

## CASE SERIES

## Experience of Avascular Necrosis of Hip Joint due to Unjustified Use of Steroid: A Case Series Study

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### Abstract

The use of steroids, whether in herbal or synthetic form, for purposes such as weight gain, appetite enhancement, and pain relief is a prevalent practice in Bangladesh. Lacking adherence to pharmacological guidelines, such as those outlined by the American College of Rheumatology (ACR) poses a significant health risk. Steroid-induced osteonecrosis is one in many adverse effects that consuming OTC steroid causes. AVN is characterized by the death of bone tissue due to the prolonged use or high-dose administration of corticosteroids. Commonly affected areas include the hip joints, knees, and shoulders. However, this seemingly innocuous trend has prompted concern, particularly at the Dhaka Specialized Pain Management and Research Centre, where a notable pattern has emerged. From July 2022 to June 2023, a total of 6 (six) reported cases highlighted a worrisome trend of individuals encountering health issues due to the misuse or prolonged use of over-the-counter (OTC) steroids. The majority of the reported cases were male, predominantly in their 2nd to 3rd decade of life. The common thread among these cases was the history of oral steroid ingestion, either in the form of herbal or synthetic compounds. The patients presented with complaints of pain in the hip and groin area, particularly during walking. Diagnostic imaging, including X-ray and MRI of the hip joints, consistently revealed a classical picture of Avascular Necrosis (AVN), underlining the potential association between steroid use and this debilitating condition. The cases reported at the Dhaka Specialized Pain Management and Research Centre serve as a stark reminder of the potential consequences, such as AVN, that can arise from the uninformed or unsupervised use of steroids.

**Keywords:** Osteonecrosis, Hip joint, Steroid, Chronic pain

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## Introduction

Synthetic steroids, commonly known as corticosteroids or glucocorticoids, mimic adrenal gland hormones<sup>1</sup>. Their potent anti-inflammatory and immunosuppressive qualities make them beneficial in treating autoimmune diseases, allergic reactions, and inflammatory disorders like asthma and rheumatoid arthritis<sup>2</sup>. Steroids are helpful when used responsibly and under medical supervision, but long-term or indiscriminate consumption can cause osteoporosis, diabetes, hypertension, and susceptibility to infection<sup>3</sup>.

Tarnishing different herbal/vitamin supplements with steroids are called steroid adulteration. Adulteration with unreported steroids poses an alarming health concern. These herbal/synthetic products are frequently sold as miracle cures for an assortment of illnesses by unregistered vendors. This practice preys upon unsuspecting naïve individuals, particularly the younger demographic, who may seek these substances for reasons such as weight gain, increased appetite, or enhanced sexual performance. Young individuals, often susceptible to societal pressures and desires for quick solutions to perceived physical inadequacies, may be enticed by these marketing strategies. These unregulated formulations do not follow pharmacological guidelines and do not have a prescribed regimen. Consumers rarely consult any licensed physicians or follow any medical protocols. Unregulated long term use of these herbal /synthetic steroids leads to various steroid induced adverse effects.

To make matters worse, older people—particularly those who have recently survived COVID-19 may become dependent on steroids which were initially recommended for short-term use during their illness. Unaware of the potential hazards, individuals suffering from post-COVID complications may extend their use of steroids beyond the suggested duration as soon as they identify that steroid gives them relief from symptoms. Additionally, another group of people who are sufferers of chronic conditions like asthma, COPD, or musculoskeletal pain tends to self-medicate with steroids to alleviate symptoms, irrespective of their exacerbation status. Consequently, both groups frequently experience adverse effects associated with prolonged and unregulated steroid use.

Physicians share some culpability in these scenarios, as they should systematically follow the ACR guidelines, which require continuous monitoring of steroid users to detect any adverse outcomes and ensure safe and effective treatment. The guideline provides exactly framed regulations about how a steroid taker should be followed up, at what interval and even which investigations are to be advised. Nevertheless, a significant number of patients have been lost to follow-up due to the widespread noncompliance with these rules, leading to problems arising from extended abuse.

Despite their efficacy, corticosteroids come with a varied side effect profile, and issues like osteoporosis and avascular bone necrosis can occur with prolonged usage<sup>4</sup>. Till last year we have observed these types of steroid consumers to seek medical help due to steroid induced complications when they have misused after a considerable long time. But recently, we have discovered short-term misusers of steroids also are reporting with a typical picture of pain in groin, buttock and lower back and consequently are diagnosed with avascular necrosis of femoral head or osteonecrosis. In this case series, we are aiming to present such 6 cases to remind us physicians once again the importance of following up of the cases of steroid users before they fall victim of such dire complication like osteonecrosis.

## Research Gap

Developed countries such as the United States possess extensive data on the incidence and prevalence of avascular necrosis (AVN) resulting from steroid usage. The prevalence of steroid-induced osteonecrosis in the United States is believed to be around 10,000 to 20,000 cases per year. Around 75% of individuals diagnosed with steroid-induced osteonecrosis fall between the ages ranges of 30 to 60 years<sup>5</sup>. The mean age of those affected by steroid-induced osteonecrosis is 33 years. The male to female ratio is expressed as a proportion of 7:36. But Bangladesh lacks such national statistics regarding steroid induced AVN. We can only rely upon physician reported cases. In this current paper we are aiming to describe 6 cases of steroid induced AVN of hip joint.

## Study center

Patients reporting at the Dhaka specialized Pain Management and Research Center within July 2022 to June 2023. Actual full name of the patients are not used for privacy issues.

## Reported cases

### Case 1

Our initial incidental case was a 44-year-old engineer from Gazipur, who was nondiabetic, normotension and a body weight of 67 kg. On February 26th, 2023, he presented to our clinic with complaints of right groin and buttock pain that had persisted for the previous six months. The pain manifested suddenly, persisted without interruption, did not spread to other areas of the body, worsened when walking, and alleviated when at rest and with the use of some form of nonsteroidal anti-inflammatory drugs (NSAIDs). Pain did not correlated with change in temperature and swelling. The pain started off as minor and steadily intensified over time. Additionally, he encountered a progressive decline in the mobility and rigidity of his hip joint, which hindered his capacity to carry out everyday tasks. There was no positive family medical history of any noteworthy disease. Physical examinations indicated tenderness and limited range of motion in all directions in the right hip joint area. Further examination revealed positive results for the Trendelenburg Test, Patrick's (FABER) Test, Log-Roll Test, and Lateral Hip Pain Provocation Test. His gait analysis revealed that he was hobbling. During inquiry about past medical history, he reported that he had consumed a 30mg tablet of Xalcort (Deflazacort) while battling a COVID-19 infection and post COVID complications. For around one year, he continued to take the prescribed medicine. He did not have any other systemic disease. Given his complaints, he was recommended to undergo standard diagnostic procedures, which included X-ray imaging of both hip joints, magnetic resonance imaging (MRI), and a Bone Mineral Density (BMD) examination. The X-ray findings indicated osteonecrosis in the femoral heads bilaterally, a diagnosis subsequently affirmed by the MRI and corroborated by the BMD scan. This case highlights the potential complications associated with prolonged steroid use in the context of managing COVID-19 and the importance of thorough investigations to guide appropriate management in such cases.

### Case 2

On April 7, 2023, a service-holder male, age 42, who is normotensive, non-diabetic, and asthmatic, presented to our clinic from Uttara, Dhaka. He had been experiencing pain in his left groin while walking for the previous four months, which had become a significant hindrance to his daily activities. The pain began over time but persistent, spreading to his buttock and the innermost portion of his left leg. It worsened when he moved and improved while resting. There was no documented history of fever or edema associated with the pain. Pain severity progressively increased over time. Upon inquiry, he disclosed that he had been consistently consuming oral methylprednisolone at a dosage of 16mg per day for the past year to cope with his uncontrolled bronchial asthma. The steroid was prescribed by a local physician for just ten days. Since taking corticosteroids alleviated his asthma symptoms, he has maintained that regimen for the past twelve months. An x-ray detected a sclerotic region in the left ischium next to the hip joint. The diagnosis of Avascular Necrosis (AVN) involving the left femoral head was confirmed by further MRI data. Following the diagnosis, the patient was prescribed nonsteroidal anti-inflammatory drugs (NSAIDs), along with calcium and vitamin D, as part of the management plan.

### Case 3

On April 25, 2023, we made our next unexpected discovery; a 40-year-old hypertensive, non-diabetic service holder from Board Bazar, Gazipur. He merely visited at Dhaka Specialized Pain Management and Research Centre with complaints of pain in both hip joints and groin for the previous month. The pain showed typical picture, where it intensified while walking and moving. Since then, the pain has worsened and has developed progressively over time. During his visit to our clinic, we performed a comprehensive physical examination and obtained a detailed medical history. Upon inquiry, he admitted that he had lately commenced a regimen of herbal capsules to augment his appetite, ingesting the capsules twice daily for a duration of three months. Due to our suspicion of a possible link between the pain and the steroid medication, we decided to do X-rays of both hip joints, which uncovered radiographic proof of Avascular Necrosis (AVN). As a result, we suggested performing an MRI of both hip joints and a Bone Mineral Density (BMD) scan in order to more accurately evaluate the scope

and seriousness of AVN. The first stage in management entailed ceasing the use of the over-the-counter (OTC) steroid. Medications recommended for pain management were used to relieve symptoms. A complete treatment plan, dependent on the outcomes of the MRI and BMD scan, was formulated, potentially including pharmacological therapies, physiotherapy, and lifestyle adjustments.

#### Case 4

Our next random diagnosis was a male electrician at his 2nd decade of life, who was normotensive and non-diabetic. He came to our clinic on August 12, 2022 from Bikrampur. He has been experiencing pain in his buttock and groins for the past six and a half months. Following an extensive medical history, he revealed a prior attempt to gain weight by ingesting Megestrol syrup for a period of two months approximately ten months ago, at a dosage of two TSF three times daily. The results of physical examinations revealed tenderness and restricted motion in all directions in the region of the right hip joint. Subsequent analysis confirmed favorable findings for the Trendelenburg Test, Patrick's (FABER) Test, Log-Roll Test, and Lateral Hip Pain Provocation Test. He wasn't suffering from any additional systemic illnesses. Potentially, the patient's vocation as an electrician exacerbated the physical stress experienced by his hip joints. To evaluate the possible occurrence and severity of Avascular Necrosis (AVN) caused by steroid usage, further examinations such as X-ray and MRI of both hip joints were conducted which showed typical pictures of osteonecrosis of hip joints. A thorough treatment plan, including the use of medications, physical therapy, and changes in lifestyle, was developed.

#### Case 5

There was only one female patient reported; Mrs. Jahanara, a 40-year-old hypertensive non-diabetic woman from Demra, Dhaka. She visited the Dhaka Pain Management Center on October 12, 2022, complaining of buttock pain that had been going on for four months and propagating to the inside of both legs. The pain was intense and aggravated by walking or activities that bore weight on the affected area. However, it was minimized by resting or taking nonsteroidal anti-inflammatory drugs (NSAIDs). Over time, the pain became increasingly severe. Additionally, she has

been experiencing severe back pain and general aches for the past six years. She consulted multiple physicians for her persistent suffering. Upon inquiry, she disclosed that she had been self-administering herbal capsules as a form of medication. She had been taking one capsule twice a day for the past year to manage chronic pain conditions, following the advice of an unqualified practitioner. Thorough examinations were performed, resulting in the unexpected discovery of avascular necrosis (AVN) in both hip joints, along with a low bone mineral density (BMD) score. She was prescribed Paracetamol, calcium, and vitamin D. She is currently undergoing routine medical examinations, including regular X-rays, MRI scans of her hip joints, and tests to measure her serum calcium and vitamin D levels.

#### Case 6

Our 2nd case of younger age group was a normotensive and non-diabetic 22-year-old male student from Naogaon, Rajshahi, appeared with a complaint of low back that has been persisting for the past 4 months June 2023. At first, his pain was of low intensity, but it progressively intensified with time and caused him to walk with a limp. The pain is exacerbated by walking or movement of the hip joints and alleviated by rest or nonsteroidal anti-inflammatory drugs (NSAIDs). The examination results indicated that there was limited mobility in both hip joints in all directions due to the use of over-the-counter (OTC) herbal steroids for weight gain during a span of 4 months. Subsequent to this time period, he starting encountering lumbar discomfort while walking. He came to our center on December 6, 2023, seeking medical attention for the previously described problems. During the MRI examination, characteristic signs of Avascular Necrosis (AVN) were detected in the femoral head on the right side. The steroid was promptly withdrawn and Mr. Joy was then prescribed a treatment plan comprising of nonsteroidal anti-inflammatory medicines (NSAIDs), calcium, and vitamin D.

#### Discussion

People who are looking for fast remedies for problems such as weight gain, pain alleviation, or recovering from an illness are easily influenced by marketing strategies that promote steroids as miraculous reme-

dies. Unsupervised utilization of steroids, non-adherence to ACR guidelines, either in natural or synthetic forms, can result in severe consequences, such as avascular necrosis (AVN) and osteonecrosis. Physicians believed they adhered closely to ACR guidelines (rating 8-10/10) for each patient, yet the reality revealed a lower level of compliance<sup>7</sup>. The cases that have been provided show a troubling trend of people developing different health problems as a result of unregulated use of over-the-counter (OTC) steroids. The worldwide prevalence of glucocorticoid-induced avascular necrosis (AVN) ranges from 3% to 38%. The femoral head is the most often affected site of avascular necrosis caused by glucocorticoids<sup>8</sup> which was reflected by every case in our study.

Our collected cases have revealed two instances of young individuals being impacted by avascular necrosis (AVN) of hip joint as a result of unwarranted steroid usage. Around 75% of individuals diagnosed with steroid-induced osteonecrosis fall between the ages ranges of 30 to 60 years<sup>6</sup>, except for those with systemic lupus erythematosus (SLE). The mean age of steroid-induced osteonecrosis is 33, and the sole therapeutic option is surgical intervention<sup>9</sup>.

The presence of only one recorded case in females suggests a predominance of males in steroid-induced AVN. Powell et al., also reported the male to female ratio is 7:3 in steroid induced AVN.

Osteonecrosis of the femoral head typically manifests as unilateral hip discomfort, however it can also cause pain in the groin, thigh, knees, or buttocks. In up to 55% of instances, the hip on the opposite side will be impacted within 2 years<sup>8</sup>. Most of our cases presented with pain in bilateral hip areas and back exacerbated during walk.

The utilization of steroids over an extended period to tackle post-COVID complications has emerged as a significant underlying component. Dr. Jain even coined the term "orthopedic pandemic"<sup>10</sup>. A study was conducted on three individuals who had successfully recovered from COVID-19 after receiving corticosteroid therapy and later developed avascular necrosis (AVN). The patients exhibited symptoms of avascular necrosis (AVN) approximately 58 days following their first diagnosis and treatment for COVID-19<sup>11</sup>

like our first case. Another young female was reported to experience osteonecrosis of both hip joints after 7 months of treatment with oral steroid for COVID-19 infection<sup>12</sup>. The potential link between the use of steroids to treat COVID-19 and the occurrence of hip avascular necrosis (AVN) is a major concern. However, there is currently no apparent connection between the duration of treatment, total amount of medication used, highest daily dosage administered, and the existence of AVN<sup>13</sup>.

The spectrum of employment also suggested that engaging in physically demanding tasks can expedite the progression of AVN.

Avascular Necrosis (AVN) is a progressive and disabling condition, and if left untreated, it leads to subchondral fracture and joint incongruity, often necessitating arthroplasty. To address this, it is imperative to advocate for judicious steroid use under the supervision of healthcare professionals, reinforcing the importance of obtaining prescriptions before initiating any steroid regimen and religiously adhering to guidelines with appropriate followup. Selling steroids over the counter should be curbed to prevent unregulated consumption and its potential adverse effects. Furthermore, promotion of herbal medicines without transparent ingredient information can contribute to unforeseen health risks, as seen in the presented cases. Elaborated national and regional survey and further researches are needed in this south Asian region.

## **Declaration**

### **Ethics approval**

Not applicable

### **Author Contributions**

Conception and development of the idea *AKMA, MMH*

Data collection *MMH, MRB, MZ, EA, MMK*

Data analysis *MMH, MRB*

Writing - Original draft preparation *MMH*

Review & editing *MMH*

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