Fat Embolism


**Key Points:**
- **Fat embolism syndrome** is a clinical diagnosis with non-specific / insensitive diagnostic tests
- **Suspect** fat embolism syndrome with appropriate signs and underlying risk factors
- **Treatment** is supportive

**Fat embolism:** fat in the circulation causing embolic phenomena with or without clinical significance

**Fat embolism syndrome:** above with clinical pattern of symptoms/signs; 24-72 hrs after insult:
- Petechial rash: head, neck, anterior thorax, subconjunctiva, axillae – 20-50% of cases
- Respiratory – tachypnea, dyspnea, b/l crackles, hemoptysis, bilateral infiltrates, ARDS
- Neurological signs – confusion, drowsiness, coma – may resolve
- Fever
- Cardiovascular: tachycardia, hypotension
- Retinal changes (fat or petechiae - Purtscher’s retinopathy)
- Jaundice
- Renal (anuria or oliguria)
- Hematological
  - Thrombocytopenia (>50% decrease)
  - Anemia (>20% decrease)
  - ESR >71 mm/h
  - Fat macroglobulemia

**Diagnosis:** none are specific
- Labs above
- Fat globules: non-specific and insensitive
- CXR: “snow storm appearance” (middle and upper lobe)
- Lipase and phospholipase A2
- PA catheter: rise in PA pressures or sampling for fat – poor sensitivity
- BAL: macrophages with fat – poor sensitivity
- Head CT: usually negative; edema and nonspecific infarcts
- TEE: embolic showers intra-operatively

**Predisposing conditions – incidence**
- Trauma / orthopedic surgery – lower limb and pelvic fractures, closed fractures
- Mechanical disruption of adipocytes: soft tissue injury, liposuction, hepatic failure
- Mechanical disruption of bone marrow: harvest or transplant
- Exogenous fat: TPN, propofol, lymphography
- Miscellaneous: sickle cell crisis, burns, pancreatitis, altitude sickness, extra-corporeal circulation
- Incidence up to 20% with long bone fractures, but unclear gold standard, based on case series, and need to distinguish fat embolism from clinical syndrome

**Treatment** – mortality estimated 5-15% - supportive care
- Heparin: no clear role; theoretically clears lipemic serum by stimulating lipase; data contradictory in patients with high risk of bleed from underlying trauma
- Prophylactic steroids: data not clear
- Prevention: external surgical fixation, certain tools, prevention of hypovolemia