints since five years and aggravated since one year. Five years back, she experienced a sudden sense of weakness in the left hip joint while climbing the stairs. X-ray taken at that time was within normal limits according to the Orthopaedician whom she consulted. Later, as the symptoms progressed she was advised to undergo MRI of bilateral hip joints.

The MRI report of 2016 was suggestive of Grade IV AVN of left femoral head and Grade III-IV of right femoral head. She underwent indigenous treatments from non-traceable sources and found little

relief. When the weakness of right hip joint increased, she once again took an MRI scan of bilateral hip joints in January 2019. This time the left femoral head AVN had progressed to Grade IV with superadded osteoarthritis of bilateral hip joints. She was advised to undergo Total Hip replacement.

Clinical Findings

General examination showed pallor, icterus, cyanosis, clubbing, koilonychia, lymphadenopathy and edema to be absent. Weight at the time of admission was 86.5 kg. Her vital signs were within normal limits. Range of motion was restricted to varying degrees with tenderness in both hip joints.

Assesment criteria

Harris Hip score⁷ (Table 2), Visual Analogue Scale⁸ (Table 3), Depression Anxiety Scale⁹ (Table 4) and weight assessment were used for assessing the outcome of treatments.

Table 1: The Ficat and Arlet Staging System

STAGE	FINDINGS
1	Normal radiograph
2	Femoral head has normal sphericity, but there are signs of bone remodelling such as cystic and osteosclerotic regions
3	Subchondral collapse or flattening of the femoral head
4	Degenerative change is shown in acetabulum with reduction in joint space

Table 2: Harris Hip Score⁷

<70	70-79	80-89	90-100
POOR	FAIR	GOOD	EXCELLENT

Table 3: V.A.S – Visual Analogue Scale⁸

0	2	4	6	8	10
NO HURT	HURTS LITTLE BIT	HURTS LITTLE MORE	HURTS EVEN MORE	HURTS WHOLE LOT	HURTS WORST

Table 4: Depression Anxiety Stress Scale Interpretation

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Therapeutic interventions

Patient was advised to take Jeeraka Jala frequently and 100ml Dashamoola Qwatha¹⁰ aimed at Vatanulomana. Chitrakadi vati¹¹ 2 TID was given for deepana and pachana effects (Table 5). As Poorvakarma to Basti therapy; Sarvanga Abhyanga with Ashwagandhabala laakshadi Taila and Sarvanga Parisheka with Dashamoola Qwatha was done for 3 days (Table 6).

Patient was advised for Karma Basti with following ingredients (Table 7).

Advise on discharge:

1. Gandha Taila 10 drops BD with milk on empty stomach
2. Tablet Laksha Guggulu¹² 2 BD after food

Results

Subjective and objective parameters of Harris hip score were used to evaluate the outcome of interventions in each hip joint separately (Table 9 and Table 10). There was noticeable changes in the range of motion in bilateral hip joints. Patient's body weight reduced from 86.5 kg to 81kg. The quality of life in terms of daily activities improved significantly by 45th day of treatment. Patient who was not able to walk without a single crutch was able to walk without support for short stretches with mild limping and slight pain after 30 days of therapy.

Table 5: Shamana Chikitsa

Medicines	Dosage	Remarks
Dashamoola Qwatha	100ml BD before food	For initial 3 days only
Jeeraka Jala	Sip by sip intake frequently	-
Chitrakadi Vati	2 TID before food	-
Gandha Taila	10 drops with milk BD	From 4th day onwards

Table 6: Shodhana Chikitsa

Sarvanga abhyanga with Ashwagandha Bala lakshadi taila followed by Sarvanga Parisheka with Dashamoola Qwatha
Karma basti –
Anuvasana basti with Guggulu Tiktaka Ghrita 80 ml and Gandha Taila 10 ml
Niruha Basti with Goksheera 300ml and Guggulu Tiktaka Ghrita 80 ml

Table 7: Niruha Basti Ingredients

Niruha Basti ingredients:	Dose
Makshika (honey)	80ml
Saindhava Lavana	12g
Kalka – Rasna, Ashwagandha, Shatapushpa, Manjishta	10g each
Sneha – Guggulu Tiktaka Ghrita	80ml
Gokshira (cow's milk)	300ml

Table 8: Karma Basti Schedule

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
VASTI	A	A	N	A	N	A	N	A	N	A	N	A	N	A	N
DAY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
VASTI	A	N	A	N	A	N	A	N	A	N	A	A	A	A	A

Discussion

Ama Lakshana like Anga Gaurava, Jihvaliptata, Malabaddhata were noticed. Hence at first Amapachana and Agnideepana were achieved with Dashamoola Qwatha and Chitrakadi Vati. Once Gatra Laaghava, Jihva Aliptata and Agnideepti were achieved, it was assumed as Niramatva.

Raktavaha Srotorodha was identified as the prime cause leading to Asthi and Majja Dhatu Kshaya. The Srothavarodha further aggravated Vata Dosha. This was identified through patient's main complaints like decreased range of movement, pain and stiffness. As basti is the prime treatment in controlling Vata; Karma Basti was planned. Acharya Vagbhata has mentioned that Basti prepared with Ksheera, Ghritha and Tikta Rasa Dravya is ideal for Asthisankshaya¹³. Guggulu Tiktaka Ghritha¹⁴ which is indicated in Sandhi, Asthi and Majja gata Vata; was selected for the same reason. Tikta Rasa is Vata Vardhaka in nature and can be expected as causative of Asthidhatu Kshaya. The Dravya which is Snigdha, Shoshana and Khara is ideal for Asthi Dhatu Vardhana. Unfortunately there is no single drug which has all the above properties together¹⁵. Hence Guggulu Tiktaka Ghritha with Goksheera was used for Basti as it is asthi vardhaka.

Gandha taila was added in Anuvasana Basti keeping in mind its special ability in curing all Vata Vikara¹⁶. Krishna Tila is the main ingredient in Gandha Taila. It has Teekshna, Sookshma and Vyavaayi attributes. By Samskara of Krishna Tila in Asthirajala, it becomes laghu, and in turn, the ability to penetrate and reach minute Srotas increases.

The regeneration phase of AVN includes destruction of subchondral bone supporting the joint cartilage (subchondral fracture) and condensation of the cancellous bone located at the core of the femoral head. Gandha Tailas Bhagna prasadhaka according to Acharya Susrutha and Asthi sthairyakrit¹⁷ according

to Acharya Vagbhata. Hence it might be able to produce stronger subchondral bone preventing collapse of the femur head.

Bastidravaya is expected to reach till sigmoid colon. In the descending colon it stimulates the Inferior mesenteric plexus (sympathetic) supplying those areas. In the light of new researches proving effect of stimulation of sympathetic nervous system in angiogenesis¹⁸, possibility of Basti Dravya stimulating the inferior mesenteric plexus (lumbar outflow) can be thought of. The femoral nerve which is arising from same nerve root levels (L2 - L4) might be stimulated and cause neovascularisation to the femur head.

Laksha guggulu tablet which is advised in Asthiruja, Asthichyuti was used for 15 days keeping in mind the Asthigata Vata.

Hip joint is a weight bearing joint. There was a reduction of 5.5kg of body weight over the course of 45 days. Even this is vital in reducing the mechanical stress on femoral heads.

Depression Score in DASS scoring showed a decrease of 6 points. This may be attributed to the general improvement in the quality of life after treatments. As Depression (vishada) is a Naanatmaja Vyadhi¹⁹; and Basti being the prime treatment of Vata Vyadhi; Guggulu Tiktaka Ghritha Ksheera basti might have aided in improving the mental status of the patient.

Table 9: Harris Hip Score of Left hip joint

Parameters	Before treatment	After treatment	Follow up after 15 days
Pain	Marked pain; serious limitation of activities	Moderate pain; but makes concessions to pain, sometimes obstructs activities	Mild pain, no effect on average activities
Distance walked	Indoors only	10-15 minutes	30 minutes
Activities : shoes, socks	Fitting with difficulty	With difficulty	Able to fit with ease
Public transportation (bus)	Unable to use	Able to use	Able to use
Support	One crutch	Walking stick most of the time	Walking stick only for long walks
Limp	Moderate	slight	slight
Stairs	Unable to climb	Using railing	Using railing
Sitting	Unable to sit comfortably on any chair	On chair for 30 minutes comfortably	For one hour, comfortably

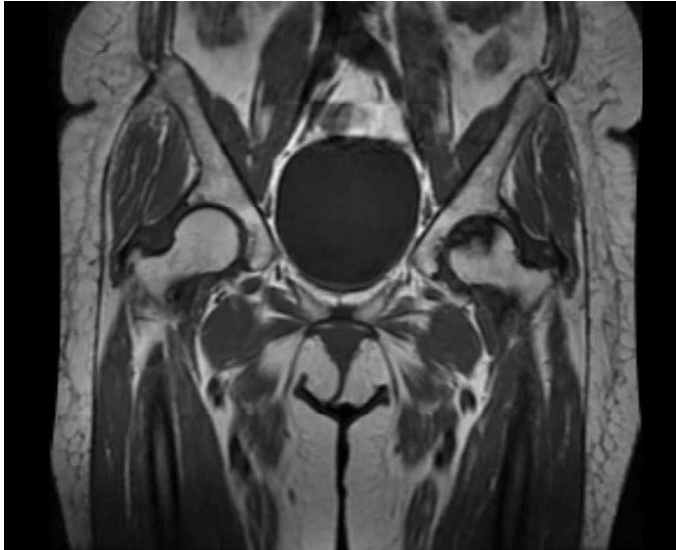
Range of motion at hip joint(in total degrees)			
Flexion	40-45	45-55	55-65
Abduction	0-5	0-5	5-10
Adduction	0-5	0-5	5-10
External rotation	5-10	5-10	5-10
Harris hip score	28.7	52.9	70.5

Table 10: Harris Hip Score of Right hip joint:

Parameters	Before treatment	After treatment	Follow up after 15 days
Pain	Moderate pain	Mild pain	Mild pain
Distance walked	Indoors only	10-15 minutes	30 minutes
Activities : shoes, socks	Fitting with difficulty	Fitting with difficulty	With ease
Public transportation (bus)	Unable to use	Able to use	Able to use
Support	One crutch	Walking stick most of the time	Walking stick for long walks
Limp	Moderate	slight	slight
Stairs	Unable to climb	Using a railing	using a railing
sitting	Unable to sit comfortably on any chair	On chair, more than 30 minutes comfortably	Can sit comfortably for more than one hour
Range of motion at hip joint(in total degrees)			
Flexion	55-65	65-70	70-75
Abduction	10-15	10-15	15-20
Adduction	5-10	5-10	10-15
External rotation	5-10	5-10	10-15
Harris hip score	39.7	63.9	73.2

Table 11: Assessment of Results

SCALES	BEFORE TREATMENT	AFTER TREATMENT	FOLLOW UP AFTER 15 DAYS
HARRIS HIP SCORE(LEFT)	28.7	52.9	70.5
HARRIS HIP SCORE (RIGHT)	39.7	63.9	73.2
WEIGHT (IN KG)	86.5kg	82kg	81kg
VISUAL ANALOGUE SCALE	8	6	4
DASS SCORE			
DEPRESSION	18	16	12
ANXIETY	9	6	6
STRESS	8	6	6



MRI AVN, Left hip



X-Ray AVN, Left hip

Conclusion

The study suggests that Guggulu Tiktaka Ghrita Basti therapy is effective; especially in the early stages of AVN of femur head (Ficat and Arlet Stage 1 and 2) where it might aid in angiogenesis and strengthen the newly formed subchondral bone in the hip joints. Further researches in this disease will help in charting a standard conservative treatment line for Avascular Necrosis of femur head.

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