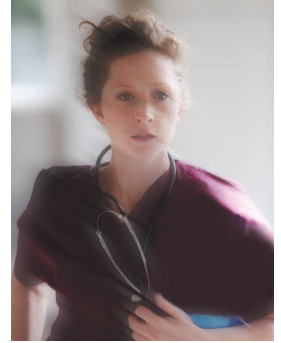


Fat embolism threatens a patient's life



● Quick action by a nurse helps an ortho patient to a better outcome.

By Dorothy Moore, DNP, RN, CCRN

JORGE VALENCIA, age 27, is admitted to the medical-surgical unit after surgical reduction and fixation of a displaced, compound right femoral fracture—an injury he sustained in a car accident the day before. His nurse, Sara, obtains his vital signs when he arrives on her unit: blood pressure (BP) 125/68 mm Hg, heart rate (HR) 101 beats/minute (bpm), respiratory rate (RR) even and unlabored at 16 breaths/minute, oxygen saturation (O₂ sat) 100% on room air, and temperature 99.5° F (37.5° C).

History and assessment hints

Sara notes that Mr. Valencia is generally healthy. Pre-surgical laboratory tests show a hemoglobin value of 14.2 g/dL, hematocrit 42.6%, platelets 167,000/mcL, and an erythrocyte sedimentation rate (ESR) of 12 mm/hour.

Sara teaches Mr. Valencia how to use his patient-controlled analgesia (PCA) pump and makes sure the call light is available.

Call for help

Two hours later, Mr. Valencia seems confused about his PCA. Sara finds his RR has increased to 24 breaths/minute and his HR to 118 bpm.

When she returns 15 minutes later to reassess him, he's delirious and waving his arms in the air. She notices petechiae on his axillae and sees that his skin has turned pale. Also, his RR has increased to 32 breaths/minute and his HR has climbed to 130 bpm, while his BP has dropped to 90/57 mm Hg and O₂ sat to 86%. What's more, his temperature has spiked to 102.4° F (39° C). These worrisome changes spur Sara to call the rapid response team (RRT).

On the scene

When the team physician arrives at Mr. Valencia's bedside, he orders new lab work, arterial blood gases (ABGs), and a STAT portable chest X-ray. ABG results reveal hypoxemia, with a partial pressure of arterial oxygen (PaO₂) of 58 mm Hg. The new lab work shows a markedly decreased platelet level (110,000/mcL) and a hemoglobin decrease to 11.2 g/dL. The chest X-ray shows bilateral infiltrates. These findings suggest fat embolism syndrome (FES)—a potentially fatal complica-

tion of traumatic injury or surgery.

The RRT places Mr. Valencia on a nonrebreather oxygen mask, administers an I.V. fluid bolus of normal saline solution, and transfers him to the intensive care unit (ICU), where he receives aggressive fluid resuscitation with an isotonic solution and supplemental oxygen to correct hypoxemia.

Outcome

In the ICU, Mr. Valencia undergoes continuous pulse oximetry and ECG monitoring, frequent neurochecks and respiratory assessments, and careful surveillance of his vital signs, ABGs, hemoglobin, platelet, and ESR values. Within a few days, his signs and symptoms clear and his neurologic status returns to baseline.

Education and follow-up

Subclinical fat emboli commonly result from trauma and usually are harmless. But with FES, a fat embolism lodges in the pulmonary tree. In approximately 90% of cases, FES stems from traumatic fracture or surgery involving a long bone, such as the femur. FES has a mortality of about 10%.

Early recognition is crucial. Hallmarks of FES include the triad of neurologic deterioration, respiratory distress, and a petechial rash. However, not all three components need be present; petechial rash occurs in only 20% to 50% of cases.

To be diagnosed with FES, the patient must have at least one major criterion and four minor criteria. *Major* criteria include axillary or subconjunctival petechial rash, hypoxemia (PaO₂ below 60 mm Hg on an FiO₂ of 0.4), central nervous system depression disproportionate to hypoxemia, and pulmonary edema. *Minor* criteria include tachycardia, fever above 101.3° F (38.5° C), a sudden hemoglobin decrease, elevated ESR, renal dysfunction, and thrombocytopenia.

Sara's astute assessment of the FES triad enabled Mr. Valencia to make a full recovery. ★

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