# Features of Intracranial hemorrhage on Head CT Scan

Pathological accumulation of blood within the cranium, either within brain tissue (parenchyma) or surrounding meninges.

## Classification by Location of Bleeding

### 1. Bleeding within the Meninges (Extra-axial hemorrhages)

- **Extradural (Epidural) Hematoma (EDH)**
- **Subdural Hematoma (SDH)**
- **Subarachnoid Hemorrhage (SAH)**

### 2. Bleeding within the Brain Parenchyma (Intra-axial hemorrhages)

- **Intraparenchymal Hemorrhage**
- **Cerebral Infarction (Hemorrhagic transformation)**

## Basic Head CT Scan Interpretation Points

- Use **5–10 mm slice thickness** , typically 14 slices per study.
- **CT without contrast** is used for acute hemorrhage detection because blood appears hyperdense (white), whereas CSF appears hypodense (black).
- Compare **both hemispheres** for:
    - Localized altered density
    - Mass lesions
    - Midline shift
- Acute blood is **bright white** initially, becoming darker with time; after ~1 month, density equals CSF.

## 1. Extradural Hematoma (EDH)

**Location:** Between the skull and dura mater (potential space).
**Etiology:** Usually arterial bleed — **middle meningeal artery laceration** after skull fracture, commonly temporoparietal region.
**Clinical:** Rapid ICP rise; classic "lucid interval" in ~1/3 patients (brief unconsciousness, then normal, then deterioration).
**Management:** Urgent clot evacuation (craniotomy or burr hole if no neurosurgical facilities).

**CT Features:**

- **Lens-shaped (biconvex/lentiform)** hyperdense extra-axial collection.
- Does **not cross suture lines** (dura adheres at sutures).
- Air within hematoma suggests open fracture.

## 2. Subdural Hematoma (SDH)

**Location:** Between dura mater and arachnoid mater.
**Etiology:** Venous bleeding from bridging veins, often after trauma or in at-risk groups (elderly, alcoholics, cerebral atrophy). Also seen in shaken baby syndrome and coagulopathy.
**Clinical:** May cause raised ICP, neurological deterioration, mass effect, herniation syndromes. Chronic SDH can present weeks later with headaches, confusion, hemiparesis.

**CT Features:**

- **Crescent-shaped (concave)** hyperdense extra-axial collection conforming to brain convexity.
- **Crosses suture lines** (not limited by dura attachments).
- Can cause midline shift and mass effect.
- In interhemispheric SDH, falx cerebri may appear thickened and irregular.

## 3. Subarachnoid Hemorrhage (SAH)

**Location:** Bleeding into the subarachnoid space (between arachnoid and pia mater).
**Etiology:** Most commonly due to ruptured aneurysm in the Circle of Willis; can also be traumatic.
**Clinical:** Sudden severe “thunderclap” headache; neurological damage mainly from complications like hydrocephalus and vasospasm.

**CT Features:**

- **High-density blood in CSF spaces:** basal cisterns, Sylvian fissure, ventricles, sulci.
- Confirmed SAH ? CT angiogram or cerebral angiography.
- If CT negative but suspicion high ? lumbar puncture for **xanthochromia** .

## Summary Table of CT Features

| Hematoma Type | Location | Shape on CT | Crosses Sutures? | Usual Cause | Key Clinical Notes |
|---|---|---|---|---|---|
| Extradural Hematoma | Between skull & dura mater | Lens-shaped (biconvex) | No | Middle meningeal artery injury | Rapid ICP rise, lucid interval (~1/3) |
| Subdural Hematoma | Between dura & arachnoid mater | Crescent-shaped | Yes | Bridging veins (venous) | Elderly, alcoholics, chronic presentation common |
| Subarachnoid Hemorrhage | Subarachnoid space | Blood in CSF spaces | N/A | Ruptured aneurysm | Sudden severe headache, vasospasm risk |