

KAFA TRAVMASI VE SPİNAL TRAVMA

UZ.DR.BARIŞ MURAT AYVACI
OKMEYDANI EĞİTİM VE ARAŞTIRMA HASTANESİ

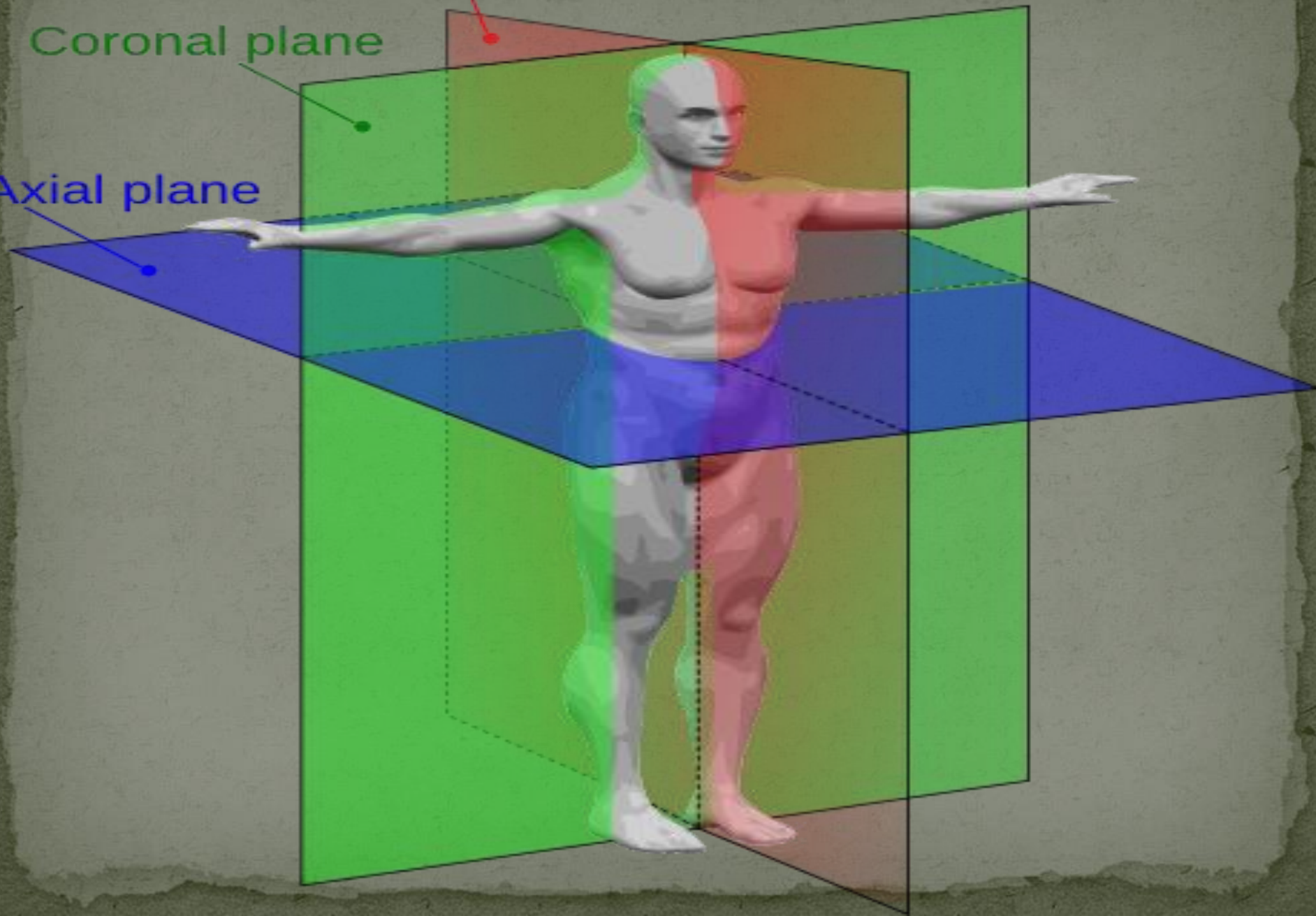
BBT

- 1980 ABD
- HOUNSFIELD
- CORMACK 1973
- Kontrastsız BBT baş için en sık istenen görüntüleme yöntemi
 - Aksiyal
 - Sagital
 - Koronal
 - 3d

Sagittal plane

Coronal plane

Axial plane



NE GÖSTEREBİLİR?

KONTRASTSIZ BBT

- HEMORAJİ
- İSKEMİK İNFARKT
- KİTLE
- KİTLE ETKİSİ
- VENTRİKÜLER ANOMALİLER---
HİDROSEFALİ
- SEREBRAL ÖDEM
- SİNÜS ANOMALİLERİ
- KEMİK ANOMALİLERİ---
FRAKTÜR

KONTRASTLI BBT

- ANORMAL VASKÜLER YAPI(AVM)
- DOLUM
DEFEKTLERİ(SAGİTAL
SİNÜS TROMBOZ)
- NEOPLASTİK
- İNFLAMATUAR
- İNFEKSİYÖZ

20:21:24

CT, 010Y, 19.01.2015 20:21:24, OTHERS

0.2 98

LIF|010Y|F

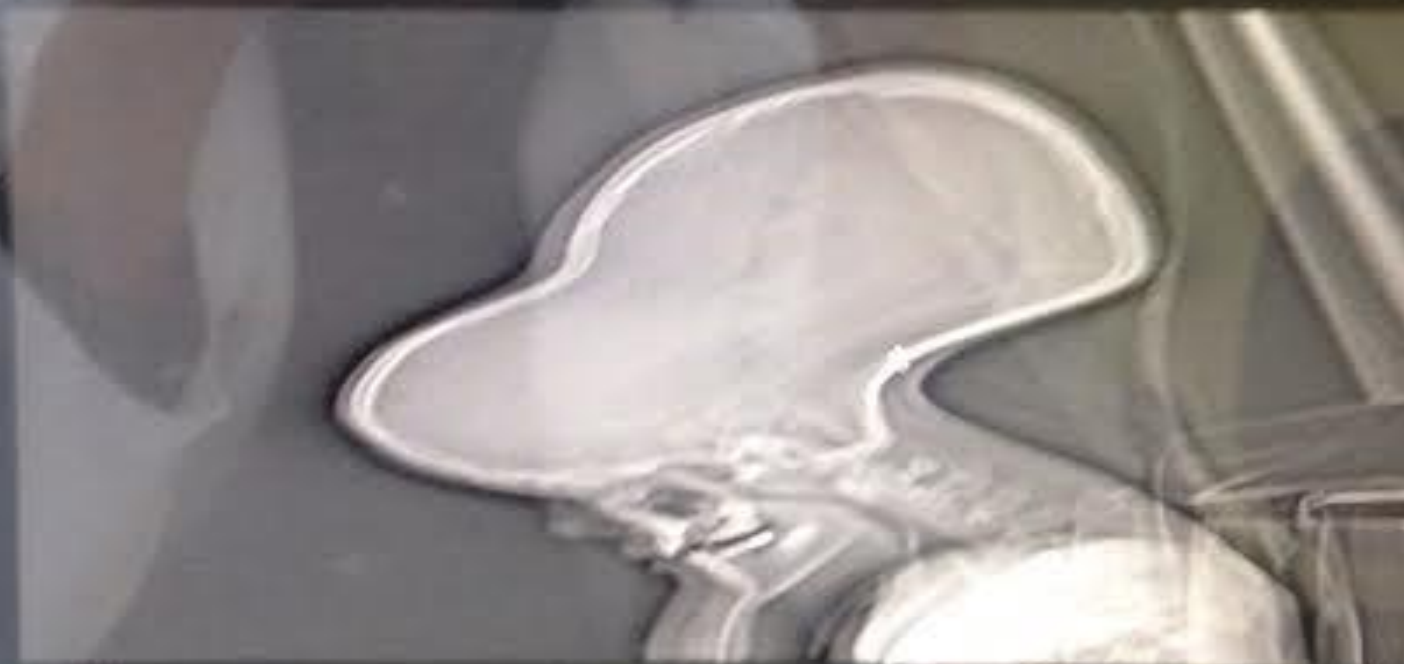
5270

15

5.50

3 ms

000000





MNEMONIKLER

BLOOD CAN BE VERY BAD

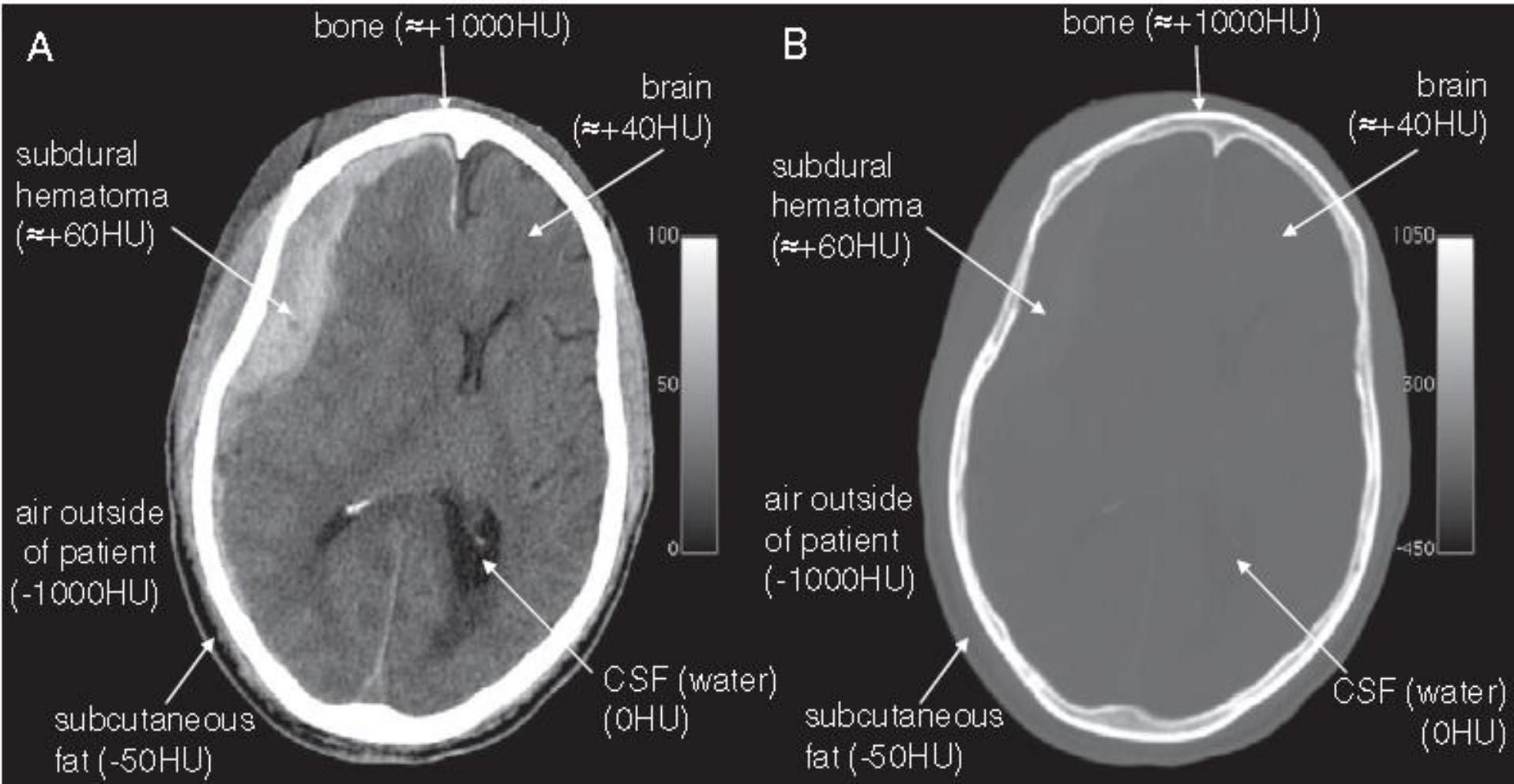
- B—BLOOD
- C---CISTERNS
- B---BRAIN
- V---VENTICULES
- B---BONES

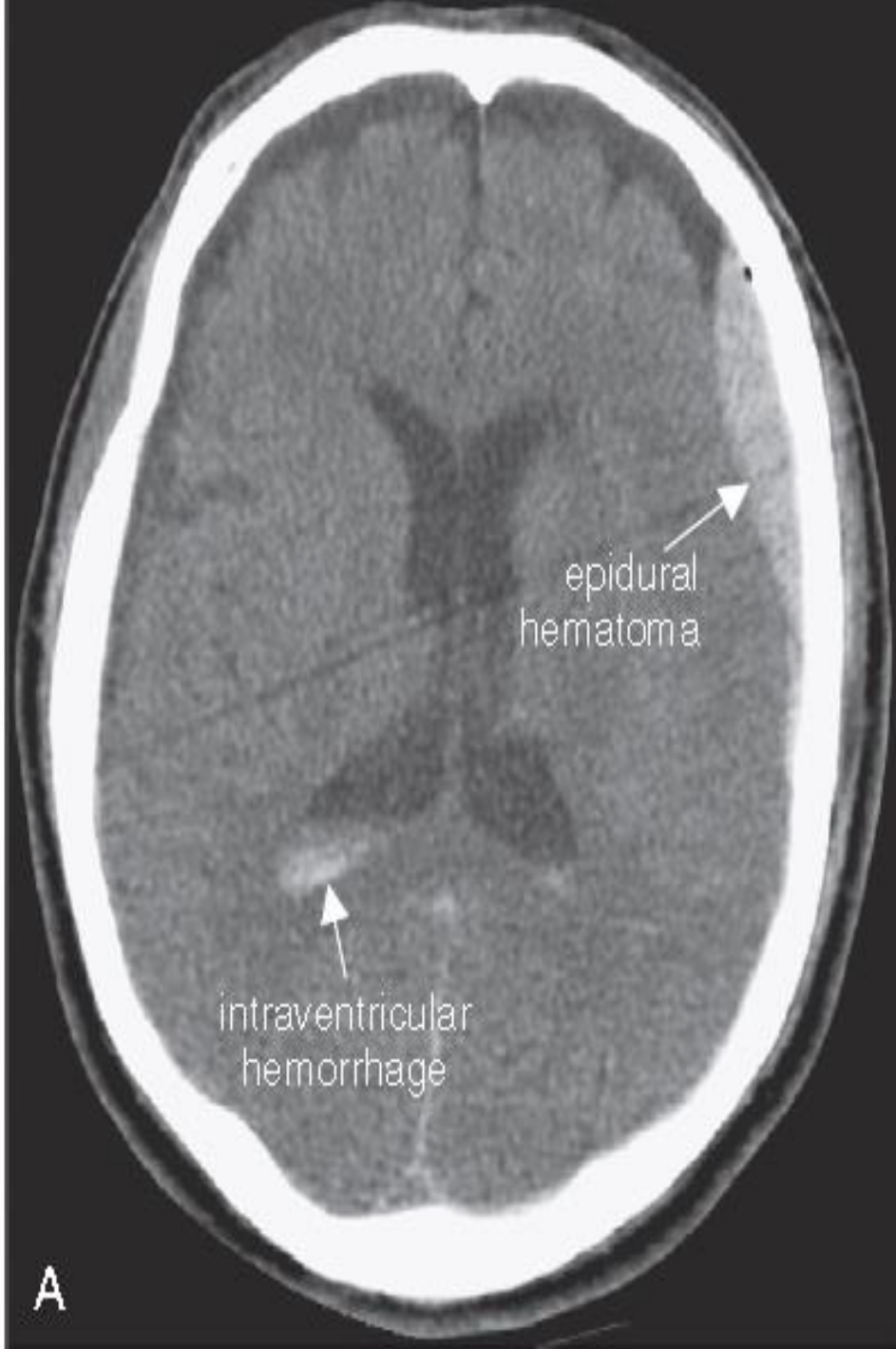
ABBBC

- Air-filled spaces
 - o Sinuses
 - o Mastoid air-cells
 - infections
 - fractures
- Bones
- Blood
 - o SAH
 - o EDH
 - o SDH
 - o Intraparenchymal
- Brain
 - o infarction
 - o edema
 - o masses
 - o shift
- CSF spaces
 - o Sulci
 - o Ventricles
 - o Cisterns
 - ICP
 - Atrophy
 - Hydrocephalus
 - Edema

HOUNSFIELD UNIT

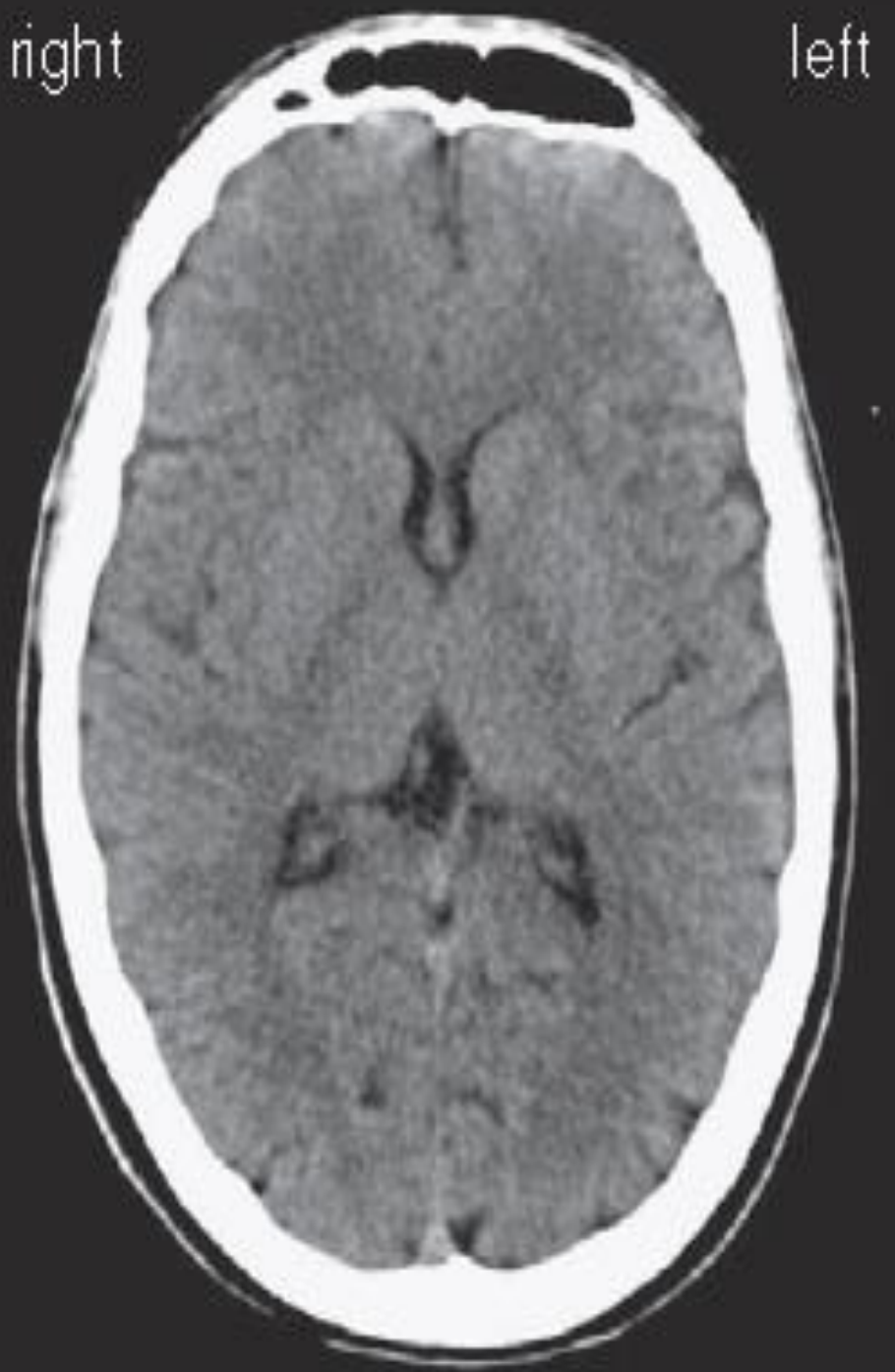
- SU = 0





right

left

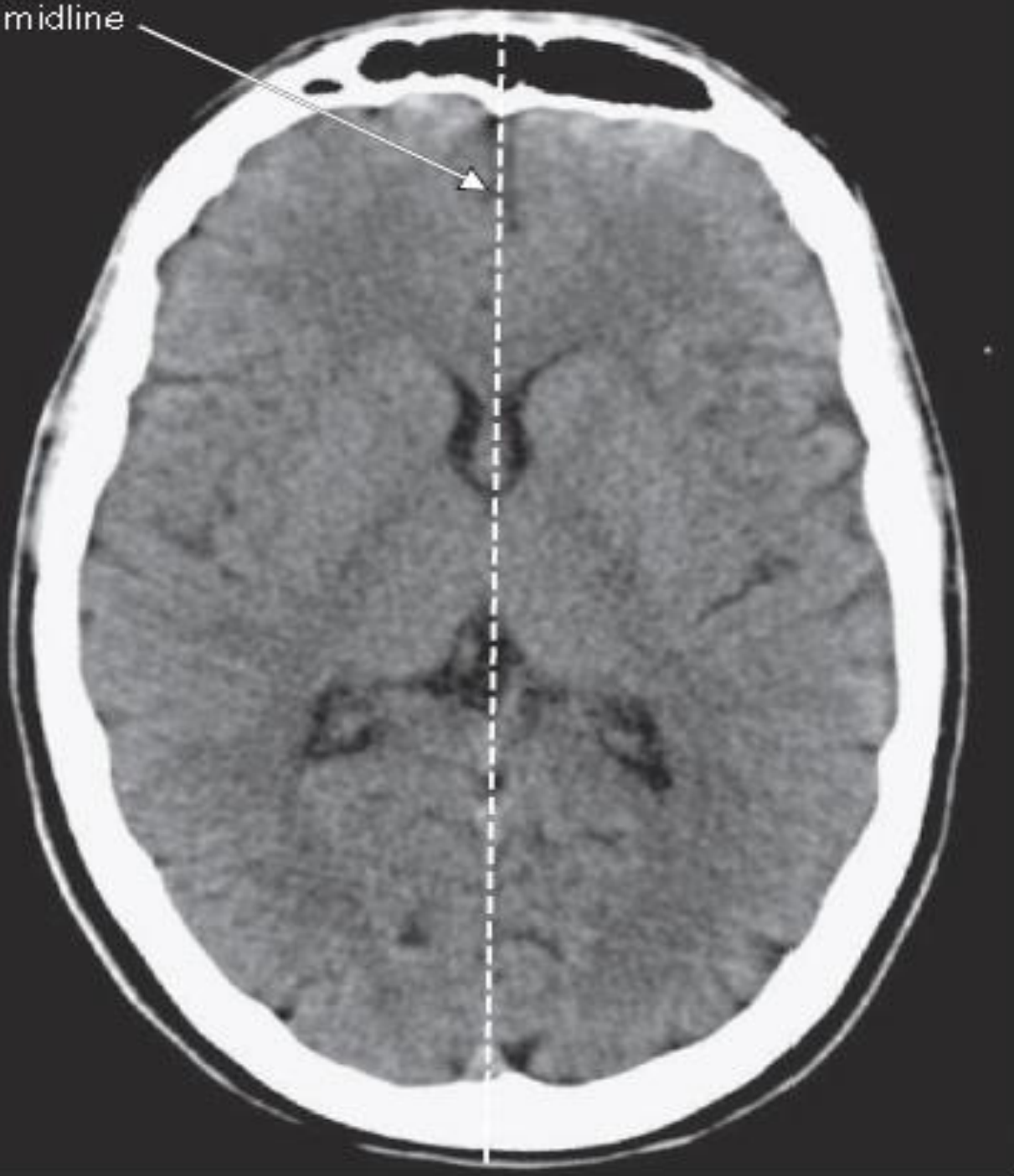


right

left



midline



SİMETRİ

BEYİN HAVA BOS
BOŞLUKLARI VE ÇEVRE
KEMİK YAPILARI
SİMETRİK OLMALIDIR

YALANCI
ASİMETRİ??????

!!!!ANCAK!!!!!!

- DİFFÜZ SAK
- SEREBRAL ÖDEM
- HİDROSEFALİ
- SİMETRİK GÖRÜLEBİLİR

• **SİMETRİ NORMAL OLMAYI GARANTİ
EDEMEZ !!!!!**

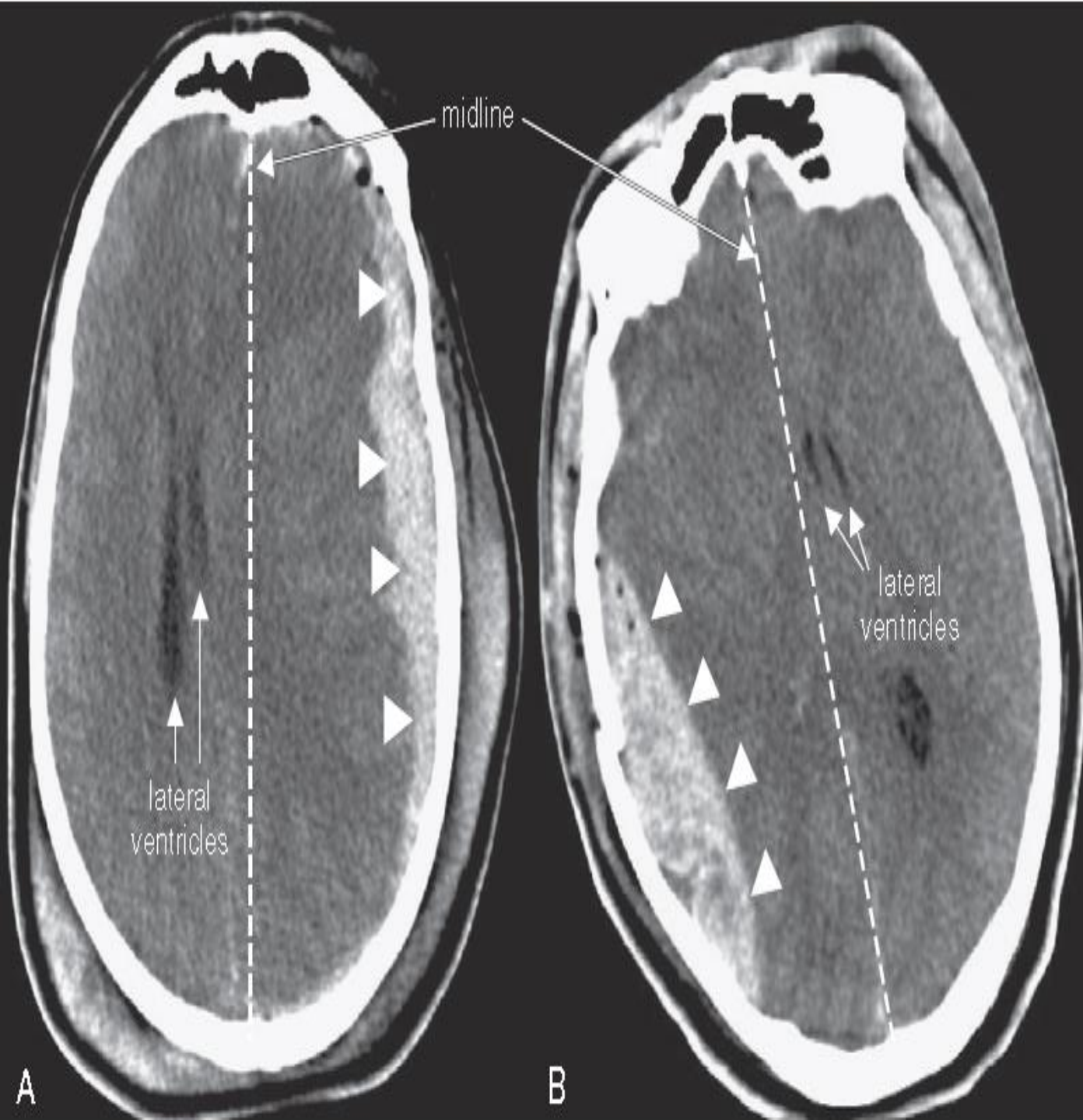
ORTA HAT ŞİFTİ

DERECE>
ETYOLOJİ

>10 MM
CERRAHİ
DEKOMPRESYO
N

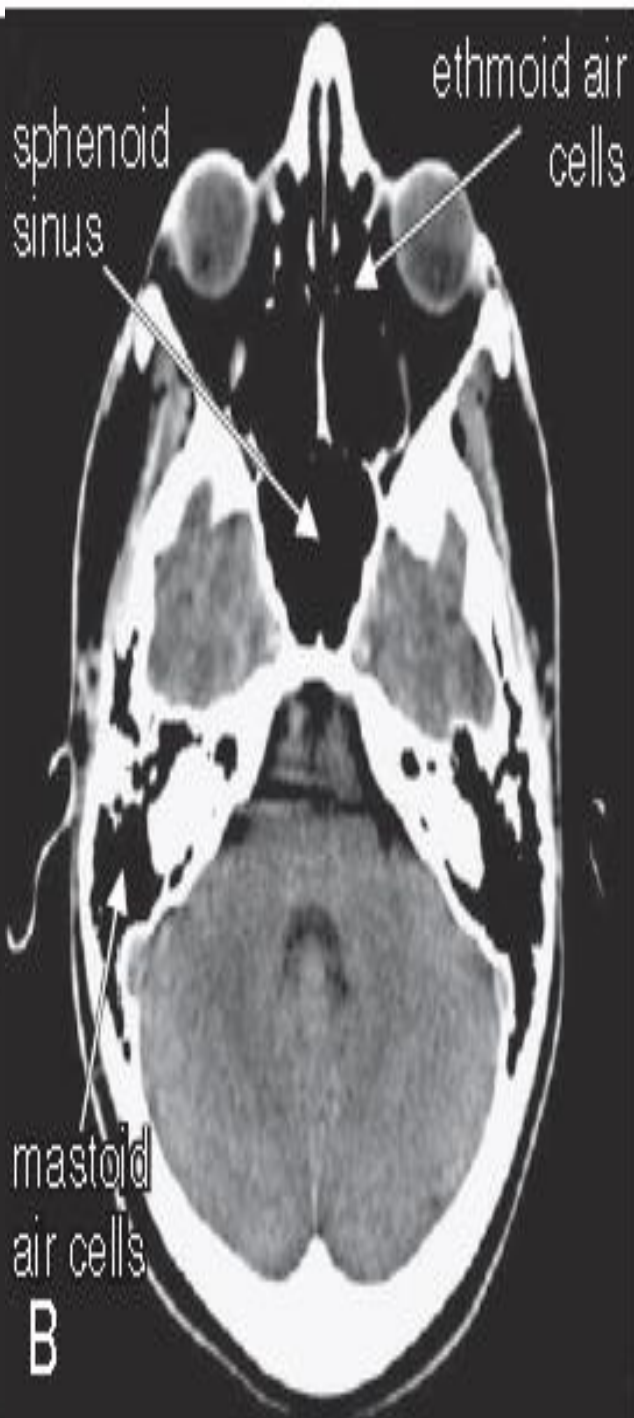
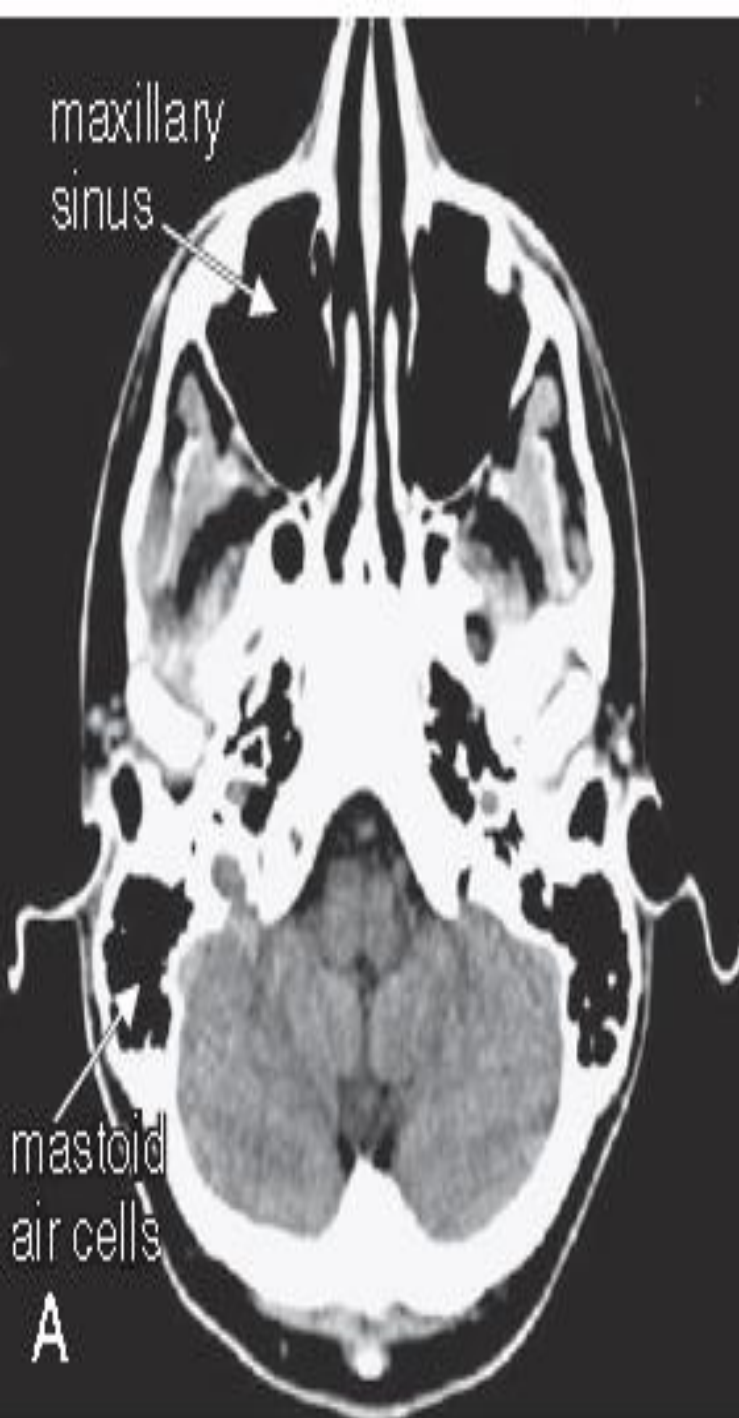
>5 MM
NÖROLOJİK
UZUN SÜRELİ
GÖZLEM

KLİNİK DURUM
> MATEMATİK



Assess These Structures...	For Signs of This Pathology
Air-filled spaces Mastoid air-cells Sinuses	Fractures Infections
Bones	Fractures
Blood	Epidural hemorrhage Intraparenchymal hemorrhage Subarachnoid hemorrhage Subdural hemorrhage
Brain	Midline shift or mass effect Edema Infarction Masses
CSF spaces Cisterns Sulci Ventricles	Atrophy Edema Hydrocephalus Subarachnoid hemorrhage in these structures

- Air-filled spaces
 - Sinuses
 - Mastoid air-cells
 - infections
 - fractures
- Bones
- Blood
 - SAH
 - EDH
 - SDH
 - intraparenchymal
- Brain
 - infarction
 - edema
 - masses
 - shift
- CSF spaces
 - Sulci
 - Ventricles
 - Cisterns
 - ICP
 - Atrophy
 - Hydrocephalus
 - Edema



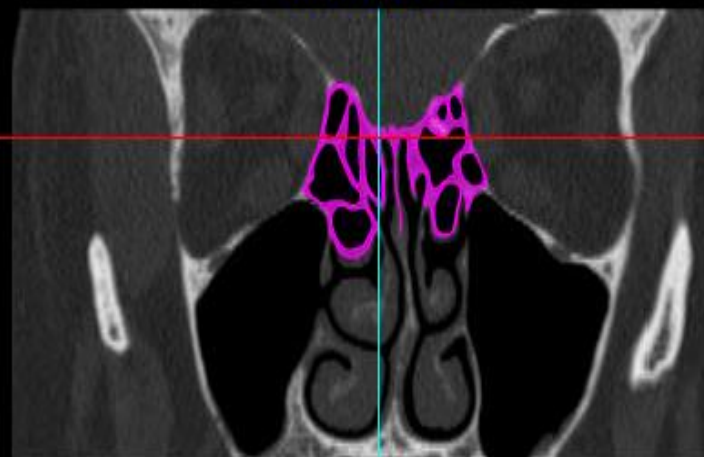
67

axials



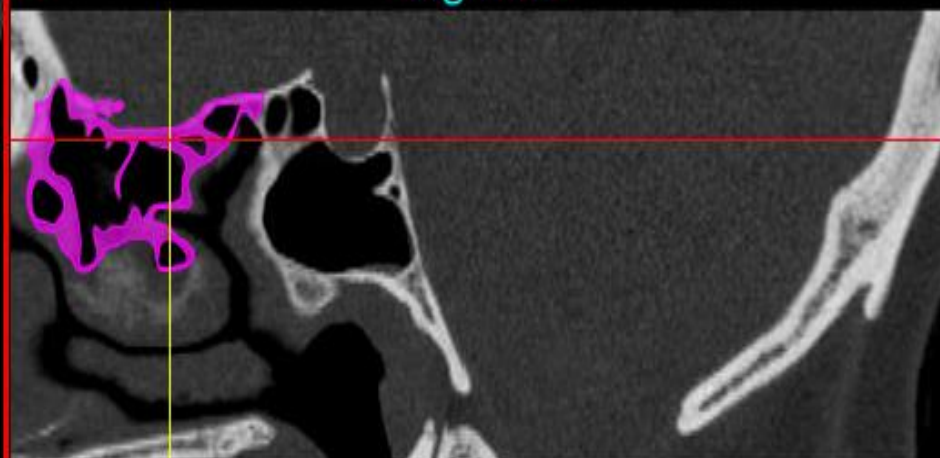
19

coronals



56

sagittals



ethmoid

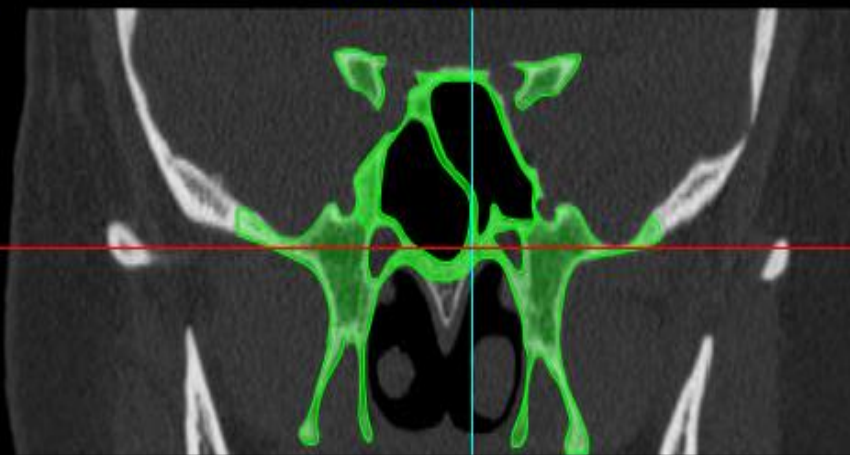
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axials



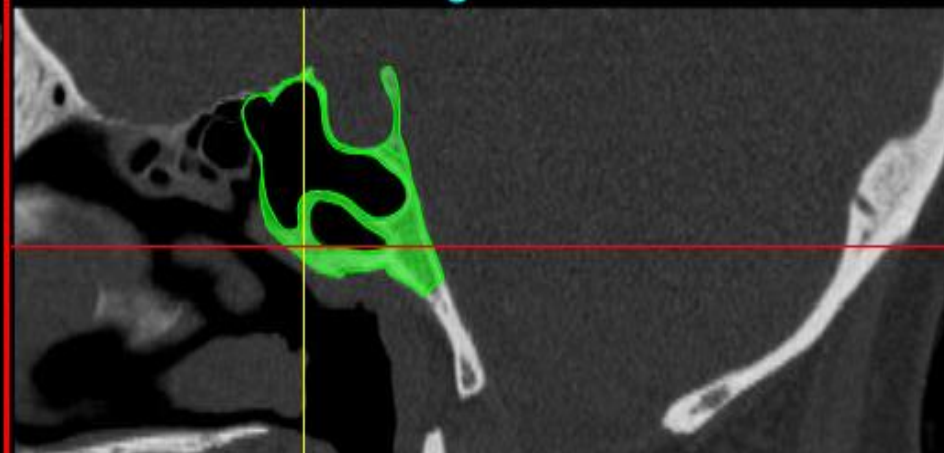
34

coronals



60

sagittals



sphenoid body

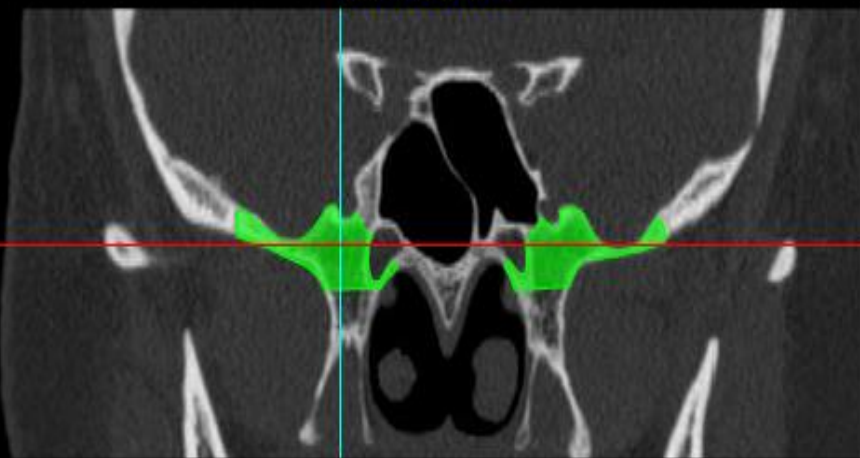
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axials



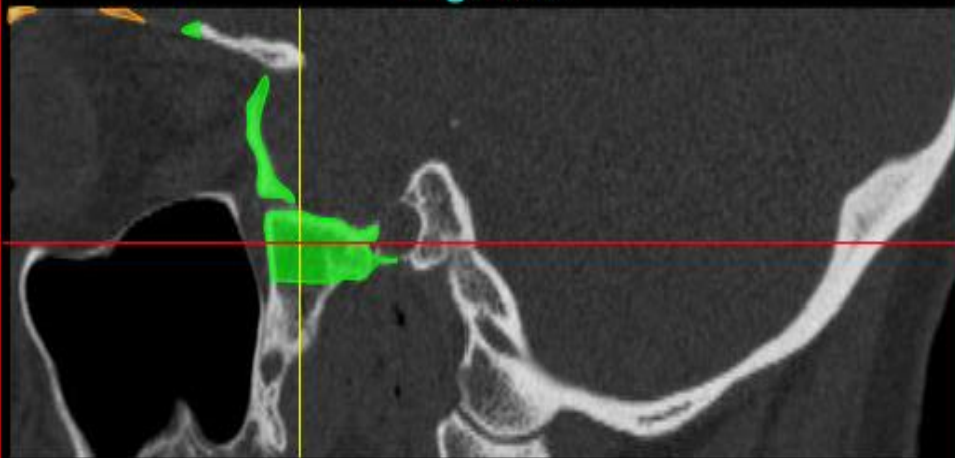
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coronals



45

sagittals



greater wing of sphenoid

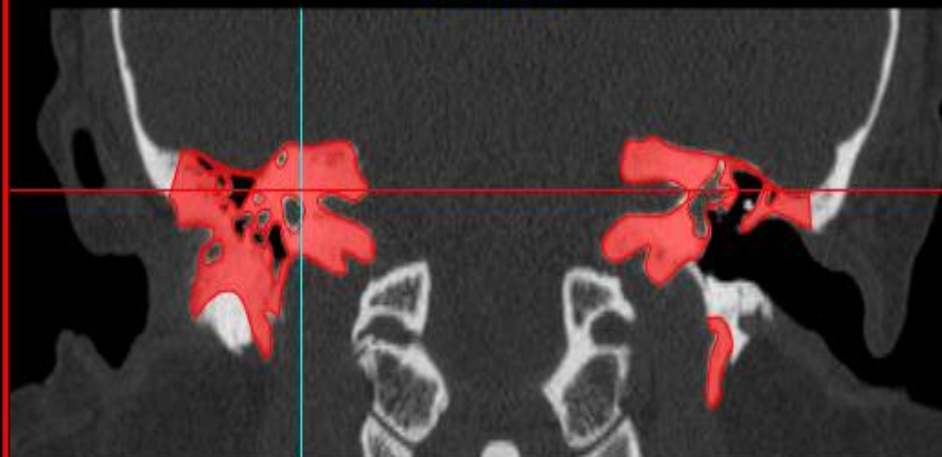
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axials



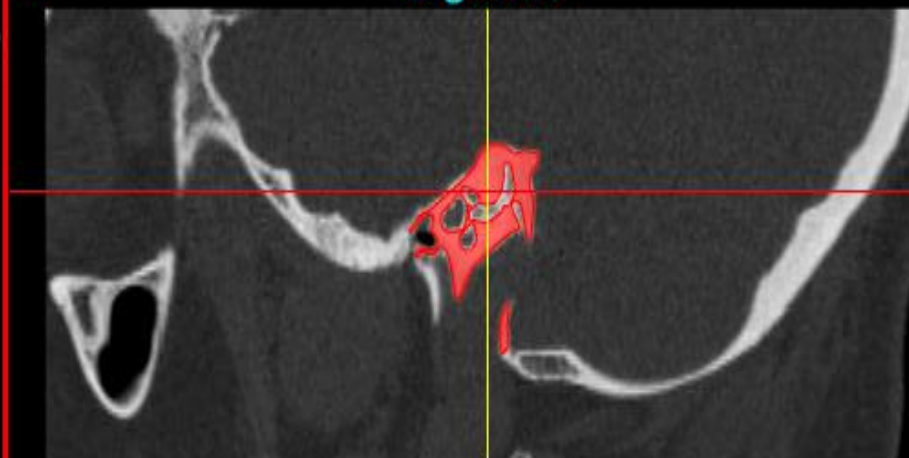
55

coronals



34

sagittals



petrous portion of temporal bone

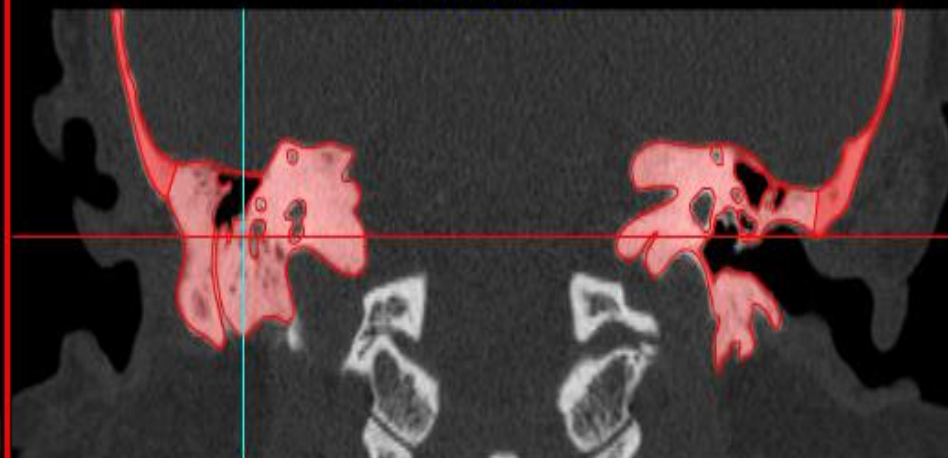
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axials



56

coronals



27

sagittals



squamous portion of temporal bone

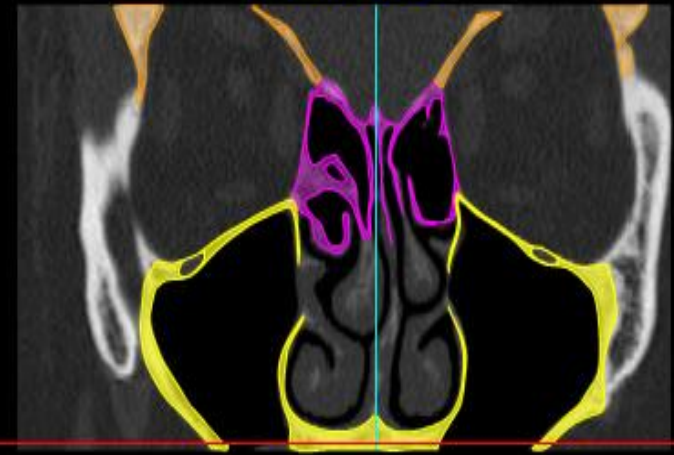
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axials



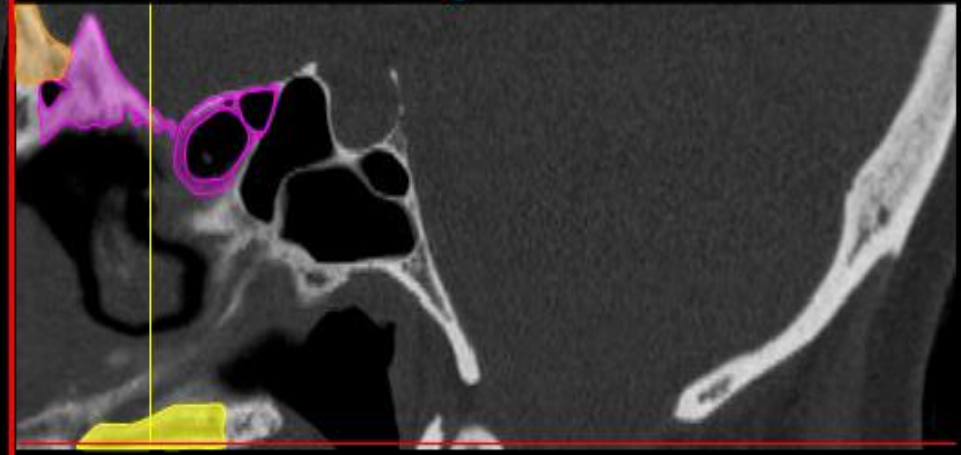
16

coronals



58

sagittals



maxilla

91

axials



89

coronals



23

sagittals



parietal bone

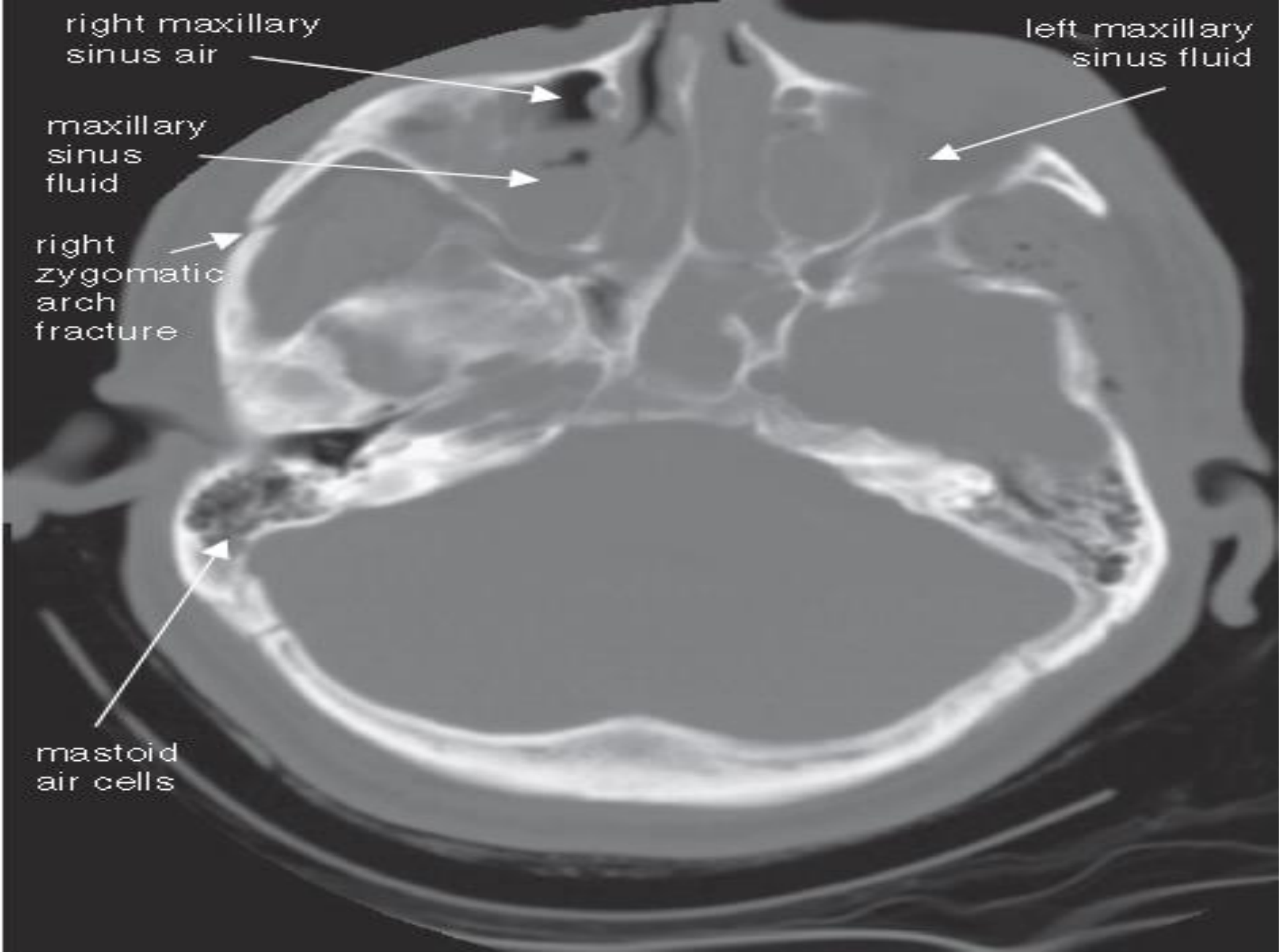
right maxillary
sinus air

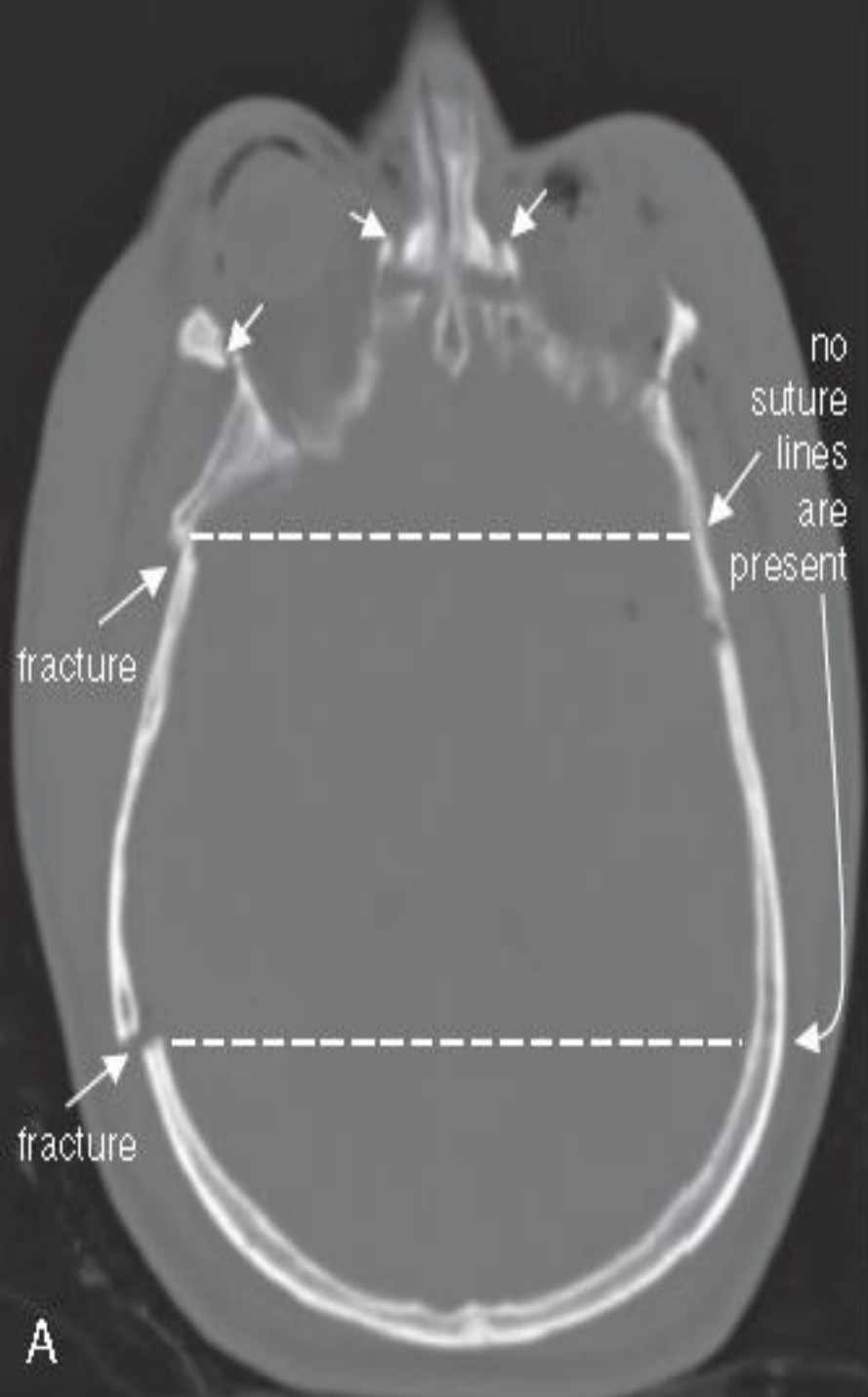
left maxillary
sinus fluid

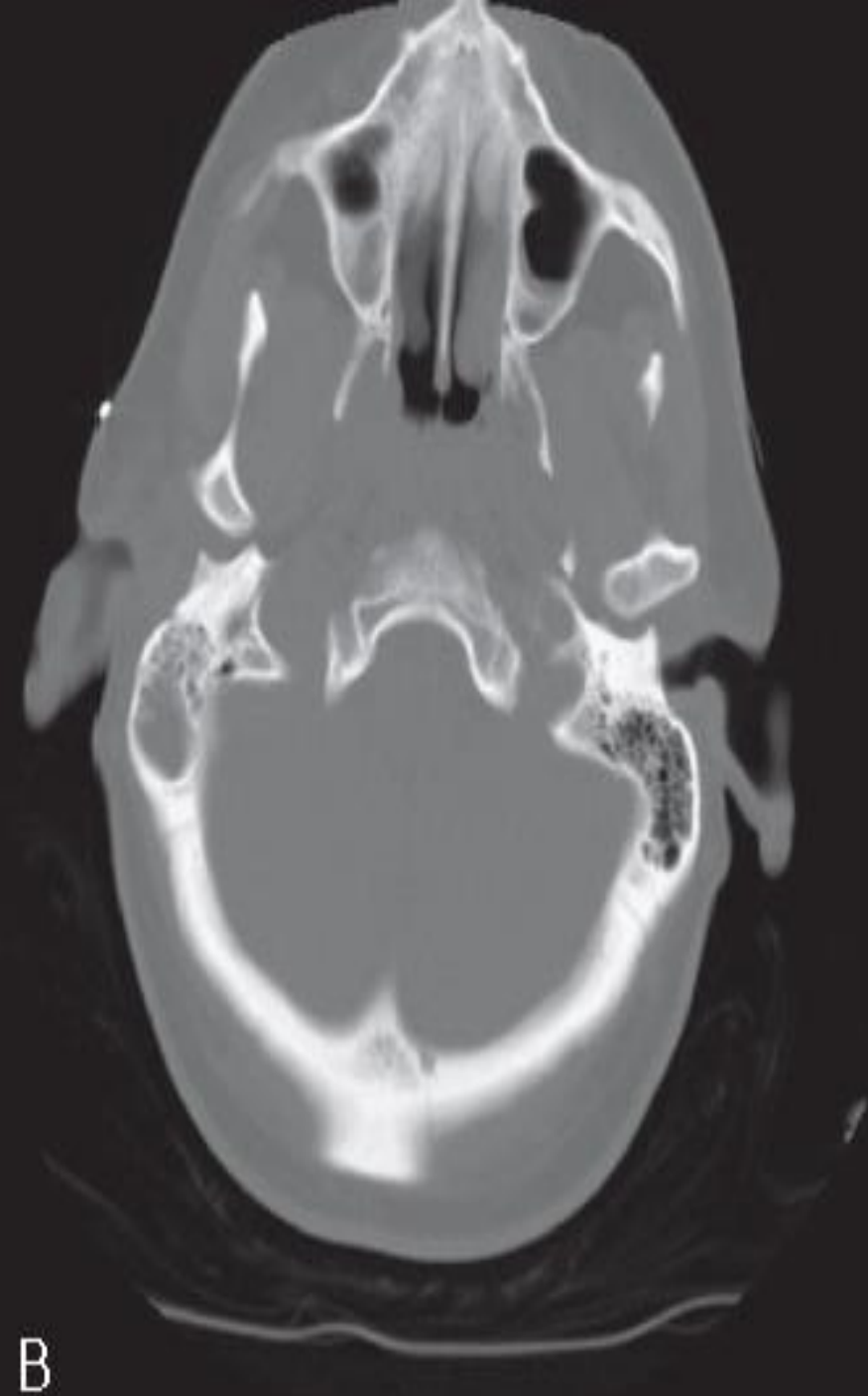
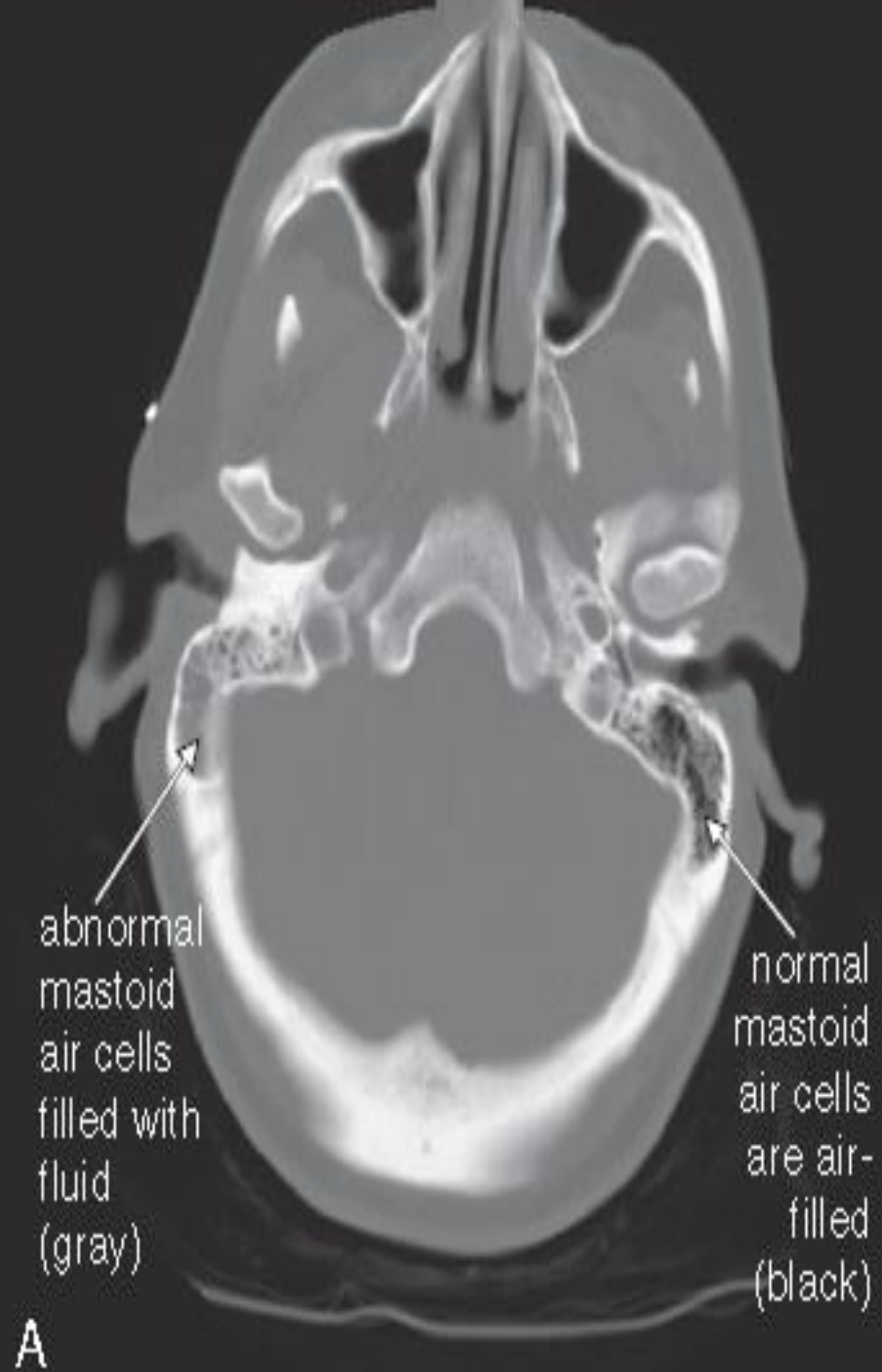
maxillary
sinus
fluid

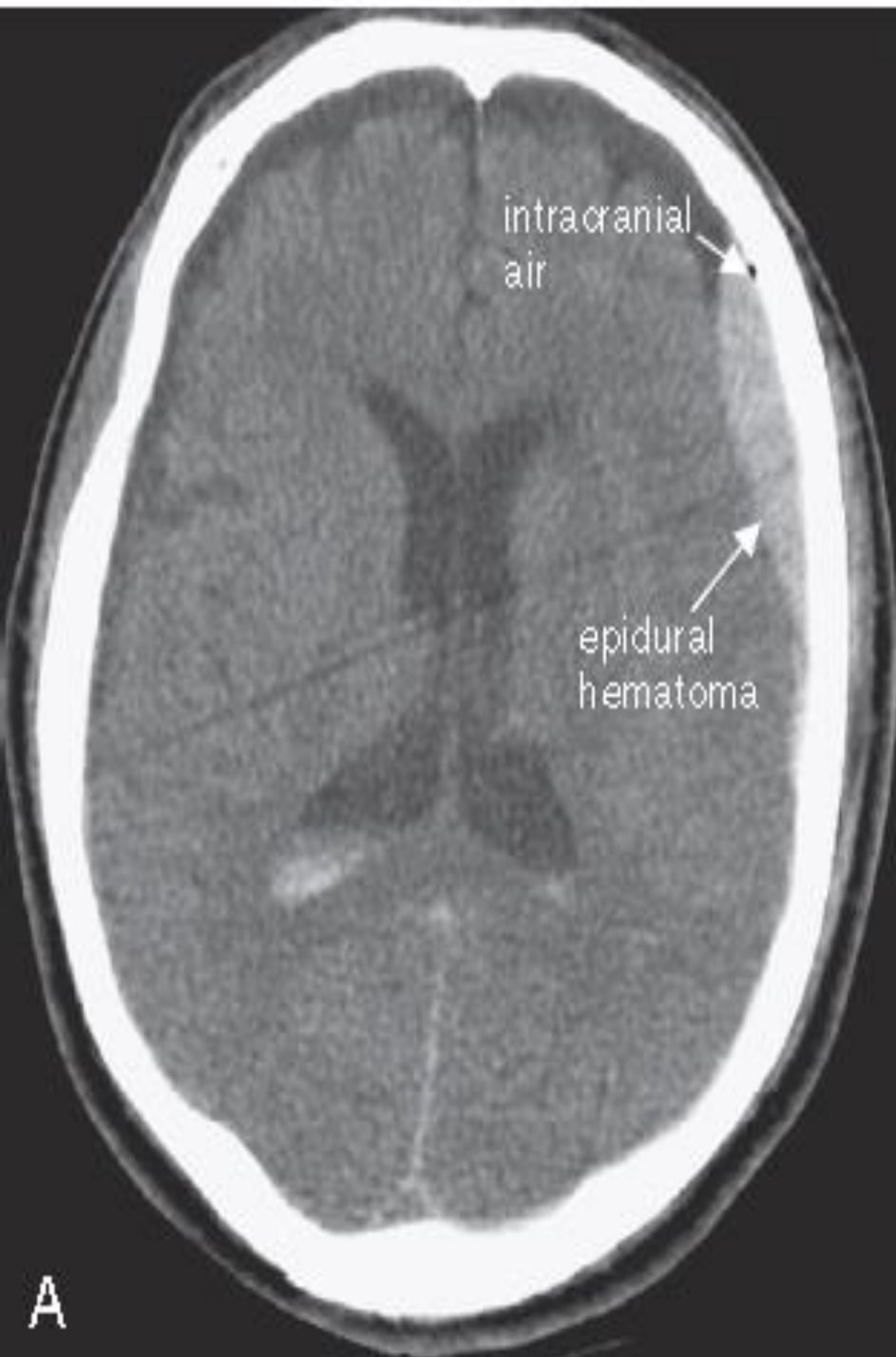
right
zygomatic
arch
fracture

mastoid
air cells



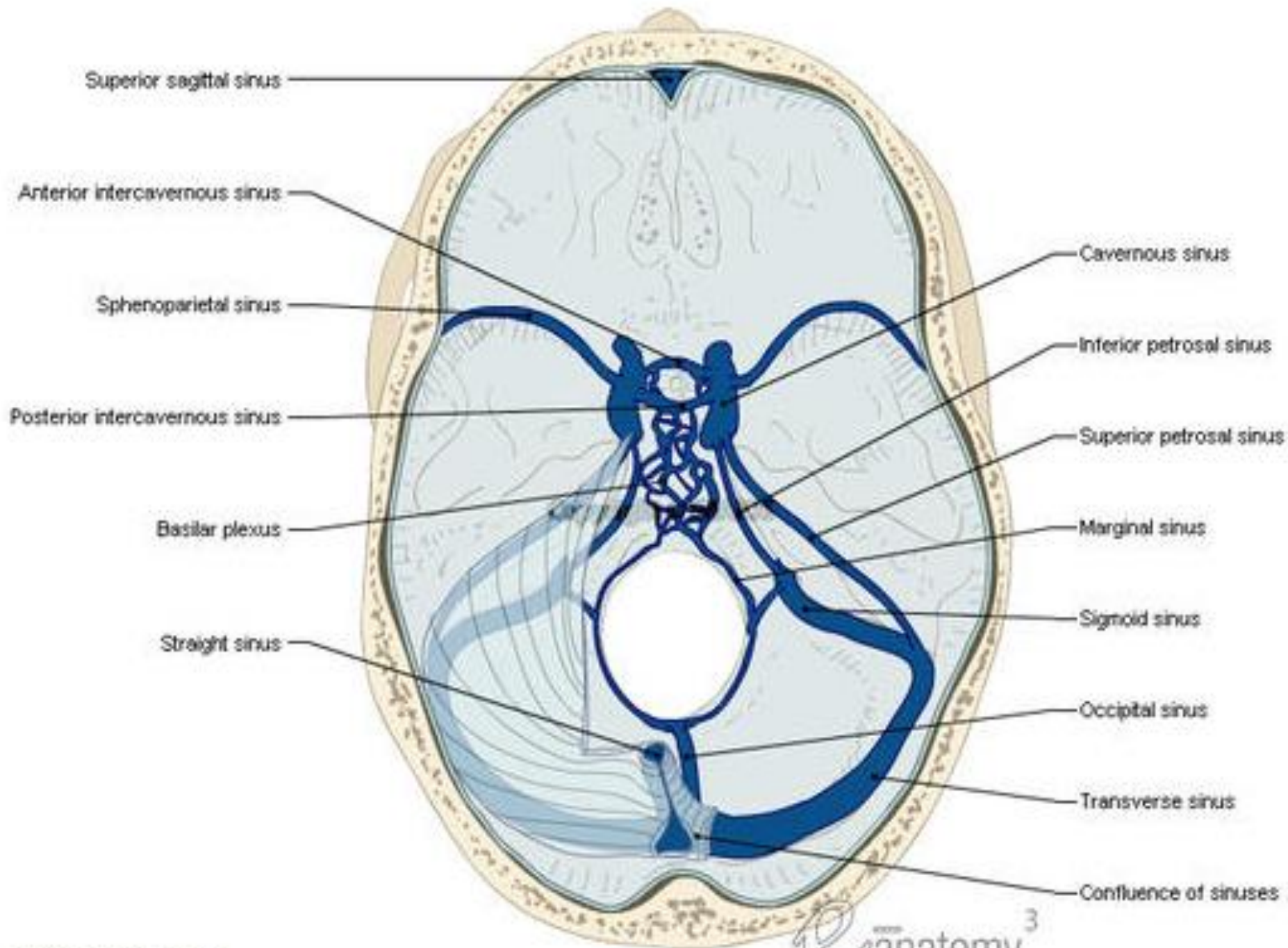


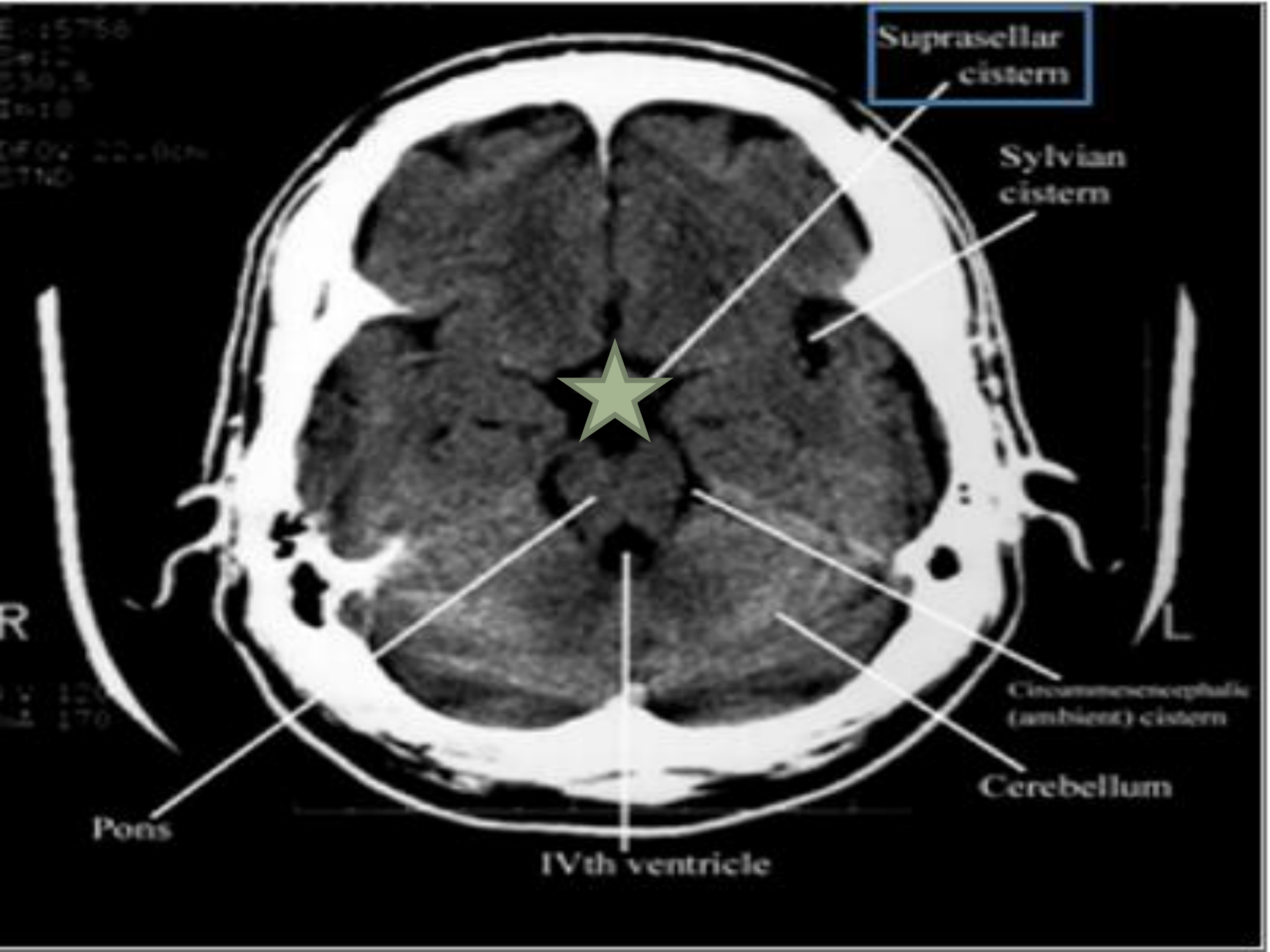




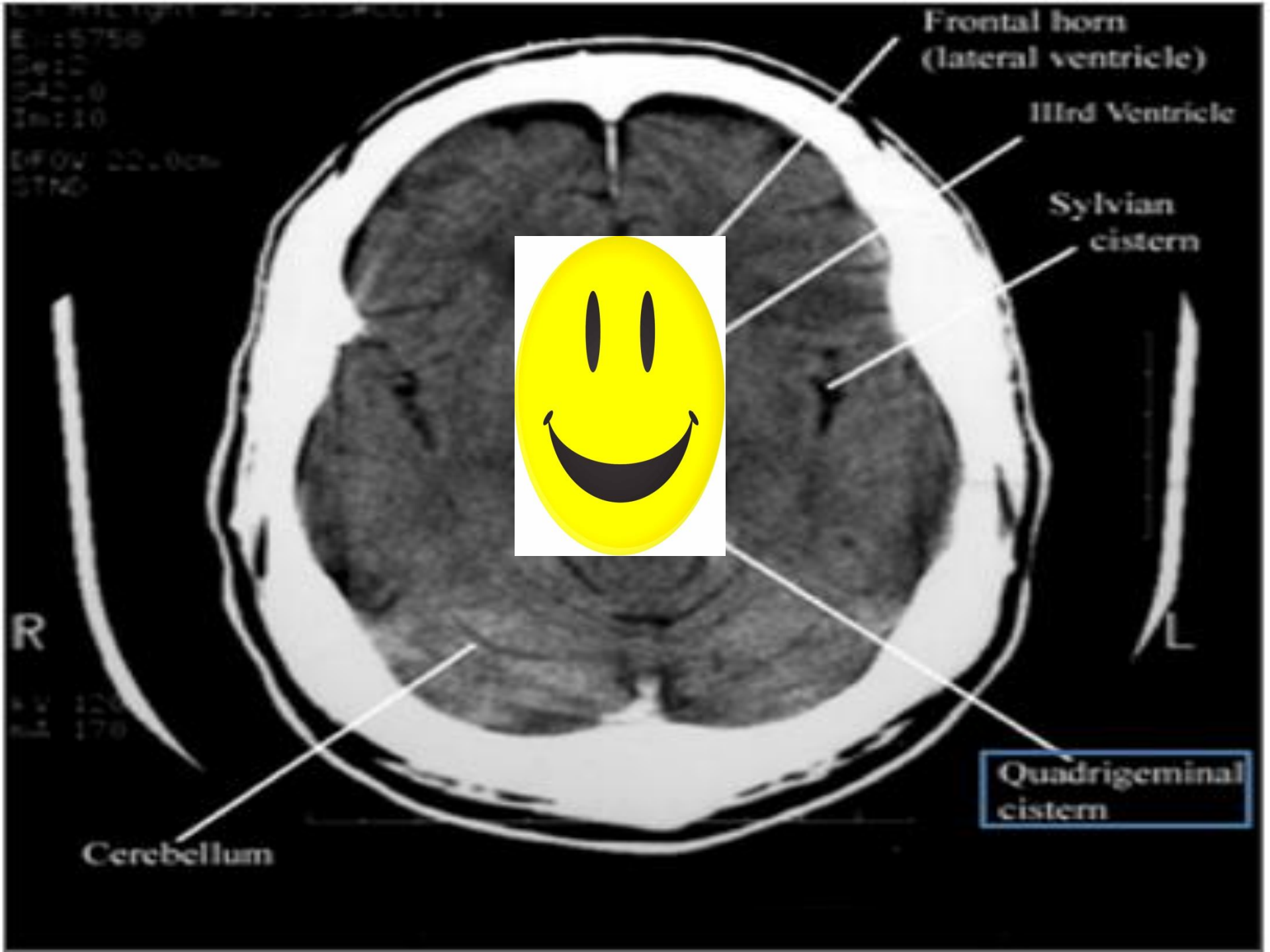
SAK

- Subaraknoid mesafede
- Beyaz ??? Taze??? Görünüm kan / bos oranına göre değişir
- BBT : İlk 12 saatte >%95 sensitif
- 12 saat sonrası <%80
- Tüm subaraknoid boşluk bakılmalı
- Sulkuslar
- Ventriküller
- Sylvian fissür
- Sisternalar





CT HEAD RIGHT ADJ. 5.0mm
E: 5750
Se: 12
342.0
1m: 10
EF OV 22.0cm
STNO



Frontal horn
(lateral ventricle)

IIIrd Ventricle

Sylvian
cistern

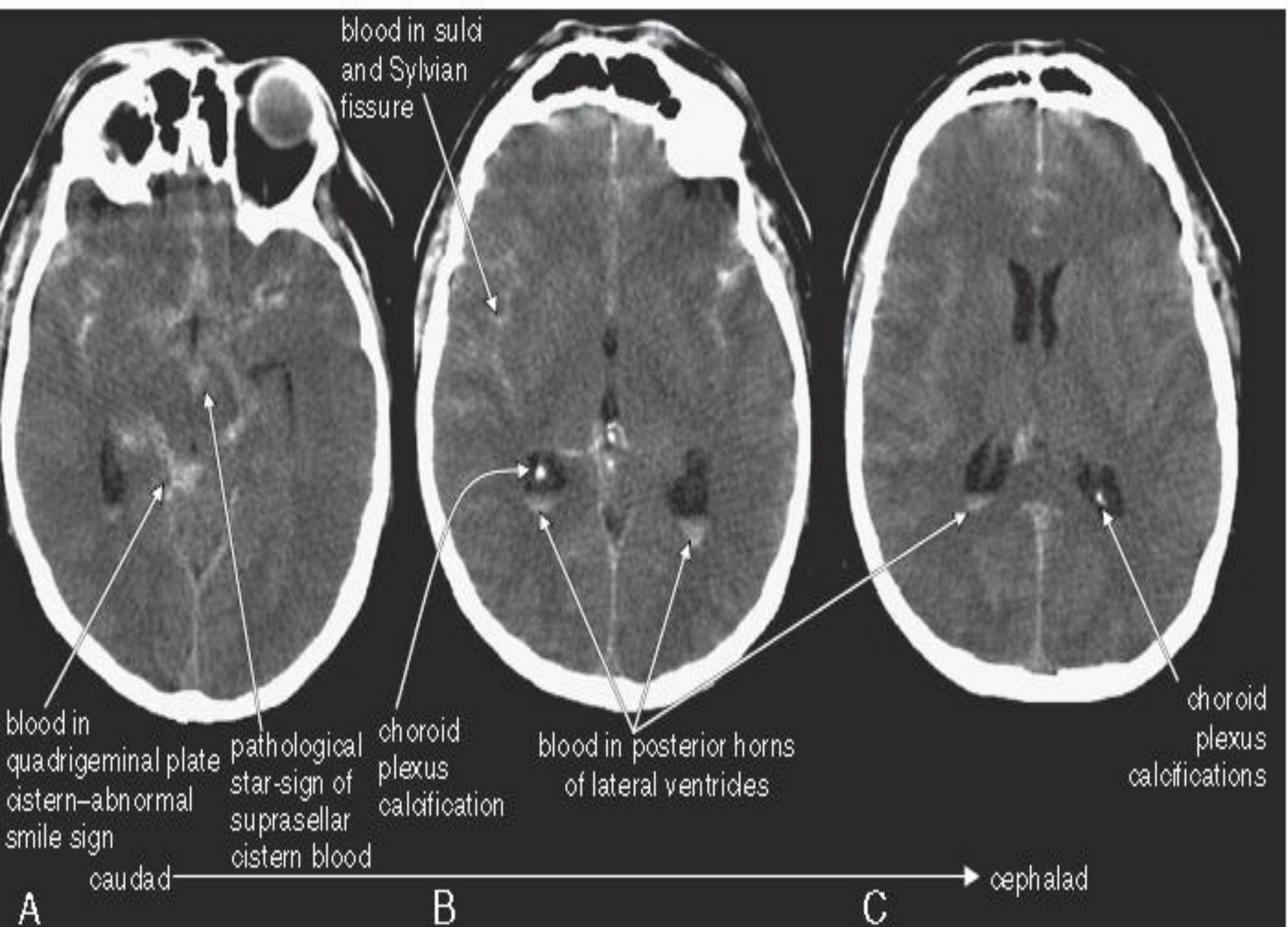
Quadrigenimal
cistern

Cerebellum

R

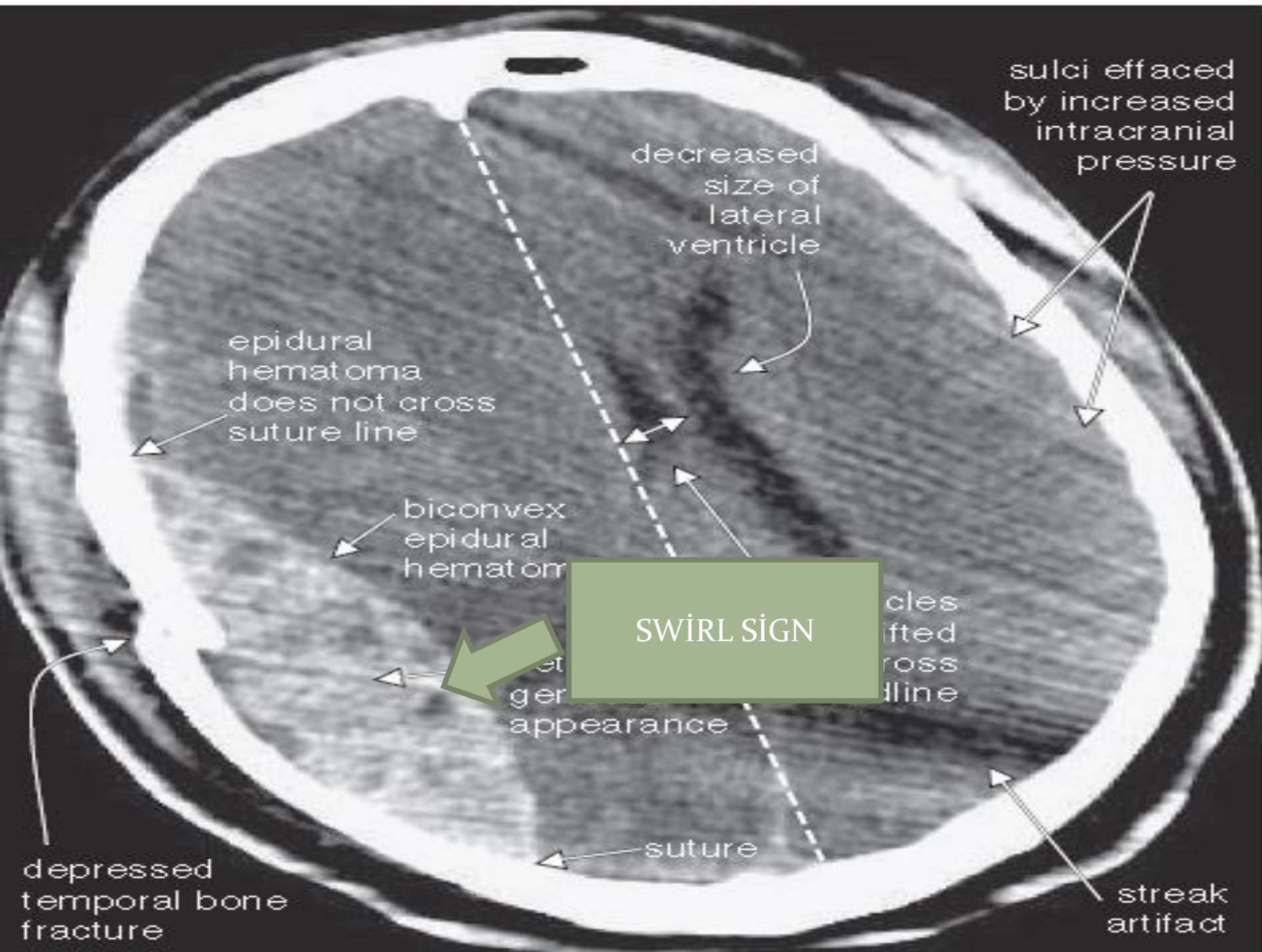
L

KV 120
mA 170



EDH

- Dura dışı--Orta meningeal arter--Neredeyse her zaman travmatik
- Hematom---hızlı---kitle etkisi veee.... transfalksin herniasyon
- Bikonveks disk veya lens
- Genellikle temporal bölgede
- Dura sutür hatlarından kalvaryuma bağlıdır bu nedenle EDH SÜTÜR HATLARINI GEÇMEZ
- ORATA HATTI GEÇER





SDH

- Dura beyin arası ---köprü ven ---
venöz
- Sınırlayabilir---shift
- Tekrar kanayabilir
- Kresent- yarım ay
- Sütürler tarafından
sınırlandırılmaz

ventricles
shifted
across
midline

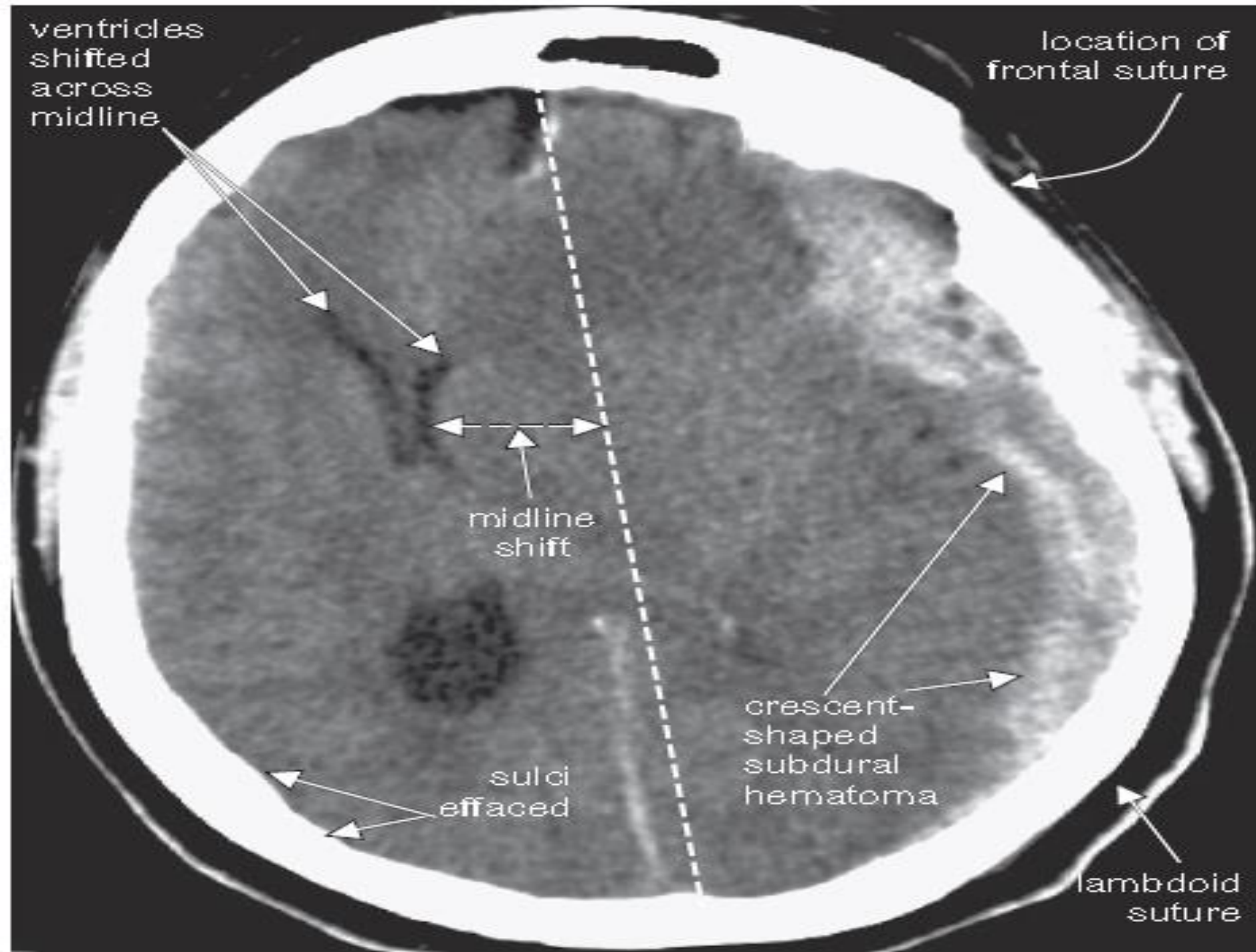
location of
frontal suture

midline
shift

crescent-
shaped
subdural
hematoma

sulci
effaced

lambdoid
suture





subdural
hematoma

A



chronic
subdural
hematomas

B

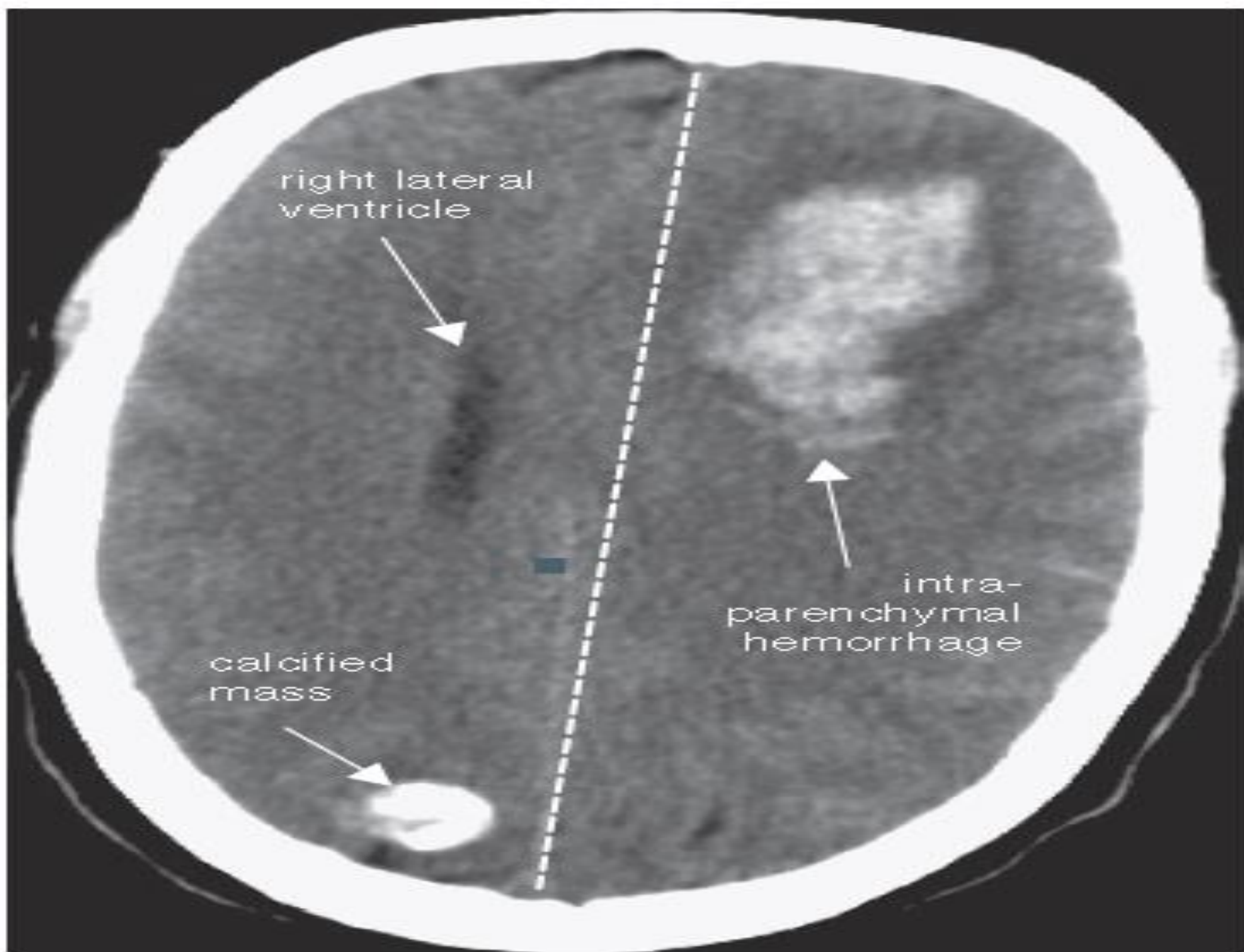


subdural hematomas
with blood of varying
ages

C

İNTRAPARANKİMAL HEMATOM

- HT---TRAVMA
- KALSİFİKASYONLAR---
PİNEAL GLAND KOROİD
PLEKSUS MENİNGKS
- KEMİK PENCEREDİ
BEYAZ KALIR





intra-
parenchymal
hemorrhage
with mass
effect

A



intra-
parenchymal
hemorrhage

B



B ----BEYİN

- NEOPLASTİK KİTLELER
 - VAZOJENİK ÖDEM
 - APSE
 - İSKEMİK İNFARKT
 - GLOBAL ÖDEM

normal
posterior horn
of right lateral
ventricle

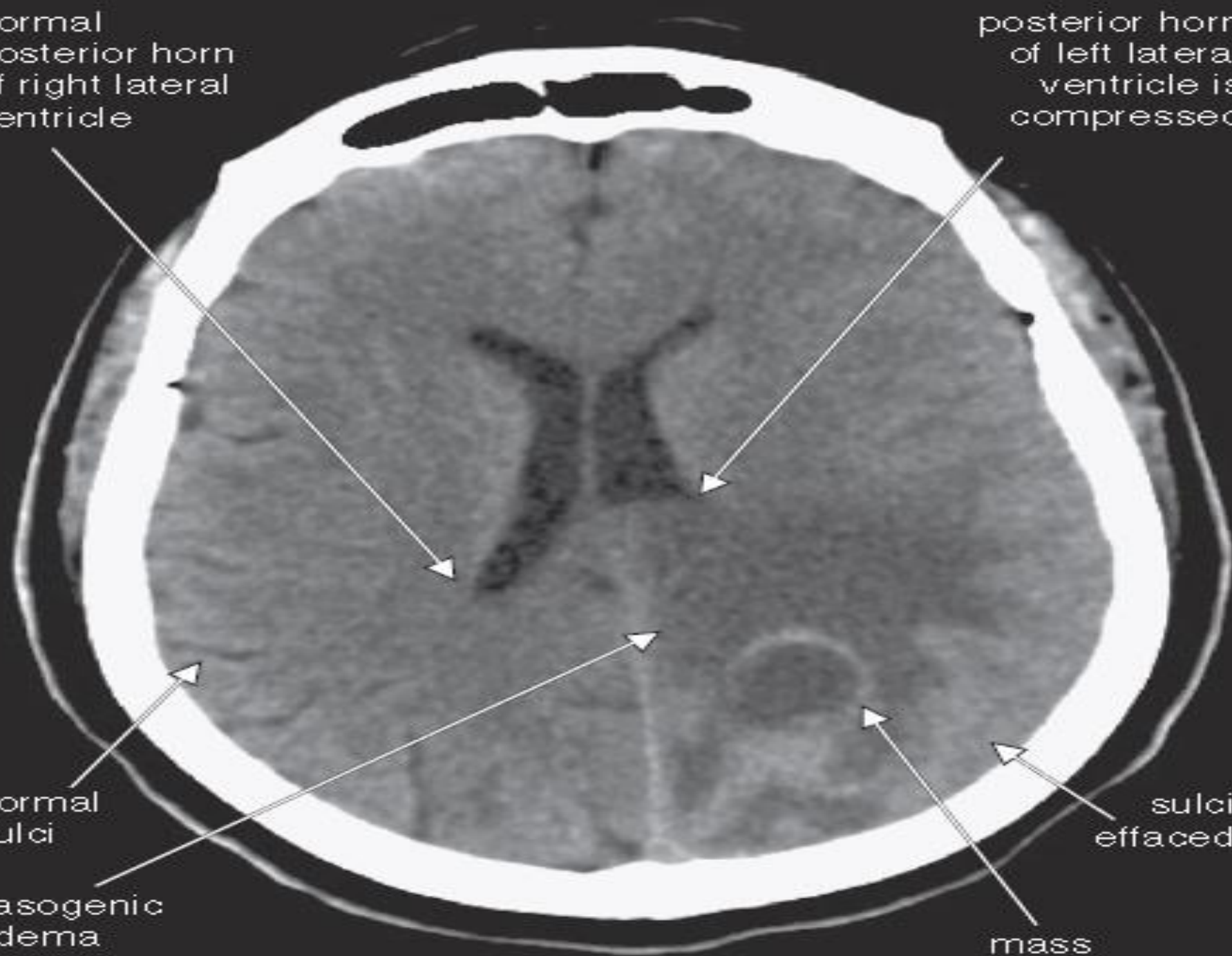
posterior horn
of left lateral
ventricle is
compressed

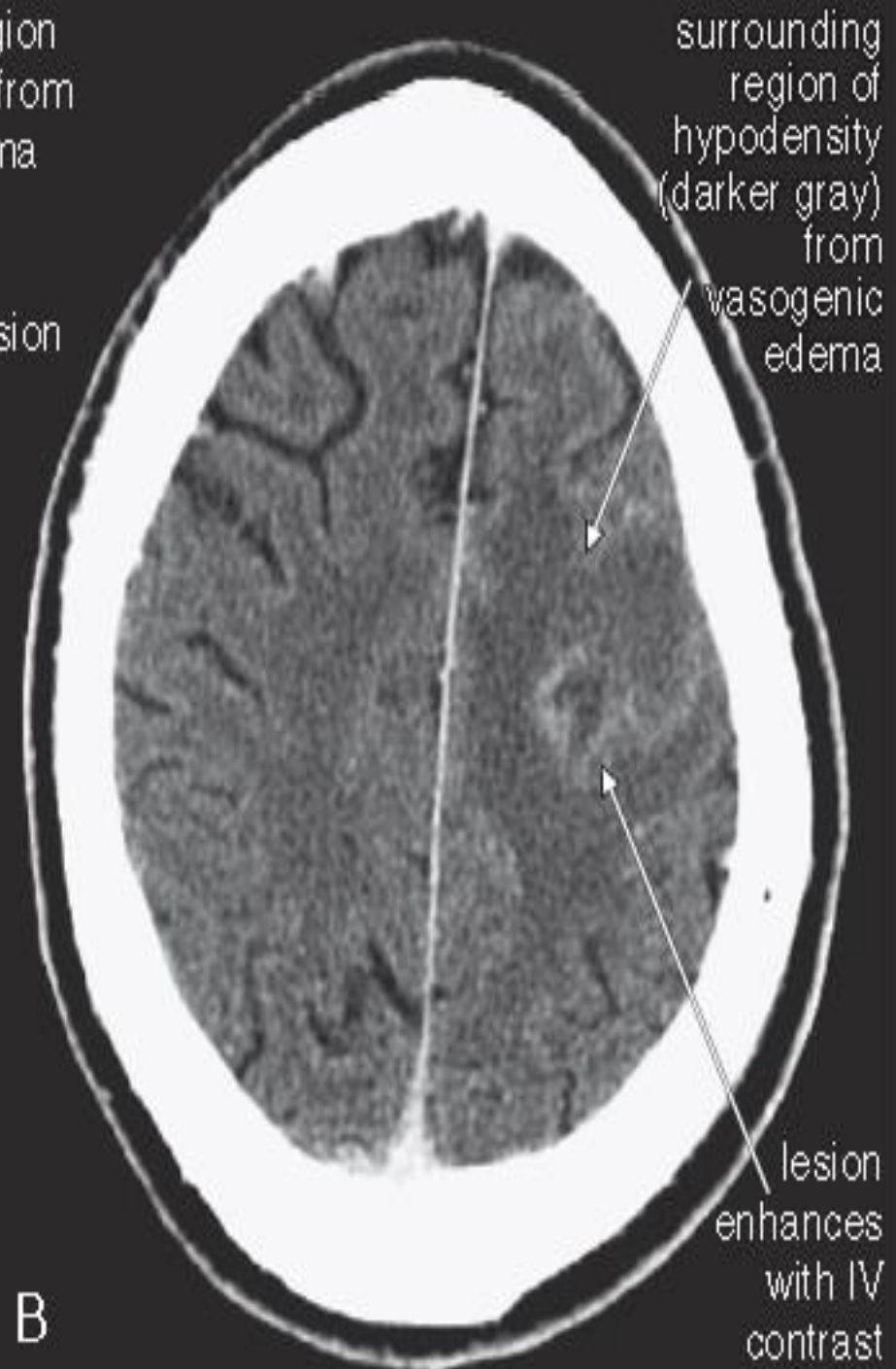
normal
sulci

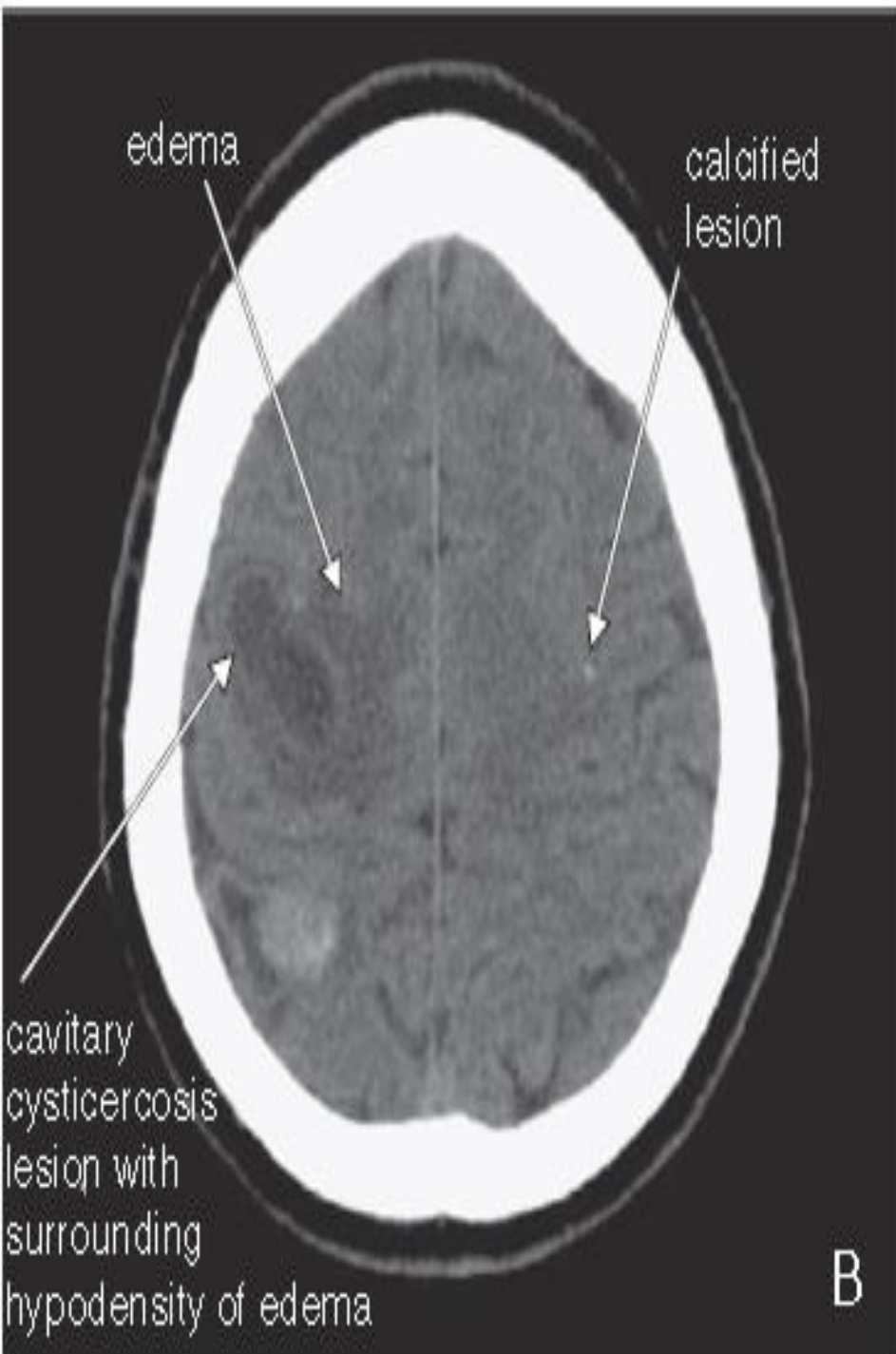
vasogenic
edema

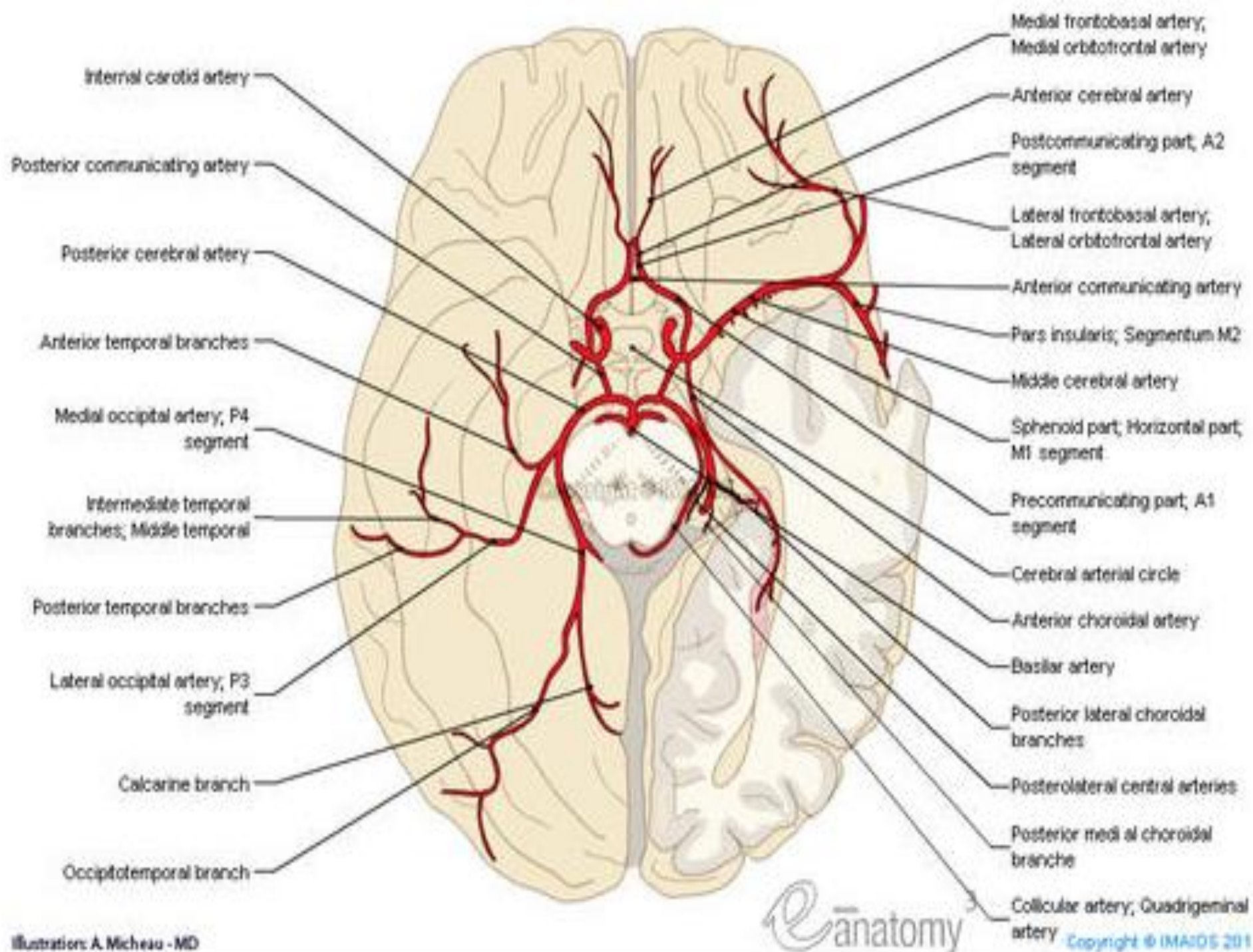
sulci
effaced

mass









normal MCA,
not visible

hyperdense
MCA



**İSKEMİK
SVO %85**

%31 İLK 3 SAAT

>6 SAAT

**HİPERDENS
MCA:**

**PROKSİMAL
MCA**

**OKLÜZYONU
SEMPTOMLA
BİRLİKTE
OLUŞUR**

gray matter

white matter



white matter (myelinated axon tracts)
contain fat, have a low density, and thus
appear darker gray on CT

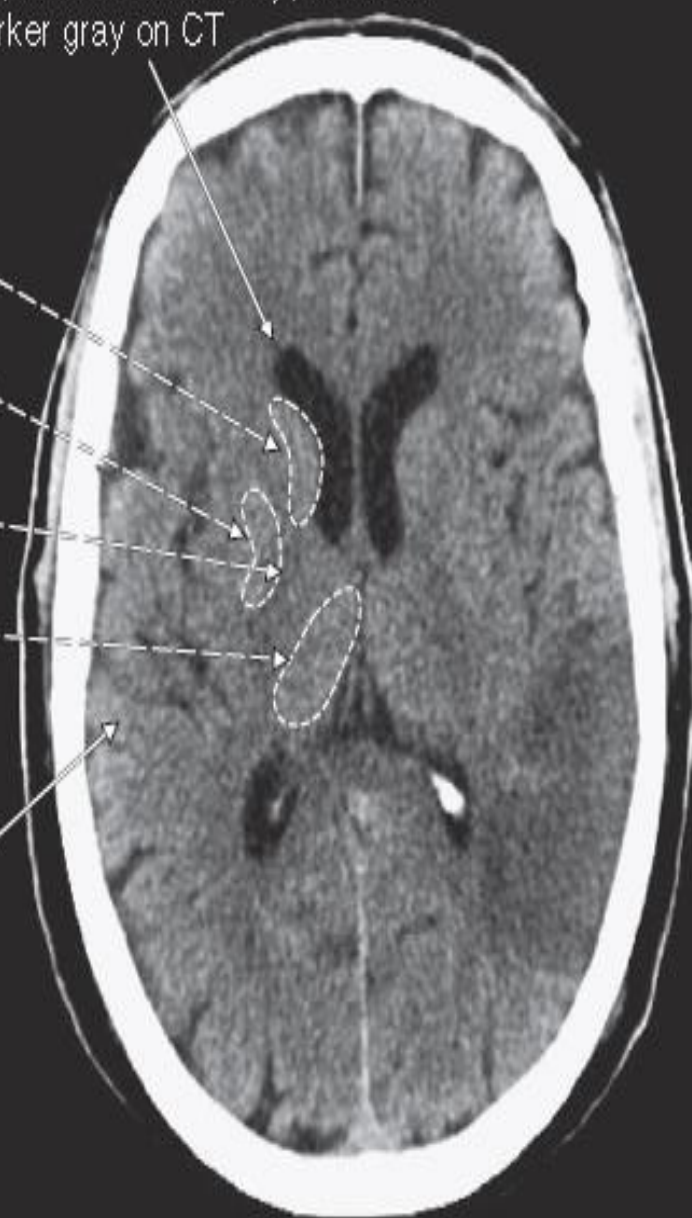
caudate

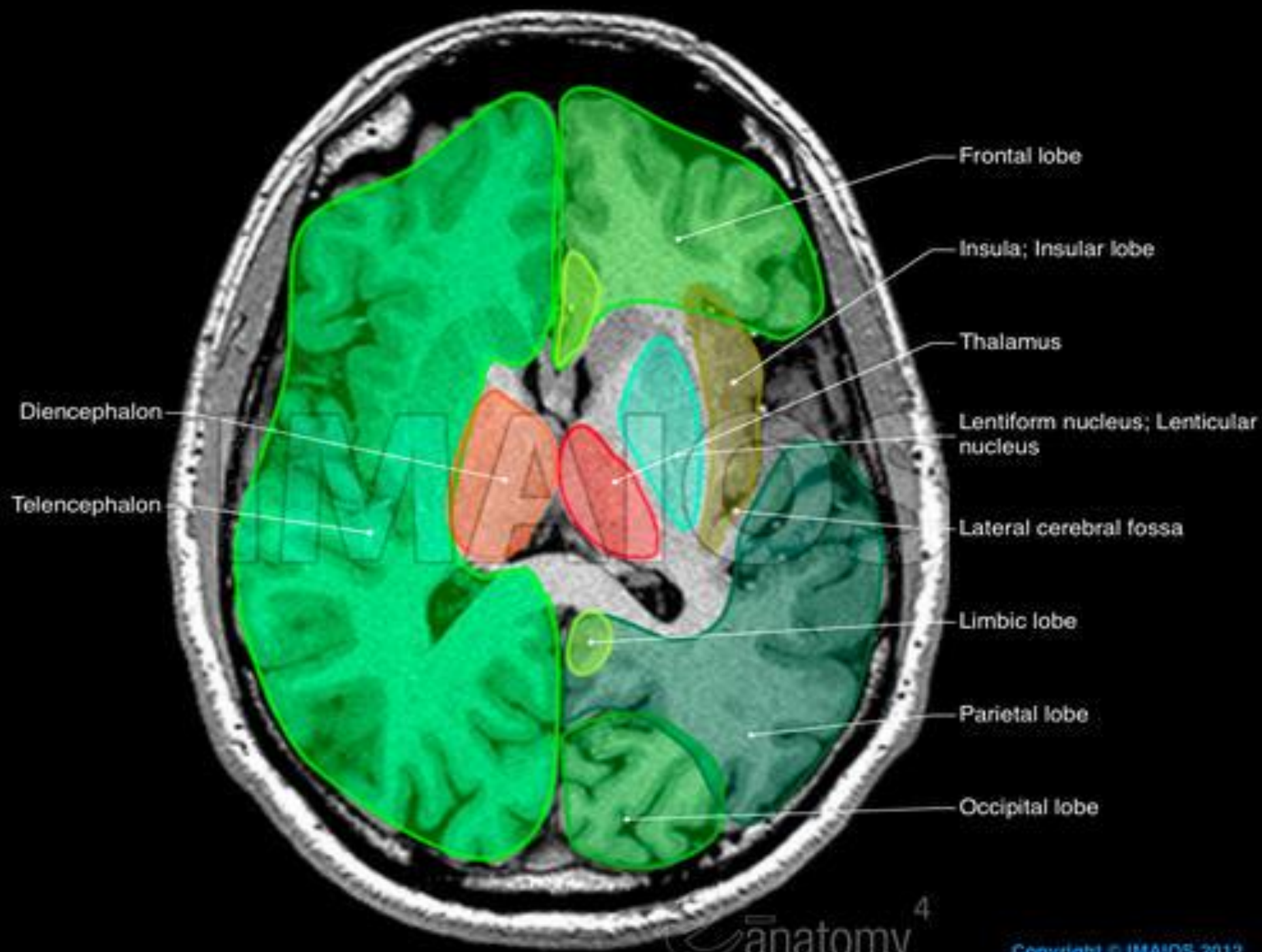
lentiform
nucleus

internal
capsule

thalamus

cerebral
cortex

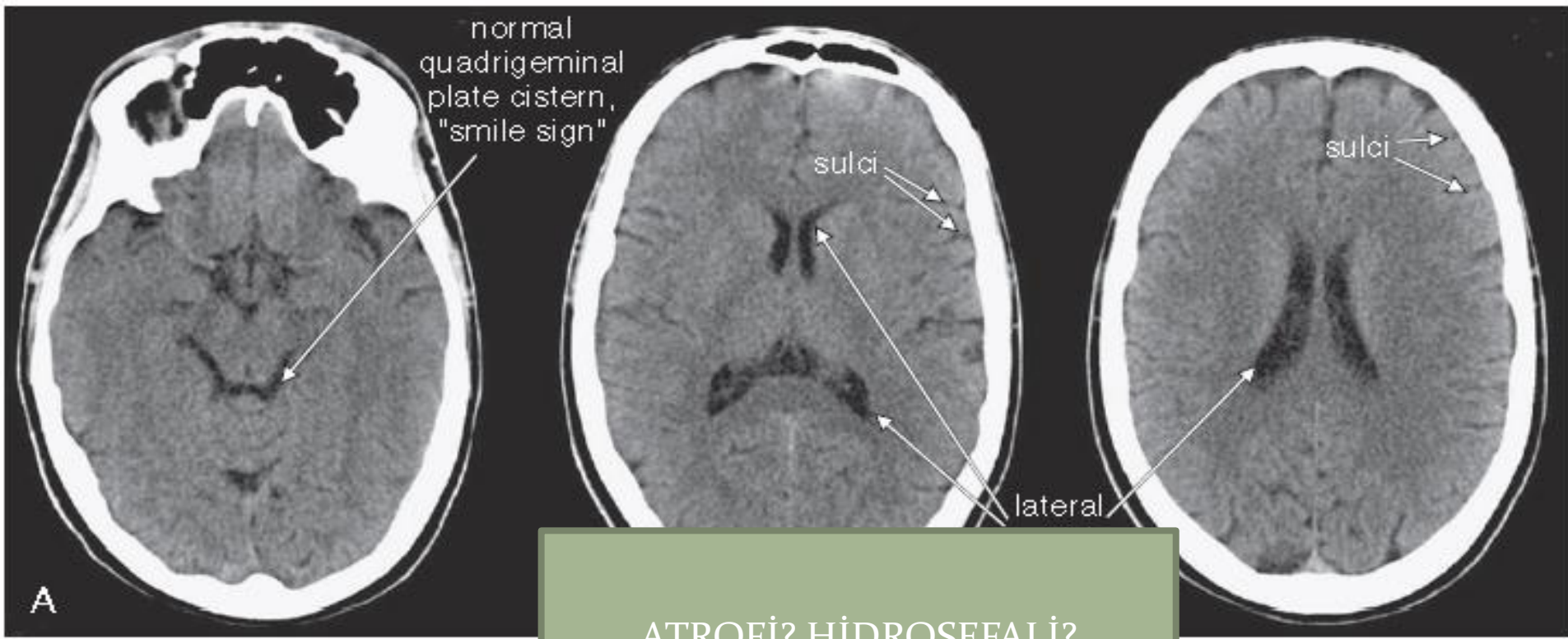




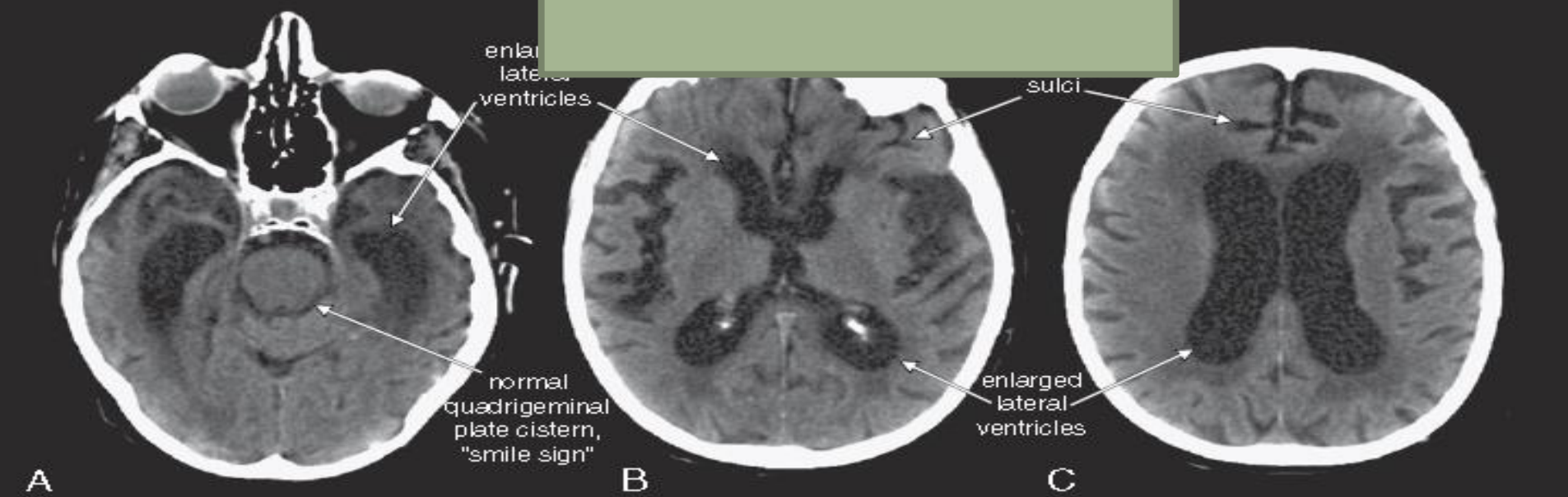


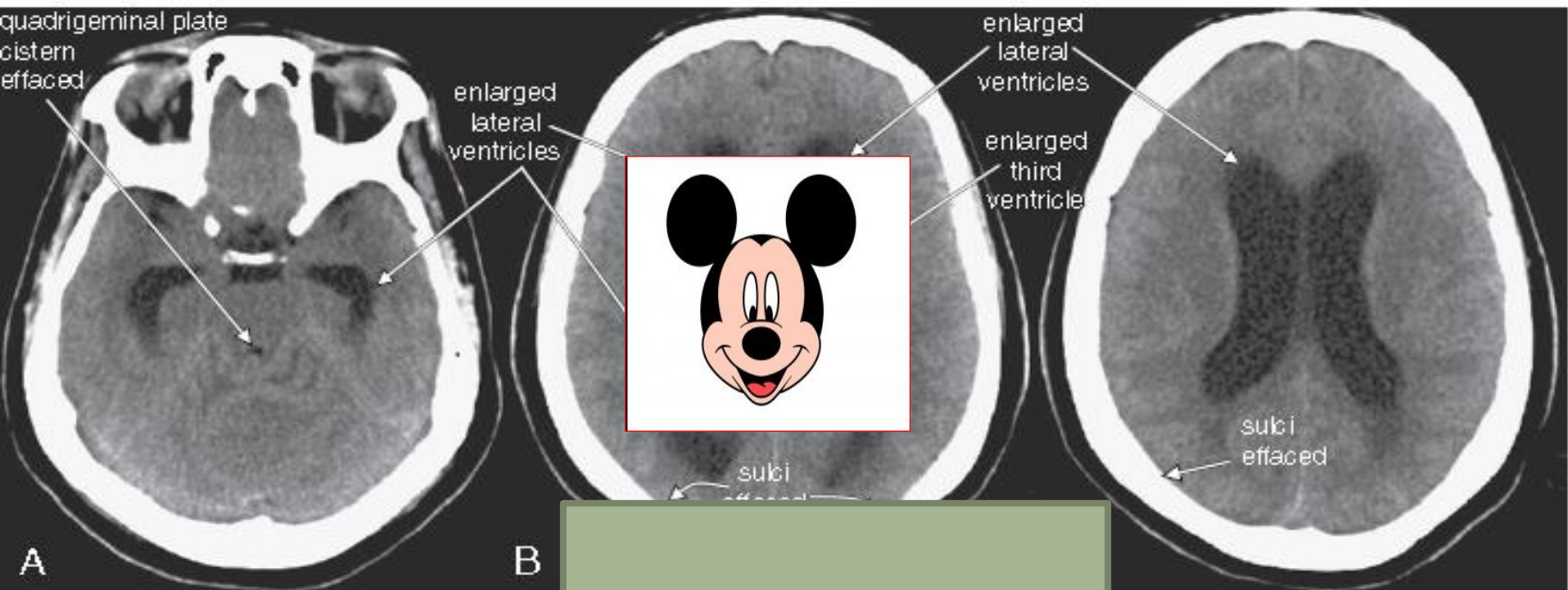
Insular ribbon sign - refers to loss of the normal insular cortex grey-white differentiation and is one of the earliest imaging signs of **middle cerebral artery territory infarction**. The insular cortex is located along the Sylvian fissure overlying the external capsule where a 'ribbon' of normal cortex should be appreciable (red arrows). In the setting of MCA infarction, cytotoxic oedema leads to hypoattenuation such that the normal insular ribbon is no longer visible (blue arrows).



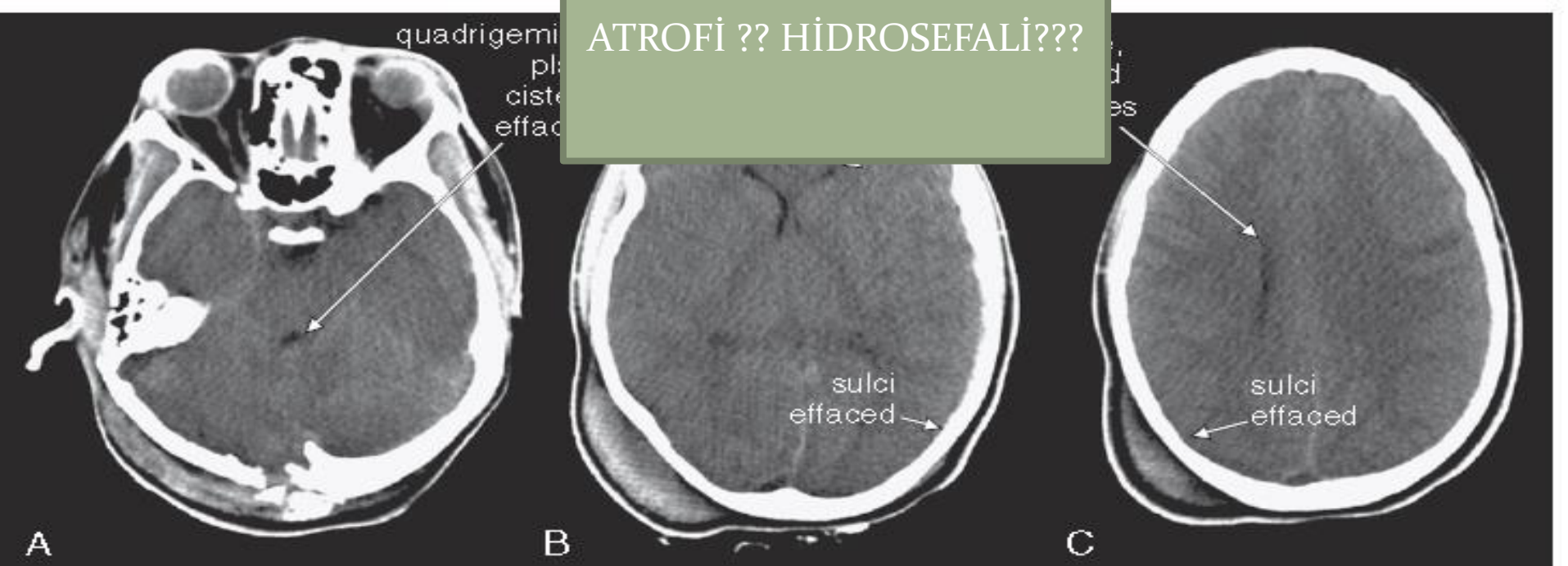


ATROFI? HİDROSEFALİ?

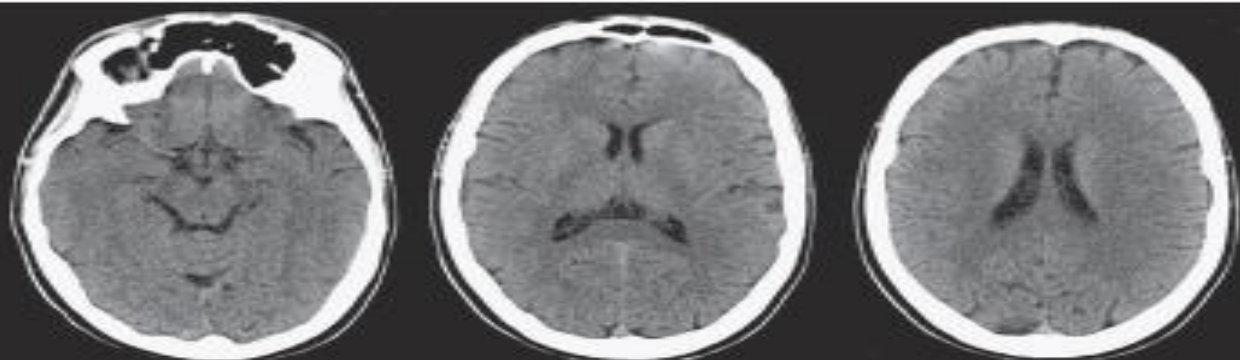




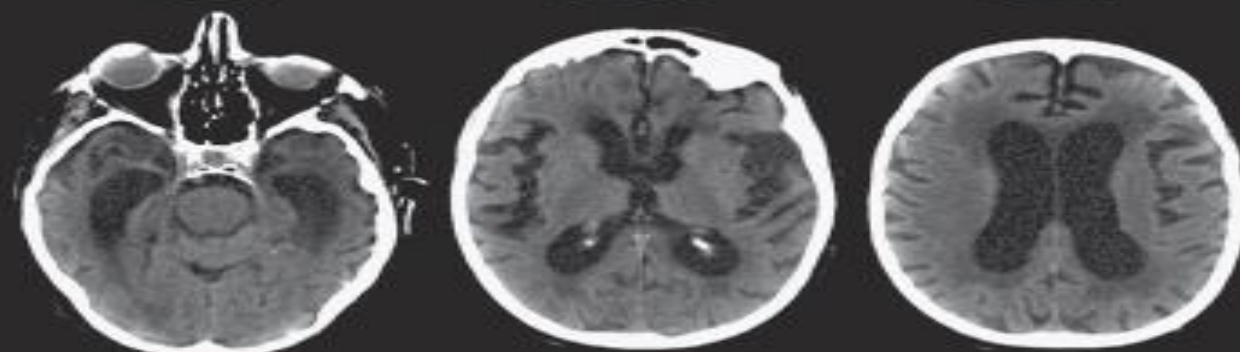
ATROFI ?? HÍDROSEFALÍ???



normal



atrophy



hydrocephalus



edema

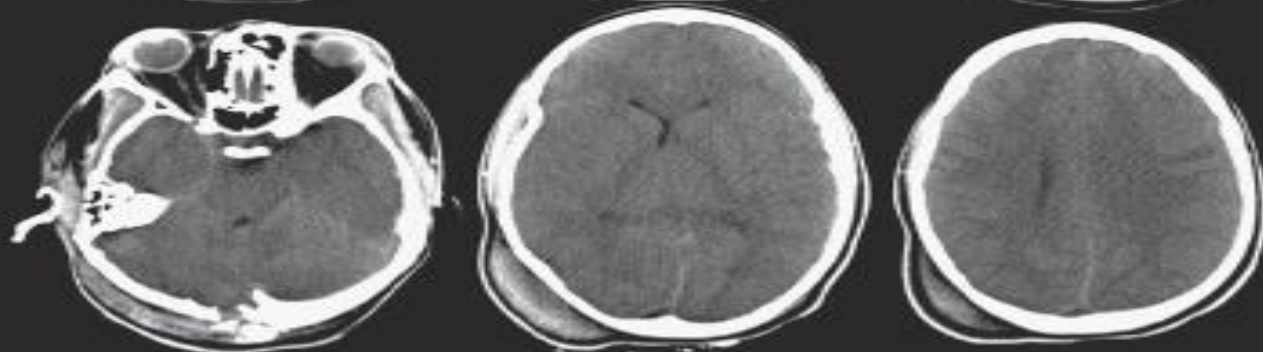


Image 1. CT Anatomy of skull, axial reconstruction, bone window.
1, Parietal bone. 2, Sagittal suture.

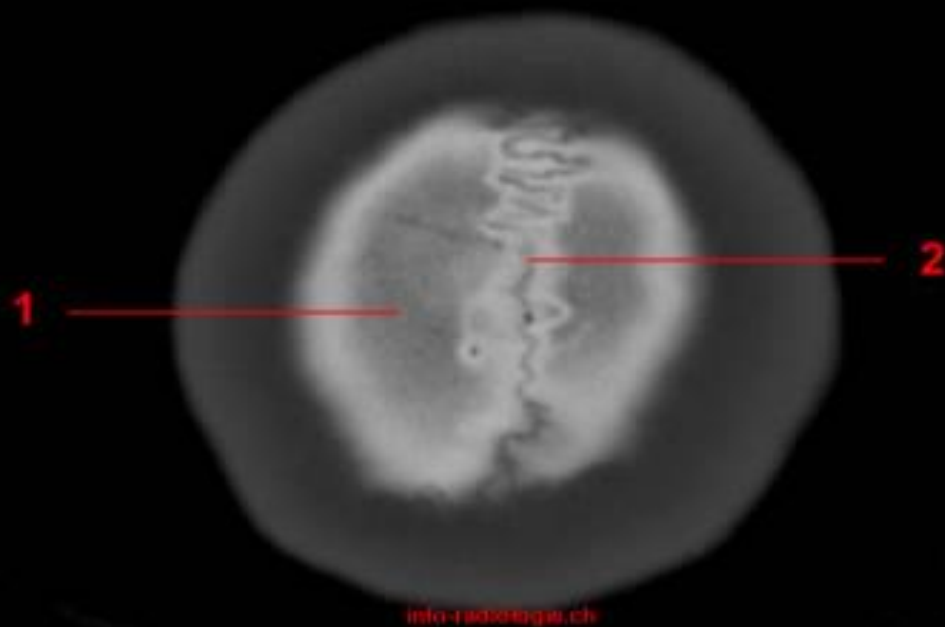


Image 2. CT Anatomy of skull, axial reconstruction, bone window.

1. Parietal bone. 2. Lambdoid suture. 3. Lambda.

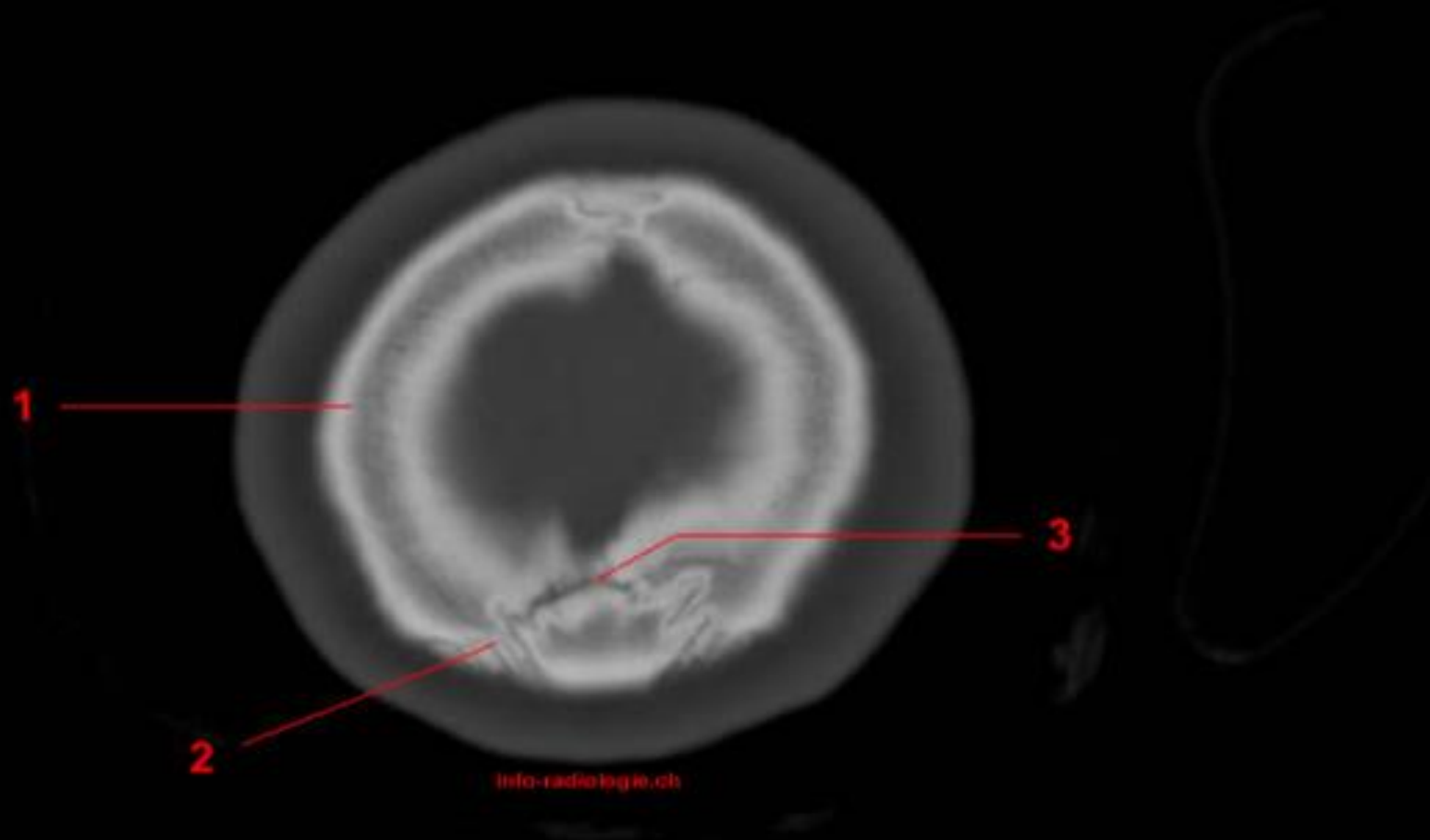


Image 3. CT Anatomy of skull, axial reconstruction, bone window.
1. Sagittal suture. 2. Parietal bone. 3. Lambdoid suture. 4. Occipital bone.

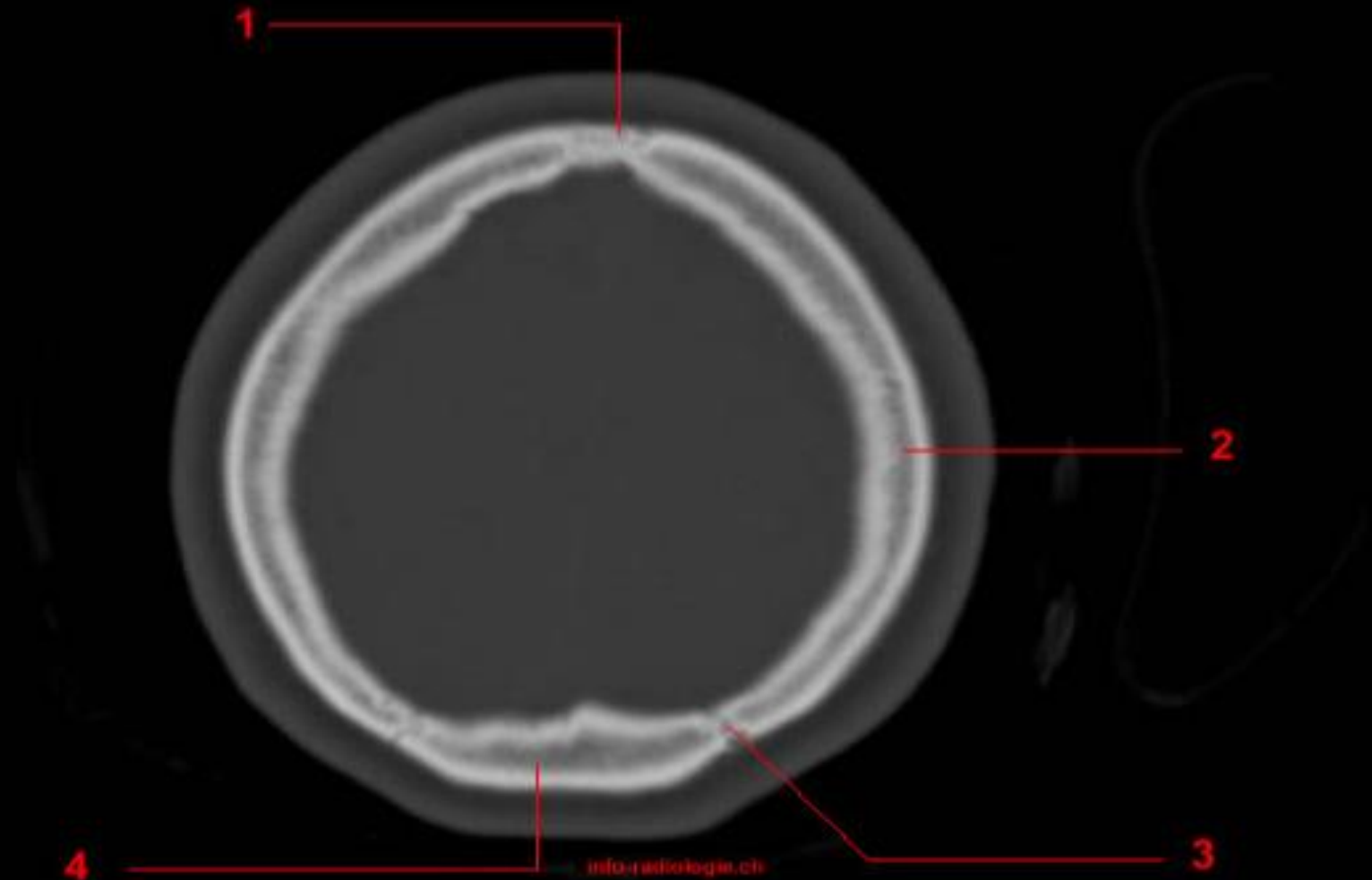


Image 4. CT Anatomy of skull, axial reconstruction, bone window.

1, Coronal suture. 2, Bregma. 3, Parietal bone. 4, Lambdoid suture. 5, Occipital bone.

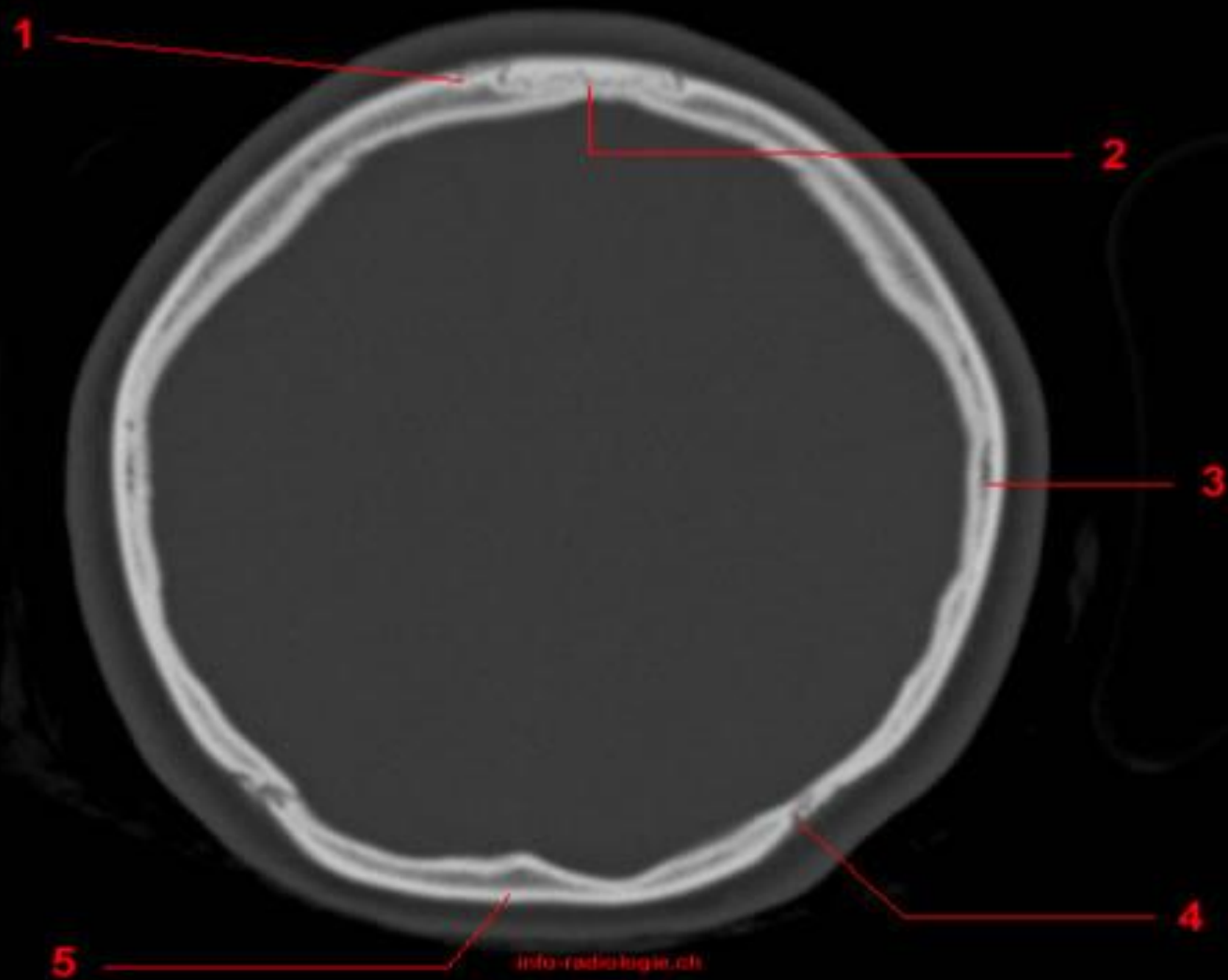


Image 5. CT Anatomy of skull, axial reconstruction, bone window.

1. Frontal bone. 2. Coronal suture. 3. Parietal bone. 4. Lambdoid suture. 5. Occipital bone.

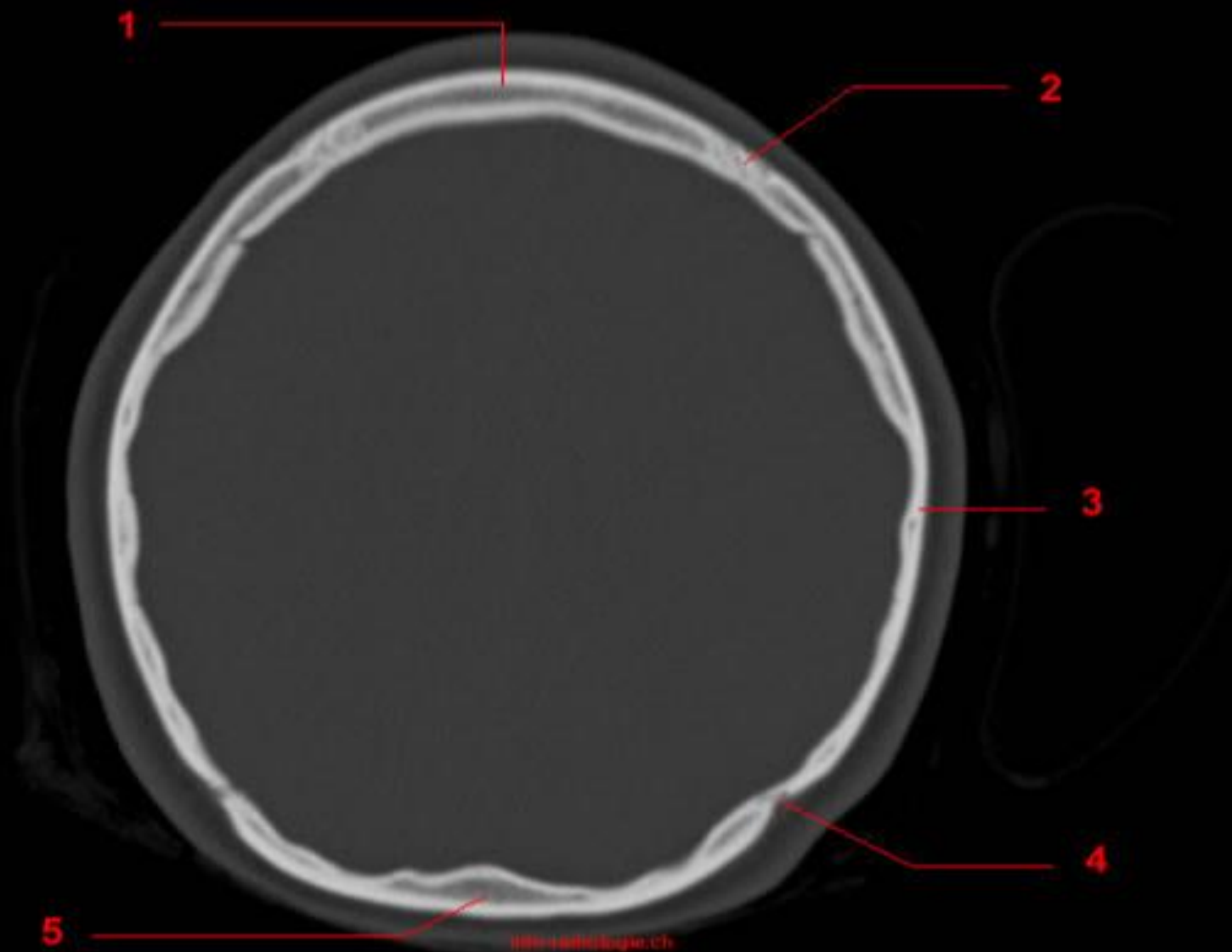


Image 6. CT Anatomy of skull, axial reconstruction, bone window.

1, Temporal bone. 2, Frontal bone. 3, Squamosal suture. 4, Mastoid air cells. 5, Lambdoid suture. 6, Occipital bone. 7, Posterior cranial fossa.

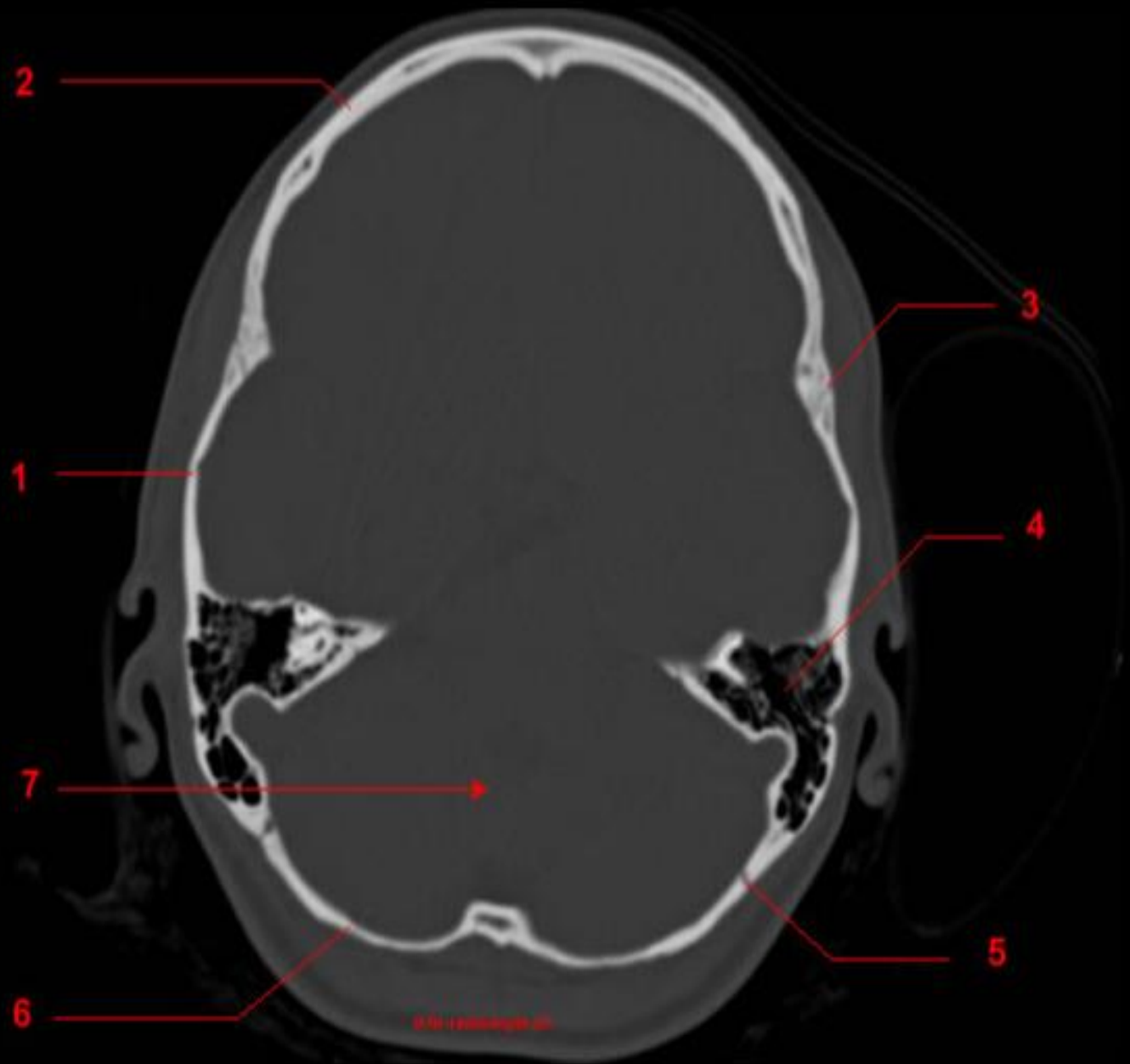


Image 7. CT Anatomy of skull, axial reconstruction, bone window.

1. Middle cranial fossa. 2. Greater wing of sphenoid bone. 3. Frontal bone. 4. Anterior cranial fossa. 5. external auditory canal. 6. Petrous temporal bone.

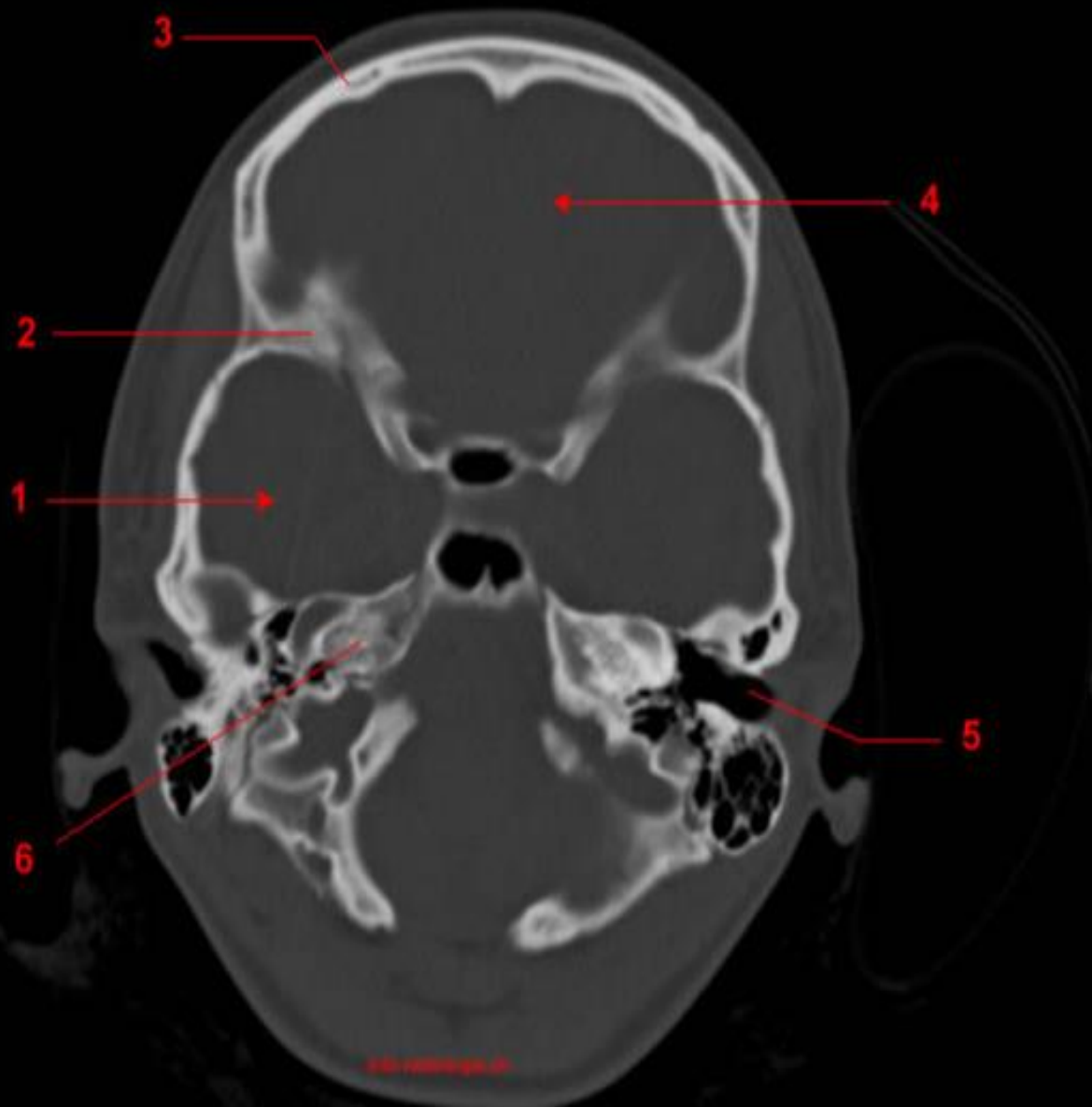


Image 8. CT Anatomy of skull, axial reconstruction, bone window.

1. Mandibular condyle, 2. Sphenosquamosal suture, 3. Frontal bone, 4. Greater wing of sphenoid bone, 5. Temporal bone, 6. Sphenoid sinus, 7. Clivus.

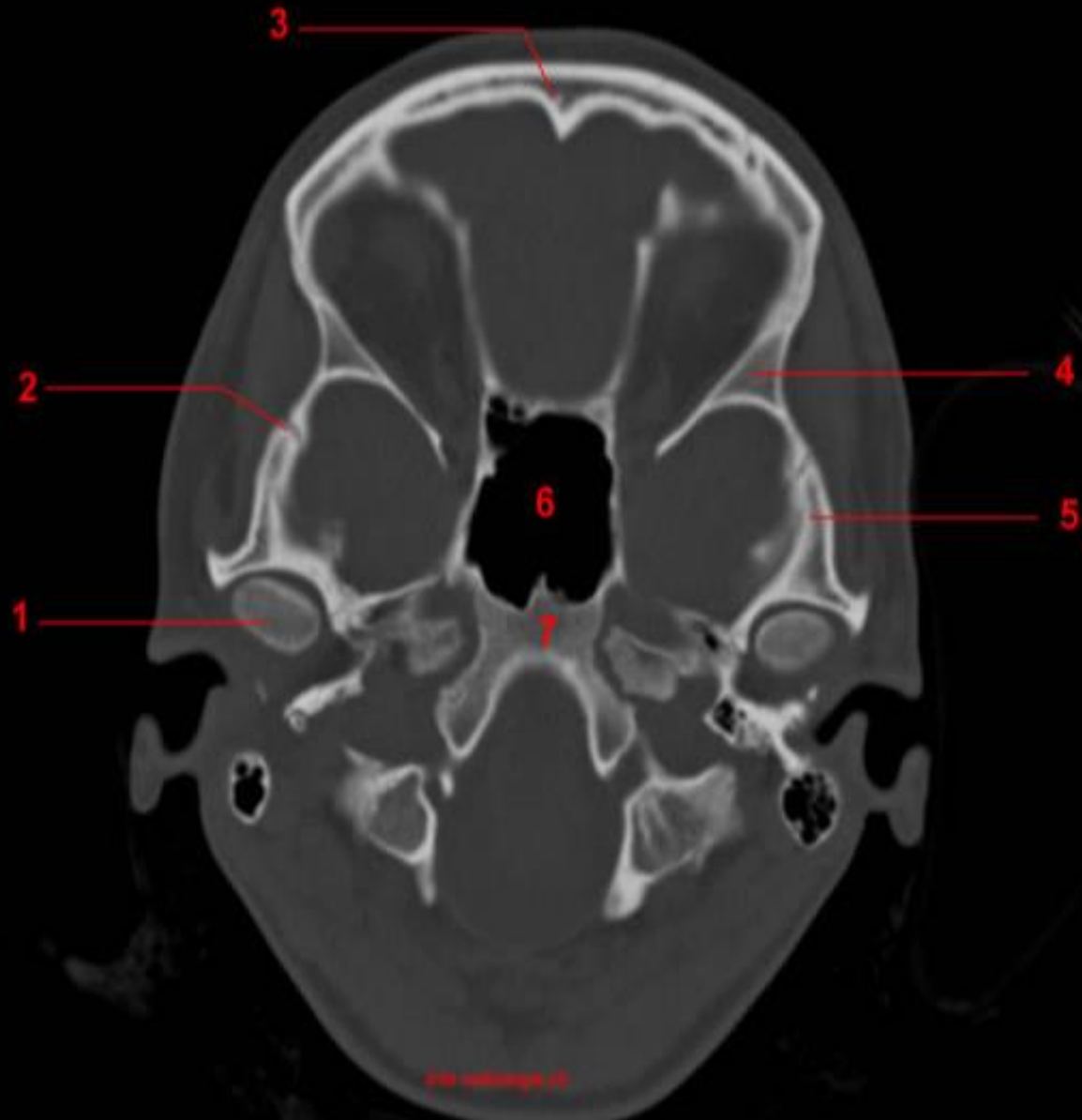


Image 9. CT Anatomy of skull, axial reconstruction, bone window.

1. Mandibular condyle. 2. Zygomatic bone. 3. Ethmoid bone / ethmoid air cells. 4. Zygomatic arch.

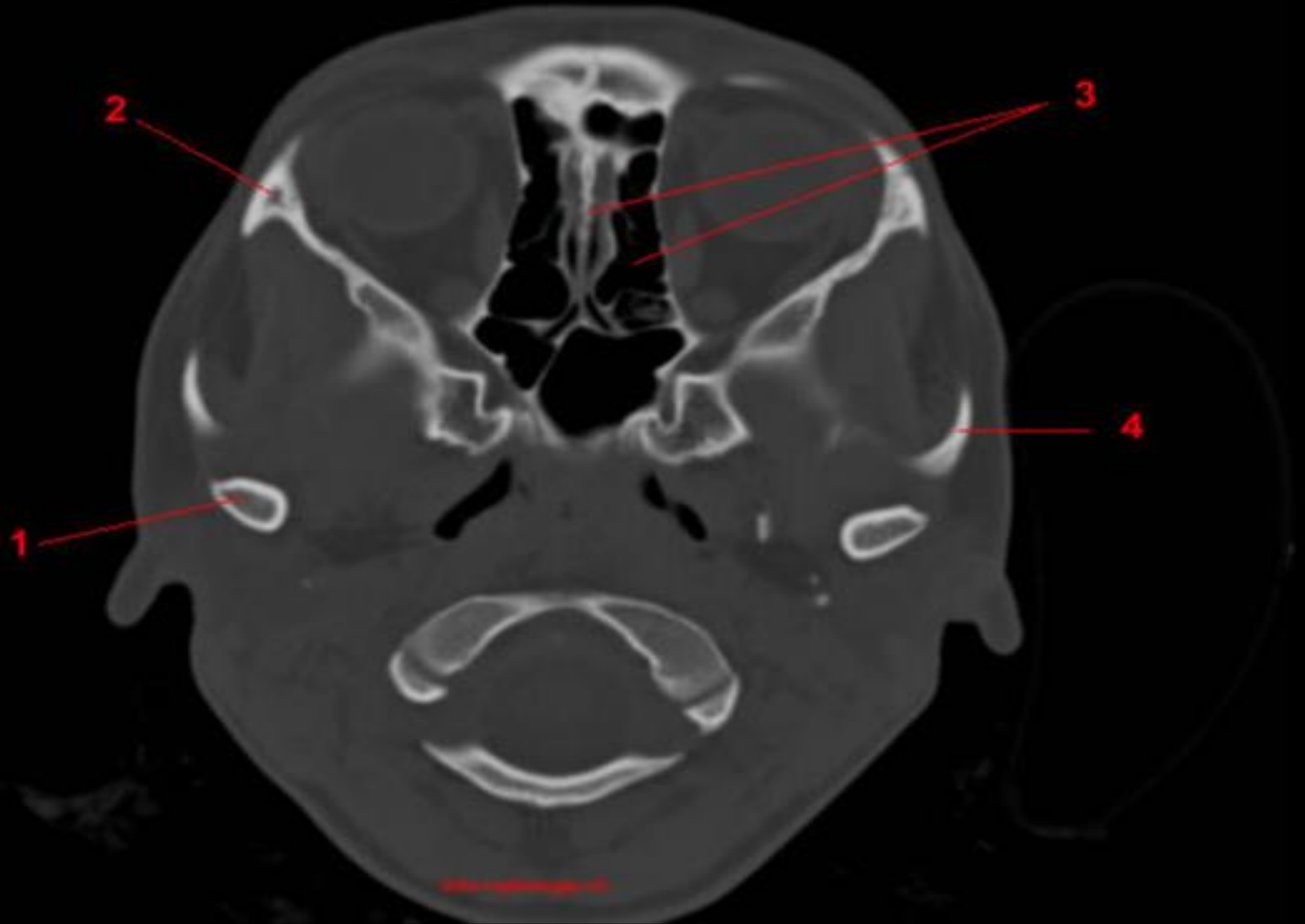


Image 10. CT Anatomy of skull, axial reconstruction, bone window.

1. Lateral mass of C1. 2. Zygomatic bone. 3. Globe. 4. Nasal bone. 5. Maxillary sinus. 6. Zygomatic arch. 7. Pterygoid process (sphenoid bone). 8. Mandible. 9. Odontoid process (C2).

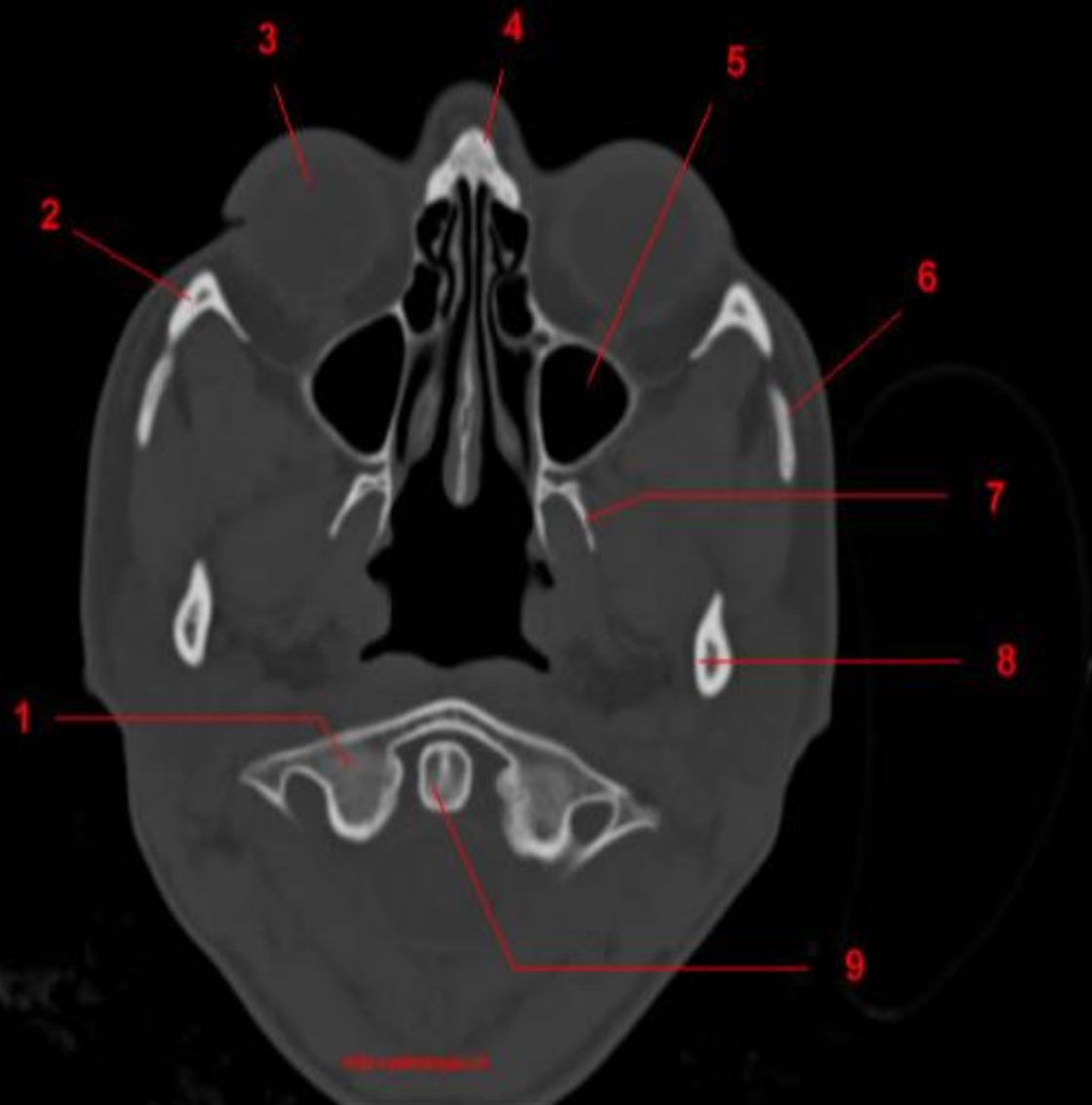
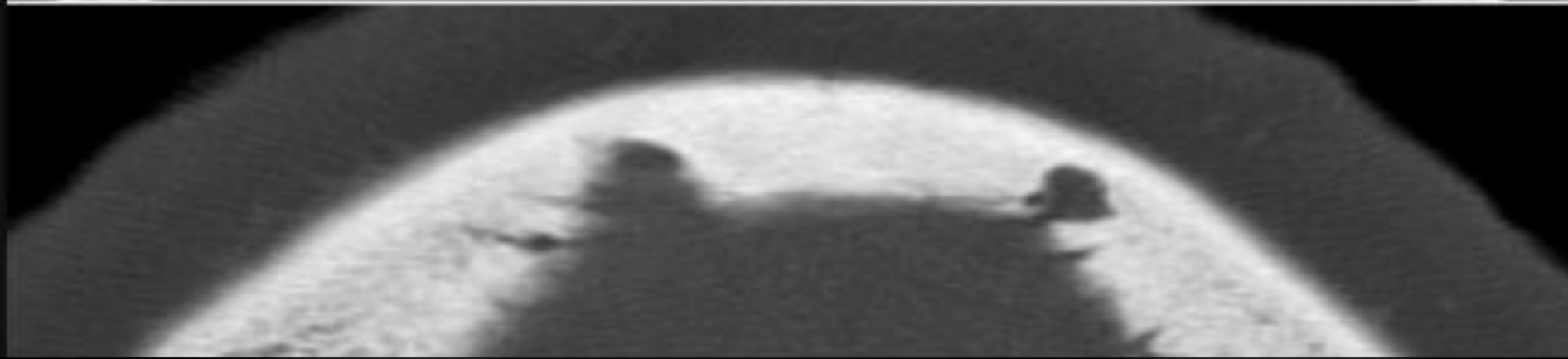
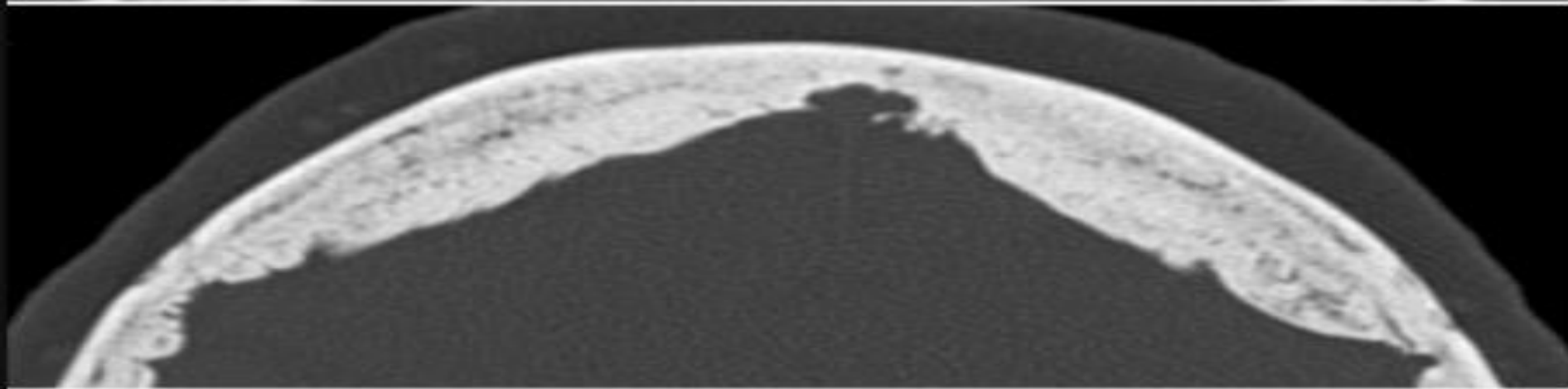
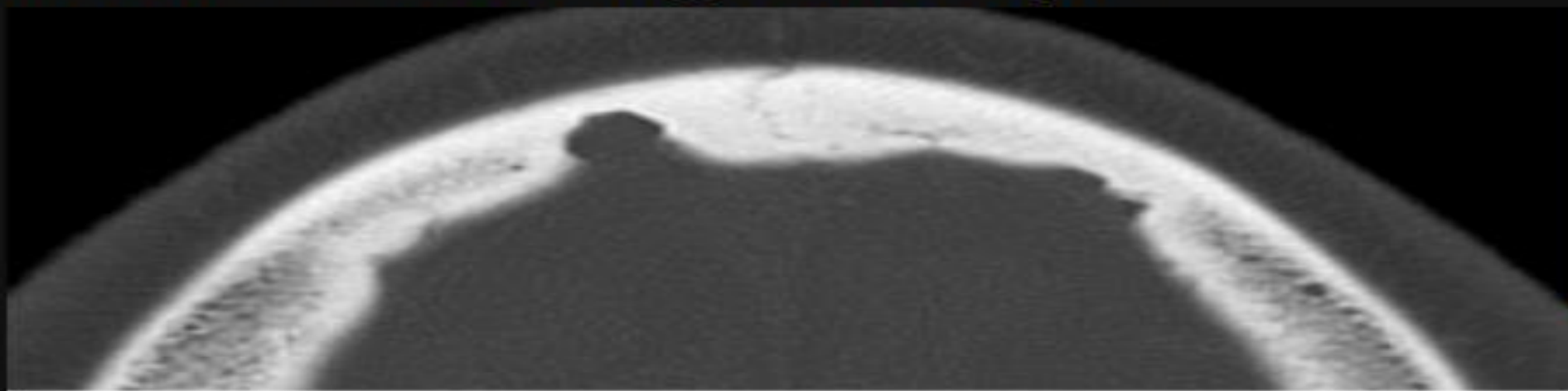


Image 11 of 11. CT Anatomy of skull, axial reconstruction, bone window.

1, C1. 2, Pterygoid process. 3, Maxillary sinus. 4, Zygomatic bone. 5, Mandible. 6, Odontoid process (C2).



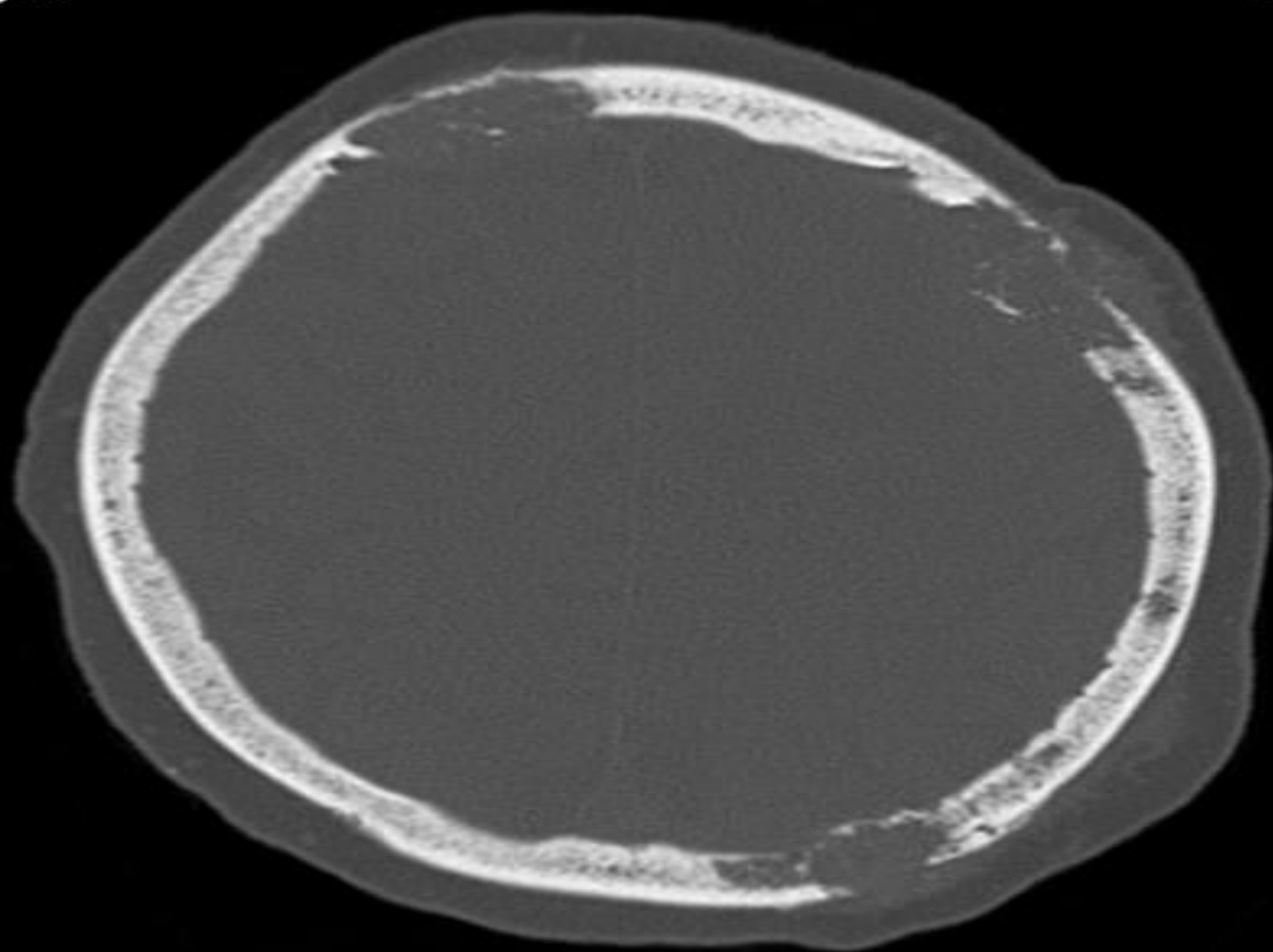
Normal CT - arachnoid granulation pits



Skull metastases

Right

Left



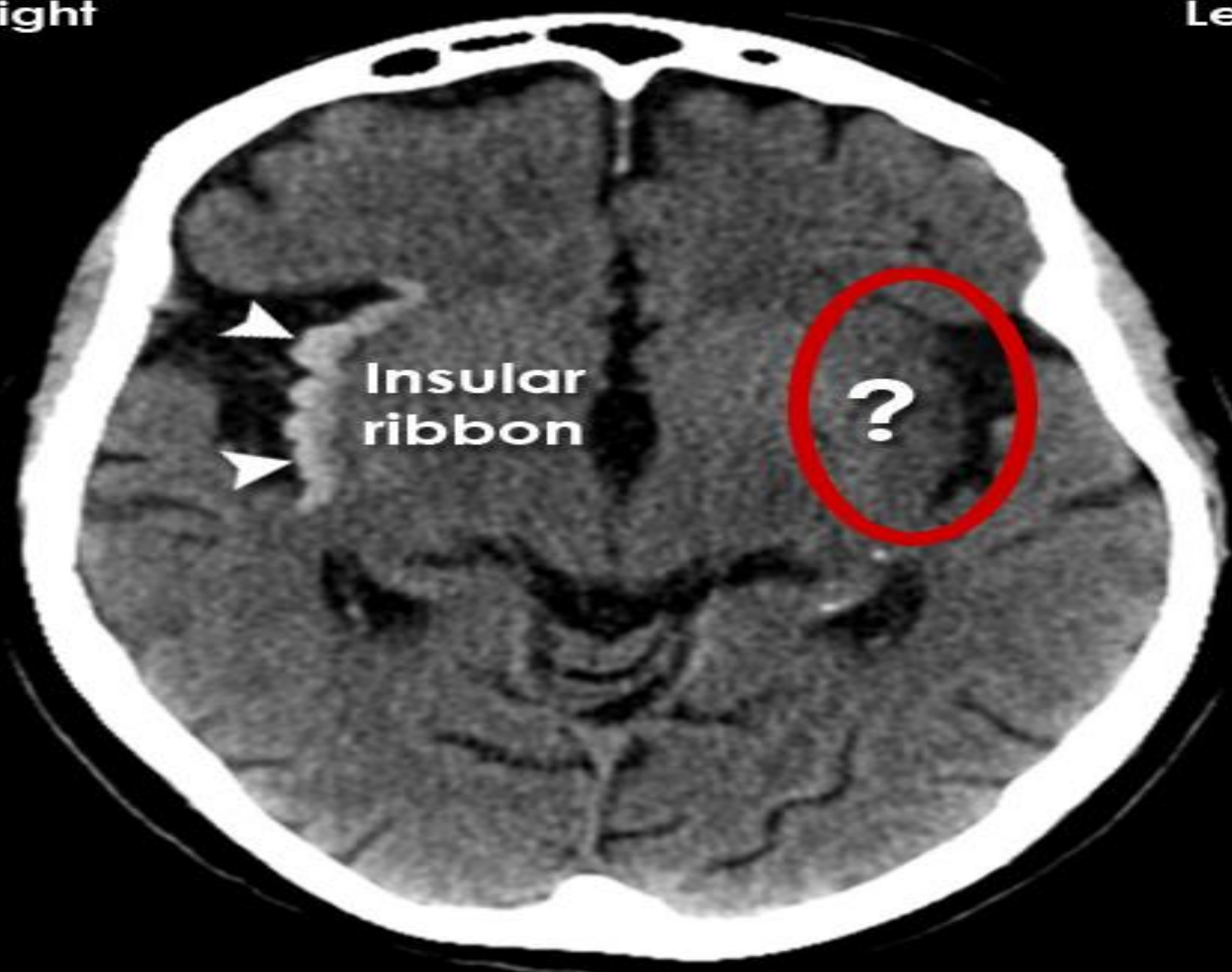
Right

Left



Right

Left



Insular
ribbon

?

Right

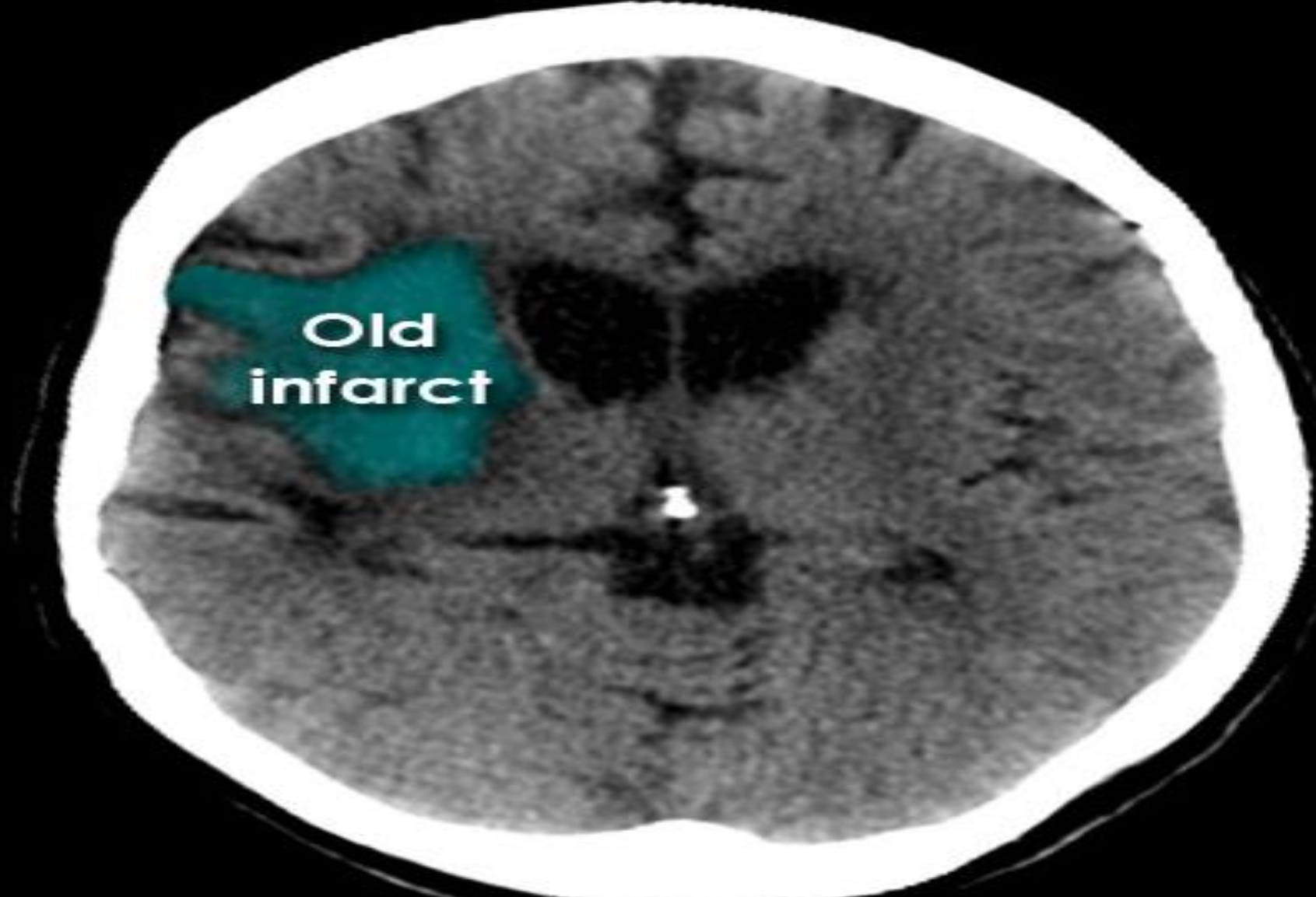
Left



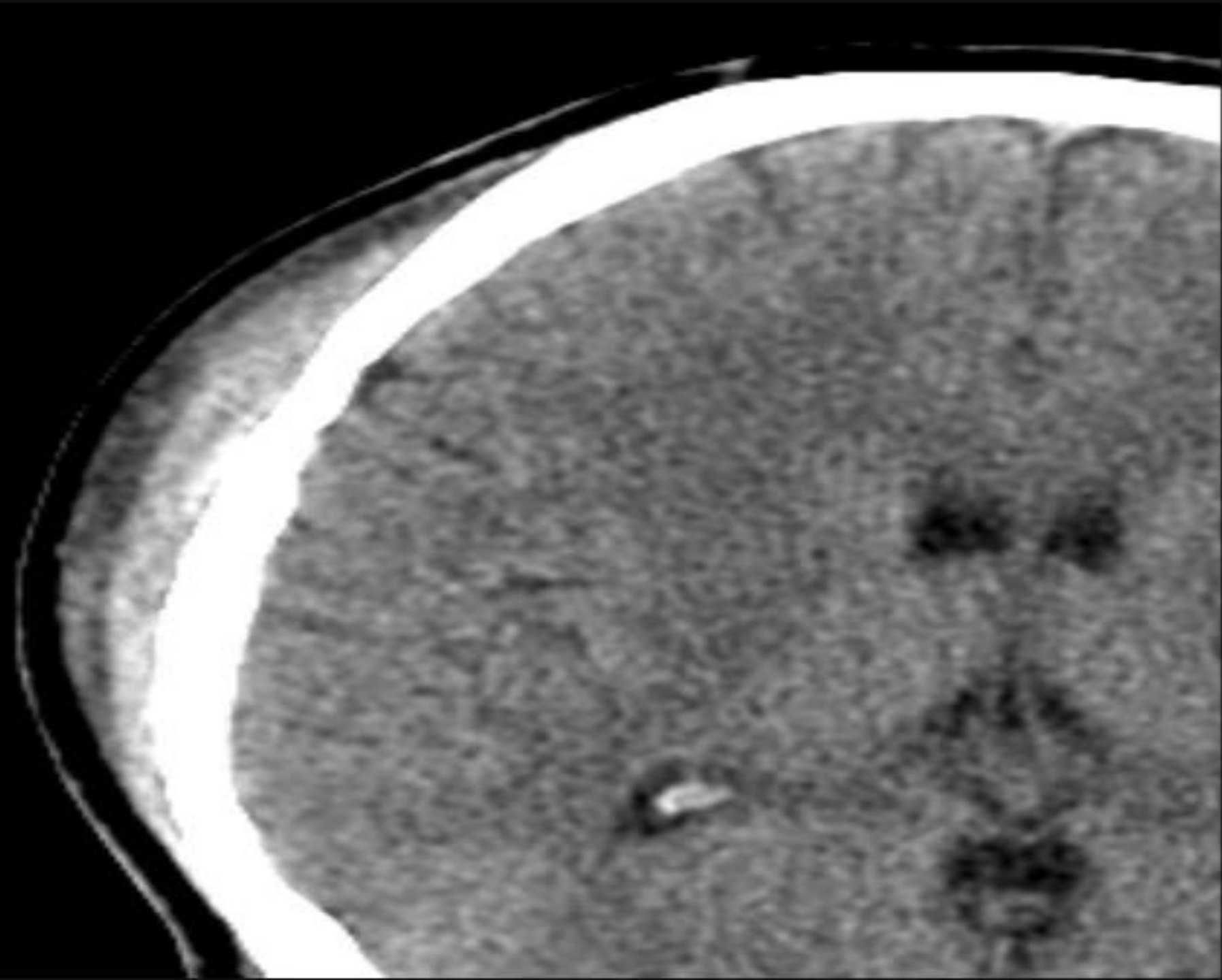
Right

Left

Old
infarct

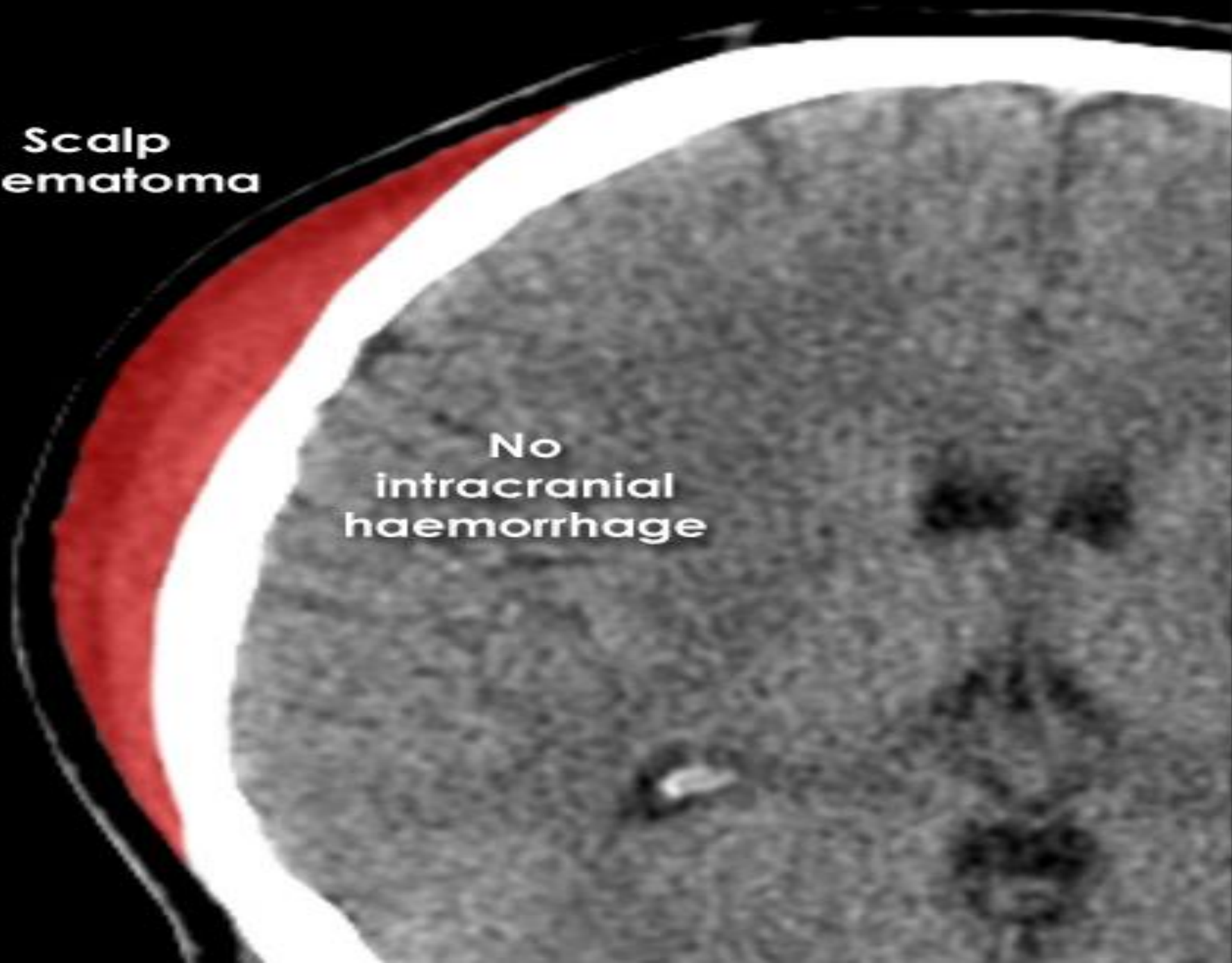


This is an axial CT scan of the brain. The image shows a cross-section of the brain with the skull visible as a bright white outer ring. The brain parenchyma is in shades of gray. In the upper left quadrant of the image, there is a well-defined, wedge-shaped area of hypodensity (darker gray) highlighted in red. This area is labeled 'Old infarct' in white text. The surrounding brain tissue appears relatively normal. The ventricles are visible in the center of the brain.

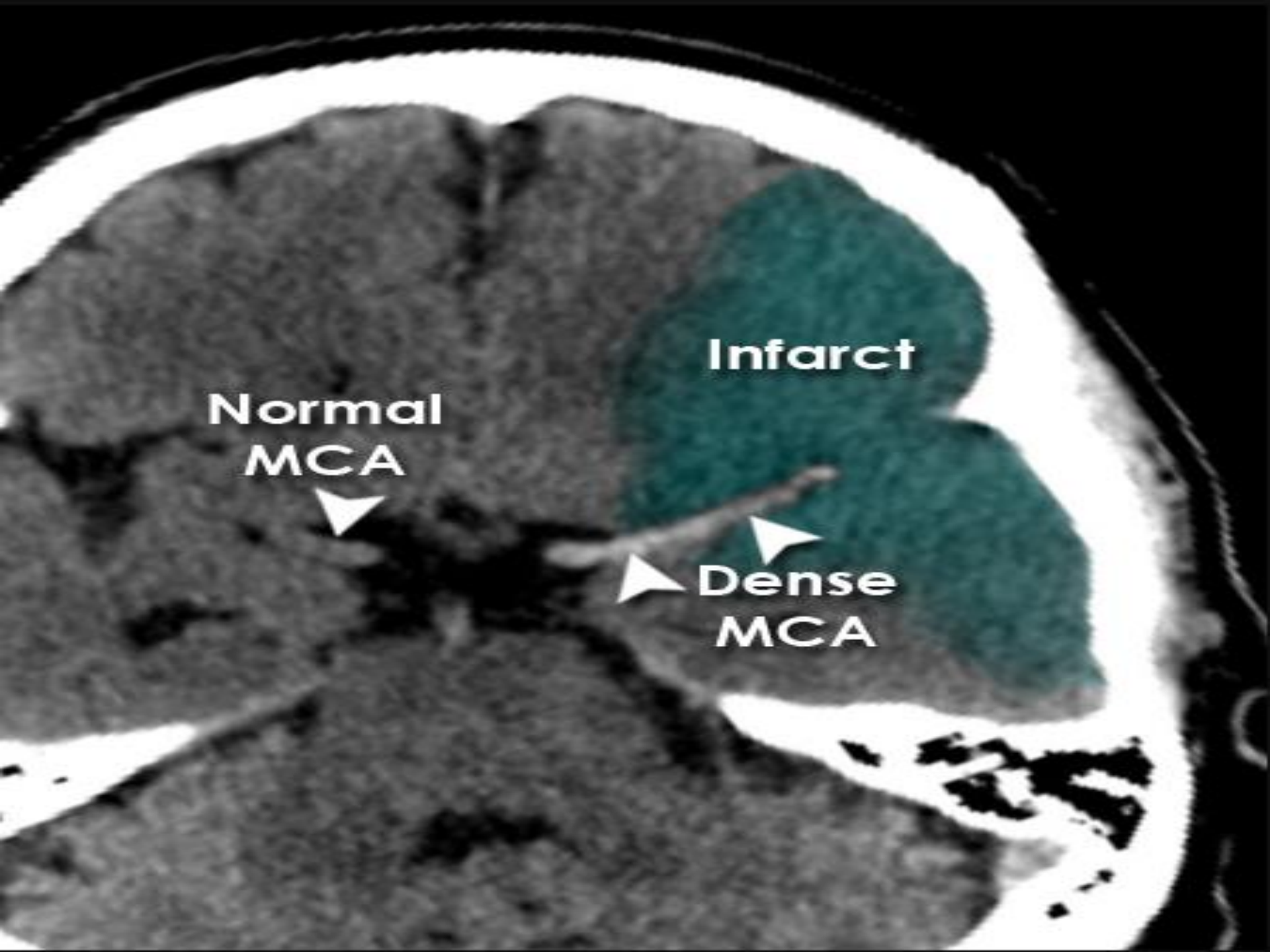


**Scalp
haematoma**

**No
intracranial
haemorrhage**







**Normal
MCA**

Infarct

**Dense
MCA**

Right

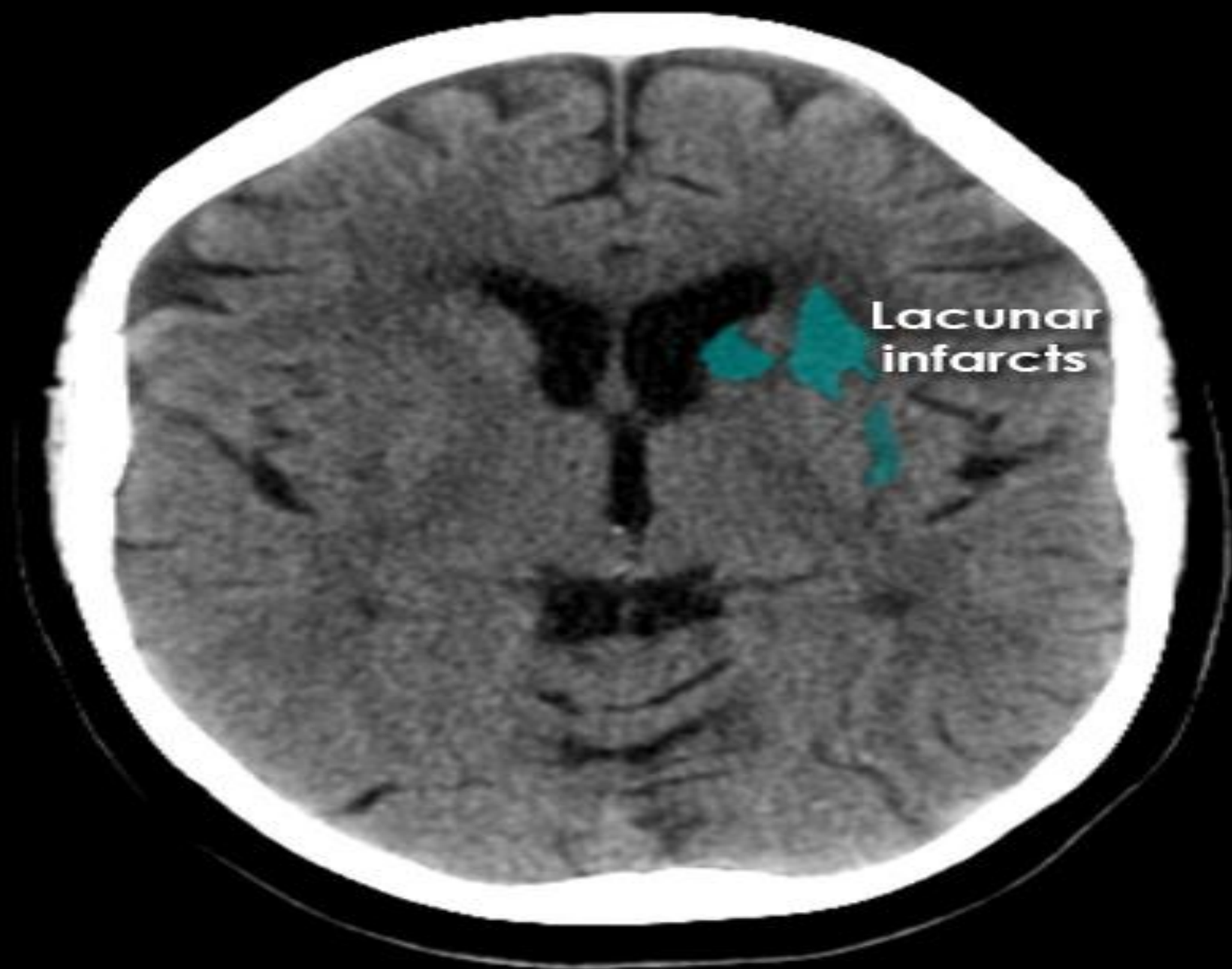
Left



Right

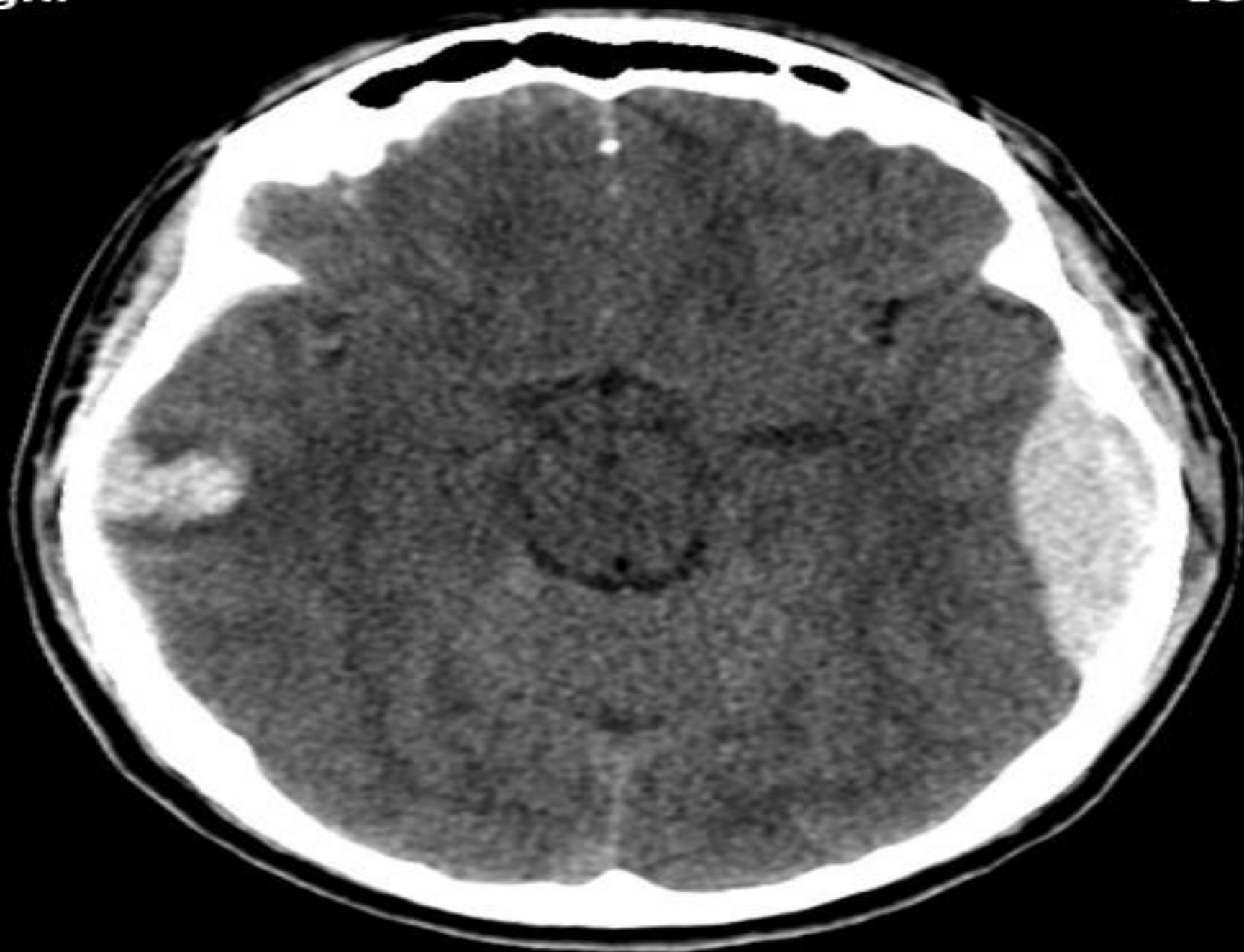
Left

Lacunar
infarcts



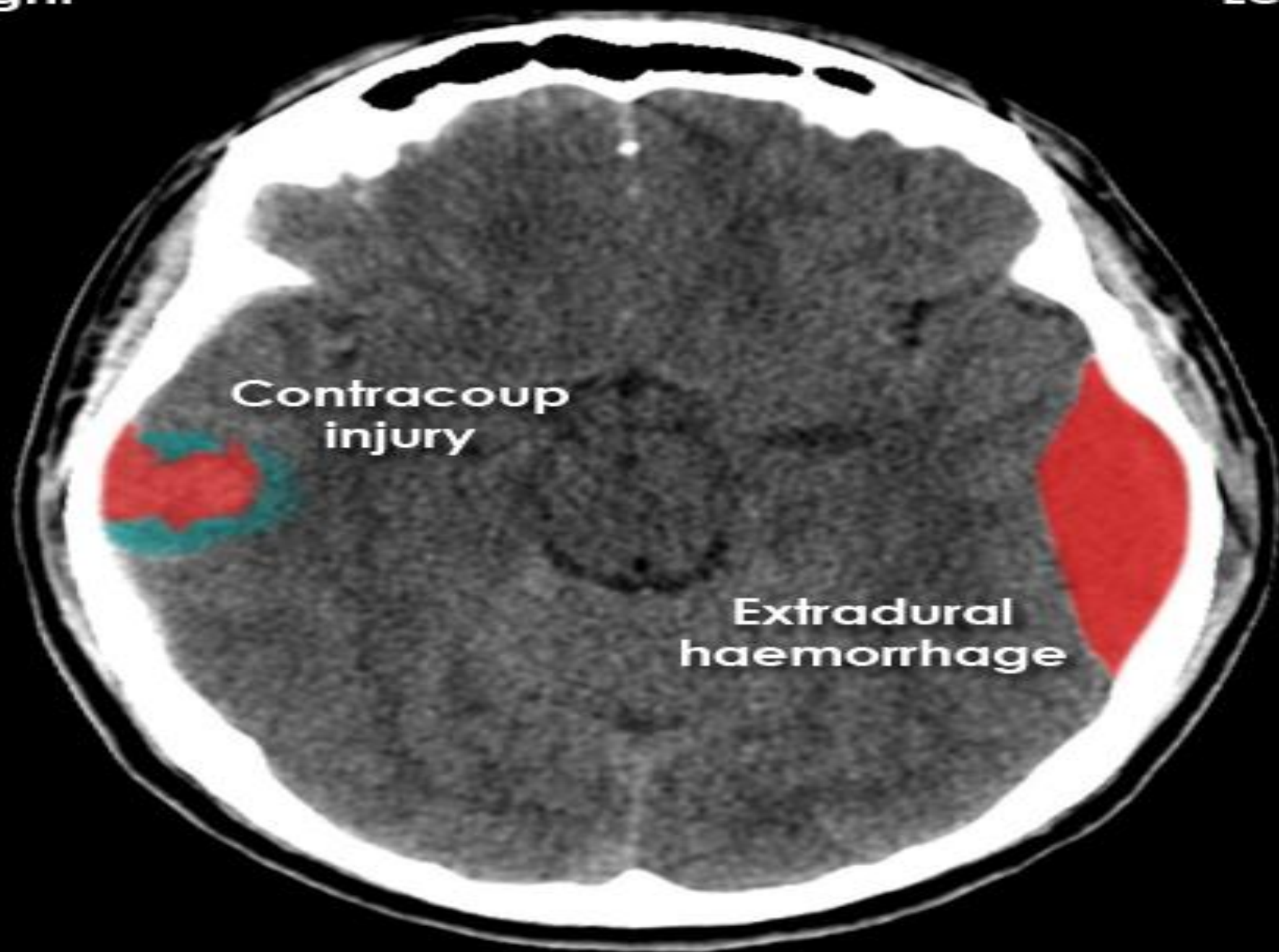
Right

Left



Right

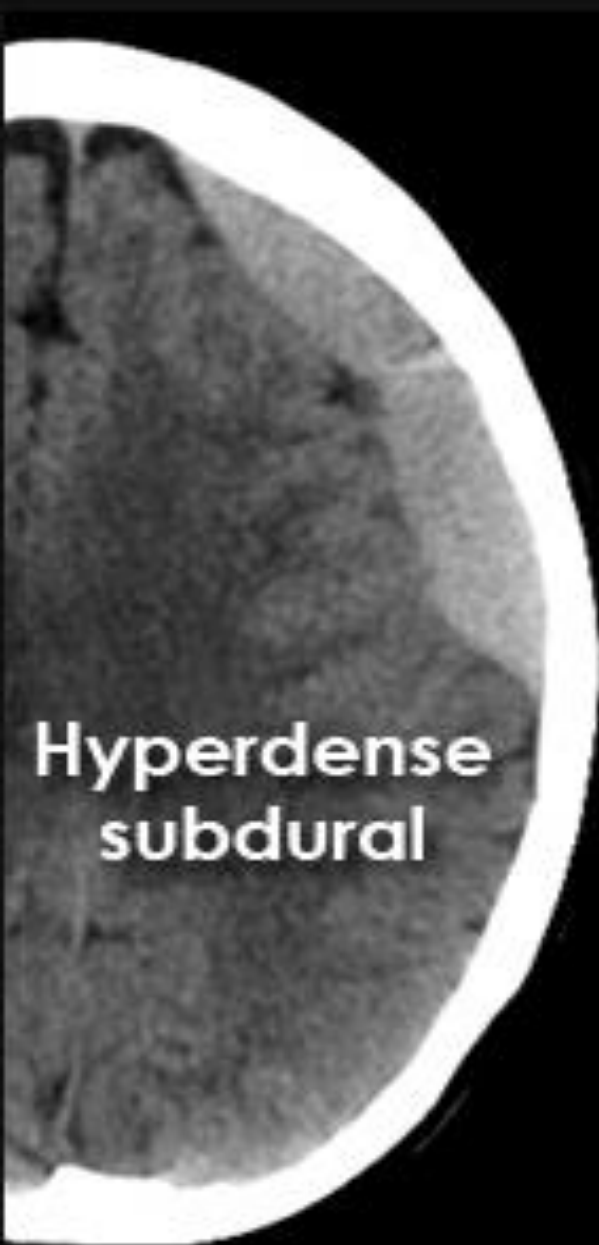
Left



Contracoup
injury

Extradural
haemorrhage

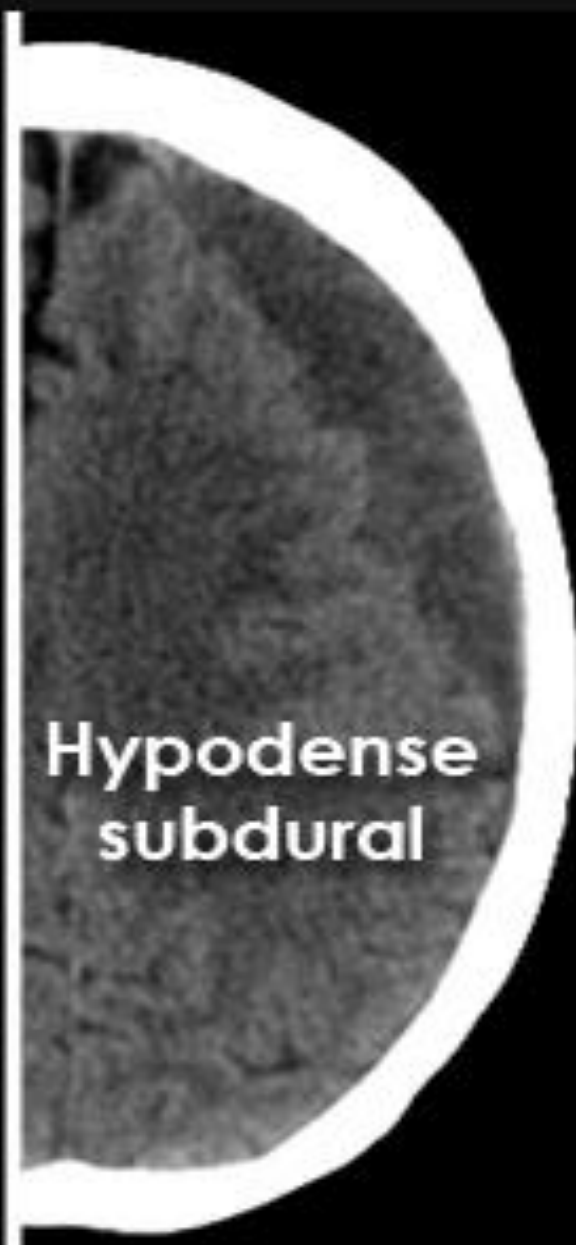
Subdural haematoma (SDH) age



Acute



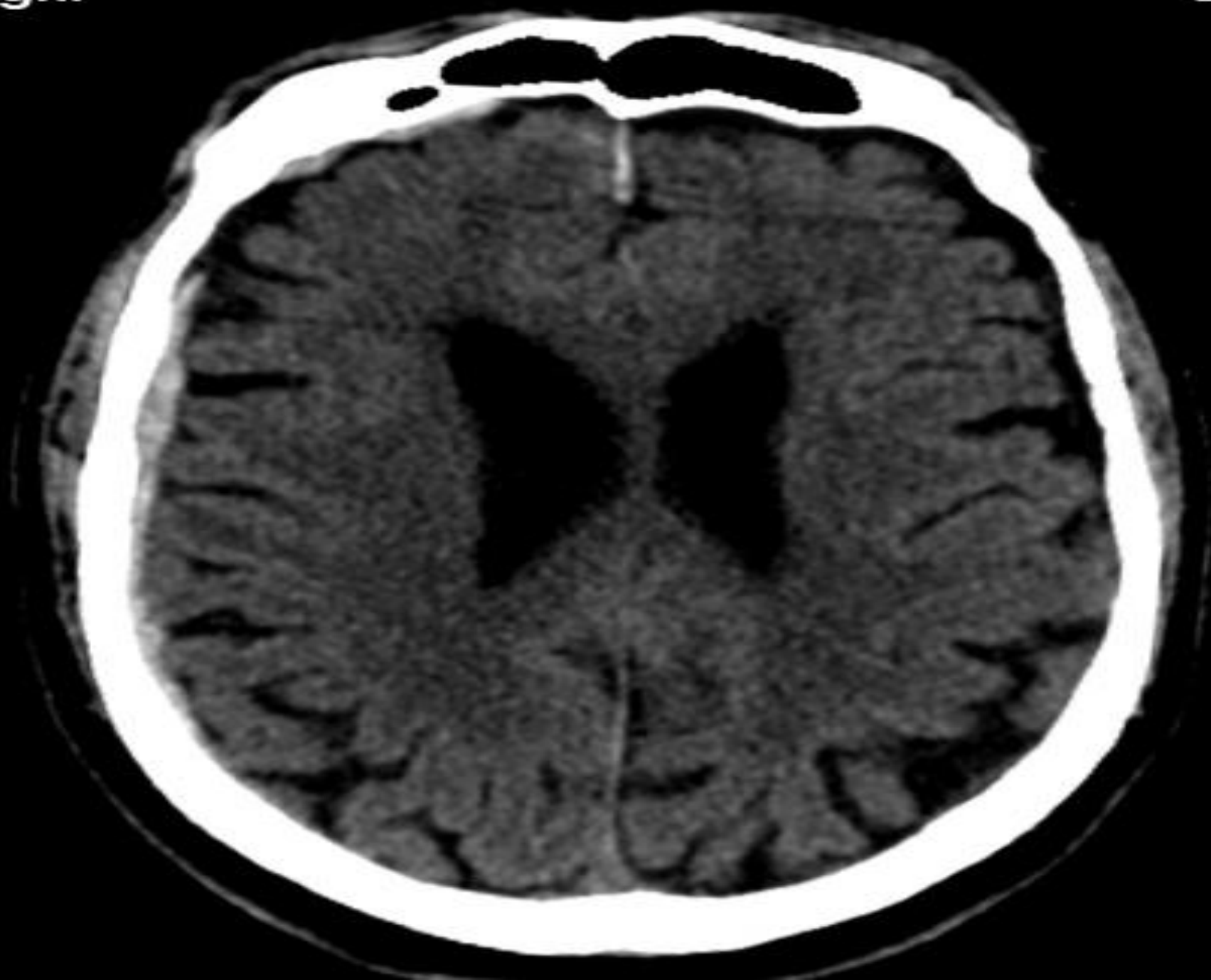
1 month



2 months

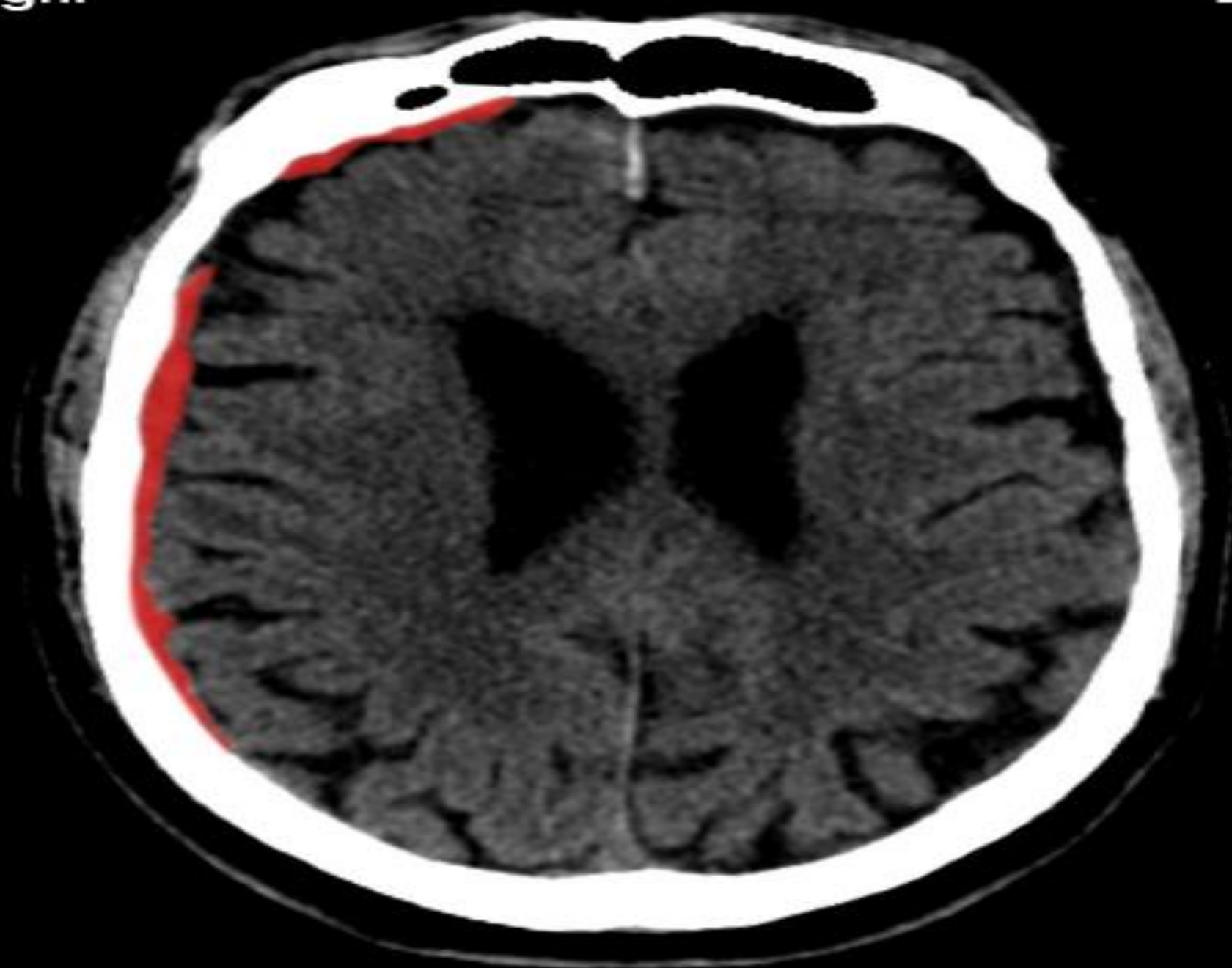
Right

Left



Right

Left



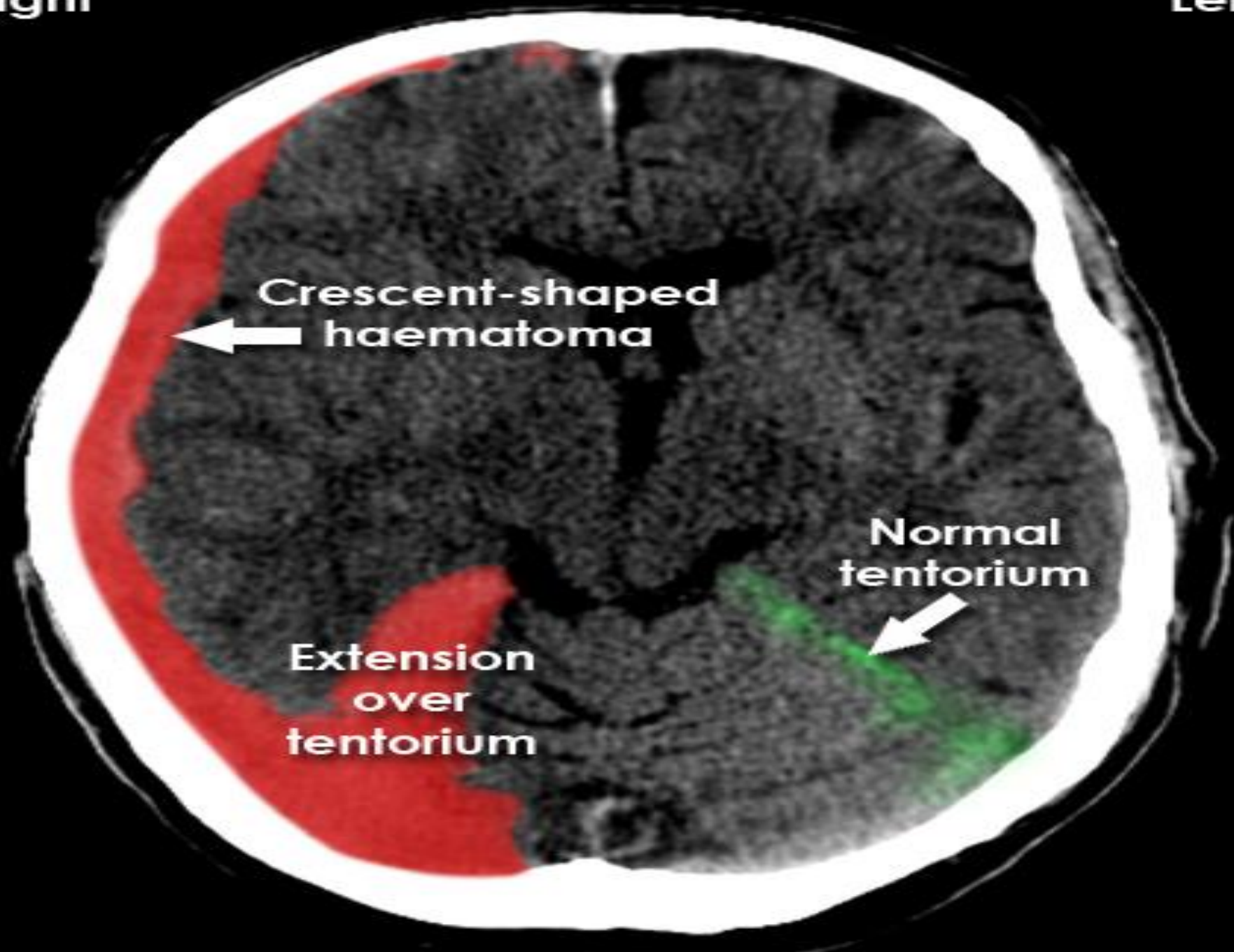
Right

Left



Right

Left



Right

Left

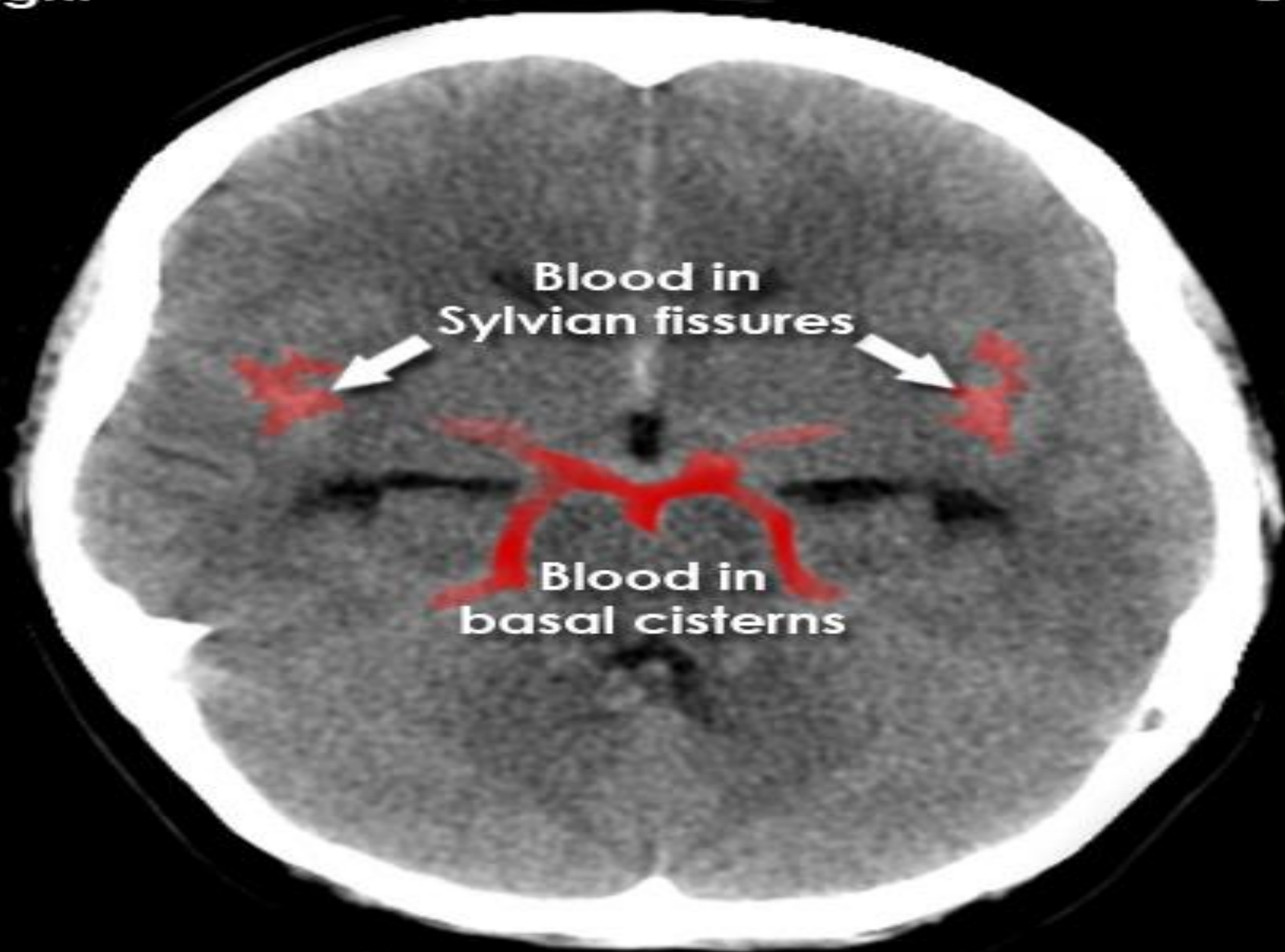


Right

Left

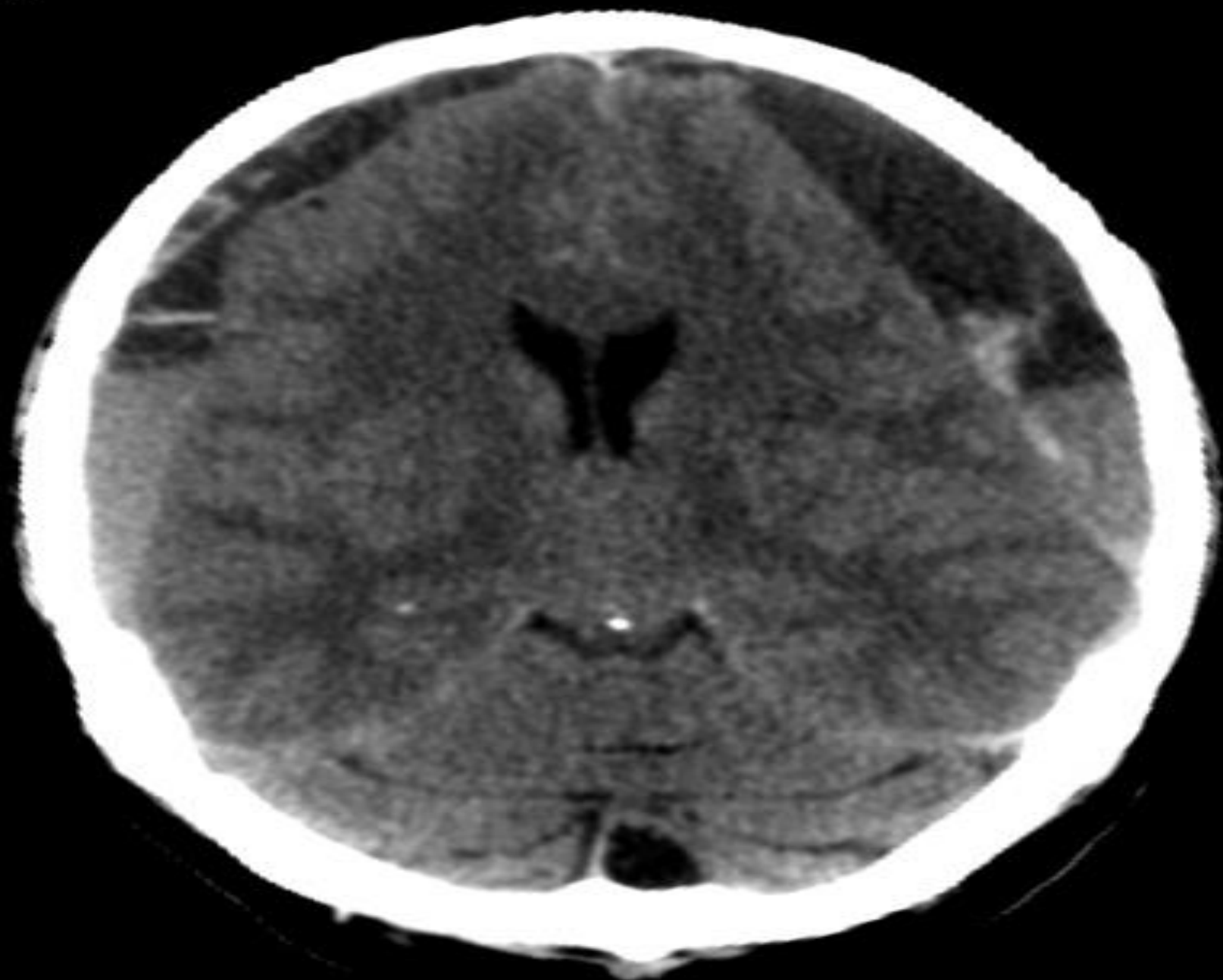
**Blood in
Sylvian fissures**

**Blood in
basal cisterns**



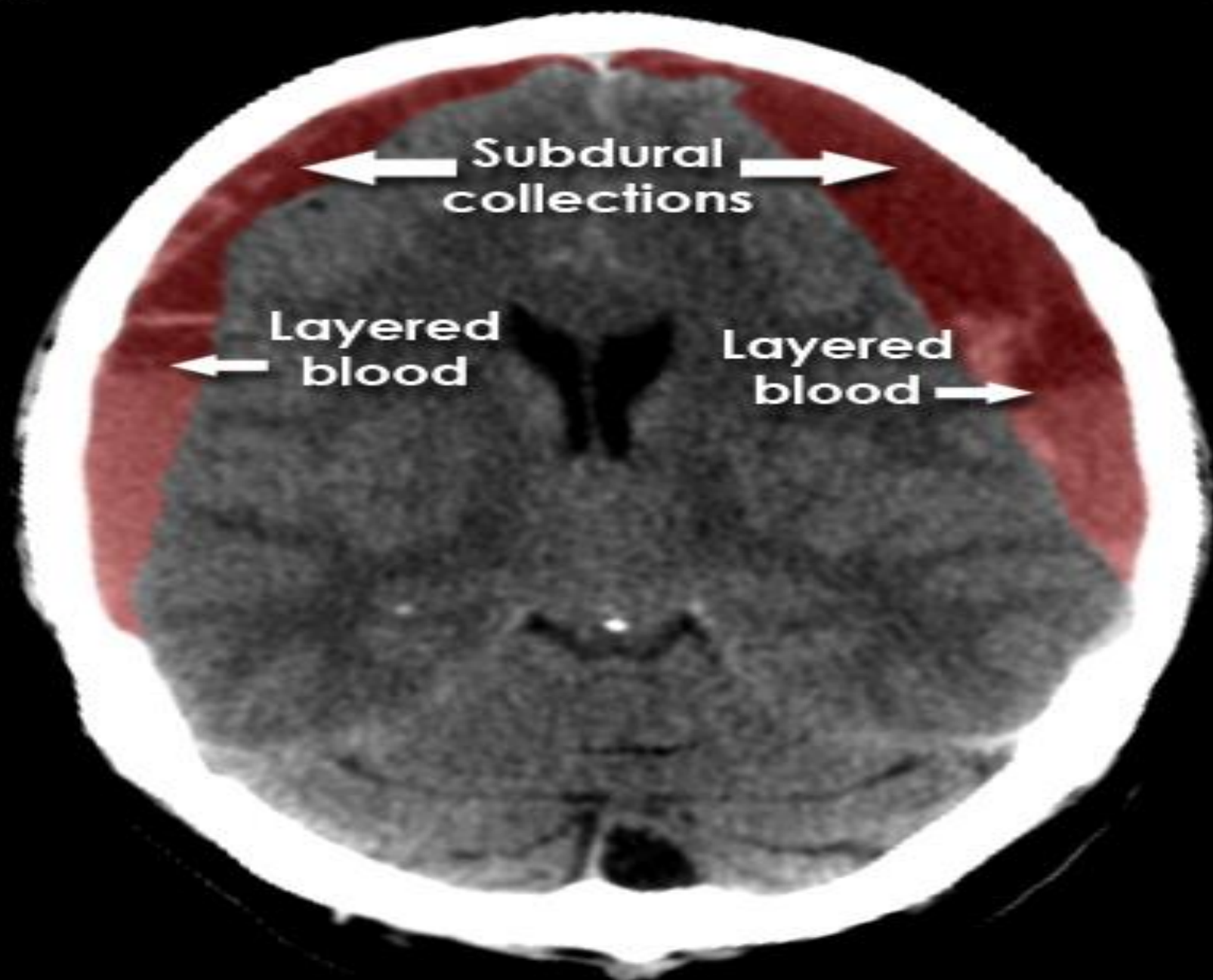
Right

Left



Right

Left



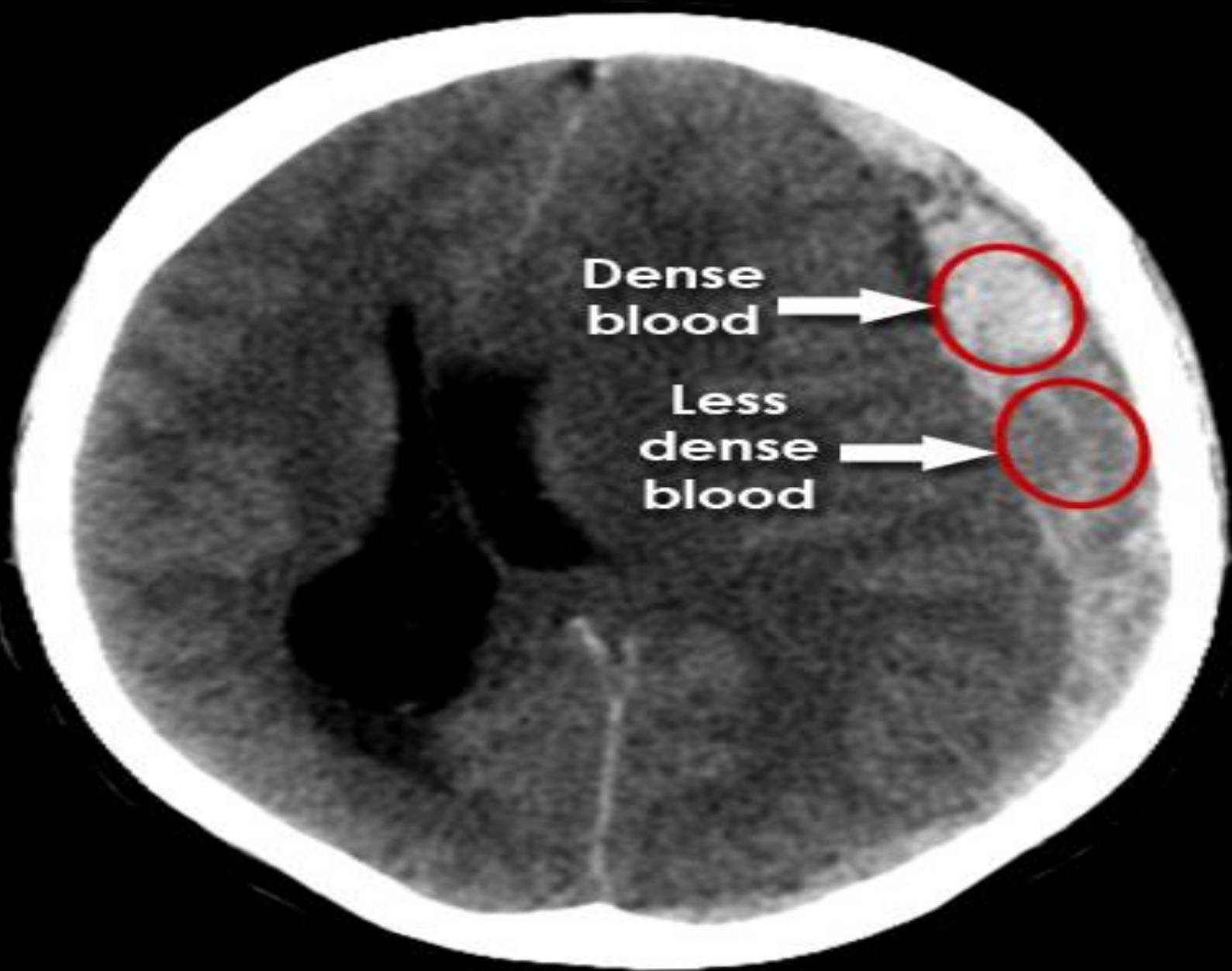
Right

Left



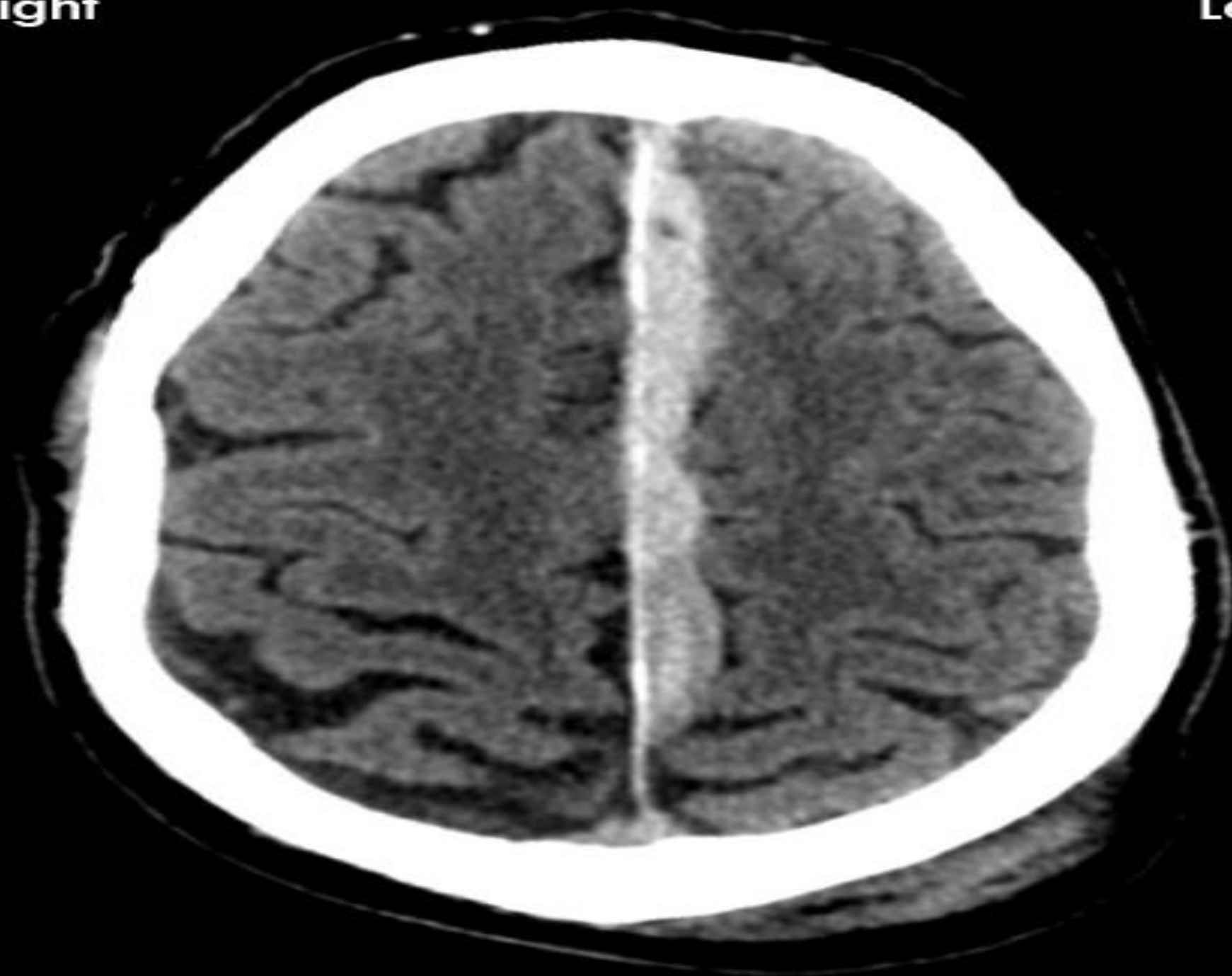
Right

Left



Right

Left



Subdural - extension onto falx

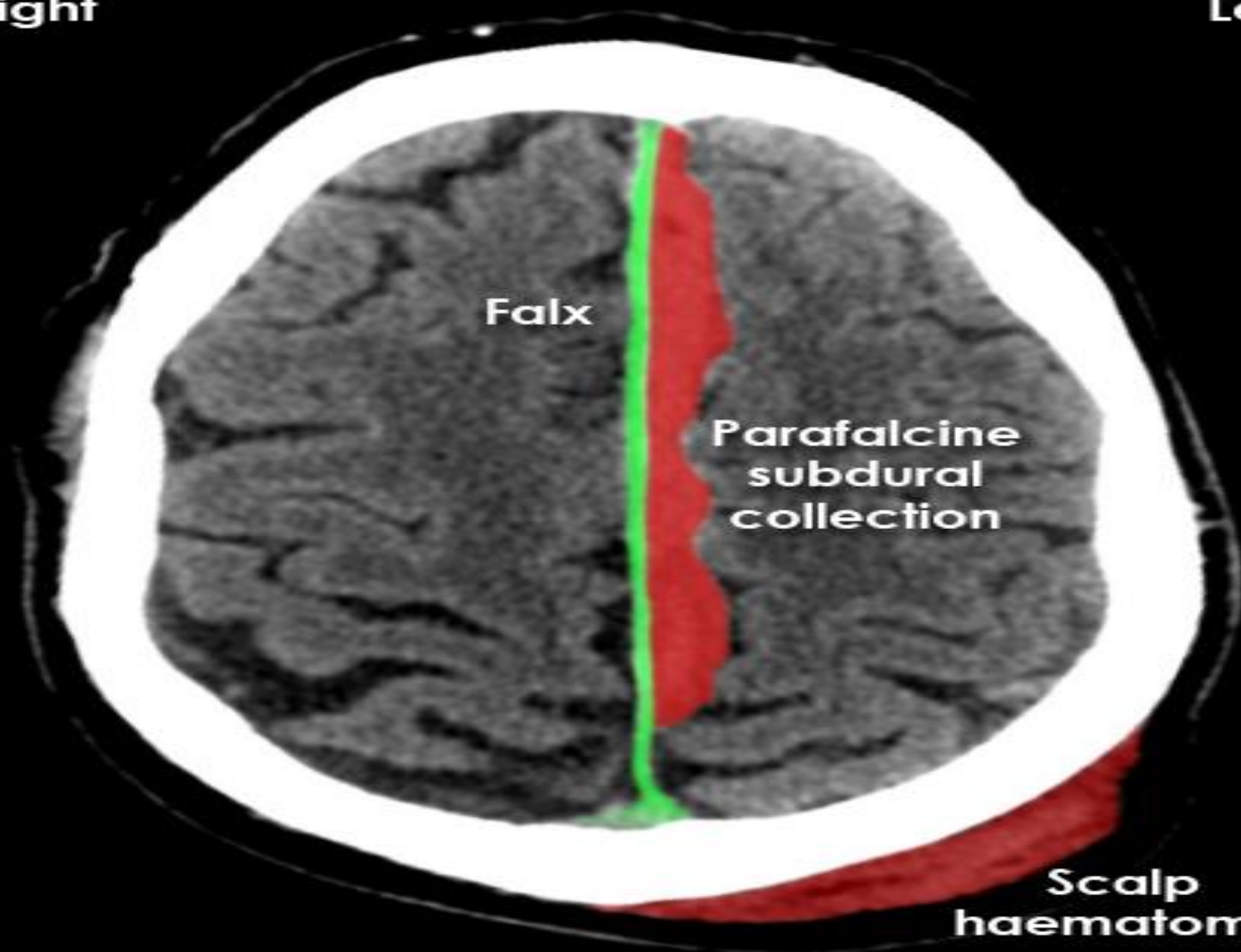
Right

Left

Falx

Parafalcine
subdural
collection

Scalp
haematoma



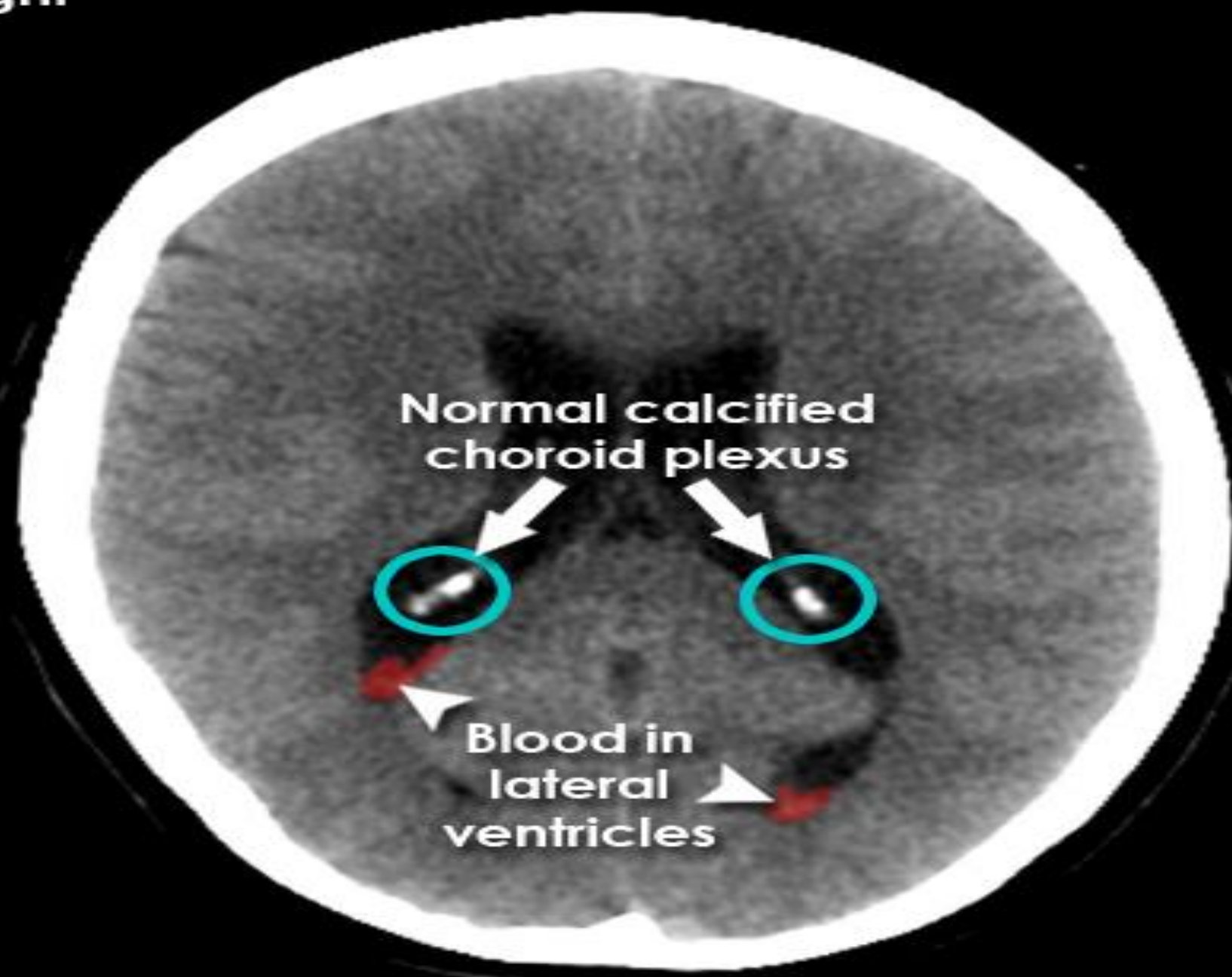
Right

Left



Right

Left



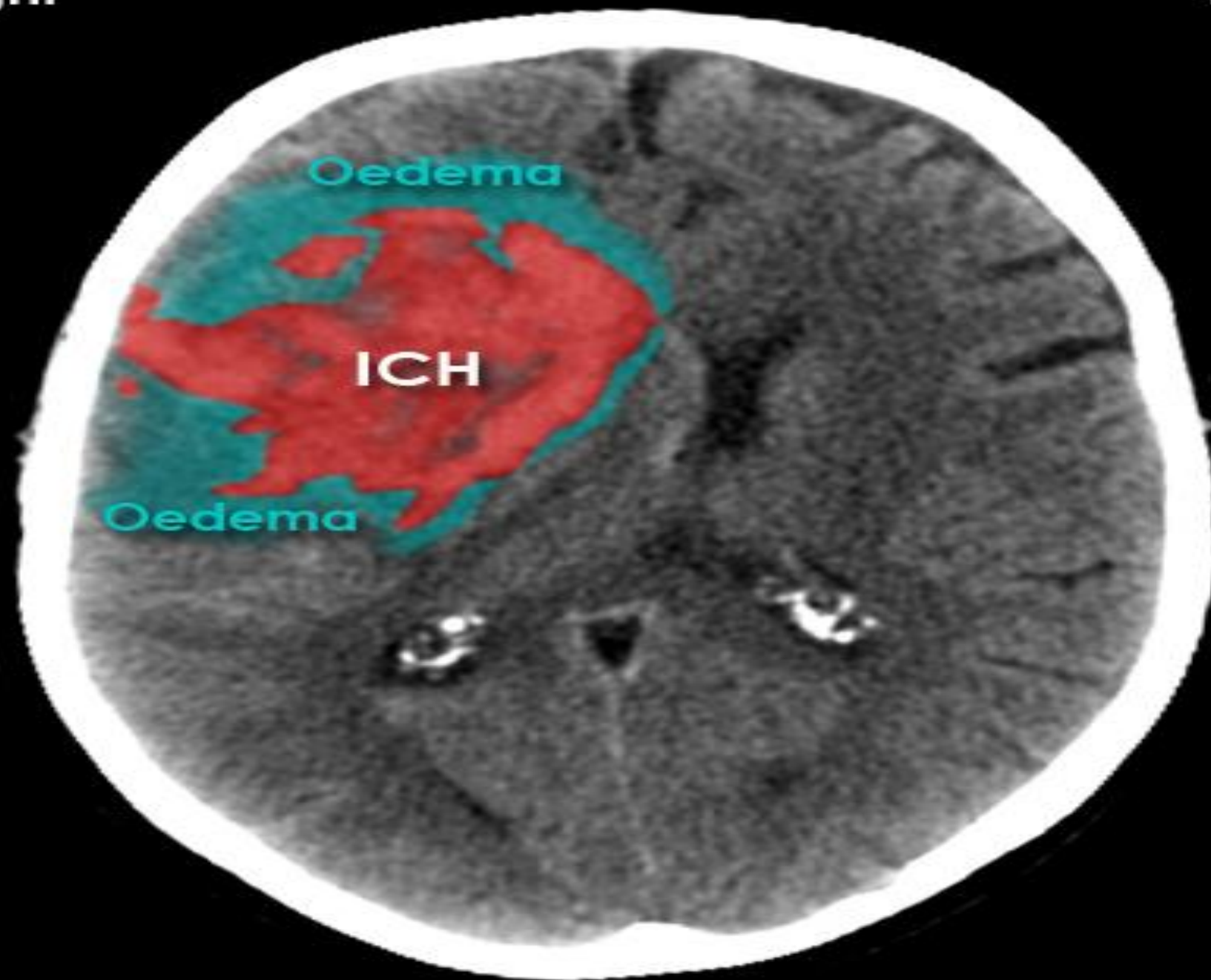
Right

Left



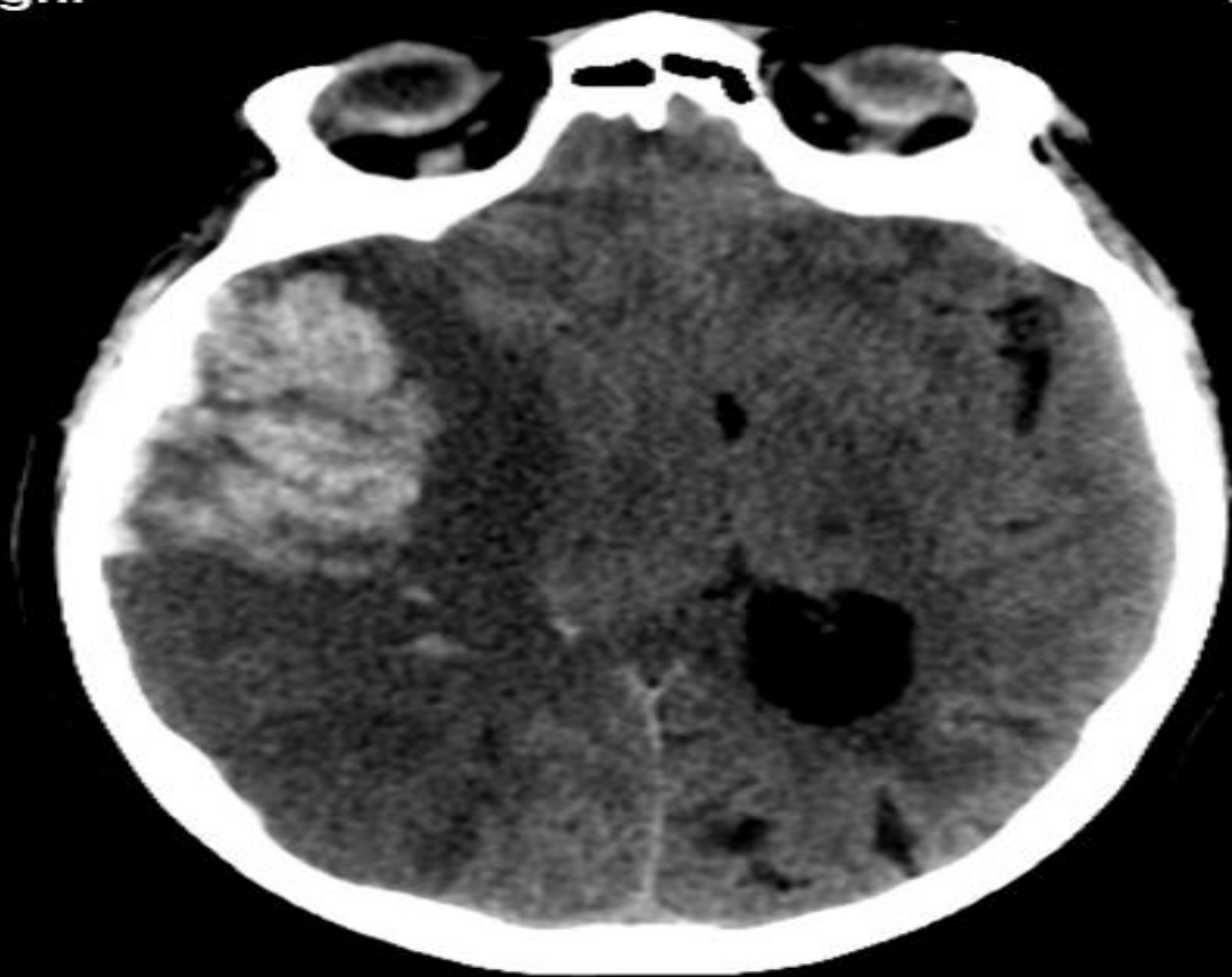
Right

Left



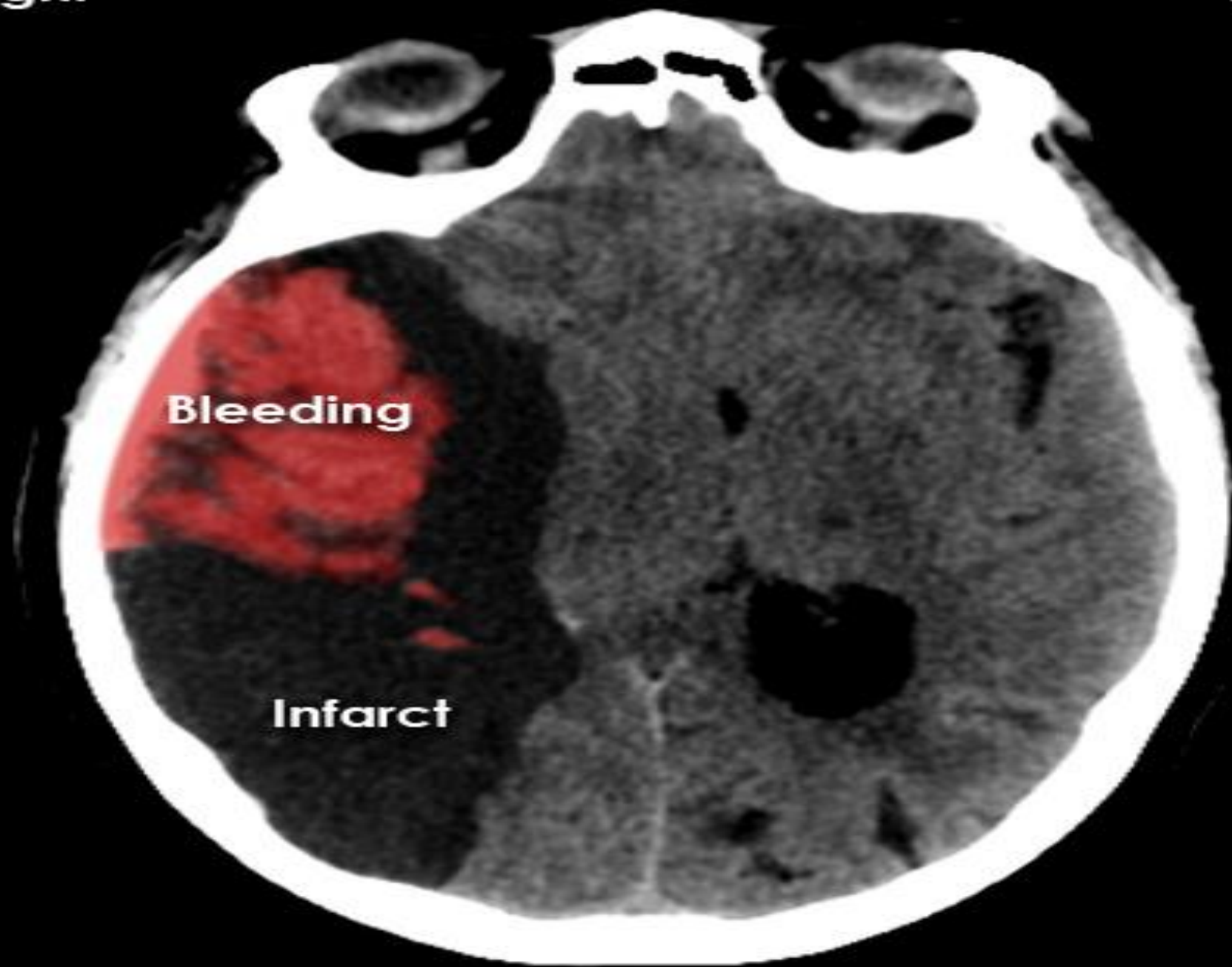
Right

Left



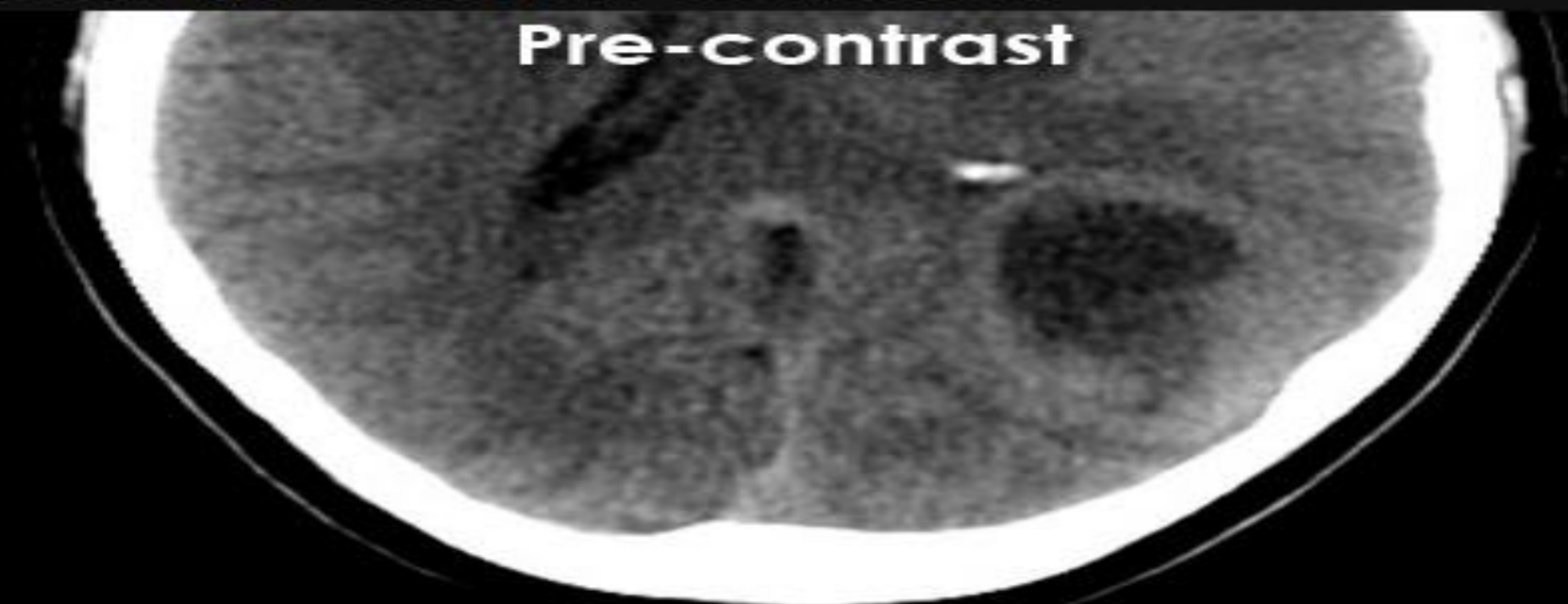
Right

Left

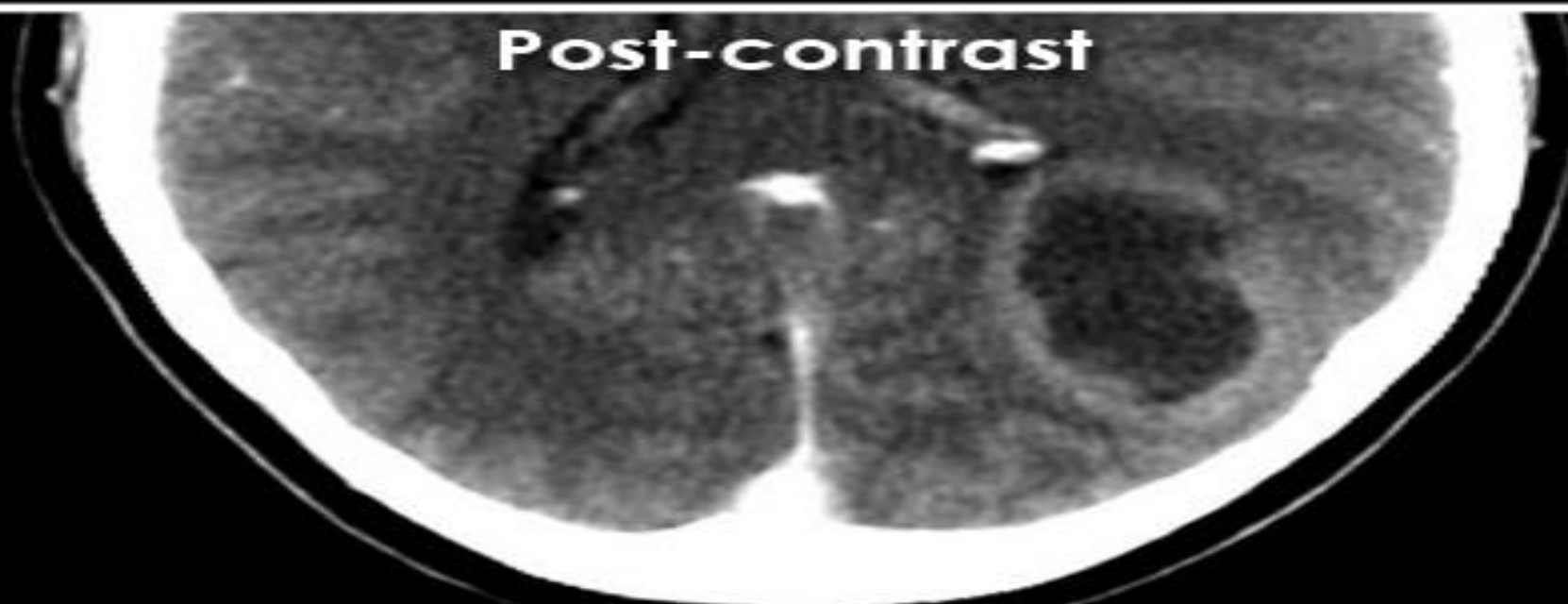


Glioma - pre and post-contrast CT

Pre-contrast

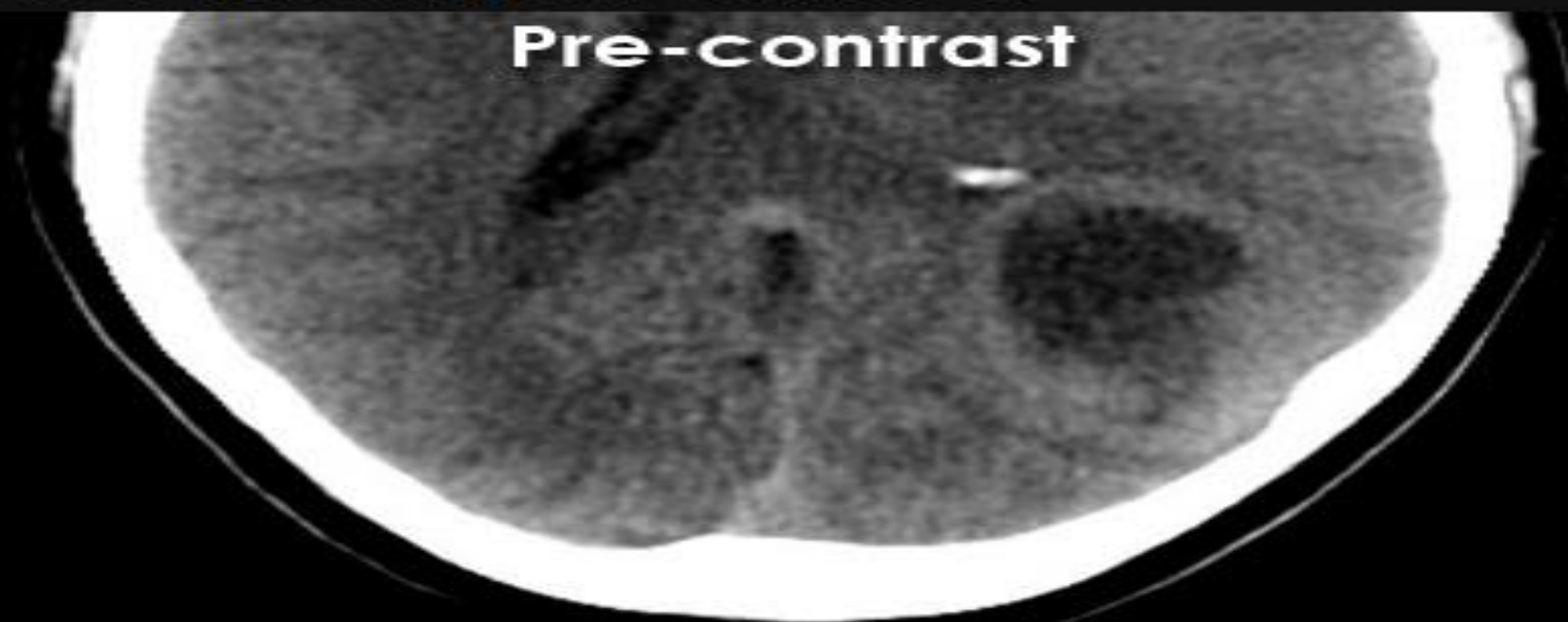


Post-contrast



Glioma - pre and post-contrast CT

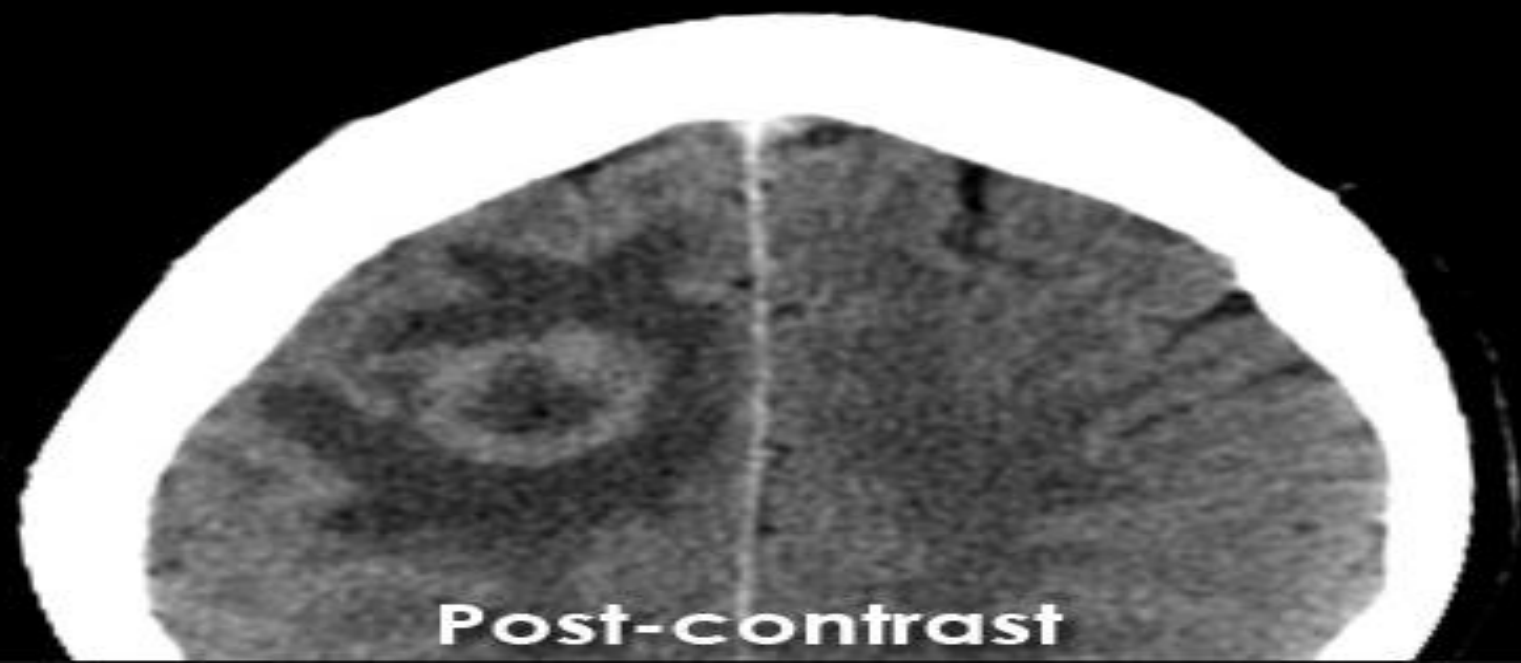
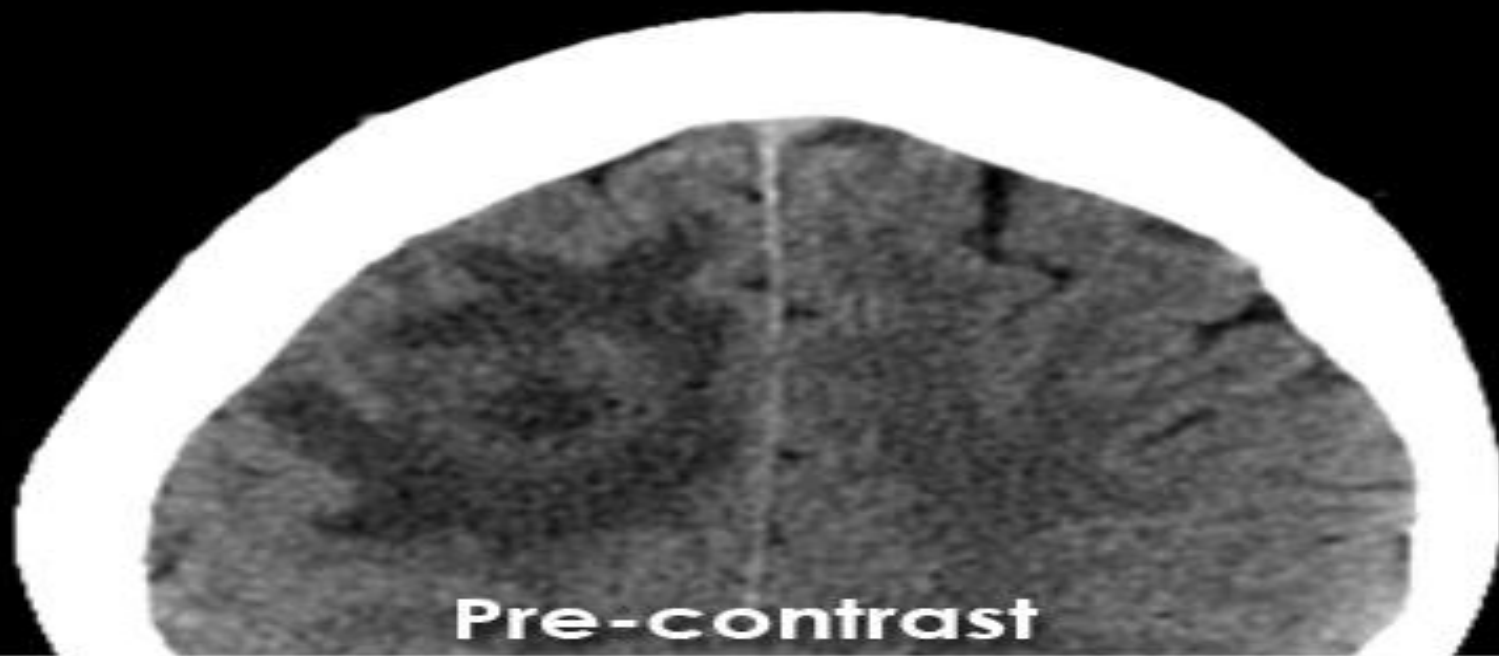
Pre-contrast



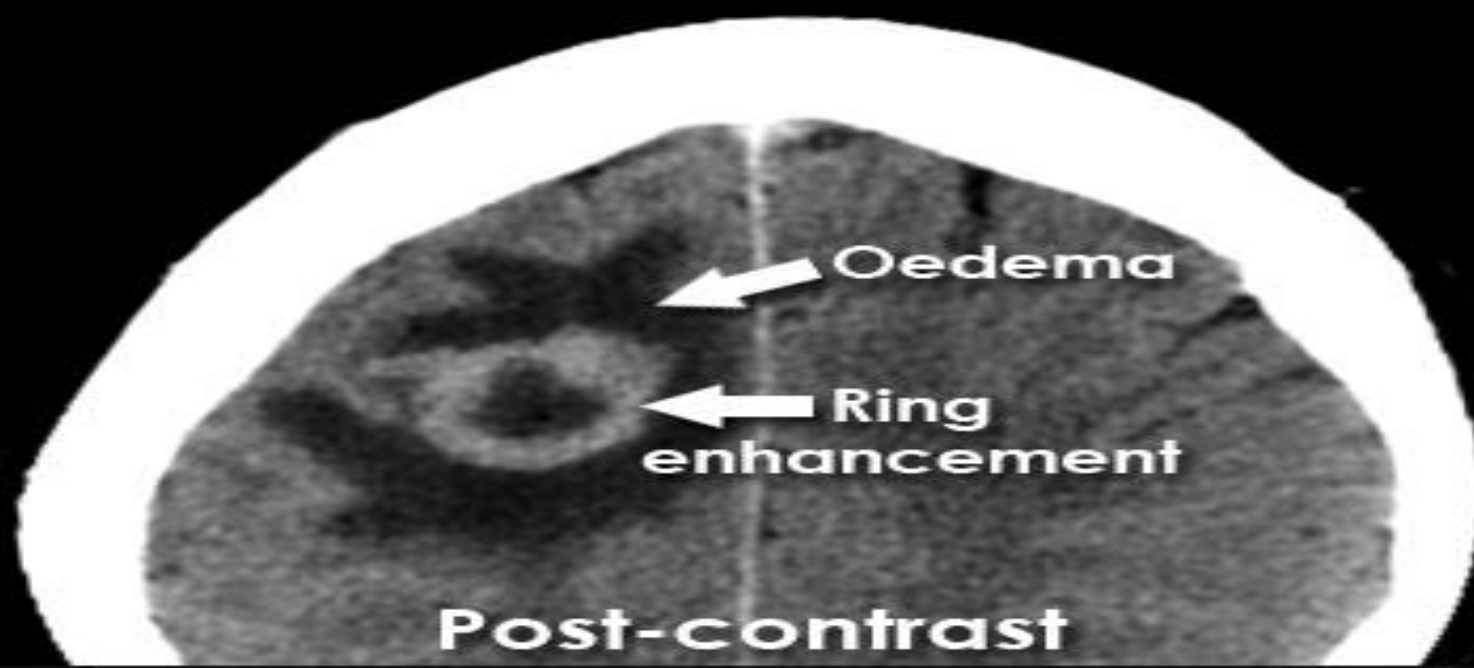
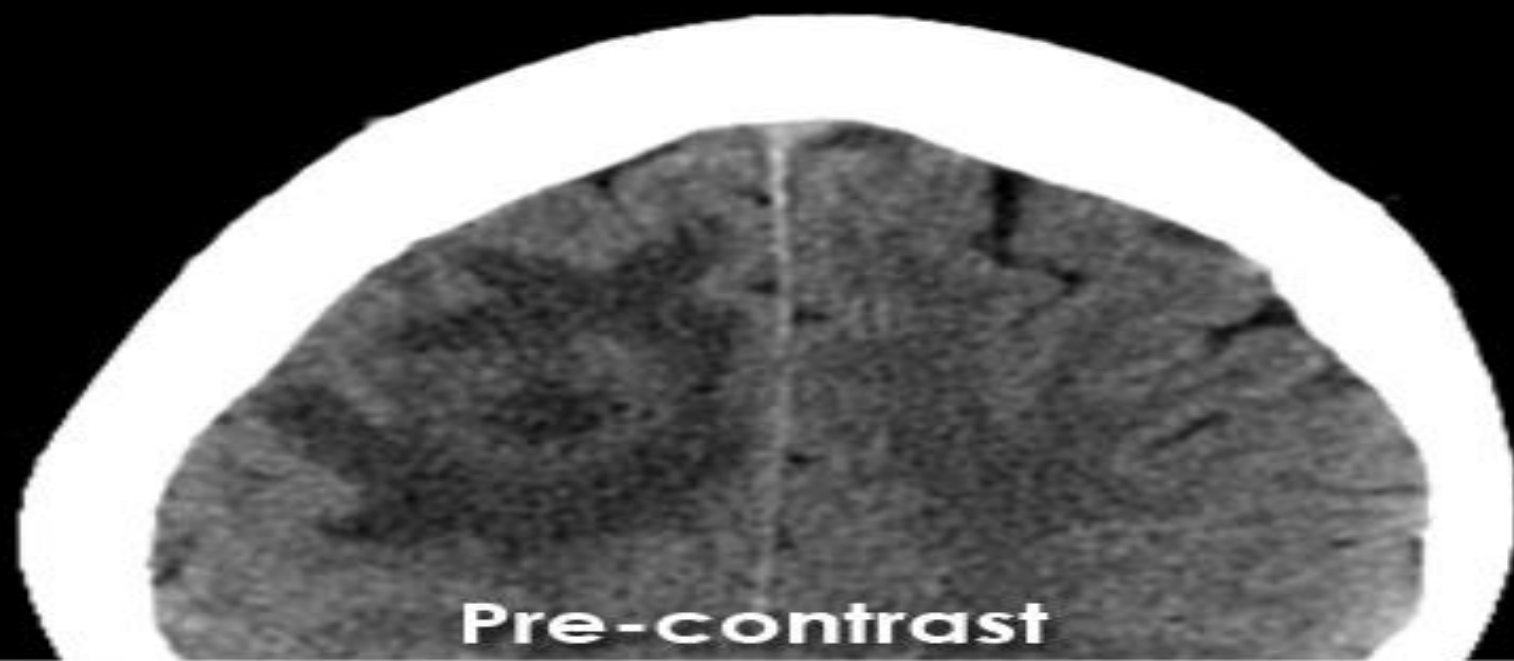
Post-contrast



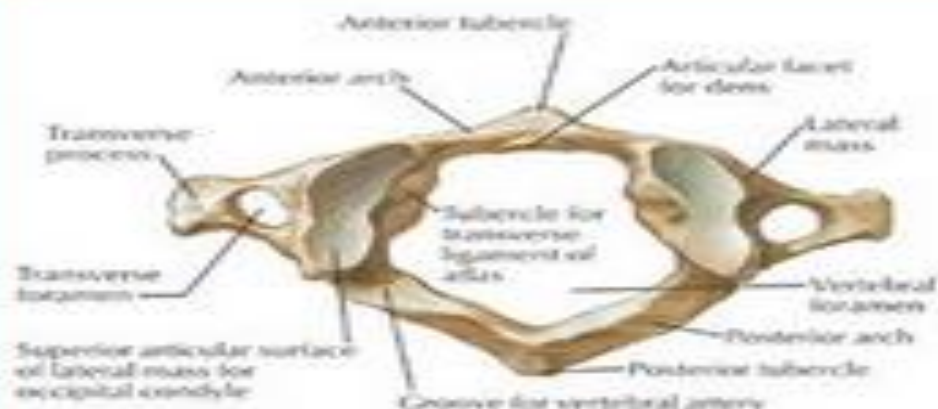
Cerebral abscess - pre and post-contrast CT



Cerebral abscess - pre and post-contrast CT



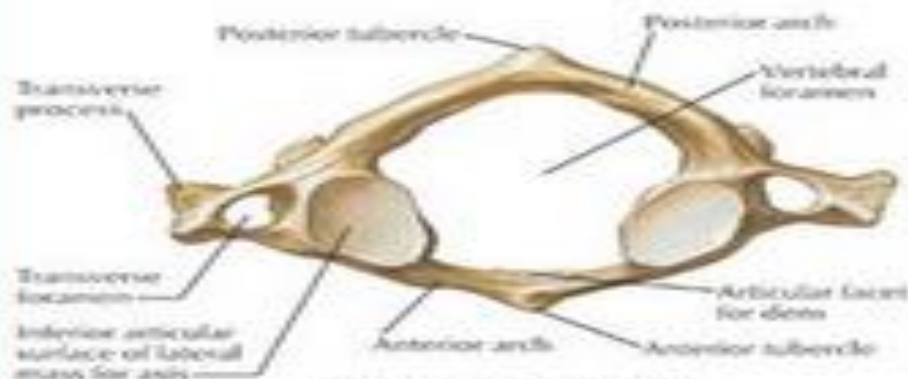




Atlas (C1): superior view



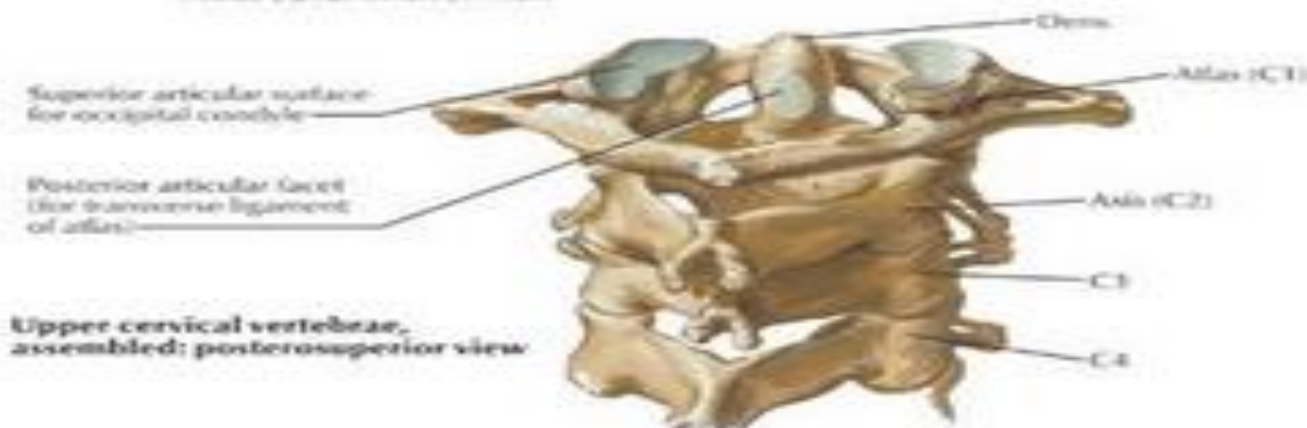
Axis (C2): anterior view



Atlas (C1): inferior view



Axis (C2): posteroinferior view



Upper cervical vertebrae, assembled: posteroinferior view

The first two cervical vertebrae: the atlas and the axis

Dens (odontoid process)

Anterior arch of atlas

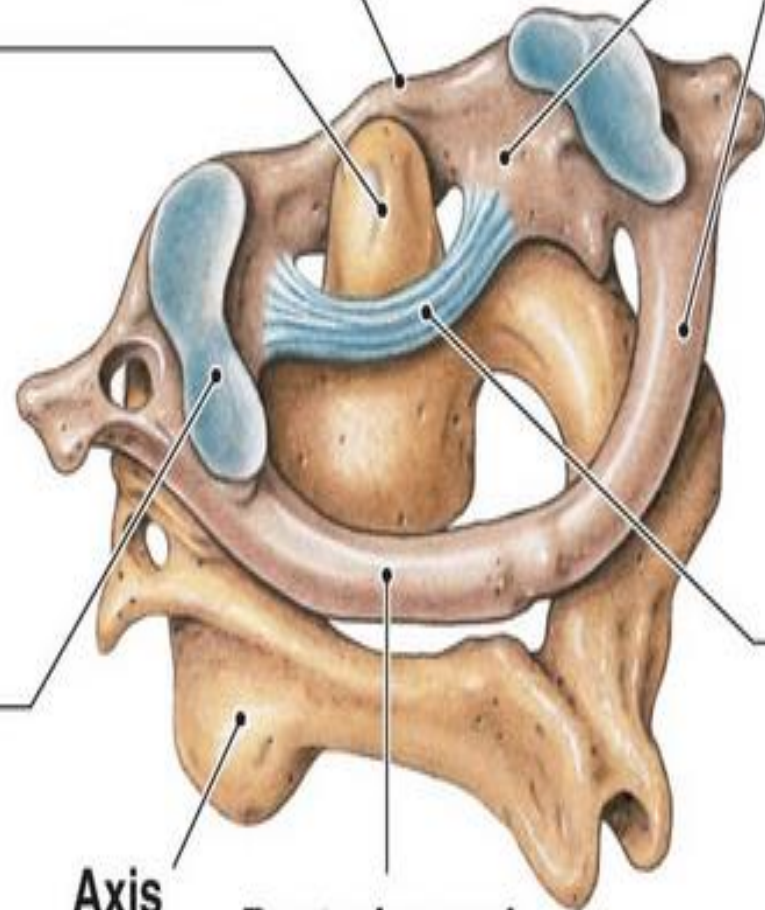
Atlas

Joint that permits nodding (as in indicating "yes")

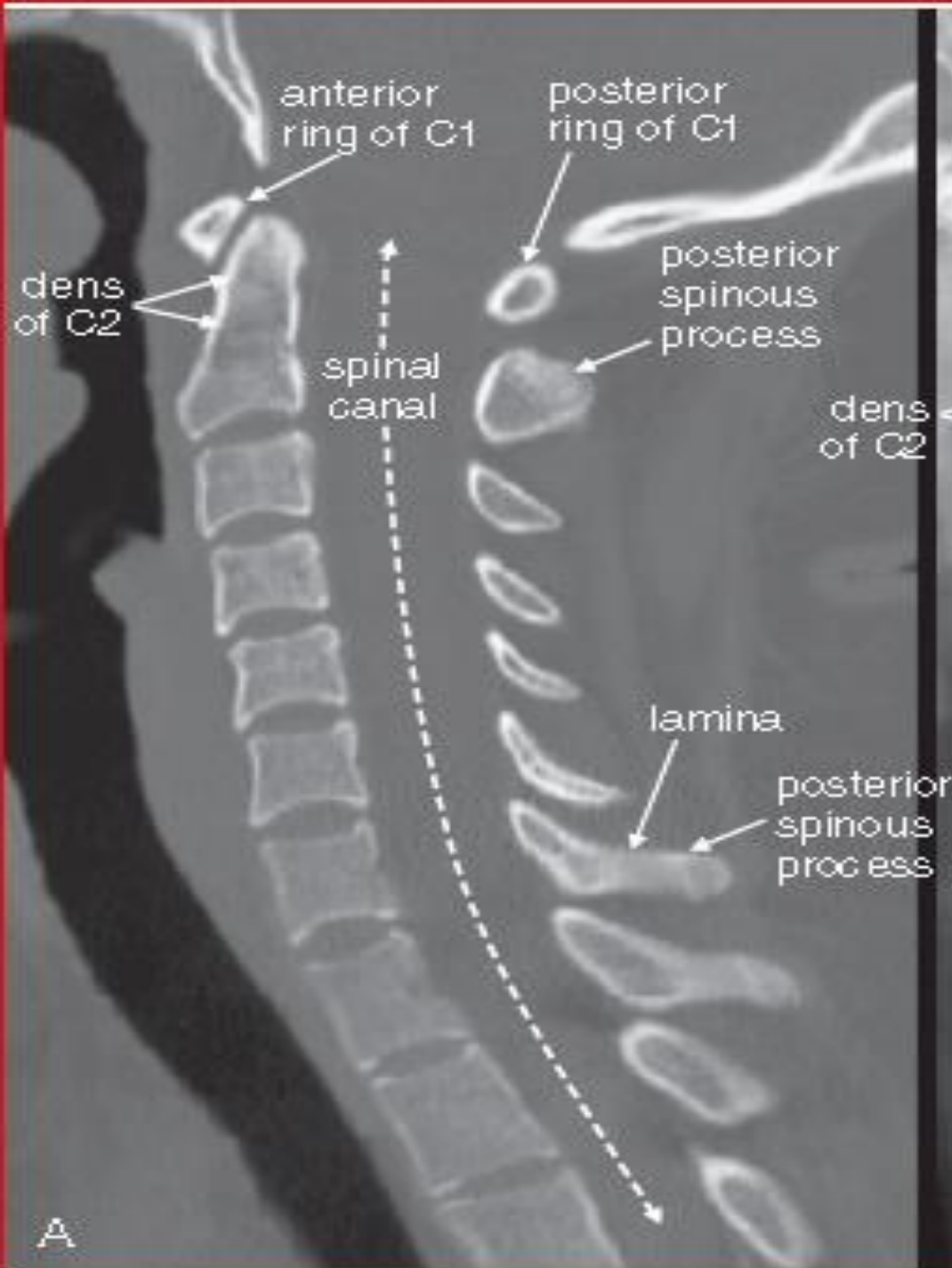
Axis

Posterior arch of atlas

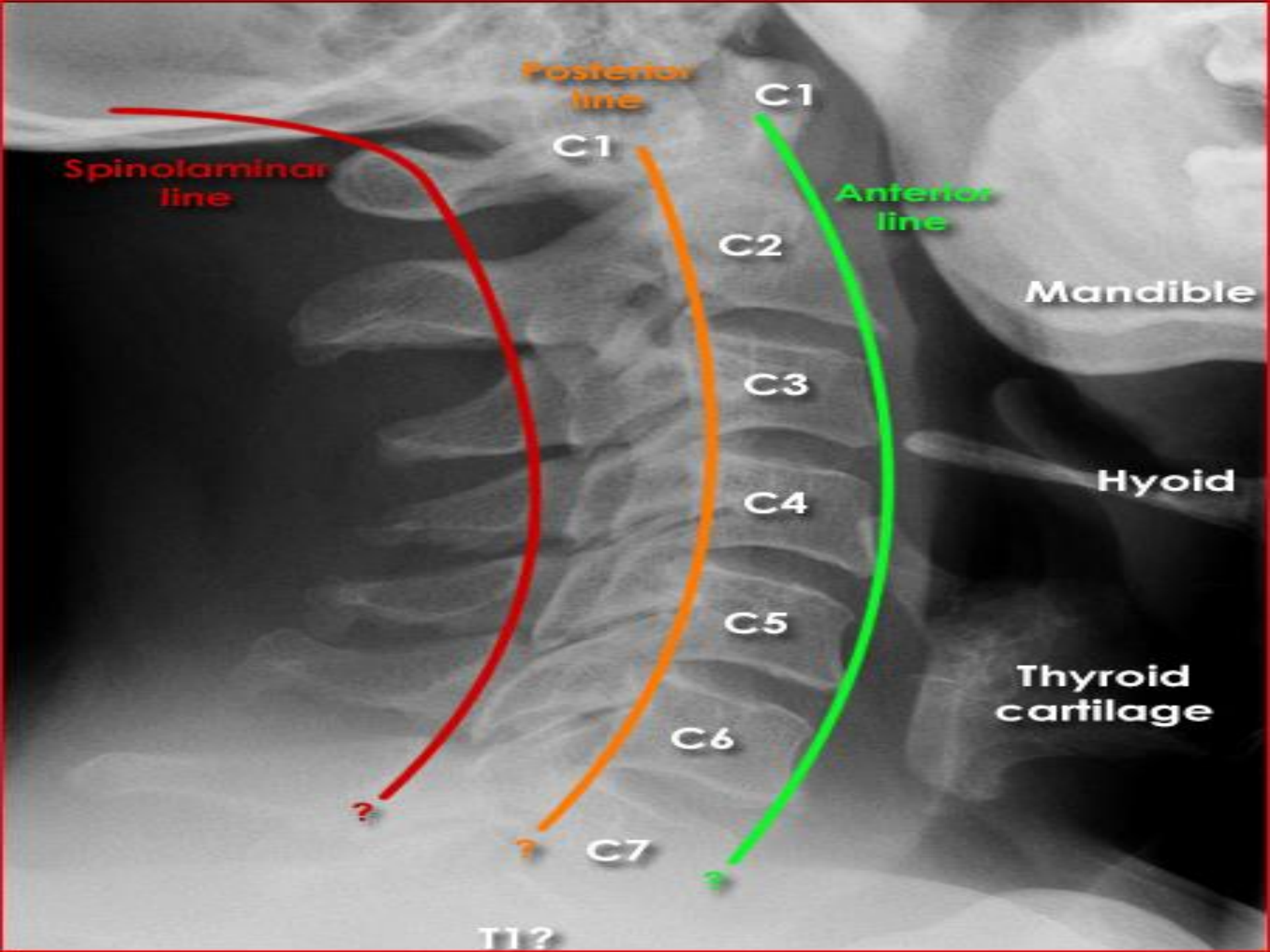
Ligament that enables rotation (as in shaking the head to indicate "no")



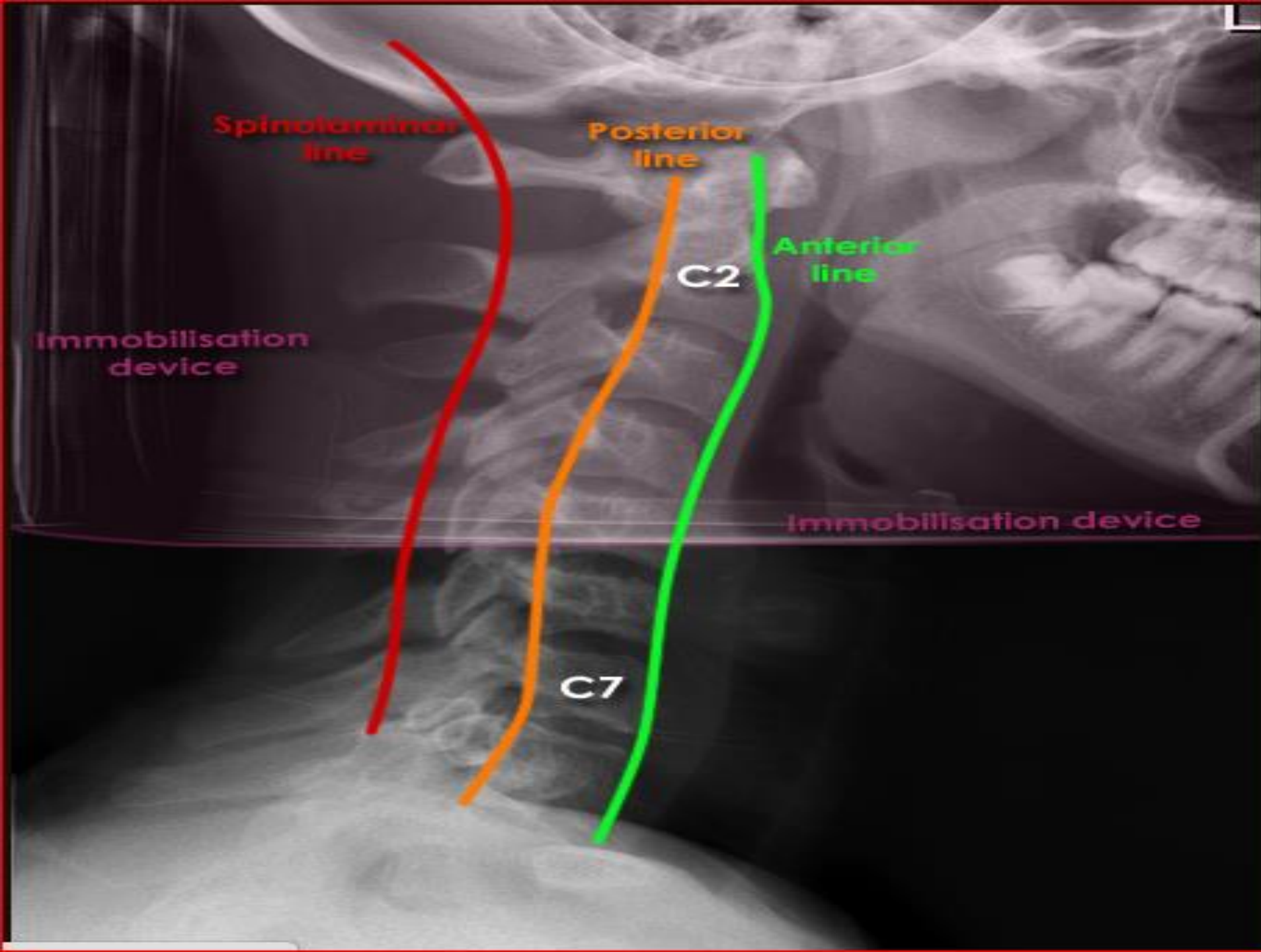




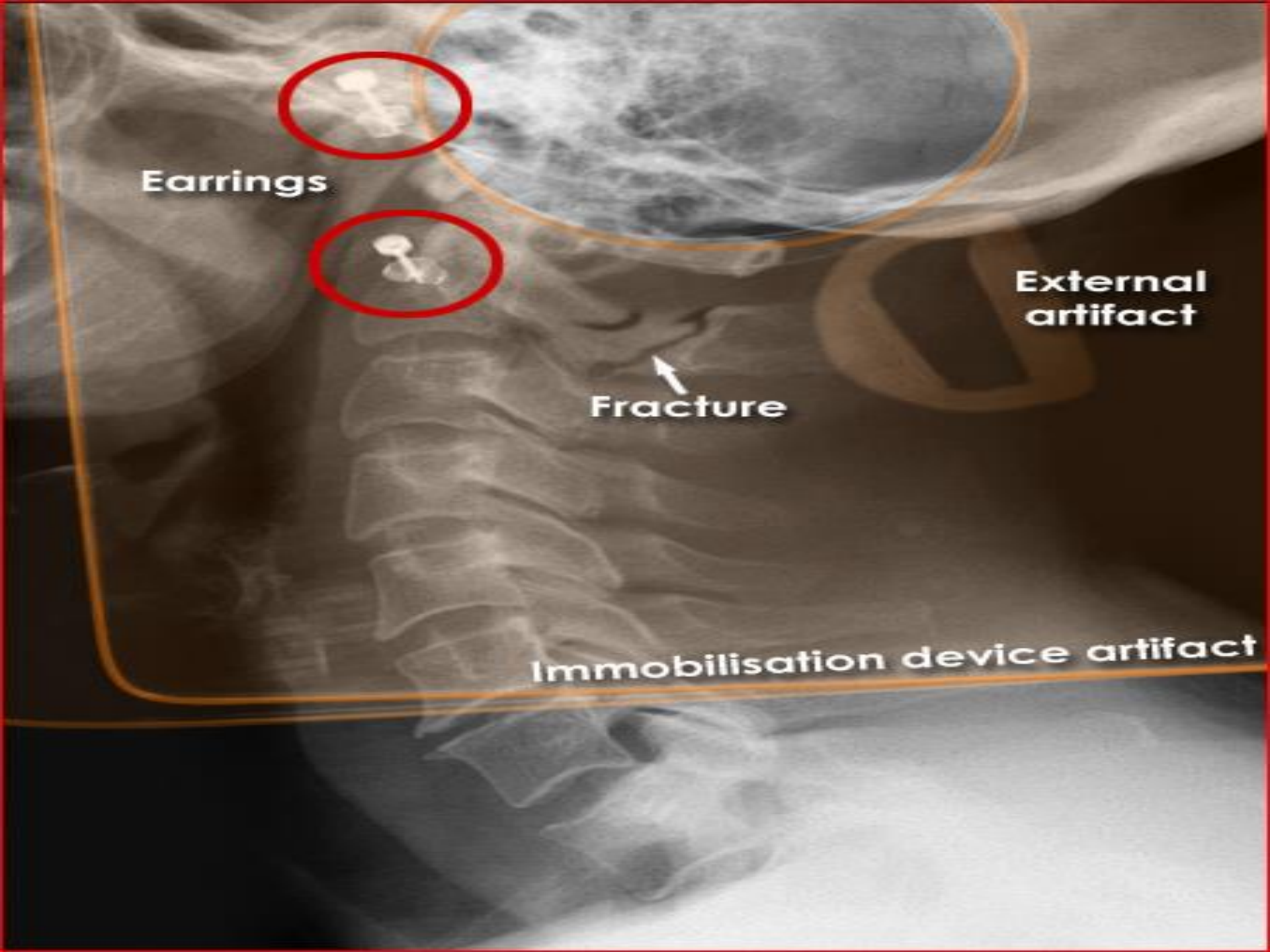












This is a lateral X-ray of a cervical spine. The image shows the vertebrae from the base of the skull down to the upper thoracic region. There are two red circles highlighting small, bright, circular objects in the upper left, labeled 'Earrings'. A white arrow points to a dark, irregular line between the C5 and C6 vertebrae, labeled 'Fracture'. A large, dark, U-shaped artifact is visible on the right side, labeled 'External artifact'. A large, dark, rectangular artifact is visible at the bottom, labeled 'Immobilisation device artifact'.

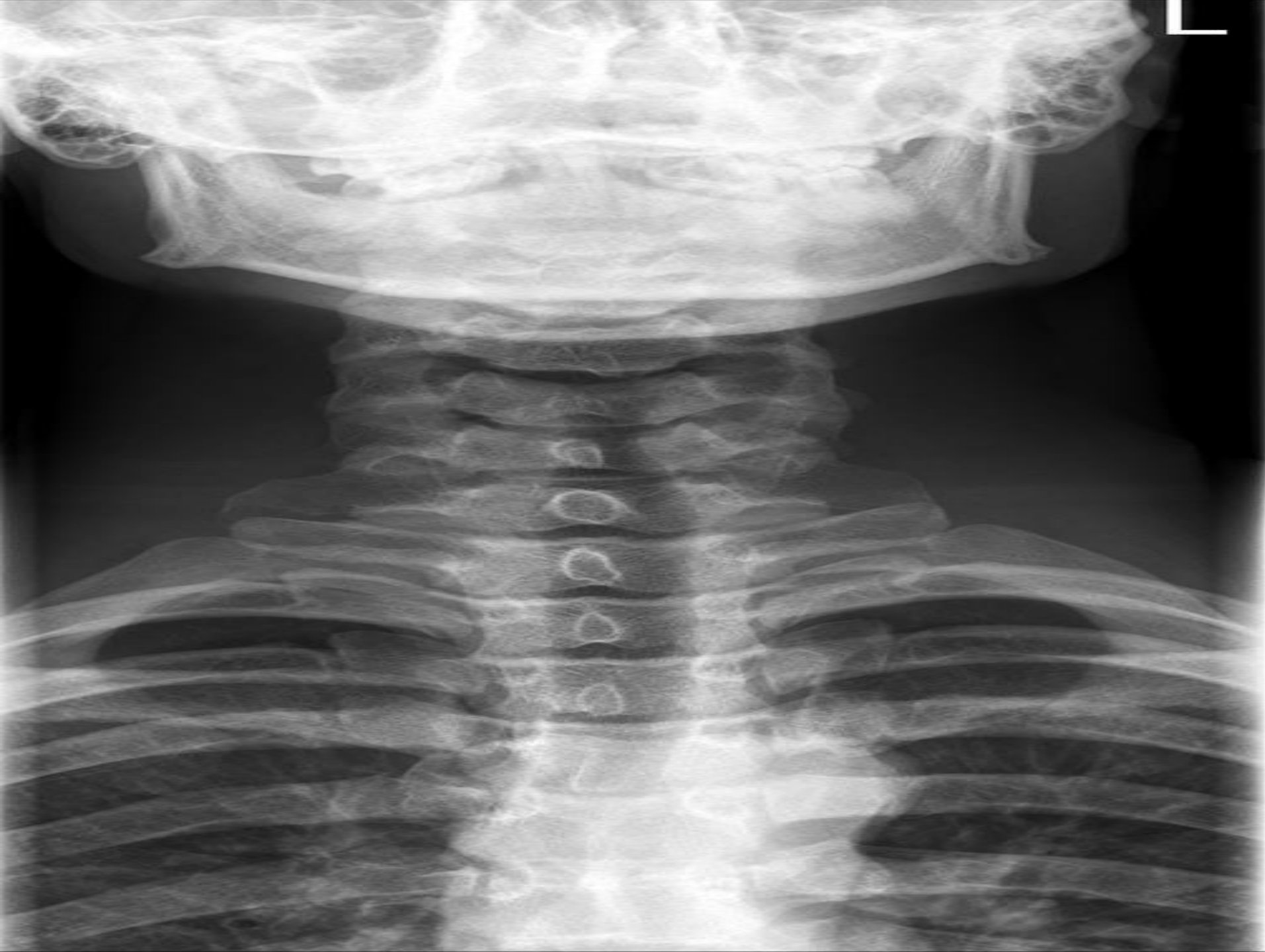
Earrings

**External
artifact**

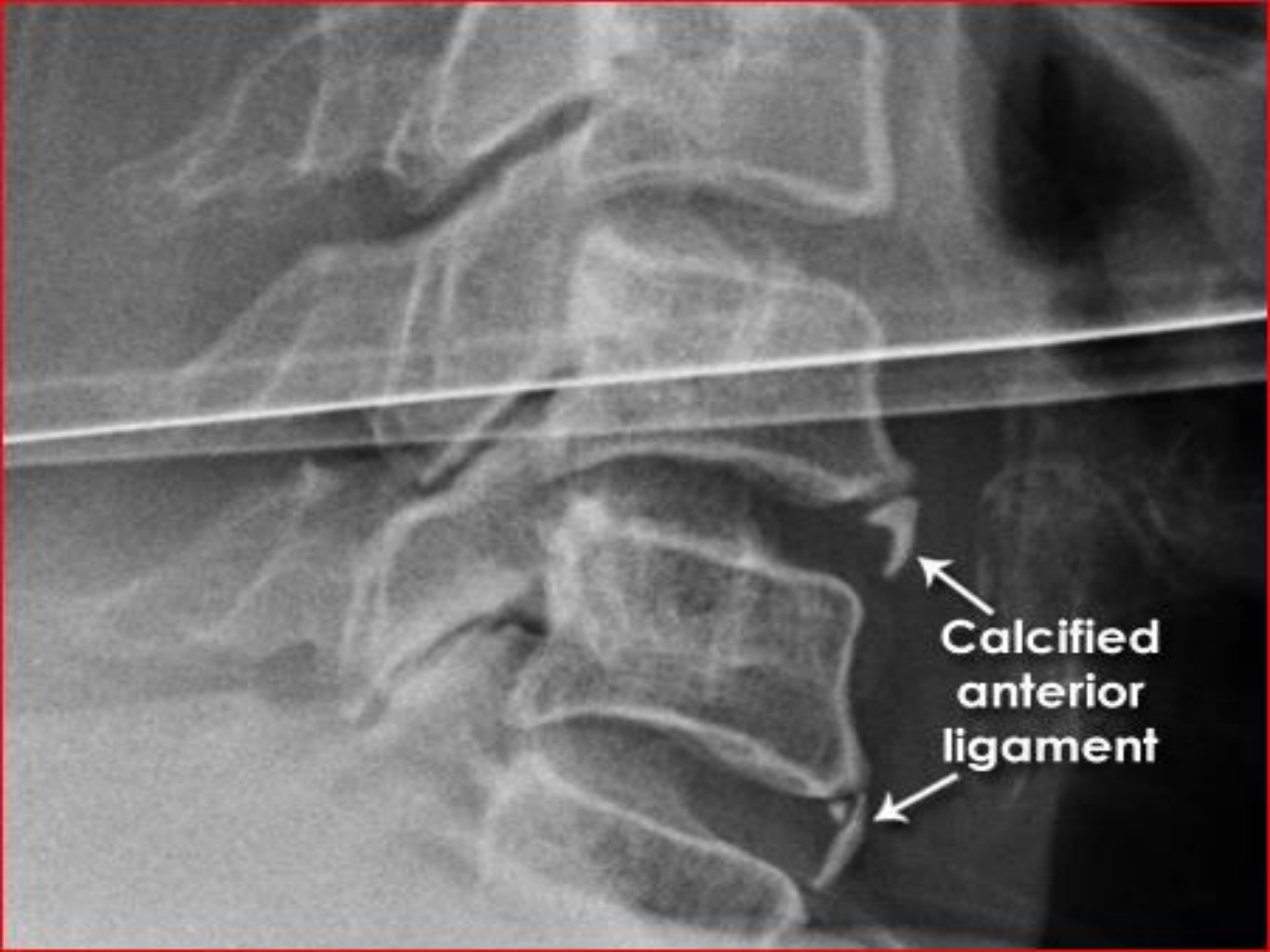
Fracture

Immobilisation device artifact

R

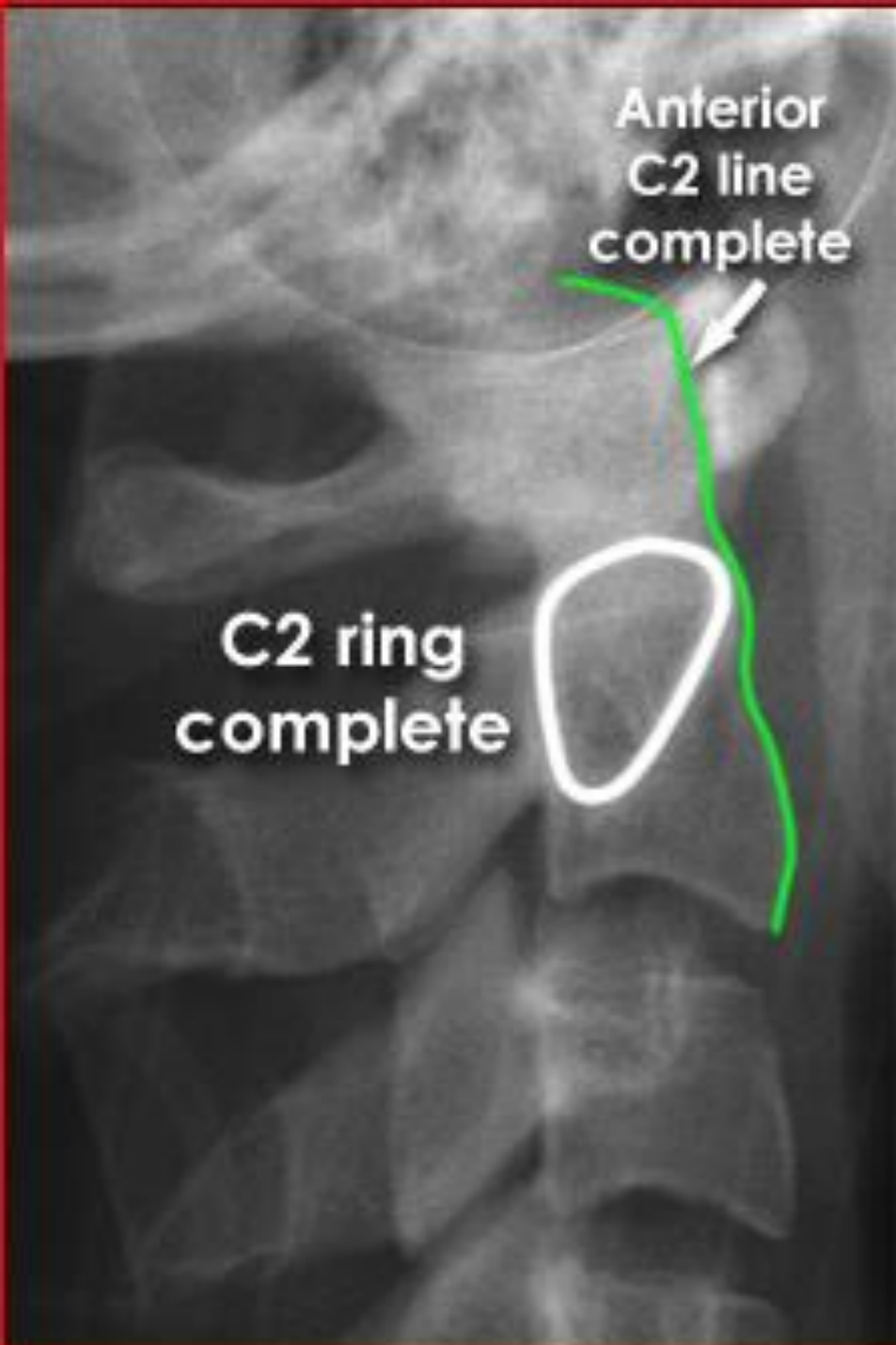




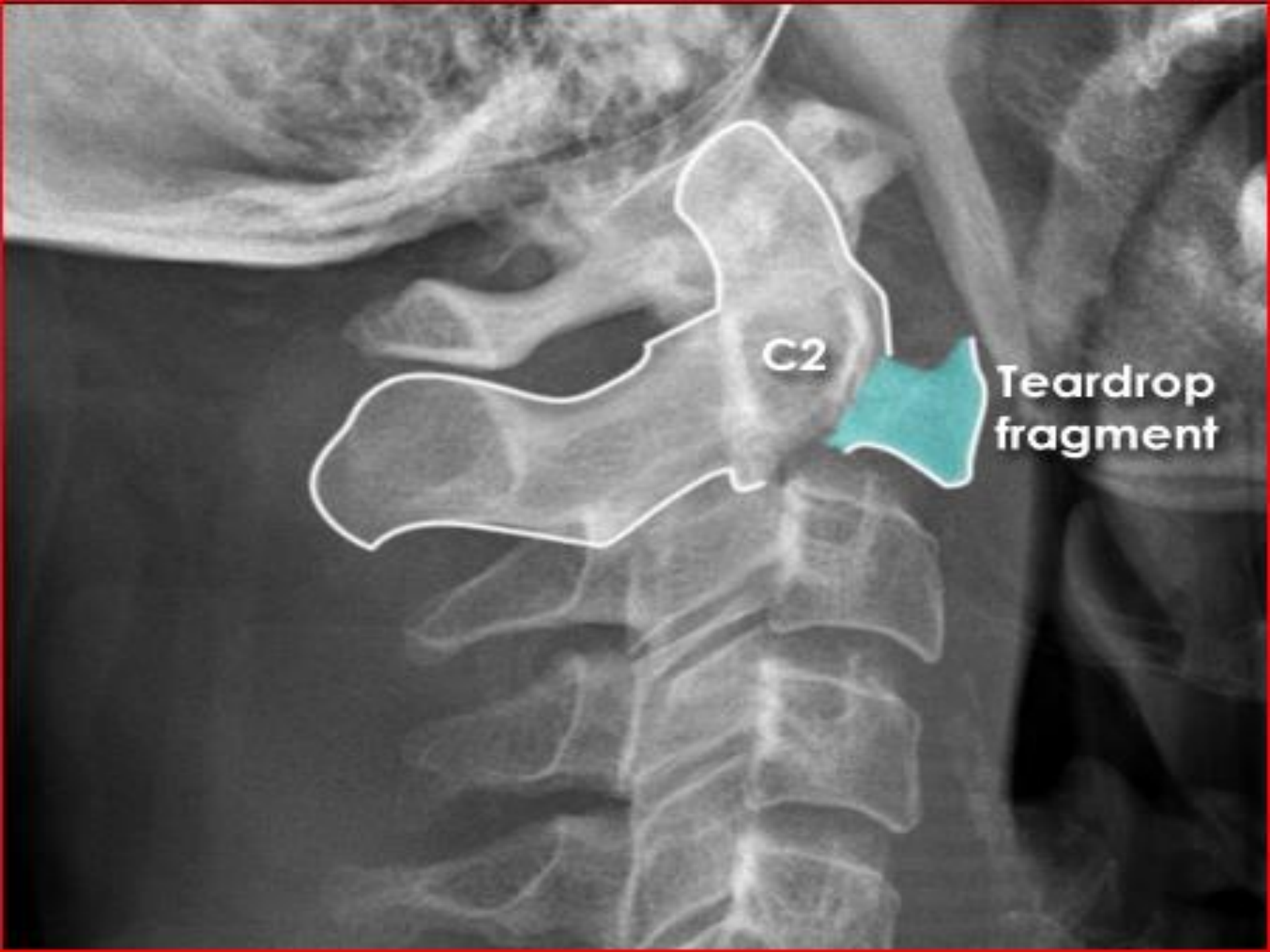


**Calcified
anterior
ligament**









C2

Teardrop
fragment





C2

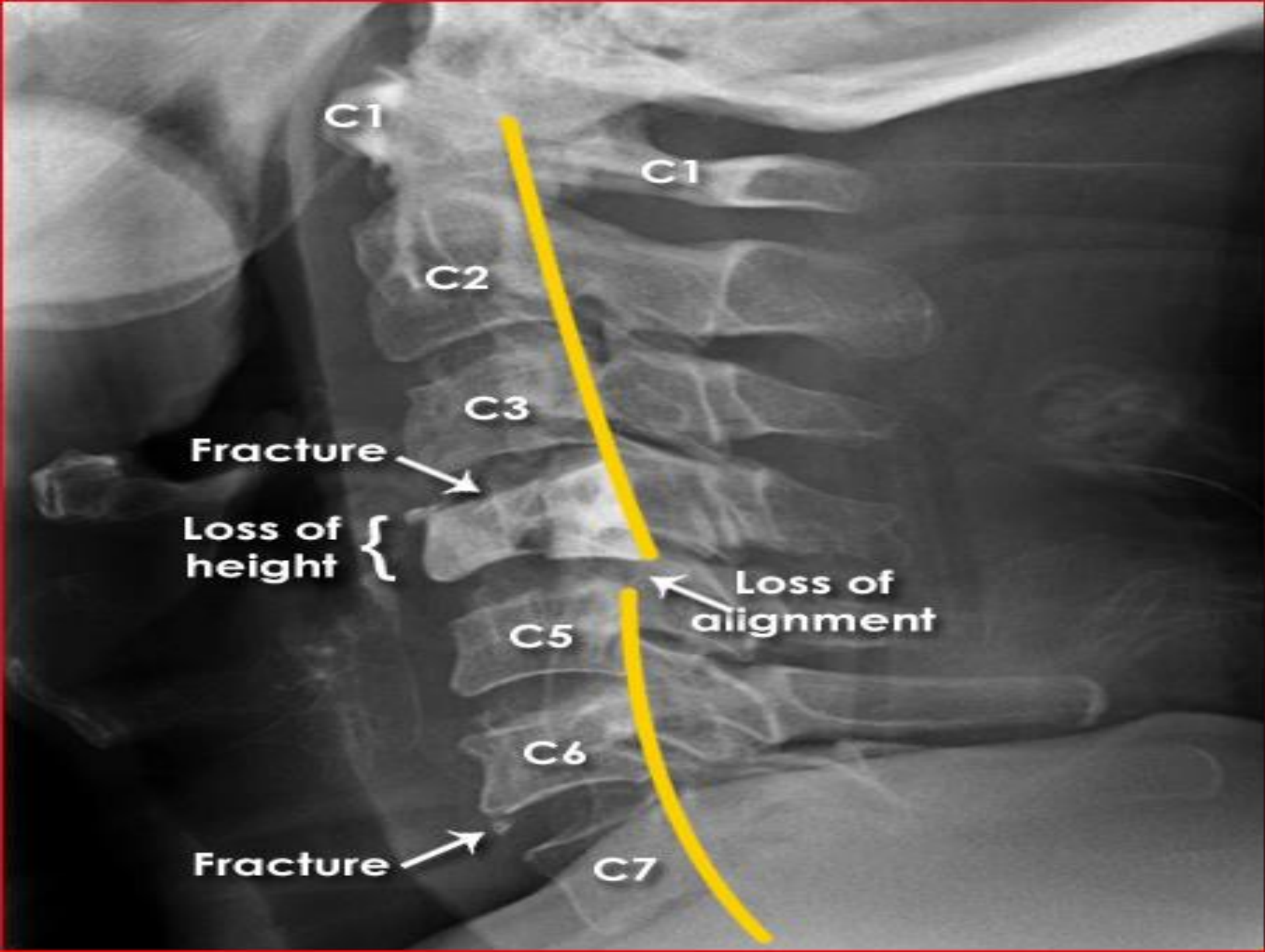
Teardrop
fracture

C4

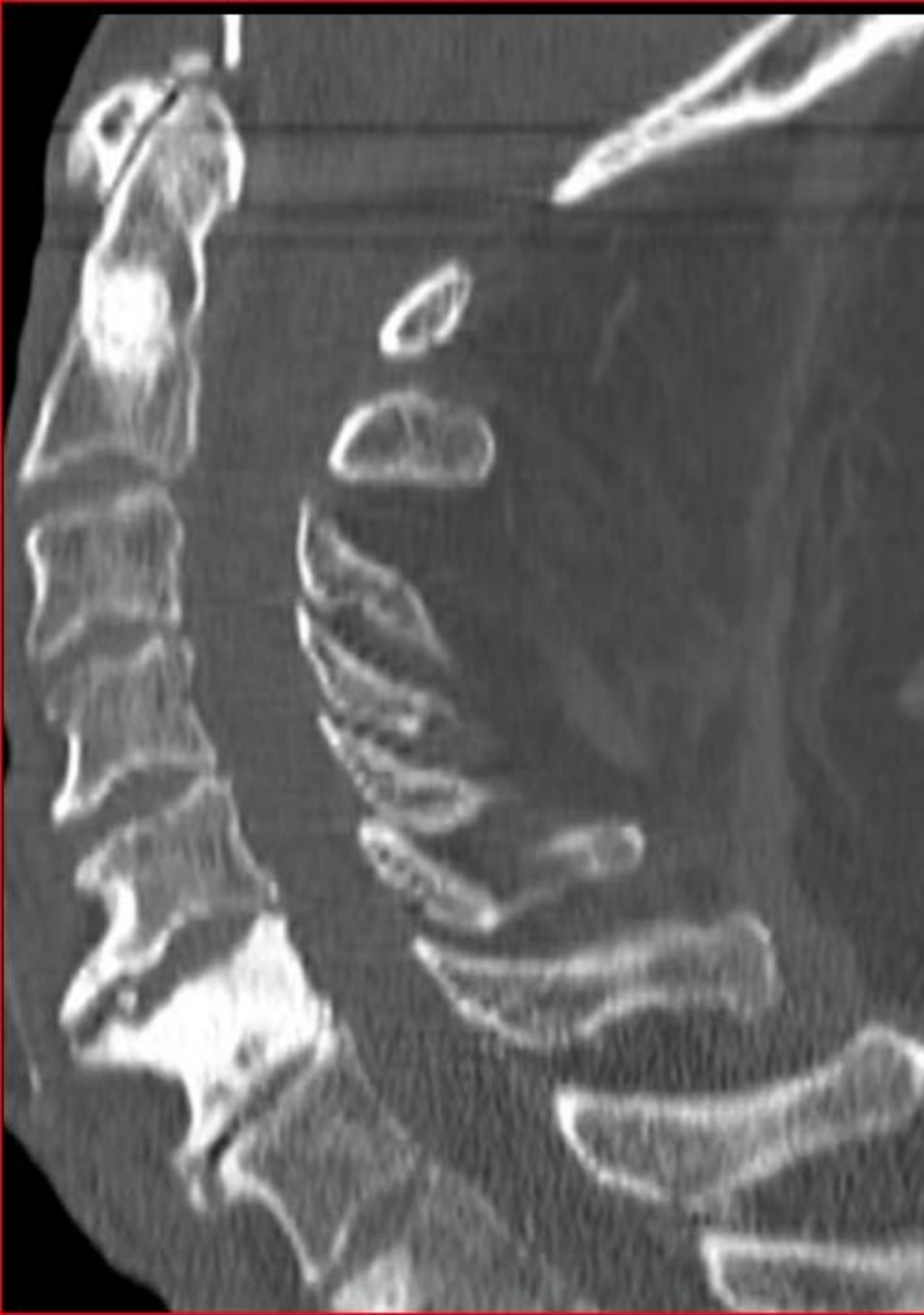
Spinous
process
fracture

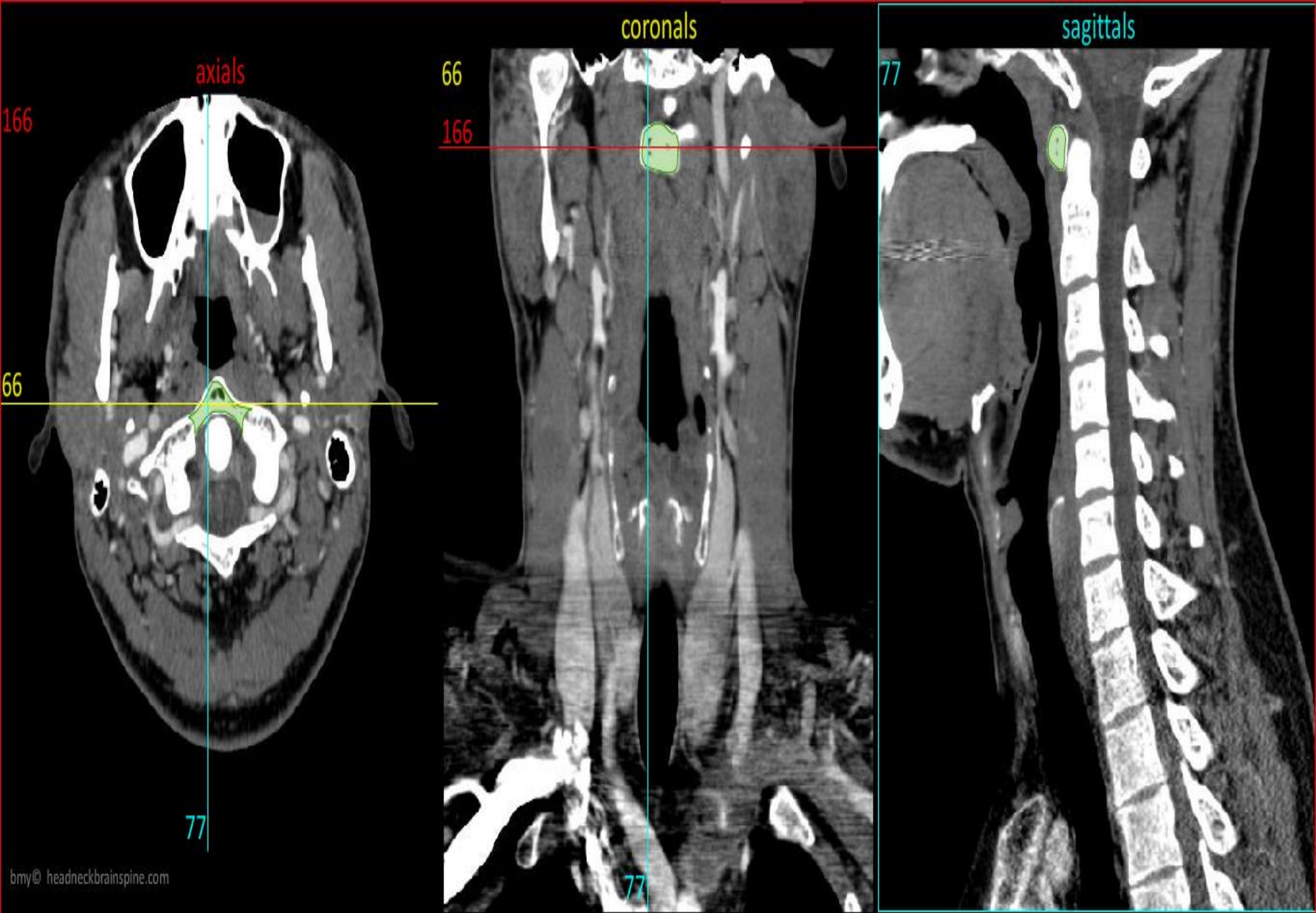
C7











C1 Anterior Arch



C1 Posterior Arch

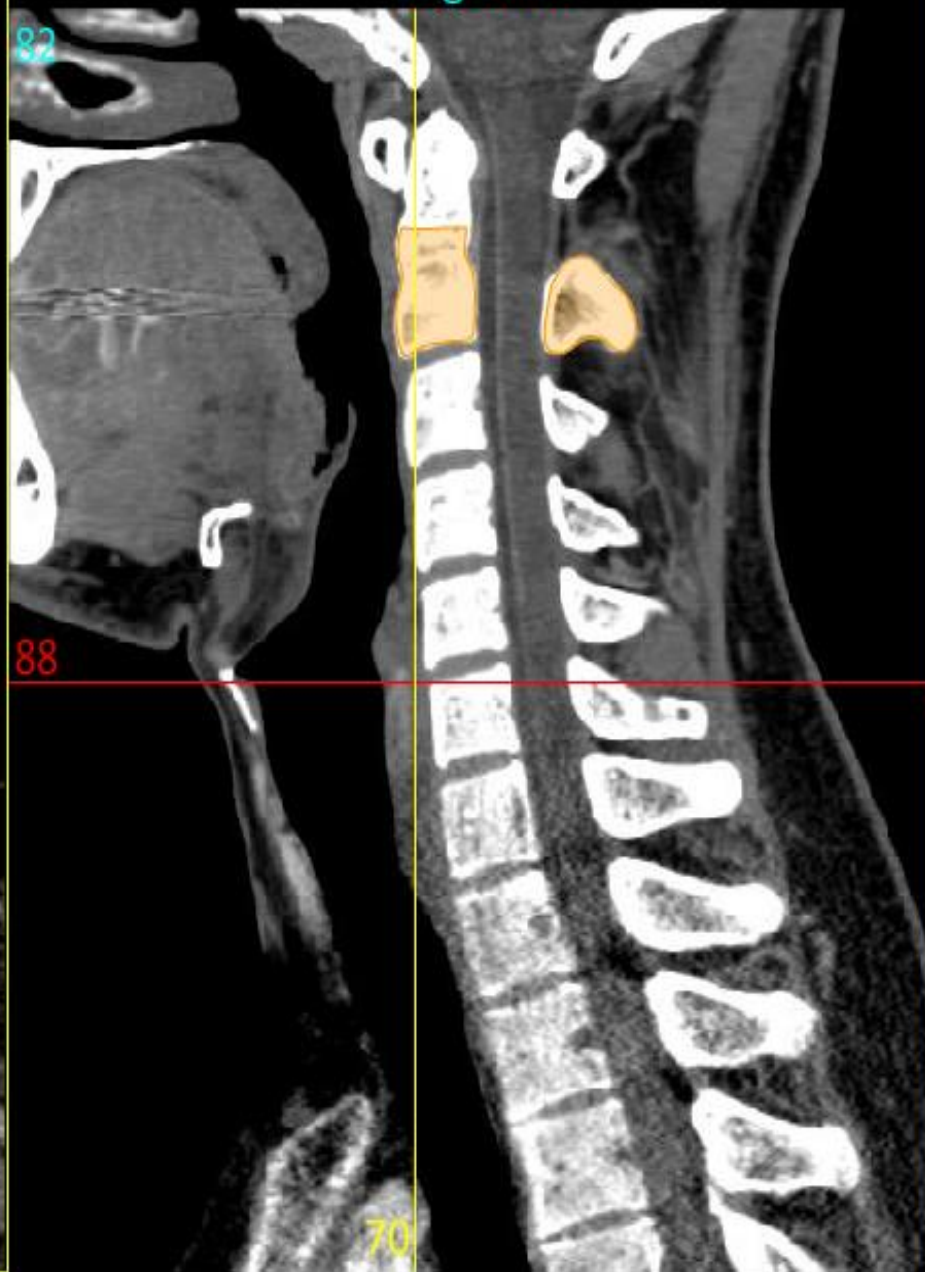
coronals

70



sagittals

82



88

70

Axis / C2

coronals

70



sagittals

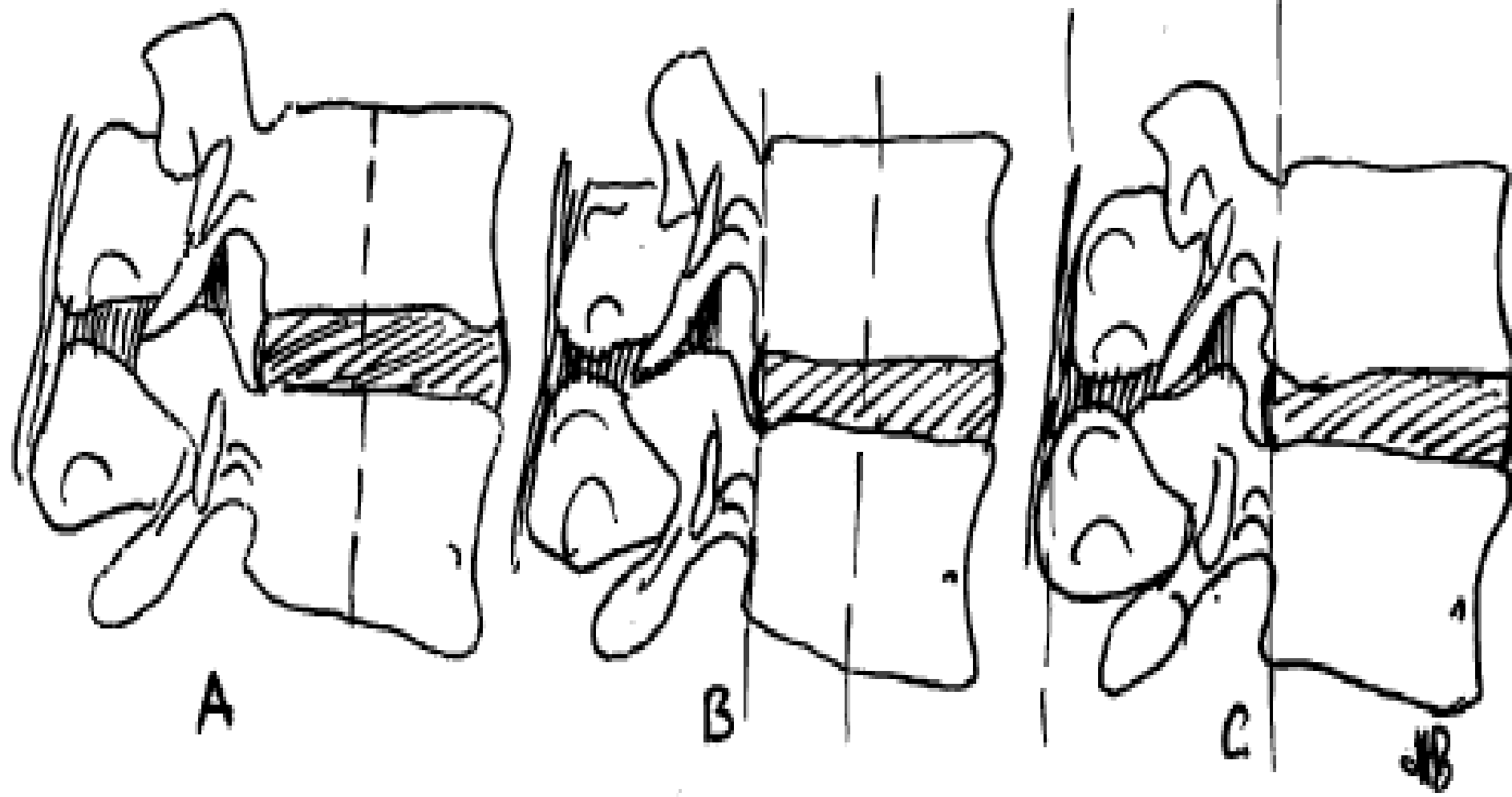
82



Dens / Odontoid Process







Şekil-5 Denis'e göre omurgada 3 kolon

A. Anterior kolon: ALL , cismin ön yarısı, **B.** Orta kolon: cismin arka yarısı ve PLL, **C.** Posterior kolon: PLL arkasındaki tüm yapılar

The image consists of two grayscale CT scan slices of a human neck. The left slice is a sagittal view, showing the cervical vertebrae in profile. A fracture is visible at the C2 level, specifically in the dens (odontoid process). The right slice is an axial view, showing a cross-section of the C2 vertebra. A fracture line is visible through the body of the vertebra. A red rectangular box is superimposed over the center of the image, containing the text 'C2 FRAKTÜRÜ' in white, bold, serif font.

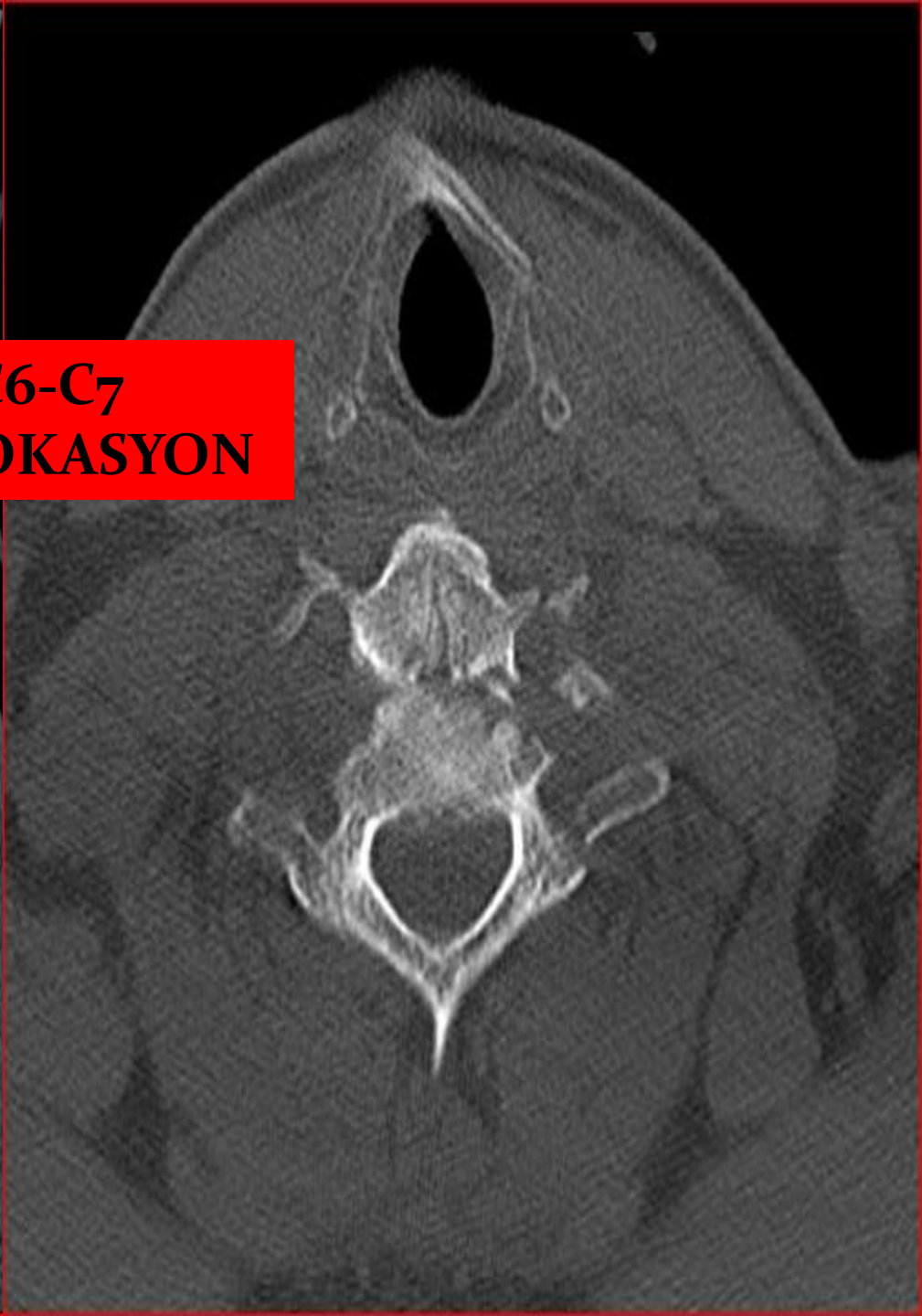
**C₂
FRAKTÜRÜ**

**FLEKSİYON TEAR
DROP FRAKTÜRÜ**



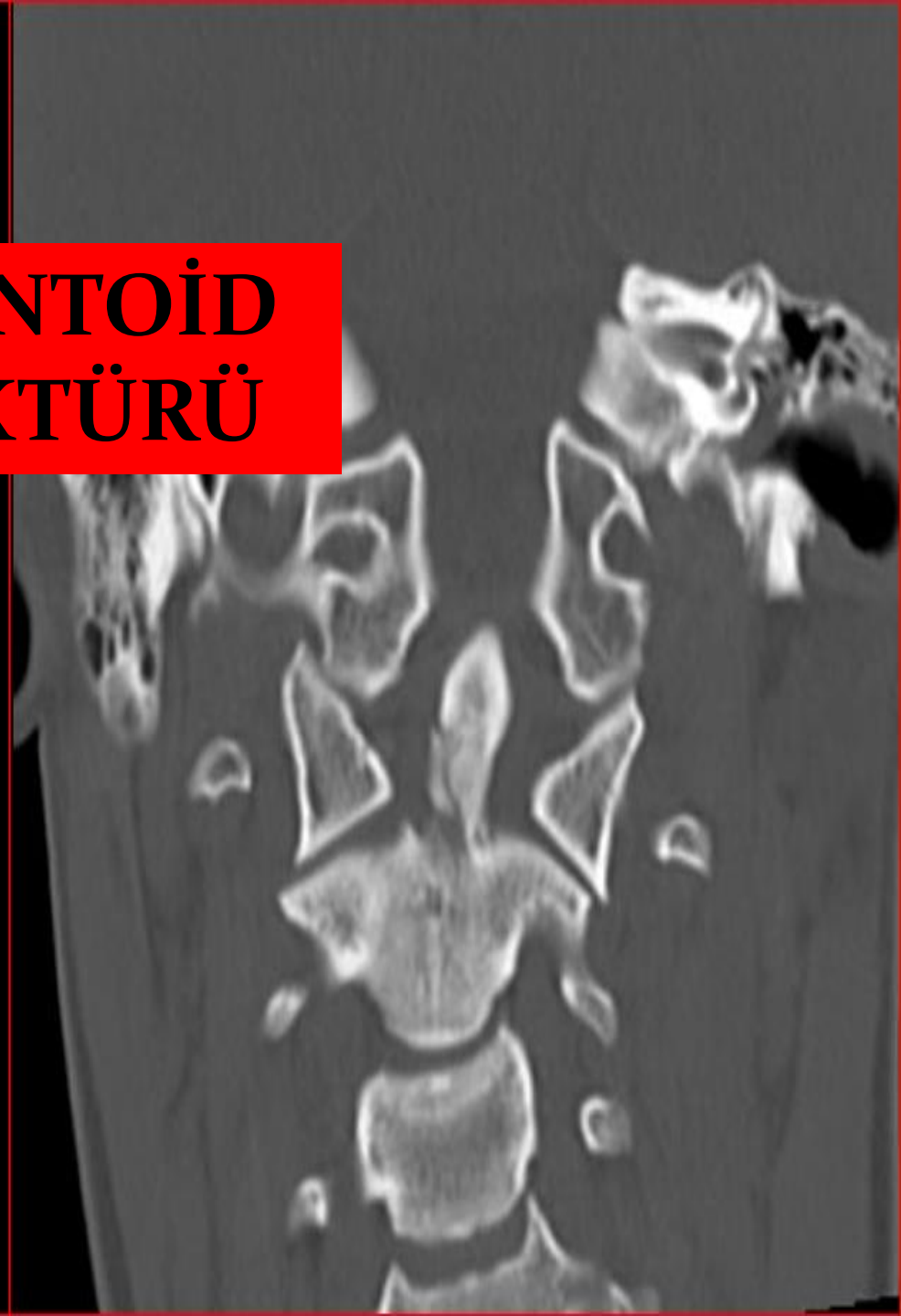
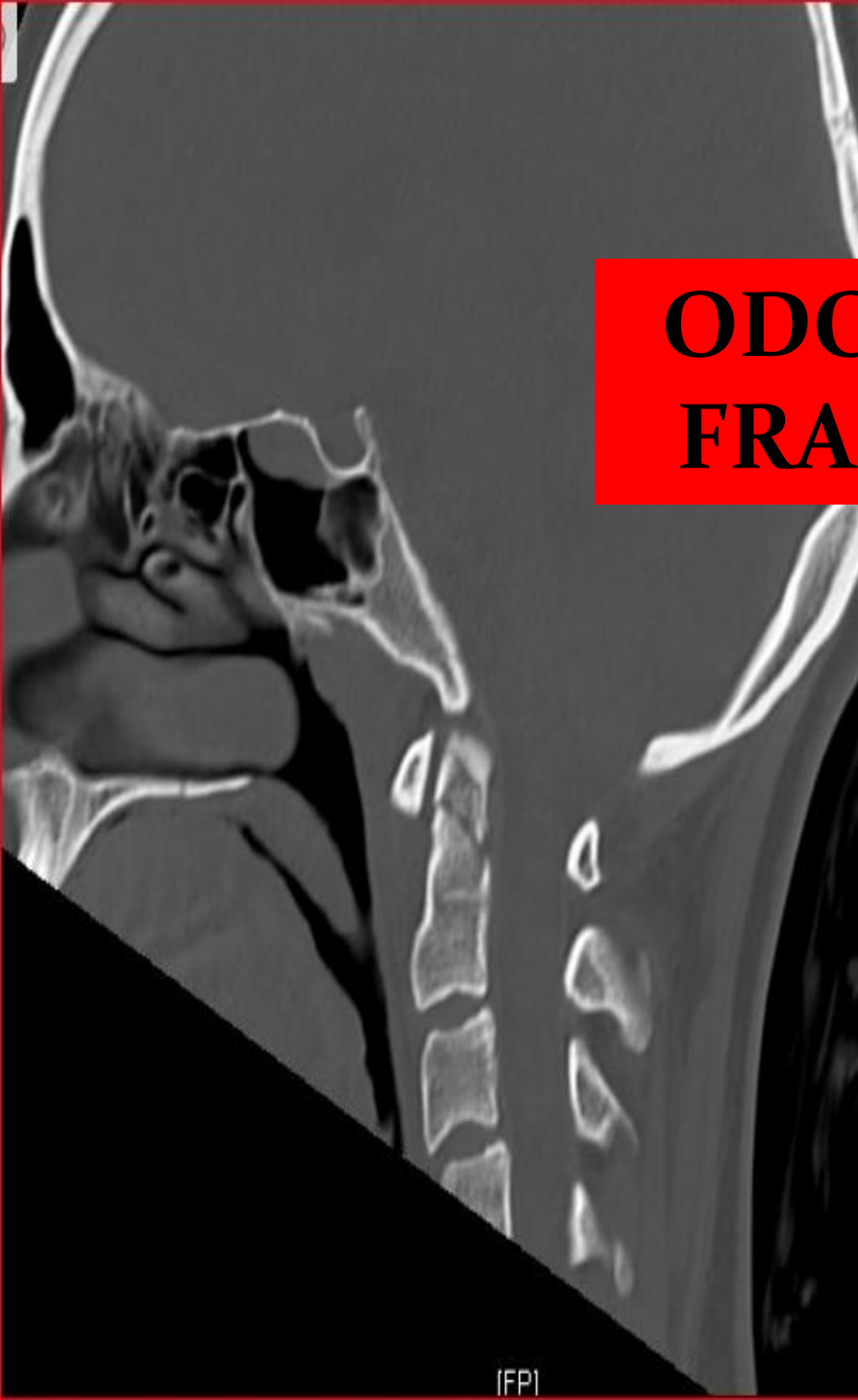


**C6-C7
DİSLOKASYON**



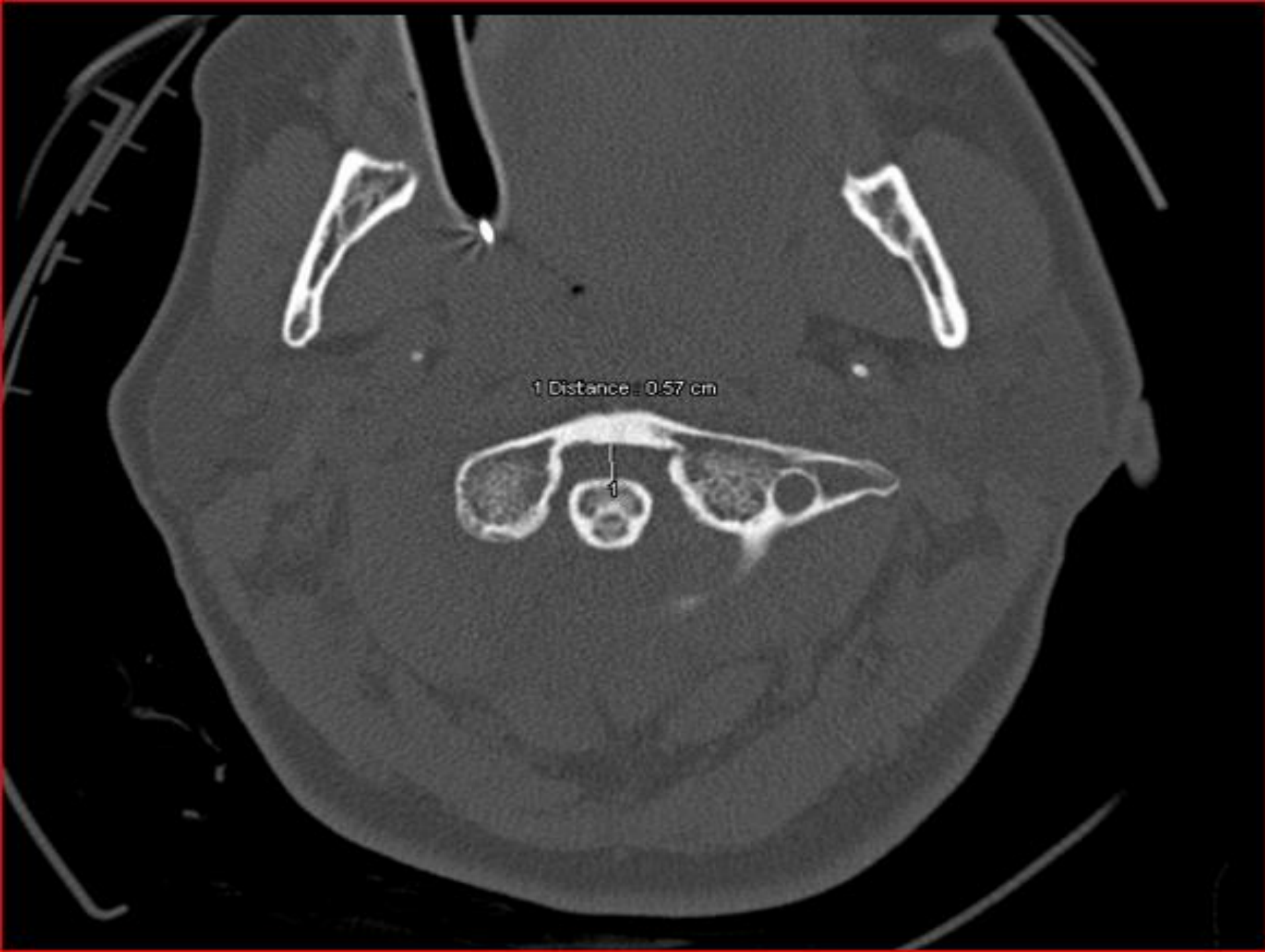


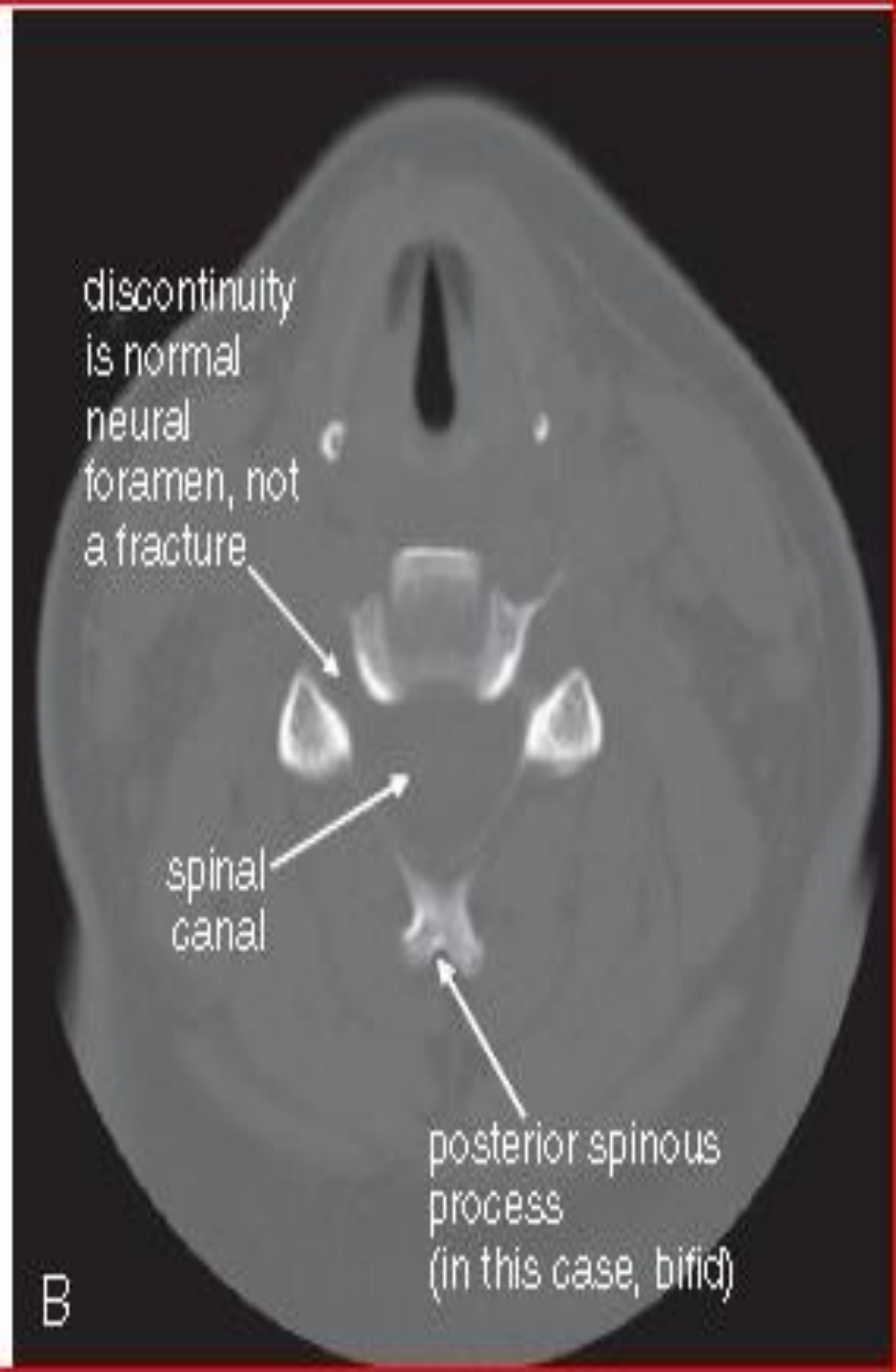
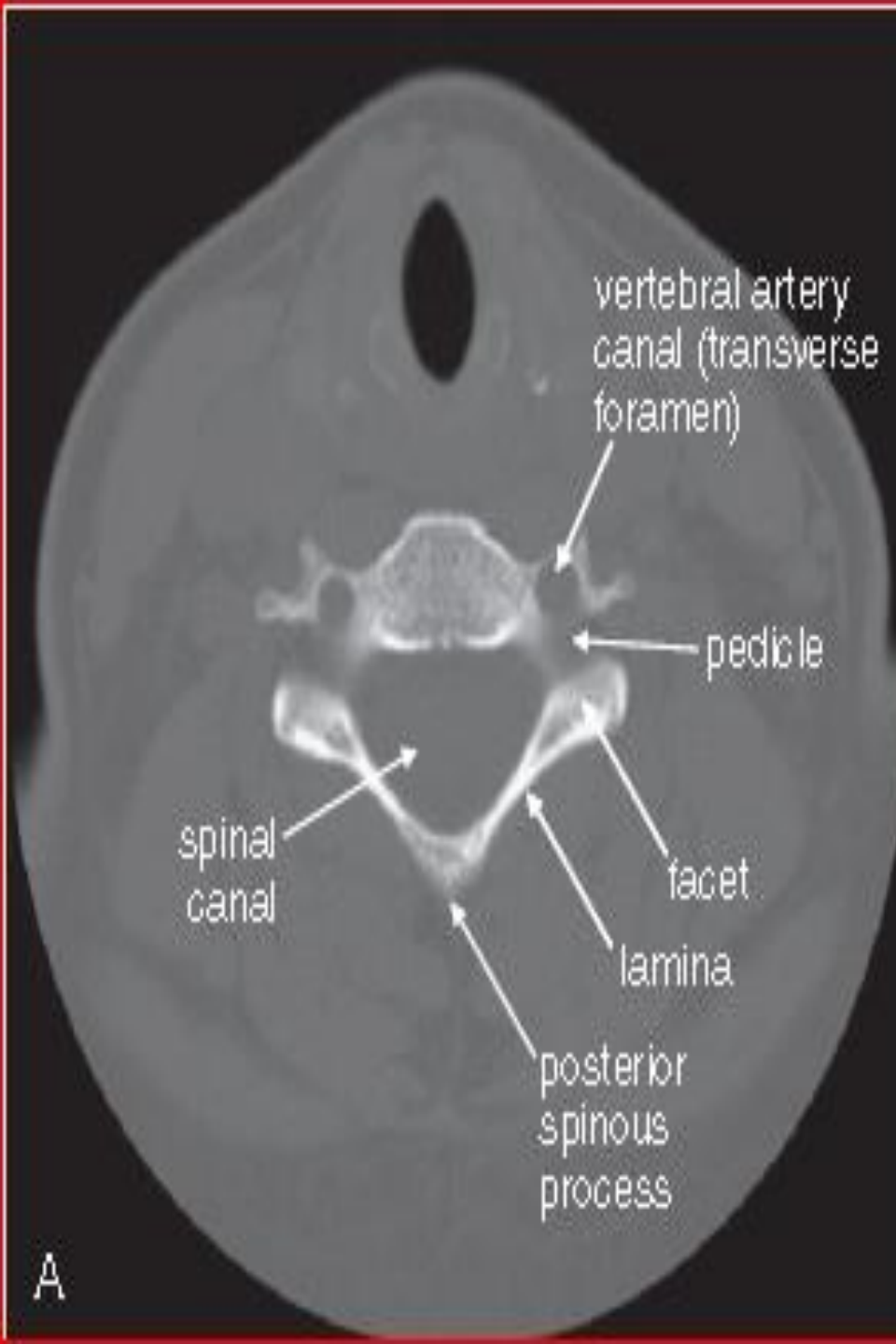
ODONTOİD FRAKTÜRÜ





**ATLANTOAKSİYAL
SUBLUKSASYON
ERİŞKİN <3 MM**





Vertebral pneumatocyst

Dr Ahmed Abd Rabou et al.

Vertebral pneumatocysts refer to the presence of air filled cavity within the vertebrae, more prevalent on the cervical spine. **Intraosseous pneumatocysts** are more common adjacent to the sacroiliac joint while it is rare in the vertebral column. Other causes of vertebral air e.g. **Kummel disease**, osteomyelitis, post surgery and necrotic tumor should be excluded.



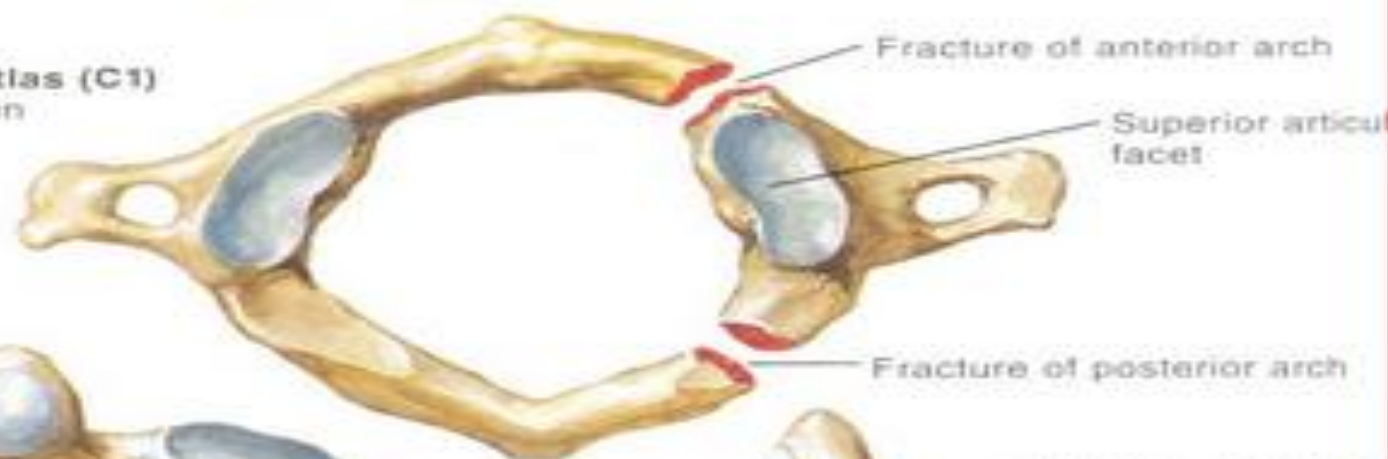
Fracture and Dislocation of Cervical Vertebrae

Fracture of odontoid process



Jefferson fracture of atlas (C1)

Each arch may be broken in one or more places.



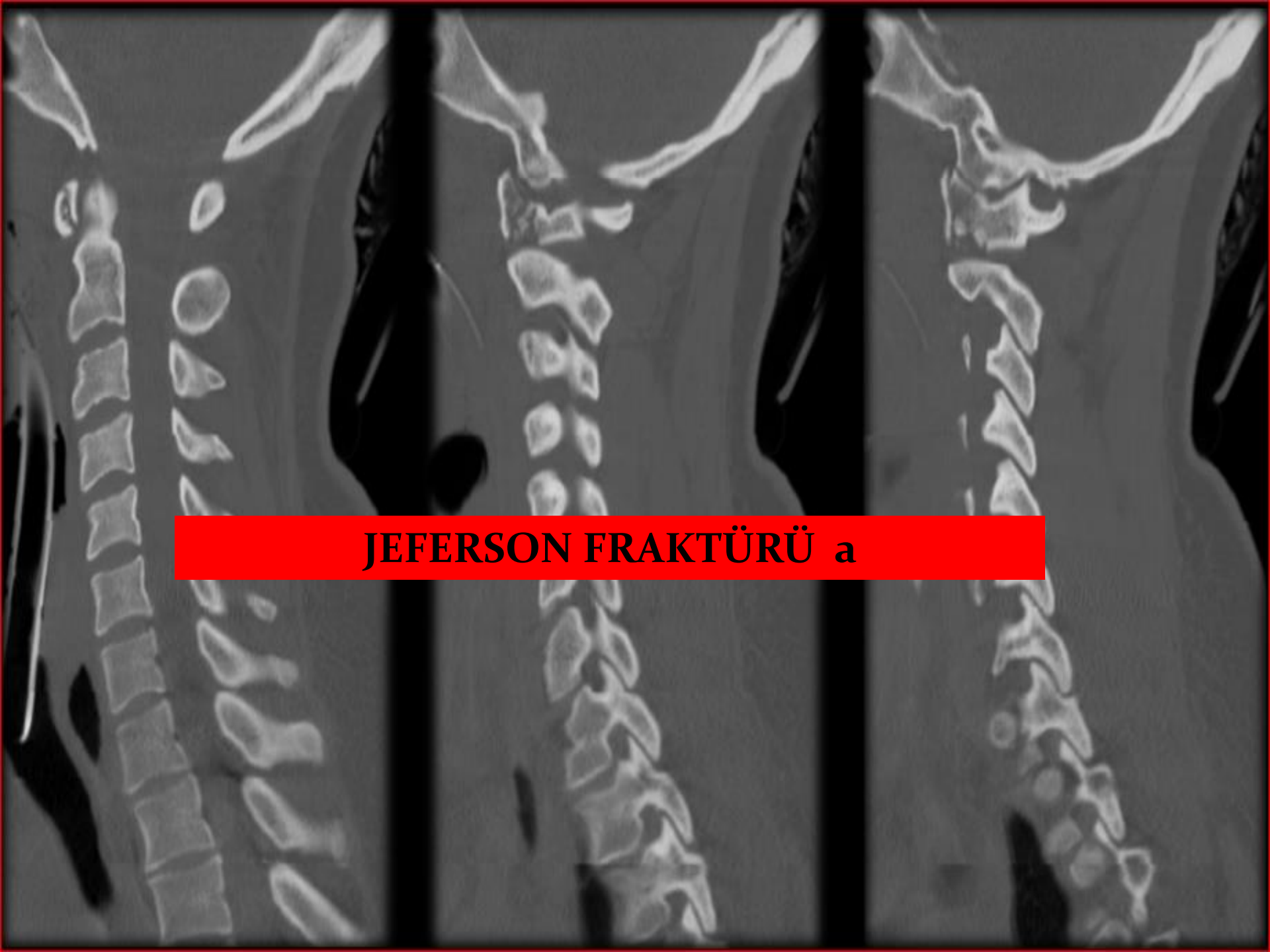
Superior articular facet

Inferior articular process



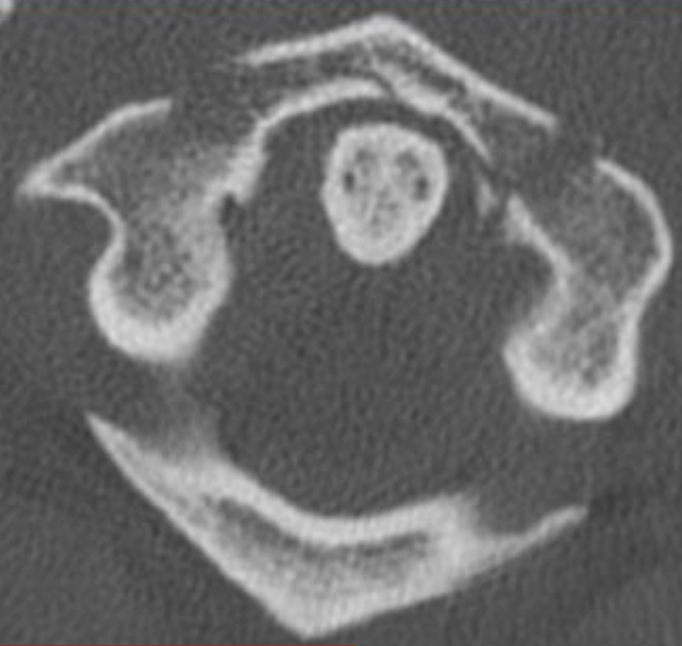
Hangman fracture
Fracture through neural arch of axis (C2), between superior and inferior articular facets



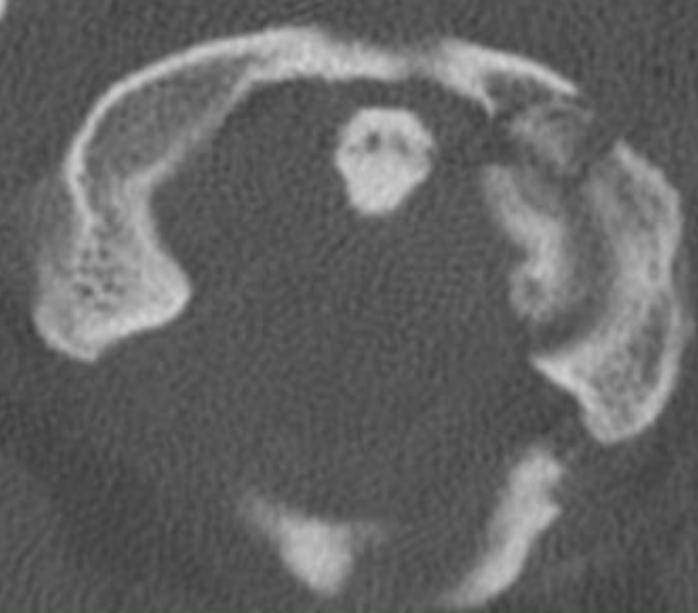
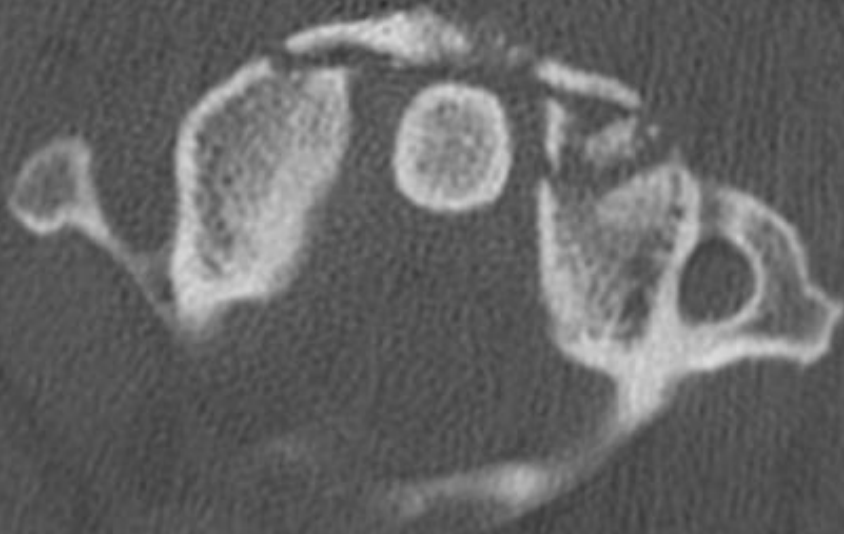


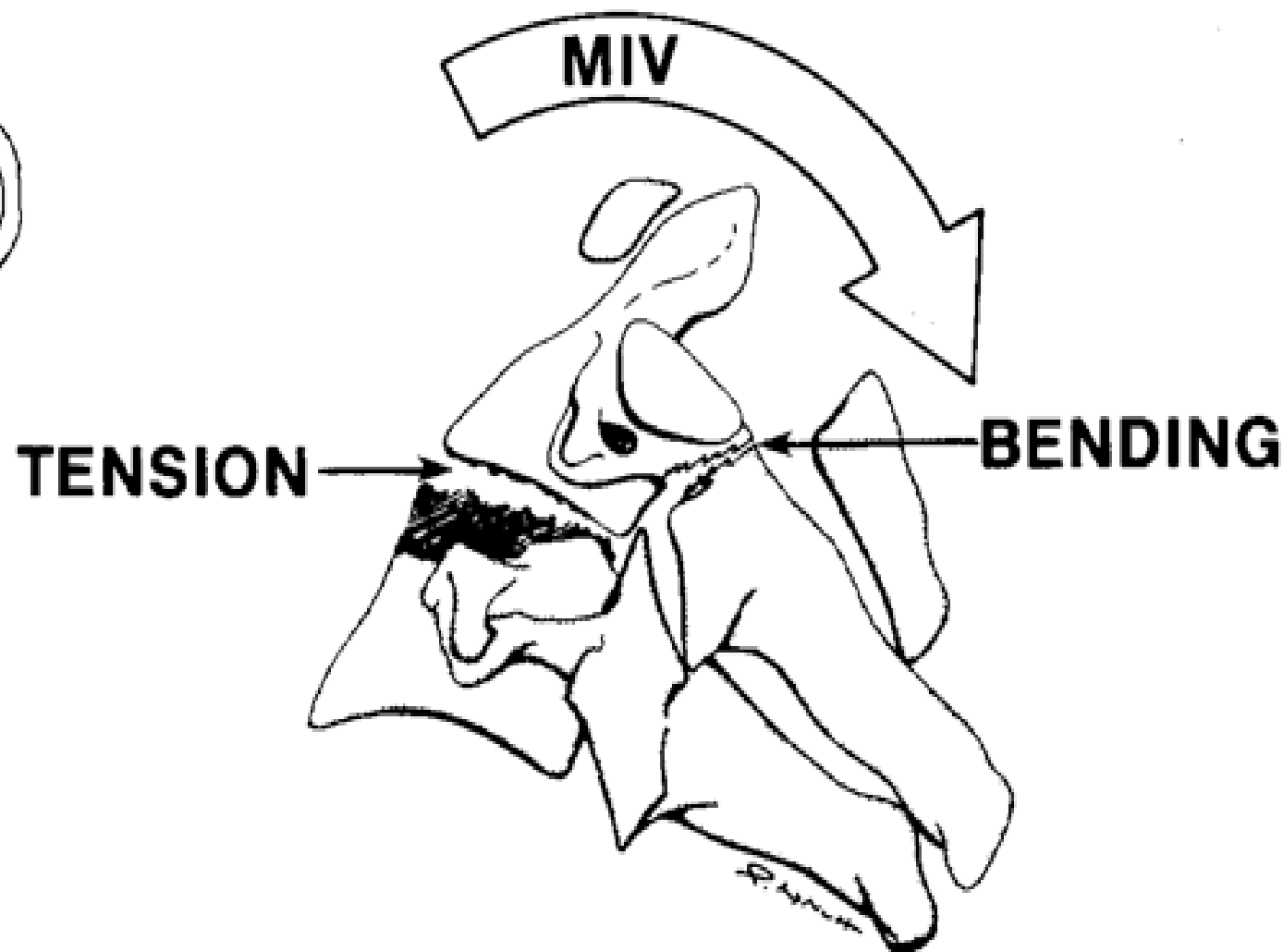
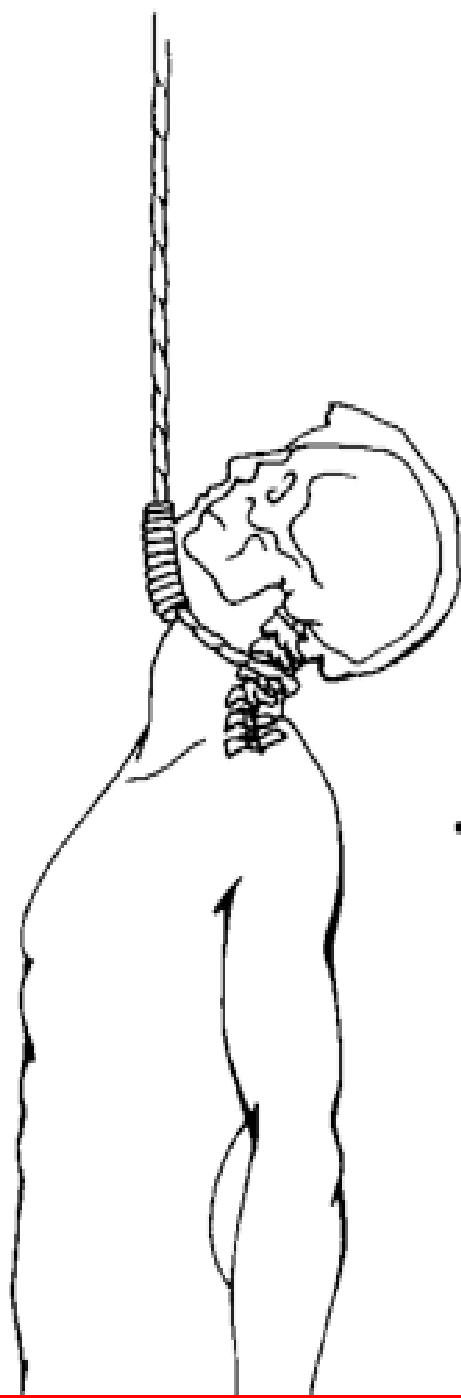
The image displays three sagittal CT scans of the cervical spine, illustrating Jefferson fractures at different levels. The leftmost scan shows a fracture at the C2 level, the middle scan shows a fracture at the C3 level, and the rightmost scan shows a fracture at the C4 level. Each scan clearly depicts the bony structures of the vertebrae and the surrounding soft tissue. A red banner with white text is overlaid across the middle of the three scans.

JEFERSON FRAKTÜRÜ a



JEFFERSON FRAKTÜRÜ b





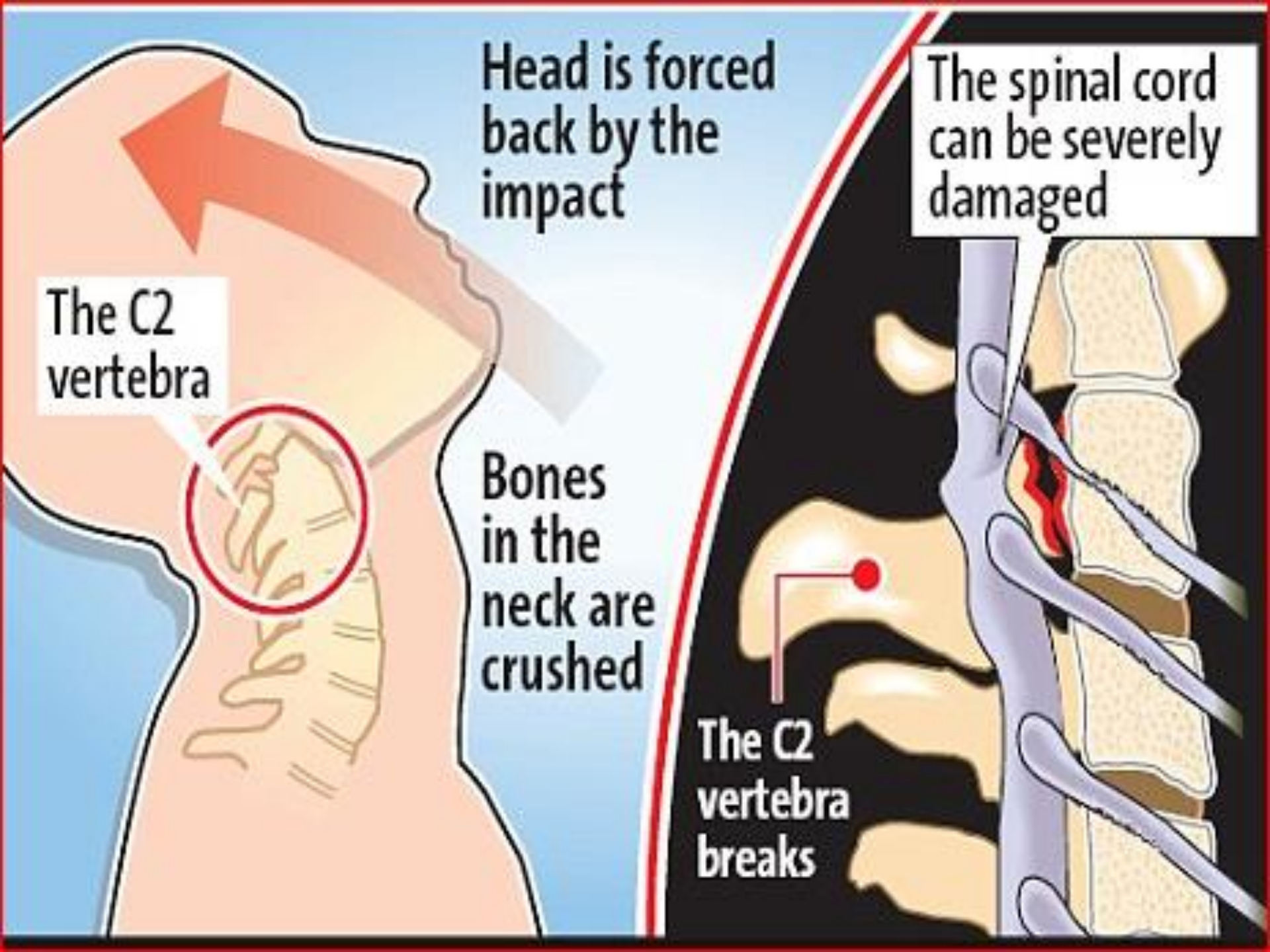
Head is forced
back by the
impact

The C2
vertebra

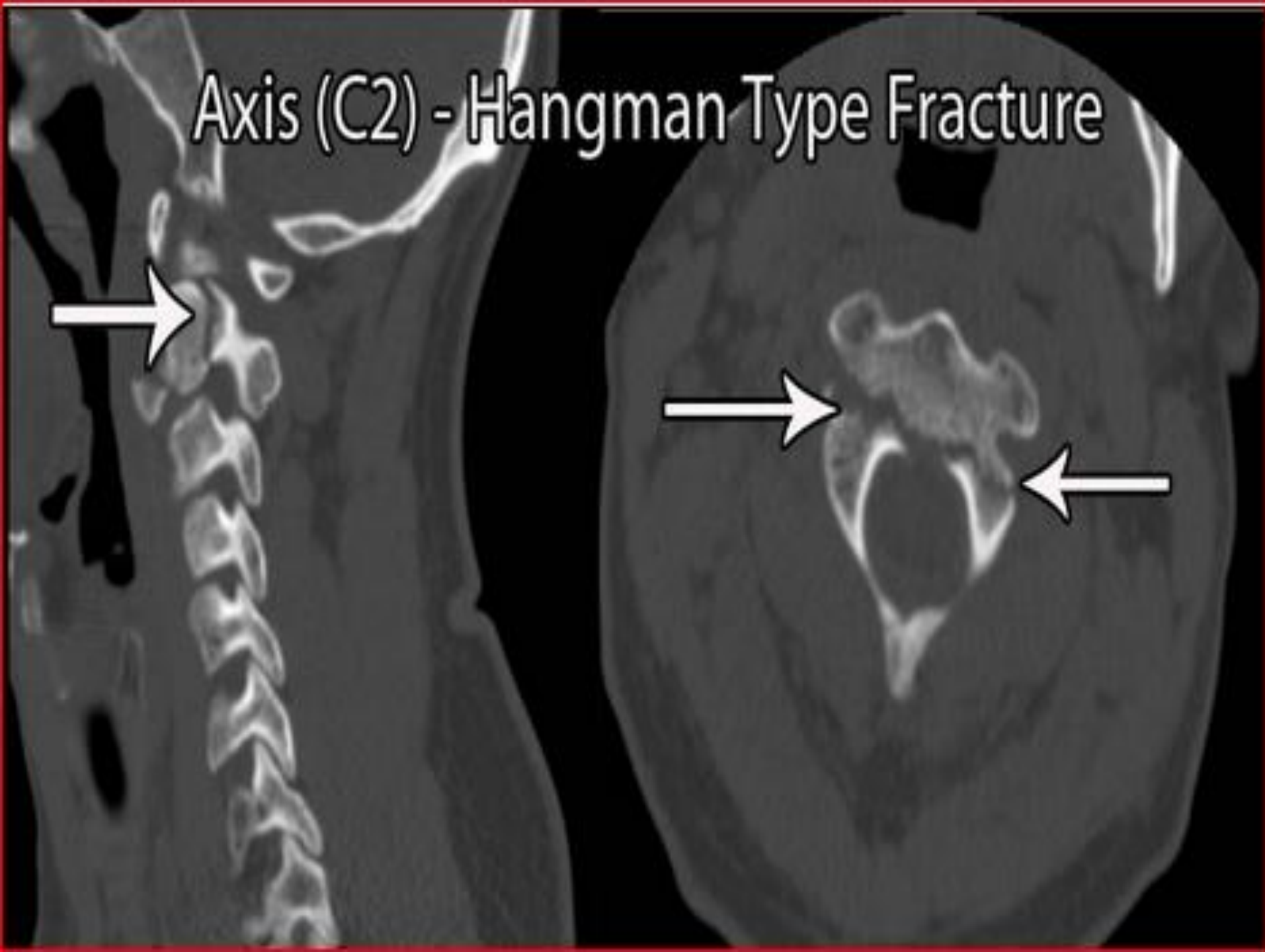
Bones
in the
neck are
crushed

The spinal cord
can be severely
damaged

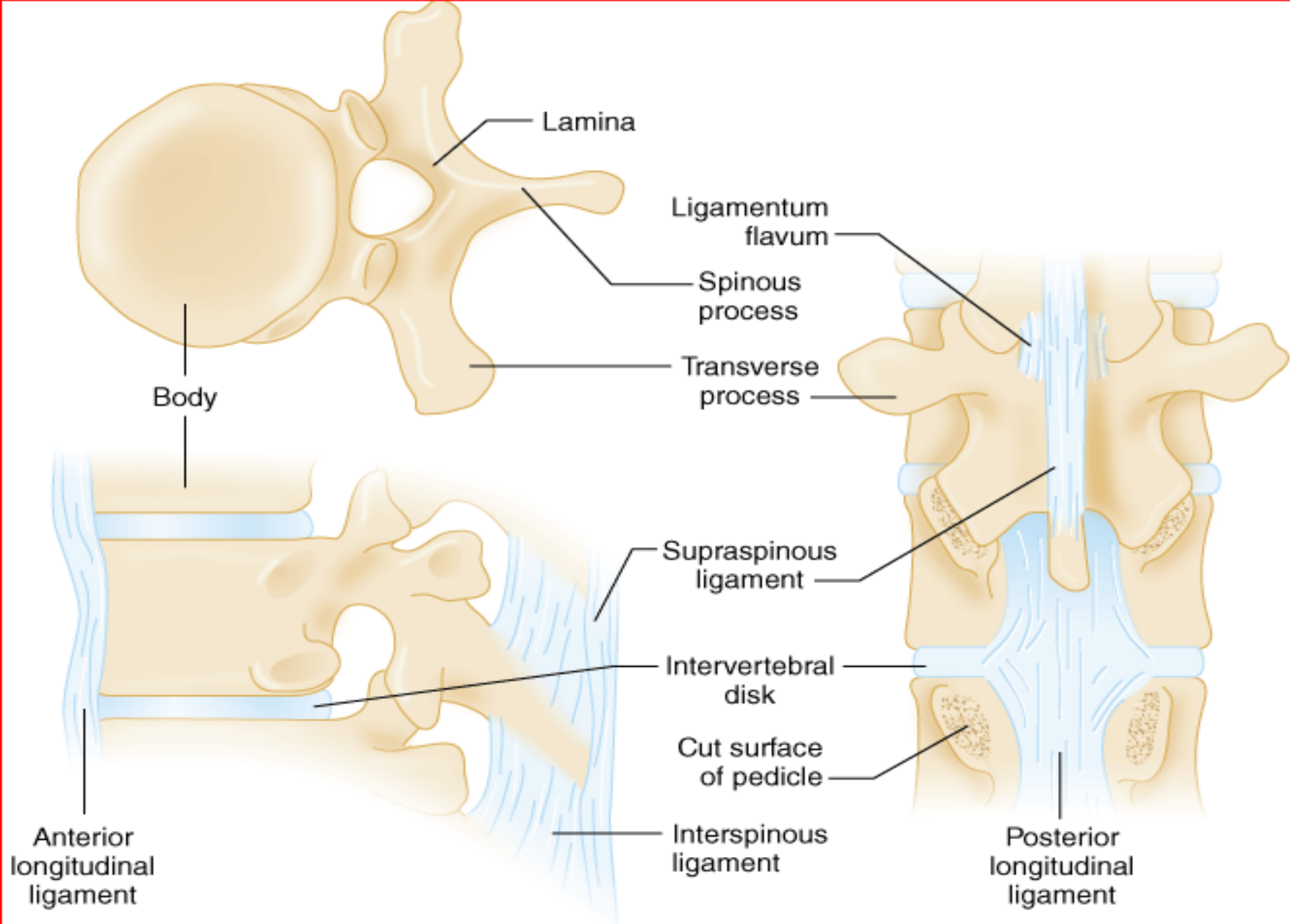
The C2
vertebra
breaks



Axis (C2) - Hangman Type Fracture



**TORAKAL VE
LOMBER
VERTEBRA**





24

sagittals



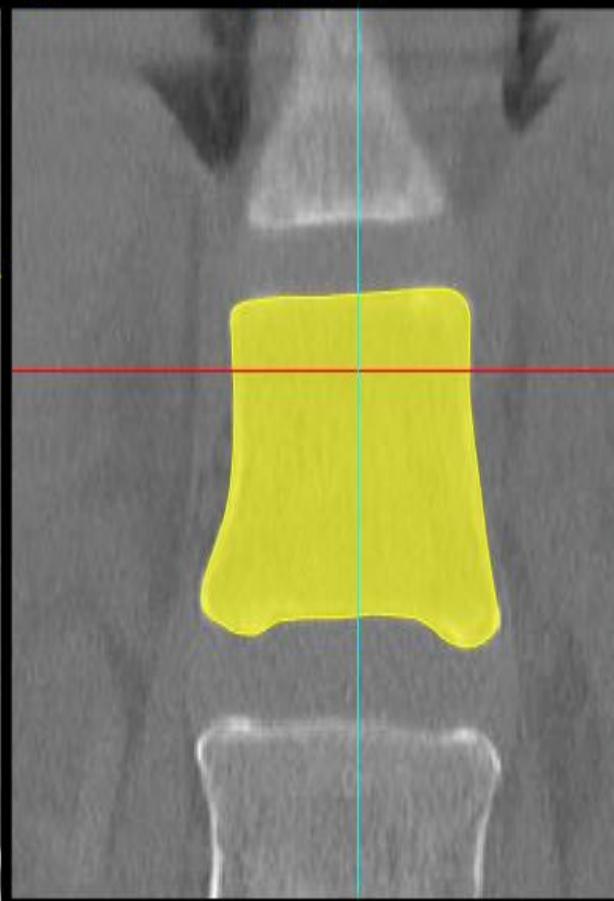
22

axials



11

coronals



L1 vertebral body

17

axials



26

coronals



L1 transverse process

22

sagittals

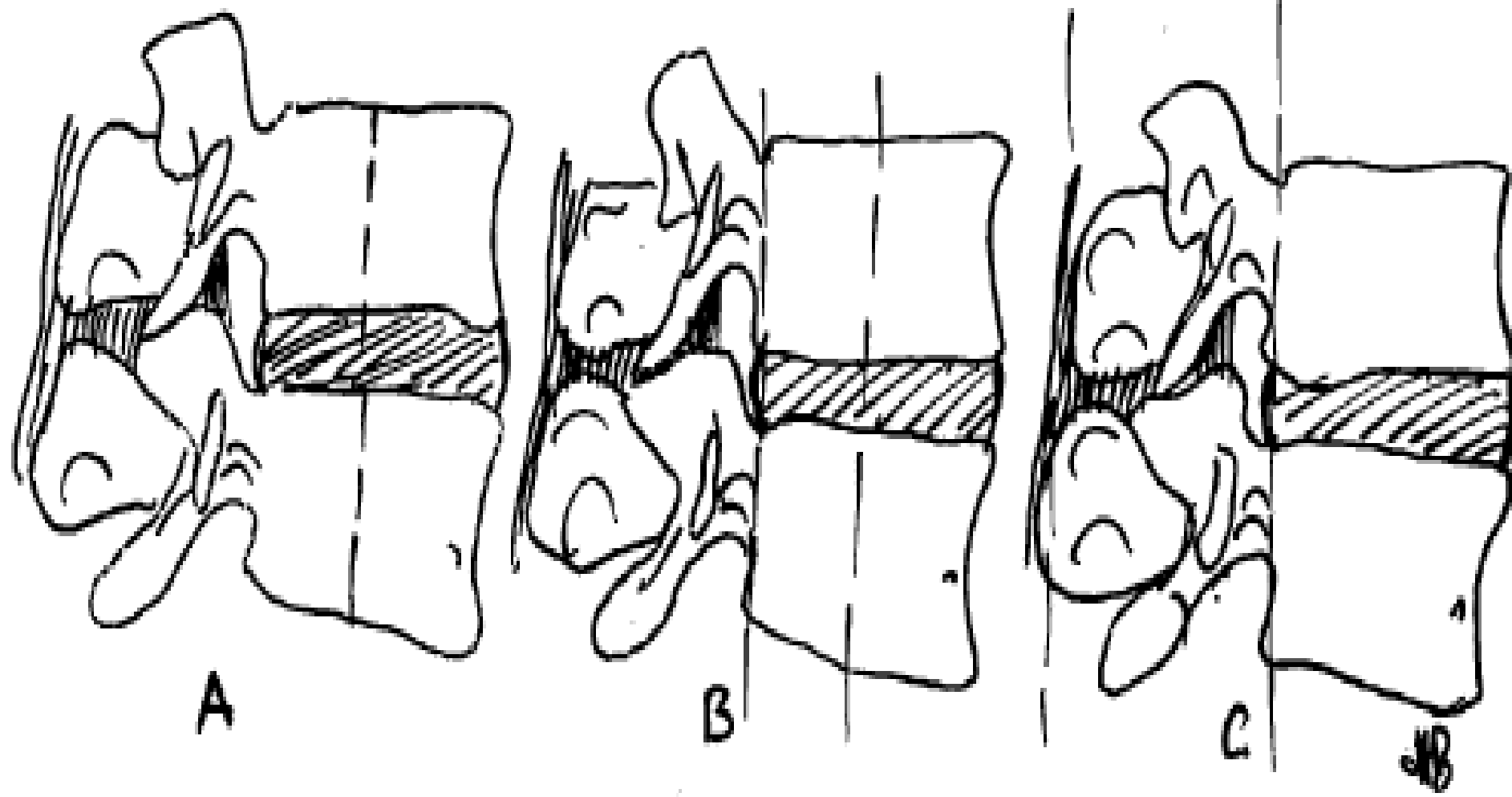


5

axials



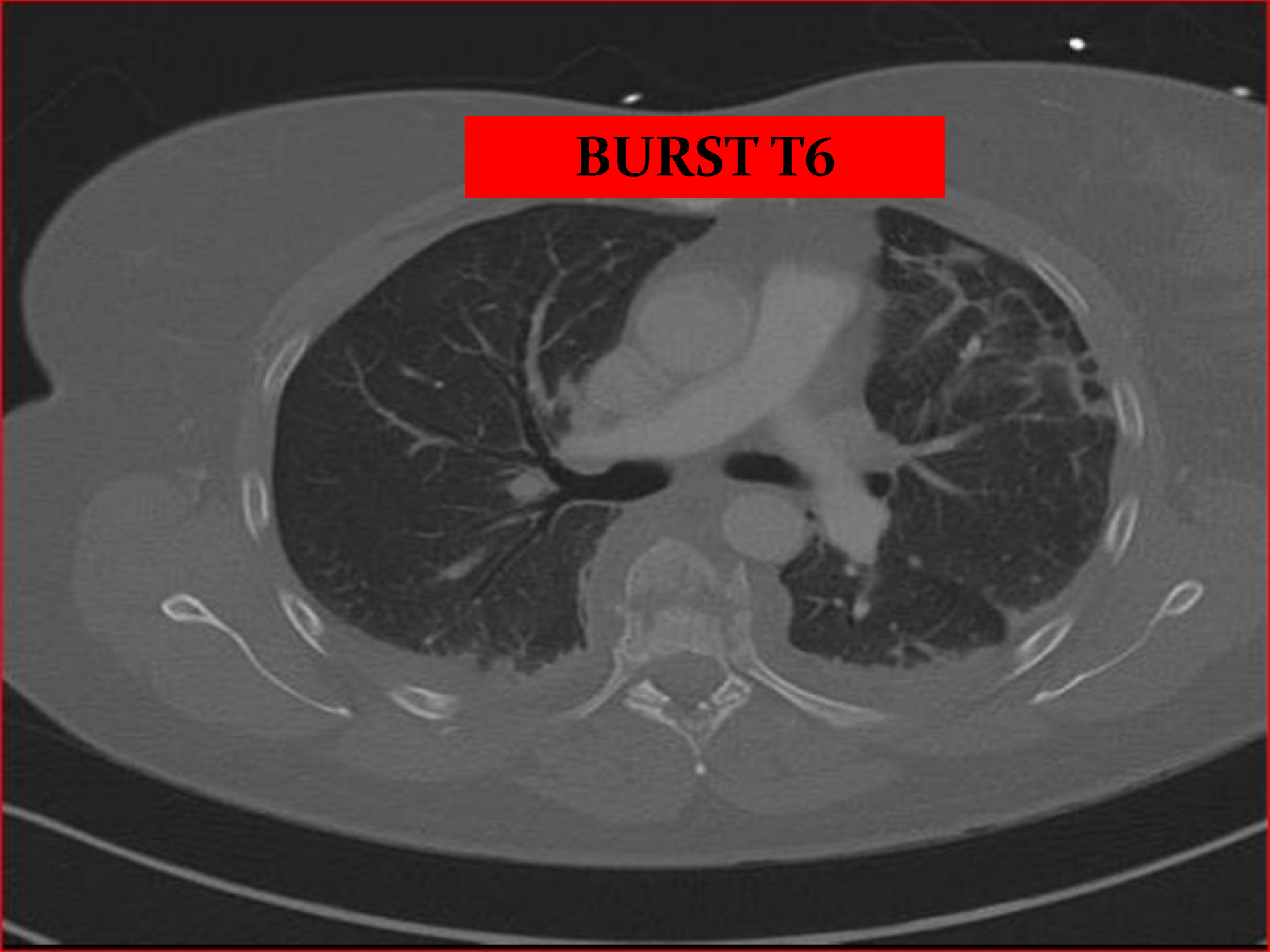
L1 spinous process



Şekil-5 Denis'e göre omurgada 3 kolon

A. Anterior kolon: ALL , cismin ön yarısı, **B.** Orta kolon: cismin arka yarısı ve PLL, **C.** Posterior kolon: PLL arkasındaki tüm yapılar

BURST T6

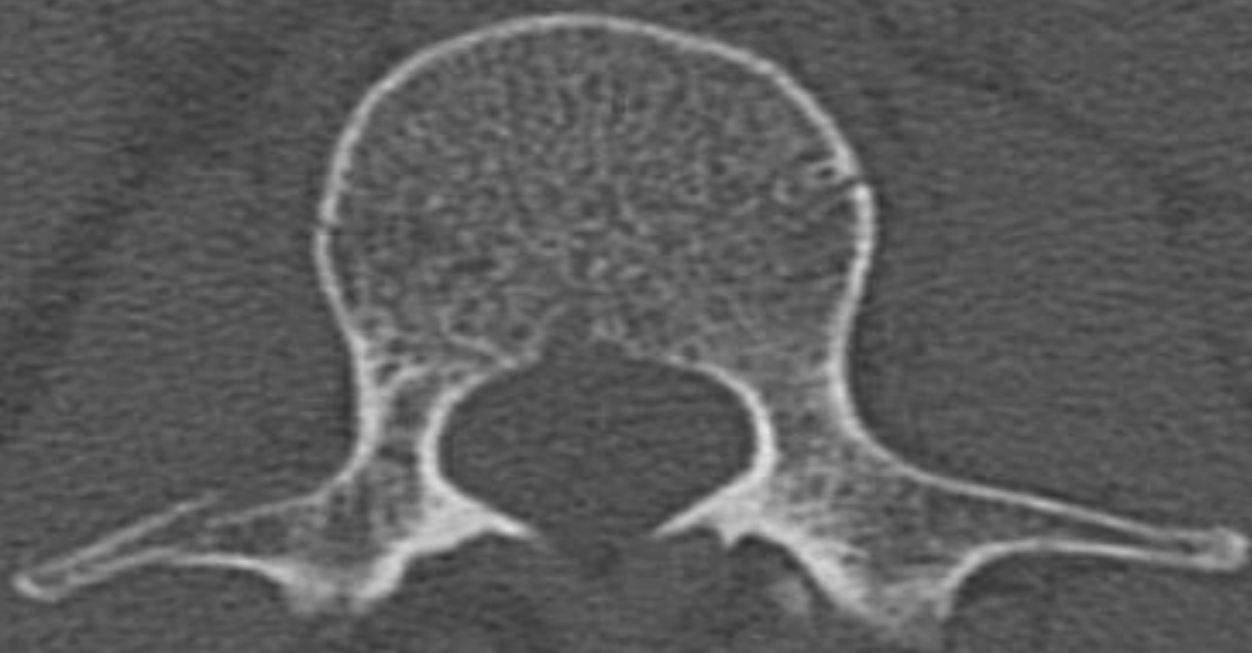




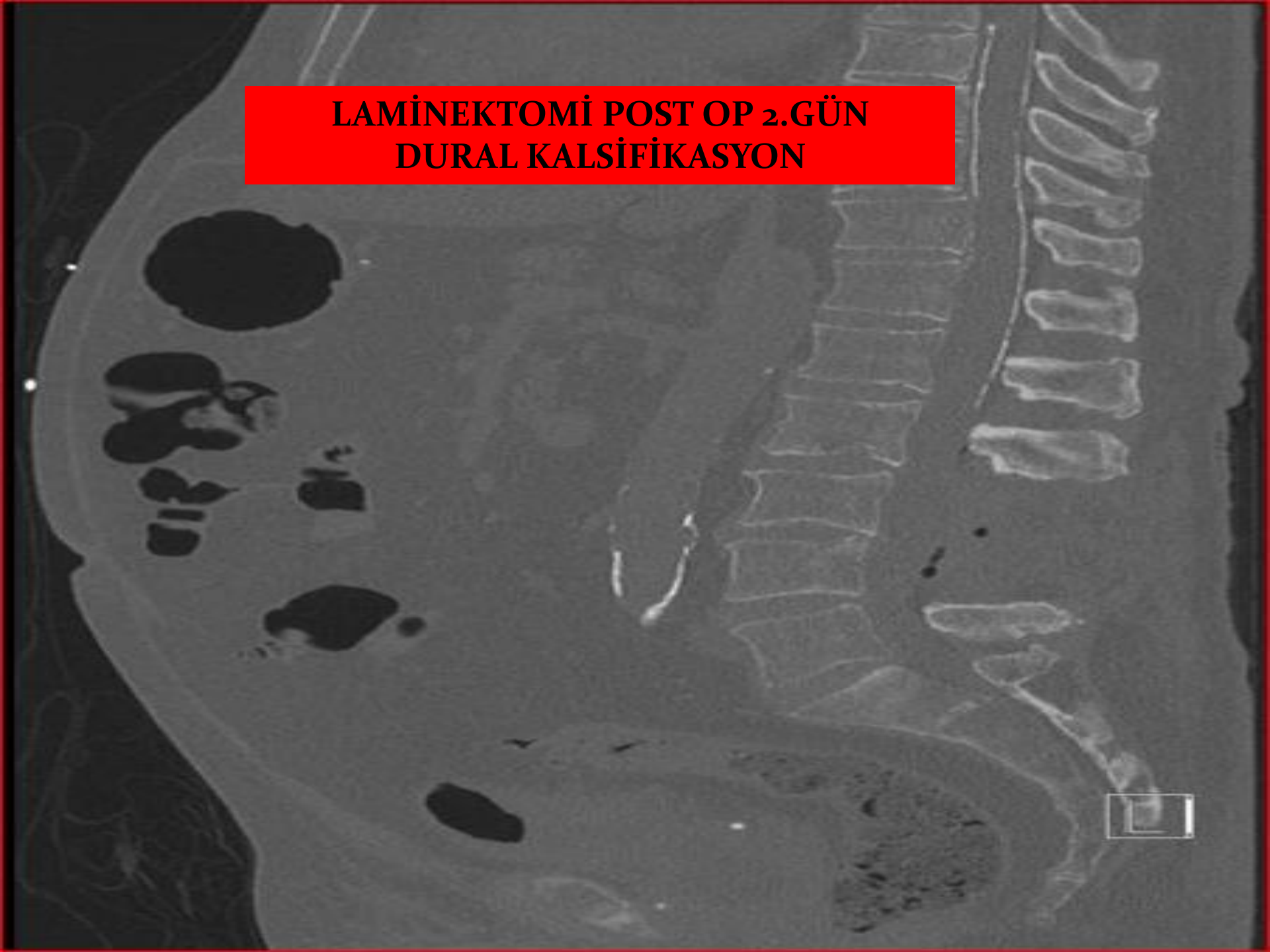
L1 FRAKTÜRÜ

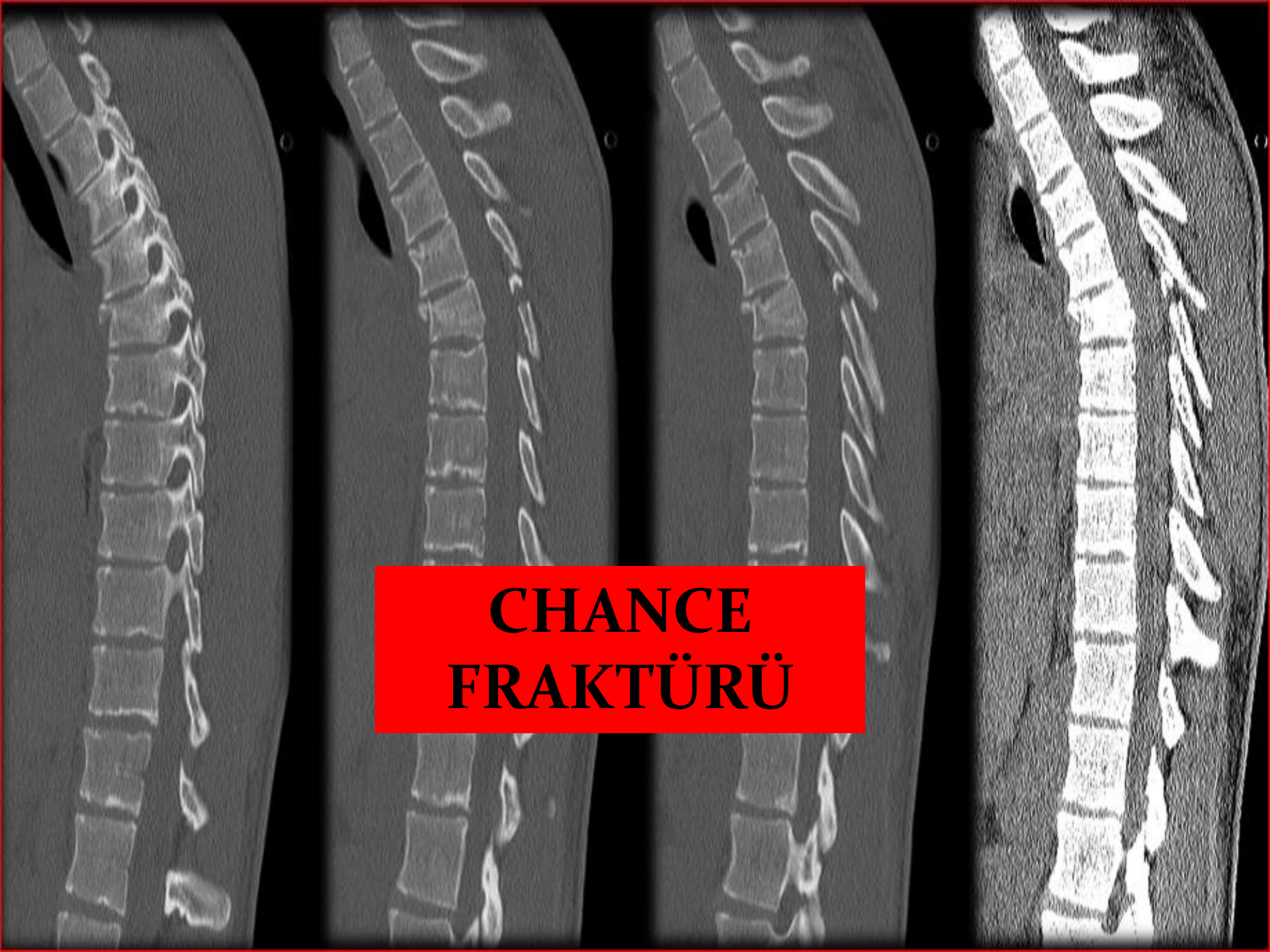


**L₂ KOMPRESYON
FRAKTÜRÜ**



**LAMİNEKTOMİ POST OP 2.GÜN
DURAL KALSİFİKASYON**



The image consists of four vertical panels, each showing a sagittal CT scan of a portion of the human spine. From left to right, the panels show the thoracic, upper lumbar, and lower lumbar regions. Each panel highlights a specific vertebral fracture, known as a Chance fracture, which is a horizontal fracture line passing through the vertebral body, the intervertebral disc, and the opposite vertebral body. The fractures are clearly visible as dark lines across the bony structures. The text 'CHANCE FRAKTÜRÜ' is overlaid in a red box in the center of the image.

CHANCE FRAKTÜRÜ



USE IT