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Hyperbaric oxygen therapy for the treatment of pain in the osteonecrosis of the femoral head: a case report

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Abstract

Introduction

Femoral-head avascular necrosis (FHN) may be caused by local oxygen demand and inadequate supply balance. Etiopathogenesis includes hypercoagulation predisposition and microthrombosis due to, among others, autoimmune diseases or prolonged use of corticosteroids (CSs)[1]. With Hyperbaric-Oxygen-Therapy (HBOT), 100% oxygen is delivered in a pressure-controlled room (>1.5 ATA), yielding a significant PaO2 increase in tissues with compromised circulation, that allows pain relief, neoangiogenesis, and inflammatory response modulation [2,3].

We report a case of HBOT treatment for FHN pain and symptoms management in a systemic lupus erythematosus (SLE) patient under chronic use of CSs.

Case Presentation

After SLE diagnosis, a 24-year-old female received three bolus doses of methylprednisolone 1 gr iv and oral methylprednisolone 60 mg daily, tapered over two years. After six years of SLE inactivity, the patient experienced severe groin pain (NRS=8) severely compromising ambulation and daily activities. Following a negative X-ray, a pelvic MRI showed a Steinberg IIC stage avascular necrosis of the left femoral head with diffused edema.

The patient underwent 40+20 (2.5-2.2 ATA) 90-minute HBOT sessions once daily, five days a week, along with magnetotherapy and a protected weight-bearing regimen.

Results

After the first 40 HBOT sessions, the patient reported significant pain reduction in the left hip (NRS=3) but the emergence of new symptoms in the right one. Two months after the first HBOT cycle, a follow-up MRI revealed almost complete resorption of the left hip edema. However, the right hip showed a new centimetric necrotic area with associated edema, likely due to the increased load. Hence, the patient underwent a further 20 HBOT sessions.

After 60 HBOT sessions, the patient gradually stopped using crutches and resumed load-bearing with complete regression of pain in the right hip (NRS=0) and almost complete in the left (NRS=2).

Discussion

FHN diagnosis at early stages may be challenging, as negative X-ray findings may underestimate FHN presence.

In case of persistent pain, an MRI is imperative to allow for a diagnosis. Among FHN patients, the emergence of newly located symptoms imposes research for potential multifocal involvement.

Avascular necrosis is mostly seen and treated by orthopedics. Nonetheless, pain is an early symptom, and pain physicians may often be involved. The latter are anesthesiologists whose unique curriculum includes

HBOT training. Given the rationale and efficacy of HBOT in FHN management, the role of pain physicians in its treatment is crucial.

Conclusion

This case report shows that HBOT can be a valuable treatment option for FHN in its early stages. It is effective for pain control and restoring function and can replace or postpone surgery.

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