



## ATELECTASIS (LUNG COLLAPSE)

---

### ◆ Definition

Atelectasis is the loss of lung volume due to inadequate expansion of air spaces (alveoli).

Key Concept:

Collapsed alveoli → still perfused but not ventilated →  
V/Q mismatch → Hypoxemia

---

### ◆ Why Atelectasis Causes Hypoxemia?

Collapsed alveoli do not participate in gas exchange, but blood flow continues.

Normal condition:

Ventilation (V)  $\approx$  Perfusion (Q)

In Atelectasis:

Alveolar collapse → No ventilation → Perfusion continues  
→ V/Q mismatch (low V, normal Q) → Physiological shunt  
→ Hypoxemia

 Atelectasis produces a shunt-like state.

---

### ◆ Classification of Atelectasis

Based on mechanism and anatomy, it is divided into three types:

1. Obstructive (Resorption) Atelectasis
  2. Compression Atelectasis
  3. Contraction (Cicatrization) Atelectasis
- 

### OBSTRUCTIVE (RESORPTION) ATELECTASIS

- ◆ Definition

Occurs when an airway obstruction prevents air from reaching distal alveoli.

---

- ◆ Pathogenesis

Airway obstruction → No fresh air enters distal alveoli  
→ Air already present gets absorbed into blood →  
Progressive reduction in alveolar volume → Alveolar  
collapse → Atelectasis

---

- ◆ Common Causes

- ◆ Postoperative intrabronchial mucus plugs (MOST COMMON)

- ◆ Mucopurulent plugs
- ◆ Foreign body aspiration (especially in children)
- ◆ Bronchial asthma
- ◆ Bronchiectasis
- ◆ Chronic bronchitis

- ◆ Intra-bronchial tumor (⚠️ may be first sign of malignancy)

🎯 Important Exam Point:

In elderly smokers, new-onset obstructive atelectasis → always suspect bronchogenic carcinoma.

---

- ◆ Clinical Significance

- Most common form
  - Frequently postoperative
  - Potentially reversible if obstruction removed
  - Predisposes to infection (because stagnant secretions accumulate)
- 

## ② COMPRESSION ATELECTASIS

- ◆ Definition

Occurs due to external pressure on lung tissue, preventing expansion.

---

- ◆ Pathogenesis Flowchart

Accumulation in pleural cavity (fluid / blood / air) →  
Increased intrapleural pressure → External compression  
of lung → Reduced alveolar expansion → Collapse

---

- ◆ Causes

- ◆ Pleural Effusion (Very Common)

- Especially in congestive heart failure

- ◆ Pneumothorax

Air in pleural cavity → Lung compression

- ◆ Hemothorax

Blood in pleural cavity

## ◆ Basal Atelectasis

Occurs in:

- Bedridden patients
  - Patients with ascites
  - During and after surgery
  - Failure to breathe deeply
- 

## ◆ Why Basal Atelectasis Occurs?

Shallow breathing → Reduced alveolar expansion →  
Gradual collapse of dependent lung areas → Basal  
atelectasis

 Very common in postoperative patients.

---

## ③ CONTRACTION (CICATRIZATION) ATELECTASIS

### ◆ Definition

Occurs when fibrosis of lung or pleura prevents lung expansion.

Unlike other types, this is due to structural restriction, not air loss.

---

#### ◆ Pathogenesis Flowchart

Chronic inflammation → Pulmonary / pleural fibrosis → Scar formation → Reduced lung compliance → Inability to expand → Persistent atelectasis

---

#### ◆ Causes

- Pulmonary fibrosis
  - Tuberculosis with scarring
  - Pleural fibrosis
  - Radiation-induced fibrosis
-

◆ Key Difference from Other Types

Feature	Obstructive	Compression	Contraction
Mechanism	Airway blockage	External pressure	Fibrotic restriction
Reversible?	Yes	Yes	✗ Usually irreversible
Air absorption involved?	Yes	No	No
Fibrosis present?	No	No	Yes

◆ Gross Morphology

- Collapsed, airless lung tissue
- Dark red or bluish appearance
- Depressed below normal surface
- Reduced volume

If prolonged → risk of infection

---

◆ Complications ⚠

Untreated atelectasis may lead to:

Atelectasis → Retained secretions → Bacterial colonization → Pneumonia → Lung abscess

---

◆ Important Clinical Points 🎯

- Causes hypoxemia due to V/Q mismatch
  - Postoperative patients are high risk
  - Must be treated early
  - Reversible except contraction type
  - Incentive spirometry prevents postoperative atelectasis
- 

◆ Viva Pearls 🧠

- ✓ Most common type → Obstructive
  - ✓ Most common postoperative cause → Mucus plug
  - ✓ May be first sign of lung cancer
  - ✓ Produces shunt physiology
  - ✓ Contraction type is irreversible
- 

#### ◆ Summary

Atelectasis is lung collapse due to obstruction, compression, or fibrosis, leading to V/Q mismatch and hypoxemia, and is reversible except in contraction type.



---

-> The End <-