

## CASE REPORT

### Intensive Care Management of Complicated Case of Fat Embolism Secondary to Femur Fracture

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#### ABSTRACT

Fat embolism syndrome (FES) is an inflammatory cascade, affecting multi-organs, potentially leading to serious complications in orthopedic patients, especially after femur fractures. It includes hypoxia due to pulmonary dysfunction, neurological and psychiatric changes, fever, tachycardia, petechial hemorrhages, thrombocytopenia, and anemia. Due to advancement in intensive care and supportive management and surgical techniques, like intramedullary reaming, the incidence of fat embolism syndrome has become only 0.5 percent. This report presents case of a 22-year-old male with femur fracture due to road traffic accident, with diagnosis of fat embolism syndrome, wound infection, pneumonia and deep venous thrombosis which was managed successfully.

**Key Words:** *Fat Embolism Syndrome (FES), Femur Fracture, Intensive Care.*

**How to cite this:** Kashif S. Intensive Care Management of Complicated Case of Fat Embolism Secondary to Femur Fracture. *Life and Science*. 2021; 2(1): 35-36. doi: <http://doi.org/10.37185/LnS.1.1.115>

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#### Introduction

Fat embolism syndrome (FES) is a life-threatening condition, mostly occurs after long bone fracture, especially femur fracture.<sup>1</sup> The incidence of FES has been reported to occur in 0.5 to 11 percent of patients with long bone fractures, classically characterized by triad of symptoms including respiratory failure, mental status changes and petechial rash.<sup>2</sup> Fat that embolizes within capillary beds causes direct tissue damage and induces a systemic inflammatory response resulting in multiple life threatening complications.<sup>3</sup>

This case report is unique because it describes management of patient, with bilateral pneumonia, deep vein thrombosis (DVT) and fat embolism syndrome secondary to femur fracture.

#### Case Report

A 22-year-old male brought in emergency department with history of road traffic accident, resulted in shaft of right femur fracture. On arrival

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*Funding Source: NIL; Conflict of Interest: NIL*

*Received: Apr 20, 2020; Revised: Aug 18, 2020*

*Accepted: Oct 19, 2020*

drowsy but arousable GCS-12/15, pale looking, with following findings on examination and investigations

VITAL: HR-110/min

BP- 90/55mmHg

SPO2- 91% at air

Temp- 100F

Chest- Harsh vesicular breathing bilaterally

- ECG: Sinus Tachycardia: Hypokalemic change
- Chest x-ray: Normal
- ECHO: Normal

**Table 1: Laboratory parameters**

Hb	9.7
TLC	17.1
PLT	126
Cr	107
ALT	132
Na	138
K	2.9

Open reduction and internal fixation right femur fracture (Fig 1) was done after pre-operative optimization, patient had continuous fever of 100-101°F in the post-operative period despite multiple broad-spectrum antibiotics. On the 5<sup>th</sup> post-operative day, patient had pain at surgical site with oozing from the wound, due to which debridement was done twice. He started having cough, HRCT chest showed bilateral pneumonia (Fig 2). On the 28<sup>th</sup> post-operative day, patient developed swelling of



**Fig 1: X-ray-femur fracture**



**Fig 2: HRCT-Chest**

right thigh and DVT was diagnosed in femoral and popliteal veins on ultrasound Doppler. On the 50<sup>th</sup> post-operative day, patient was discharged with resolving pneumonia and DVT, with healthy wound.

### Discussion

FES is mainly a systemic manifestation of embolized fat in the microcapillaries, associated with orthopedic trauma, with highest incidence in closed, long bone fractures of the lower extremities, particularly the femur.<sup>4,5</sup> The risk of FES is highest between ages 10 to 40 years and greater in men than women.<sup>6</sup> There are non-orthopedic causes of FES, which are rare and include pancreatitis, sickle cell crisis, alcoholic liver disease, bone marrow harvest or transplant, and liposuction. In the orthopedic and trauma literature, the incidence of FES is ranged between <1% to >30% of cases.<sup>7</sup>

Prevention of complications and early stabilization is the main stay of treatment. As there are currently no disease-specific treatments for FES, heparin and corticosteroids are proposed as treatments but they have not reliably demonstrated improvement in morbidity or mortality.<sup>8</sup> Systemic anticoagulation has been considered as a potential therapy for FES. Heparin acts by stimulating the lipase activity, that accelerate the clearance of lipids from circulation, but the resultant increase in free fatty acids may exacerbate the underlying inflammatory cascade.<sup>9</sup>

Management with anticoagulants in trauma patients and patients with preexisting hematologic abnormalities may prove harmful. There are limited studies to support the routine use of heparin or other anticoagulants in FES. Systemic use of corticosteroids in the management of fulminant FES is helpful. There is insufficient data to support routine use of corticosteroids for the management of FES.<sup>10</sup>

### Conclusion

Fat embolism syndrome (FES) occurs after long bone fractures, complicated with pneumonia and deep venous thrombosis. It requires prompt management by a multidisciplinary team in an intensive care unit.

### Consent

Written informed consent was obtained for the presentation of the case.

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