İNVAZİF ASPERGİLLOZ
Radyolojik Tanı

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Ege Üniversitesi Tıp Fakültesi
Radyoloji AD, İzmir

AMAÇ

- Radyolojik olarak algoritm
- Tanı ve bulgular
- Tedavi sonrası takip

İnvazif Asperjilloz

- Akciğer – EN SIK
- Sistemik tutuluş (% 1-10)
- Paranazal sinusler/ orbita
- Beyin
- Karaciğer, dalak, GİS ve diğer abdominal organlar (nadir)
- Çok nadiren diğer organlarda (göğüs duvarı, plevra, kalp, kemik, deri)

ALGORİTM:

- Akciğerde düşünülüyorsa Yüksek Rezolüsyonlu BT (YRBT, HRCT) (PA akciğer grafisi daha çok takip için..)
- Sinusler için PNS BT
- Orbita için BT veya MRG
- Beyin için MR (kanama ise BT)
- Abdomen için BT ve/veya US

TANI VE BULGULAR

- Akciğer : Halo işareti içeren nodül
- PNS : Mukozal kalınlaşma/seviyelenme
- Beyin : İnfarkt, abse gelişimi
- Orbita : İnflamasyon bulguları
- Abdomen: İskemik nekroz, infarkt ve perforasyon

AKCİĞERDE 5 kategoride incelenir:

1- Aspergilloma (saprofit form)

2- ABPA (hipersensitivite reaksiyonu)

3- Semi-invazif (kronik nekrotizan) form

4- Hava yolu invazif aspergillozu (akut trakeobronşit, bronşit, bronkopnömoni, obstrüktif bronkopulmoner aspergilloz)

5- Anjioinvazif aspergilloz

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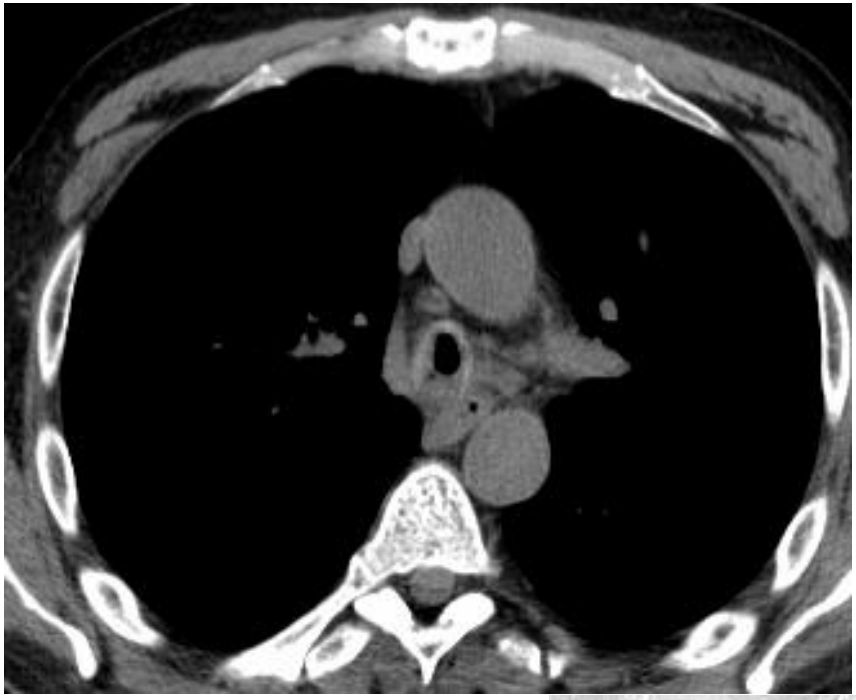
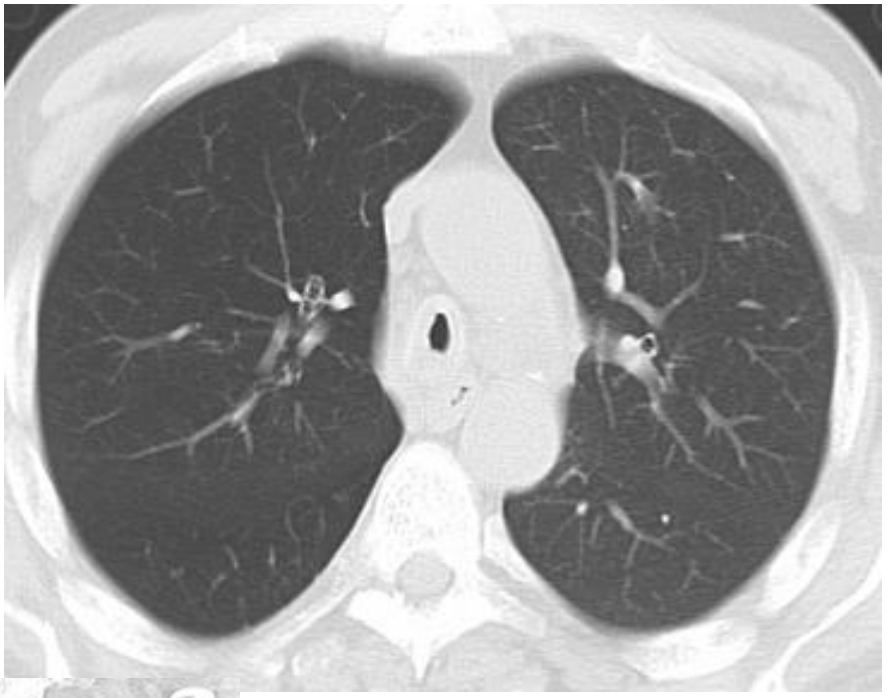
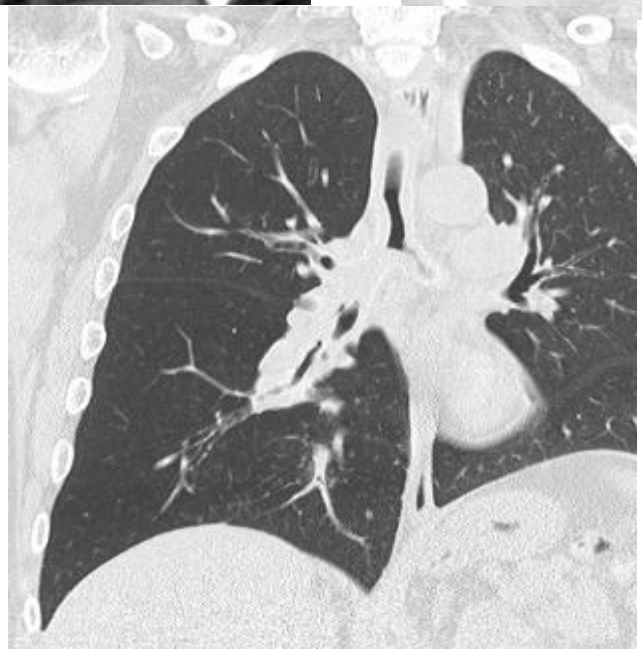
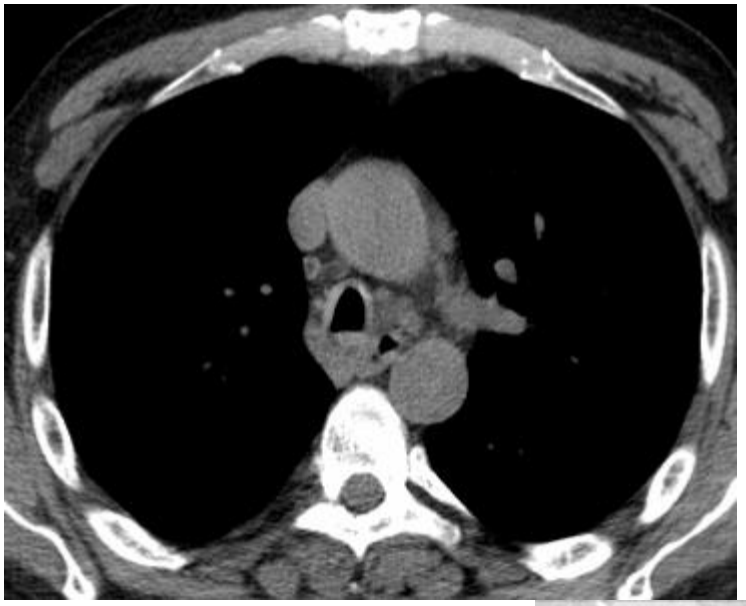
HAVAYOLU İNVAZİF ASPERGİLLOZU

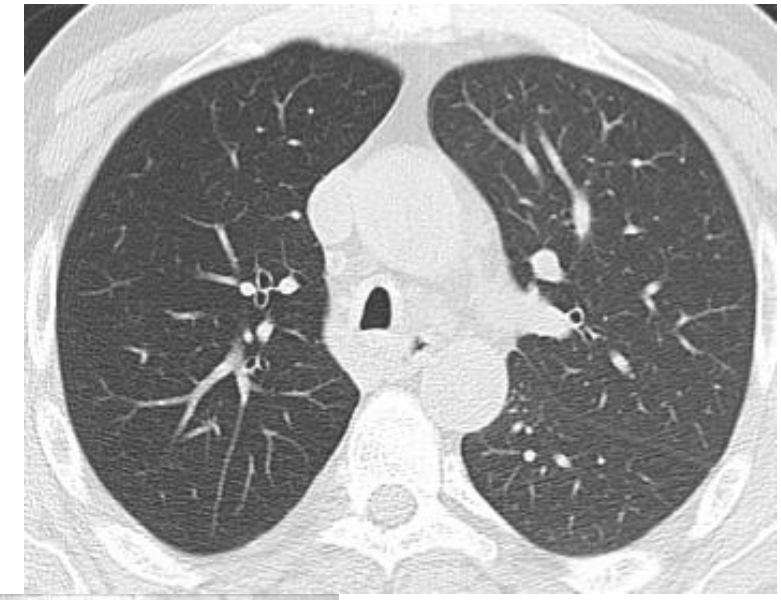
- Trakeit: Normal veya duvar kalınlaşması
- Bronşit: Radyoloji sıklıkla normal
- Bronşiolit: Asiner nodüller
- Bronkopnömoni: Konsolidasyon

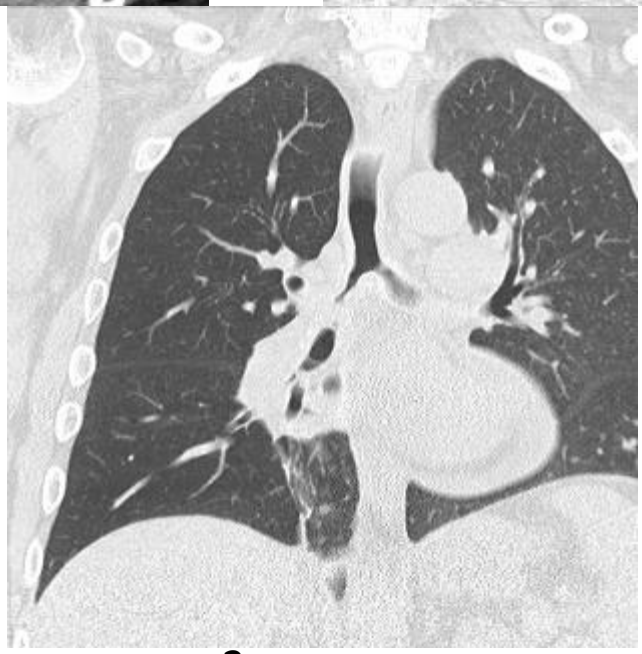












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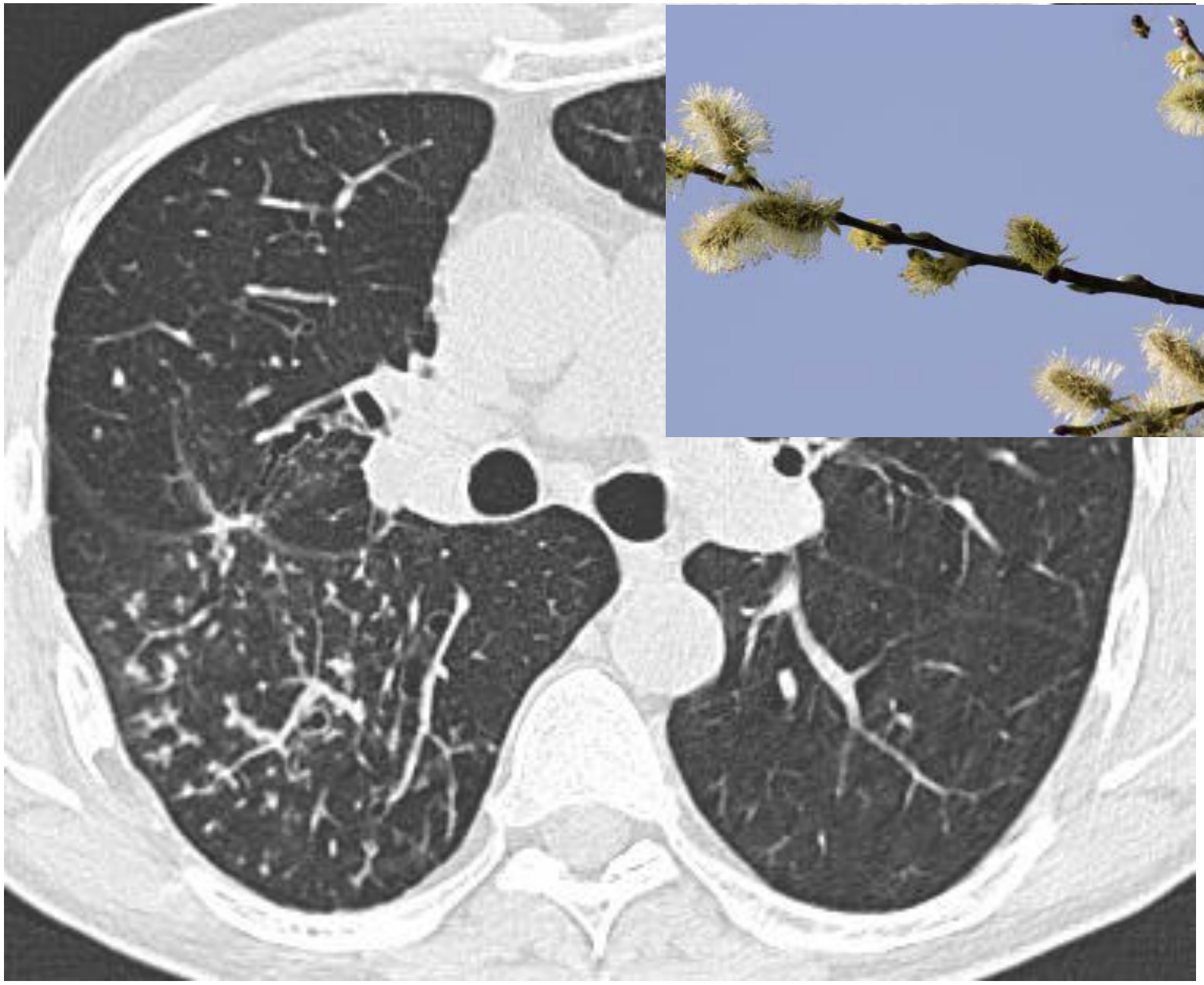
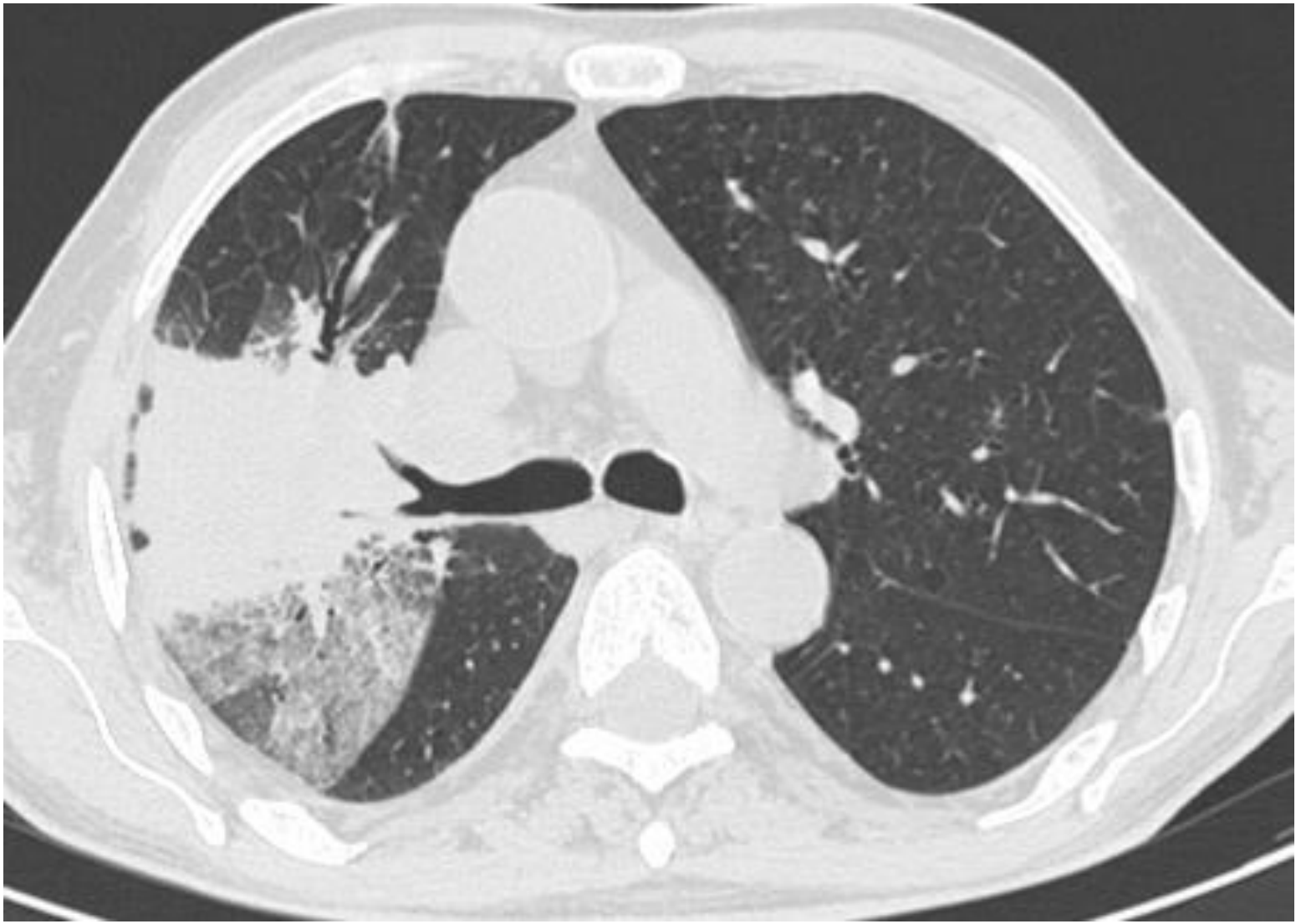
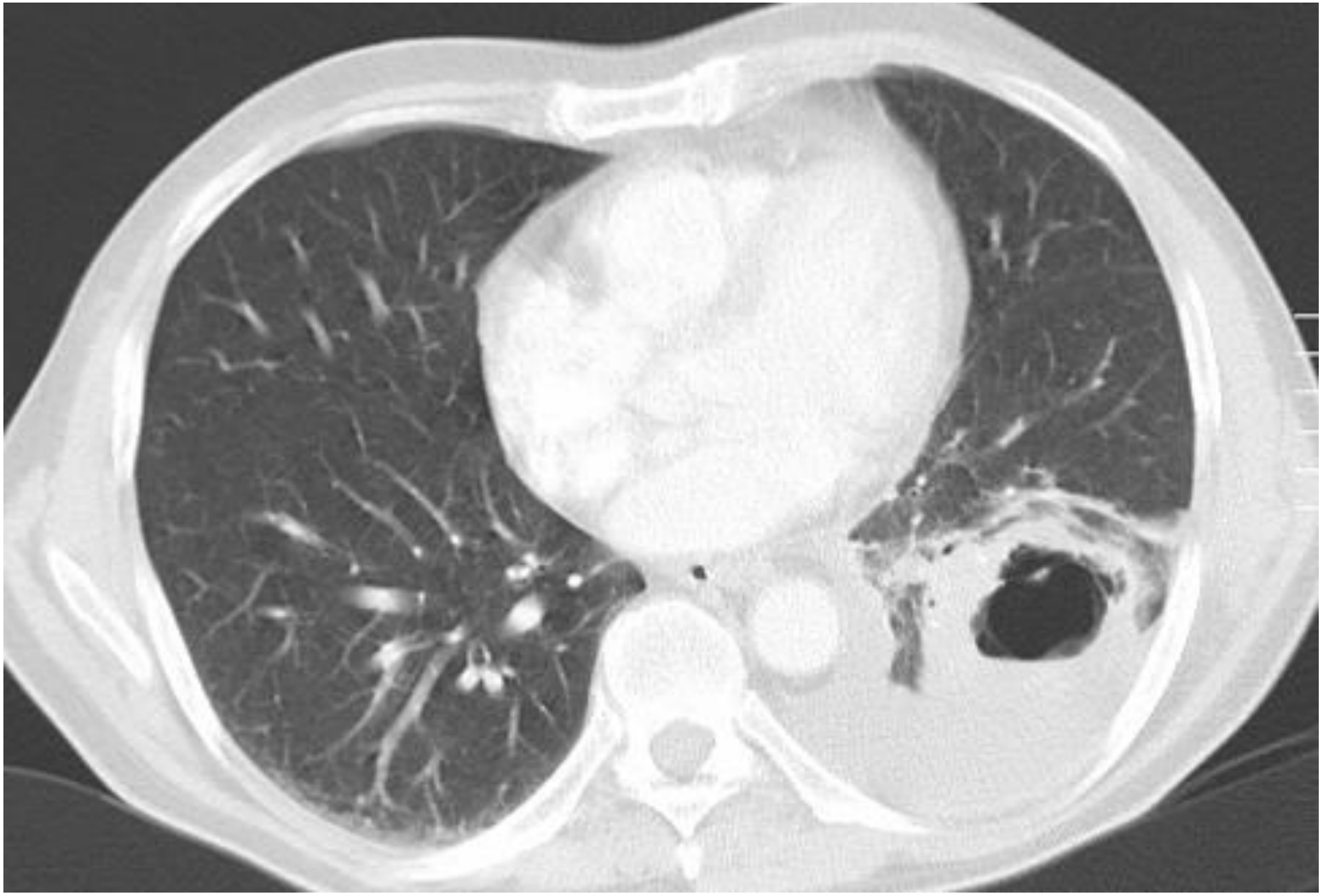


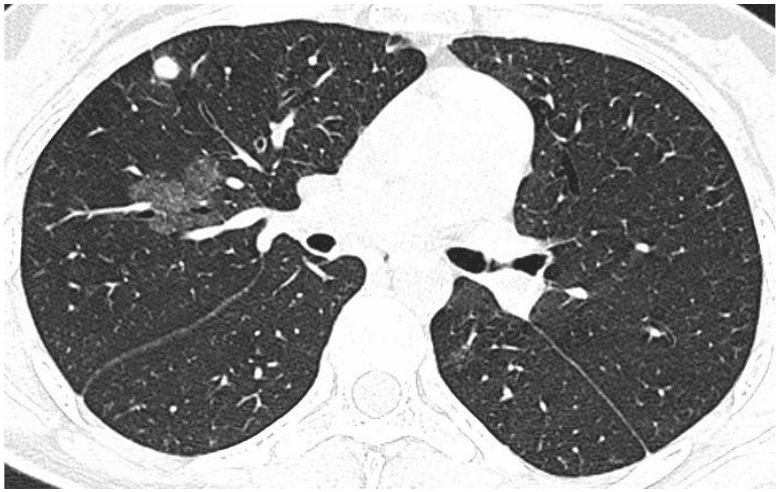


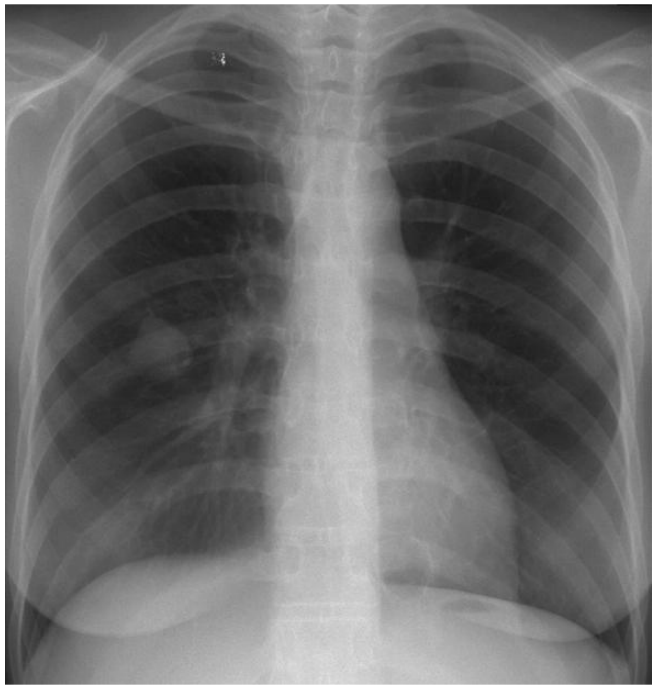


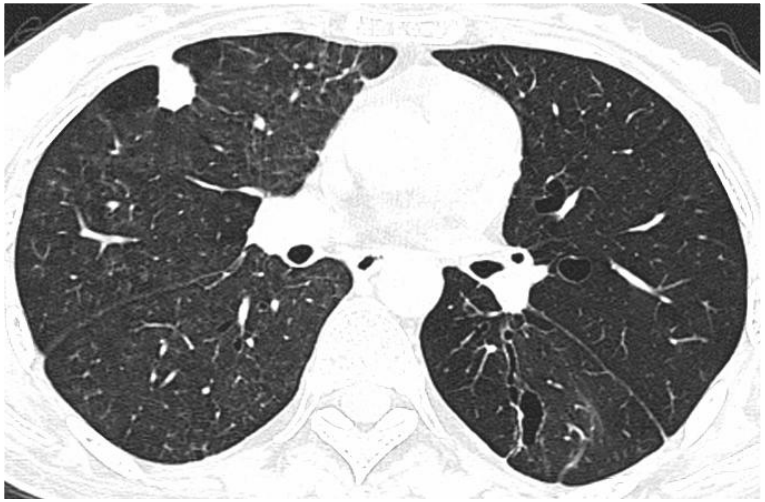
ANJİOİNVAZİF ASPERGİLLOZ:

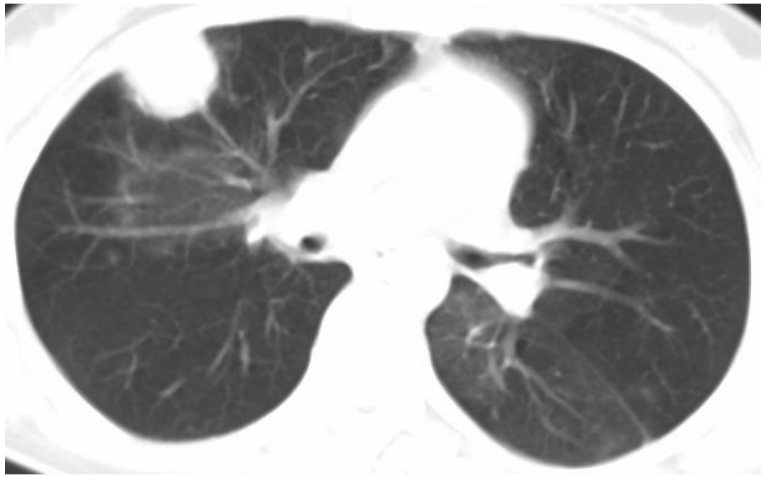
- Nodül : Halo işareti ile (erken dönem)
- Hipodansite işareti (erken dönem)

- Nodül : Hilal işareti ile (immun yanıtın gelişmesi ile)





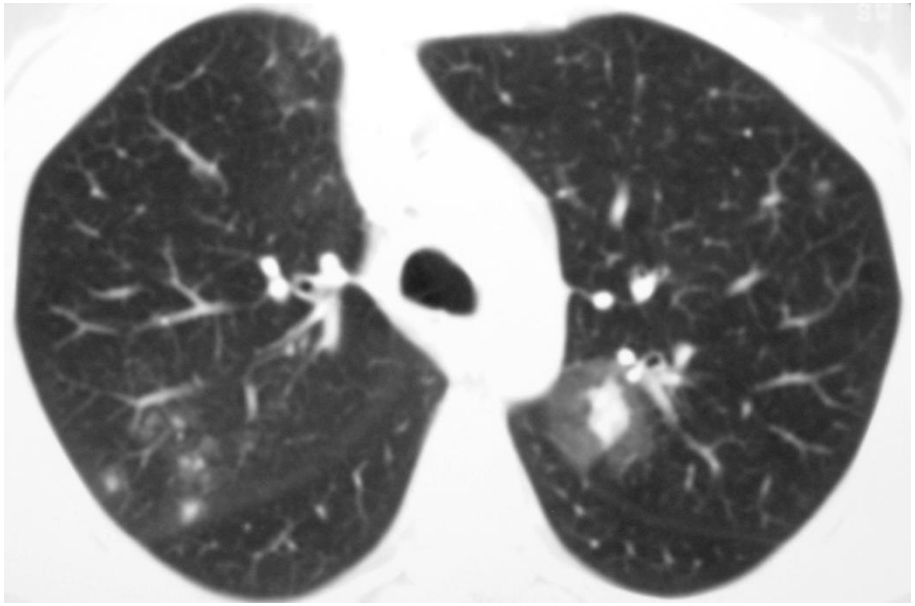


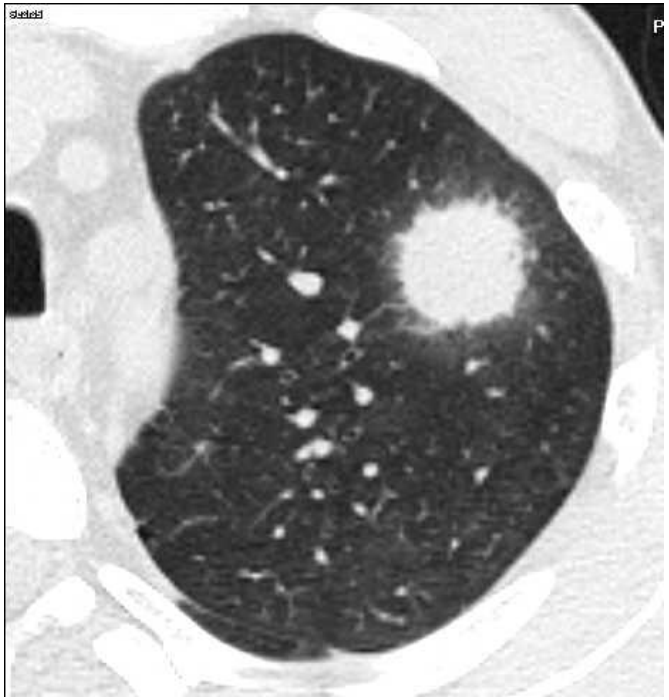


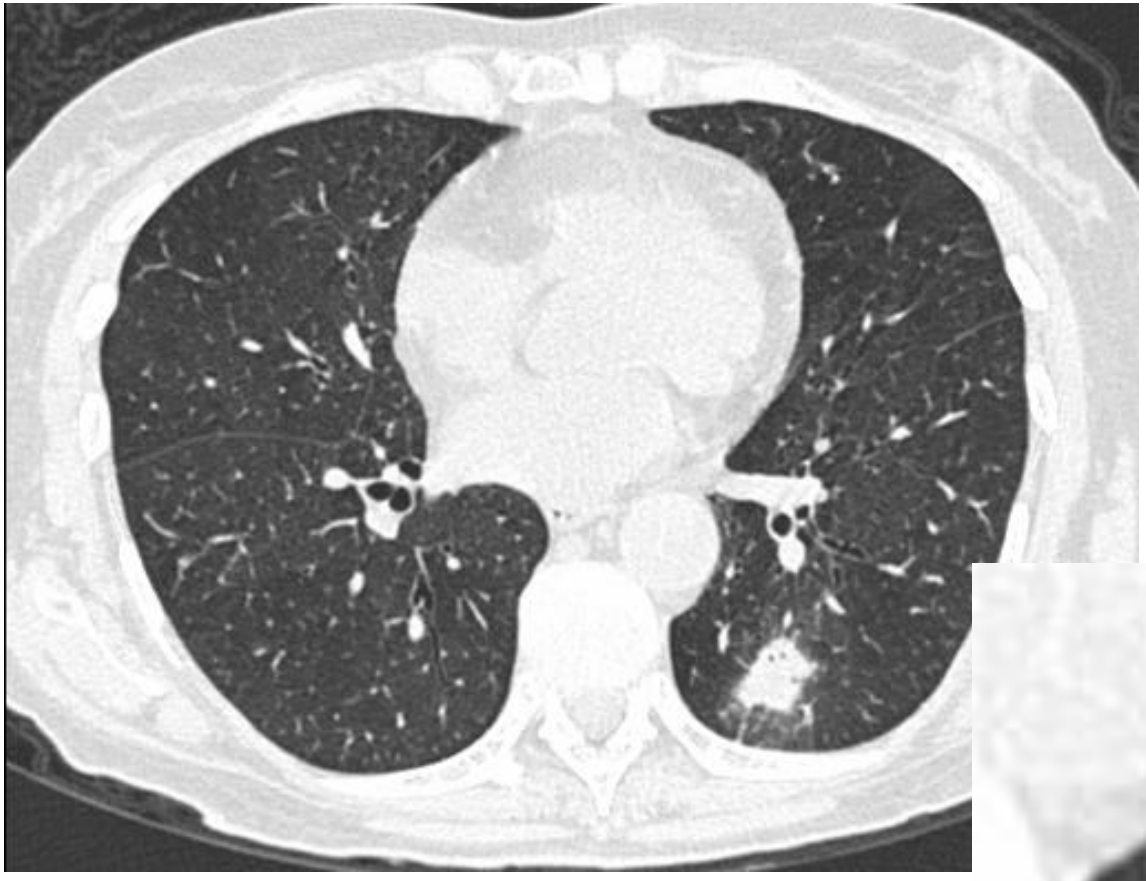
Anjiosentrik dağılım

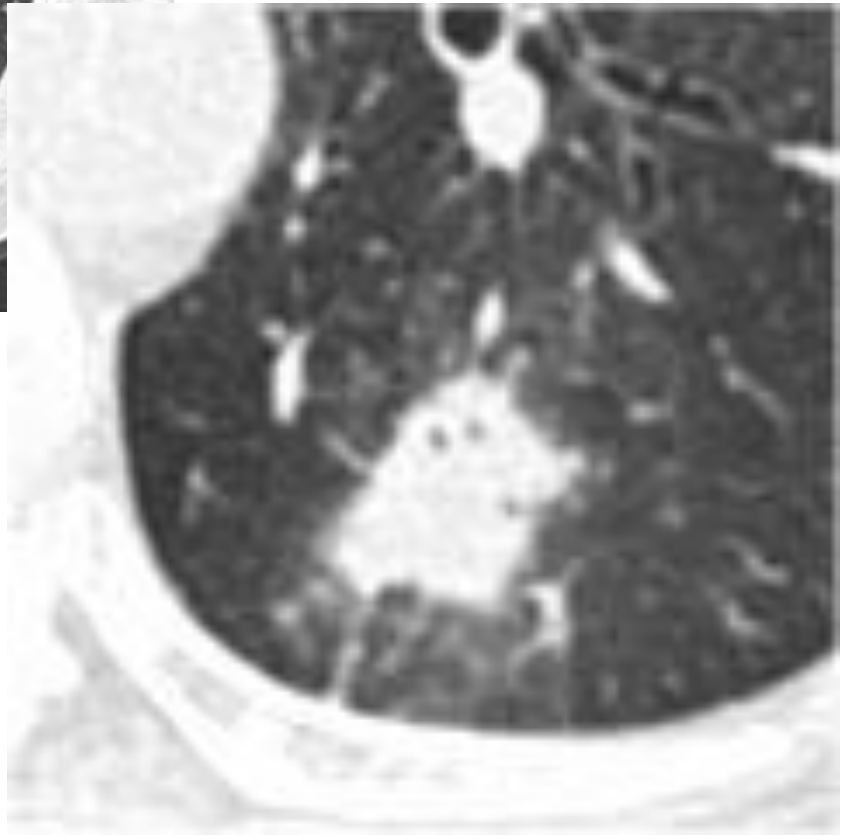
HALE (HALO) İŞARETİ

- Nodül veya kitle çevresindeki buzlu cam alanına verilen isim
- Fungusun küçük ve orta damarlara olan invazyonu ile damar içi tromboz ve sonuçta iskemik nekroz oluşur.
- Nodül infarkt alanını, çevredeki buzlu camda alveoler hemorajiyi yansıtır.
- **Serolojik testlerin pozitifliğinden önce görülmesi nedeniyle önem arzeder.**



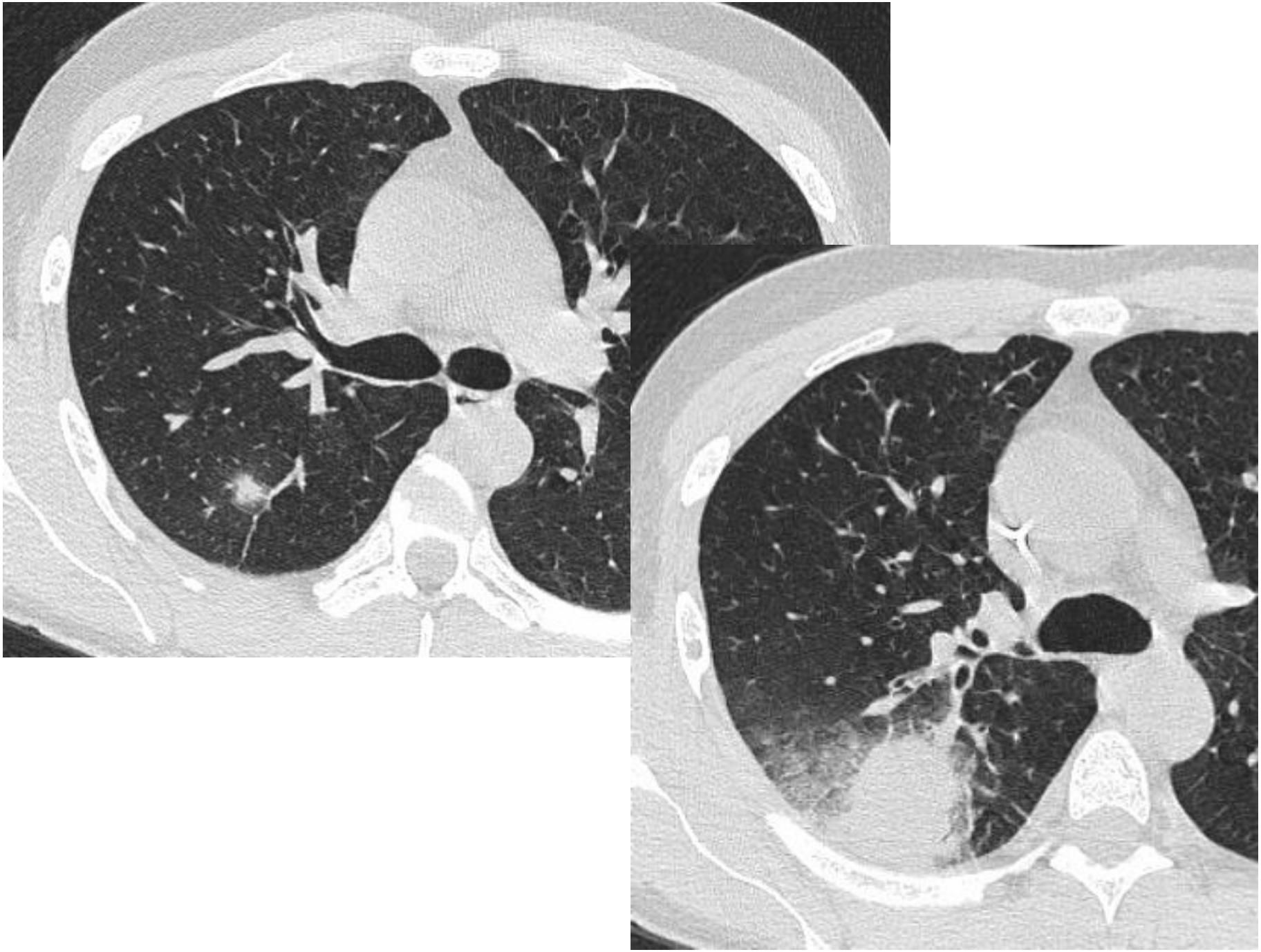






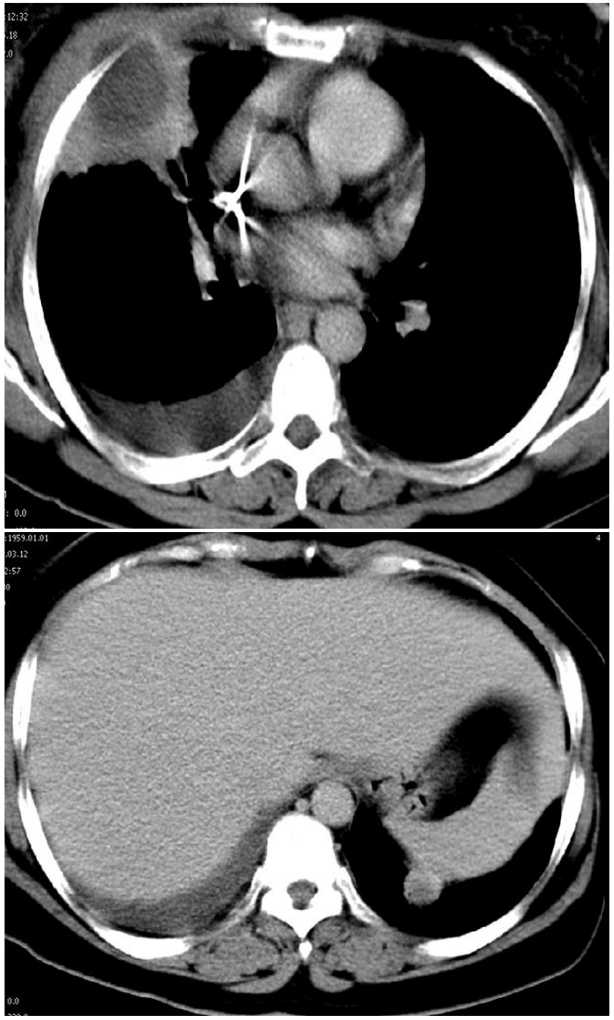
HALO İŞARETİ

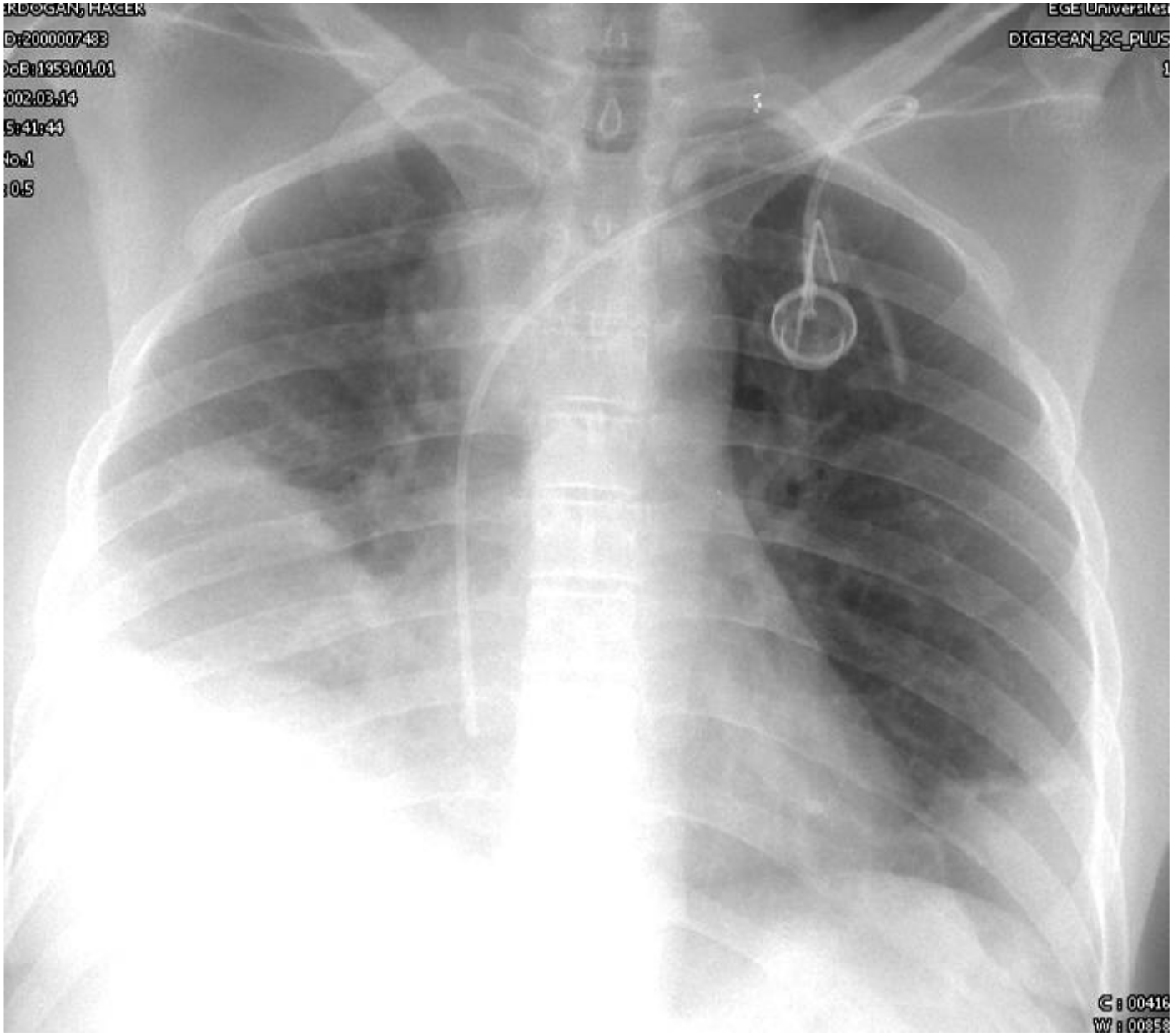
- Hemorajik metastaz
- Kaposi sarkomu
- Wegener granülomatozisi vb görülebilir.



HİPODANSİTE İŞARETİ

- Bağışıklığı baskılanmış hastalarda nodül veya konsolidasyonun ortasında görülen düşük dansite ‘hipodansite işareti’ aspergillus enfeksiyonunu düşündürtür.

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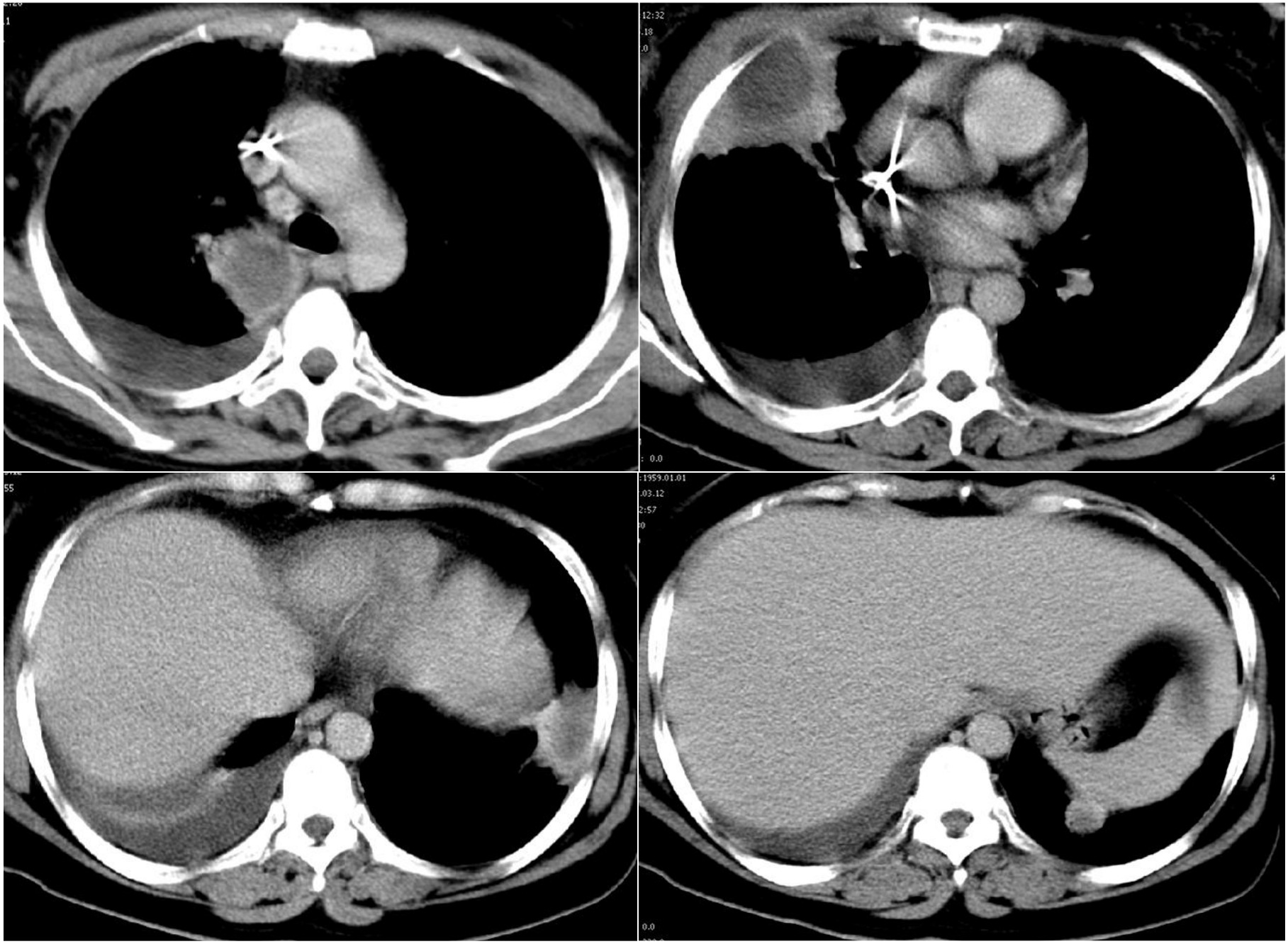
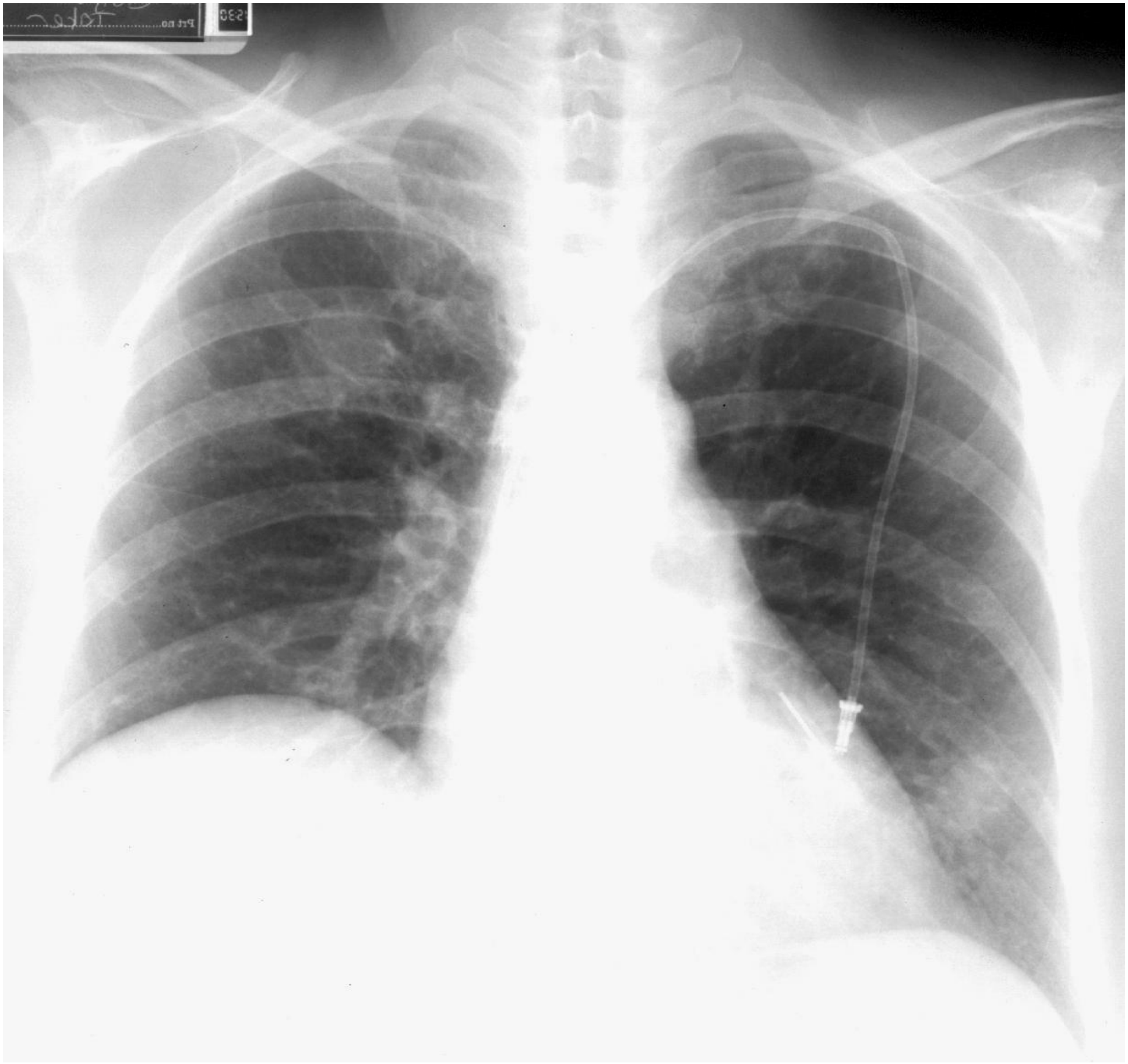
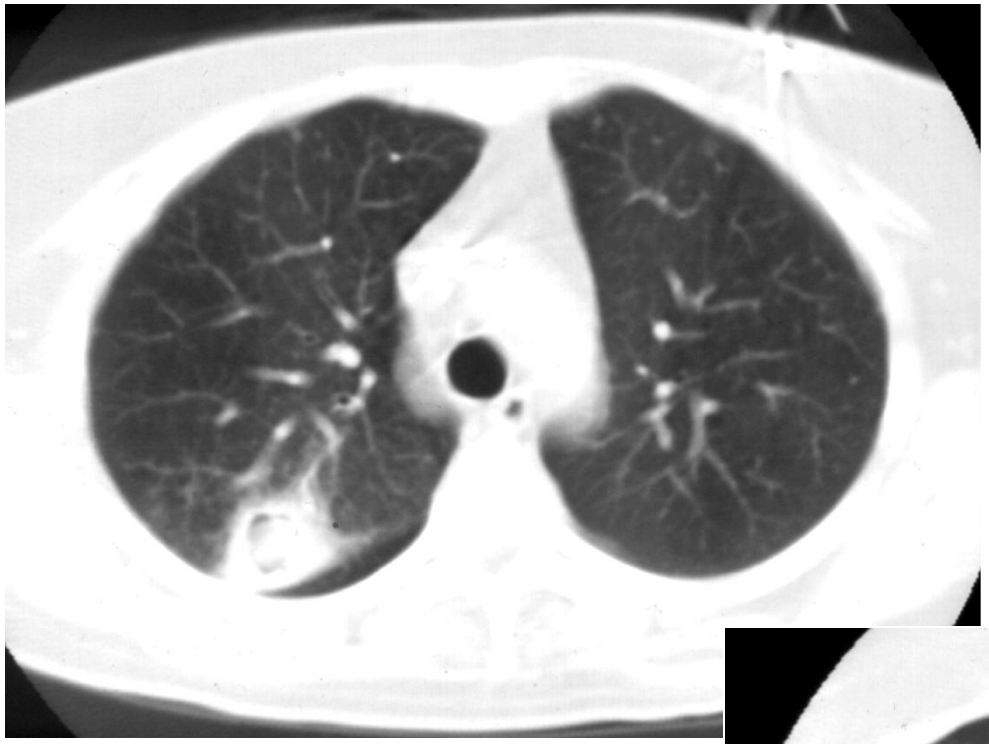
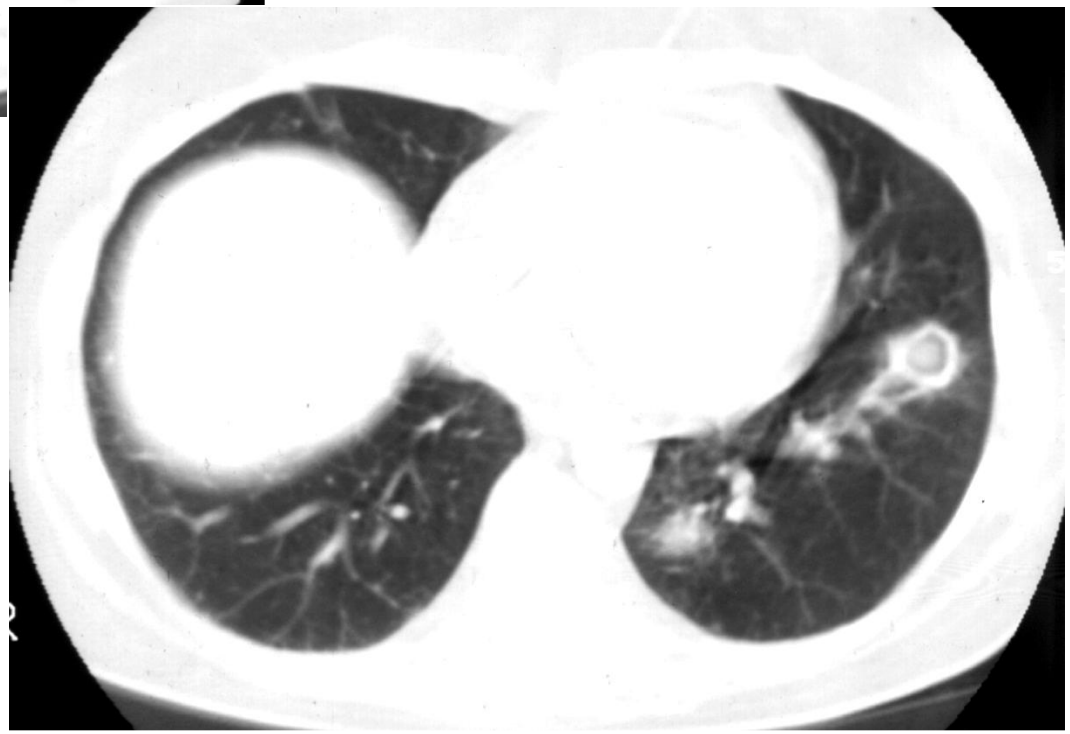


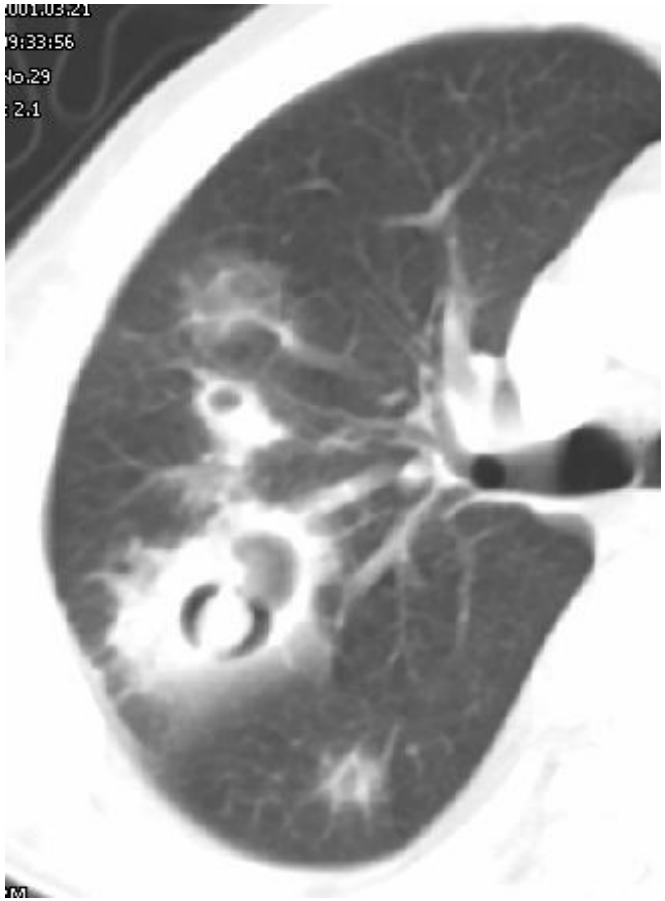


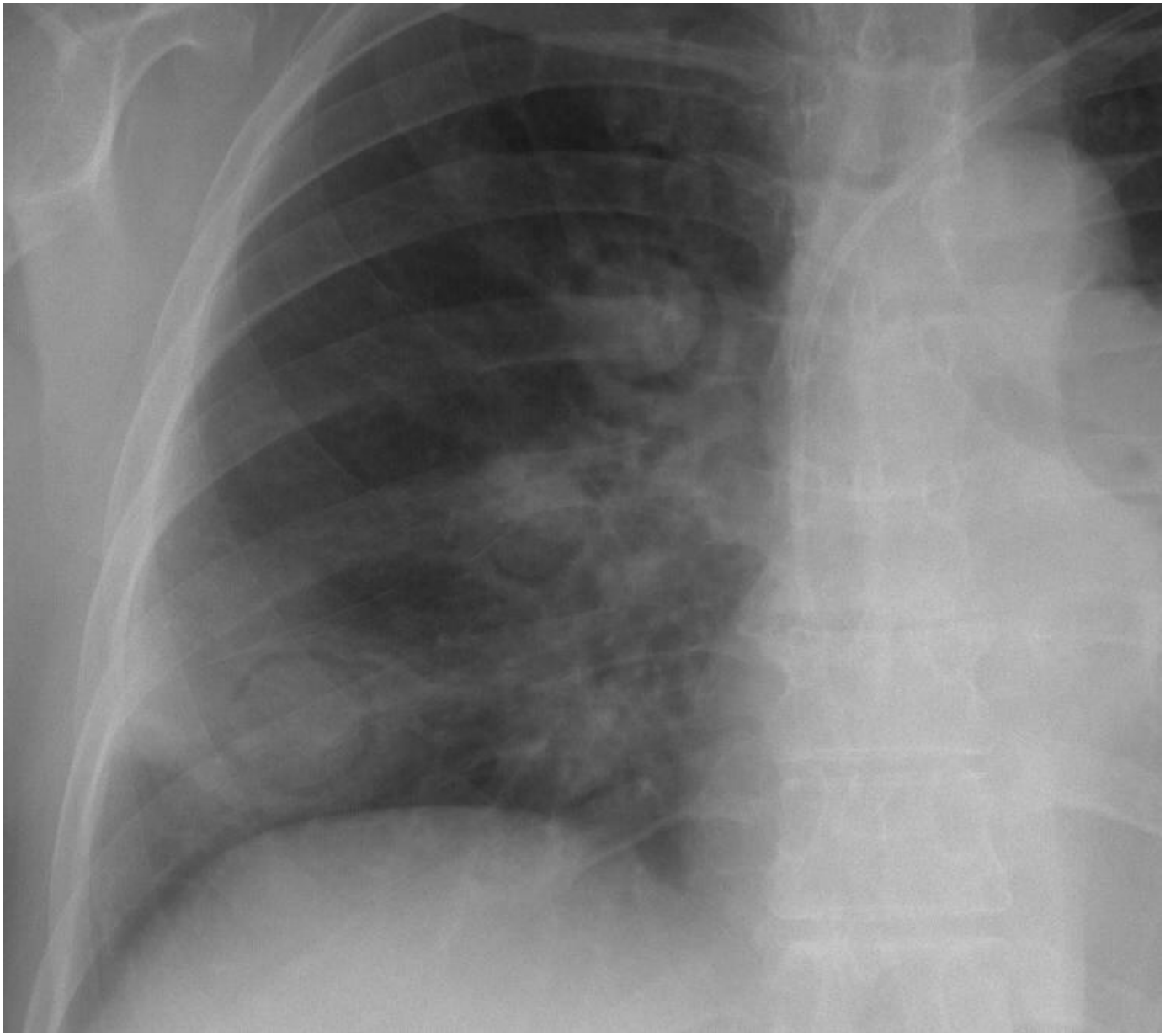




HİLAL (AIR-CRESCENT) İŞARETİ

- Nodül veya enfeksiyon alanında görülen nekroz ile rezidü enfeksiyon duvarı arasına hava girmesi ‘ hilal işareti’ olarak anılır.





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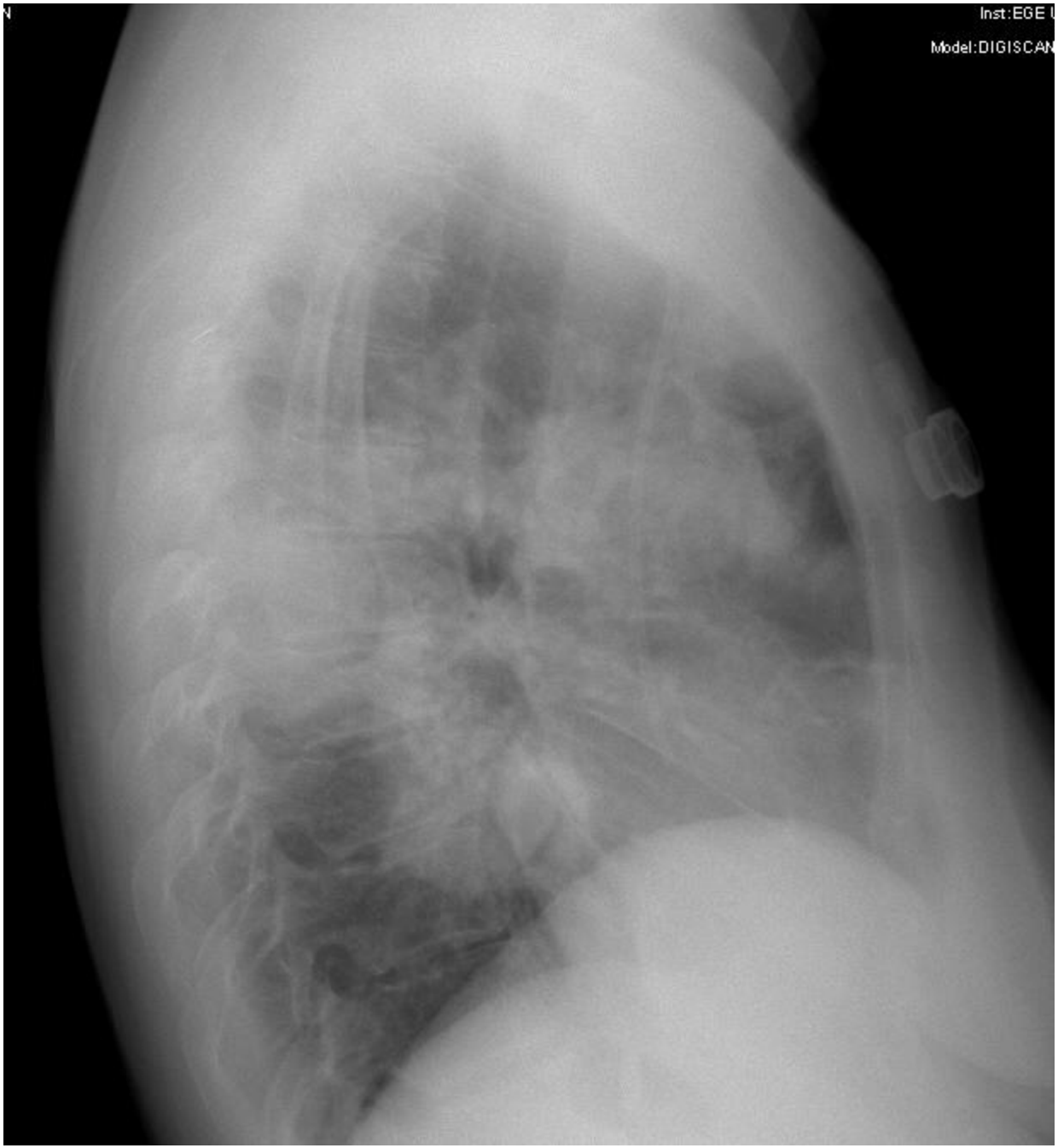
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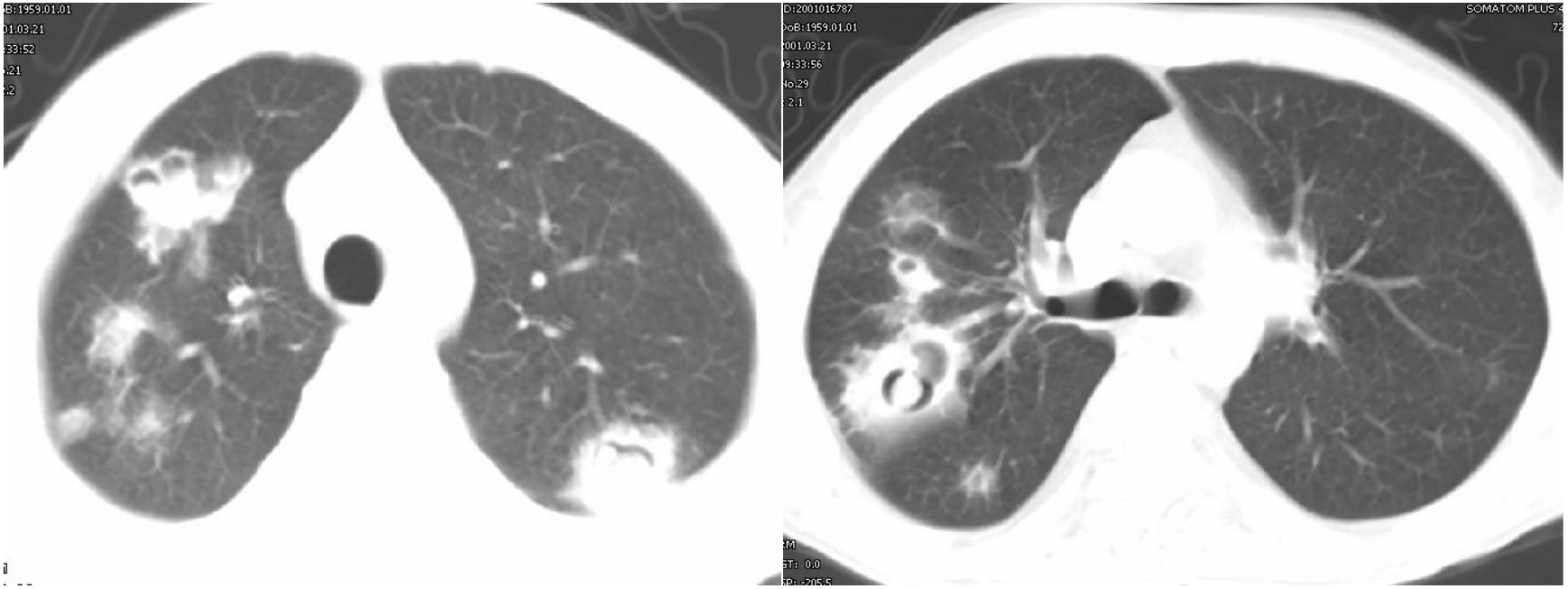


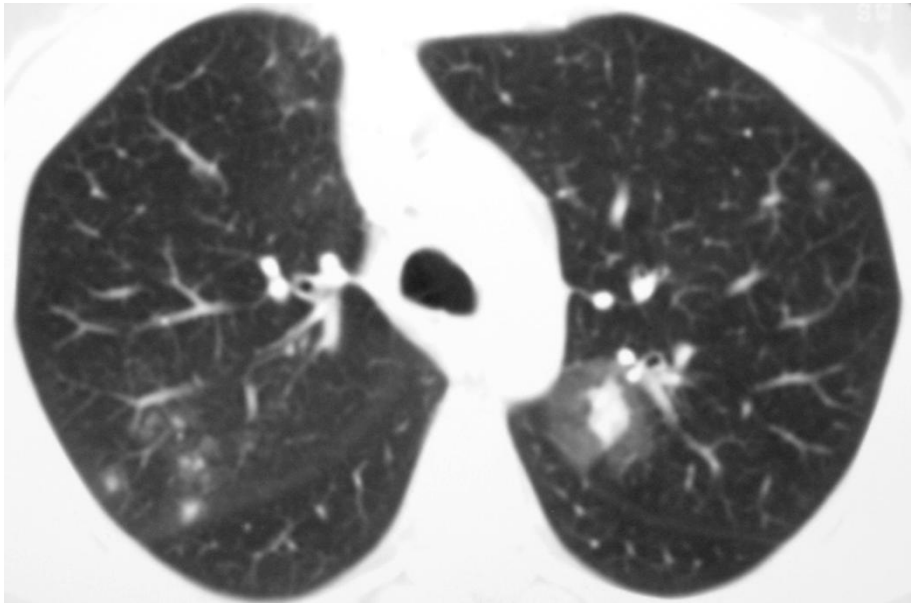
Santral nekrotik nodül- çevrede buzlu cam → HALO işareti
Nodül duvarına yakın hava → HİLAL işareti
ANGİOİNVAZİV ASPERGİLLUS

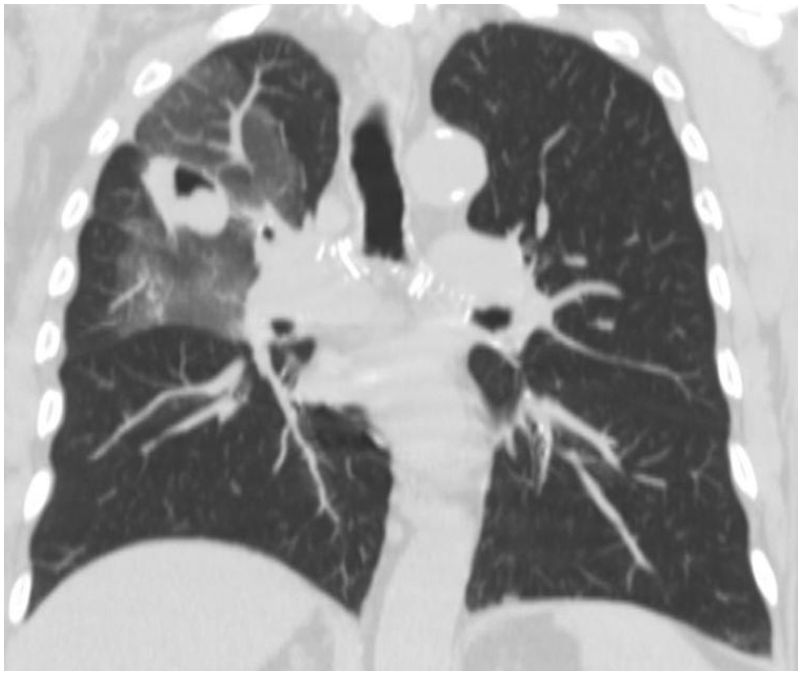
HİLAL İŞARETİ:

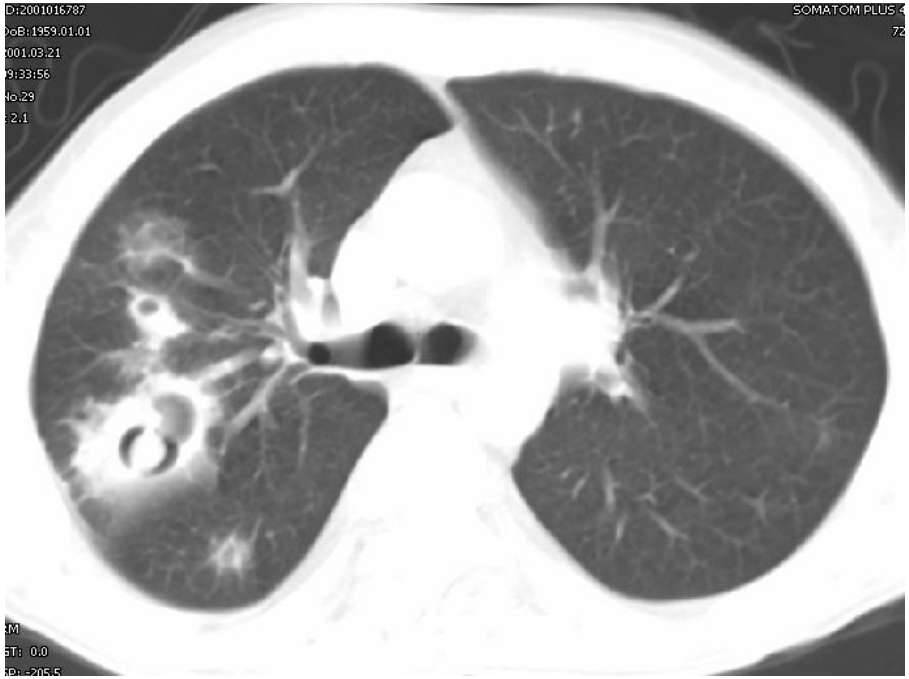
- Asperjilloma (mevcut kavitede)
- Akciğer absesi
- Bronş kanseri
- Tüberküloz
- Kist hidatikde görülebilir

İnvazif Aspergillozis

- Bağışıklığı baskılanmış hastalarda
- Nötropeni
- Hava yolları tutulumu
- Akciğerde tek veya multipl nodüller
- Hipodansite işareti
- Halo işareti
- Hilal işareti
- Konsolidasyon, Kavitasyon



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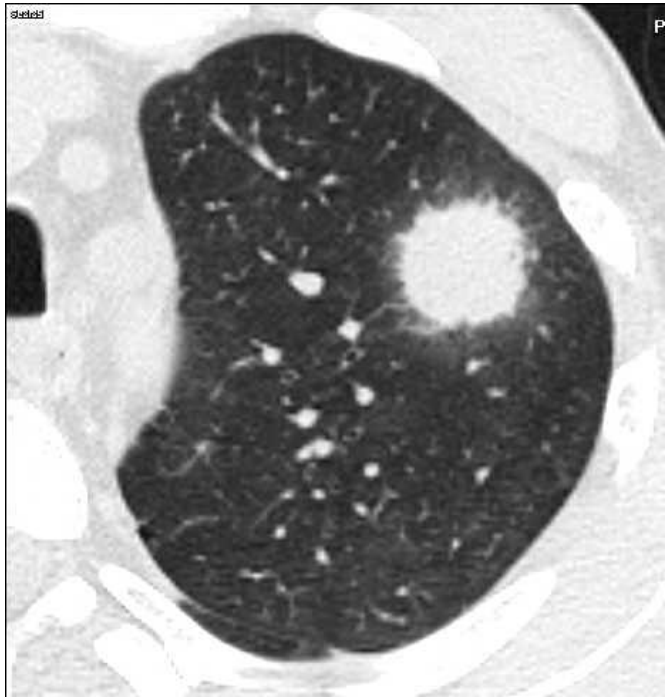

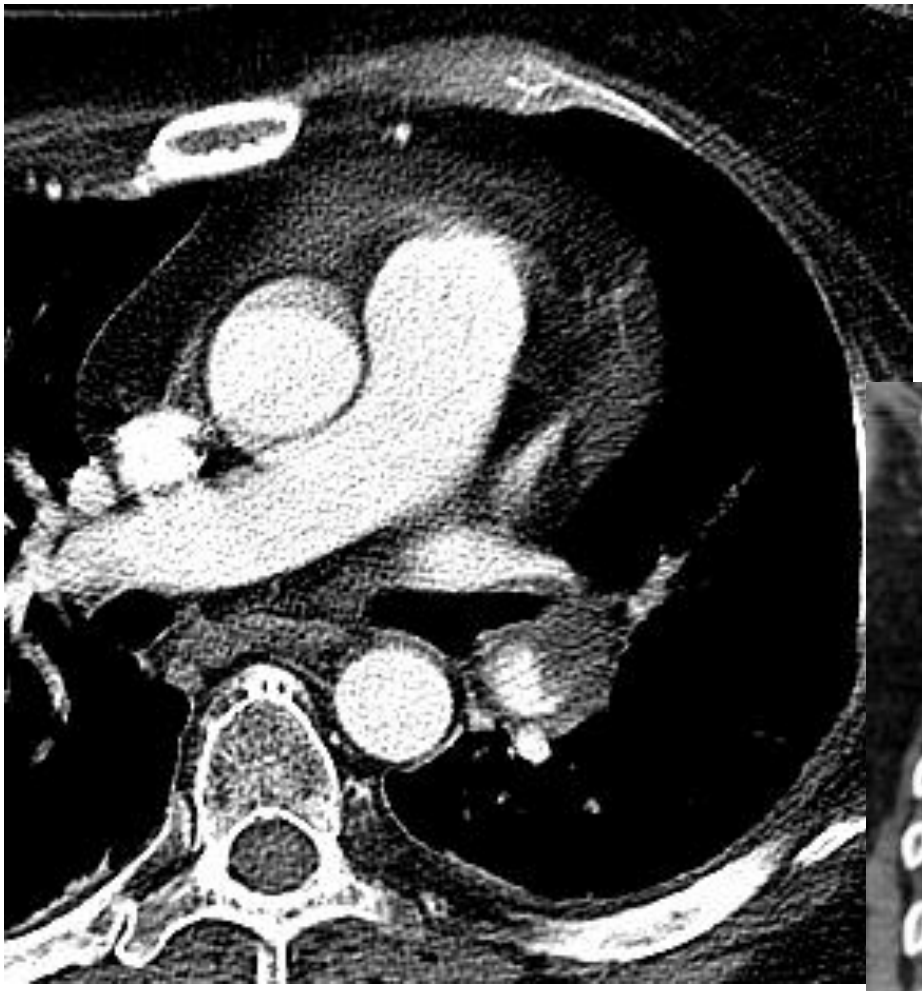

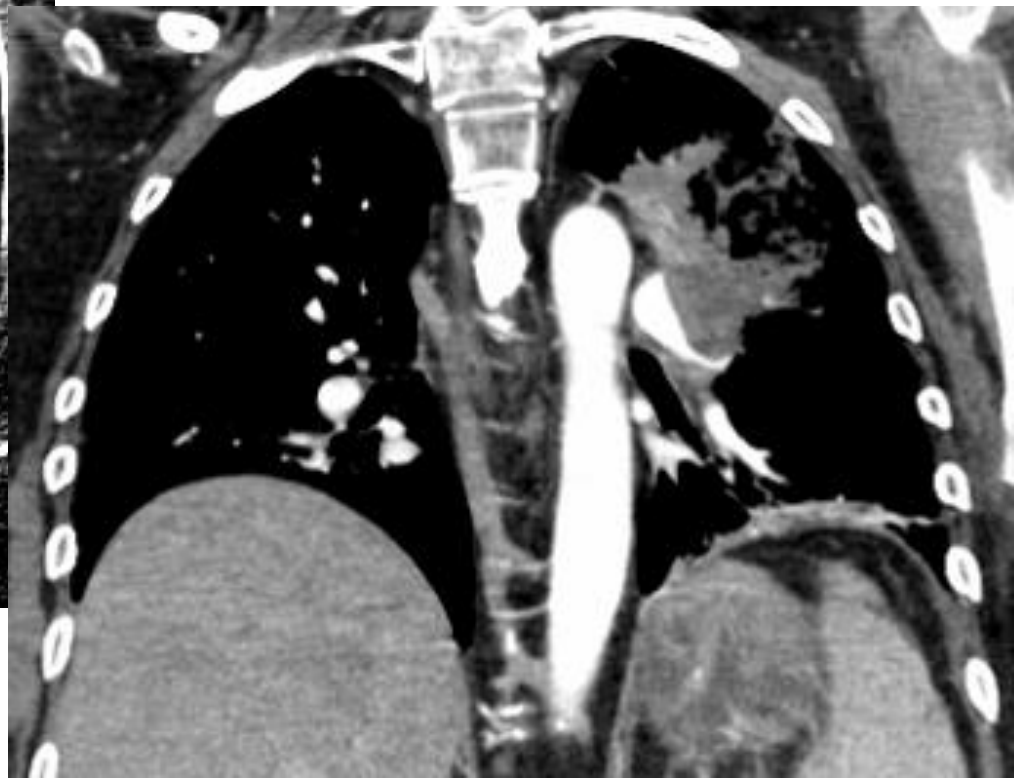

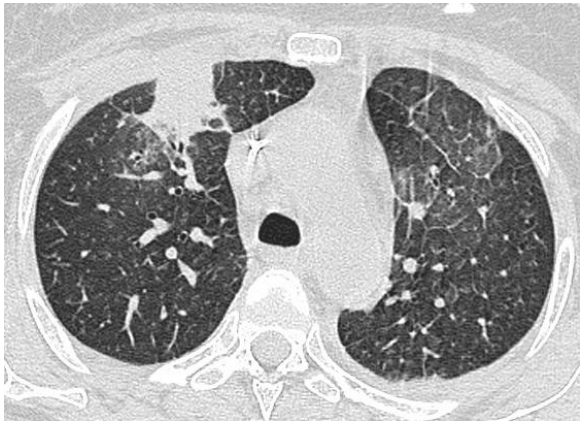
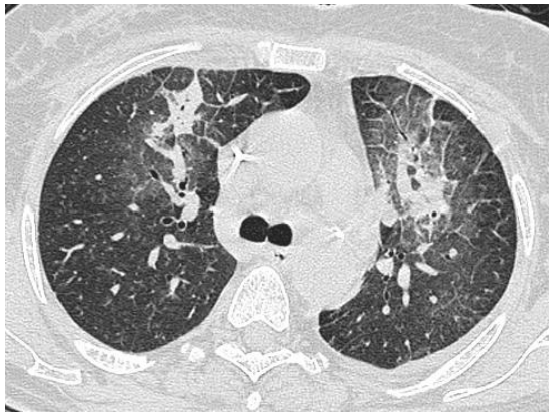
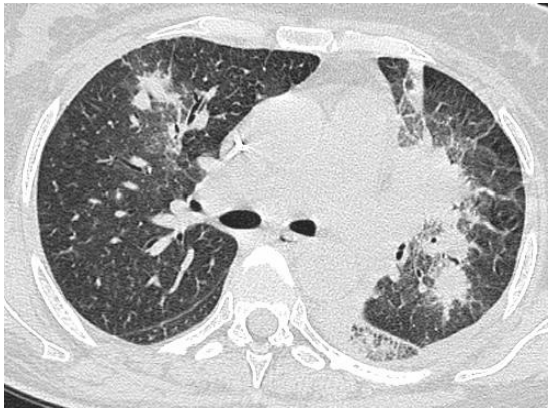
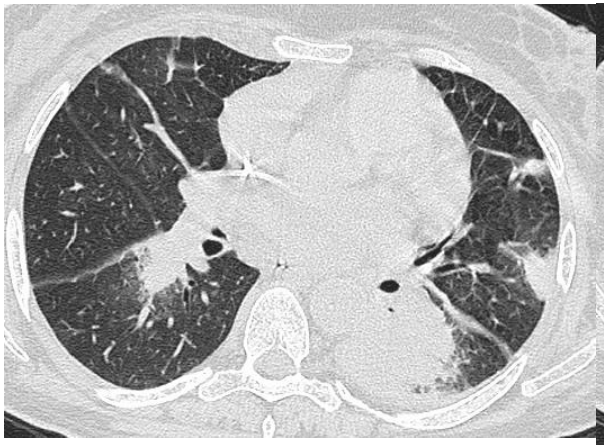
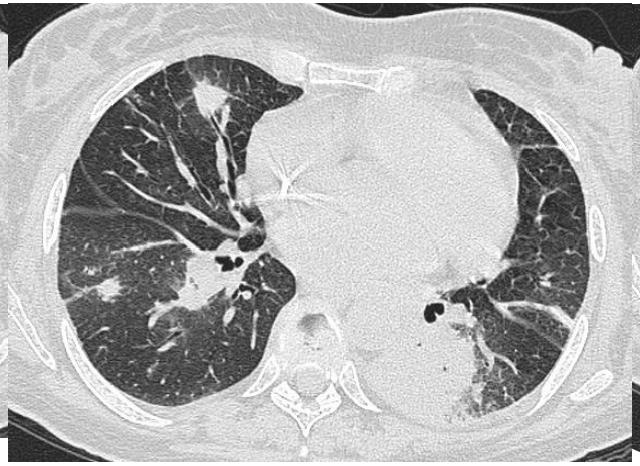
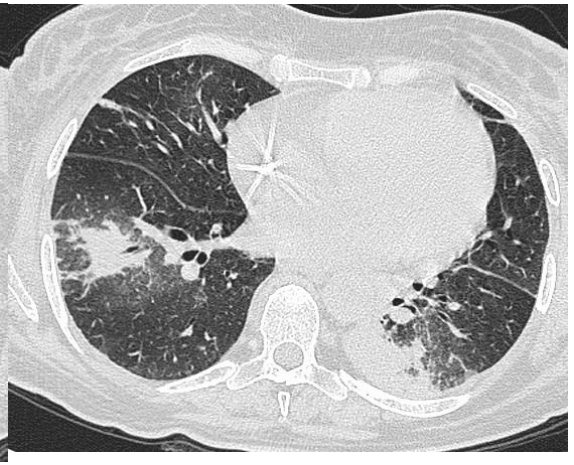

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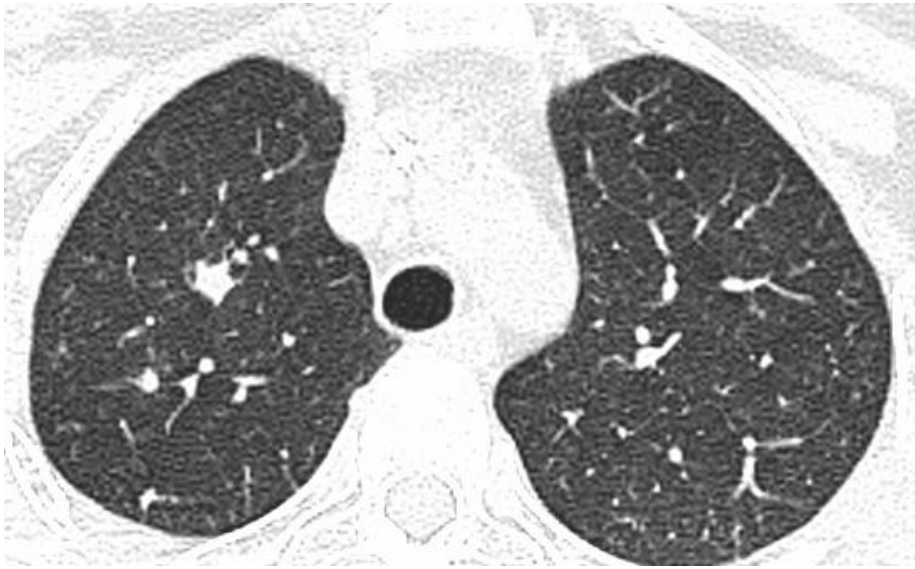

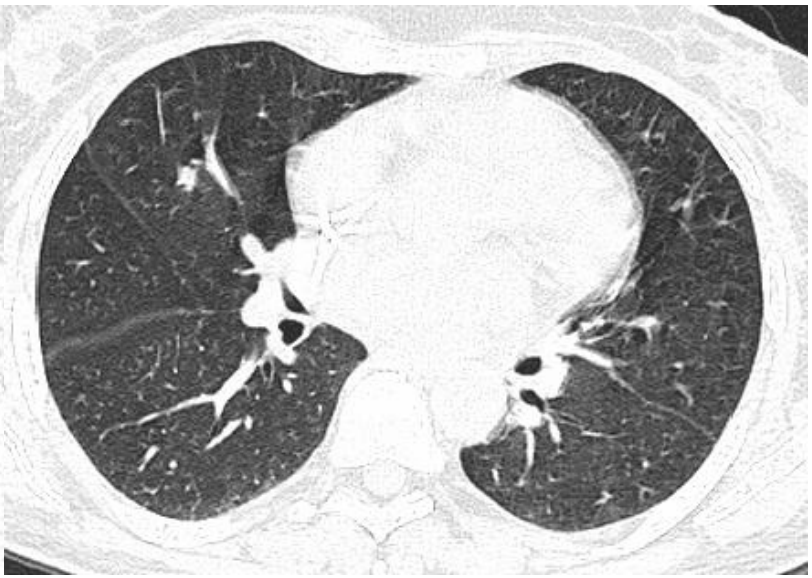

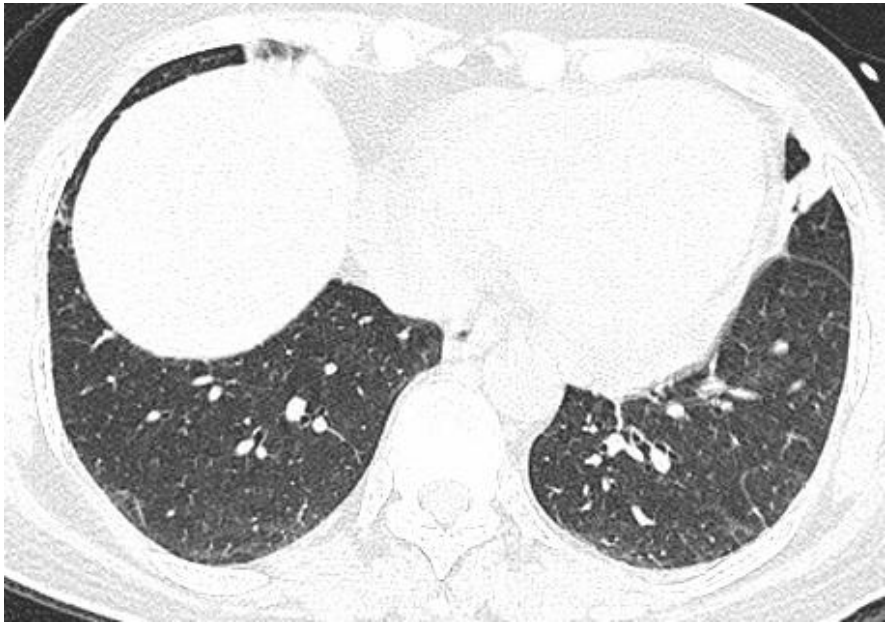

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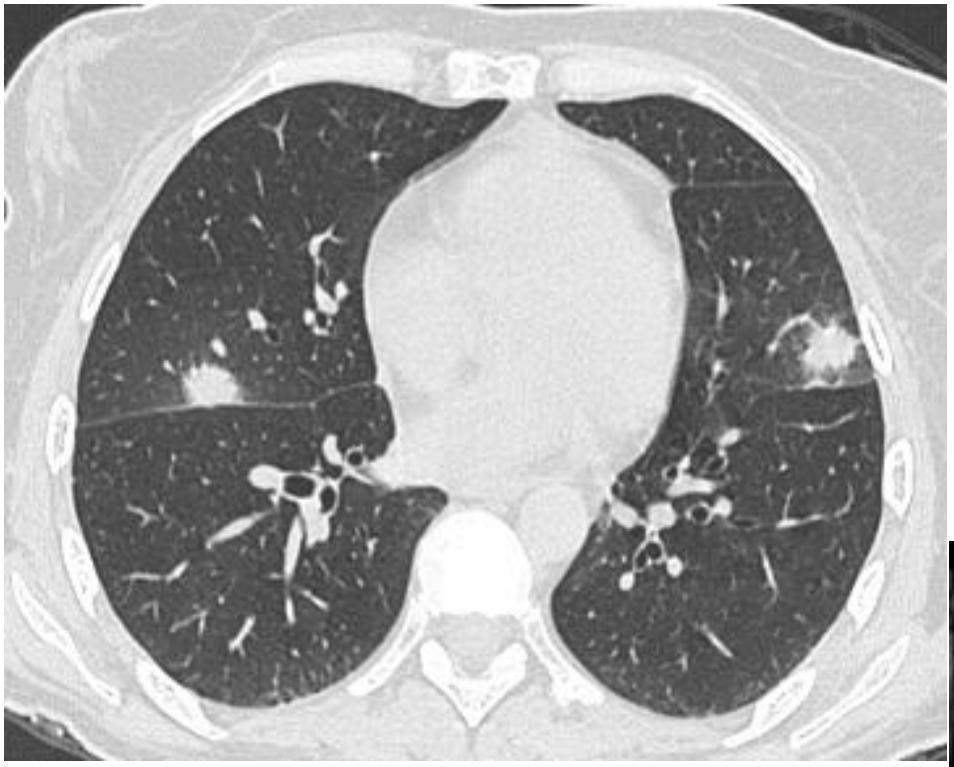

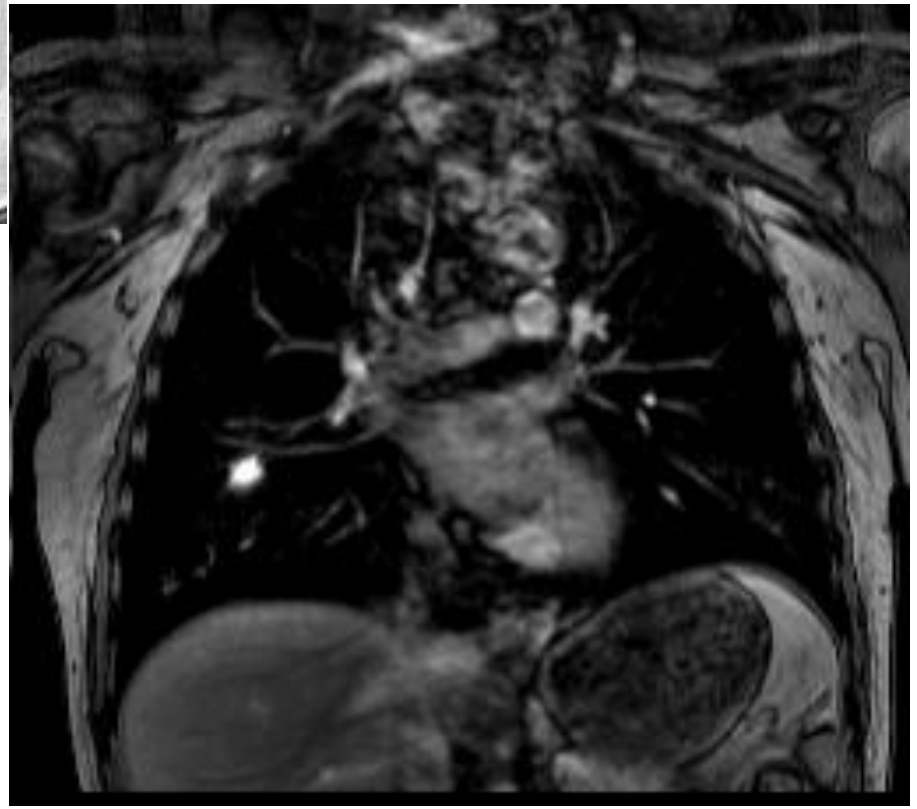

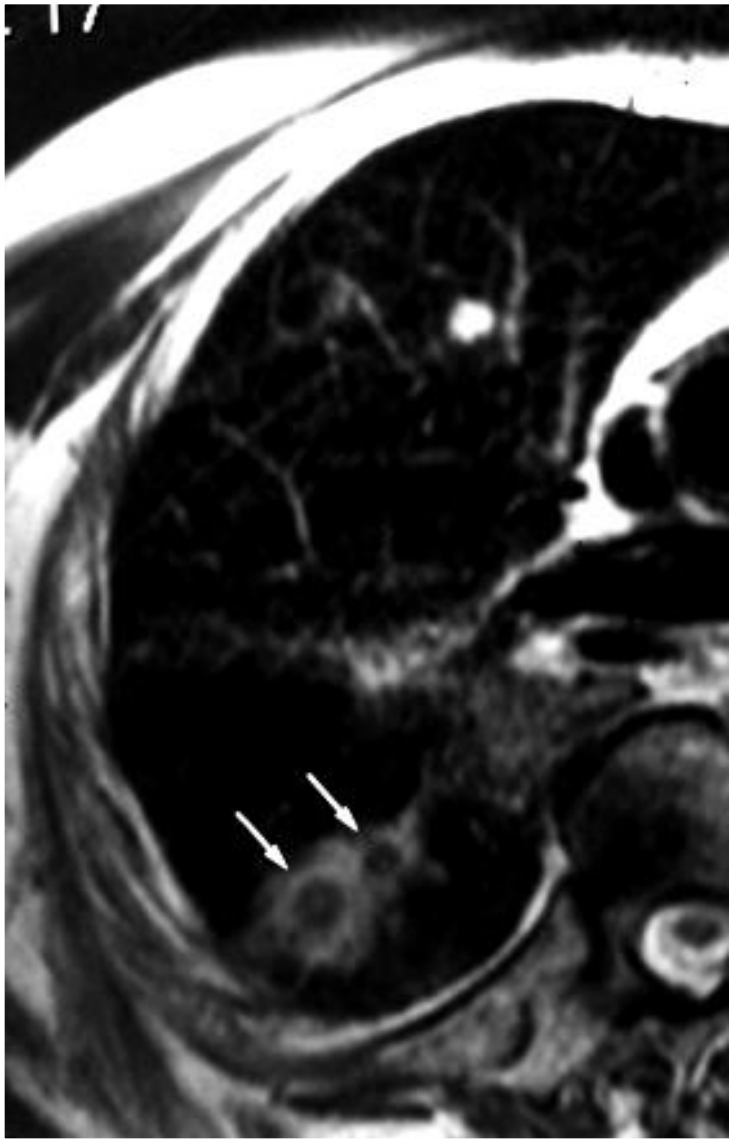

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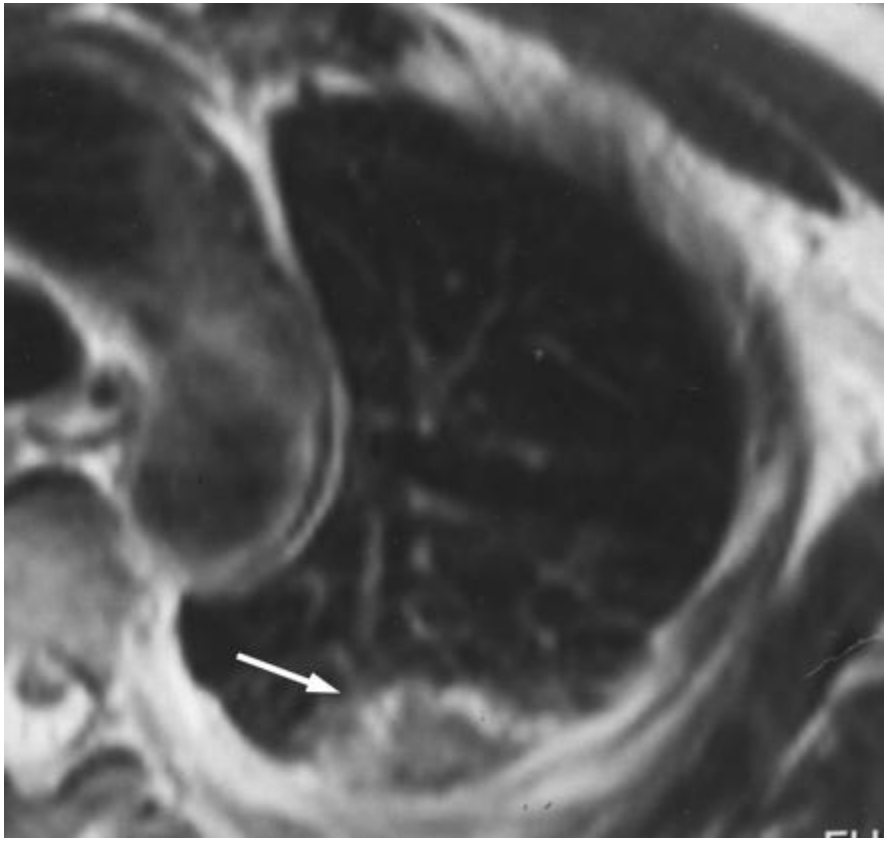
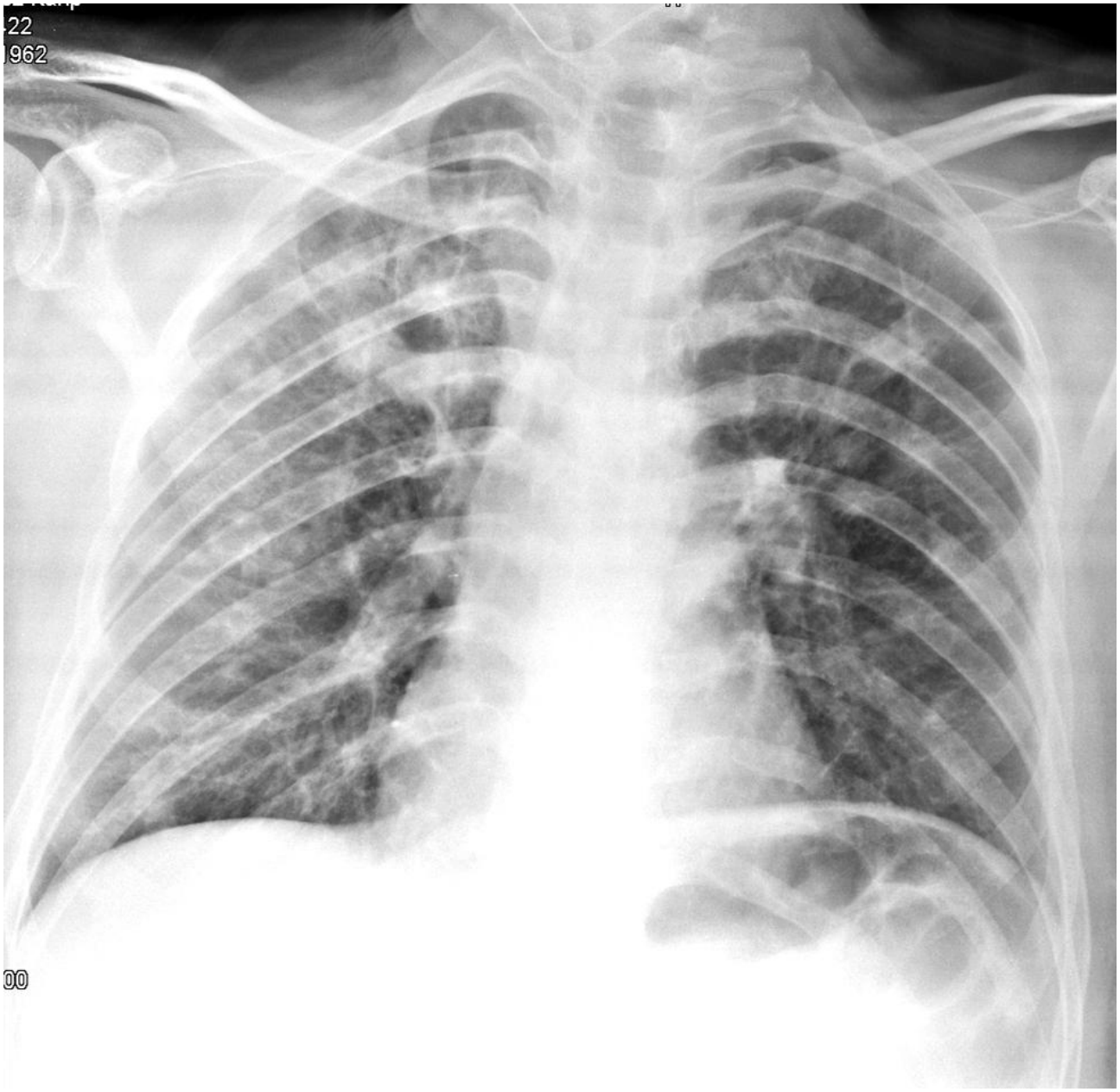


AJR 2000; 175:391-397 Leutner CL ve ark. MR Imaging of pnemonia in immunocompromised patients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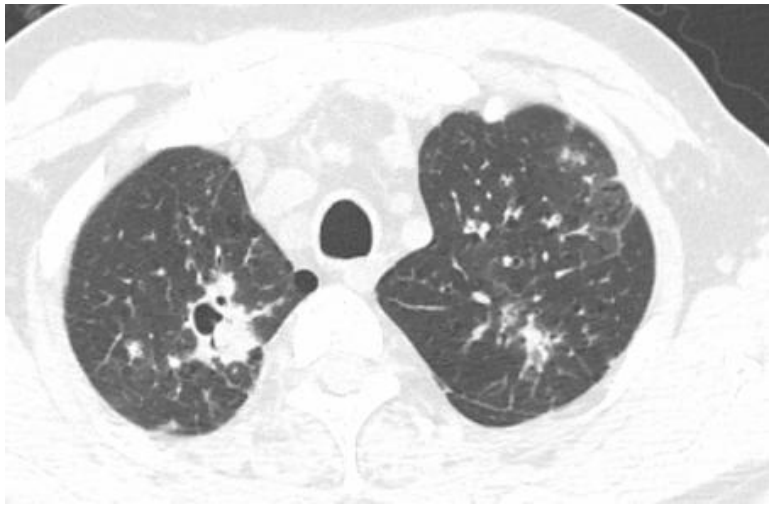

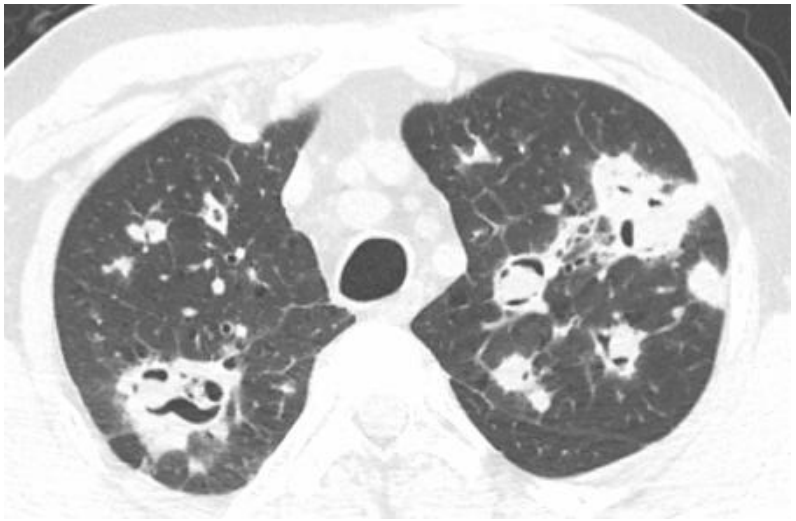

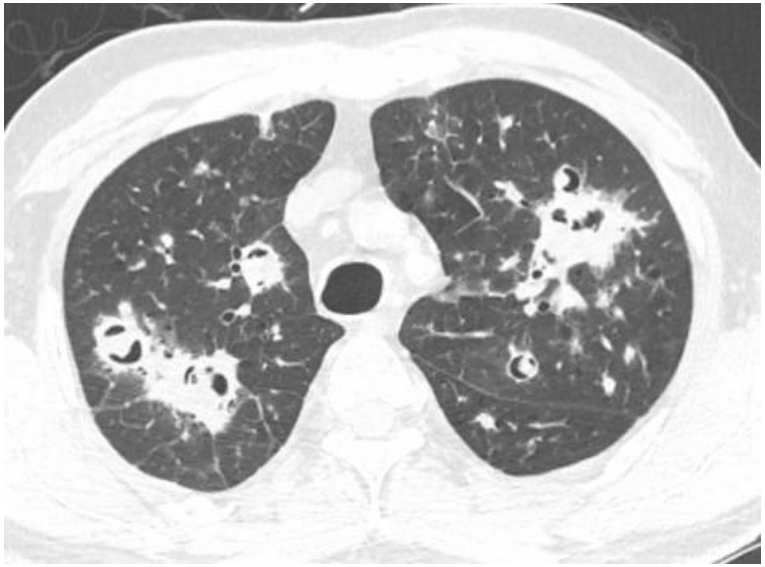

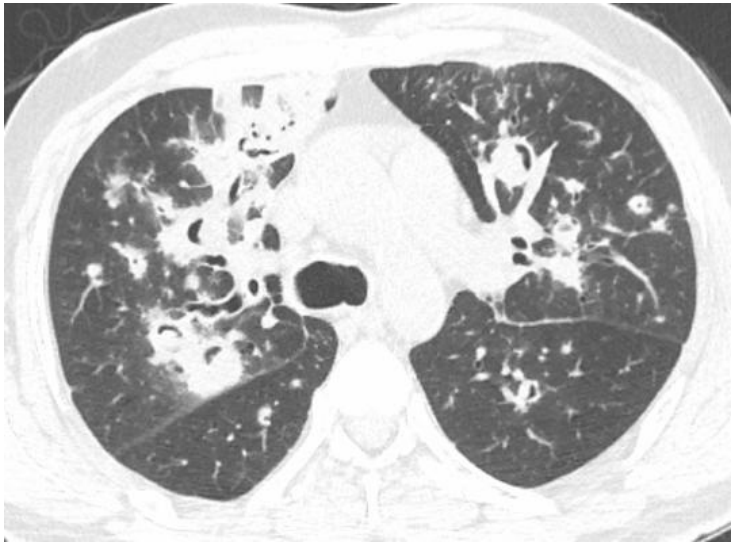

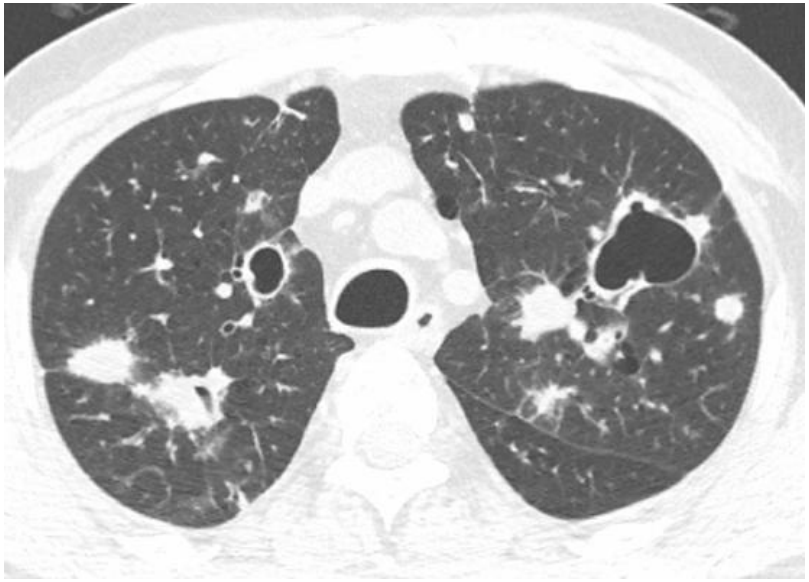

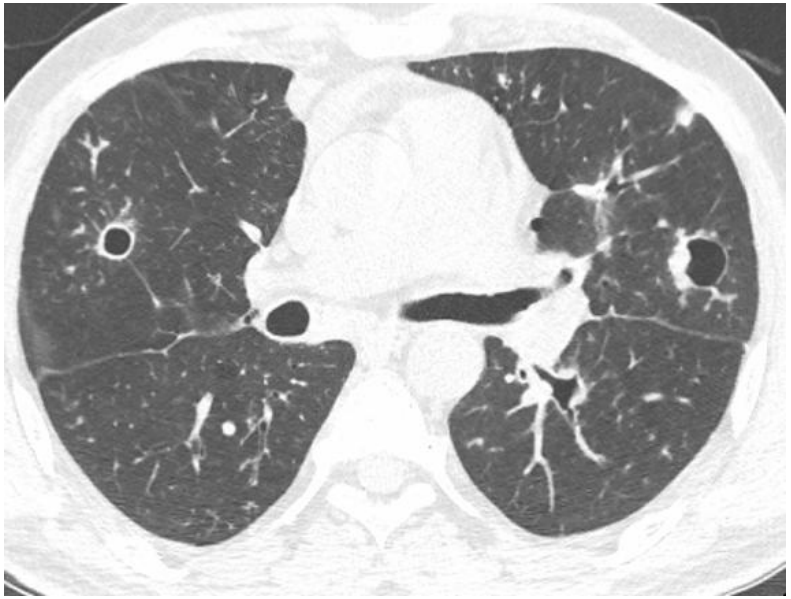

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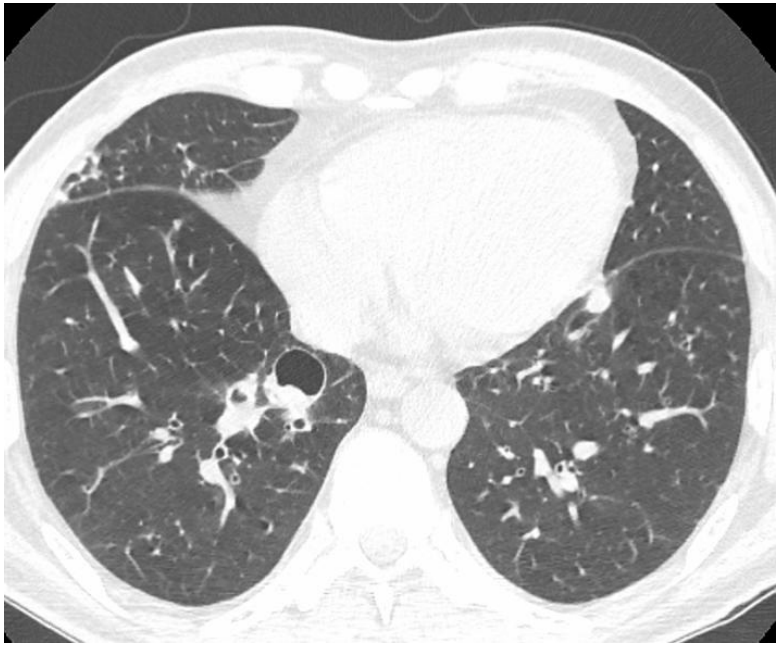

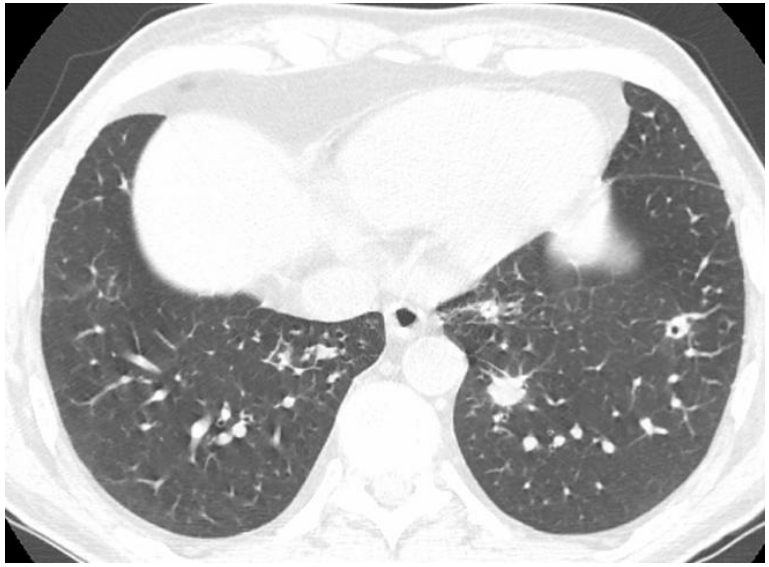

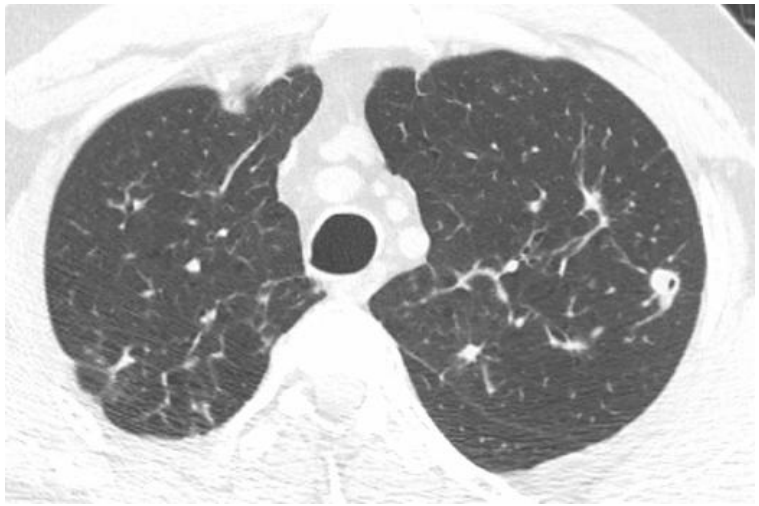

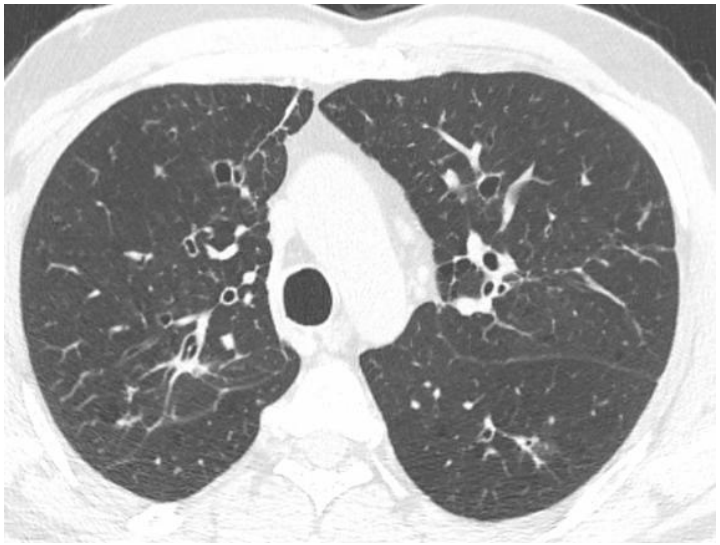

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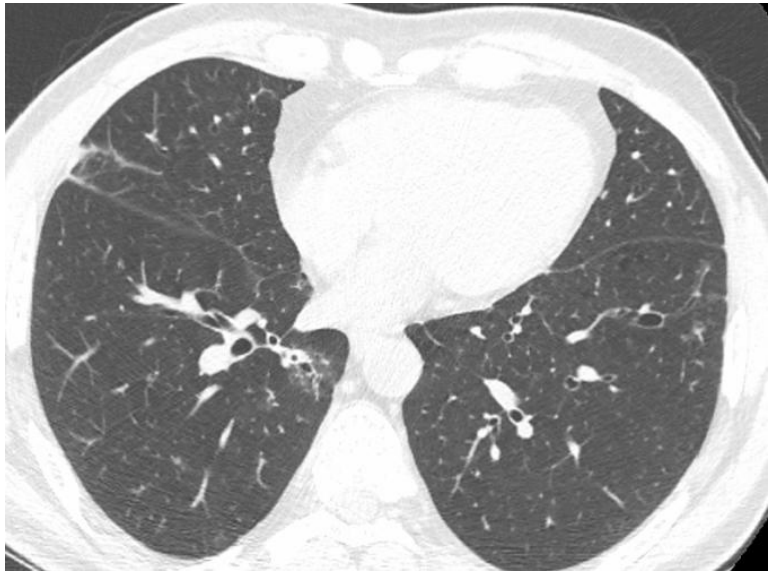
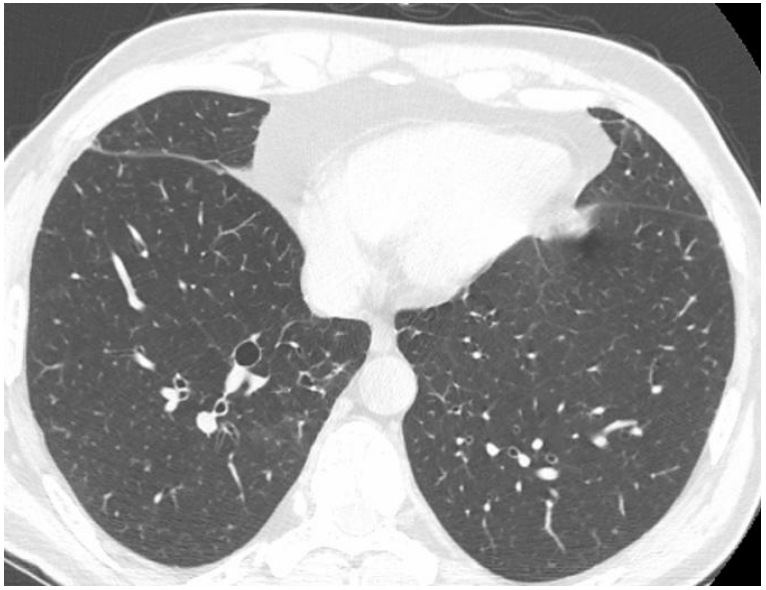




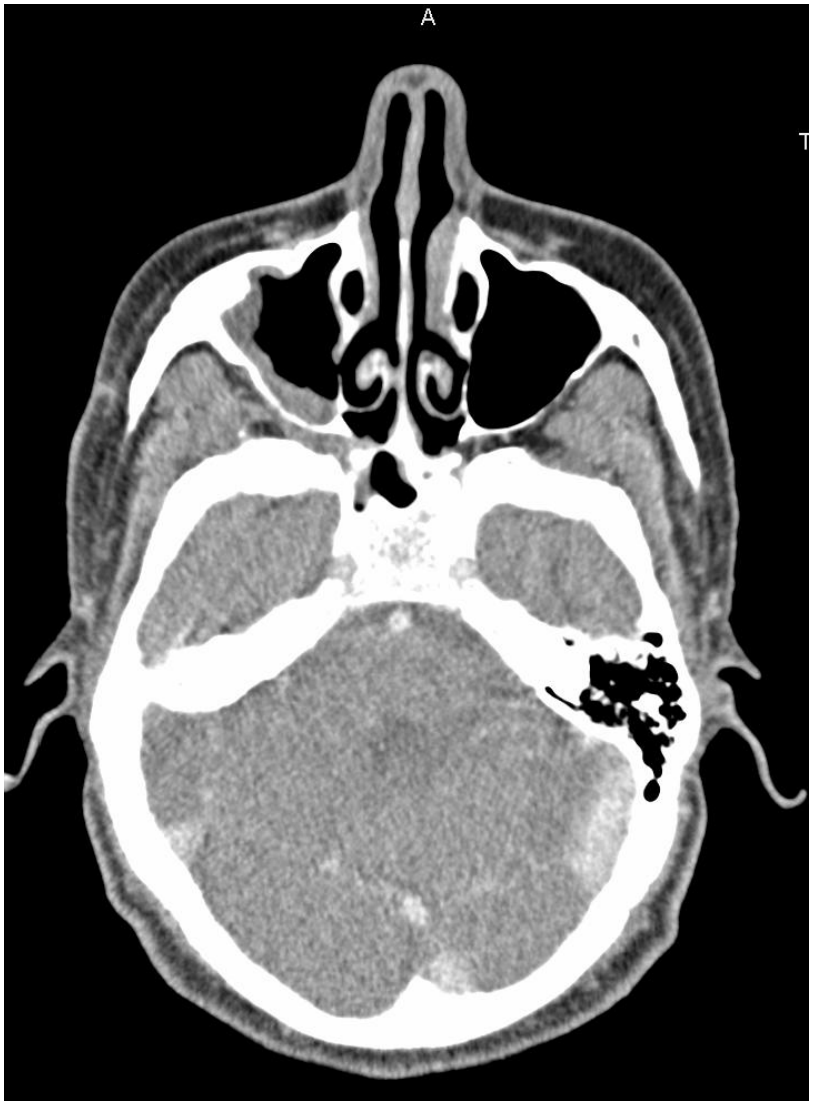
Aspergilloziste

	1. hafta	2. hafta	3. hafta
Halo işareti	% 68	% 22	% 19
Hilal işareti	% 8	% 28	% 63
Konsolidasyon	%31	%50	%18

ORBİTA VE PARANAZAL SİNUS TUTULUŞU

- Lokalize
- Fulminan

- Sfenoid sinus tutuluşu intrakranial yayılım olasılığı nedeniyle daha tehlikeli ve % 80 gibi bir oranda da tutulum var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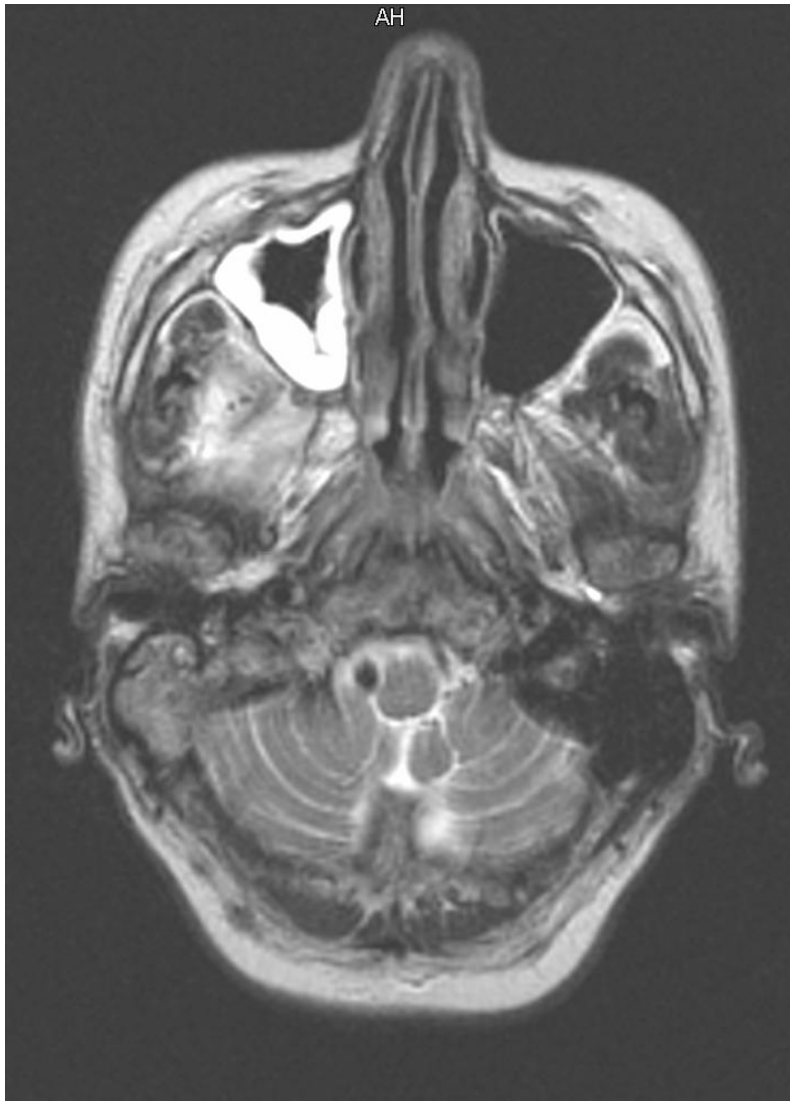
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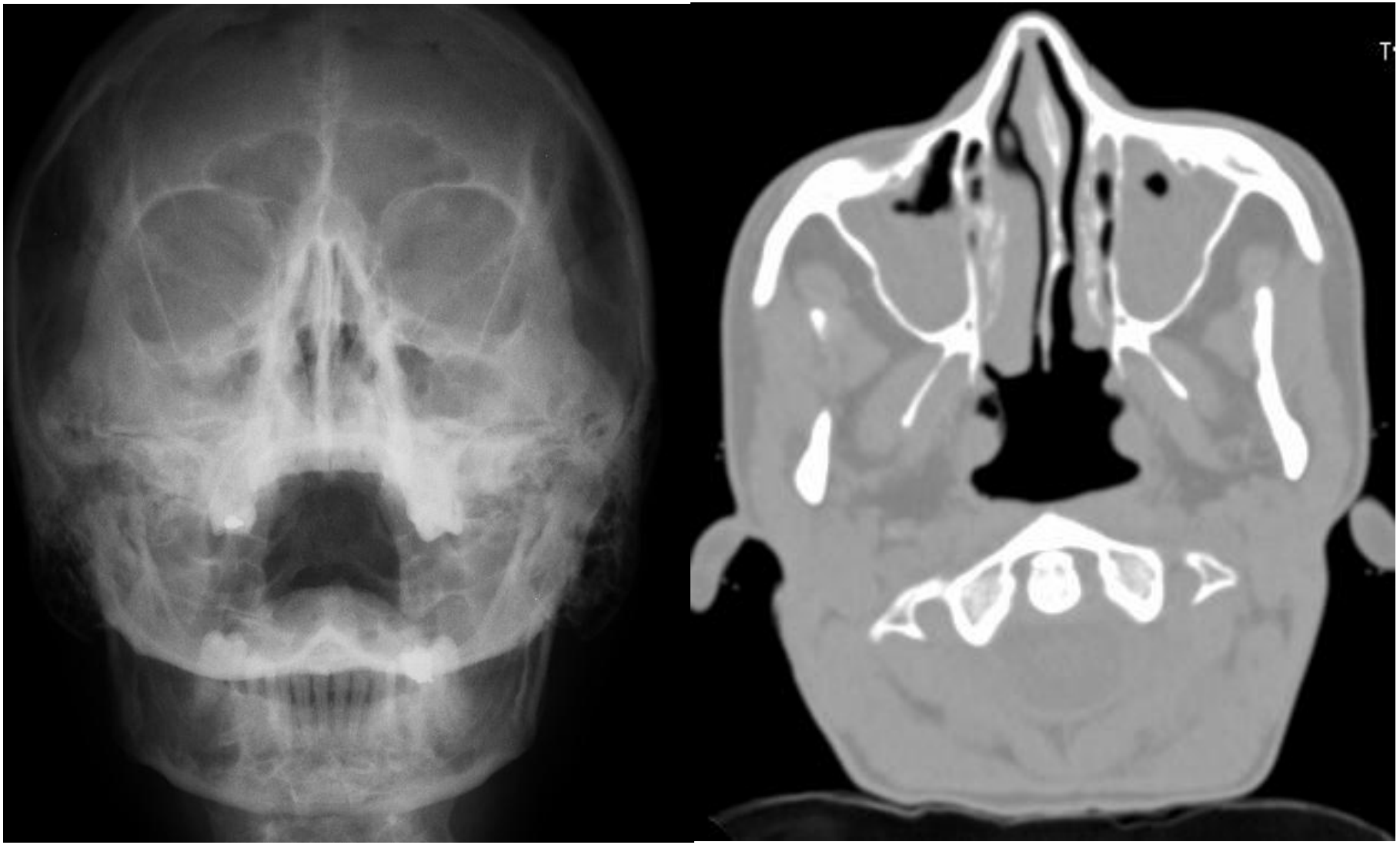

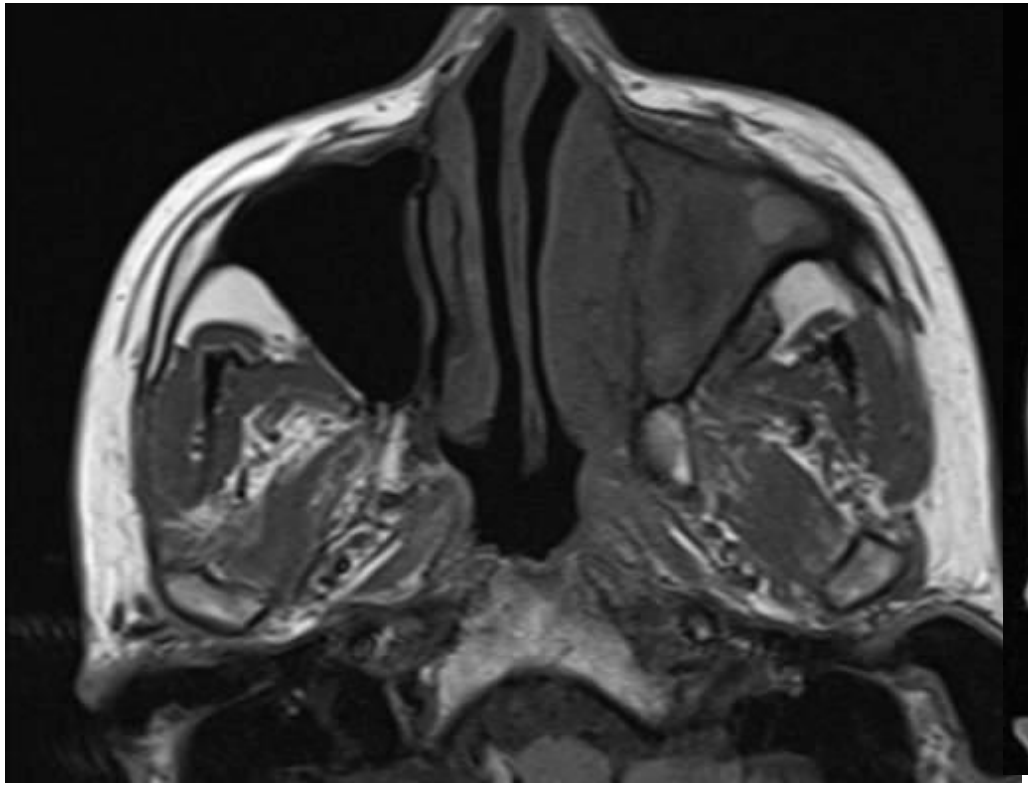
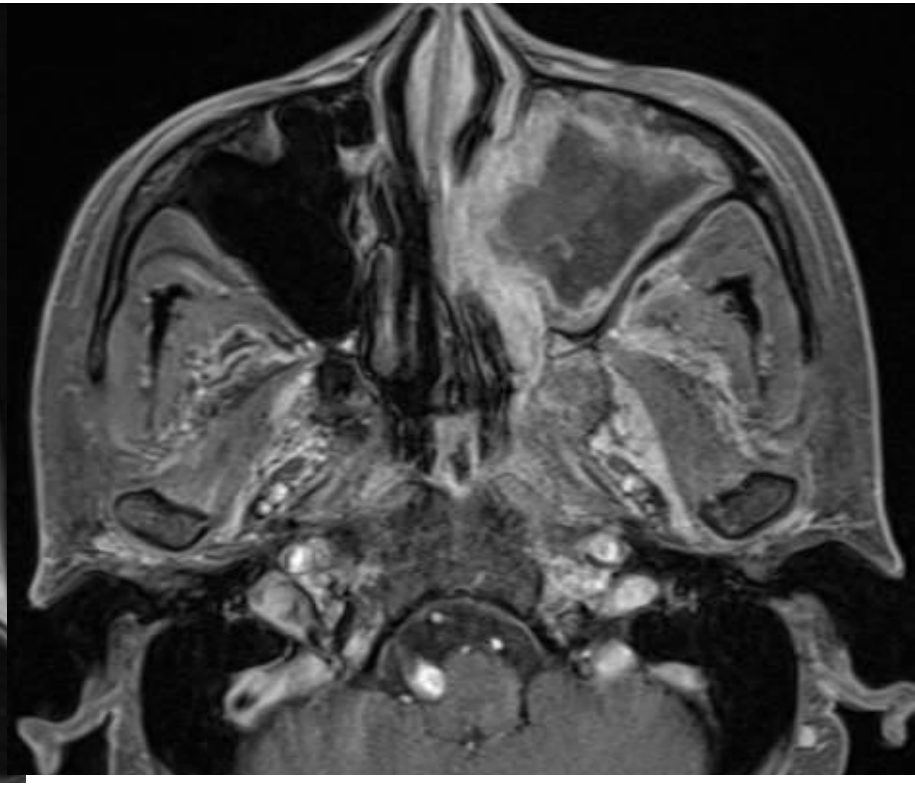

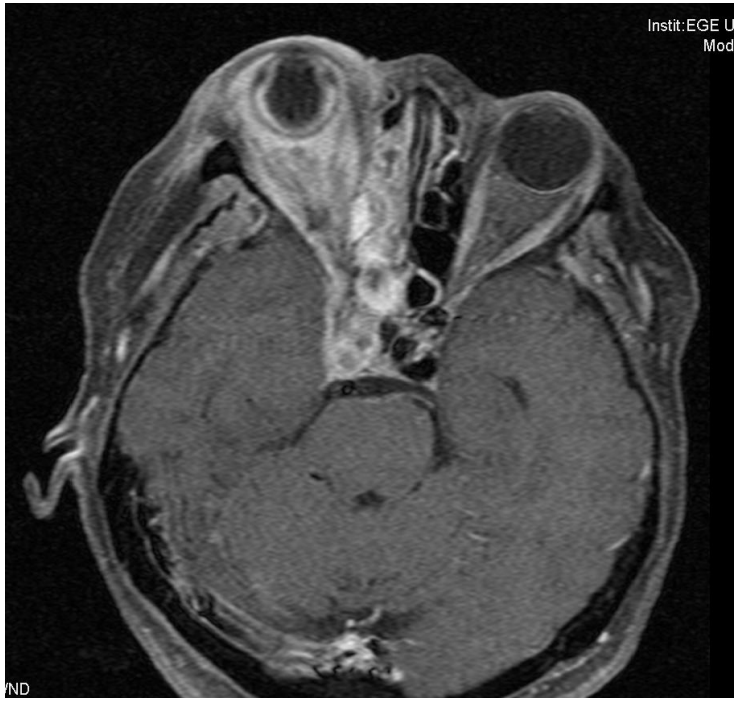
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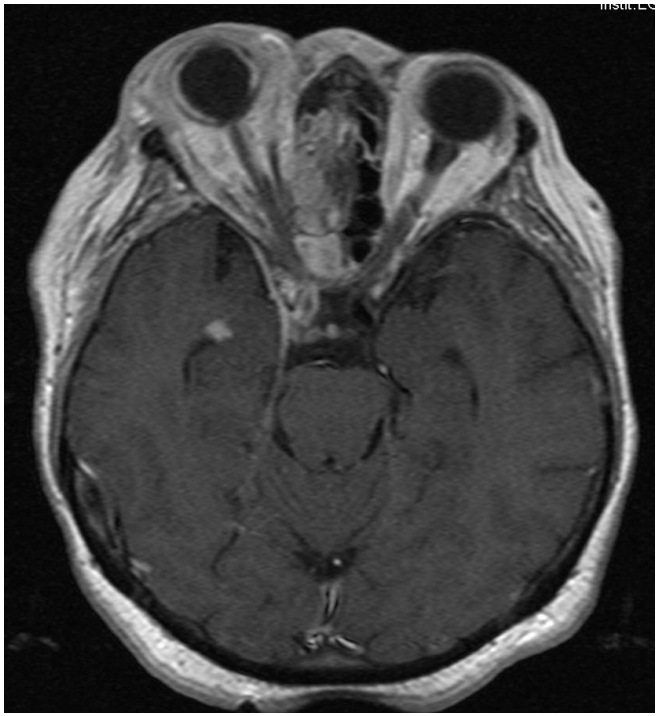

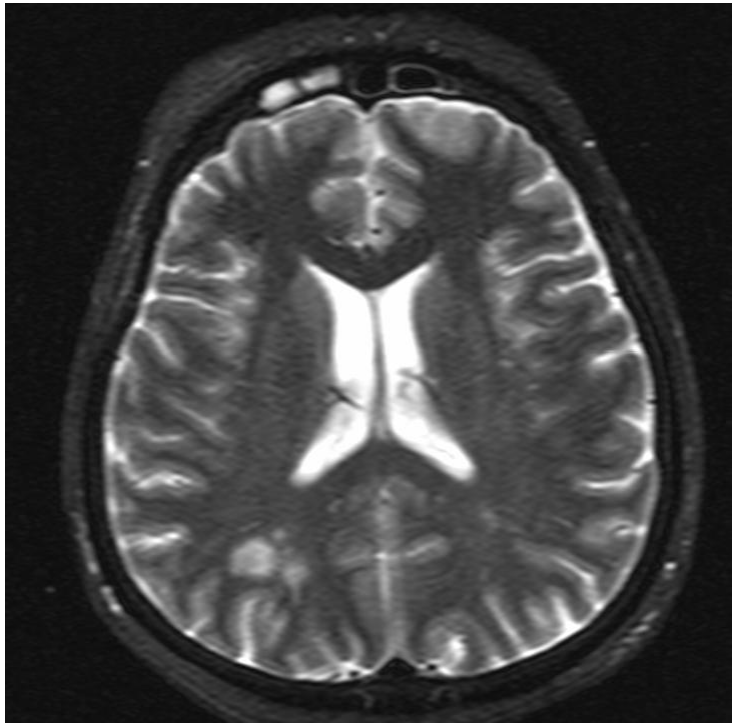

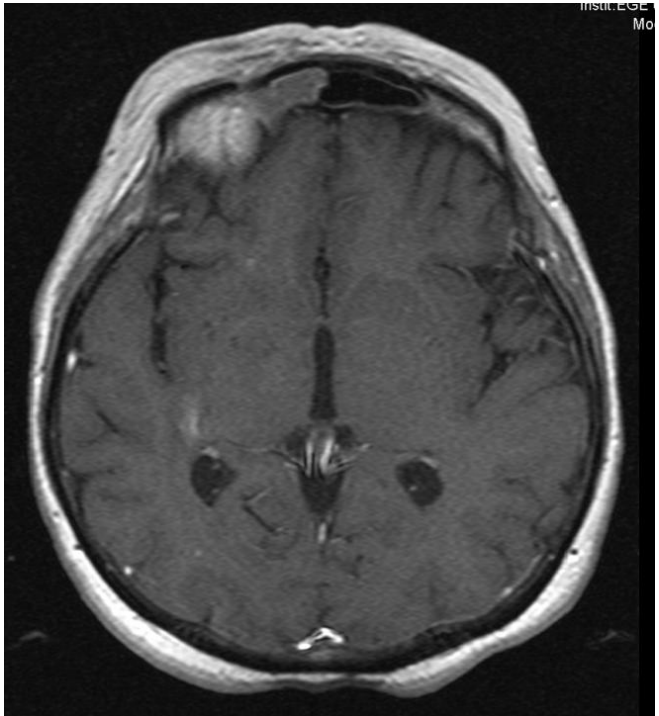
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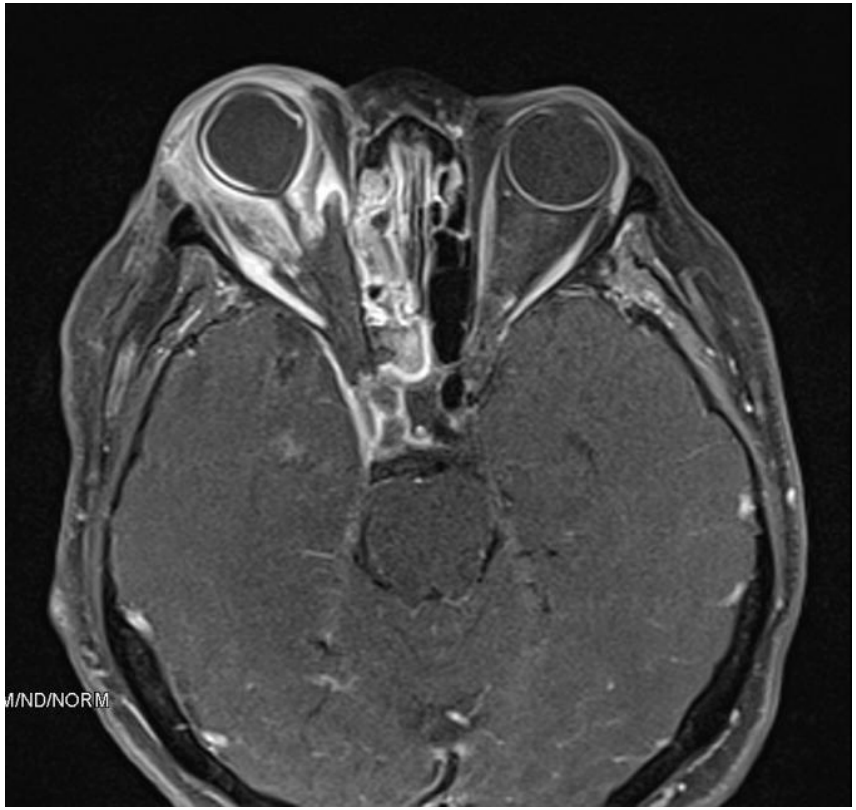
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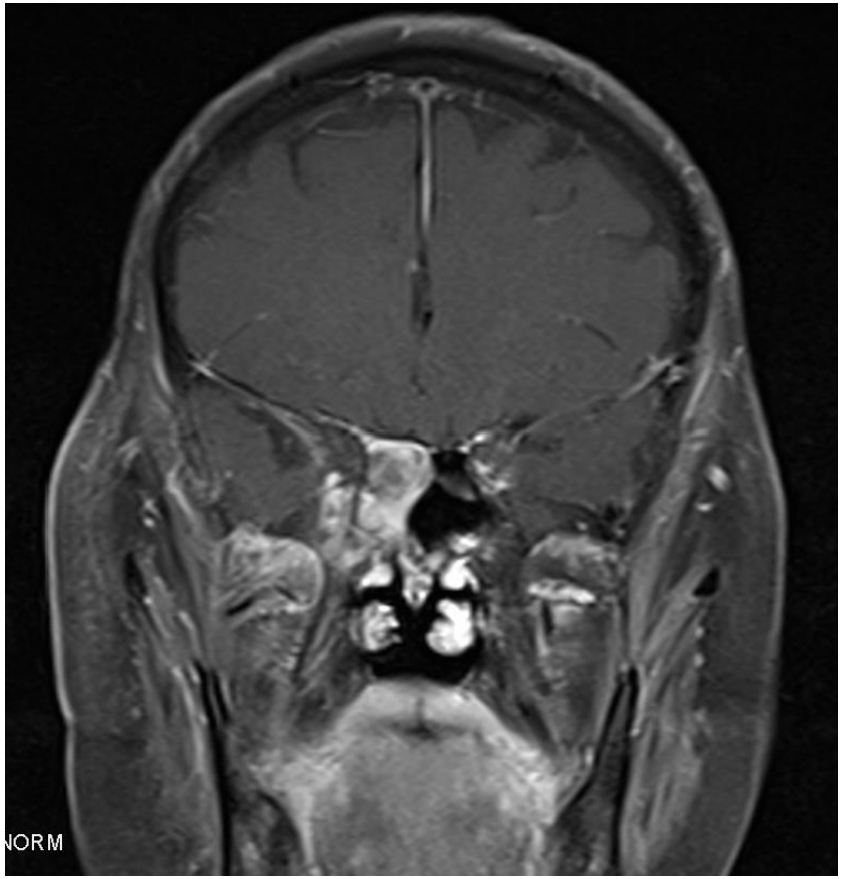
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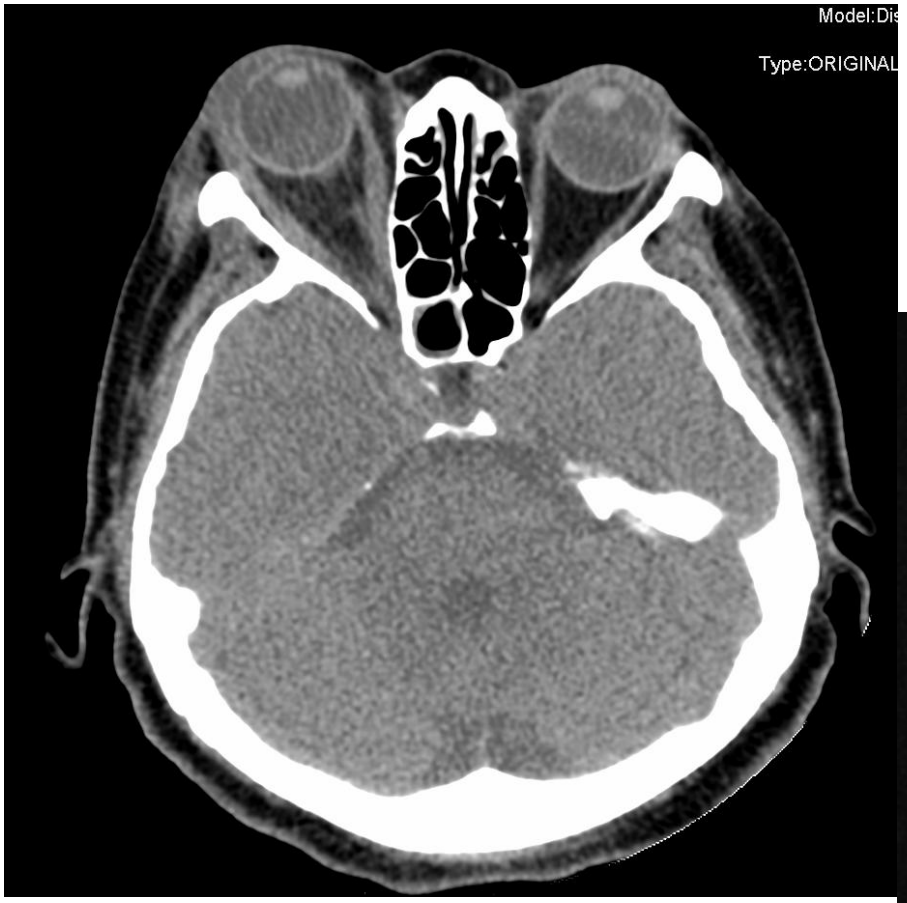
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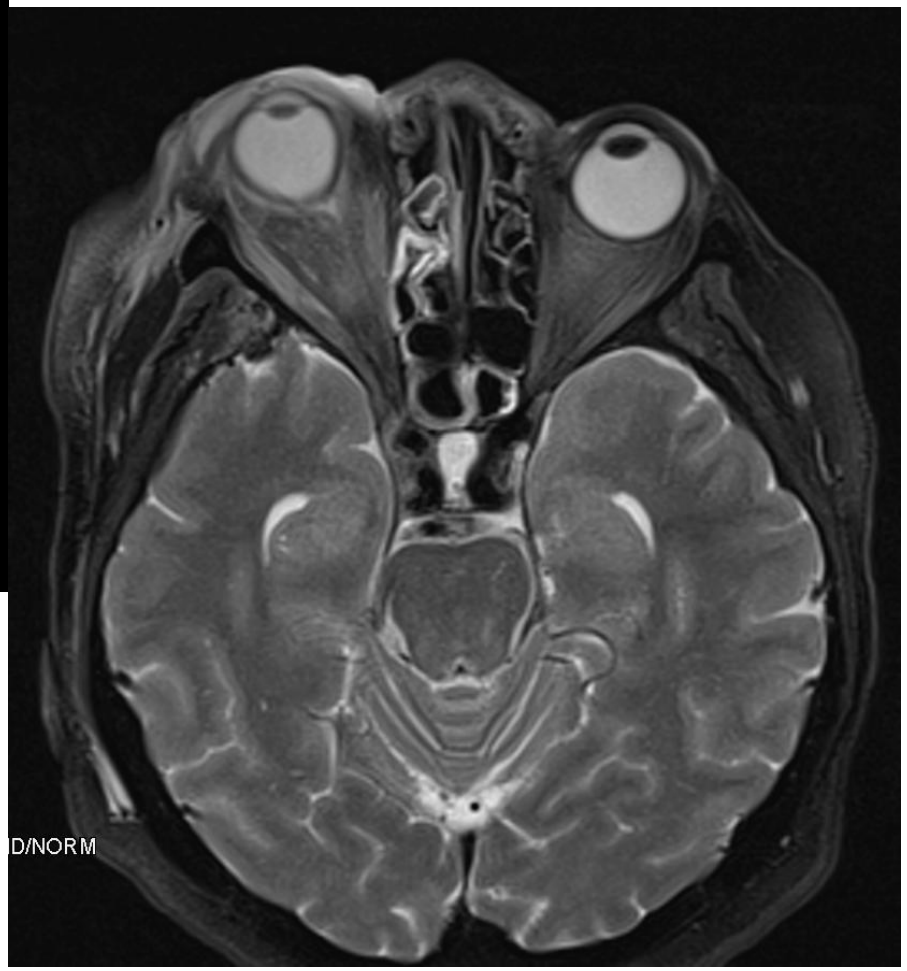

D/NORM

SSS TUTULUŞU

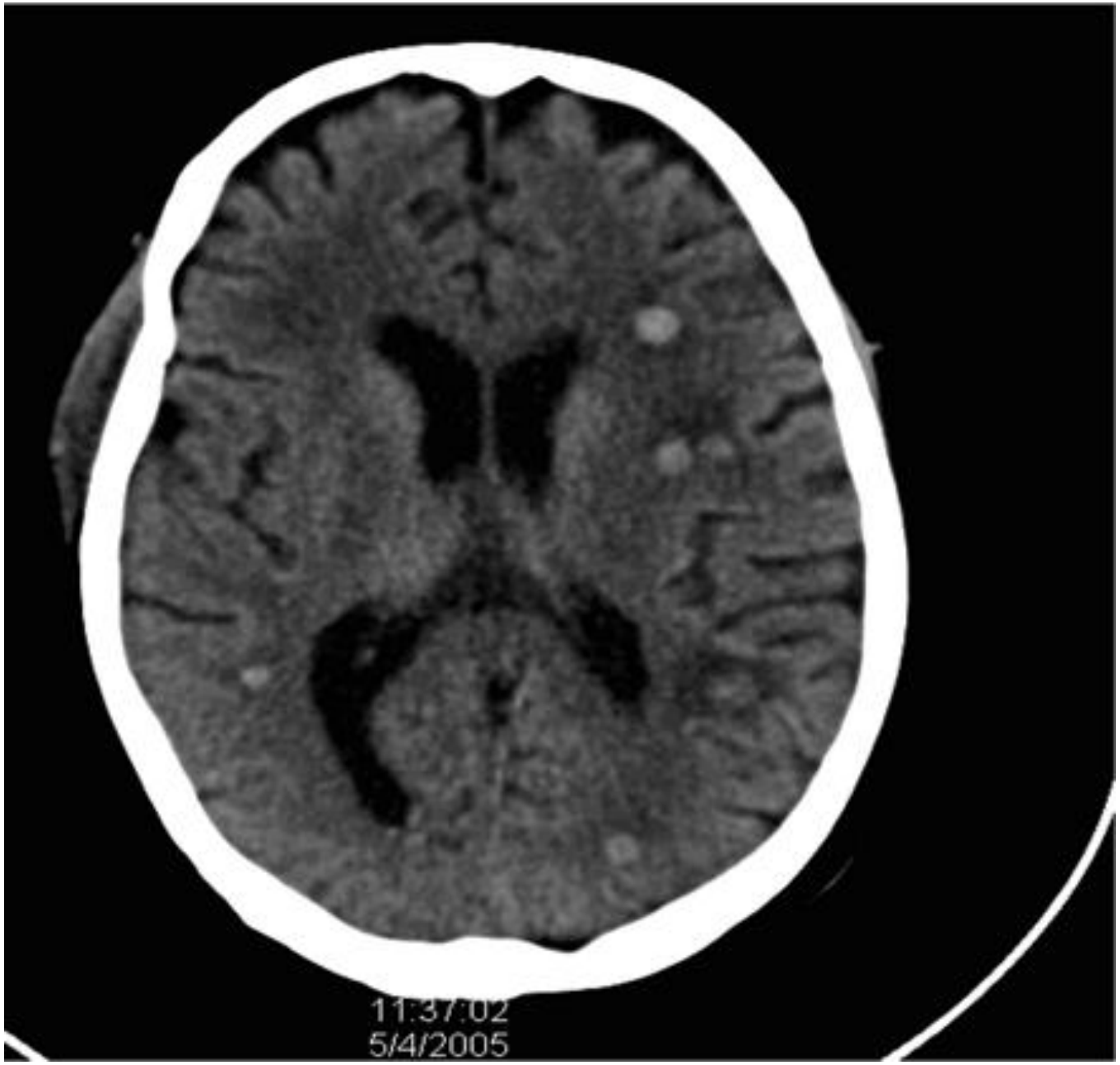
- Hematojen yolla veya paranazal sinus/ orbita yoluyla direkt olarak
- Hematojen yolla yayılımda hemorajik infarkt gelişir.
- Eğer damar duvarı tutulursa septik karakter kazanır ve serebrit, abse formasyonuna dönüşür.

SSS TUTULUŞU

- Subaraknoid mesafeye yayılırsa menenjit/meningoensefalit gelişebilir.
- Ön ve orta serebral arter sulama alanı boyunca ve bazal ganglionlarda kortikomedüller bileşkede multi fokal lezyonlar
- Mikotik anevrizma

SSS TUTULUŞU

- BT ile 5 patern tanımlanmış:
  1. Beyin abse paterni (%43) : tek veya multipl
  2. Hemorajik infarkt paterni (%12)
  3. Parankimal hemoraji paterni (%12)
  4. Diffüz nekrotik ensefalit paterni (%6)
  5. Mix patern (%22)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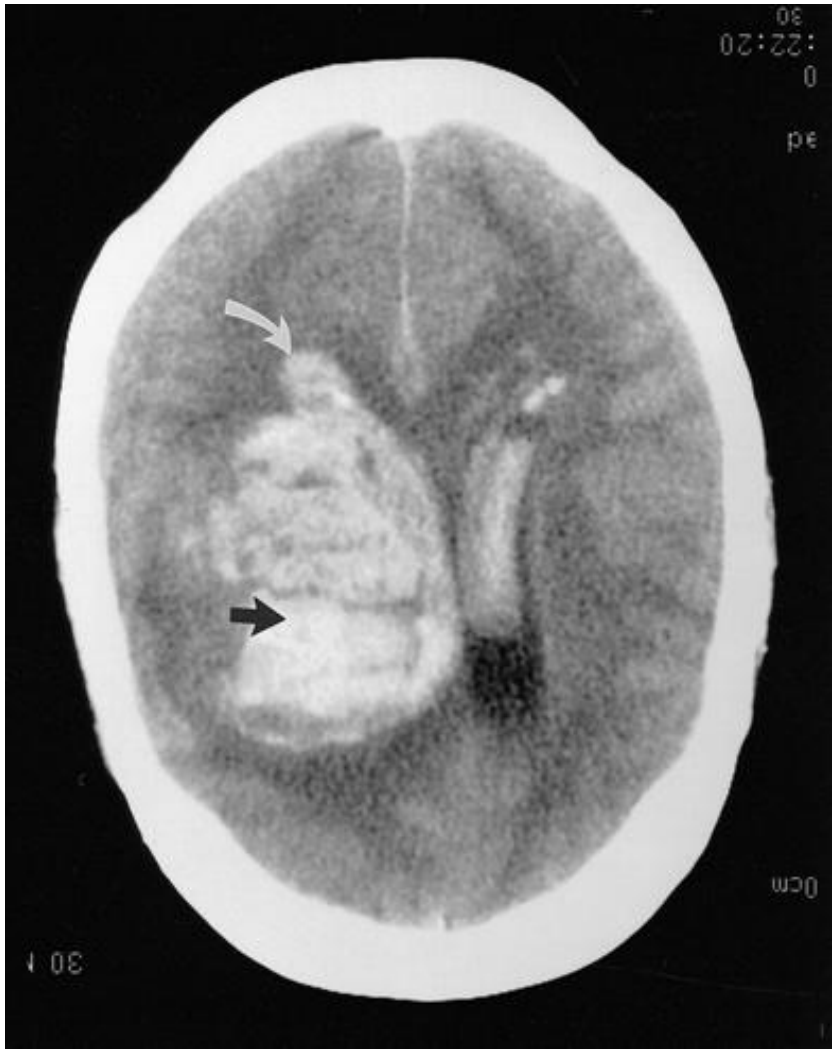

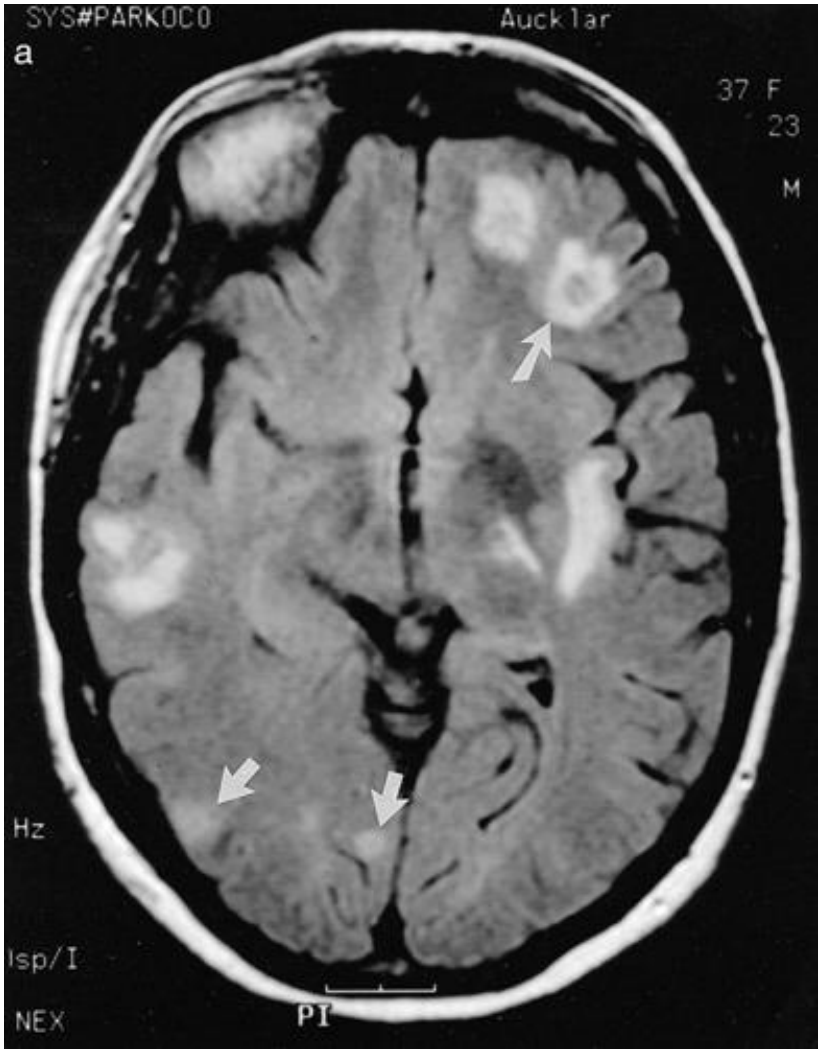
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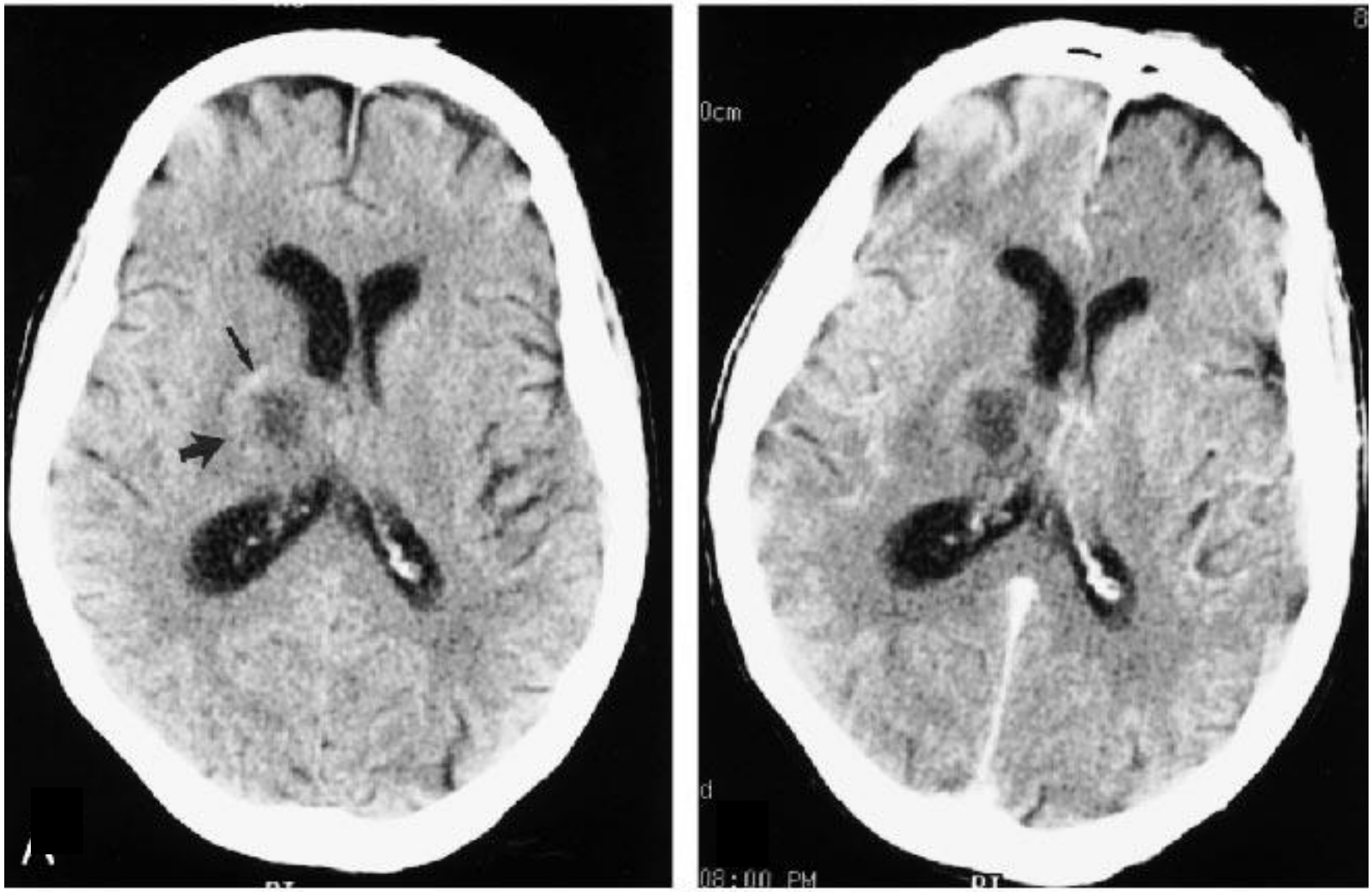
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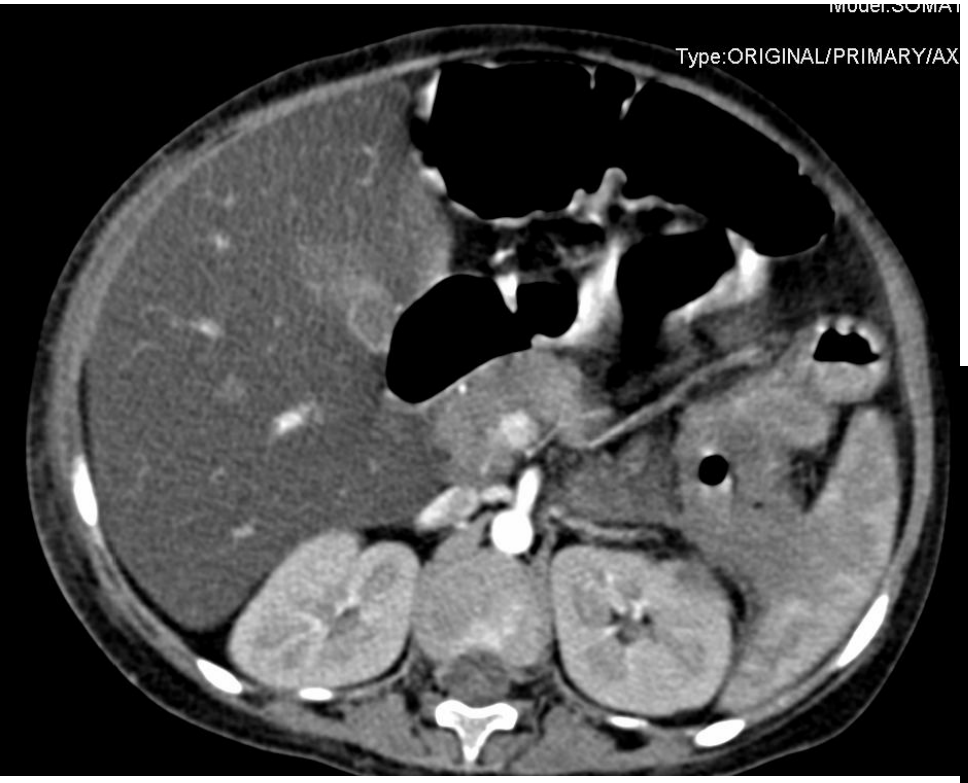
ABDOMİNAL ORGAN TUTULUŞU

- Başta barsak obstrüksiyonu olmak üzere, barsakta iskemi, hemoraji ve nekroz ile seyreder.
- Karaciğer, dalak, pankreas ve böbrek tutuluşu olabilir
- Genel olarak bu organlarda **iskemi ve infarkta** neden olur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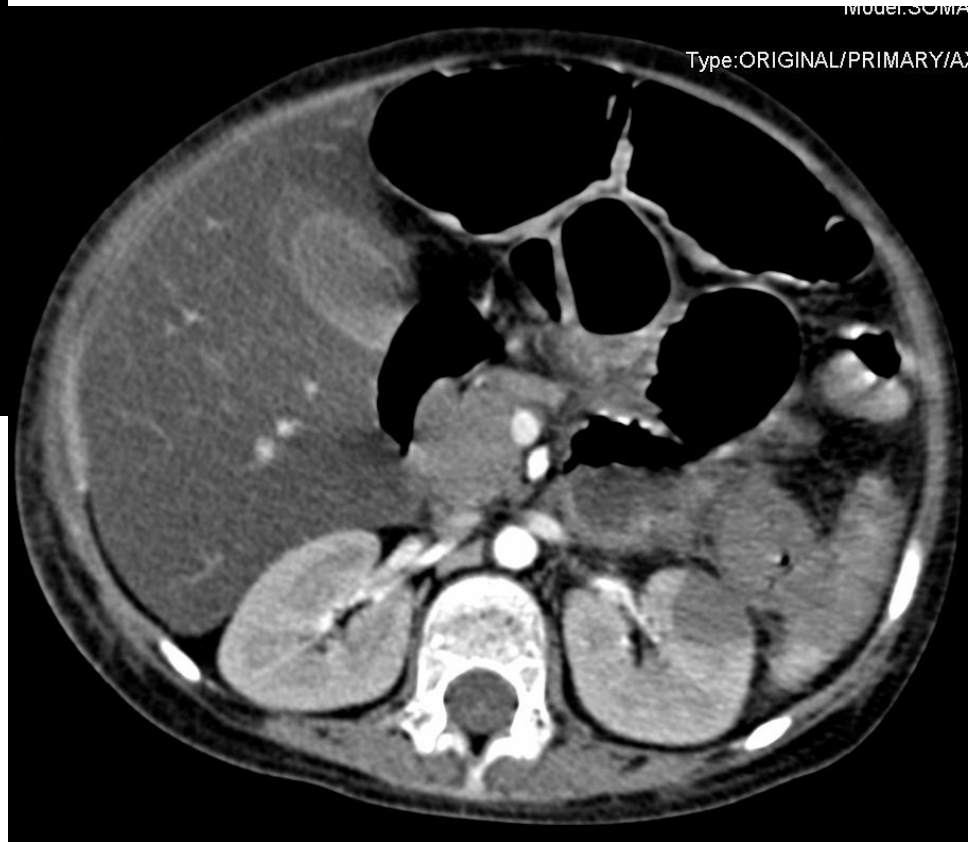
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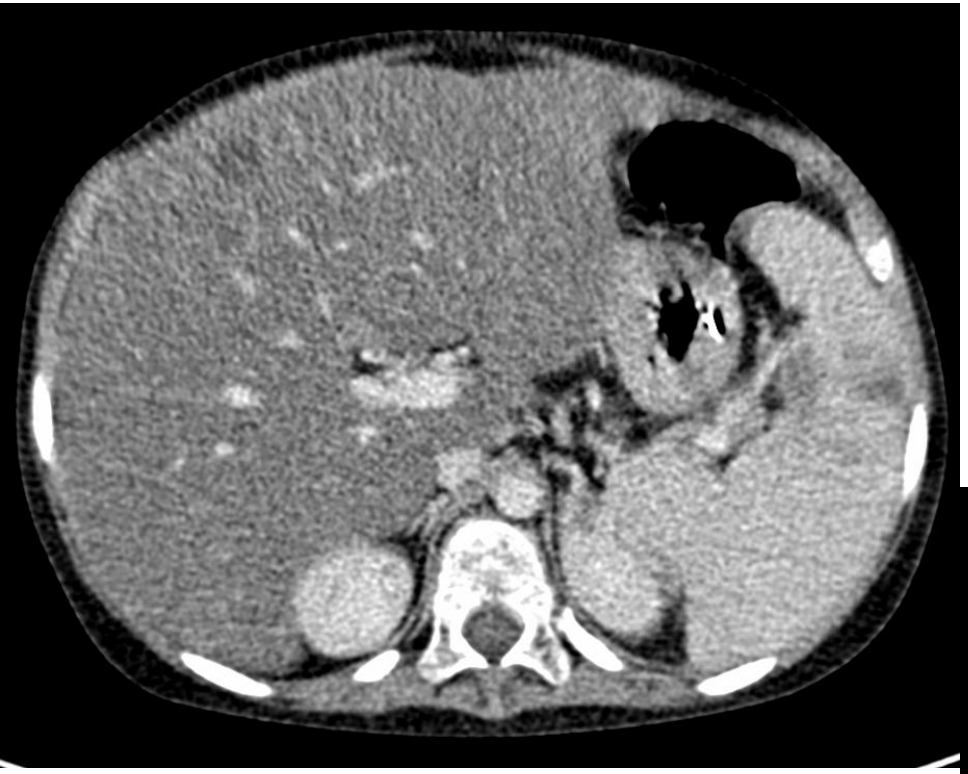

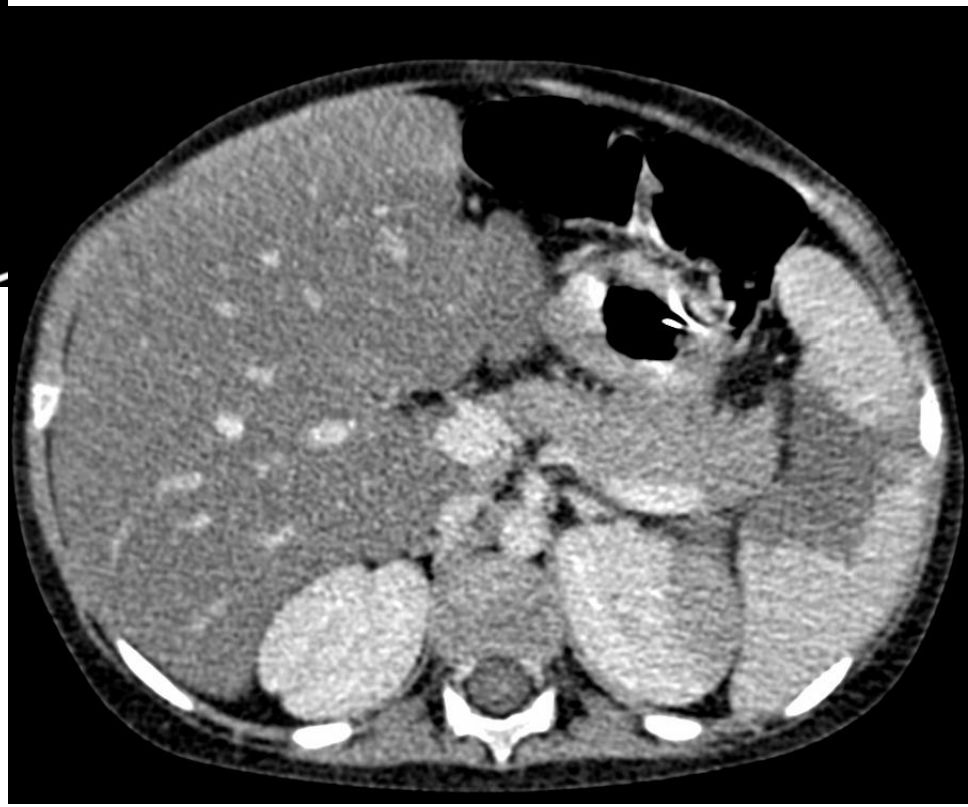

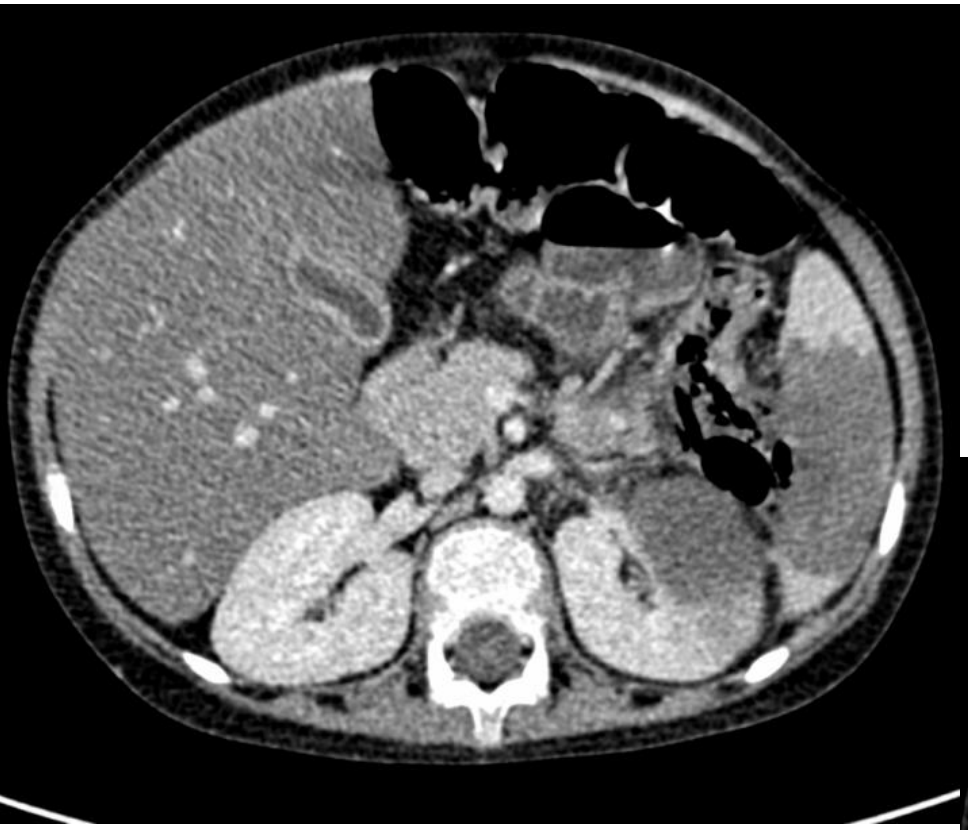

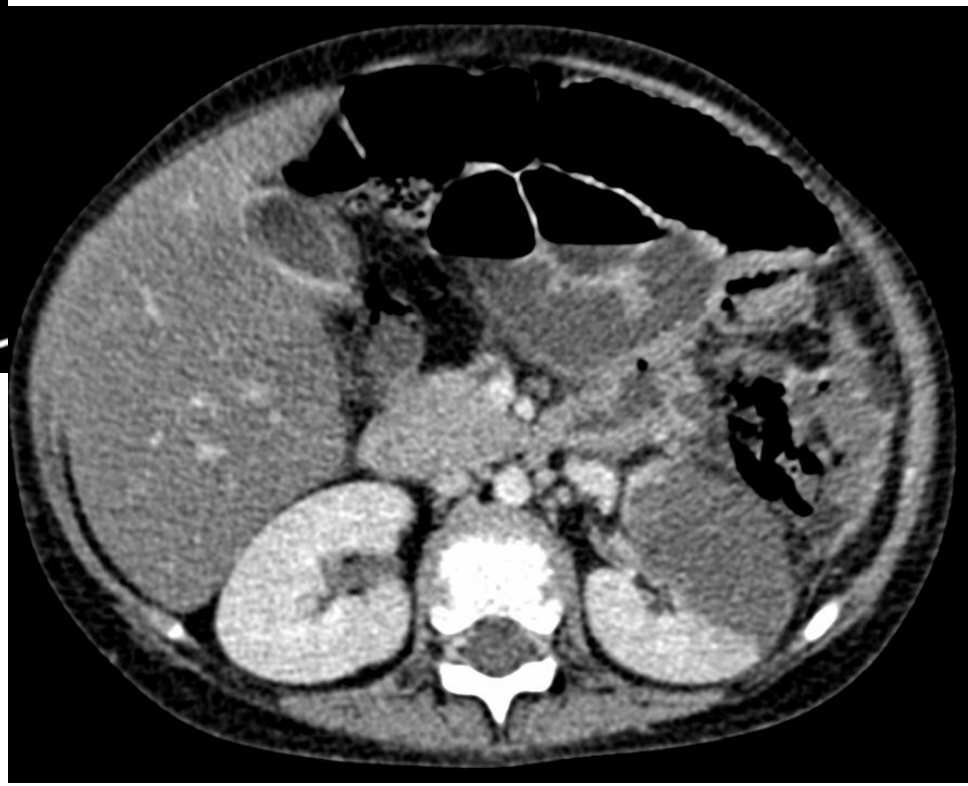

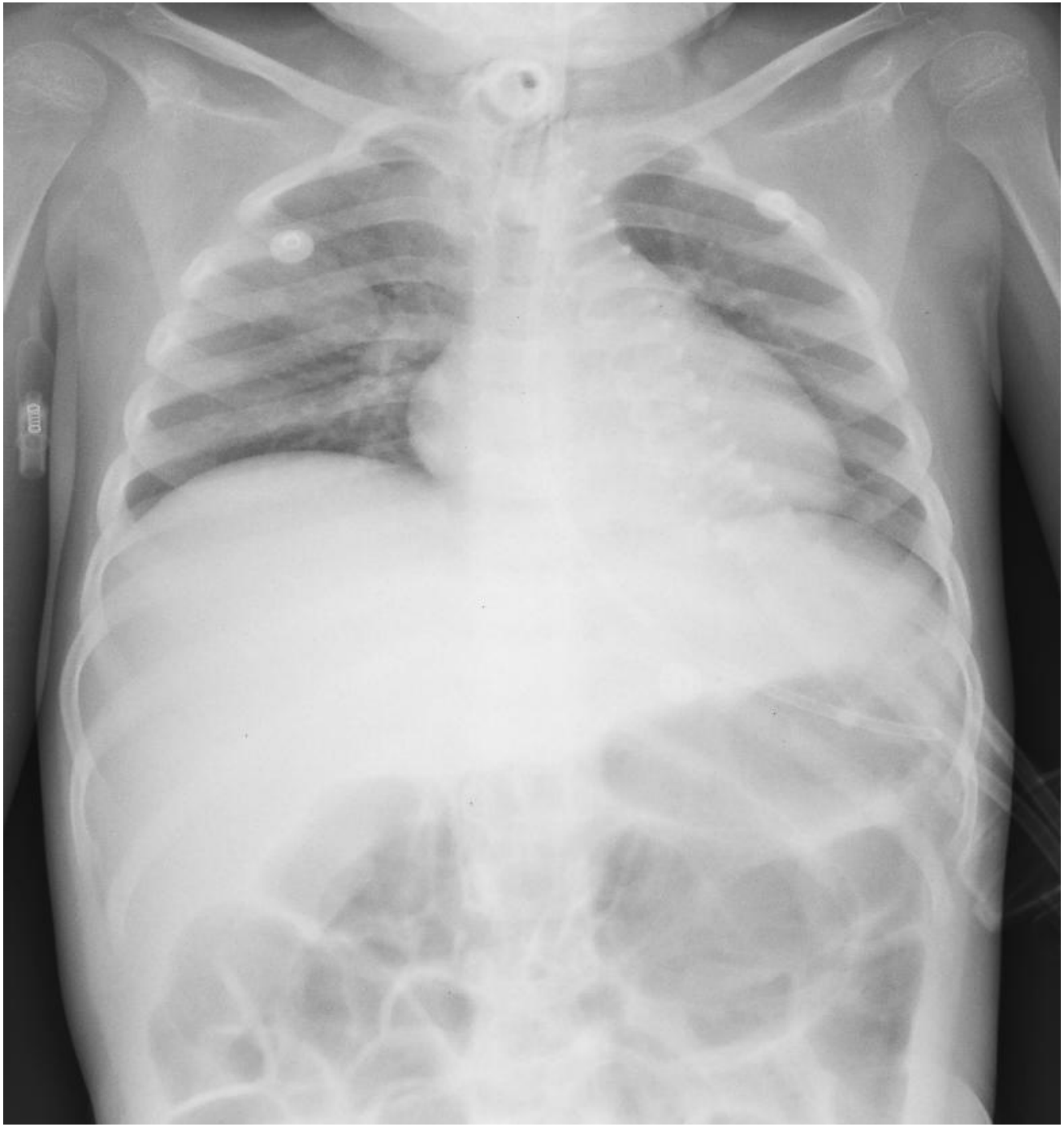

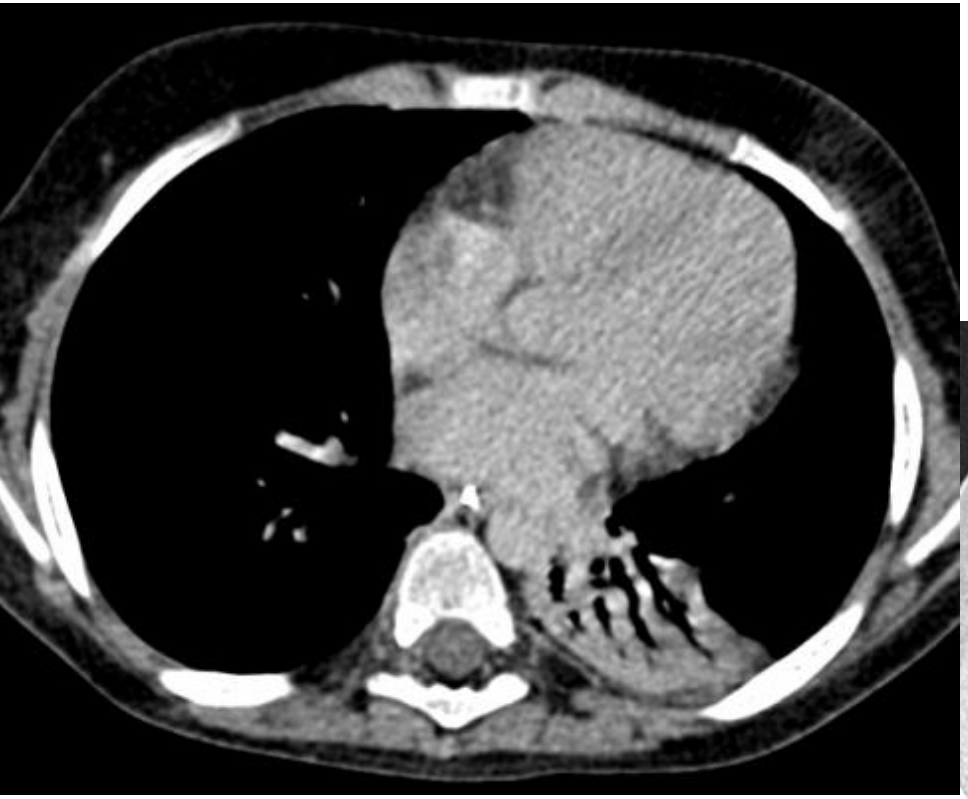

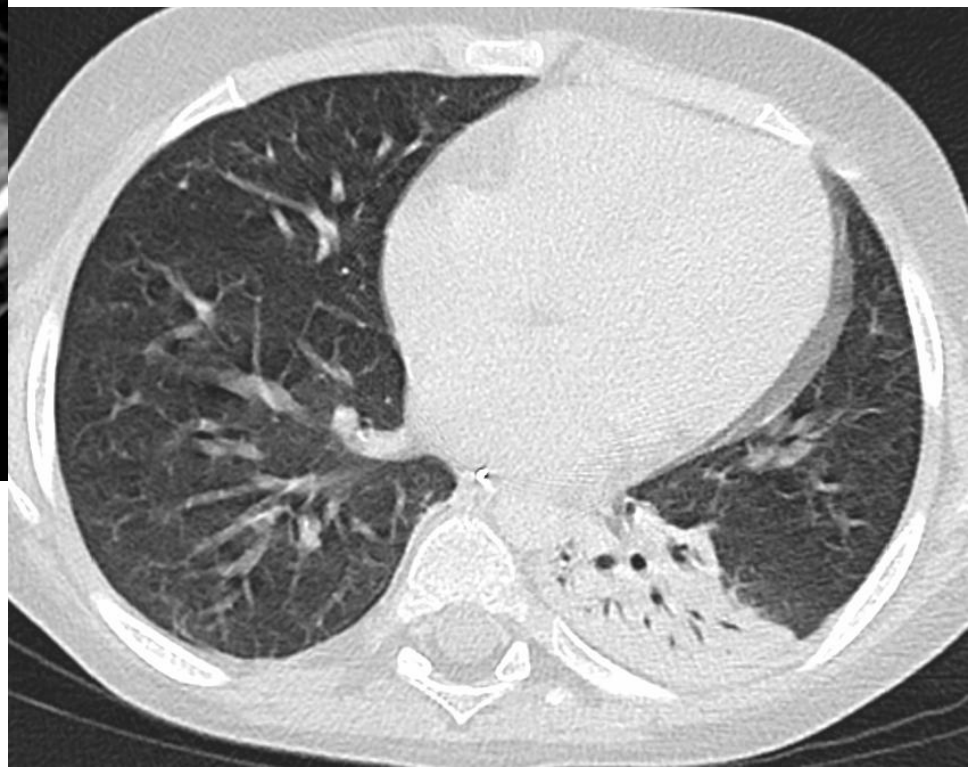

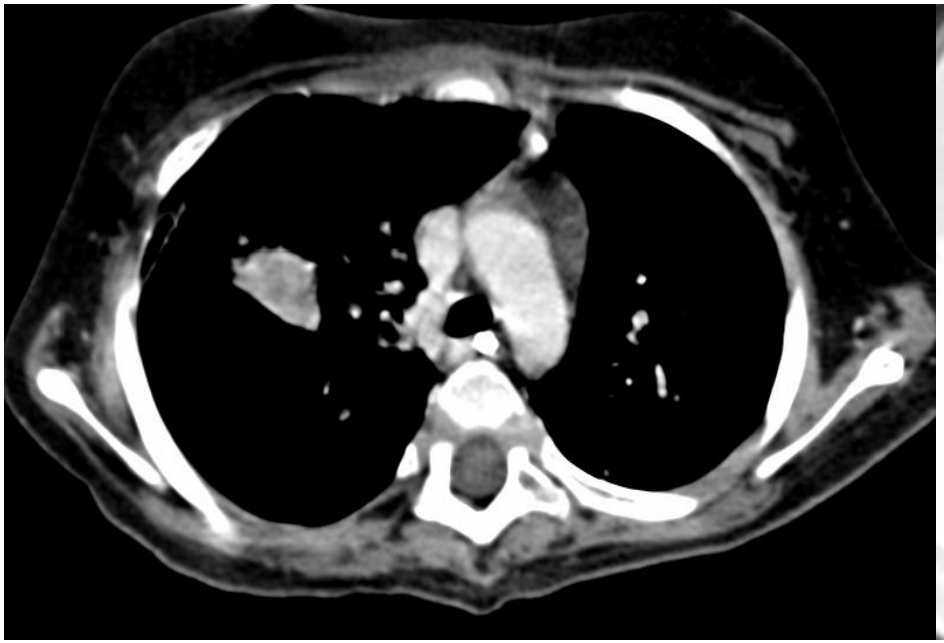

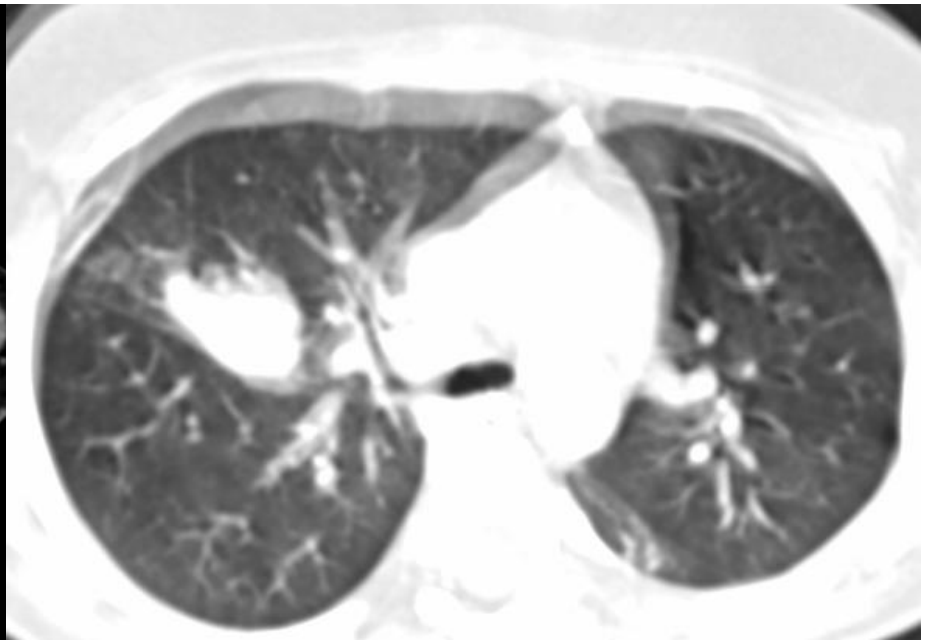

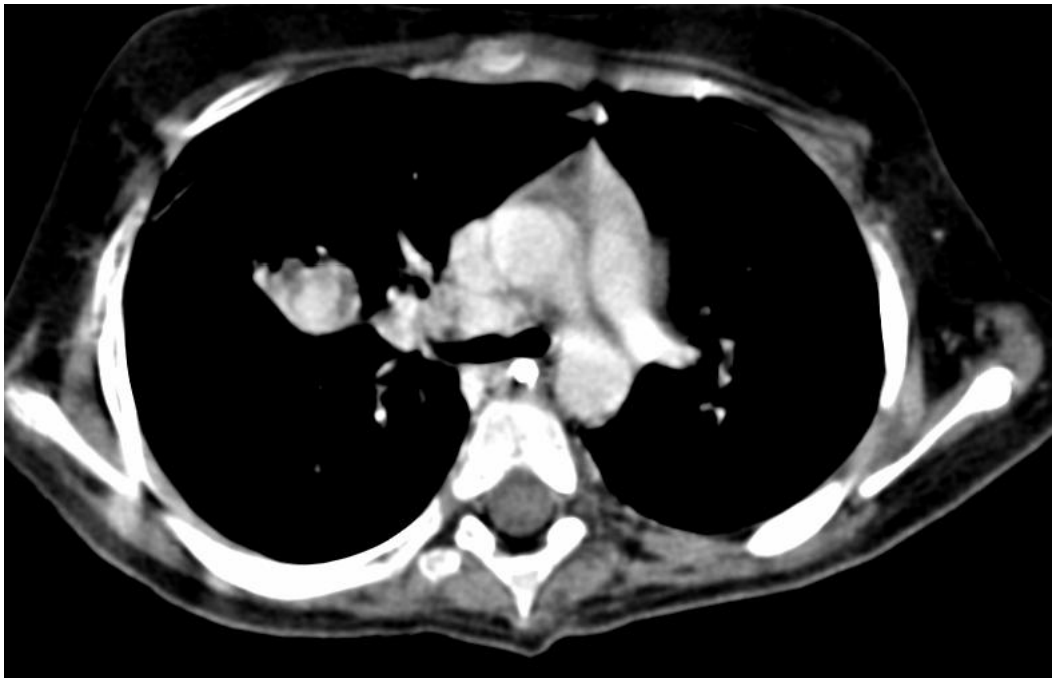

SONUÇ:

- Erken tanı için radyoloji, özellikle BT gereklidir
- Tanı ve takipde ve tedaviye yanıt değerlendirmede yine radyolojinin rolü çok önemlidir.