

## Bilateral avascular necrosis of the femoral head after COVID-19 treatment with simultaneous bilateral total hip arthroplasty: A case report

Alan Jalil Singh-Unzón<sup>1</sup>, Jonathan Achoy-Inzunza<sup>1</sup>, Jesús Edgardo López-Díaz<sup>1</sup>, Oralia Sandoval-Guerrero<sup>2</sup>, Joseph Varon<sup>3</sup>, Joel Murillo-Llanes<sup>4,5</sup>, Adrian Canizalez-Roman<sup>4,5</sup>, Dalia Magaña Ordorida<sup>5</sup>, Nancy Godoy Rodriguez<sup>6</sup>, Francisco Javier Castro-Apodaca<sup>5,6</sup>

### Abstract

**Avascular necrosis of the femoral head (ANFH) is a multifactorial pathology, and one of its etiologies is the use of steroids to treat coronavirus disease 2019 (COVID-19) infection. Imaging studies diagnose ANFH. During and after the**

**COVID-19 pandemic, an association was found between the onset of ANFH and the use of steroids as a treatment. The treatment of avascular necrosis is arthroplasty, which can be performed unilaterally or bilaterally in a single surgical session.**

**Keywords:** Avascular necrosis of the femoral head, COVID-19, corticosteroids.

### Introduction

Avascular necrosis (AVN) of the femoral head is a multifactorial pathology. Major risk factors include trauma, such as dislocation and fracture of the femoral epiphysis, as well as infection, steroid use, dys-

lipidemia, and alcoholism. The incidence of AVN of the femoral head in patients with a history of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has been previously published. The relationship between the presence of AVN and SARS-COV-2 infection is not well defined. An association between the use of high-dose corticosteroids to treat the disease and its correlation with AVN has been demonstrated. (1,2) Simultaneous total hip arthroplasty (STHA) has several advantages over two-stage surgery: lower cost, shorter hospital stay, a single dose of anesthesia, and better and faster return to daily activities. (3)

This report presents the first simultaneous total hip arthroplasty successfully performed in a patient with bilateral AVN of the femoral head secondary to treatment with high-dose corticosteroids for coronavirus disease 2019 (COVID-19) in Mexico.

### Ethical issues

This research considered no risks and violated no fundamental principles, as it was conducted using existing records and medical records/electronic files. The confidentiality of the information was maintained. Thus, the researcher was the only person authorized to handle the data obtained exclusively for the purposes of the study, as approved by the Ethics Committee.

<sup>1</sup> Traumatology and Orthopedics, Culiacán General Hospital, Culiacán, Sinaloa, Mexico

<sup>2</sup> Research Department, Culiacán General Hospital, Culiacán, Sinaloa, Mexico

<sup>3</sup> The University of Houston College of Medicine, Houston, Texas, USA

<sup>4</sup> Research Department, Women's Hospital, Culiacán, Sinaloa, Mexico

<sup>5</sup> Autonomous University of Sinaloa, Mexico

<sup>6</sup> Civil Hospital of Guadalajara "Fray Antonio Alcalde", Guadalajara, Jalisco, Mexico

### Address for correspondence:

Dr. Francisco Javier Castro-Apodaca  
Civil Hospital of Guadalajara "Fray Antonio Alcalde",  
Guadalajara, Jalisco, Mexico

Email: francisco.castroapodaca@uas.edu.mx

<https://orcid.org/0000-0002-1857-1595>

## Case presentation

A 42-year-old male patient who presented to the emergency department in March 2021 with severe respiratory distress and suspected COVID-19 infection underwent rapid testing, which was positive, followed by polymerase chain reaction (PCR) testing of a nasopharyngeal specimen. During his hospitalization in the COVID-19 patient area, he required intubation due to oxygen desaturation, and it was decided to transfer him to the COVID-19 intensive care unit, where he was started on enoxaparin and intravenous dexamethasone. After 15 days of hospitalization, the patient's condition improved clinically, and it was decided that he should be discharged. Subsequently, he returned to the emergency room with severe bilateral coxalgia, predominantly on the right side, with a progressive increase in intensity and complete loss of ambulation to the point of bedriddenness. In the physical examination performed by a traumatologist and orthopedic surgeon, the patient was found to be alert, cooperative, and oriented in a wheelchair, with severe pain in the sitting position at 9/10 on the visual analog pain scale (VAS), unable to tolerate the supine position, and decreasing to 6/10 in the prone position. He had a very limited active and passive range of motion due to severe pain, with a predominance of external and internal rotation block on the right side, with a 2-cm shortening of the right side relative to the left. He had a full range of motion in the distal joints of both extremities with no neurovascular changes. Surgery was scheduled for December 10, 2022, with a modified 5-point Harris Functional Scale. (4) Anteroposterior radiographs of both hips were requested: both femoral heads showed deformity consistent with AVN, loss of joint space, and shortening of the right side (**Figure 1**). Due to the current condition and history, we did not request a magnetic resonance imaging scan. Given the diagnosis of AVN, it was decided to perform simultaneous bilateral total hip arthroplasty using the Watson-Jones lateral decubitus approach, starting with the right side and then the left (**Figure 2**), after application of tranexamic acid 1 g intravenously 30 minutes before incision and during wound closure. The procedure took 4 hours and 20 minutes, and there was 700 cc of bleeding. Two days after surgery, he reported mild pain on a VAS of 2/10 and began a program of rehabilitation and early ambulation with a walker on day one. He was discharged after 72 hours due to

improvement and did not require a blood transfusion. He was followed up 10 days later for suture removal, 4 weeks later for ambulation with a walker without assistance from a relative, with a modified Harris scale of 54 points, at 6 months with 76 points, and 1 year with a scale of 90, already performing his daily and work activities without complications.

## Discussion

With the onset of the global COVID-19 pandemic in 2020, there has been a significant increase in the incidence of side effects from the use of high-dose corticosteroids, either due to inappropriate use or the need for prolonged high-dose treatment for complicated diseases (5,6). As a patient in his forties with no comorbidities, he met the criteria for surgery with simultaneous bilateral joint replacement. There is little evidence in the literature to differentiate the risks in older and younger patients. However, simultaneous total hip arthroplasty can reduce overall bleeding, hospital stay, with a single surgical procedure, shorter rehabilitation time, and patient and institutional costs, among other benefits. (3,7-9) Regarding complications, there is no evidence of an increase in deep vein thrombosis, thromboembolism, or overall mortality in these patients compared to two-stage replacement. (10,11) Some investigators have shown an increase in postoperative complications in patients with a recent diagnosis of SARS-COV-2 infection, especially in the first 6 months after symptom onset. (12-14) Therefore, the prothrombotic nature of the disease must be taken into account when making decisions and scheduling surgery.

## Conclusions

Simultaneous bilateral total hip arthroplasty is an option that should be considered in the treatment of patients with bilateral coxarthrosis, as it has high success rates and a lower percentage of complications compared to two-stage arthroplasty, provided that the selection and individualization of cases allow it, as was the case in our clinical study.

We believe that the association of AVN of the femoral head in young patients secondary to the use of high-dose steroids in the treatment of moderate to severe COVID-19 infection will increase substantially in the population, with high rates of work disability and high healthcare costs.

**Figure 1.** Anteroposterior hip radiograph showing deformity of both femoral heads, with radiologic data consistent with avascular necrosis of the femoral head



**Figure 2.** Postoperative anteroposterior hip radiograph showing bilateral hip replacements



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