Unilateral Diaphragm Paralysis in Incomplete Cervical Spinal Cord Injury

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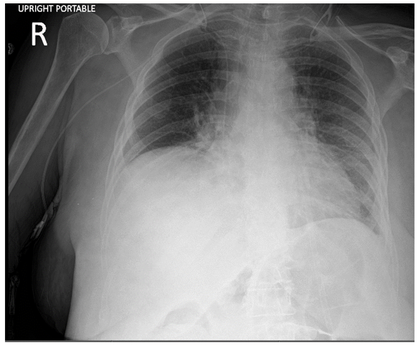
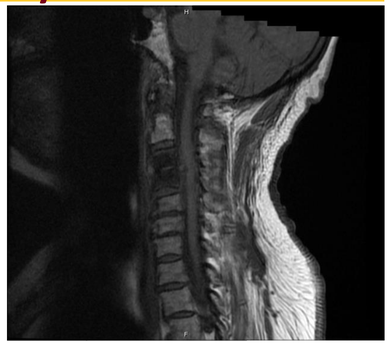
An SCI patient with C3-4 discitis developed unilateral diaphragmatic paralysis.

- A 69-year-old female developed incomplete tetraplegia (C1 AIS D) due to spinal cord injury (SCI) from C3-4 discitis with disc protrusion and epidural abscess
- Admission chest radiograph showed a new right hemidiaphragm elevation, without dyspnea or hypoxia. Three days after C3-4anterior discectomy and fusion, she became hypoxic with evidence of atelectasis, small pleural effusions, and mild pulmonary edema on computed tomography (CT).
- Her hypoxia intermittently worsened, primarily due to fluid overload and myocardial ischemia, becoming most severe one month after surgery.
- Auscultation revealed poor right lung air flow and fluoroscopic sniff test confirmed right hemidiaphragm paralysis with paradoxical elevation during inspiration.
- She was managed with high flow oxygen, BiPAP and aggressive diuresis. Oxygen was weaned off and after two weeks, right lung air flow had improved.

Diaphragmatic paralysis should be considered early in the differential diagnosis of a hypoxic patient with high cervical spinal cord injury.





Chest fluoroscopy, (Sniff test of Hitzenberger)

Diagnosis:

- Chest radiograph or CT: insensitive and do not evaluate respiratory motion.
- Ultrasound and fluoroscopy, (Sniff test of Hitzenberger) can assess motion.
- Pulmonary function tests reveal a restrictive process but cannot specifically identify diaphragm dysfunction.
- Diaphragm electromyography and phrenic nerve stimulation: high sensitivity and specificity but carry risk of pneumothorax and discomfort.

There is limited information about Diaphragmatic Paralysis in SCI patients and may lead to pulmonary complications.

- Diaphragm paralysis is an underdiagnosed condition with unknown incidence.
- Unilateral denervation may result from asymmetric impairment of the spinal cord above C5, trauma to C3-5 roots or phrenic nerve, mass effect, motor neuron disease, or rarely an infectious process.
- Unilateral diaphragm paralysis is considered a benign and transient complication, but it may embody a significant challenge for a patient with SCI. Early pulmonary rehabilitation may improve diaphragm motility and reduce the need for surgery after 1 year.

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