DEPARTMENT OF RADIOLOGY

# Case of the Day # 2

# Lung Torsion

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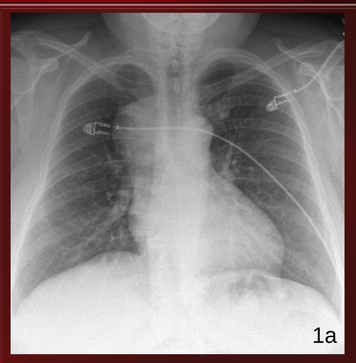
A 56-year-old female with non-significant past medical history was admitted with 1 day history of nonspecific chest pain and shortness of breath.
Posteroanterior and lateral chest images (**FIG 1a-b**) and subsequent chest computed tomography were performed (**FIG 2a-c**) .
The extrapulmonary posterosuperior mediastinal mass showed fluid attenuation coefficient of 14 CT units.
The rest of the complete workup was totally unremarkable. The patient was then taken to surgery and the mass was resected via a right posterolateral thoracotomy.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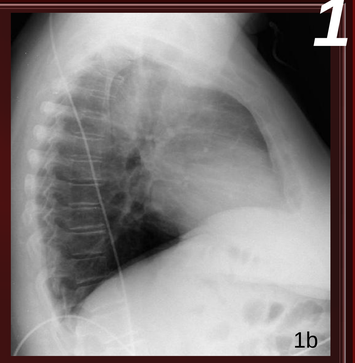
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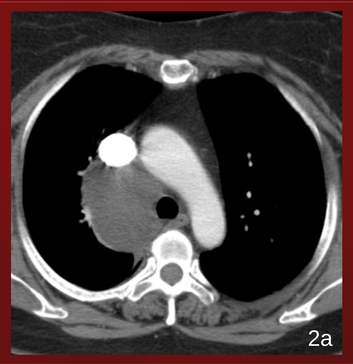
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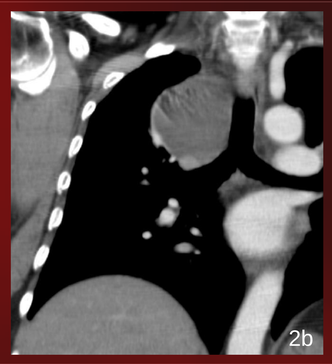
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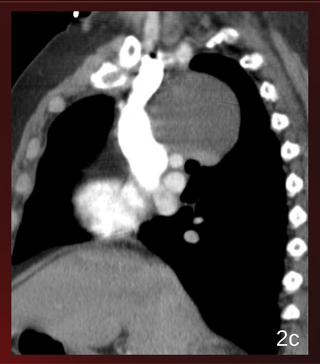
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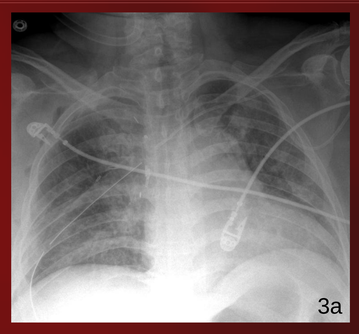
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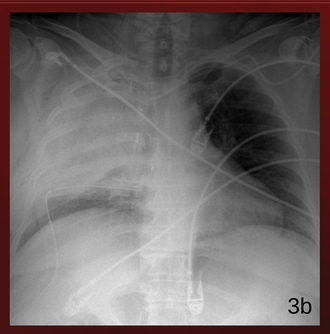
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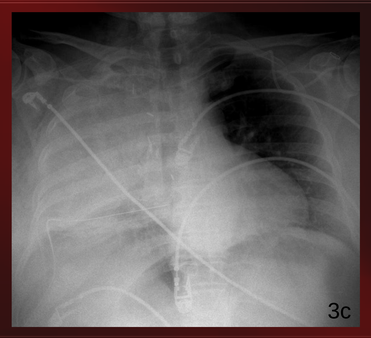

3c

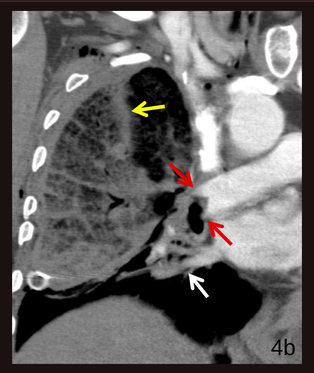
**Fig 3a.-** Immediate post operative chest radiograph. Patient in satisfactory condition.
Final hystologic diagnosis: benign endothelial lined cyst.

**Fig 3b.-** 18 hrs. and **Fig 3c.-** 25 hrs. post operative status. Patient developed fever of 101.1° F, leukocytosis and cough, associated to yellowish sputum; no hemoptisis, hypoxemia or respiratory distress.
**Based on the available clinical and radiological findings can you suggest the diagnosis?**

2

Essential differential diagnosis possibilities such as atelectasis, acute lobar pneumonia, necrotizing pneumonia, pulmonary emboli, pulmonary hemorrhage, hemothorax and massive effusion could reasonably be put on a second plane on basis of the available clinical and radiographic signs; therefore, lung torsion emerged as the primary diagnostic consideration. A requested bronchoscopy was deferred; instead, an enhanced CT of the chest was done.


4a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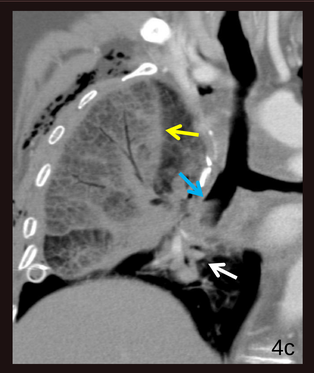
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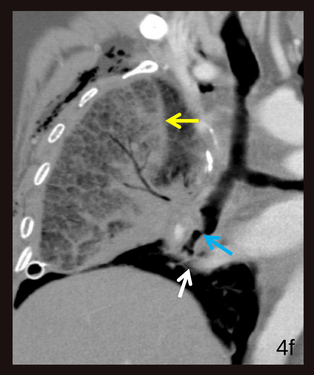
4d


4e

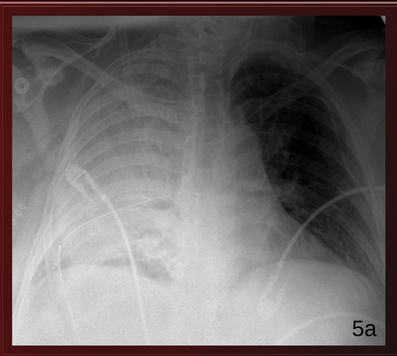

4f

At 30 hrs. postoperative status after removal of the mediastinal cyst an enhanced CT of the chest was performed **(Fig 4a-f)**
- **Red arrows:** obstruction of the right upper and middle lobar pulmonary arteries with beaking of the arterial stumps
- **Blue arrows:** obstruction of the upper lobe bronchus with beaking, and irregular partial obstruction of lower lobe bronchus
- **Yellow arrow:** a pleural fissure in a most bizarre position, separating right upper lobe (anteriorly located) from middle lobe (posteriorly located).
- **White arrows:** scarce arterial and venous contrast flow in the partially atelectatic lower lobe

The diagnosis of lung torsion was established and the patient went immediately to surgery. The upper and middle lobes had the "appearance of a liver", with an aproximately 180° torsion (clockwise from observer's perspective). Detorsion was accomplished and operative ultrasound showed acceptable arterial blood flow; therefore, expectant management without lobectomy was decided.

3

**Fig 5a.-** Immediate post detorsion image and
**Fig 5b.-** 14 hrs. after.
Persistence and progression of parenchymal consolidation involving the entire right lung.
At this time, the patient was increasingly tachycardic, hypotensive, with fever of 103° F and marked leukocytosis.
Reoperation was decided for a probable lung resection.
In the way to the operating room, cardiac arrest ocurred.
After resucitation maneuvers, abundant blood was emanating through the endotracheal tube.
At thoracotomy, there was blood engorgement of upper and middle lobes, massive intraparenchymal hemorrhage and abundant free blood in the chest cavity.
Upper and middle lobes were not salvageable and emergency bi-lobectomy was performed.


5a

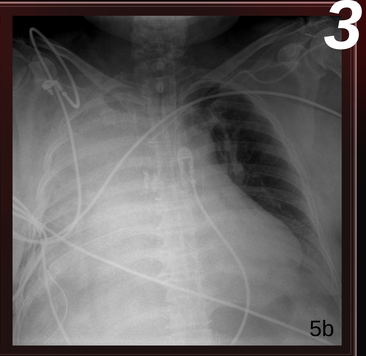
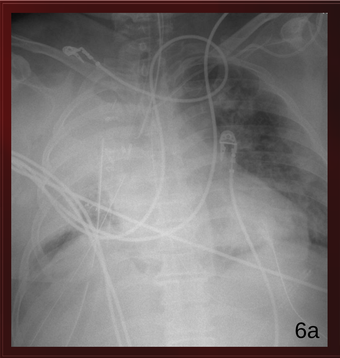

5b

**Fig 6a.-** Immediately post upper and middle bi-lobectomy image with minimal re-expansion of lower lobe.

**Fig 6b.-** 13 days post bi-lobectomy. Patient had sustained multisystemic complications and died two days later.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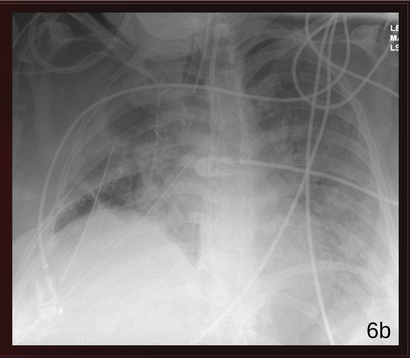
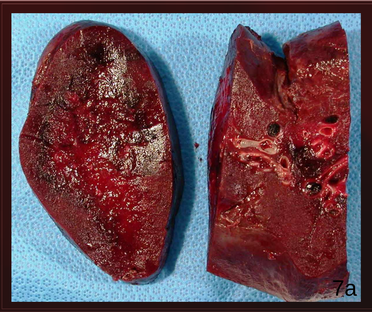

6b

**Fig 7a.- Right upper lobe.**
It shows extensive hemorrhage as a result of hemorrhagic infarction. The section shows intravascular thrombus.

**Fig 7b.- Right middle lobe.**
It shows extensive hemorrhage as a result of hemorrhagic infarction.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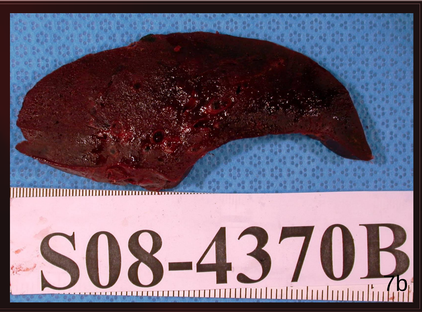

7b

4

# DISCUSSION

## INTRODUCTION

- Pulmonary torsion is a rare, but life-threatening complication in thoracic surgery, which if undetected, can result in hemorrhagic infarction and gangrene.
- The authors experienced a case of bi-lobar torsion following the removal of a benign mediastinal bronchogenic cyst, which required resection of the affected lobes and had a fatal outcome.
- The rarity of the condition, the possible catastrophe when the diagnosis and/or the corrective surgery are late, or as opposed, the favorable outcome if timely diagnosis and treatment are given, led the authors to report this case.

## LUNG TORSION

- Can involve a single or multiple lobes, or the entire lung
- Can occur spontaneously
- After trauma
- During surgery or postoperatively
- With or without lung resection
- Associated to other pulmonary anomalies.
- When diagnosed, is usually too late to salvage the affected lung parenchyma
- Introduces significant morbidity and mortality

## STATISTICS

- Lobar torsion occurs with similar frequency in both lungs
- Right middle lobe is the most common site
- Followed by the left upper lobe
- More frequently reported to be clockwise
- Incidence of 0.089-0.3% after pulmonary resection
- Probably higher frequency than published
- 30 % of surgeons in a survey questionaire answered to having had one or several cases

## UNDERLYING CIRCUMSTANCES

- Long free lobar pedicle
- Airless consolidated or atelectatic lobe
- Absence of parenchymal bridge between contiguous lobes
- Pneumothorax or pleural effusion
- Transection of the inferior pulmonary ligament

## CLINICAL EFFECTS

- Produced by obstruction of the respective bronchus, arterial and venous circulation
- Can be unimpressive at early stages
- Fever, tachycardia, sepsis, shock, loss of breath sounds and sudden cessation of a previous air leak

## COMMON FINDINGS

- Collapsed or consolidated lobe occupying unusual position on plain radiographs, conventional tomograms, CT scans, angiograms or bronchograms
- Hilar displacement in an inappropriate direction for the lobe that appears to be atelectatic
- Alteration in the normal position and sweep of the pulmonary vasculature
- Rapid opacification of an ipsilateral lobe following trauma or thoracic surgery
- Change in position of an opacified lobe on sequentially obtained radiographs
- Bronchial cutoff or distortion on plain radiographs, conventional tomograms, CT scans or bronchograms
- Lobar air trapping
- Primary and secondary signs of lobar collapse
- Hemithorax completely opaque, if an entire lung has undergone torsion
- Failed attempts of aspiration of blood or fluid

## DIFFERENTIAL DIAGNOSIS

- Atelectasis
- Acute lobar pneumonia
- Necrotizing pneumonia
- Pulmonary embolism
- Pulmonary hemorrhage
- Hemothorax or effusion

## CONSIDERATIONS

- Once the presence of torsion is established, immediate surgery is indicated.
- Mortality is high when operation is delayed, and when in doubt about vascular impairment, the involved lobe or lobes should be removed
- In several patients in whom detorsion alone was performed, lobar necrosis developed postoperatively, with fatal outcome
- Careful observation of the chest radiograph and the CT scan of the thorax are strongly emphasized
- Attending medical staff should always be aware of this rare, although frequently fatal complication
- Early diagnosis and timely surgical intervention are crucial to avoid catastrophic consequences

## REFERENCES

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