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RECOGNITION AND MANAGEMENT OF FAT EMBOLISM AFTER ORTHOPEDIC SURGERY: A CASE REPORT

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Abstract

Patients who have undergone surgery must be closely monitored for the potential development of Fat Embolism Syndrome (FES).This case report present a 45-year-old patient who had implant removal a year after lower limb fracture repair. The patient was stable following surgery at first, but on the second day, soon after ciprofloxacin was administered, the patient experienced a high fever, chest pain, shivering, and sweating. He was treated with heparin and an acute coronary syndrome protocol after the initial treatment for a suspected medication reaction proved ineffective. The patient gradually stabilized after vomiting a yellow, greasy material. This case emphasizes the importance of being vigilant in identifying FES in postoperative patients, since prompt identification and supportive care are essential for positive results.

INTRODUCTION

Fat embolism syndrome (FES) is a rare but serious complication following liposuction or orthopedic fractures, in which fat globules enter the bloodstream and obstruct vital vessels, leading to impaired blood flow and possible cerebral or pulmonary infarction.[1].Fat droplets in the peripheral and pulmonary microcirculation, with or without clinical consequences, are a common and typically benign phenomena known as FES[2]. This case, which was reported in hospital's orthopedic ward, is noteworthy because the patient experienced fat embolism symptoms while receiving postoperative medicine. It emphasizes how crucial it is for medical personnel, especially those involved in orthopedic surgery, to maintain a high degree of clinical alertness. To guarantee the best possible patient results and avoid potentially dangerous complications, fat embolism must be identified early and treated promptly.

CASE REPORT

Mr. M. Haider, 45, had surgery on August 26, 2024, to remove an implant because he had a history of femur fractures one year prior. After surgery, the patient was moved to the medical ward for post-

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operative medicine. The patient's vitals were stable.The following post-operative medications were given: injections of diclofenac sodium, tramadol, co-amoxiclave 1.2g, and ciprofloxacin. After receiving IV medicine on the second day at 6 p.m., the patient had fever, perspiration, chest pain, and shivering. The patients were given injections of avil. The patient had nausea and chest pain while receiving injections of avil and hydrocortisone. The patient became stable after receiving an injection of heparin and ACS(AcuteCoronarySyndrome) protocol. Reactions can not be associated with infusion ciprofloxacin because patient was receiving 3rd dose of ciprofloxacin..

Patient information

The patient was a 45-year-old man with no notable genetic, familial, or medical history. He had a lower limb fracture that required surgical stabilization a year earlier as shown in **Figure 1**, but the procedure went well. He was initially stable following his return for a standard implant removal. However, he experienced a rapid fever, chest ache, shaking, and perspiration on the second day. The patient led a generally healthy lifestyle and had no psychological risk factors. To ensure confidentiality, all identifying information has been eliminated.

Clinical findings and Medications

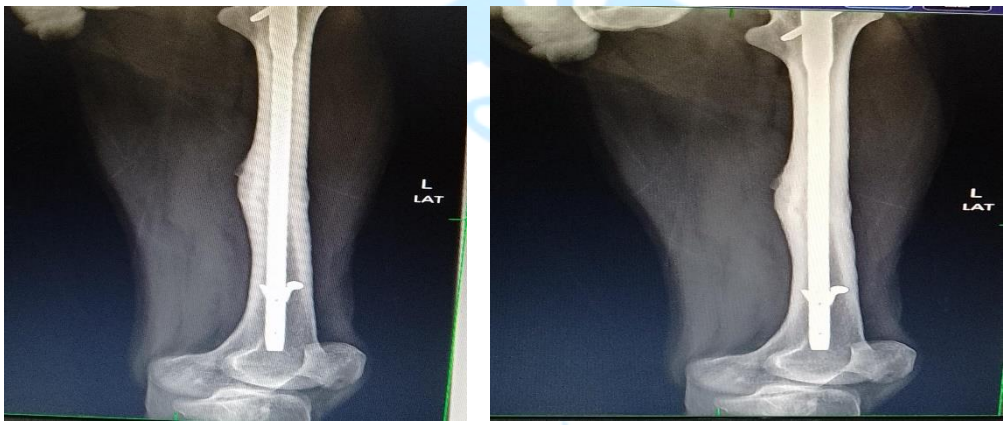


Figure 1: Pre-operative films of the left femur with implant

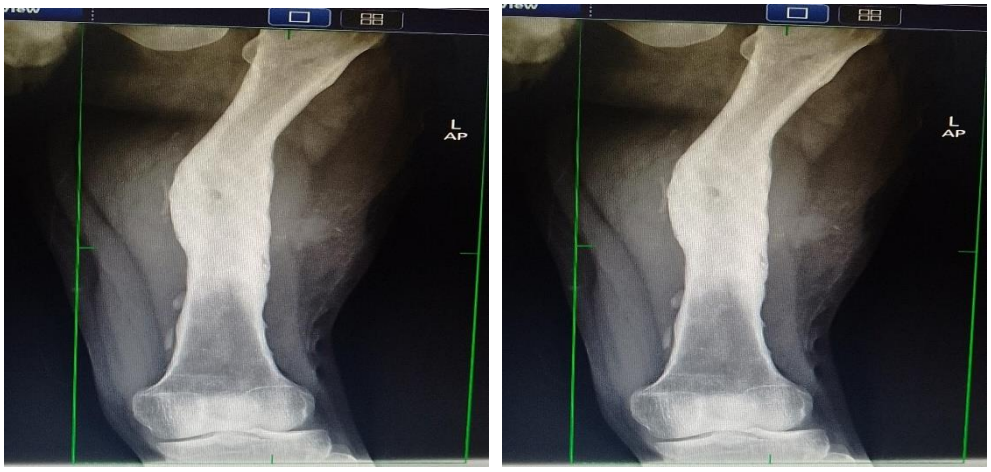


Figure 2: Post-operative films of the left femur after Implant Removal

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Table 1. Post-Operative Medications given to the patient

Day	Time	Medicine	Stable
First day	6pm	Ringer lactate 1000ml	Yes
First day	6pm	Inj Diclofenac sodium	Yes
First day	5pm	Infciprofloxacin 200mg	Yes
First day	5pm	Inj co amoxiclav 1.2g	Yes
First day	10pm	Inj Tramadol	Yes
Second day	6am and 6 pm	Ringer lactate 1000ml	Yes
Second day	6am and 6pm	Inj diclofenac	Yes
Second day	6am and 6pm	Inj co amoxiclav 1.2g	Yes
Second day	6am and 6pm	Inf ciprofloxacin 200mg	Shivering, fever, chest pain, sweating
Second day	6am and 6pm	Inj Pheniramine 25mg01ml Inj Hydrocortisone 250mg	No improvement in symptoms

Table 2. Pharmacologic Management of Post-operative symptoms

Medicine	Dose	Route of administration
Injection Heparin 500IU/1ml	1ml	IV
Tablet Aspirin 75mg	State 300mg	Oral
Tablet Clopidogrel 75mg	State 300mg	Oral
Tablet Captopril 50mg	State dose	Oral
Tablet Nitroglycerin	State 0.5mcg	Sublingual
Oxygen Perfusion	1 litre ,Low flow	Nasal oxygen mask

Ethics statement

This study was conducted in compliance with the principles of the Declaration of Helsinki. Written informed consent for publication of the research details and clinical images was obtained from the patient.

DISCUSSION

This case study emphasizes the challenge that is to diagnose fat embolism in orthopedic patients who have recently had surgery. The present case report showed that after the implant was removed as shown in **Figure 2**, the patient seemed stable at first, but on the second postoperative day, he started experiencing acute symptoms, such as fever, chest pain, shaking, and sweating. Given his tolerance to prior dosages, a medication reaction, especially to ciprofloxacin, is less expected because these symptoms did not improve with antihistamines or steroids as shown in **Table 1**. The probability of fat embolism or a similar thromboembolic event is supported by the patient's improvement after starting Injection Heparin(Anticoagulant) and the ACS treatment(presented in **Table 2**).

Fat embolism syndrome (FES), first described by Zenker in 1861, is a rare complication of long bone fractures characterized by neurological, pulmonary, dermatological, and hematological symptoms. incidence ranges from 0.5% to 11%, with mortality up to 20%. FES is more common in polytrauma patients at level I trauma centers, and management relies on early diagnosis, high ventilation, and supportive care[3]. Fat Embolism Syndrome (FES) generally appears between 24 to 72 hours following the initial injury, whether it be trauma or an orthopedic procedure. Patients affected by this condition typically exhibit a classic triad of

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symptoms: hypoxemia, neurological disturbances, and a petechial rash. Respiratory dysfunction is common and can range in severity from mild symptoms, such as dyspnea and/or tachypnea, to severe manifestations that resemble Acute Respiratory Distress Syndrome [4].

Young age,closed fractures ,multiple injuries and conservative management of long bone fractures all increases the risk of developing FES[5].

Biochemical theory, as outlined by Kumar et al., posits that fat embolism syndrome (FES) arises from fat emboli in the lungs. These emboli stimulate the secretion of lipase through the hydrolysis of glycerol and free fatty acids, which subsequently causes dysfunction in pneumocytes and the pulmonary endothelium, ultimately resulting in acute respiratory distress syndrome (ARDS) [6]. Bulger conducted a decade-long investigation at a prominent trauma center to further clarify FES, identifying 27 patients with the fat embolism syndrome (FES) , of whom 12 (44%) required mechanical ventilation [7].

Fat embolism syndrome does not have a specific treatment; instead, prevention, early detection, and effective symptom management are critical. Maintaining appropriate oxygenation and ventilation, stable hemodynamics, blood products when clinically necessary, hydration, prevention of deep vein thrombosis and stress-related gastrointestinal bleeding, and nutrition are all components of supportive care. Pharmacotherapy aims to lower morbidity and avoid problems. The cornerstone of treatment for fat embolism syndrome that manifests clinically is supportive care[8].All patients should undergo early femur fixation as it helps minimizes pulmonary complications and decreases overall health care expenses[9]. It is safer for the lungs to use external fixation or plates and screws rather than inserting a metal rod into the bone. A tiny hole must be made in the bone canal when a rod is inserted, which may allow more fat or air to enter the bloodstream. Emboli are more likely as a result. As a result, lung damage and complications are reduced when using external fixation or plate-and-screw techniques[10]. Corticosteroids (methylprednisolone) can help prevent fat embolism syndrome in high-risk patients, especially when multiple risk factors are present[11].

This case study highlights the necessity for medical professionals to keep a high index of suspicion for fat embolism syndrome in patients recuperating from orthopedic surgeries, particularly in cases where postoperative progress seems straightforward at first.

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