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Review Article

AVASCULAR NECROSIS OF FEMORAL HEAD – A REVIEW

Sawarkar Gaurav[1*], Suple Yogeshwari[2]

[1]Assistant Professor, Mahatma Gandhi Ayurveda College, Hospital & Research Center, Salod (H), Wardha, India
[2]Assistant Professor, B.M. Ayurveda College & Hospital, Nandanwan, Nagpur, India

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*Corresponding Author: **Gaurav Sawarkar**
[1]Assistant Professor, Mahatma Gandhi Ayurveda College, Hospital & Research Center, Salod (H), Wardha, India

ABSTRACT

Avascular necrosis (AVN) is a disease where there is cellular death of bone component due to interruption of the blood supply. Without blood, the bone tissue dies and the bone collapses. The disease found in age of 35 to 45 yrs. Head of femur is one of the classical site of AVN. In the course of AVN, however, the healing process is usually ineffective and the bone tissues break down faster than the body can repair them. If left untreated, the disease progresses, the bone collapses. All the treatment procedures are cost worthy and prognosis is very poor. Prognosis of AVN may include the duration of disease, chances of complications and more factors. To overcome these factor one may choose the therapy of Indian science i.e. Ayurveda. In Ayurveda, Panchkarma therapy likewise basti and pind sweda along with shaman treatment have miraculous result which can boost the effectiveness of treatment and quality of life of patient also. It is observed that the disease progression is slow down; AVN did not worsen and was maintained. The treatment is cost effective.

Keywords: Avascular necrosis, Age, Modern treatment, Prognosis, Ayurveda treatment.

INTRODUCTION

Avascular Necrosis of the Femoral Head (AVN-FH) refers to a progressive weakening of the knobby head of the thigh bone (femur), resulting in eventual collapse of the bone structure if not remedied in time. This disorder involves disrupted circulation (hence the term avascular), leading to death (necrosis) of bone cells that maintain the solid bone matrix. It is seen in children and young adults in age of 35 to 45 yrs[1], as the result of injuries and various genetic bone disorders, and it may occur later in life as the result of abuse of drugs (corticosteroids and alcohol are the main culprits) and secondary to chronic diseases that affect the vascular system. The disorder is sometimes referred to as aseptic necrosis, meaning that it does not involve a bone infection. It is usually diagnosed after a person complains of pain and restricted motion of the hip, where the pain is worsened with activity and improved by rest; one or both hips can be involved; in cases other than traumatic injury, one side is affected first, and the other may develop the condition later.

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Aim & Objectives

Preventive and cost effective management of Avascular Necrosis of Femoral Head

Literary Review

1) Causes of AVN

Avascular necrosis occurs when blood flow to a bone is interrupted or reduced, which may be caused by:

- **Joint or bone injury.** A traumatic injury, such as a dislocated joint, may reduce the blood supply to a section of bone, leading to bone death. Cancer treatments involving radiation also can weaken bone and harm blood vessels.
- **Pressure inside the bone.** Some medical conditions, such as sickle cell anemia or Gaucher's disease, Haemoglobinopathies, Caisson disease, Hyperlipidemia, SLE, Chronic liver disease, Antiphospholipid antibody syndrome, HIV, Hypercoagulable states (protein C & protein S deficiency) can increase the pressure inside the bone — making it more difficult for fresh blood to enter[1].

Normal mechanism of body:
Bone continuously breaks down and rebuilds old bone is reabsorb and replaced with new bone. The process keeps the skeleton strong and helps it to maintain a balance of minerals[2]. In AVN, healing process is usually ineffective and the bone tissues break down faster that the body can repair them.

2) Risk factor
Risk of developing avascular necrosis can be increased by certain diseases, medical treatments or excessive drinking.

A) Excessive drinking
several alcoholic drinks a day for several years can cause fatty deposits to form in your blood vessels. This can restrict the flow of blood to your bones. The more alcohol you habitually drink every day, the higher your risk of avascular necrosis[3].

B) Medications
Certain types of medications can increase risk of avascular necrosis. Examples include:

- **Steroids.** Taken at high doses and for long periods of time, corticosteroids, such as prednisone, increase your risk of avascular necrosis. Like alcohol, these drugs may increase the amount of fat in your blood, leading to blockage of the small vessels feeding your bones. Doctors often prescribe high doses of corticosteroids for diseases such as vasculitis or lupus[4].
- **Osteoporosis drugs.** People who take bisphosphonates — a type of medicine used to help strengthen bones weakened by osteoporosis — sometimes develop osteonecrosis of the jaw. This risk is higher for people who have received large doses of bisphosphonates intravenously to counteract the damage caused by cancer in the bones[5].

C) Medical conditions
some underlying medical conditions increase risk of developing avascular necrosis. They include:
Sickle cell anemia or Gaucher's disease, Haemoglobinopathies, Caisson disease, Hyperlipidemia, SLE, Chronic liver disease, Antiphospholipid antibody syndrome, HIV, Hypercoagulable states (protein C & protein S deficiency), post trauma[1]

D) Medical procedures
several types of medical procedures increase risk of Avascular necrosis. Examples include:

- Cancer treatments such as radiation
- Dialysis, a process to clean the blood after kidney failure
- Kidney and other organ transplants

3) Complications
Avascular necrosis that goes untreated will worsen with time. Eventually the bone may become weakened enough that it collapses. When the bone loses its smooth shape, severe arthritis can result[6].

4) Imaging tests[7]
many disorders can cause joint pain. Imaging tests can help pinpoint the proper diagnosis.

- **X-rays.** In the early stages of avascular necrosis, X-rays usually appear normal. But X-rays can often reveal bone changes that occur in later stages of the disease.
- **Bone scan.** For a bone scan, a small amount of radioactive material is injected into your vein. This material then travels to the parts of bones that are injured or healing, and shows up as bright spots on the imaging plate.
- **Magnetic resonance imaging (MRI).** MRI scans can show early changes in the bone that may indicate avascular necrosis. MRI uses radio waves and a strong magnetic field to produce detailed images of internal structures.

Table 1: Steinberg's classification of avascular necrosis of the femur head (seven stages)[7]

Stage	Description
0	Normal or non-diagnostic radiograph, bone scan, or MRI
I	Normal radiograph, abnormal bone scan, or MRI
II	Sclerosis & cysts
III	Subchondral collapse, crescent sign
IV	Flattening of hea, normal acetabulum
V	Acetabular involvement
VI	Obliteration of joint space

5) Treatments and drugs
The treatment goal for avascular necrosis is to prevent further bone loss. What treatment you receive depends on the amount of bone damage you already have.

A) Modern Medications
In some people, avascular necrosis symptoms may be reduced with medications such as:

- Non steroidal anti-inflammatory drugs (NSAIDs)- Medications such as ibuprofen (Advil, Motrin, others) or naproxen (Aleve) may help relieve the pain and inflammation associated with Avascular necrosis[8].
- Osteoporosis drugs - Some studies indicate that osteoporosis medications, such as alendronate (Fosamax, Binosto), may slow the progression of Avascular necrosis[9].
- Cholesterol drugs - Reducing the amount of fat (lipids) in blood may help prevent the vessel blockages that often cause avascular necrosis[10].
- Blood thinners - If someone have a clotting disorder, blood thinners such as warfarin (Coumadin, Jantoven) may be prescribed to prevent clots in the vessels feeding bones.

B) Therapy
In the early stages of avascular necrosis-

- **Rest.** Reducing the amount of weight and stress affected bone may slow the damage of avascular necrosis. One may need to restrict the amount of physical activity. In the case of hip avascular necrosis, one may need to use crutches to keep weight off on joint for several months[11].
- **Exercises.** Certain exercises may help you maintain or improve the range of motion in your joint. A physical therapist can choose exercises specifically for your condition and teach you how to do them[12].
- **Electrical stimulation.** Electrical currents may encourage your body to grow new bone to replace the area damaged by avascular necrosis. Electrical stimulation can be used during surgery and applied directly to the damaged area. Or it can be administered through electrodes attached to your skin[13].

C) Surgical and other procedures[7]

Because most people don't start having symptoms until the disease is fairly advanced, may need to consider surgeries such as:

- Core decompression- In this operation, surgeon removes part of the inner layer of bone. In addition to reducing pain, the extra space within bone stimulates the production of healthy bone tissue and new blood vessels.
- Bone transplant (graft) - This procedure can help strengthen the area of bone affected by avascular necrosis the graft is a section of healthy bone taken from another part of body.
- Bone reshaping (osteotomy) - This procedure removes a wedge of bone above or below a weight-bearing joint to help shift weight off the damaged bone. Bone reshaping may allow postponing joint replacement.
- Joint replacement- If diseased bone has already collapsed or other treatment options aren't helping; one may need surgery to replace the damaged parts of joint with plastic or metal parts.

6) Prevention

Following points can also help to improve general health:

- **Limit alcohol.** Heavy drinking is one of the top risk factors for developing avascular necrosis[3].
- **Keep cholesterol levels low.** Tiny bits of fat (lipids) are the most common substance blocking blood supply to bones[3].
- **Monitor steroid use.** Make sure doctor about any past or present use of high-dose steroids. Steroid-related bone damage appears to worsen with repeated courses of high-dose steroids[4].

Treatment in view of Ayurveda

Type	Drugs
Palliative treatment	Kaishor guggul.
	Amalaki rasayan 5 gm + ashwagandha powder 2 gm with Milk
	Cold decoction of sariva & manjishta
	Chandraprabha vati
	Sahachar tail
Panchakarma treatment	Snehan with narayana tail
	Nadi swedana with (dashmula + bala + ashwagandha) decoction
	Avagaha sweda with above decoction
	Panchtikta ghrut kshirbasti (Kalbasti regime) (200 ml milk medicated with panchtikta decoction i.e. guduchi, nimb, patol, vasa, kantkari + 50 ml ajamansras (meat soup)/ mahasneha (ghrut), tail, vasa, majja each 10 ml by drip method
	Pind sweda over both lower extremities & lumber region

OBSERVATION AND RESULTS

Palliative care and Ayurveda medication gives miraculous results in handling the case of AVN. Progression of disease is slow down within few weeks and quality life of the patient is improved but not totally cured. Early diagnosis is very important in the case of AVN. And there is necessitating for the research work on this topic.

CONCLUSION

The avascular necrosis of femur is complex disease. To treat the disease, there are some steps as-etiological factors is played importance role in the progression of disease. First rule out the etiological factor and eradicate it from day today life of the patients. Identification of prakruti and decide the treatment likewise. Follow the basic concepts of the Ayurveda text to treat AVN, which treat complex AVN with simple treatment.

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