CONSERVATIVE MANAGEMENT OF STAGE 2 AND 3 AVASCULAR NECROSIS OF FEMORAL HEAD AND ITS FUNCTIONAL OUTCOME: AN OBSERVATIONAL STUDY

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ABSTRACT

Introduction: The Common Prevailing standard of treatment for stage 2 and 3 AVN is surgical line of management with core decompression and total hip replacement. Conservative management of stage 2 and 3 AVN is a less explored method of treatment. Hence we planned to study conservative management of AVN with muscle strengthening exercises, intermittent skin traction, calcium supplements, VIT D3, zolendronic acid and a good balanced diet, and also its functional outcome.

Material and Methods: An Observational Study was conducted from 2012 to 2018 among patients with stage 2 and 3 AVN. The patients who were not willing for surgical management were offered an alternative option of conservative treatment. Aggressive physiotherapy and traction with Zolendronic acid 5mg i.v. infusion, methylcobalamin supplementation, balanced diet, calcium, iron and were used as a part of treatment regimen.

Results: Overall 23 of the 28 patients treated with conservative method gained complete range of motion with good pain relief. X ray demonstrated recovery in terms of osteoporosis and resolution of acetabular osteophytes with rebuilding of vertical trabeculae in all the 28 patients. Blood Triglycerides and uric acid level were normalised.

Conclusion: Patients with stage 2 and 3 AVN of femoral head were managed conservatively and as assessed with Harris hip score, they showed good functional outcome.

INTRODUCTION

Osteonecrosis of the femoral head occurs in around 20,000 patients every year, mean age of incidence being 38 years. An insult to the vascular supply of femoral head leads to death of osseous tissue termed osteonecrosis. Avascular necrosis of bone can be because of various factors viz. alcoholism, smoking or tobacco in any form, chronic steroid intake, systemic hemovascular diseases like systemic lupus erythematosus, sickle cell disease,
Gauchers disease, even trauma, radiation and caisons disease.\(^1\) Femoral head is the most commonly affected site. The possible postulated causes in our study after detailed analysis of history were chronic corticosteroid use, alcohol intake, chronic tobacco consumption, and dietary factors. Radiological features of osteonecrosis are subchondral cyst, collapse of the articular cartilage, mottled trabecular pattern, fragmentation, sclerosis, subchondral fracture. As high failure rates are noted in joint preserving procedures, with conservative procedures patients can have significant morbidity. We planned this study aimed at evaluating the functional outcome of patients with stage 2 and 3 avascular necrosis of femoral head who were treated conservatively by identifying and avoiding all possible risk factors, introducing a balanced diet in their life, muscle strengthening exercises and supervised physiotherapy, traction and with zolendronic acid 5mg i.v. infusion, calcium, iron and methylcobalamine supplementation.

**MATERIAL AND METHODS**

During the period from 2012 to 2016 in our tertiary health care centre, patients diagnosed with stage 2 and 3 AVN were offered conservative treatment as an alternative to conventional surgical treatment. Total convenient sample size of 28 was taken, among the patients who refused surgical management. Written informed consent was taken from all the patients before enrollment. Institutional ethical committee clearance was taken. Stage 2 AVN was defined as mixed osteopenia and/or sclerosis and/or subchondral cysts, without any subchondral lucency and stage 3 as crescent sign and eventual cortical collapse on radiography, according to Ficat and Arlet et al.\(^6\) Stage 4 AVN patients were excluded from the study. All the patients were treated with the conservative regimen as per planned regimen. Patients were strictly abstained from the tobacco smoking, alcohol consumption, and were put on a carefully structured balanced diet. In the initial 2 weeks, skin traction was used with NSAIDS for symptomatic pain relief. They were started on calcium supplements 1200mg /day along with cholecalciferol (vitD3) and supervised controlled physiotherapy. Two weeks later all the patients received 1 dose of zolendronic acid 5 mg infusion. After that Supervised aggressive physiotherapy was started and with continued oral calcium, vitamin D3 supplementation, and analgesics for two more weeks and patient was discharged with advice to stop analgesics, continue oral supplements and maintain the balanced diet as advised and continue on aggressive physiotherapy. Follow up was done with clinical examination for range of movement, radiograph, and blood investigations to assess the functional improvement and to assess the blood parameters every month until complete functional recovery was achieved. Continuous variables were compared using student t tests and categorical variables were compared using chi square test. A p value <0.05 was considered significant.

**RESULTS**

A total of 28 patients were included in the study, all aged between 25-45 years. 17 had left femoral involvement and in 11 right side was involved. Results were assessed according to Harris hip score. Most of them had the risk factors like steroid intake, regular alcohol intake, tobacco intake. All the patients had history of hip pain and difficulty in sitting crossed leg and in squatting. All the patients were diagnosed to have stage 2 and 3 AVN by clinical examination, radiographs and MRI. All the patients were treated with the conservative regimen as planned. The triglycerides level without Clofibrates touched base line, anemia improved, 21 out of 28 patients showed clinical improvement with respect to reduced need of analgesic dose, improved range of motion at affected hip. 12 patients who had initially high serum triglycerides level touched
baseline. 9 patients having high serum uric acid level at the presentation were normalized. Monthly X ray of both hips and pelvis and both hips lateral view were taken which revealed improvement in lucency and sclerosis of femoral head with reformation of trabecular pattern with improvement in osteoporosis and disappearance of acetabular osteophytes in 22 of them. Rebuilding of vertical trabeculae seen. Sphericity was 15, n 9 phonates like alendronate in 18 f -

DISCUSSION

Avascular necrosis of femoral head as mentioned above is due to vascular compromise due to various contributing factors resulting in endothelial damage. Most commonly affected site is femoral head. The possible causes in this study were corticosteroid use, alcoholism, tobacco. Collapse in the articular cartilage, trabecular pattern getting mottled, sclerosis of femoral head, subchondral cyst and/or even subchondral fracture, fragmentation are the radiological features of osteonecrosis. Radiograph of all the patients hip demonstrates the presence of extensive osteonecrosis of hip and articular congruity of uninvolved side is maintained. There was affected hip segmental collapse radiologically. In this study, rehabilitation has played a vital role. No rest was given and patients were back at work after approximately two months. The main purpose of the rehabilitative regimen is to stretch the contracted capsule, reinforcing the strength of muscles surrounding and attached to hip, promoting aerobic capacity of muscles and remodeling of tissues also promoted. Patient were subjected to comprehensive rehabilitation exercises like rotations, flexion, extension with weights attached to their limbs, weight bearing mobilization with change in their diet and underwent treatment for osteoporosis. These exercises prevent venous stasis which increases intraosseous vascularity. Clinically there was quick improvement in range of motion with drastic improvement in pain and improved limping. Various surgical options for degenerative hip are total hip arthroplasty and osteotomy. Total hip arthroplasty in young individuals should always to be avoided as the life span of THA is limited to 25 yrs. The life expectancy of the implant material is often less with active individuals due to osteolysis around the prosthesis and its loosening and dislocation. The success of revision THA is more variable with 10 year longevity of the device varying from 35-100% with a higher rate of failure in the younger population. Another study by Agarwala et al have reported good outcome in osteonecrosis of femur head with Alendronate therapy by a reduction in the collapse rate and a decrease in the requirement for total hip replacement, compared with the findings of other studies in which treatment was not given. In our case series we have used Zolendronic acid 5 mg, bisphosphonate as single infusion. Treatment when begun in the pre-collapse stages of the disease gives more favourable results. Wu B et al in their case report reported that fat hypertrophy, intravascular coagulation and fat emboli are the pathology behind the avascularity of femoral head and also stated the beneficial effect of bisphosphonates like alendronate in retarding the progression of the disease. Plenk H Jr et. al. studied the pathomorphology in the
avascular process and it is the kind of repair process that determine the time course of AVN. new bone formation increases underneath necrotic area and reactive interface when surrounded by bone marrow edema. The subchondral fracture can apparently undergo reconstructive repair by chondral and membranous ossification by “creeping substitution “can reduce the necrotic area. A case report published in a European journal, by Kyle M et.al. reported the effectiveness of physiotherapy in aspects of functional improvement in a degenerative hip in a female which was treated successfully.12

CONCLUSION
Patients with Grade two and three avascular necrosis of femoral head were managed conservatively in this study with physiotherapy and bisphosphonates and oral supplements shows good outcome result as assessed by Harris hip score.

LIMITATIONS
Further studies with larger sample size are needed to establish the benefits in more detail. More number of studies are needed to address the long term outcome of osteonecrosis considering the disease course, extent of sclerosis. Periodic follow up is essential in monitoring the integrity of femoral head both clinically and Radiologically. Randomized clinical trials are needed to evaluate the efficacy of this treatment in AVN hip.

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REFERENCES
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