RADYOLOJİ KIŞ OKULU 2019

4 -10 Şubat 2019
Mirage Park Otel, Antalya

TRD 1924

Acil Torasik Görüntüleme
Sık Rastlanan Olgular

Dr. N. Sinem Gezer

Dokuz Eylül Üniversitesi Tıp Fakültesi
Radyoloji Anabilim Dalı

drsinemgezer@gmail.com

ÖĞRENME HEDEFLERİ

- **Travmatik**
  - Künt travmalar
  - Penetran travmalar
- **Non-travmatik**
  - Vasküler
  - Ekfeksiyöz
  - Kardiak

- Annals of Emergency Medicine, 2015;66:589-600

Prevalence and Clinical Import of Thoracic Injury Identified by Chest Computed Tomography but Not Chest Radiography in Blunt Trauma: Multicenter Prospective Cohort Study

Mark I. Langdorf, MD, MHPE*; Anthony J. Medak, MD; Gregory W. Hendey, MD; Daniel K. Nishijima, MD, MAS; William R. Mower, MD, PhD; Ali S. Raja, MD, MBA; Brigitte M. Baumann, MD, MSCE; Deirdre R. Anglin, MD, MPH; Craig L. Anderson, PhD, MPH; Shahram Lotfipour, MD, MPH; Karin E. Reed, MD; Nadia Zuabi, BS; Nooreen A. Khan, BS; Chelsey A. Bithell, BS; Armaan A. Rowther, BS; Julian Villar, MD; Robert M. Rodriguez, MD

- 2048 hasta, Radyografi ve Toraks BT
- Direk grafi ardından çekilen BT ile olguların %46.6'sında ek patoloji saptanmış
- Direk grafi olguların sadece %29'unda tüm patolojileri gösterebilmiş
- Pnömotoraks, hemotoraks, akciğer kontüzyonu, sternum, kosta, vertebra ve skapula fraktürleri, diyafram ve büyük damar yaralanmaları

- The American Surgeon, 2015;81(10):965-8

Utility of Chest Computed Tomography after a "Normal" Chest Radiograph in Patients with Thoracic Stab Wounds

BRIAN M. NGUYEN, M.D., DAVID PLURAD, M.D., SADAF ABRISHAMI, B.S., ANGELA NEVILLE, M.D., BRANT PUTNAM, M.D., DENNIS Y. KIM, M.D.

- 386 hasta, Radyografi ve Toraks BT
- Radyografisi normal olan hastaların %37'sinde Toraks BT ile ek patoloji saptanmış
  - Pnömotoraks, hemotoraks, hemoperikardiyum

- American Journal of Emergency Medicine 2017;35(4):623-627

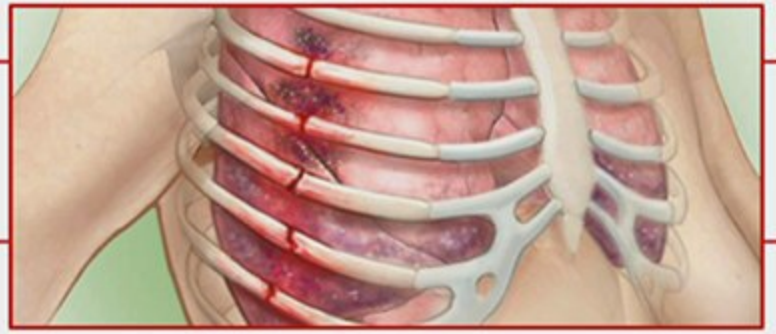
Utility of chest CT after a chest X-ray in patients presenting to the ED with non-traumatic thoracic emergencies

Naciye Sinem Gezer [a,*], Pınar Balcı [a], Kemal Çağlar Tuna [a], Işıl Başara Akın [a], Mustafa Mahmut Barış [a], Neşe Çolak Oray [b]

[a] Department of Radiology, Faculty of Medicine, Dokuz Eylul University, Izmir, Turkey
[b] Department of Emergency Medicine, Faculty of Medicine, Dokuz Eylul University, Izmir, Turkey

- 500 hasta, Radyografi ve Toraks BT
- %53.4'ünde ek patoloji saptandı
- %35.4'ünde hasta yönetimi değişti
- BT'de pnömoni saptanan 205 hastanın %55'inin radyografisinde pnömoni atlandı

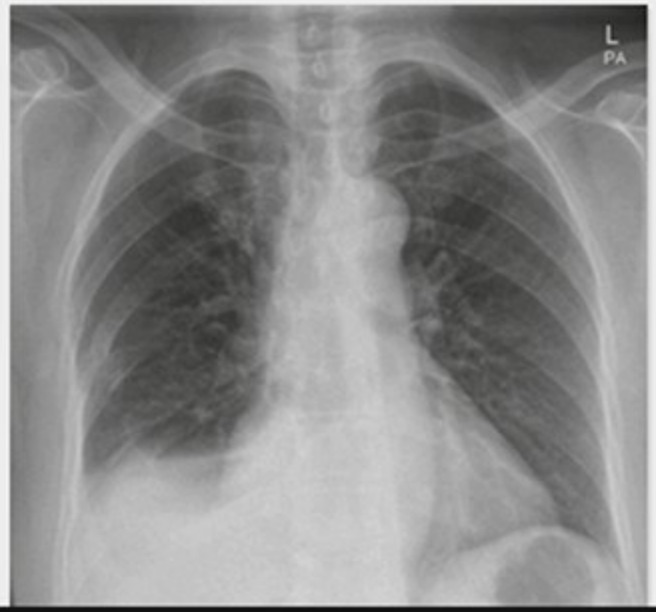
TORAKS TRAVMASI

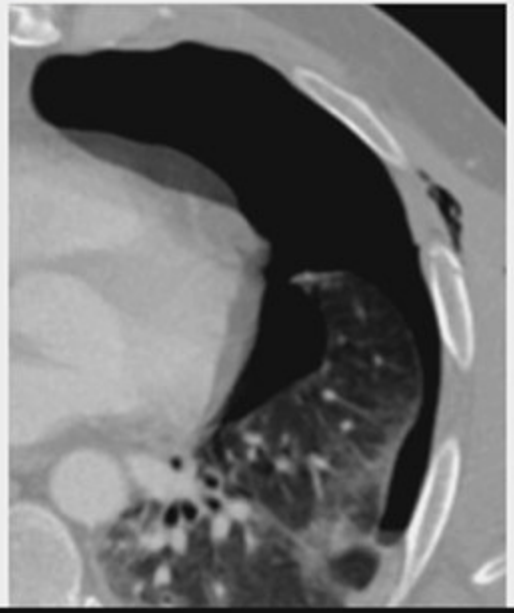


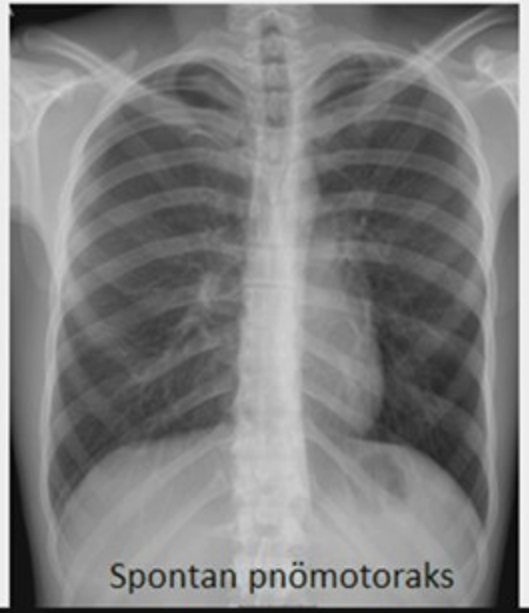
- Tüm travmalar arasında 3. sıklıkta
- Travmaya bağlı ölümlerin 1/4'ü
- %74-78 künt travma
- %22-26 kesici delici travma

Kot Fraktürü

- Künt toraks travmalarının %10 unda en az bir kot fraktürü
- %16 tek, %84 multiple
- En sık 4.-9. kotlar, posterolateral kesim
- Direk grafi ile %60'ı gözden kaçıyor!







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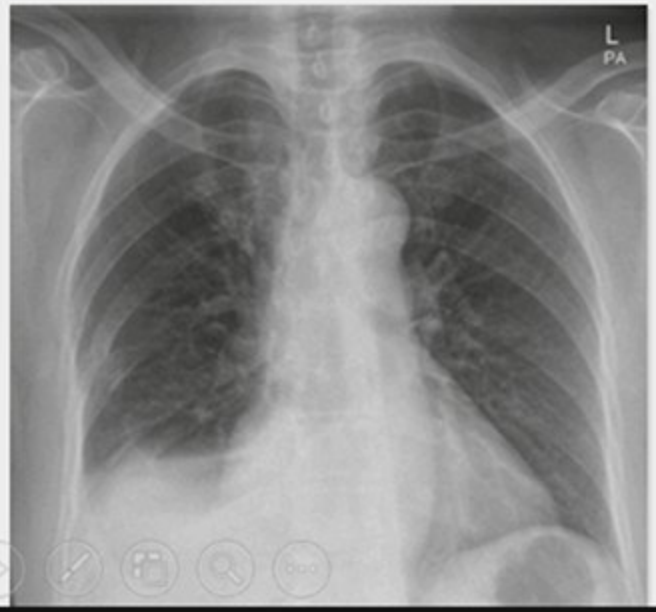

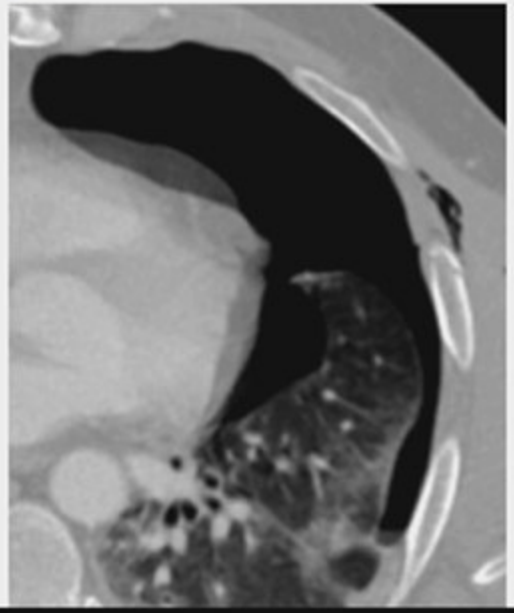

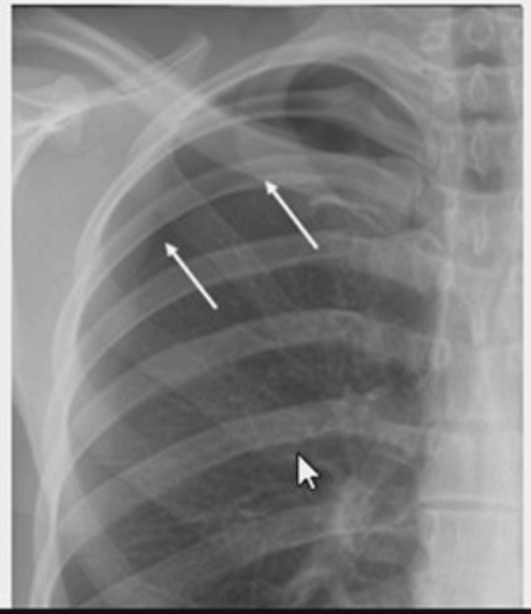

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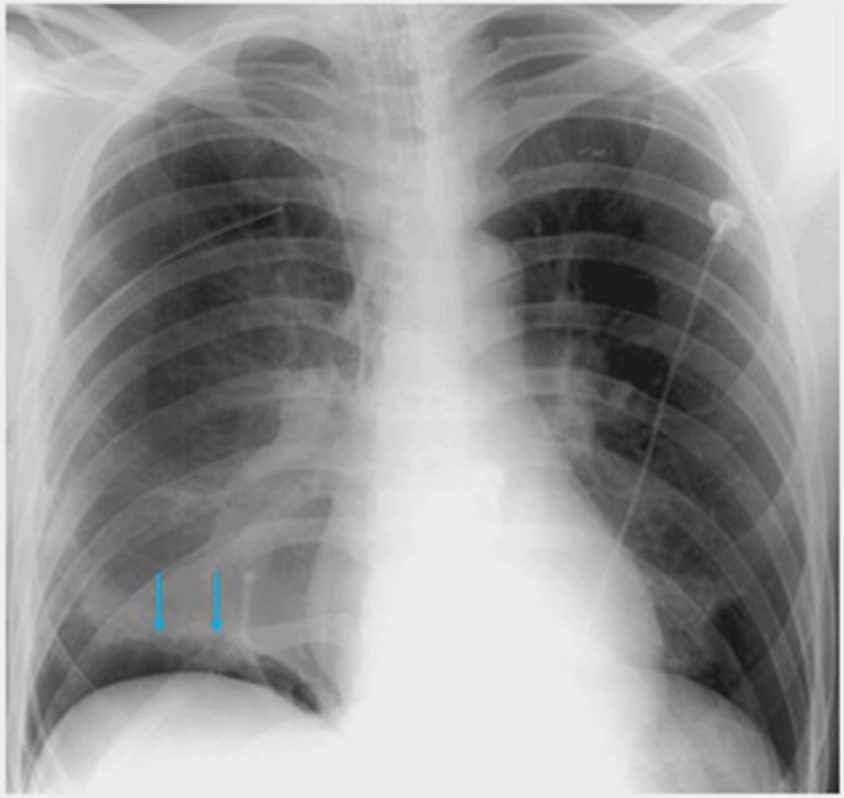

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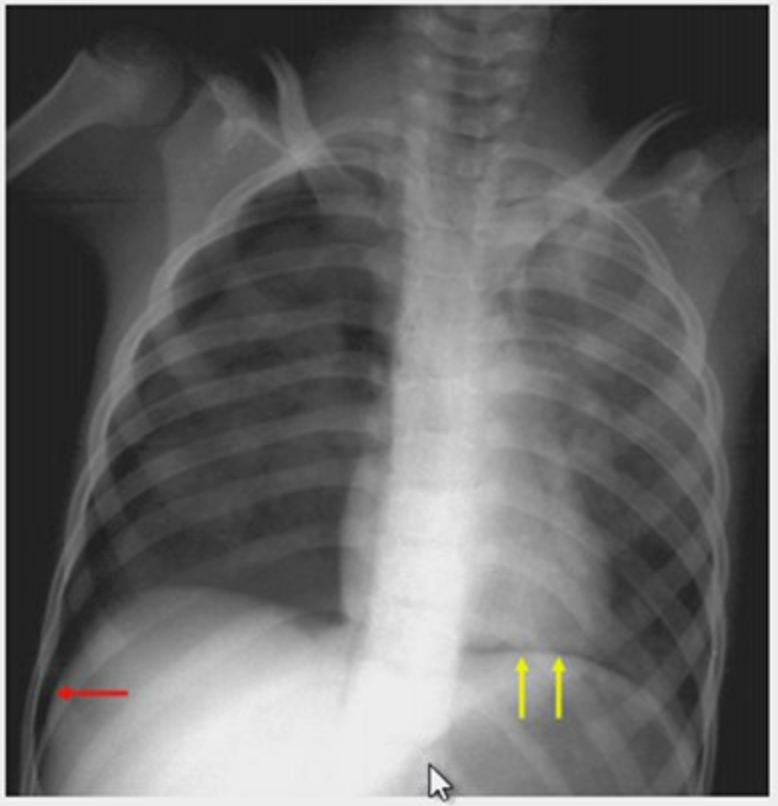

Derin sulkus işareti - Devam eden diyafram işareti

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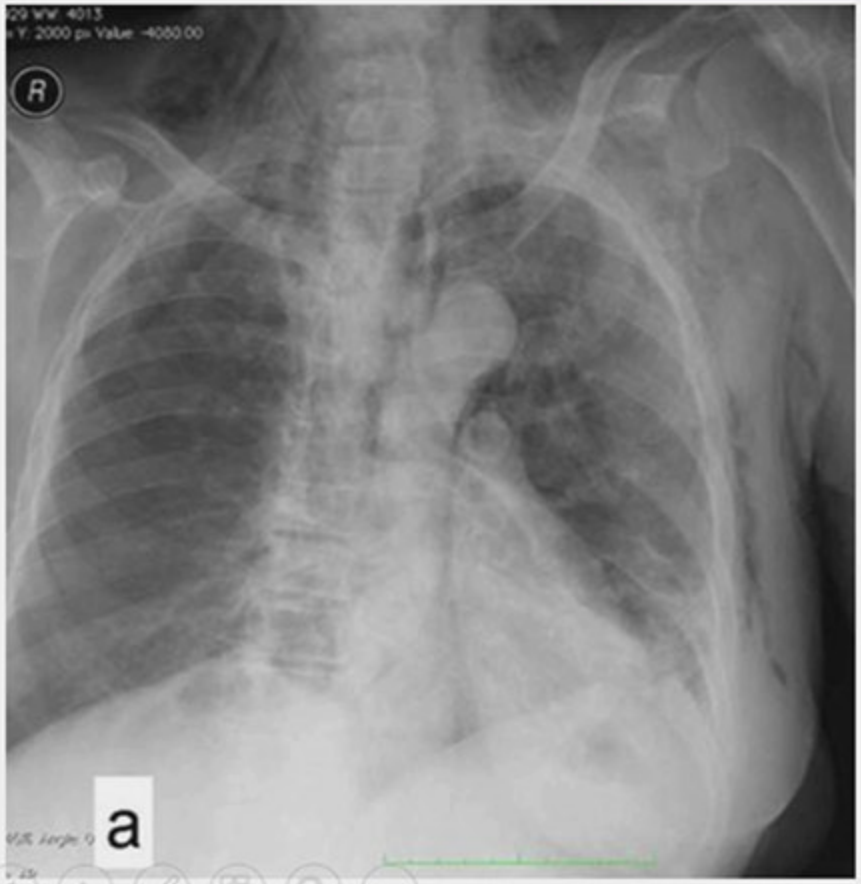

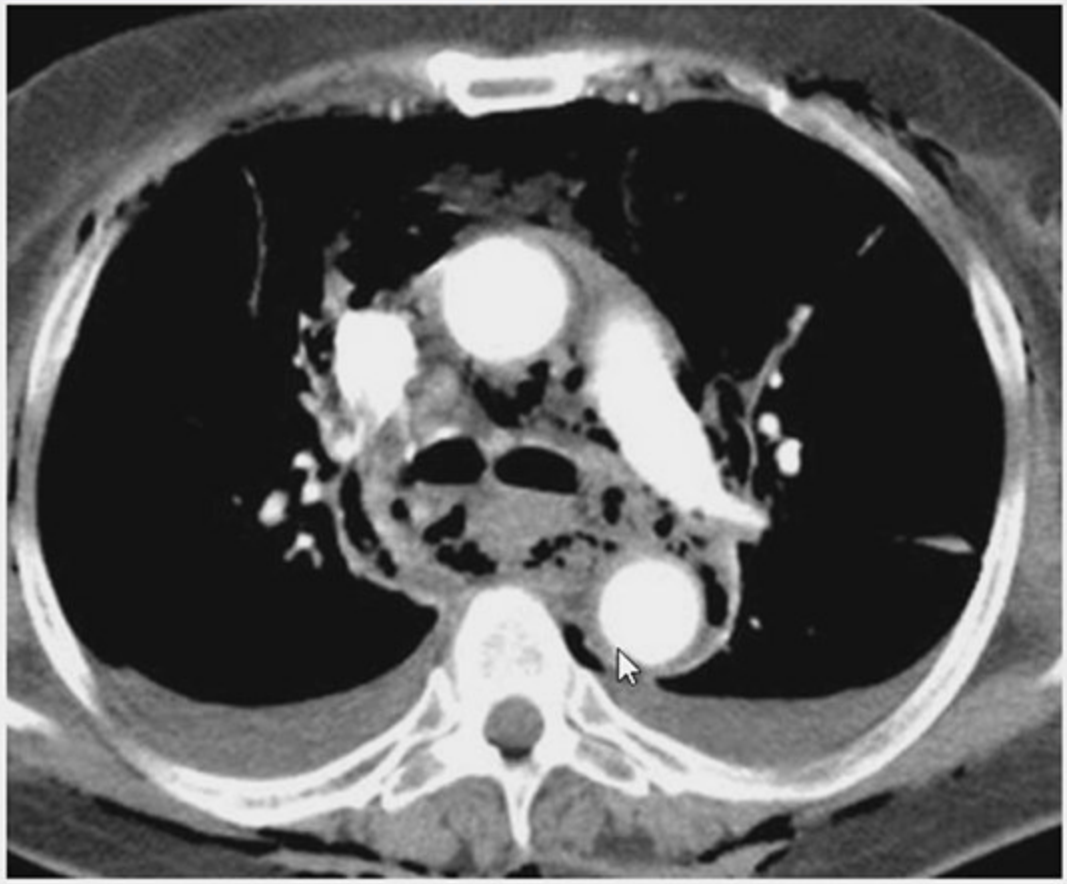

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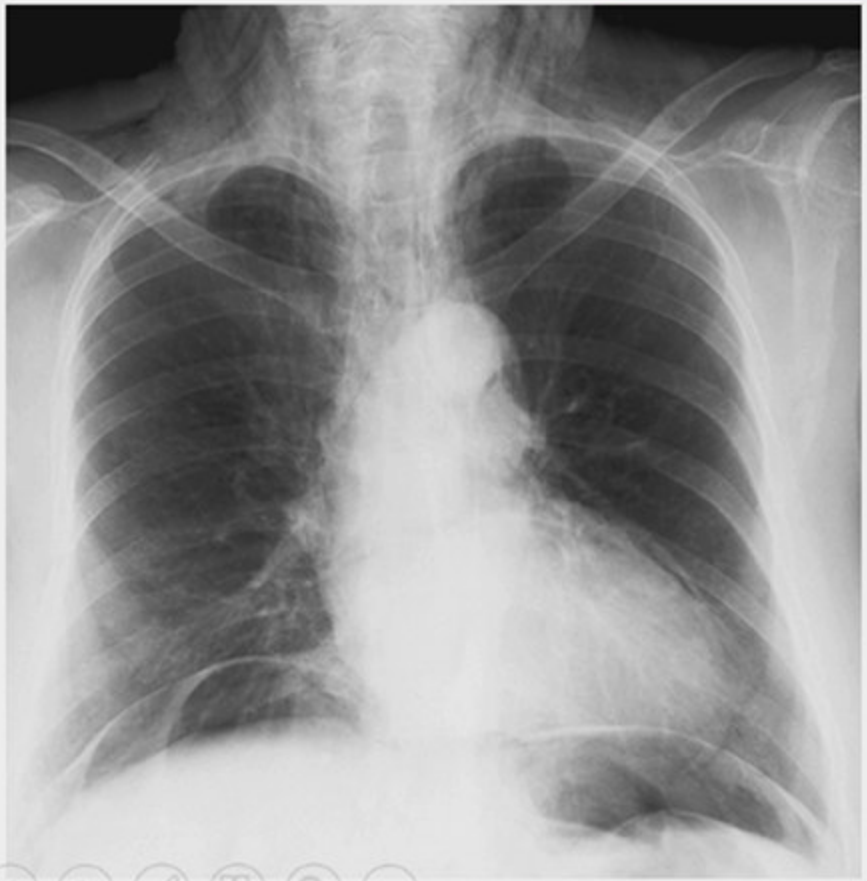

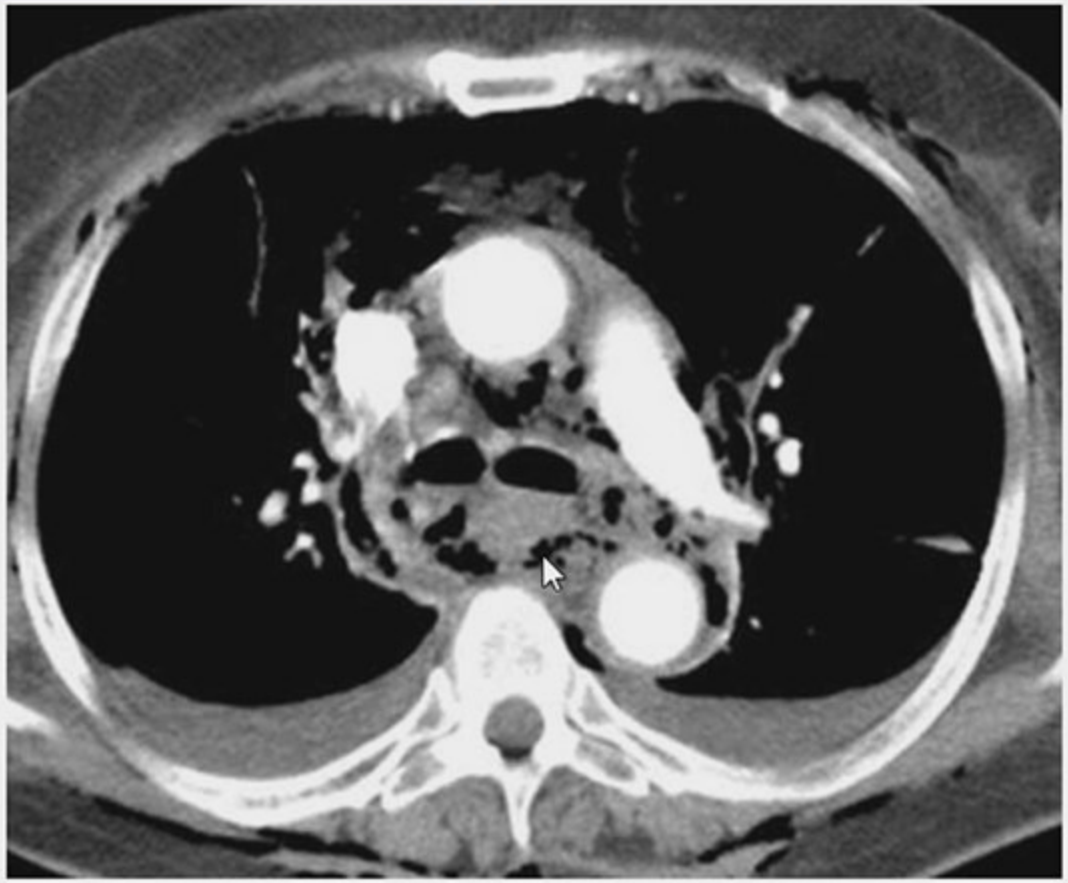

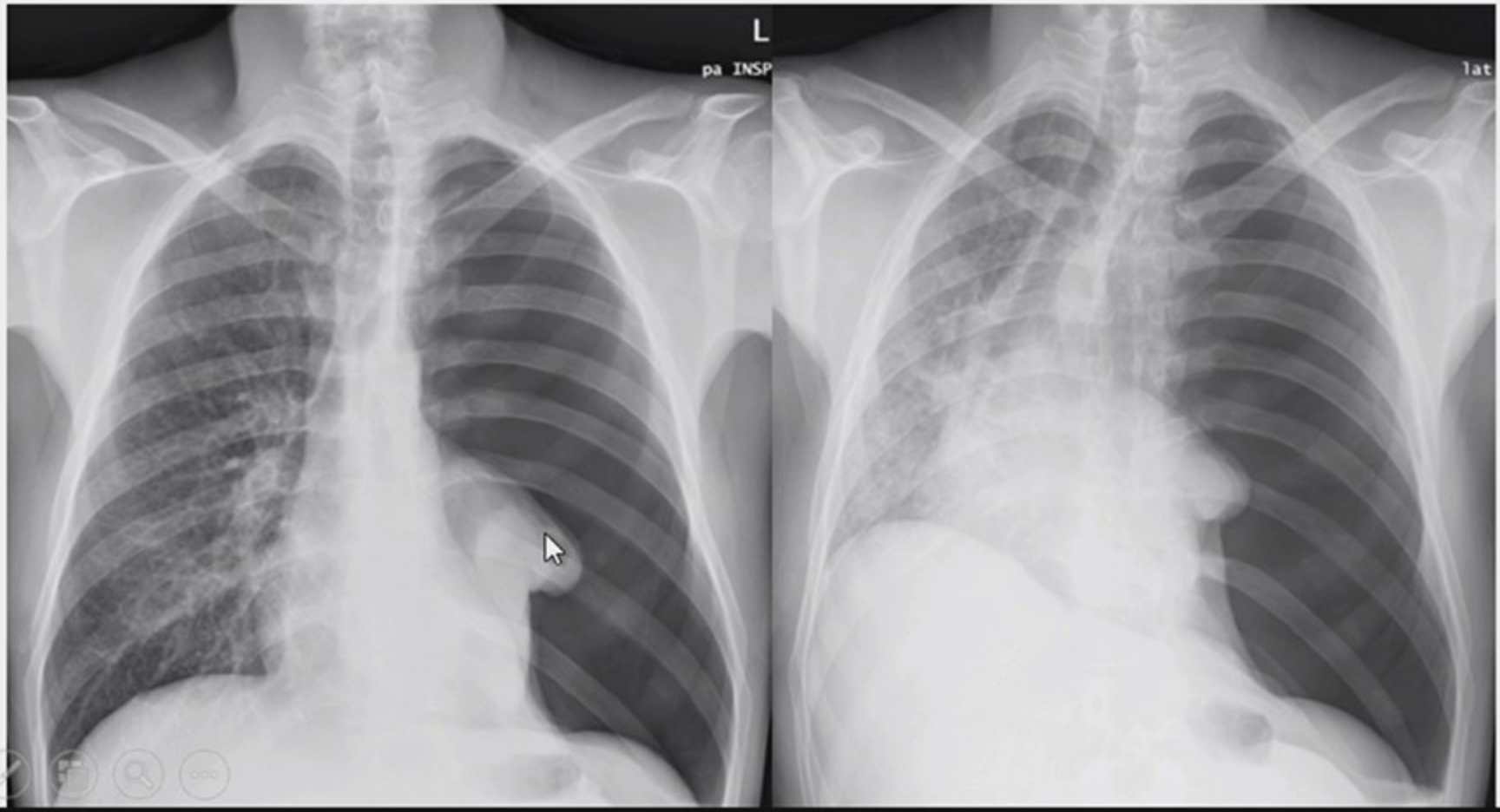
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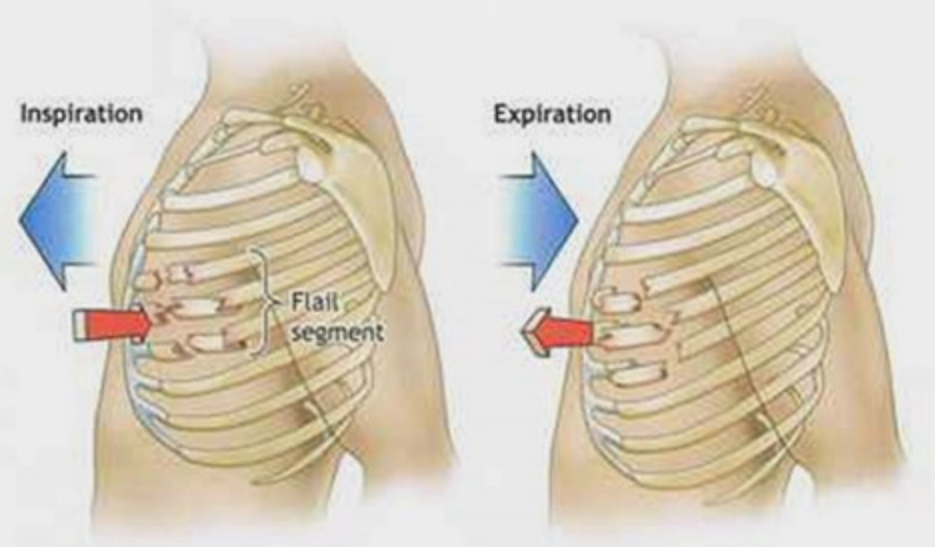
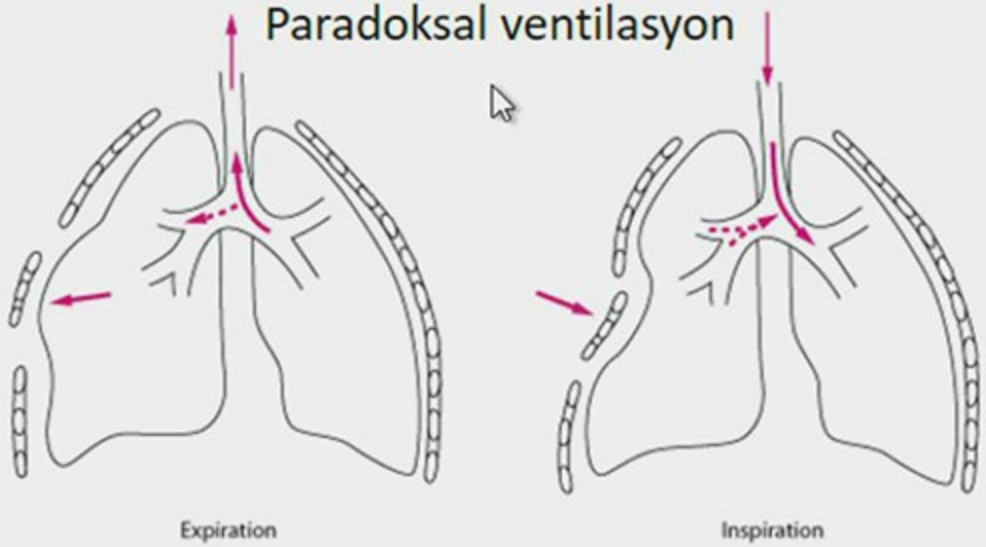
Yelken Göğüs





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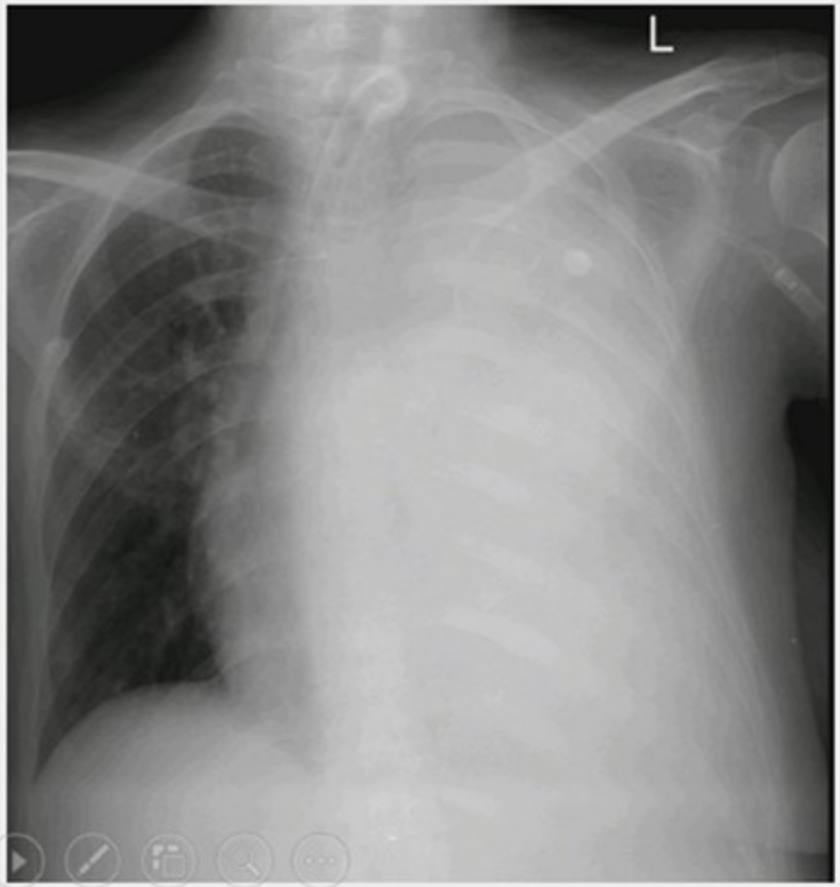

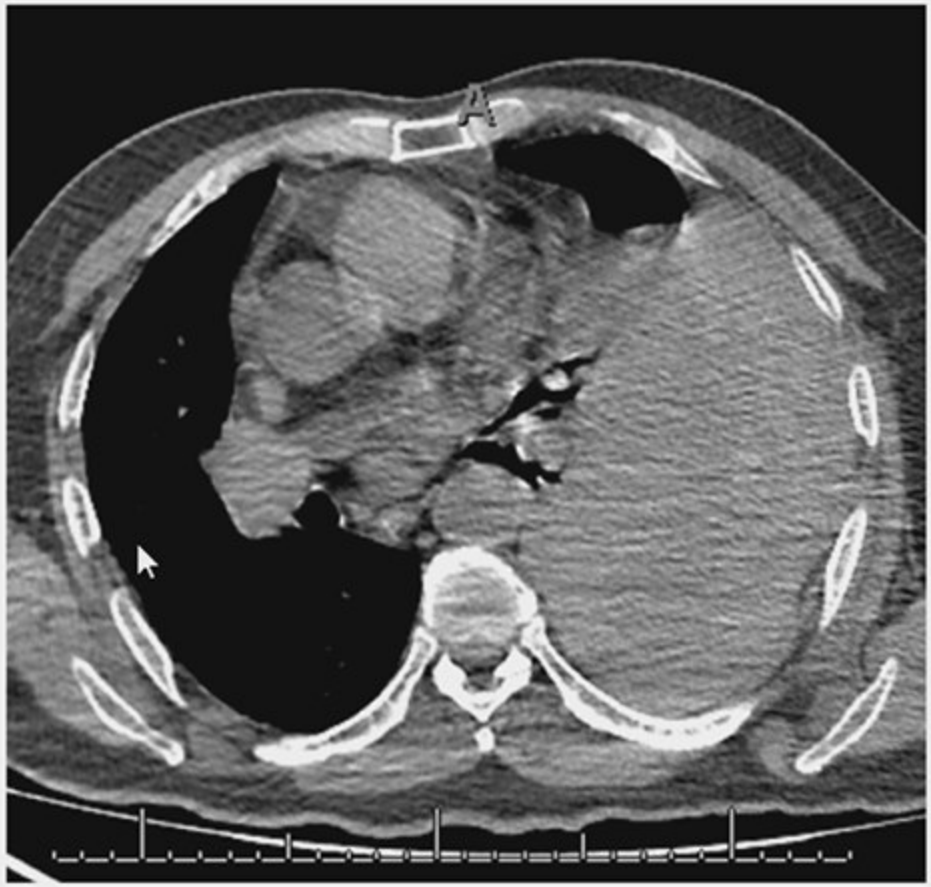

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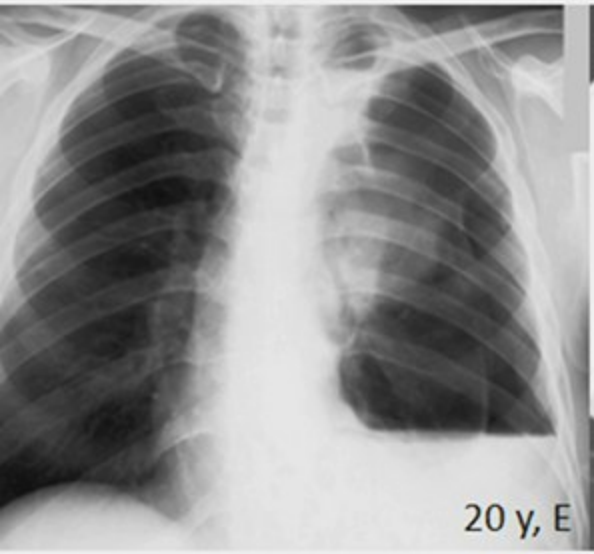

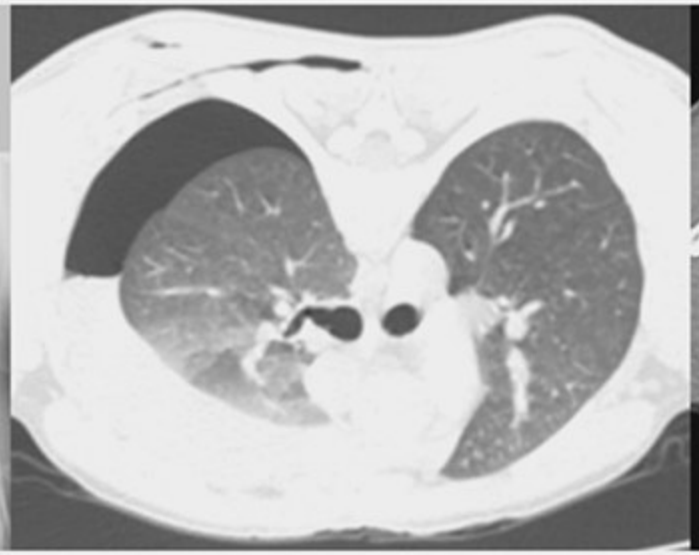

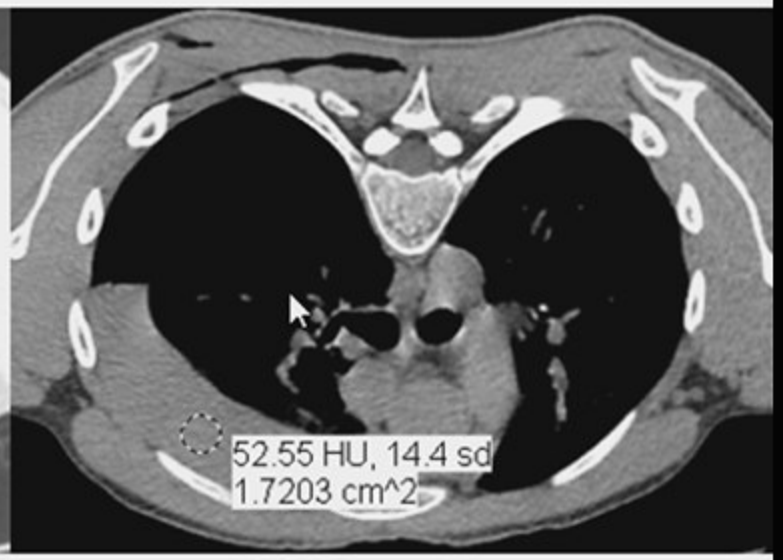

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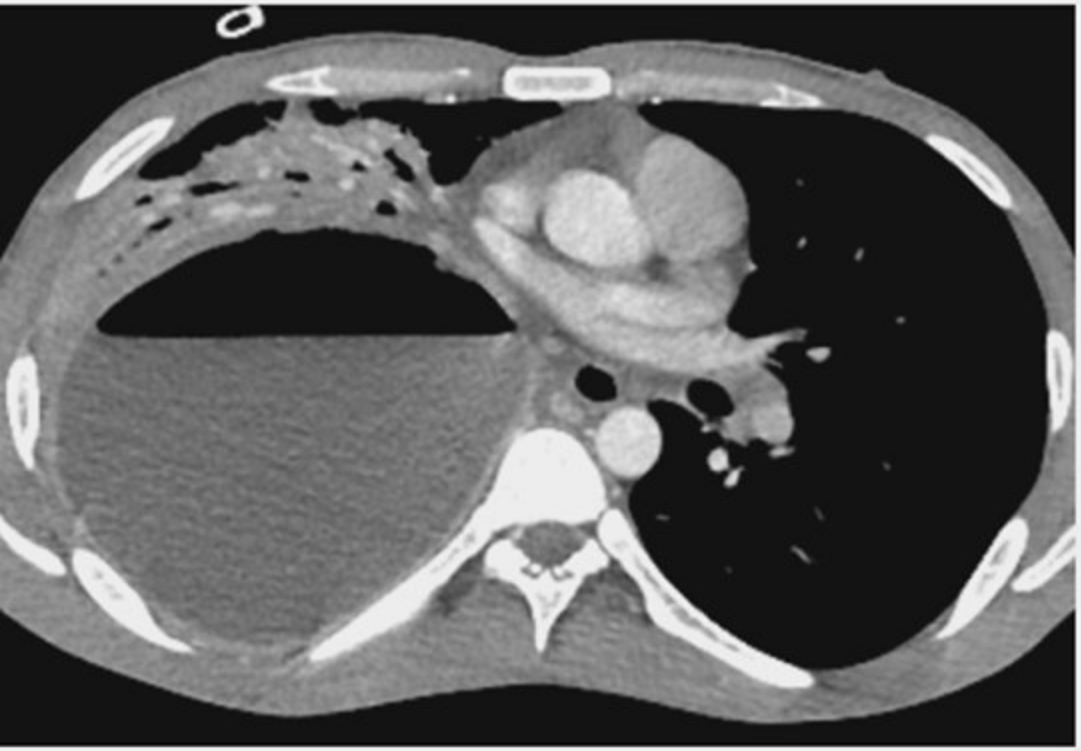

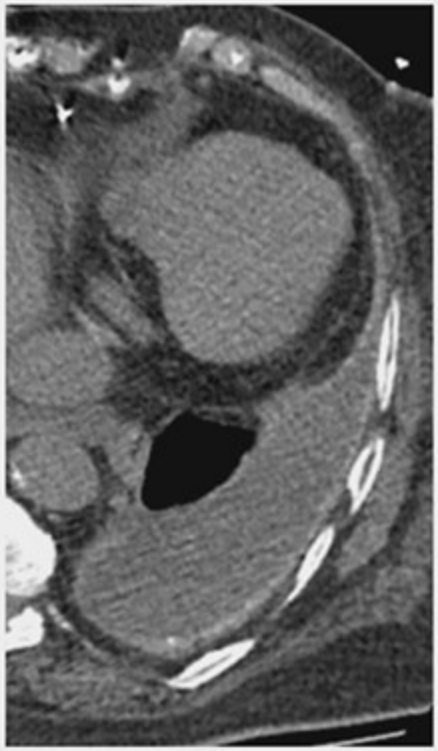

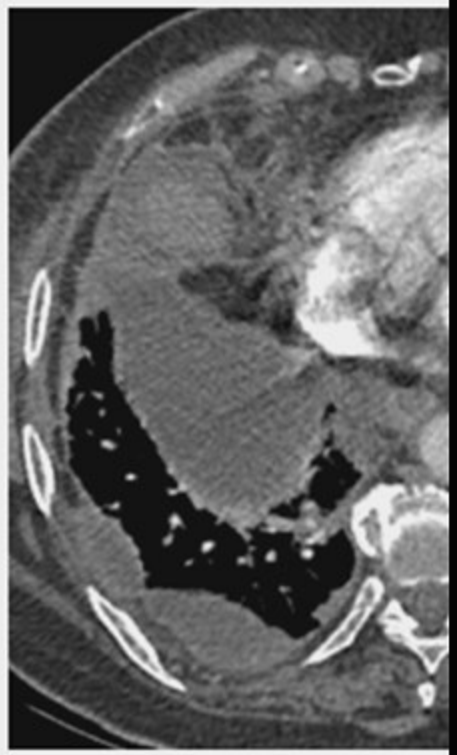

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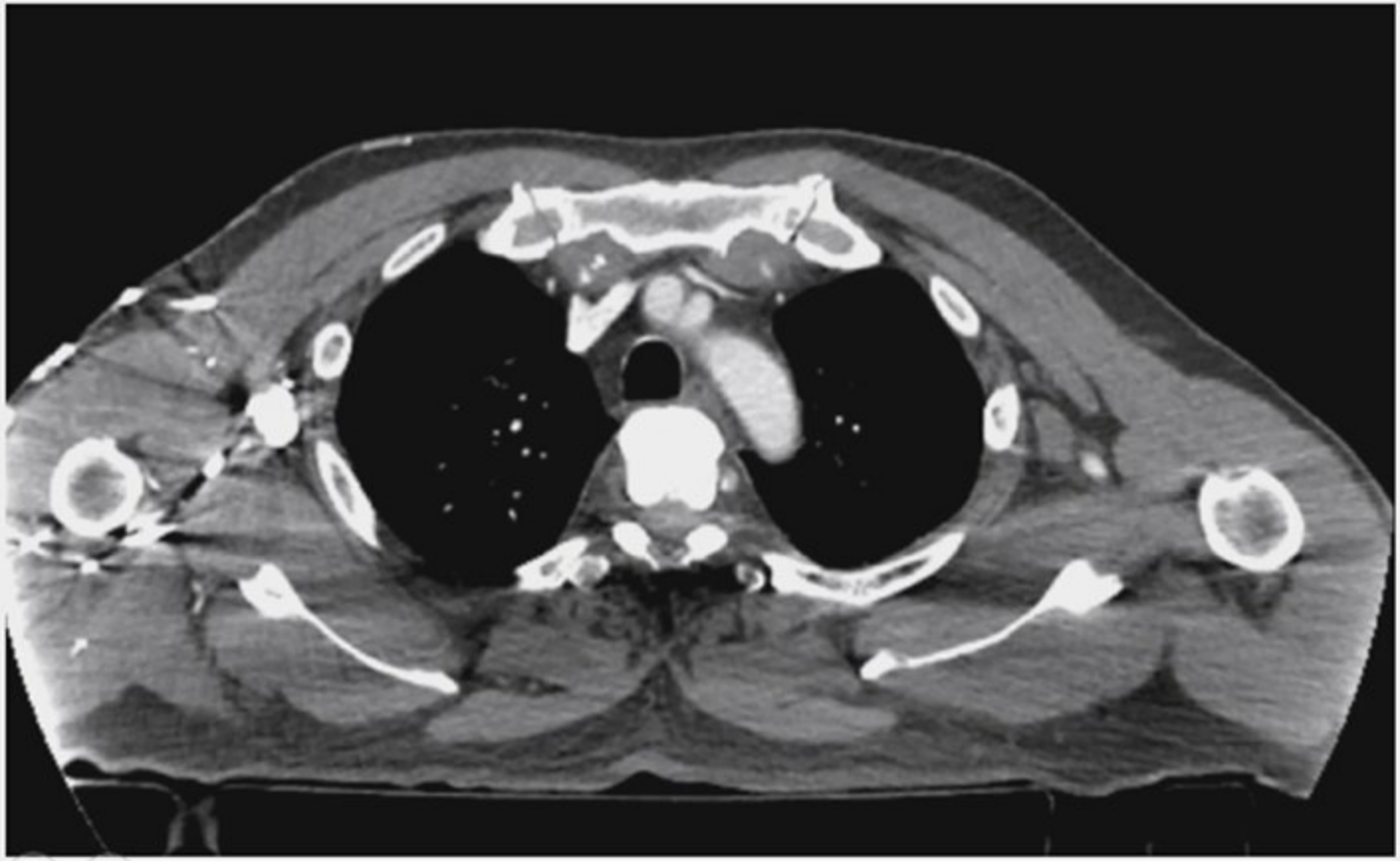

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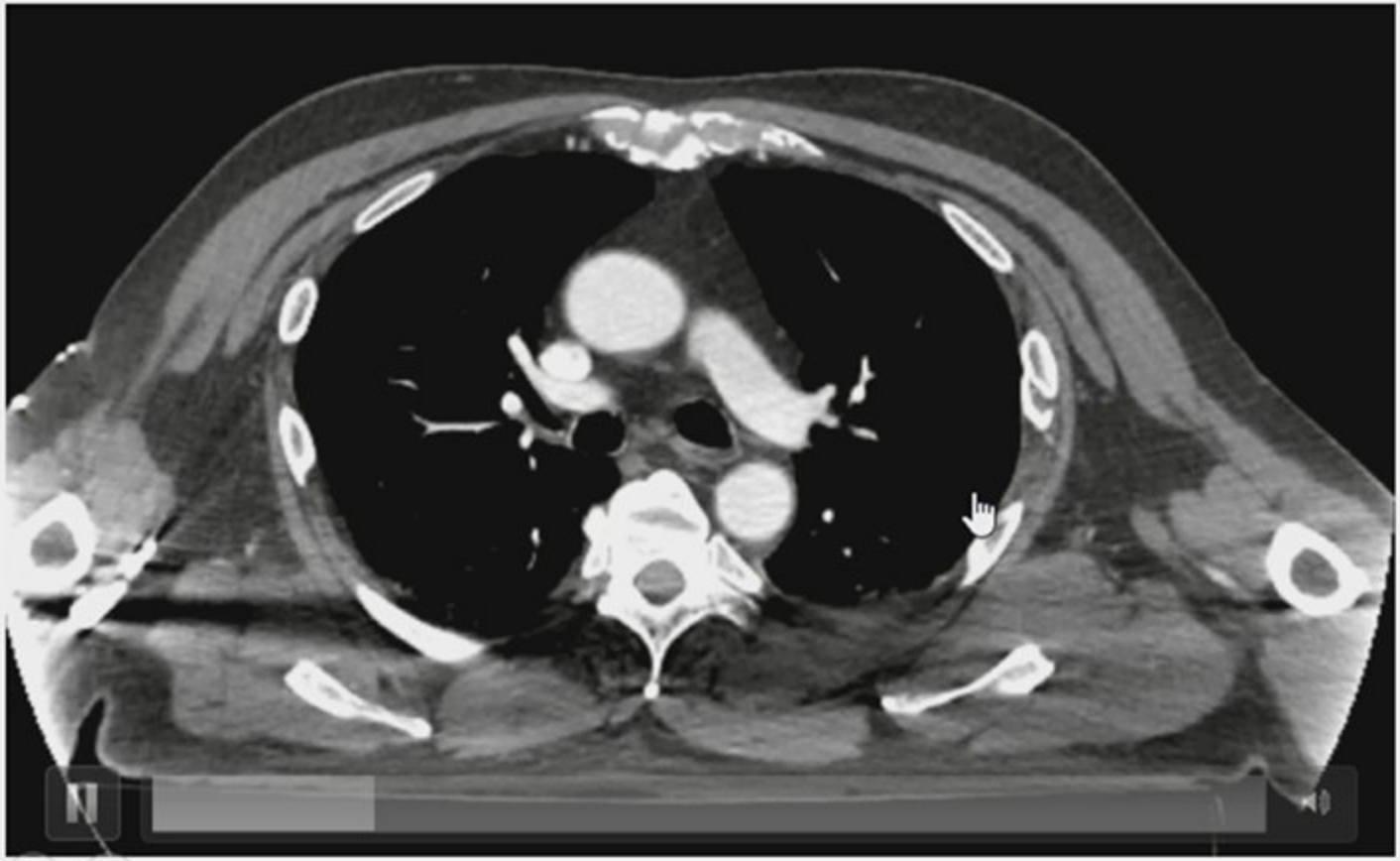

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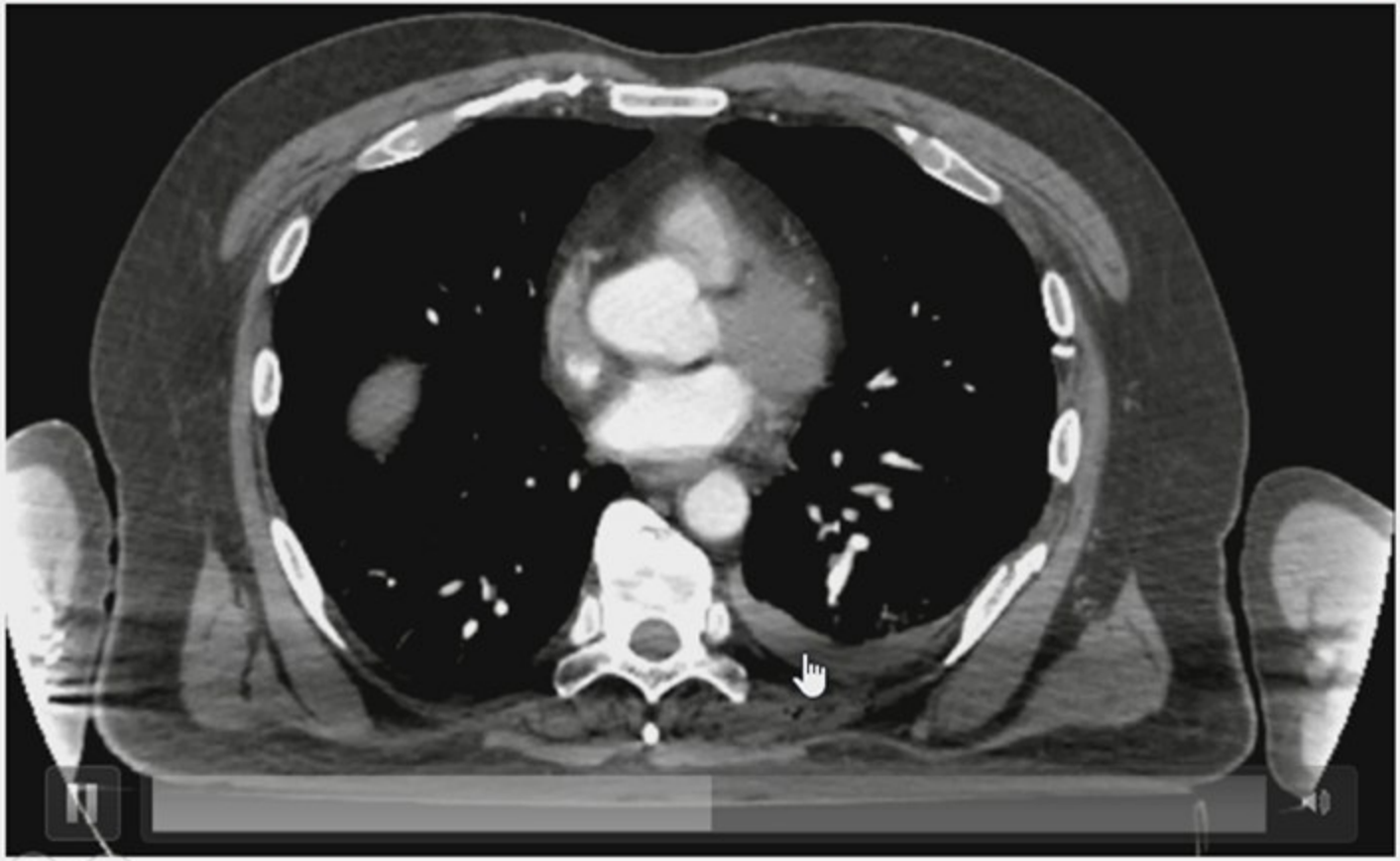

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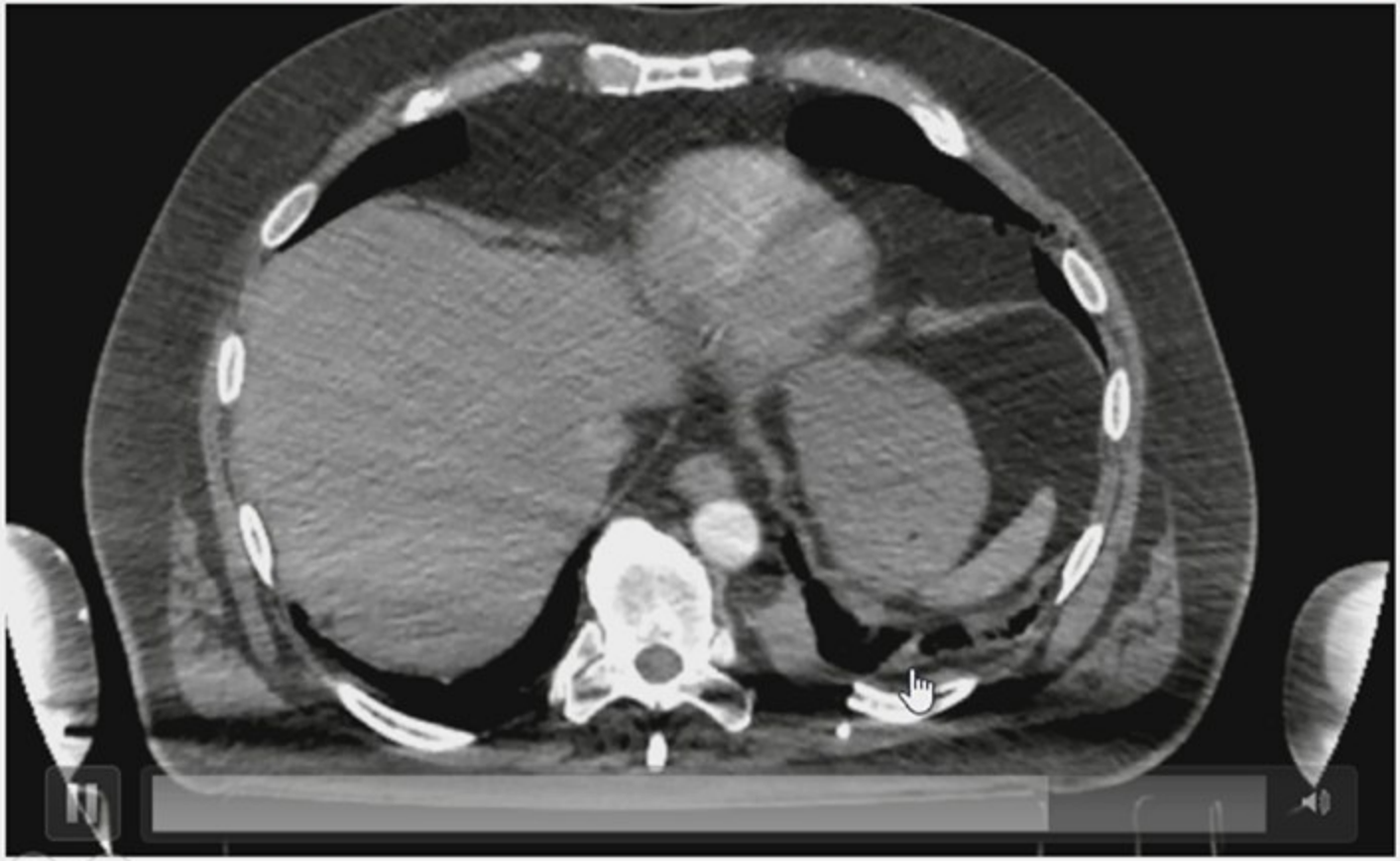

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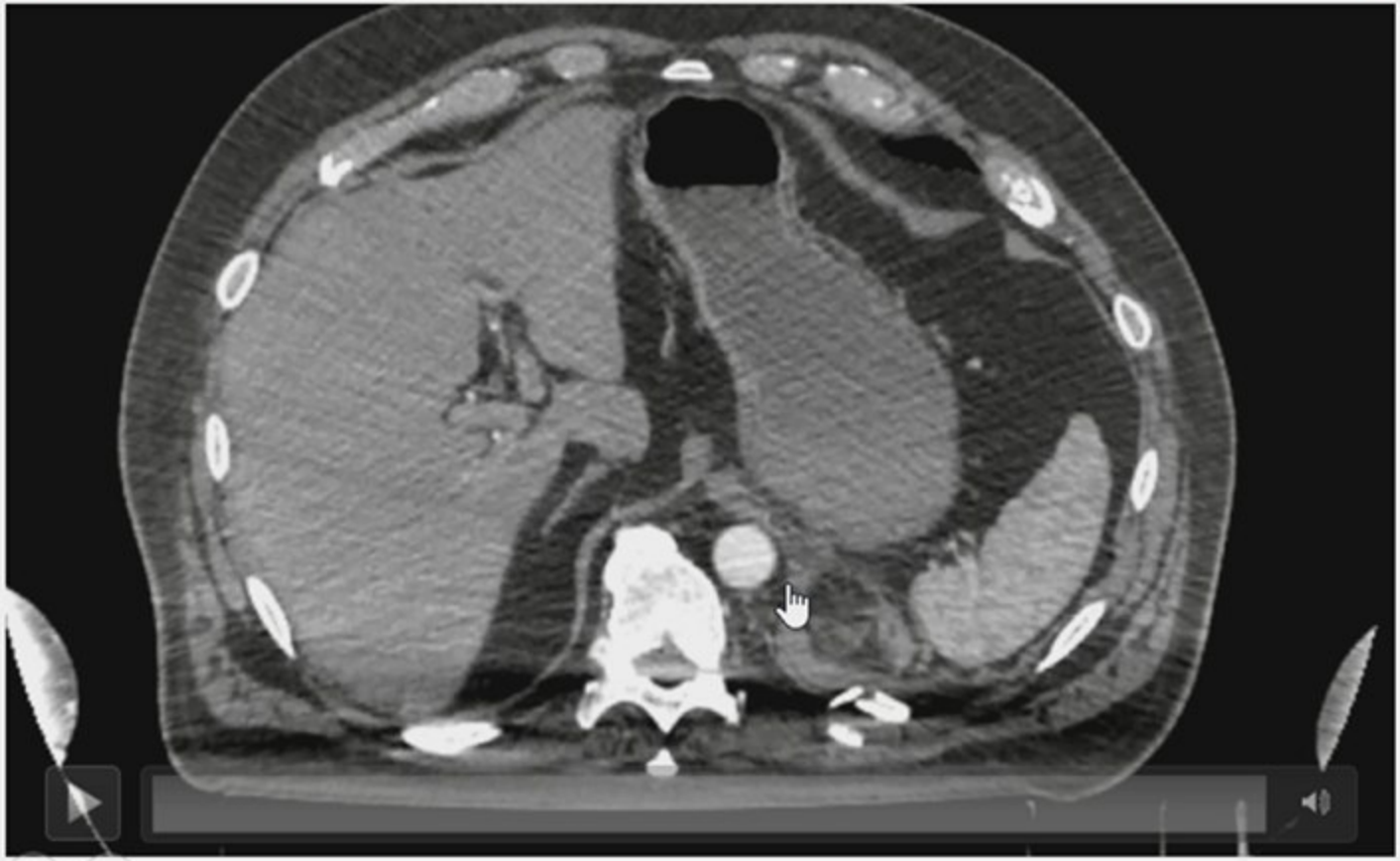

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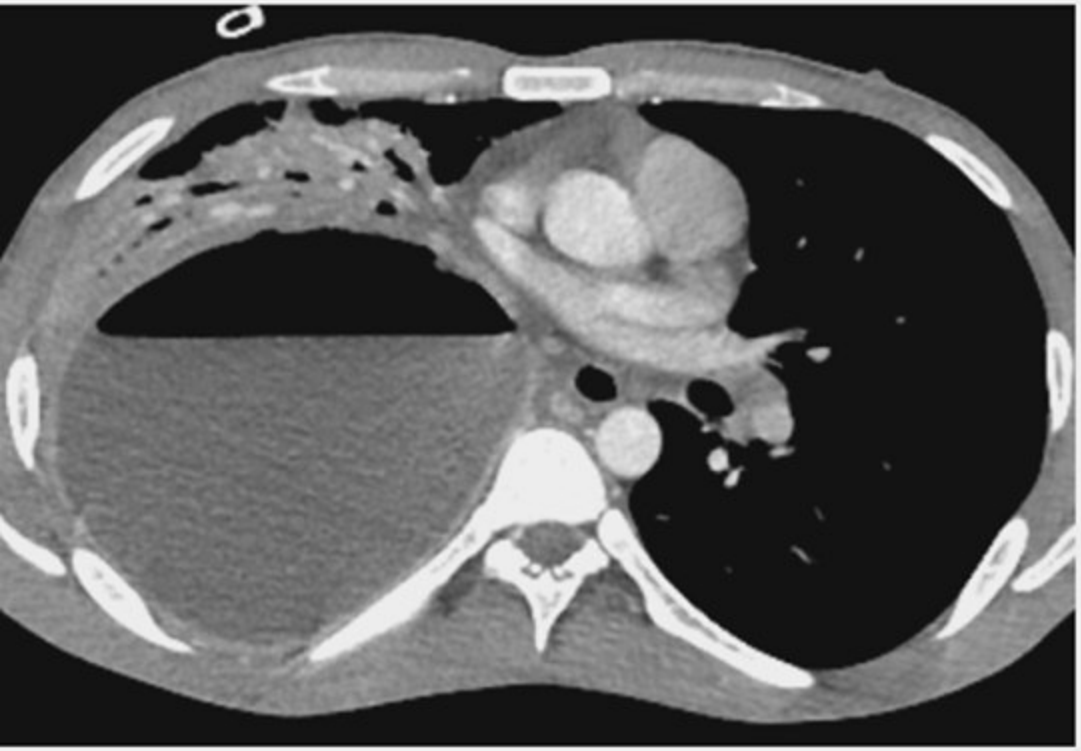

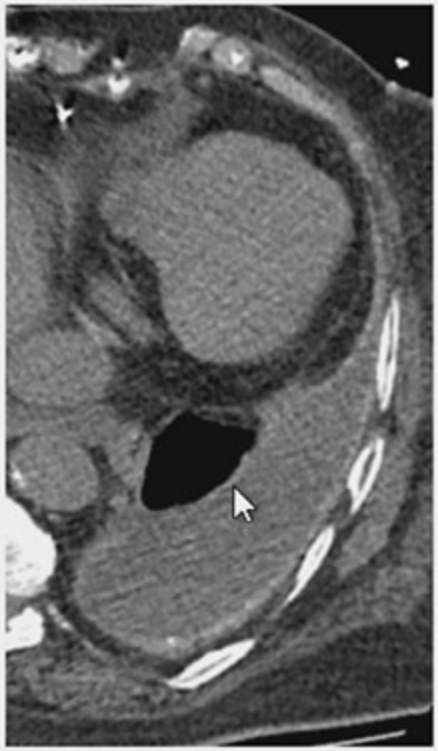

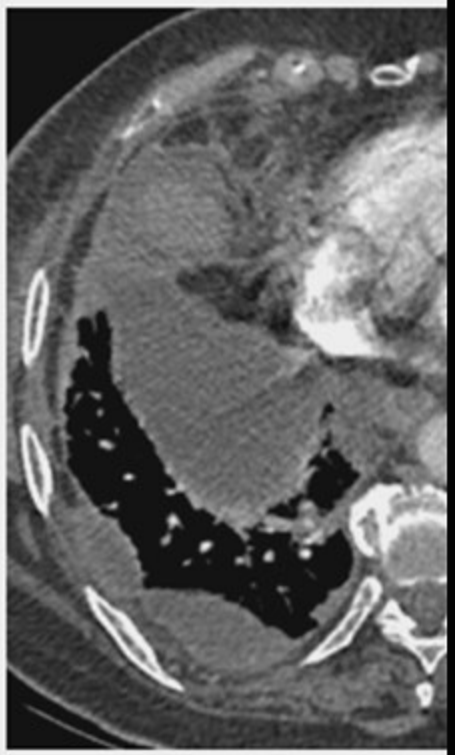

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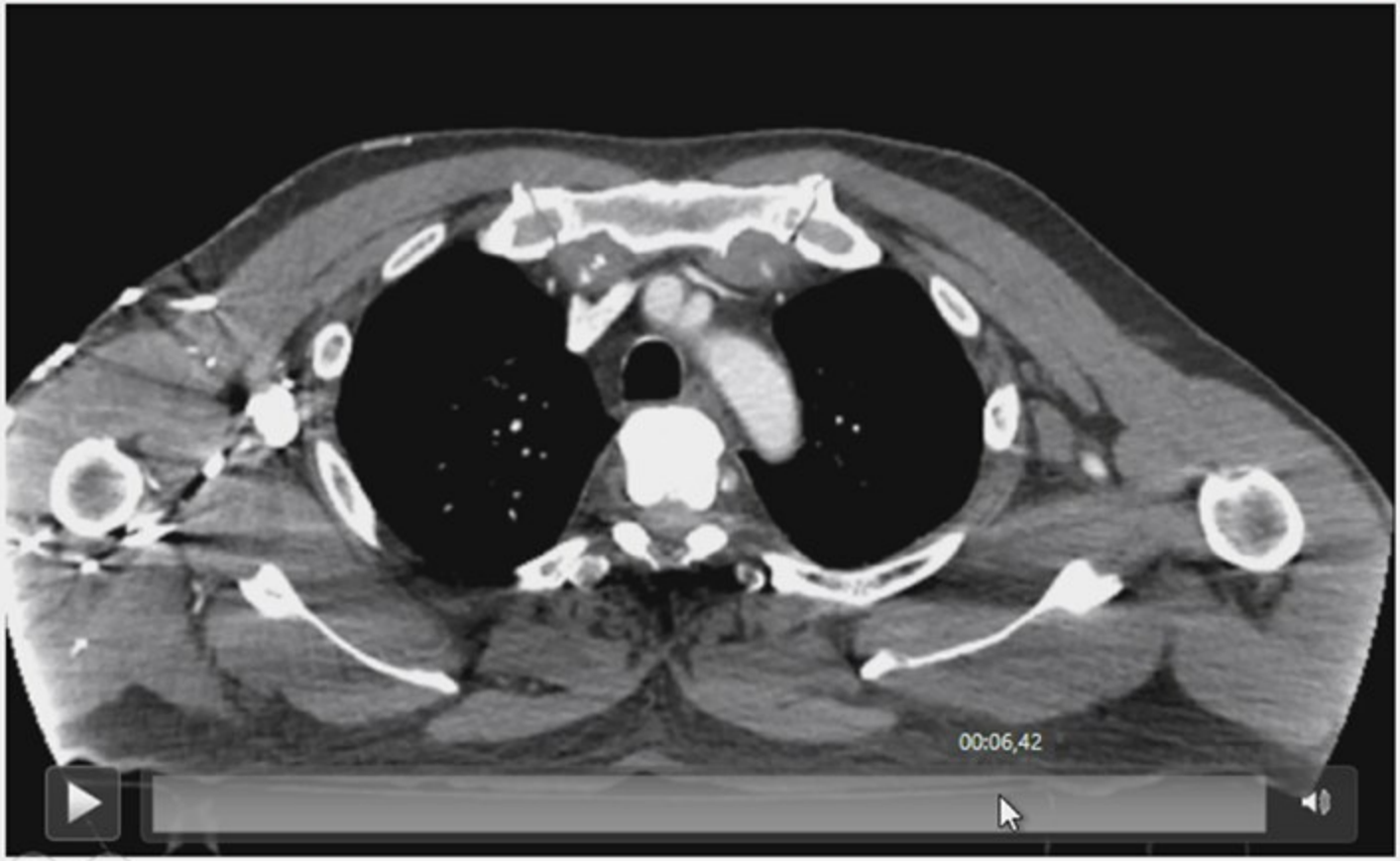

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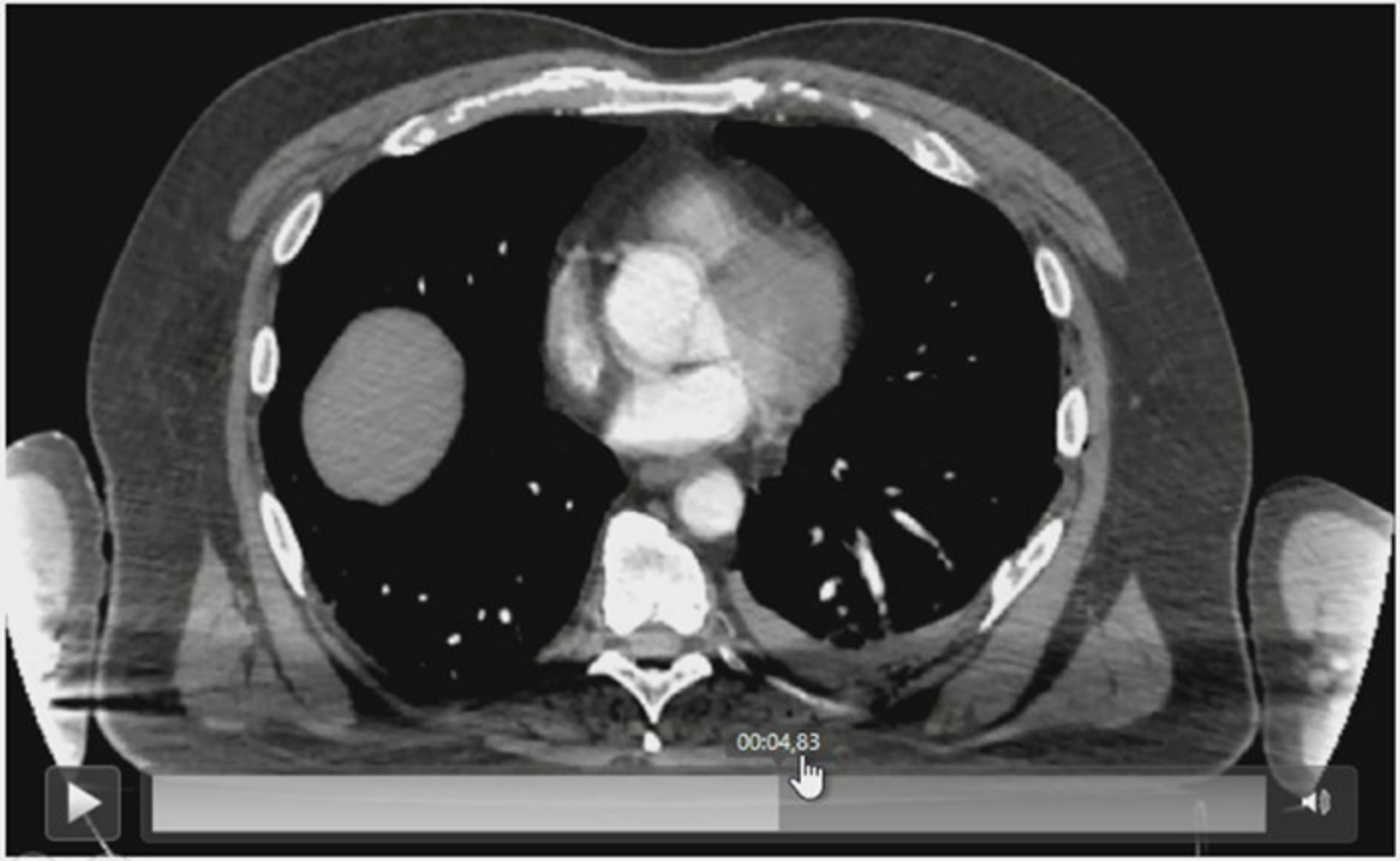

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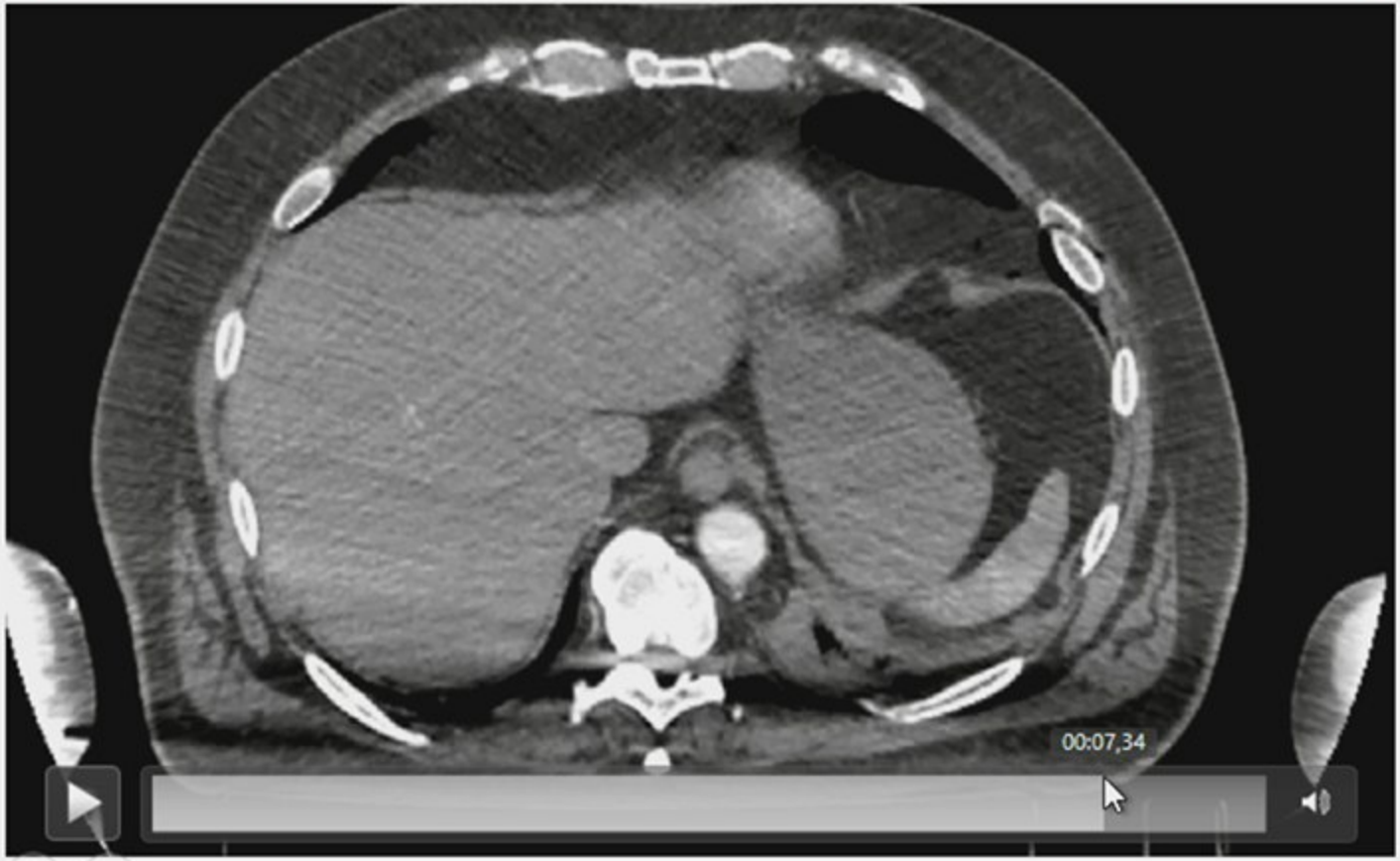

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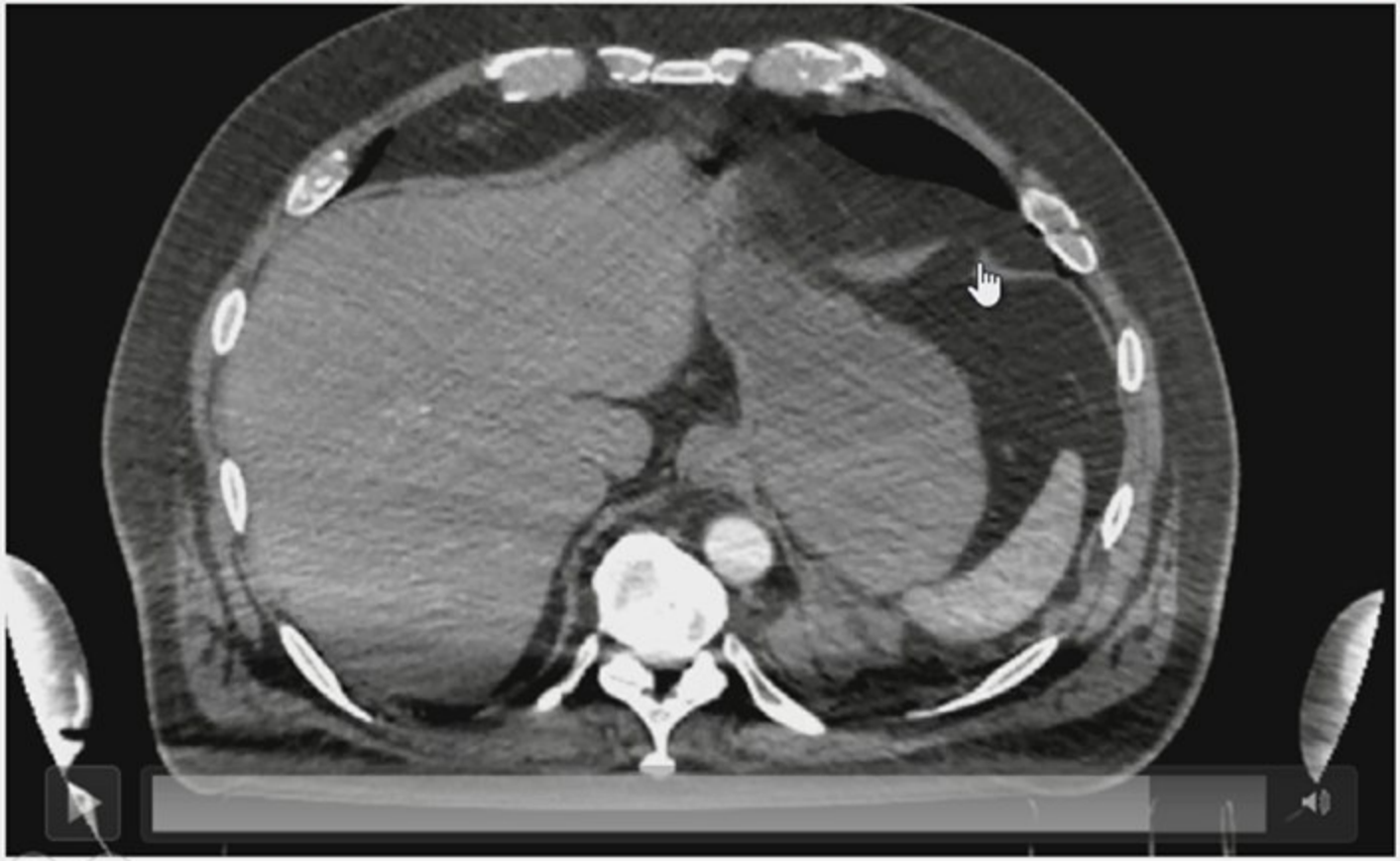

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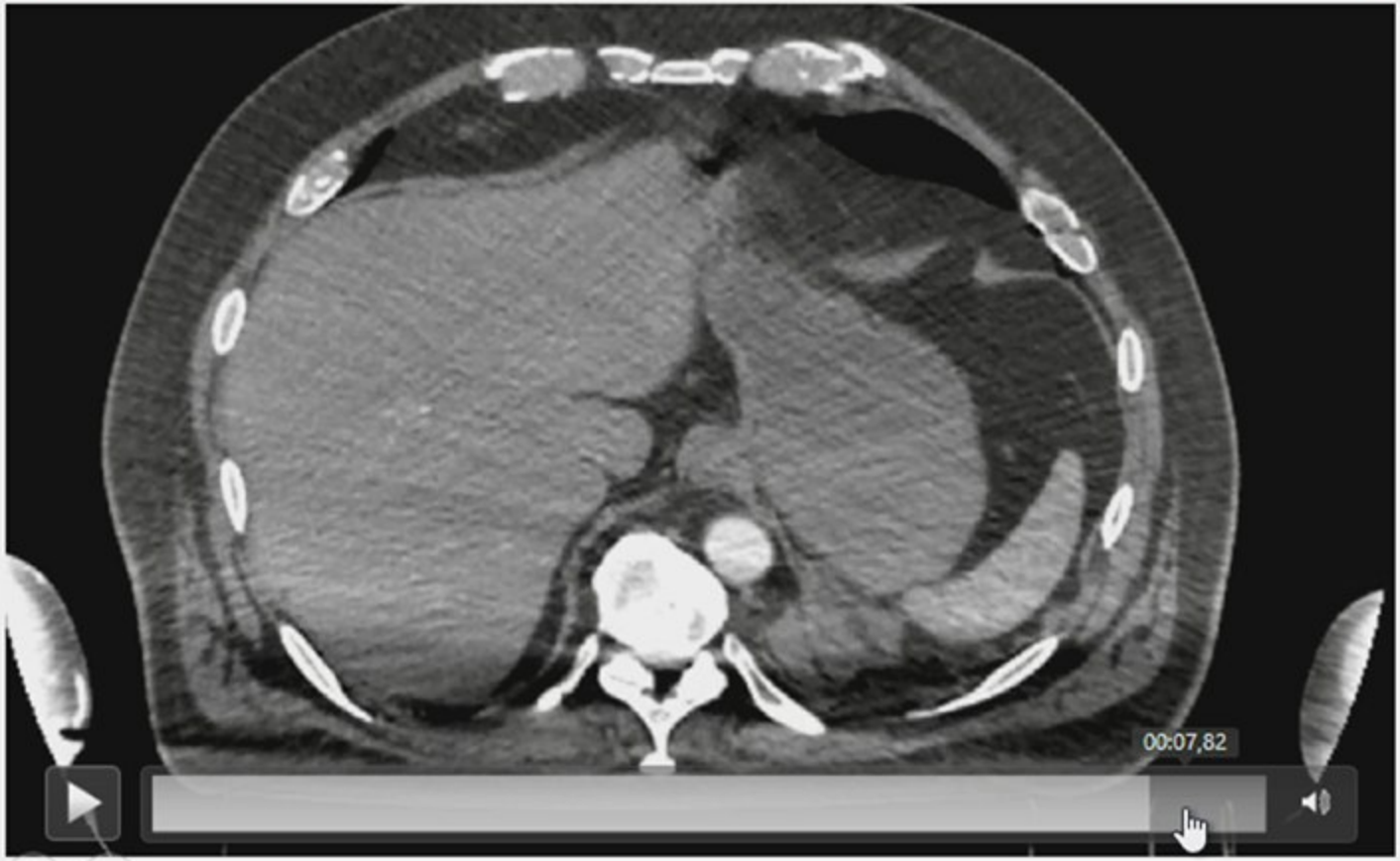

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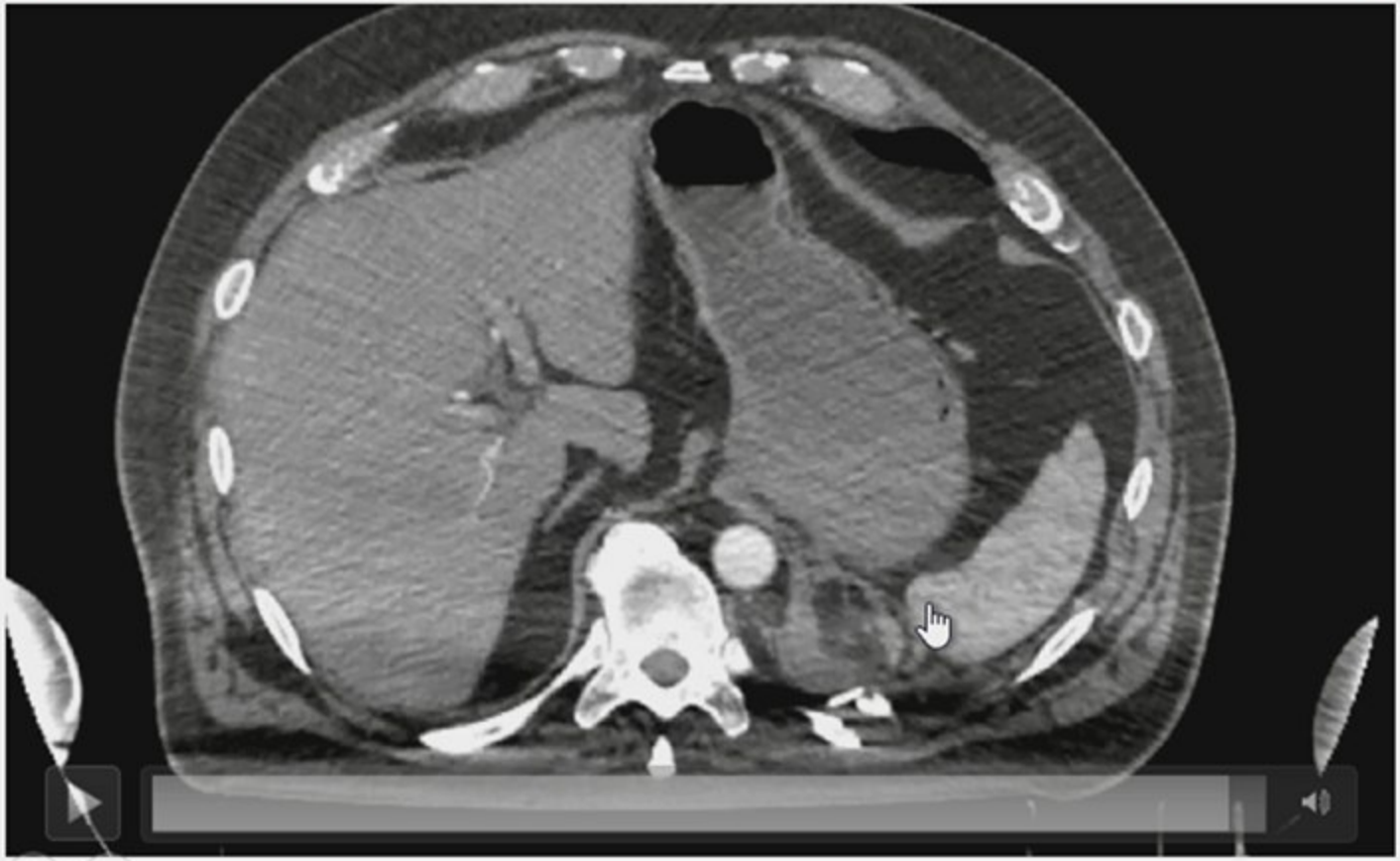
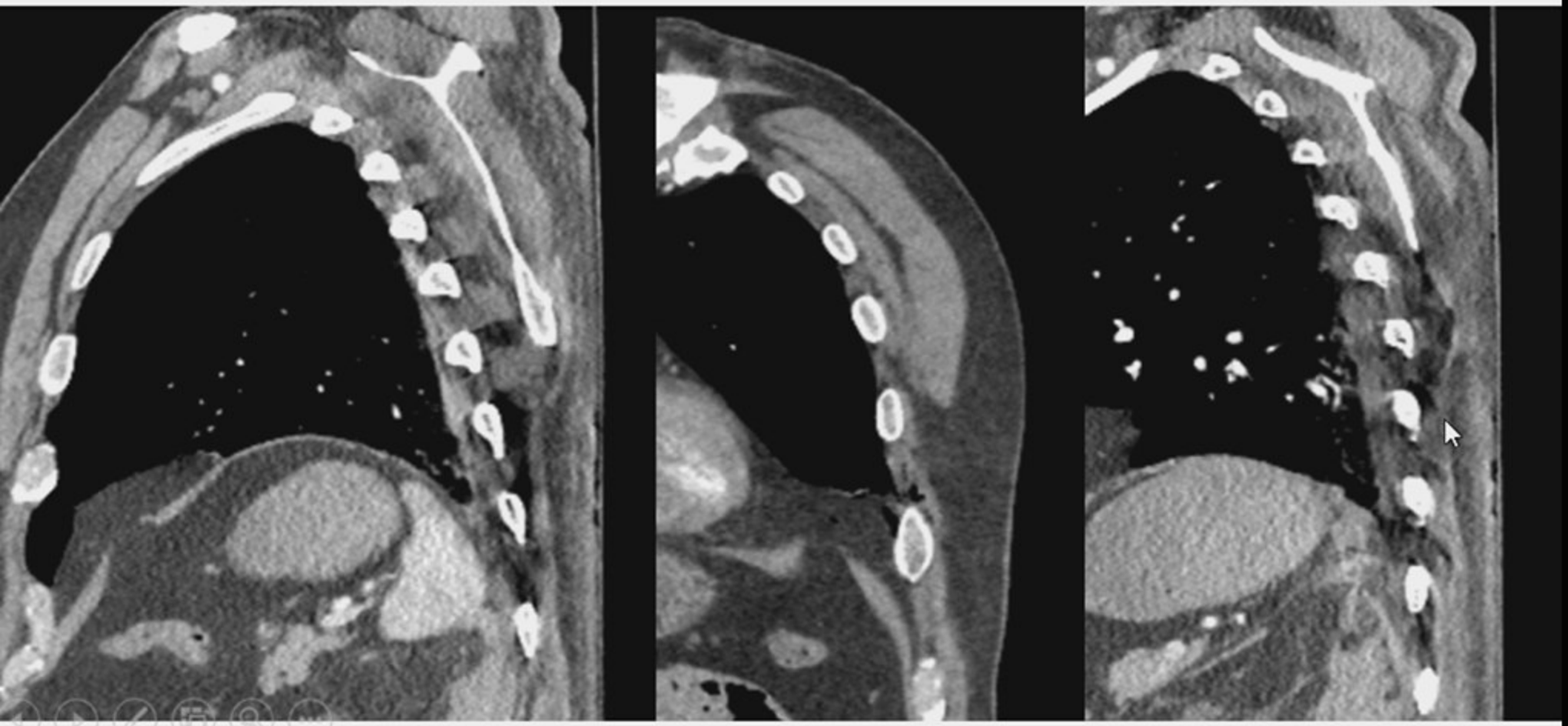


Sagittal görüntüler



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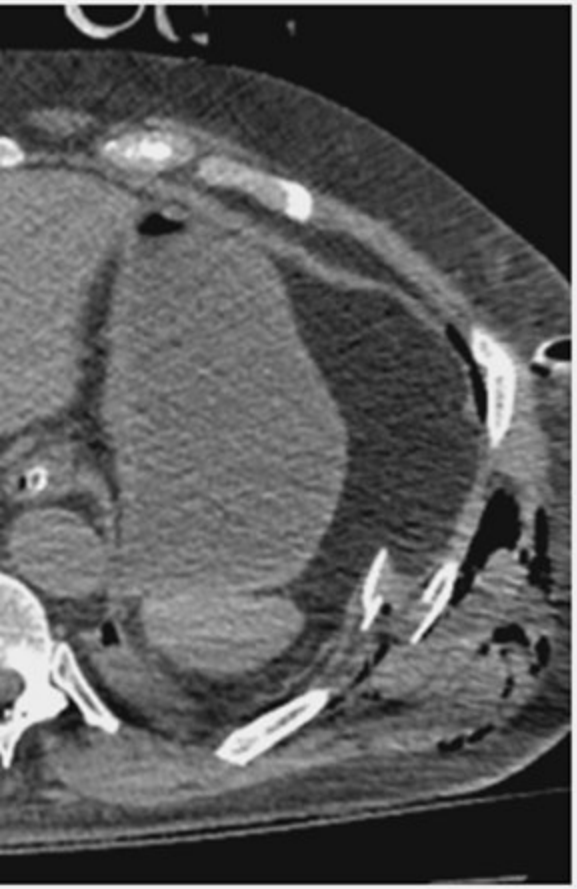

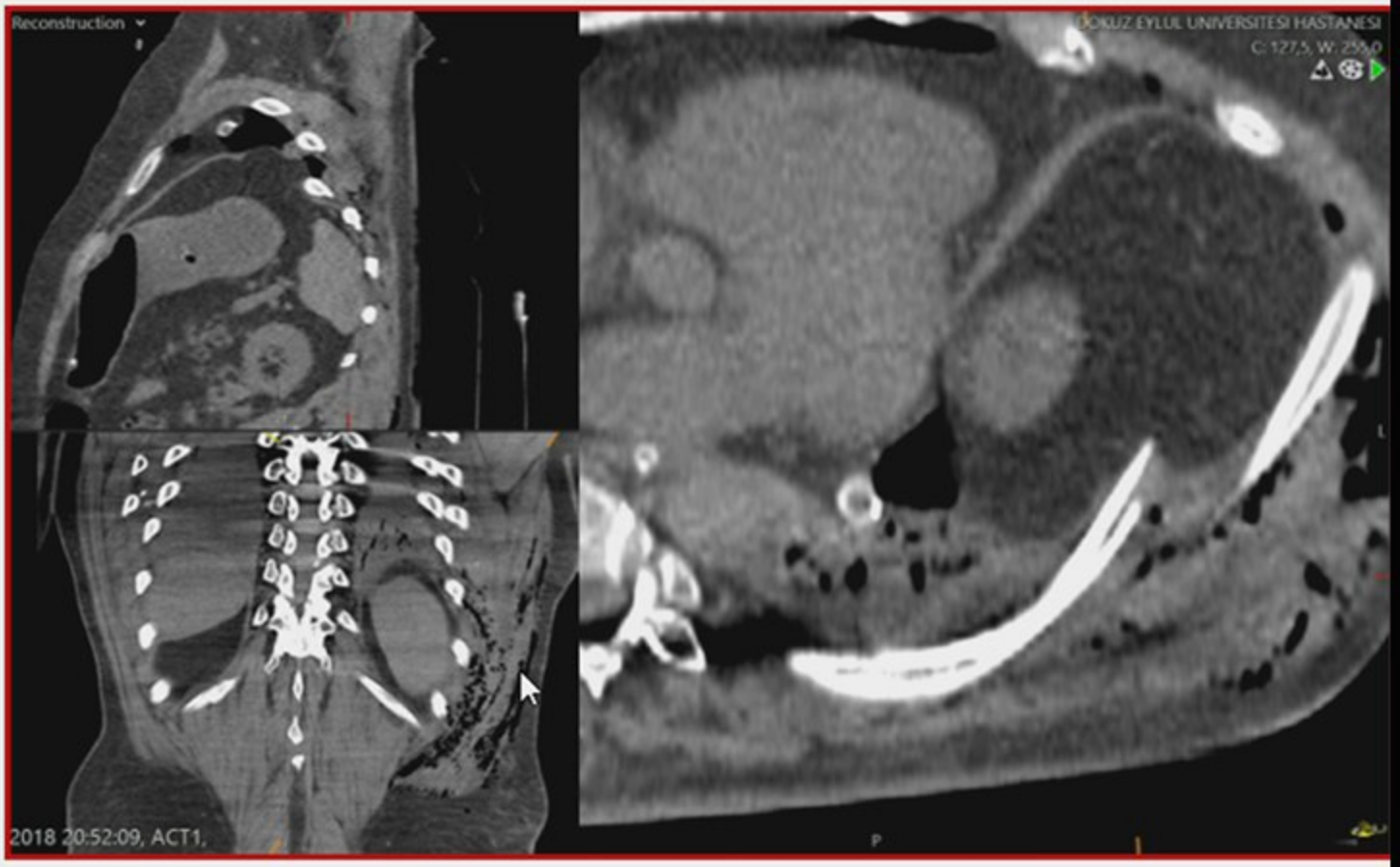

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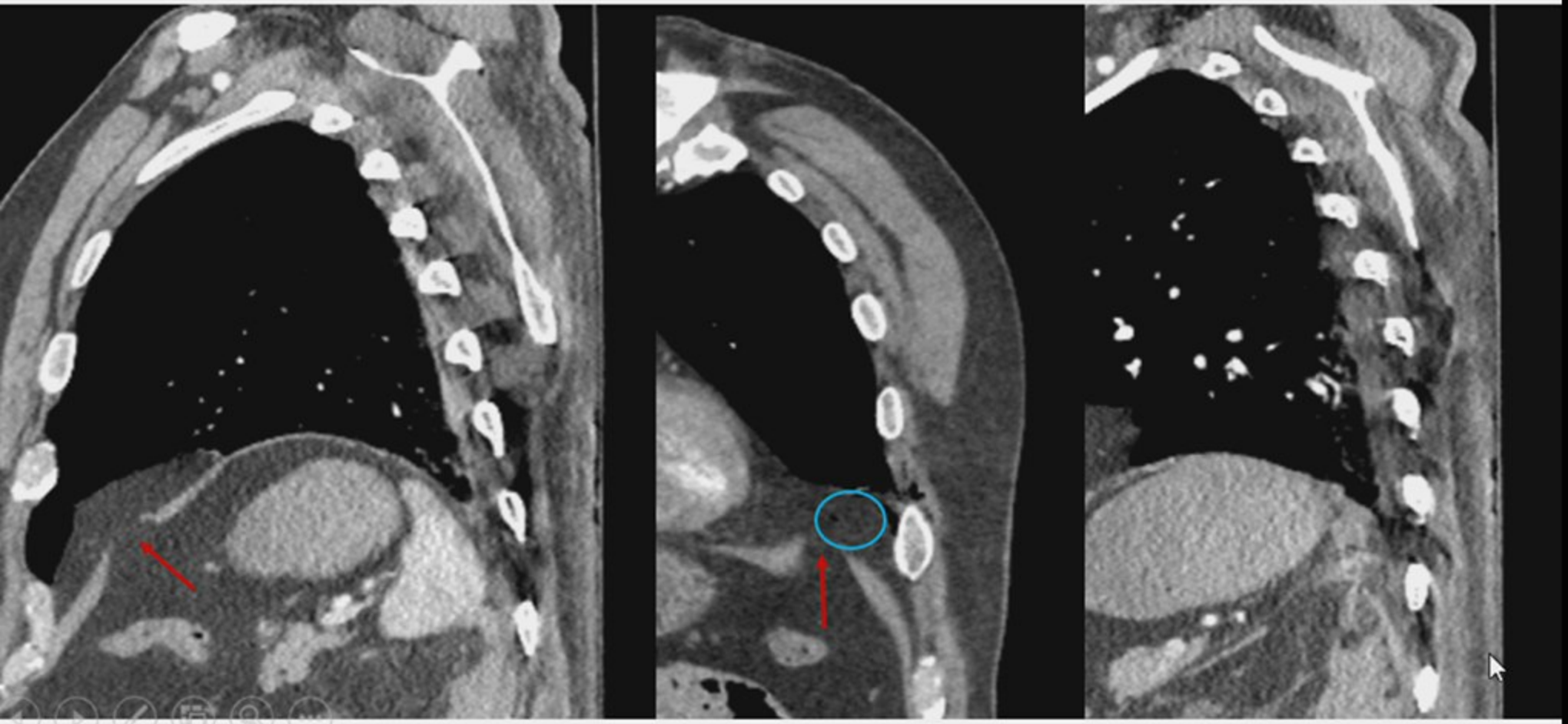

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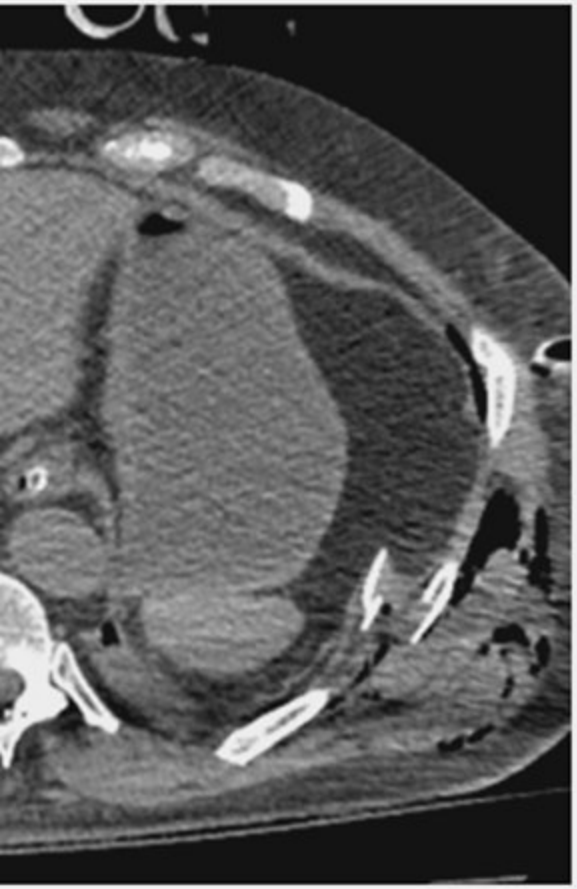

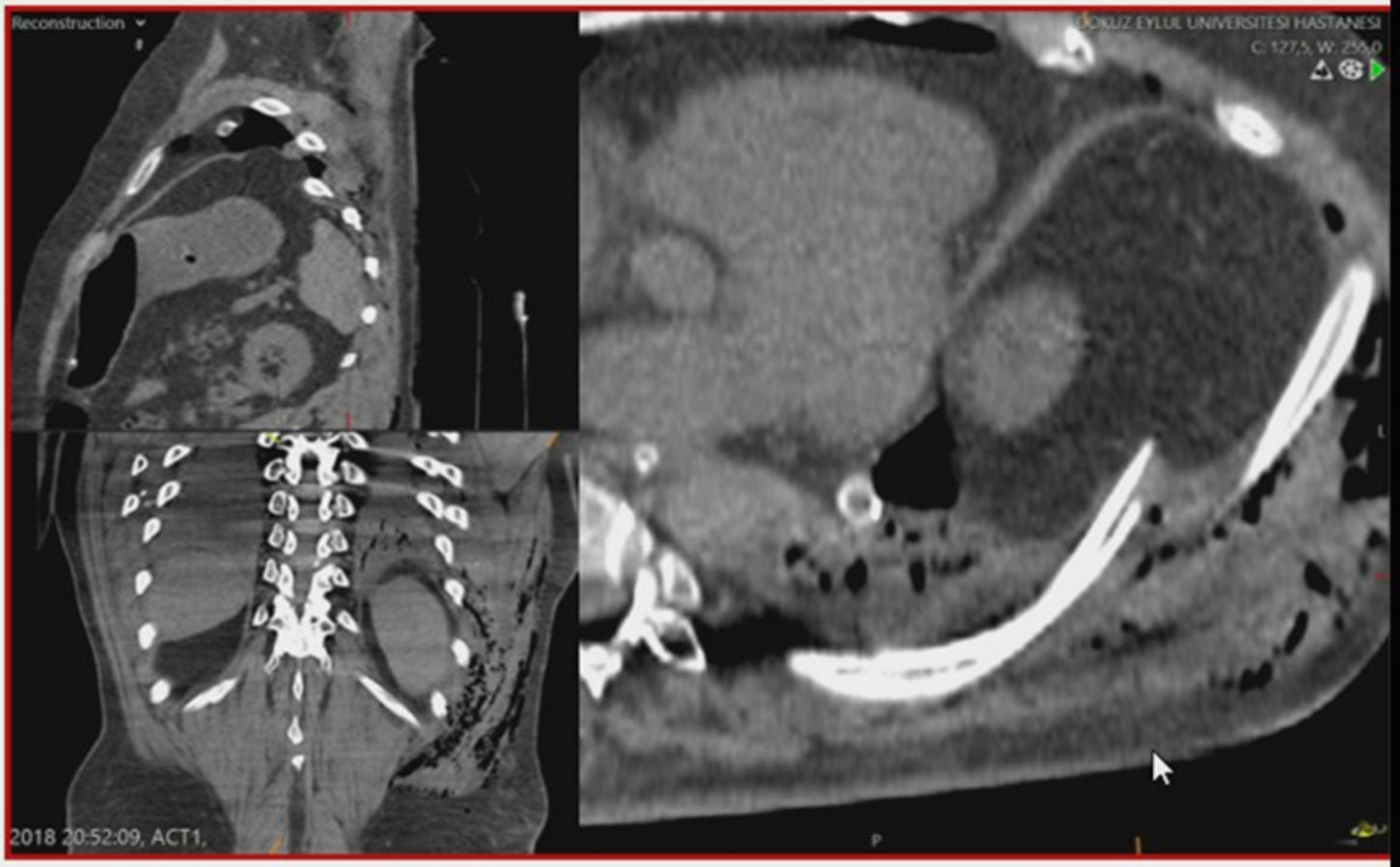

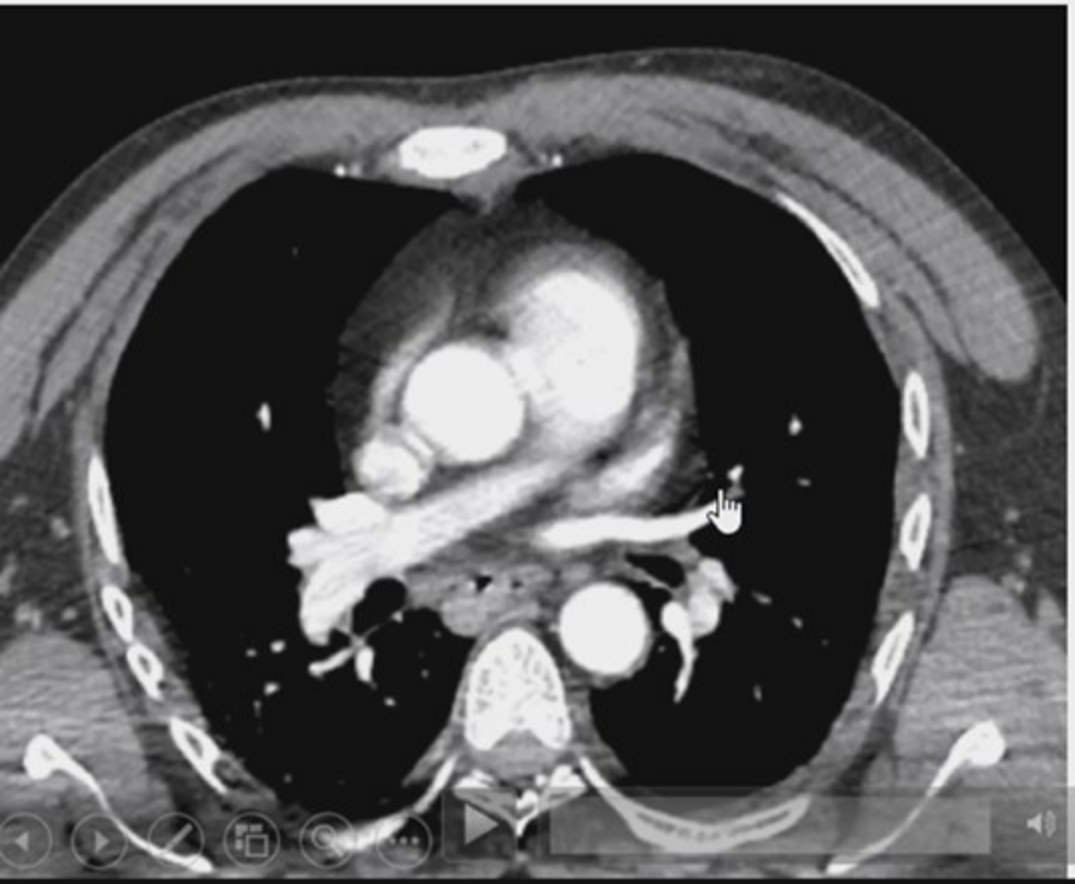

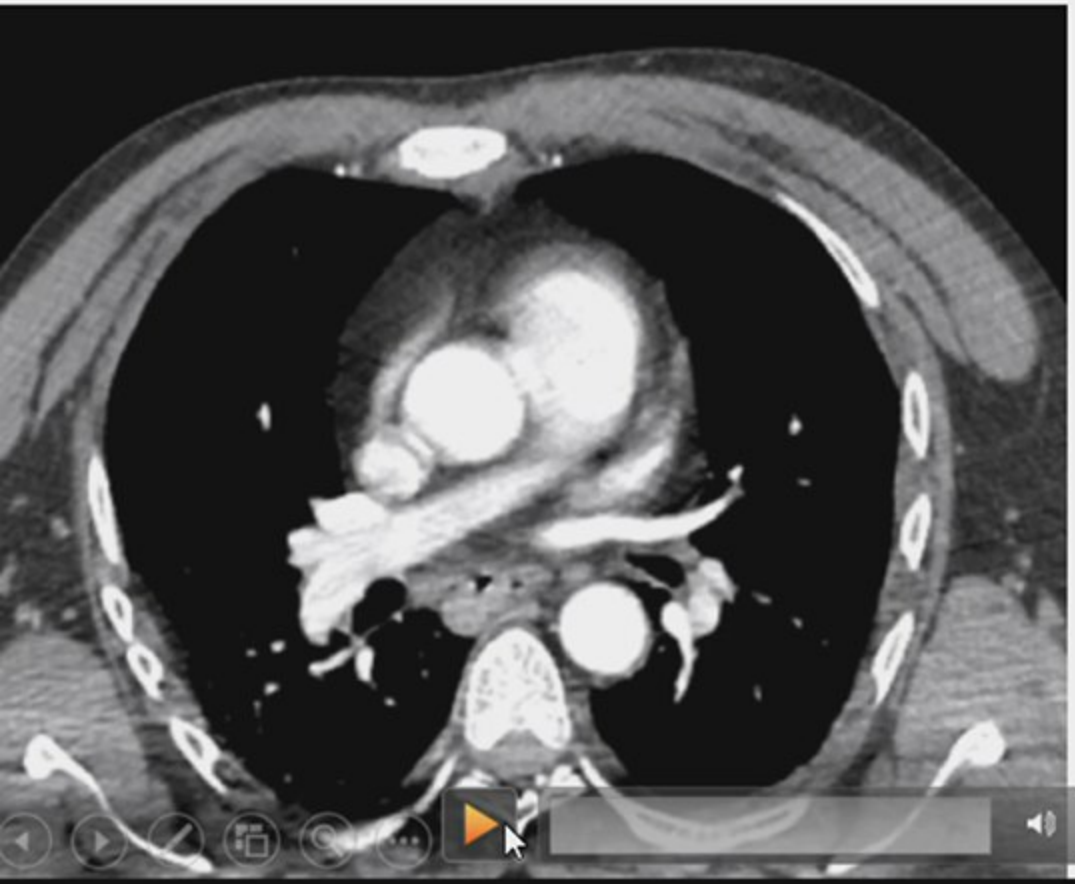

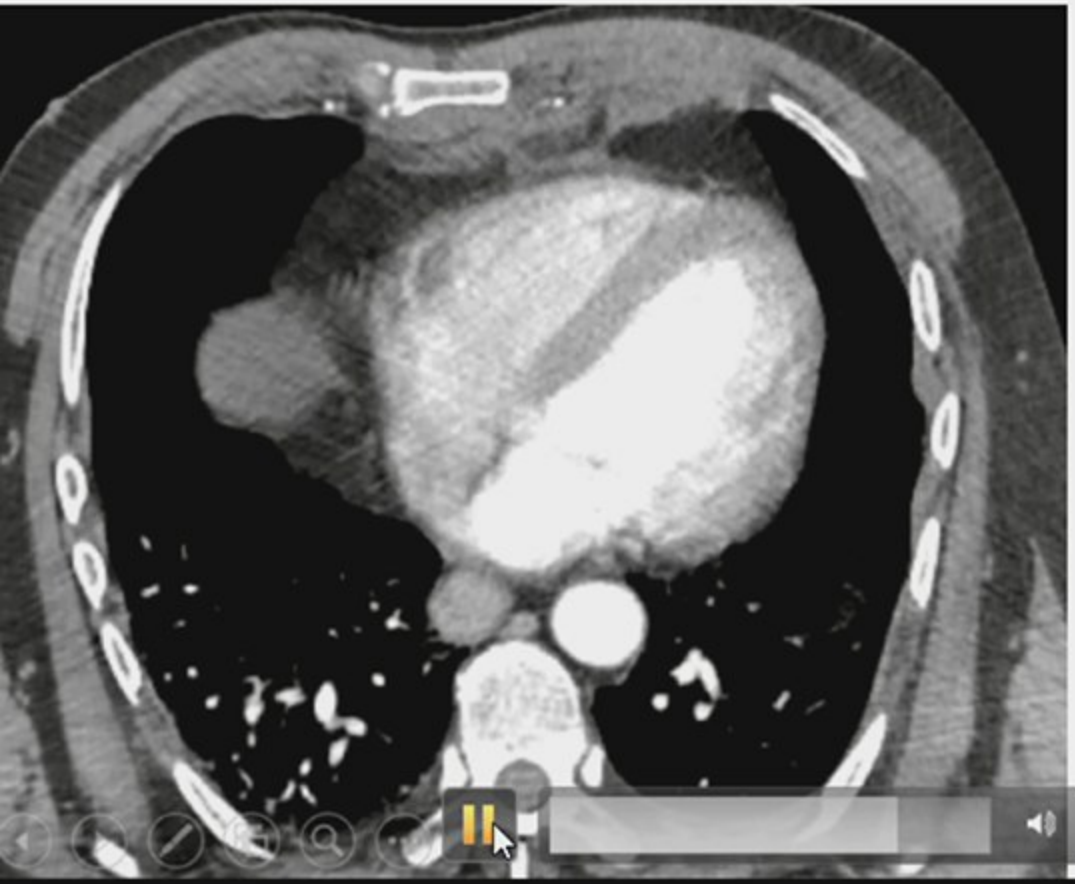

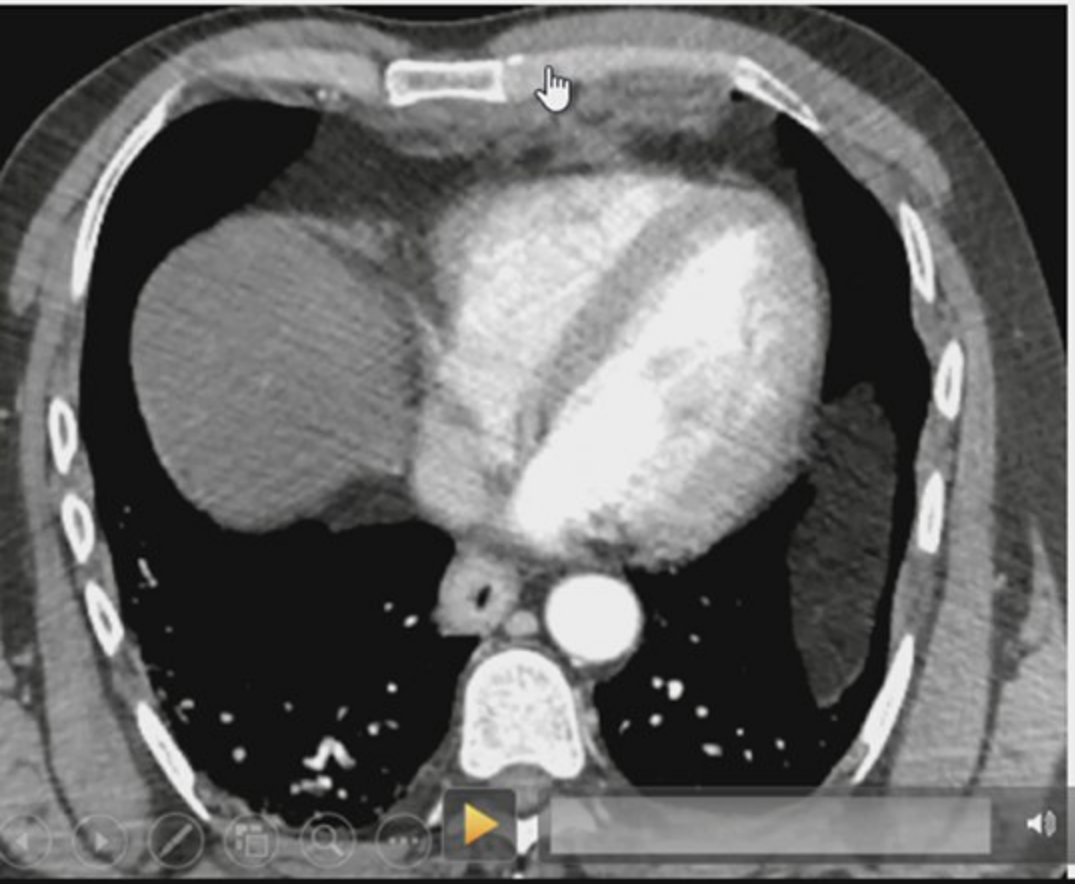

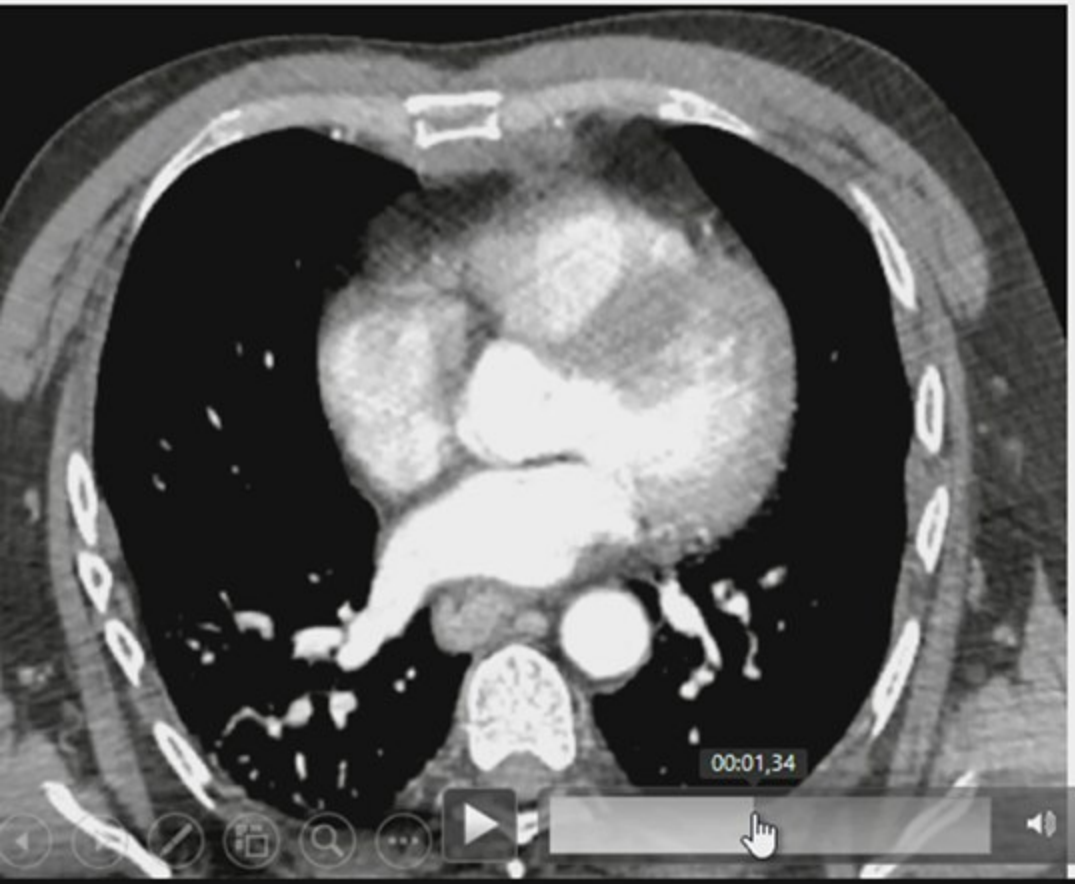
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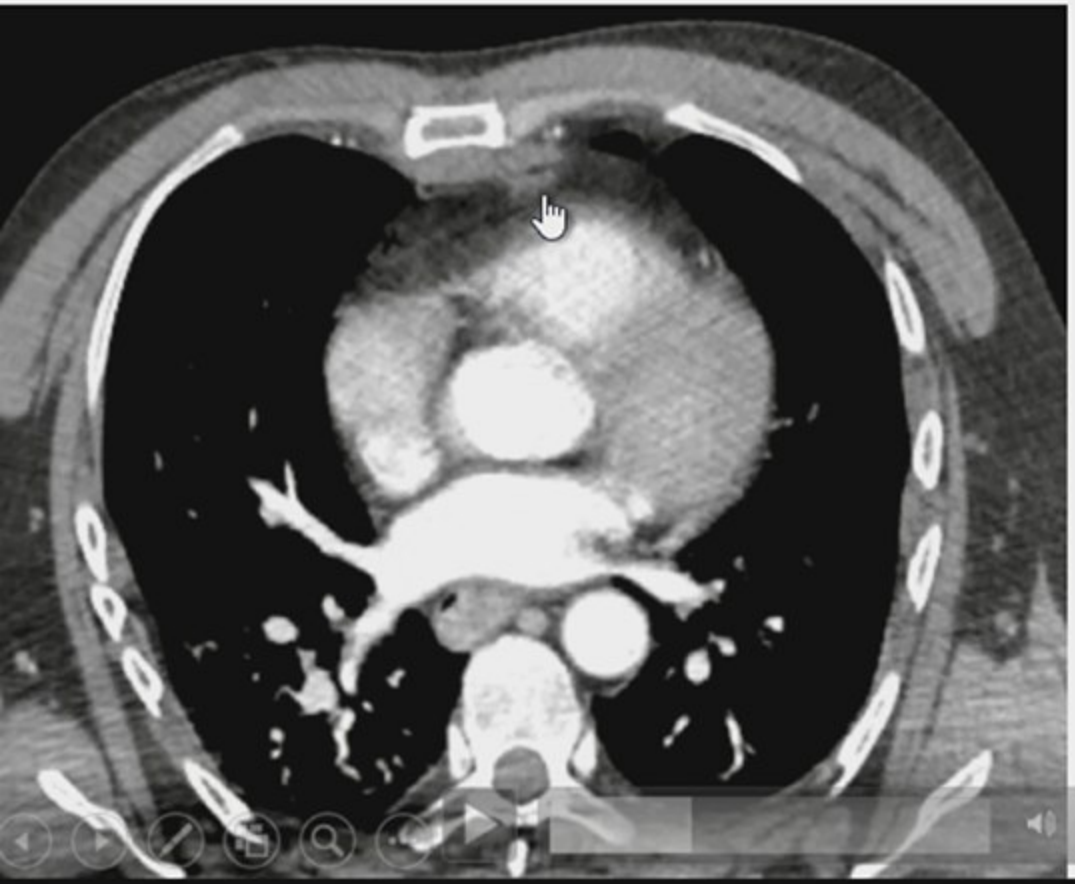

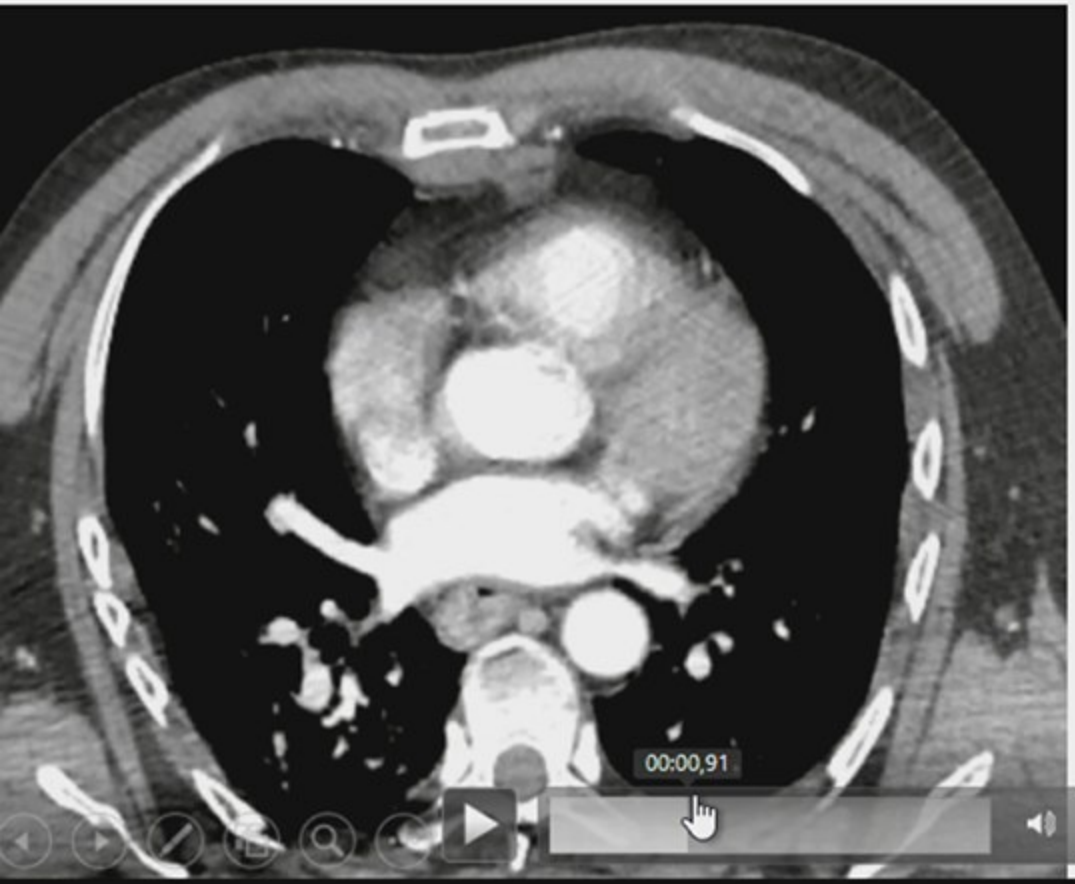
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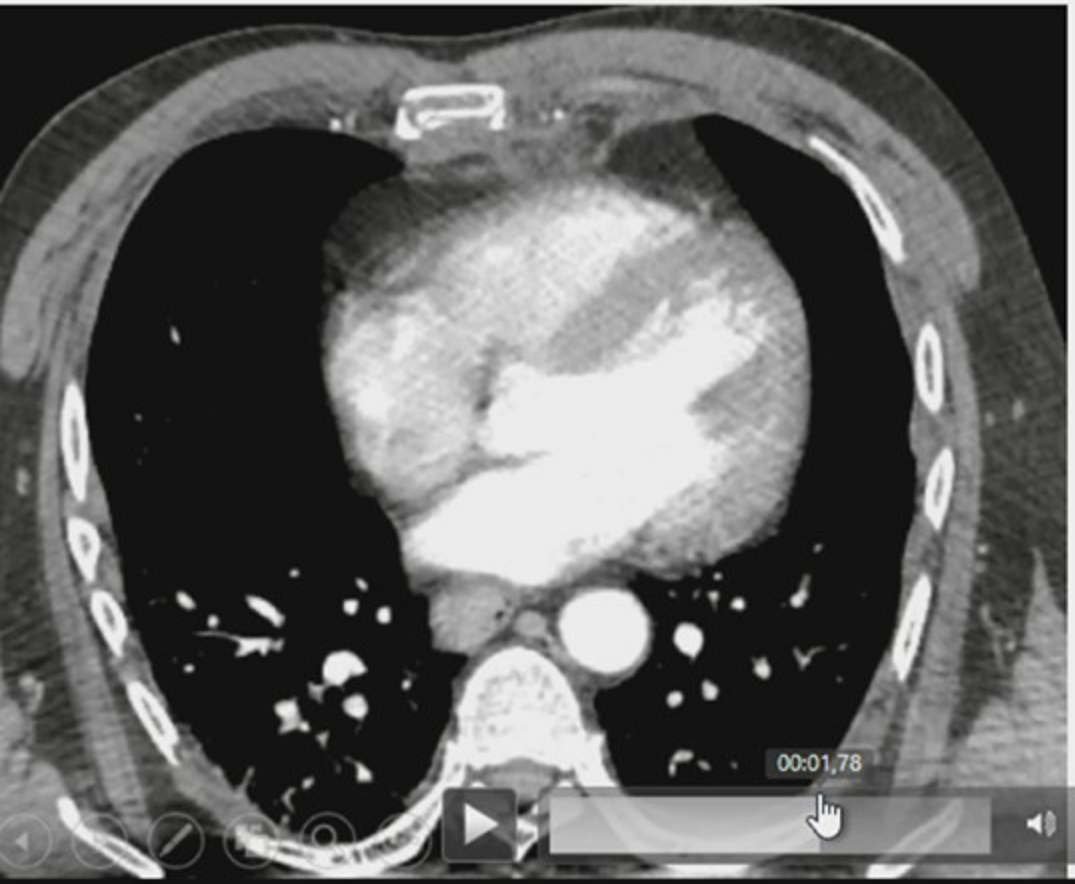
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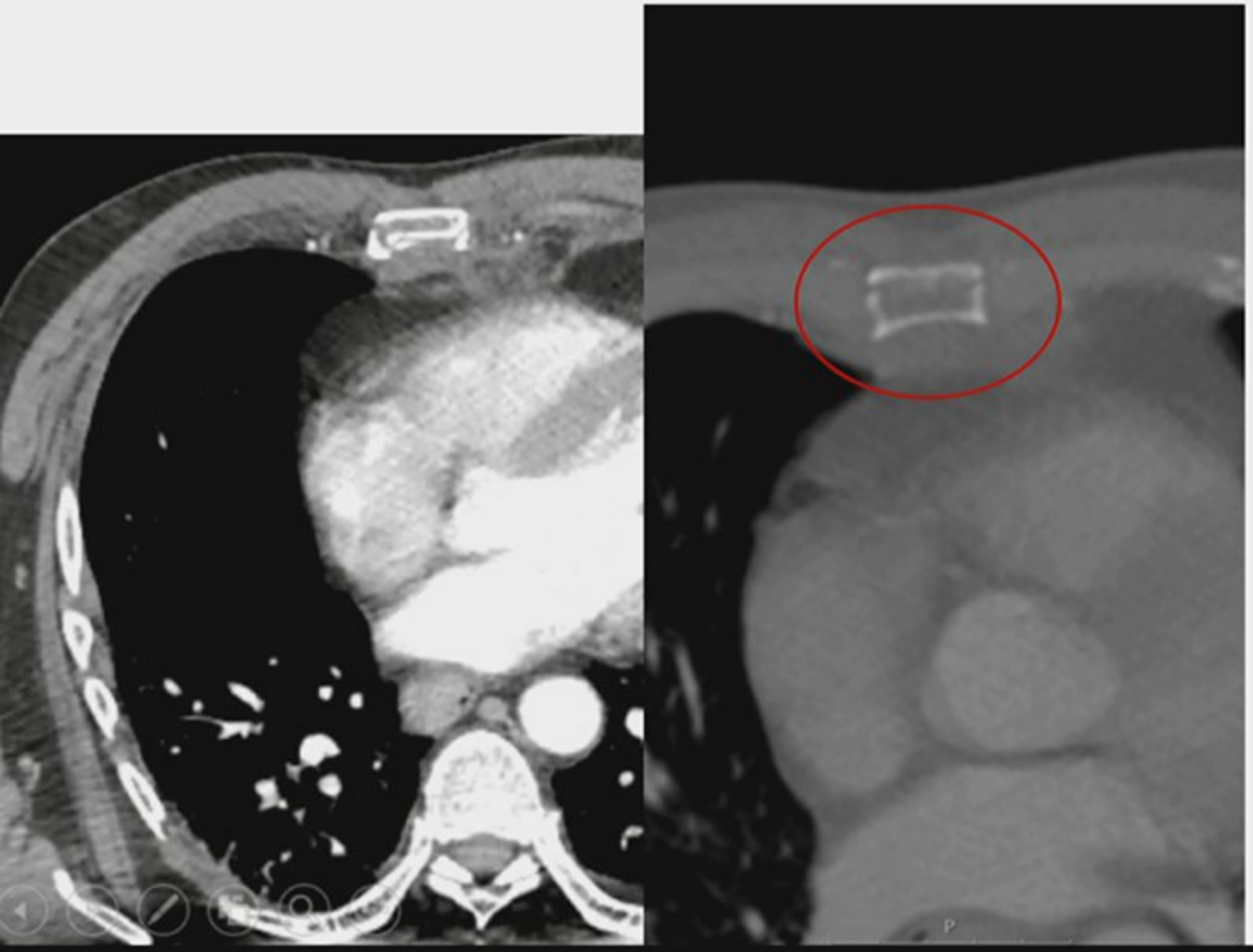

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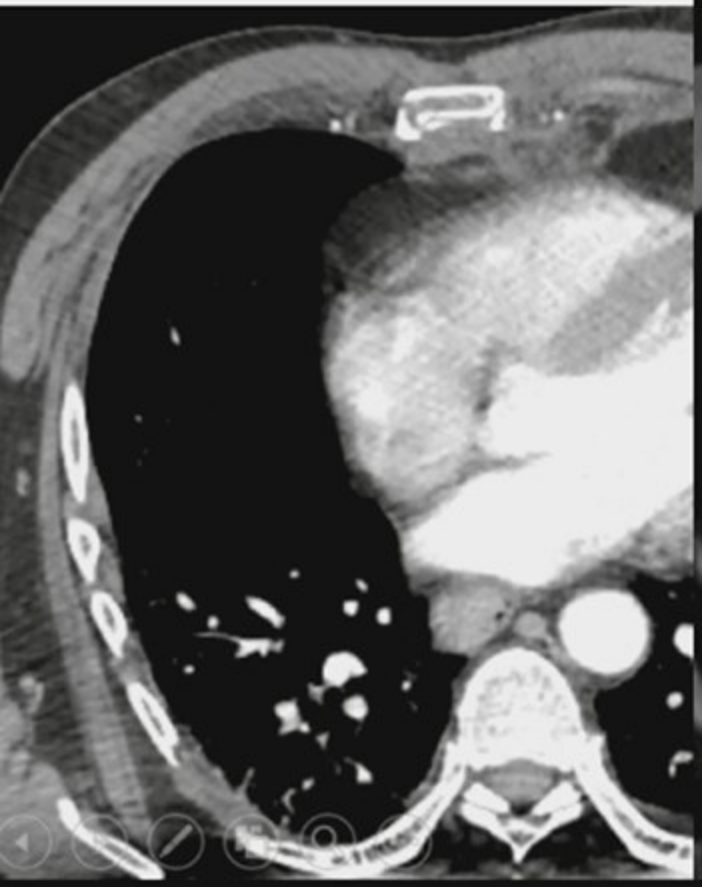

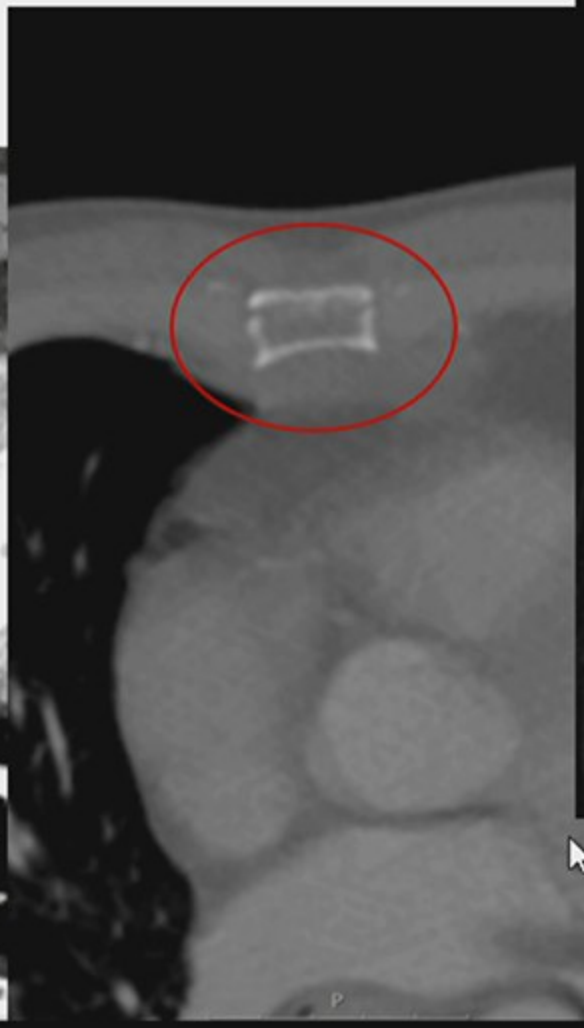

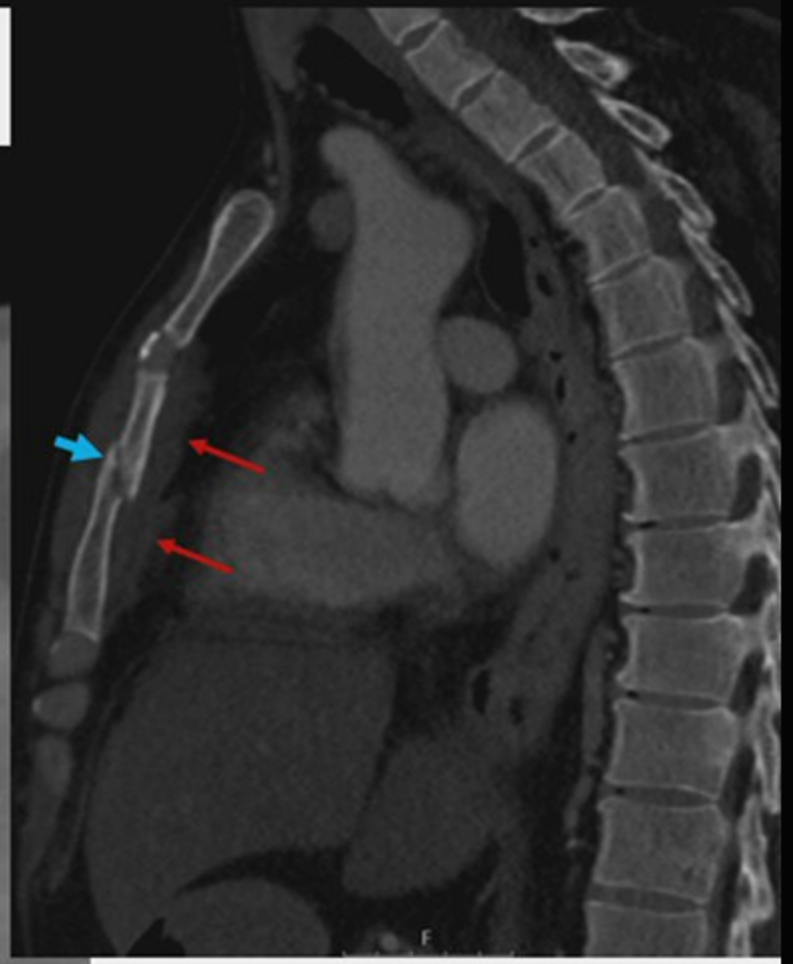

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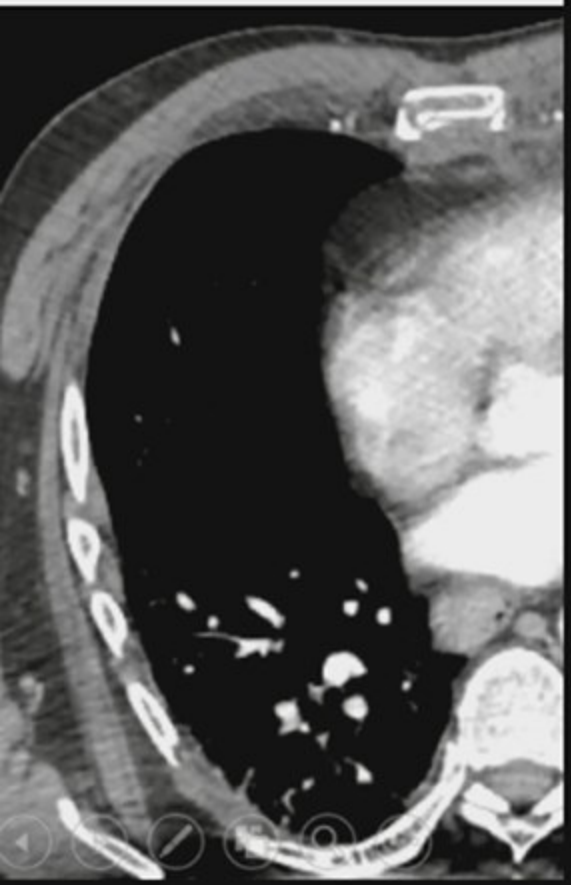

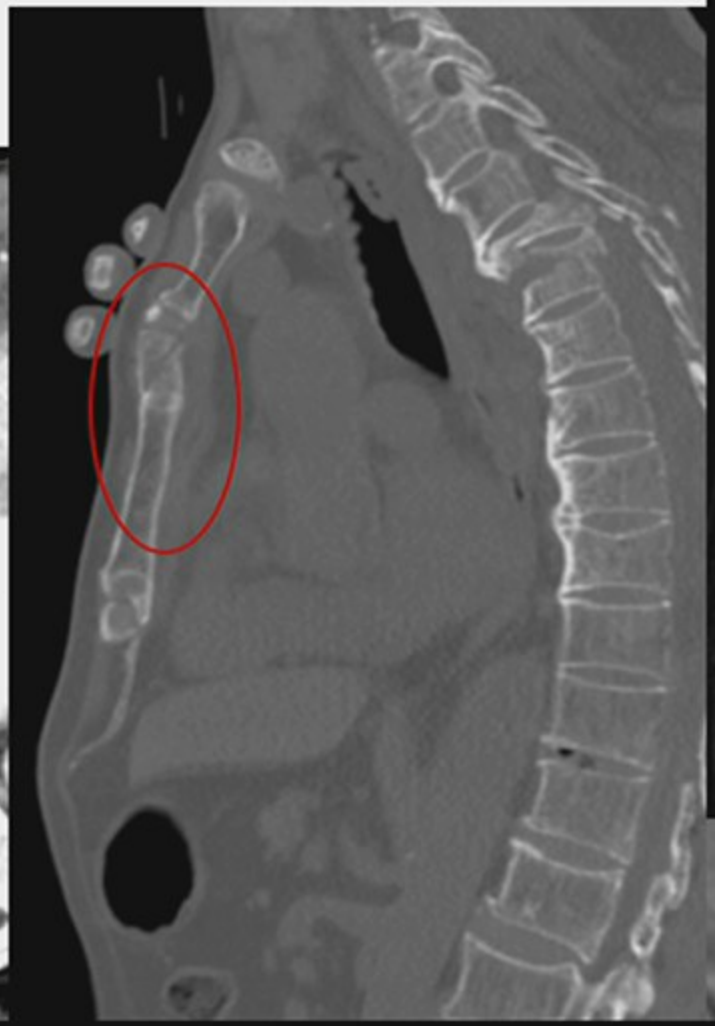

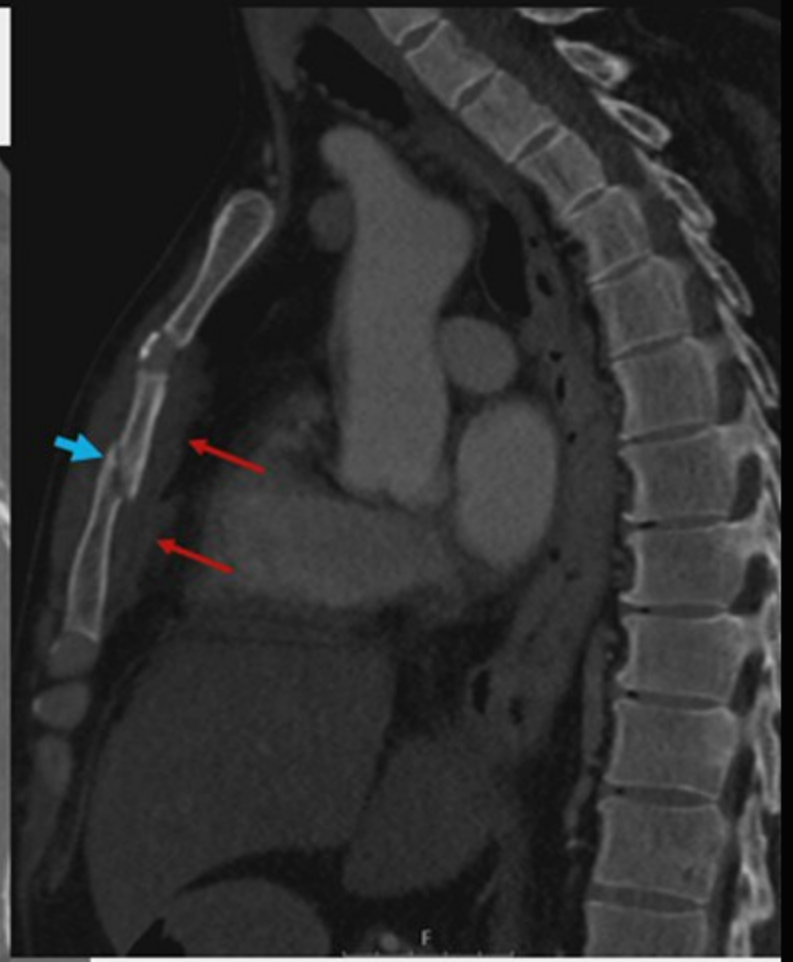

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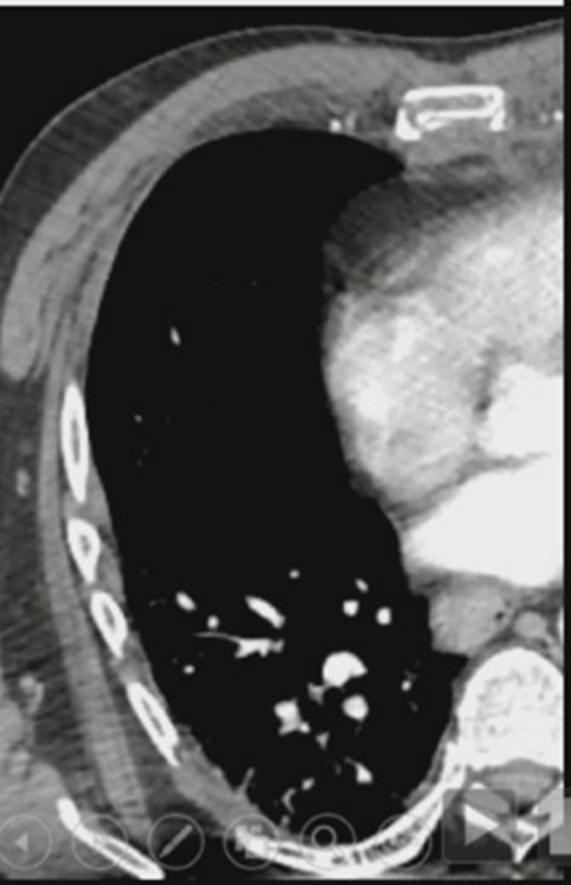

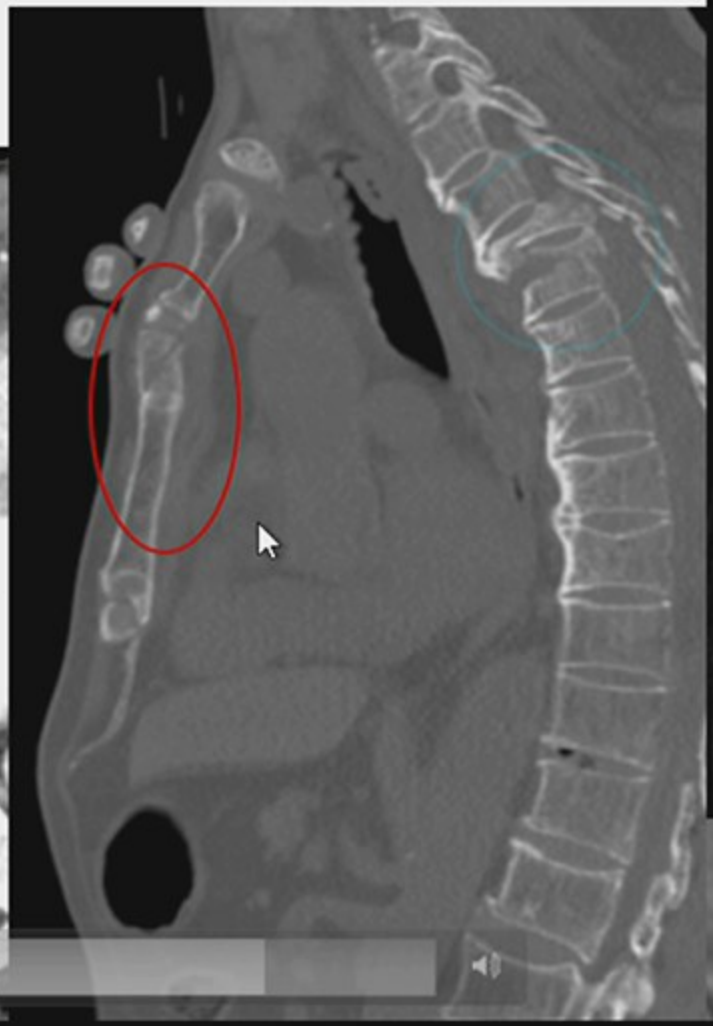

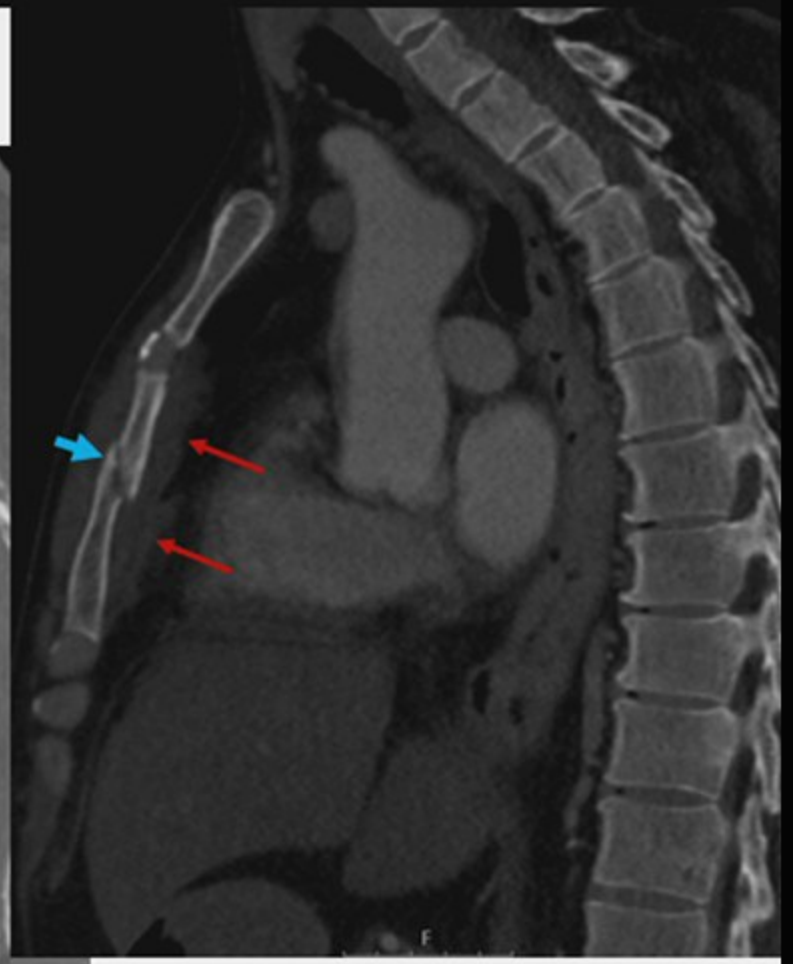

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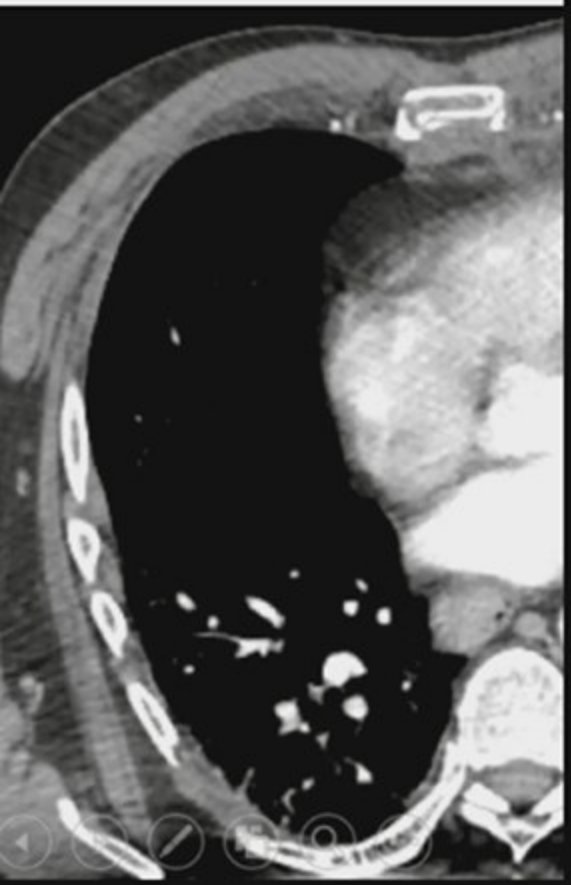

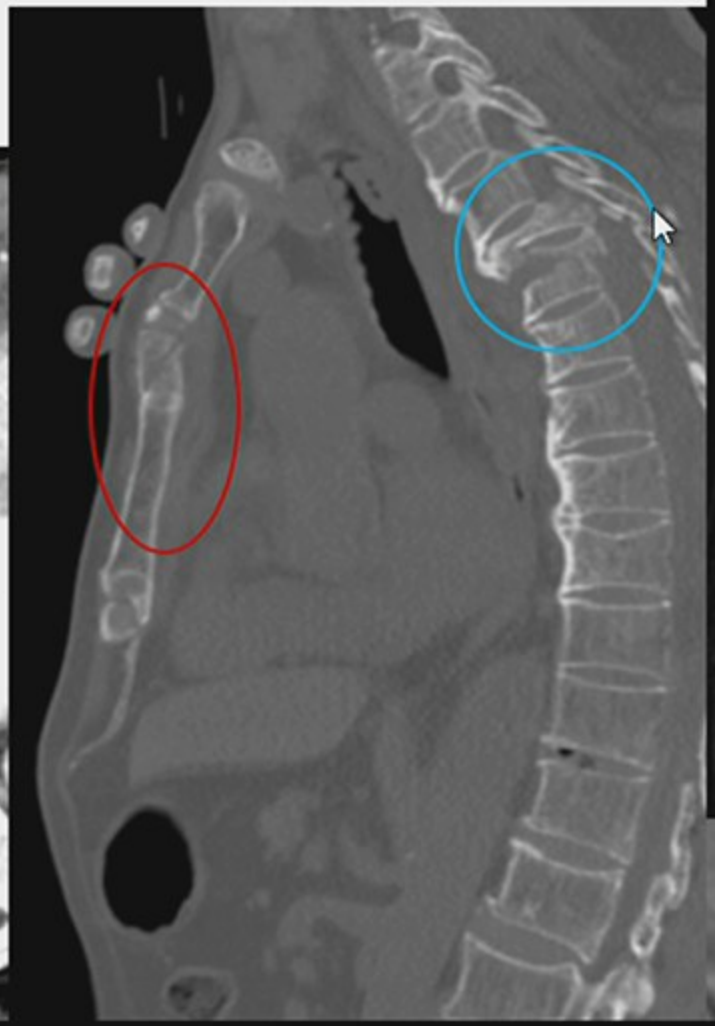

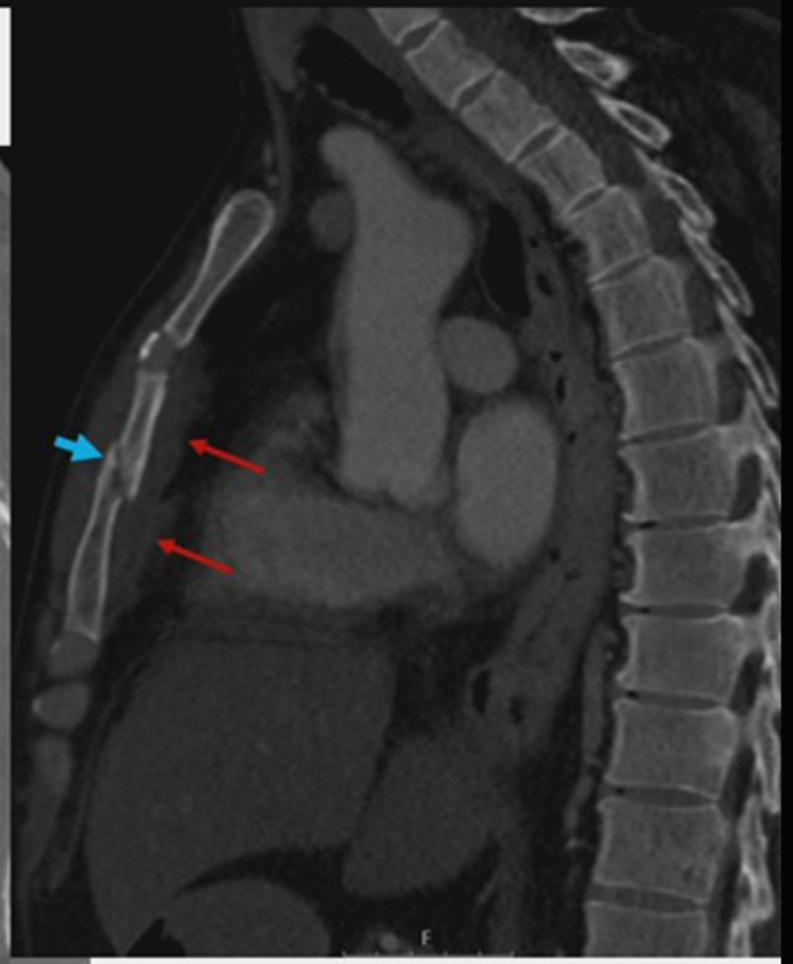

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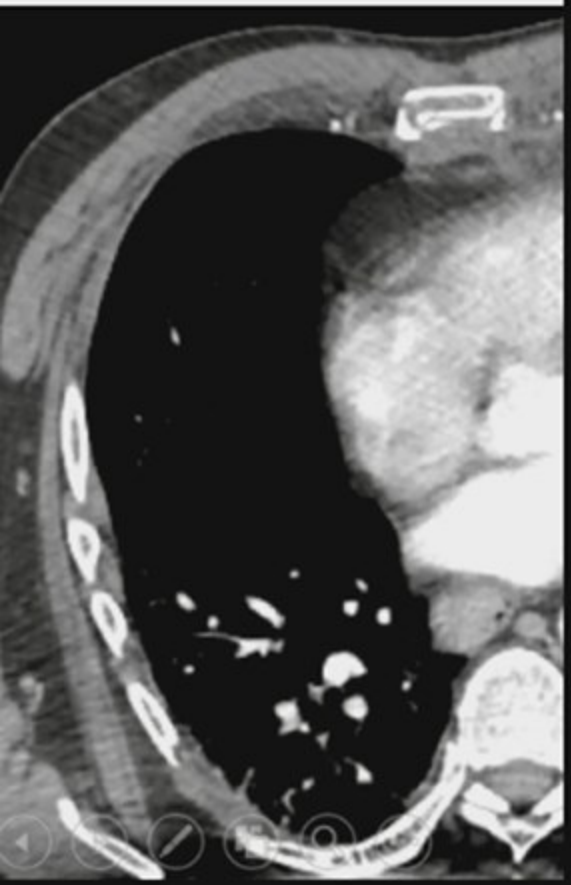

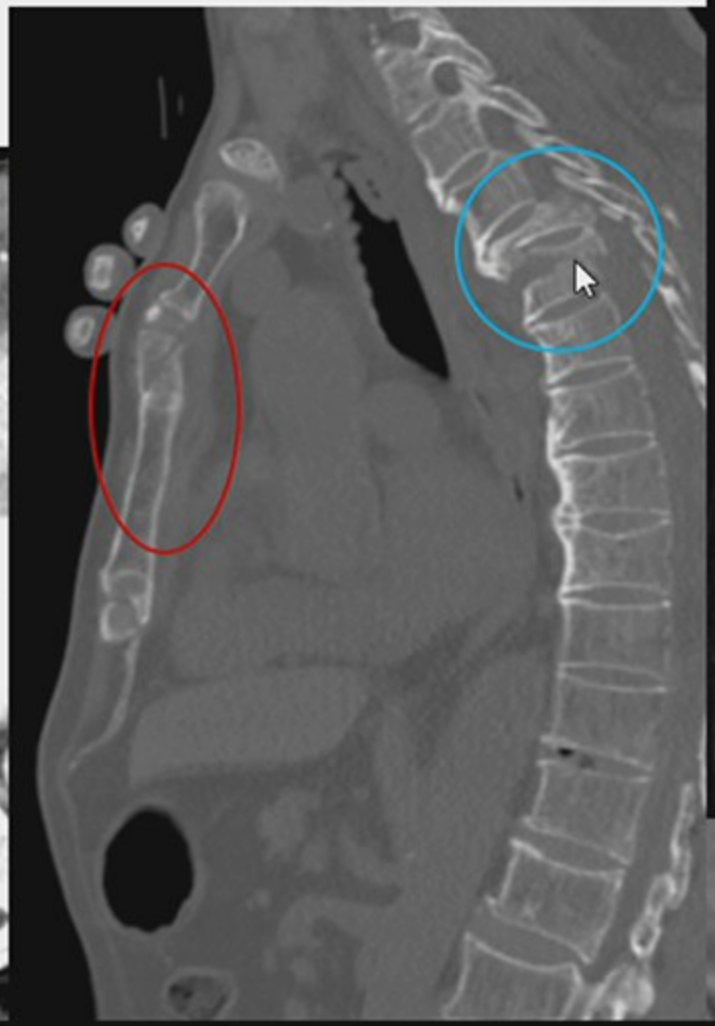

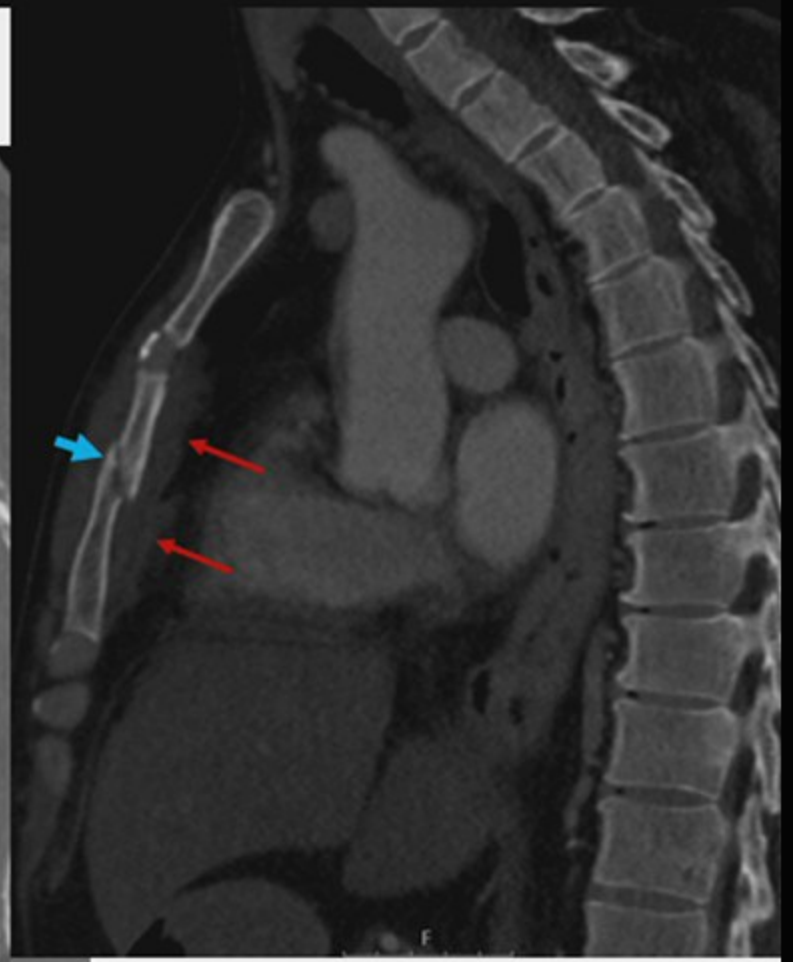

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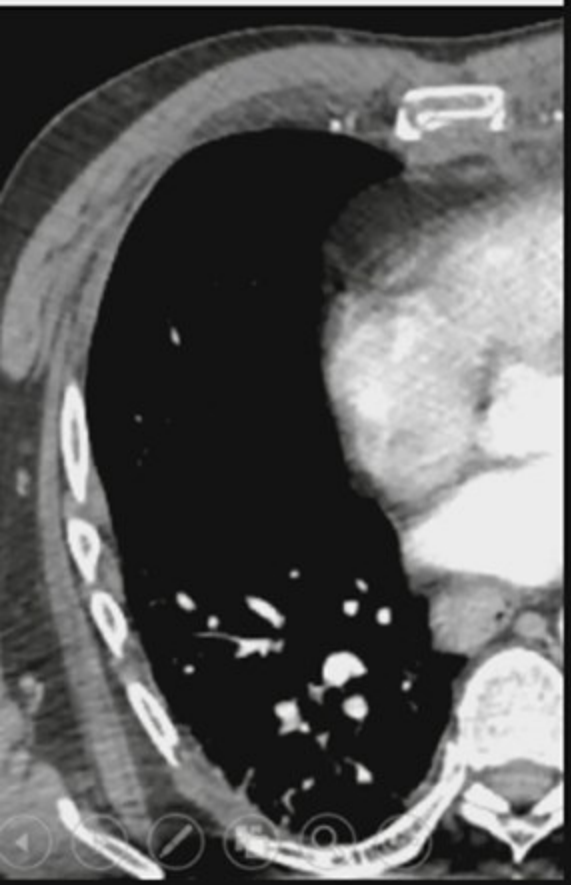

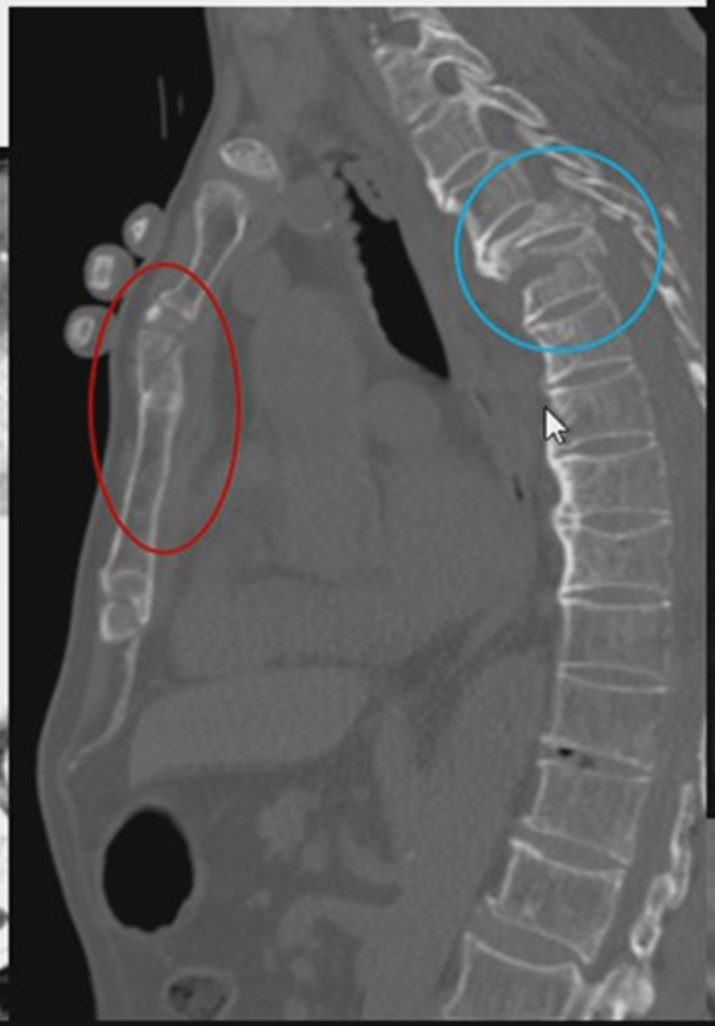

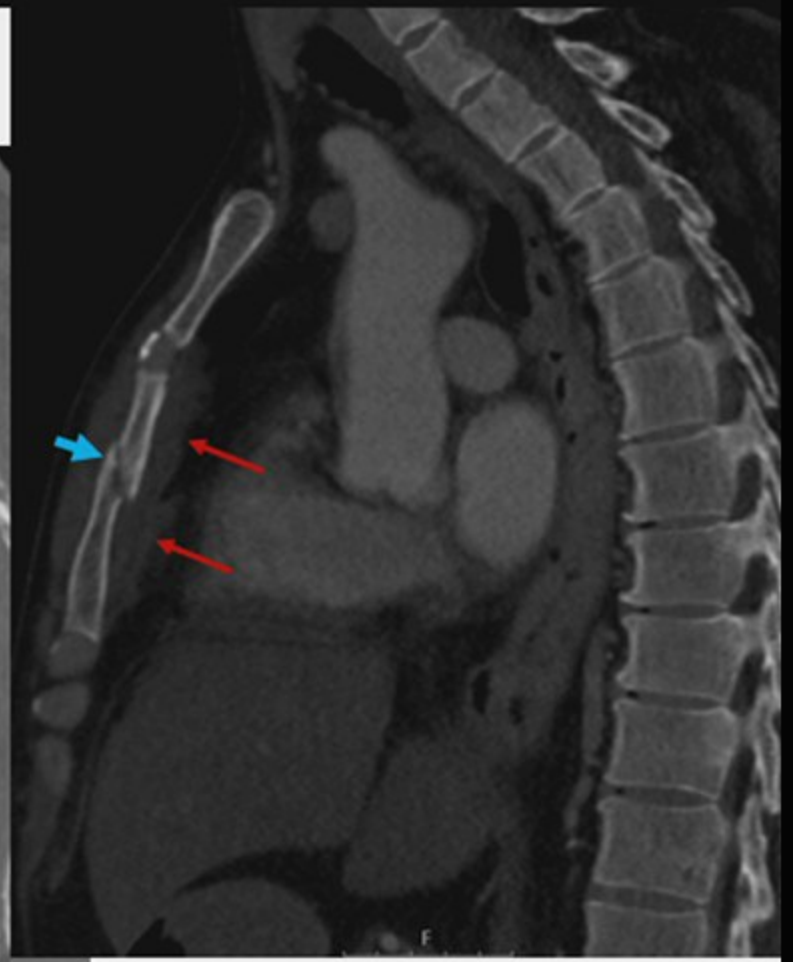

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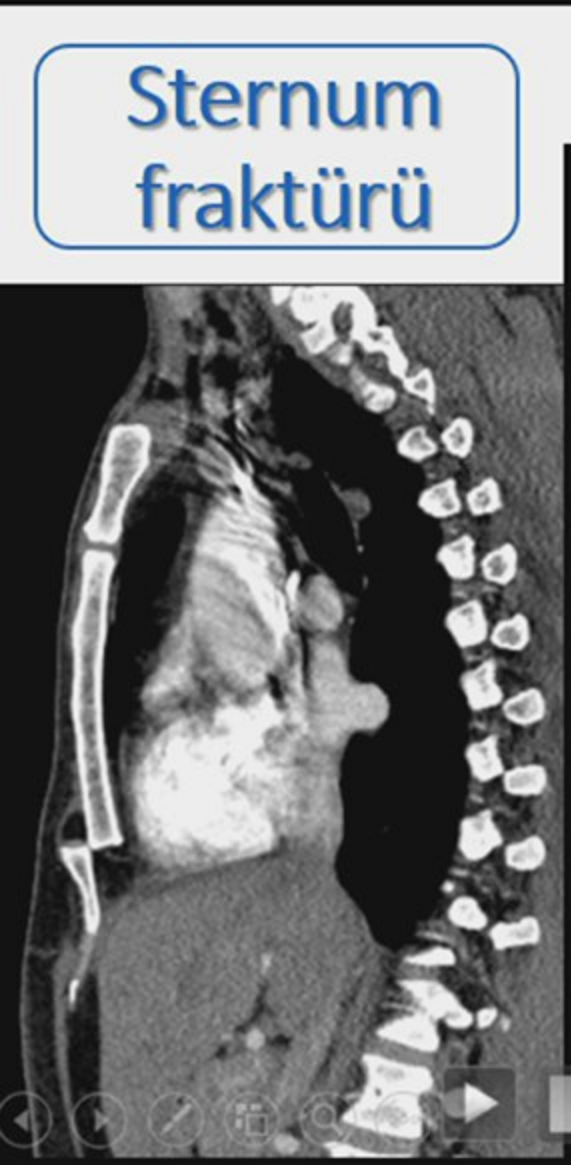

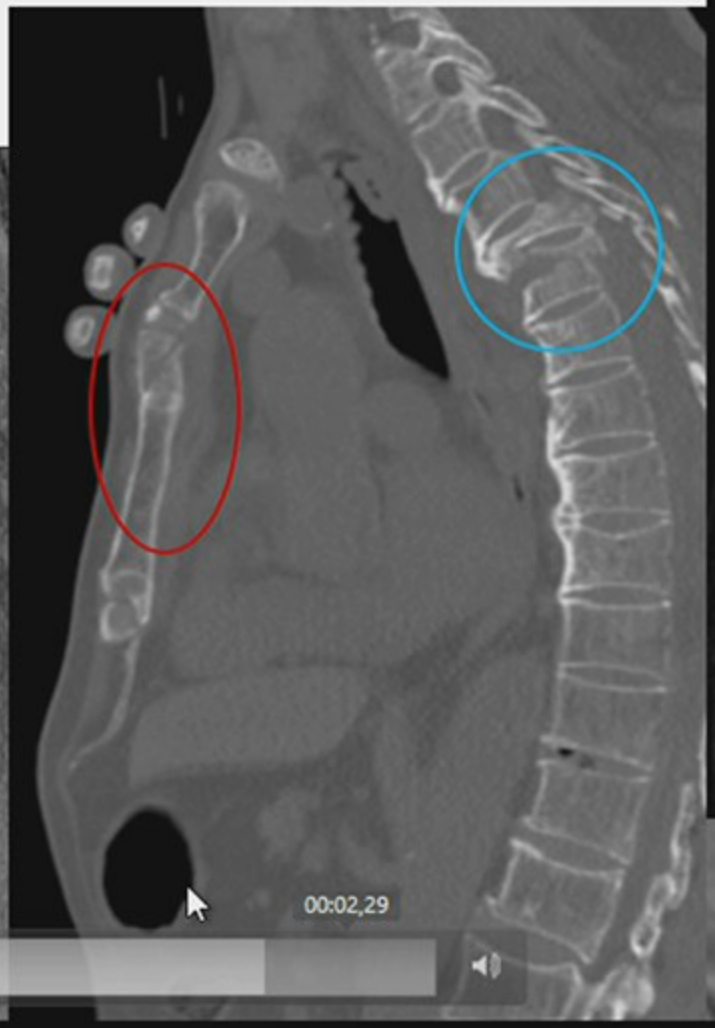

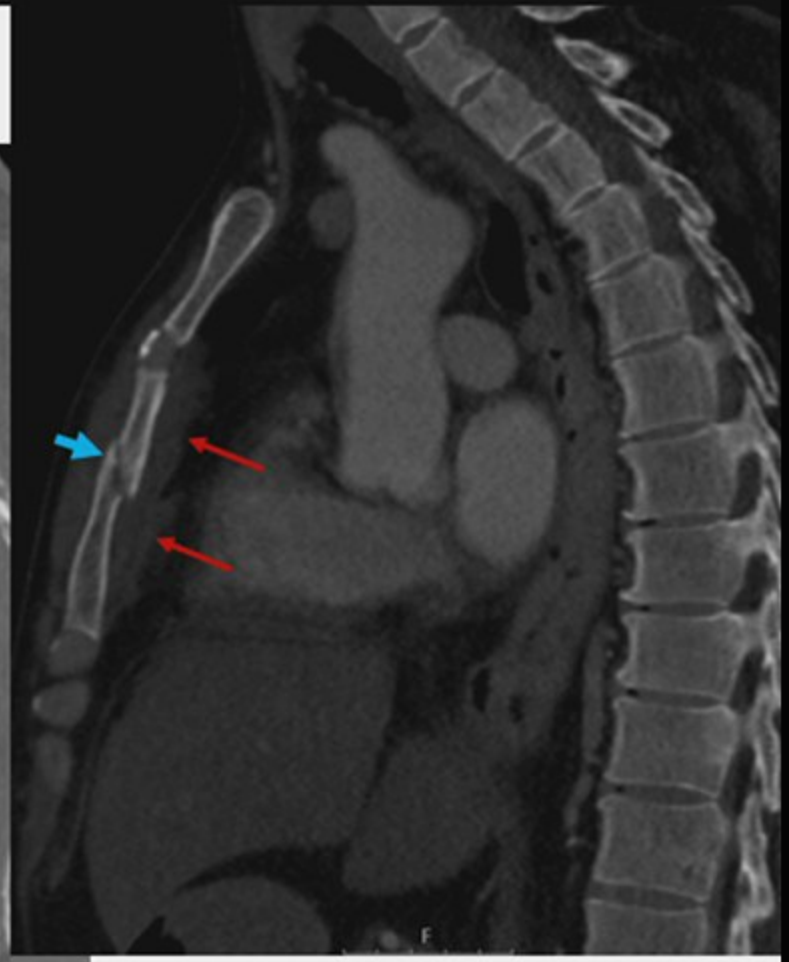

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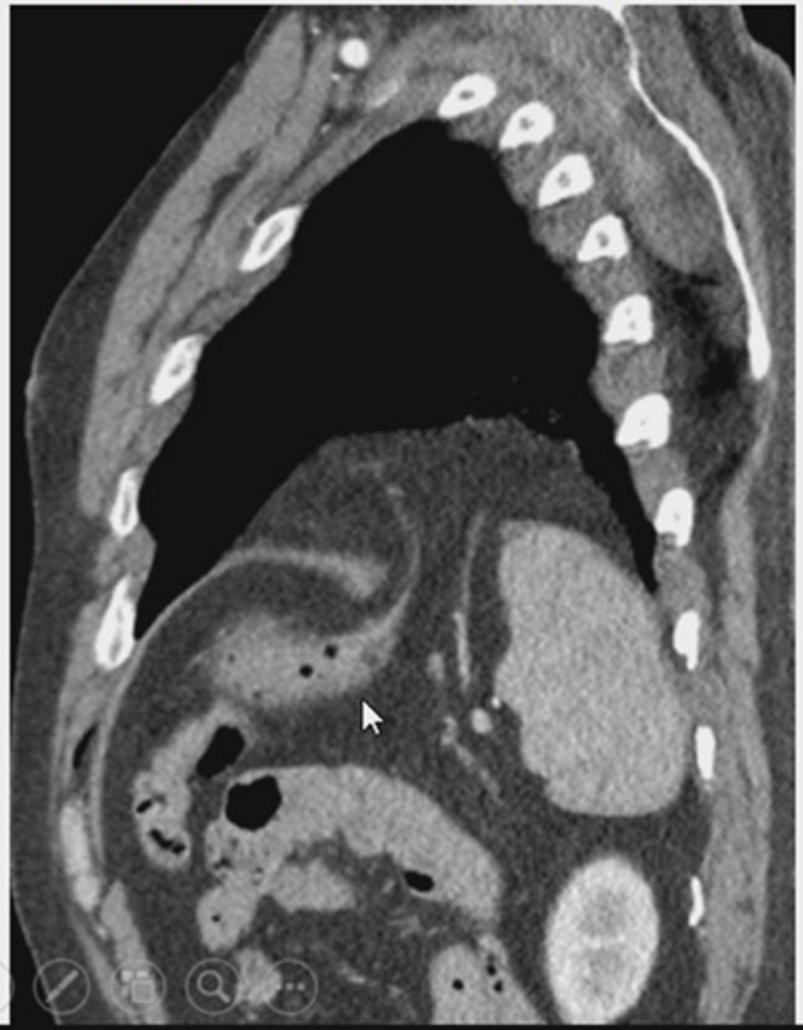

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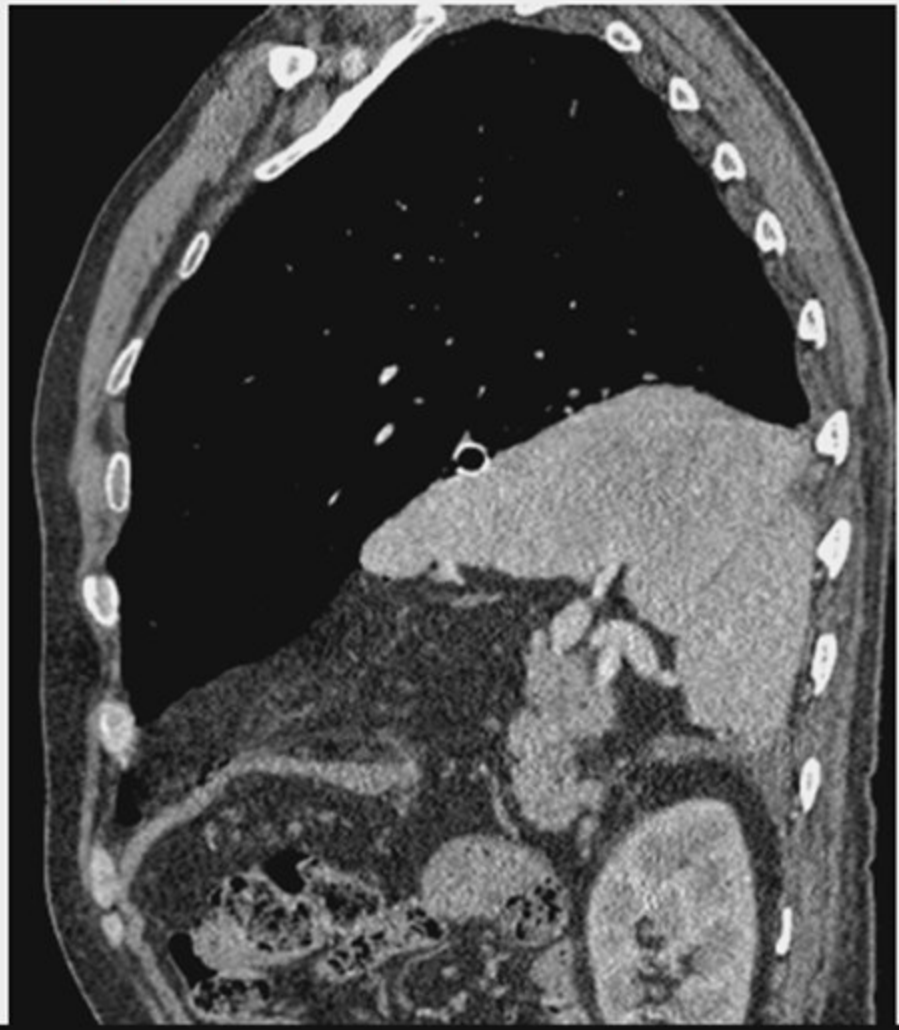

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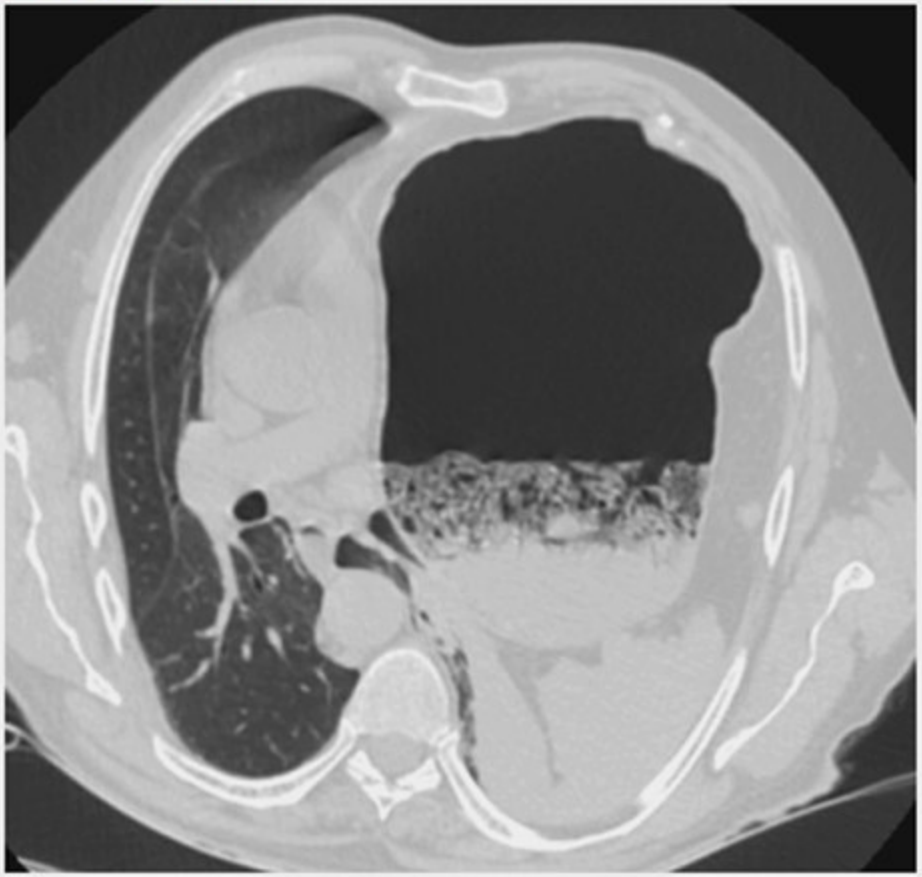
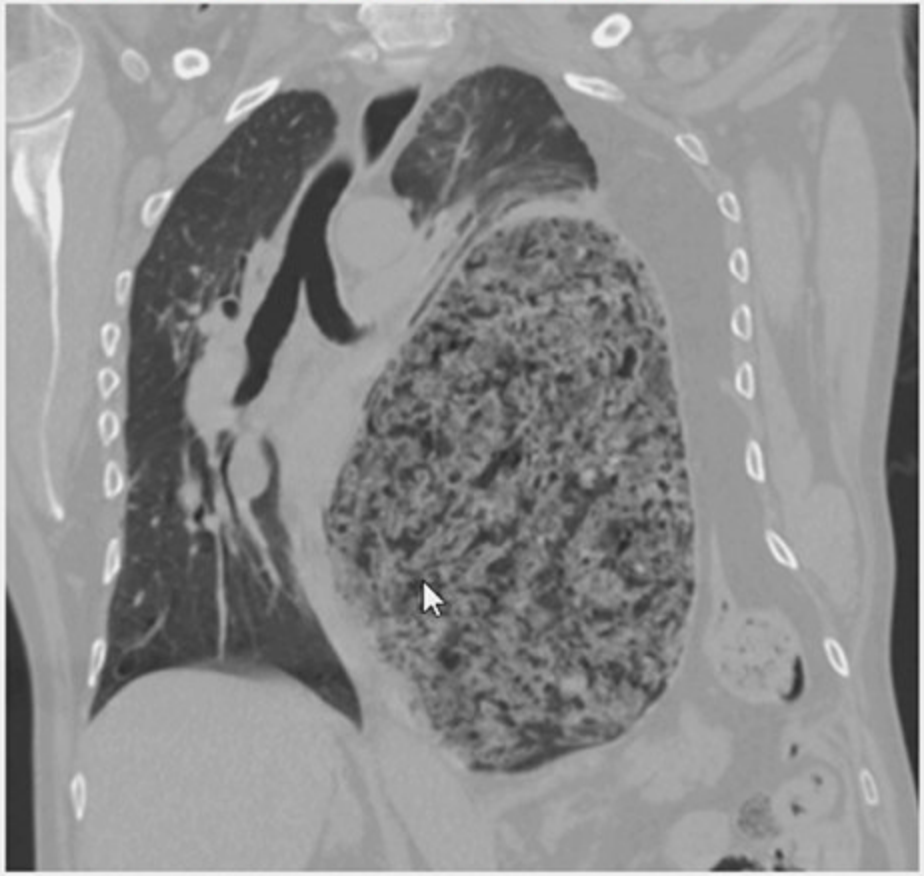


GİS obstrüksiyonu / strangulasyon



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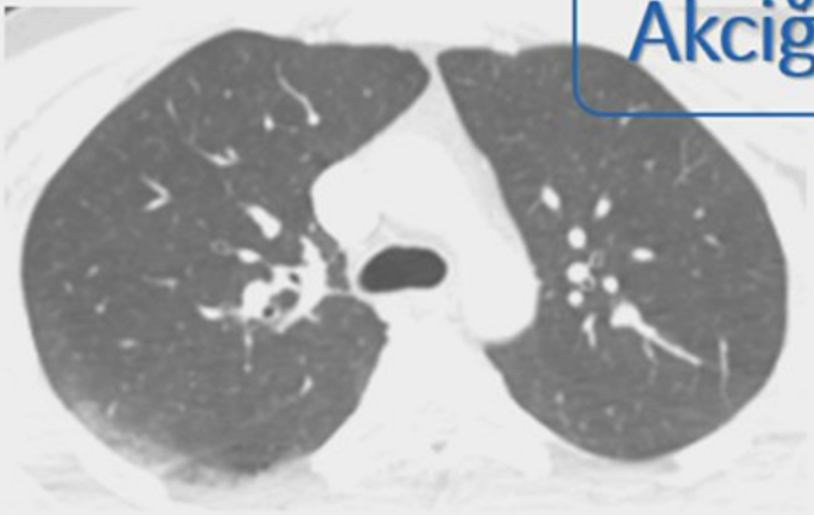
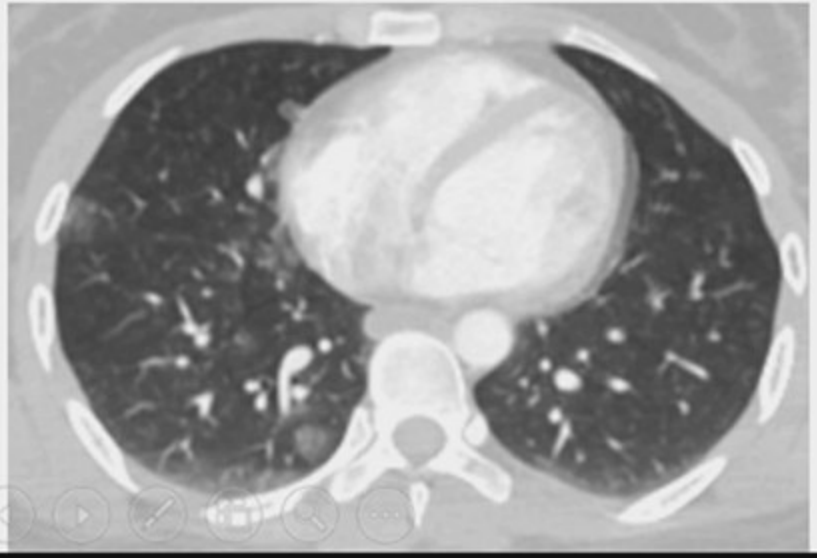
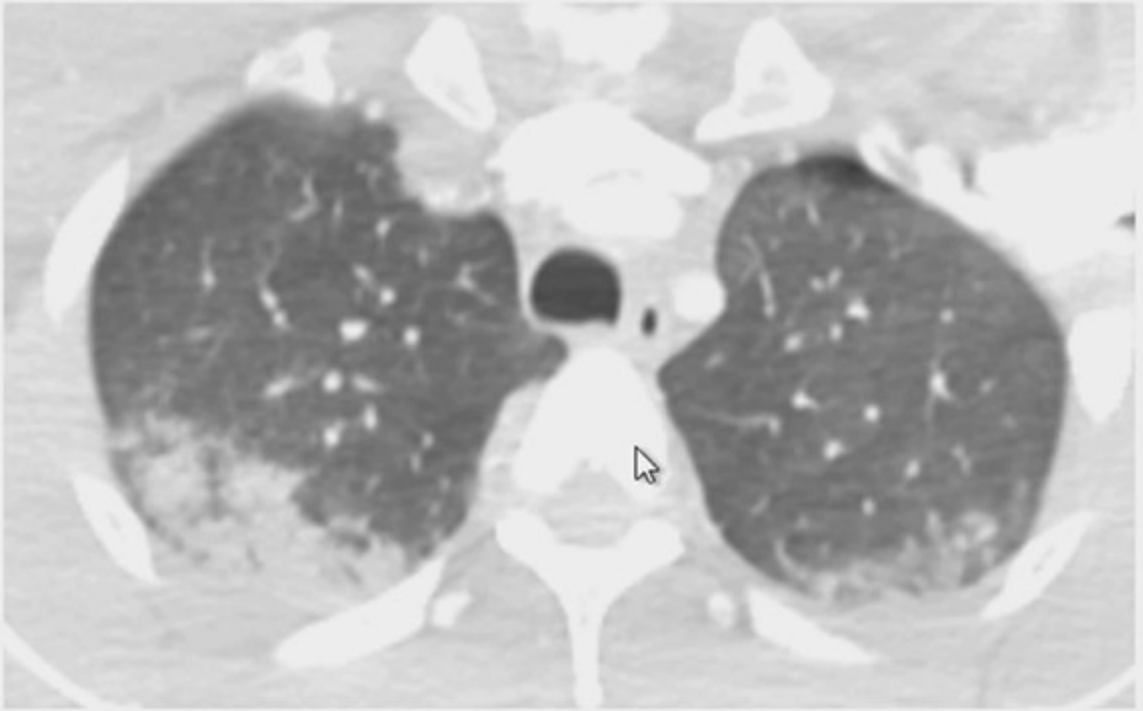
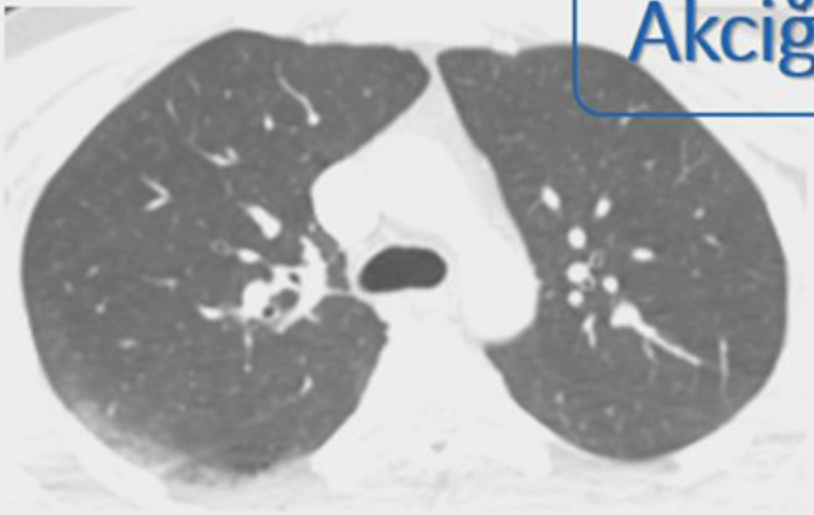
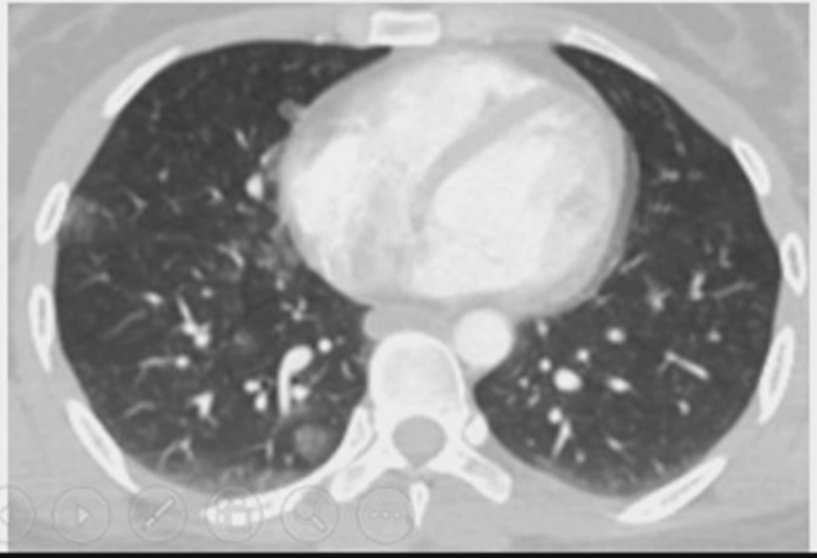


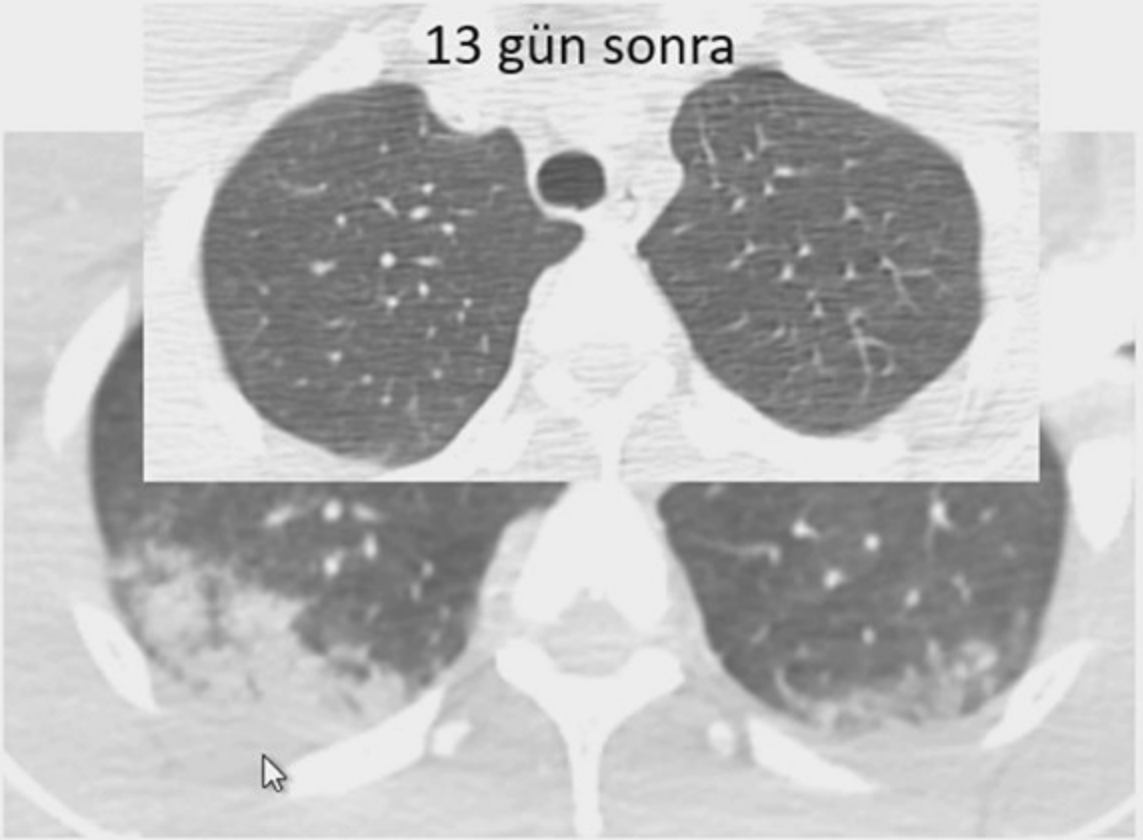




Akciğer Kontüzyonu







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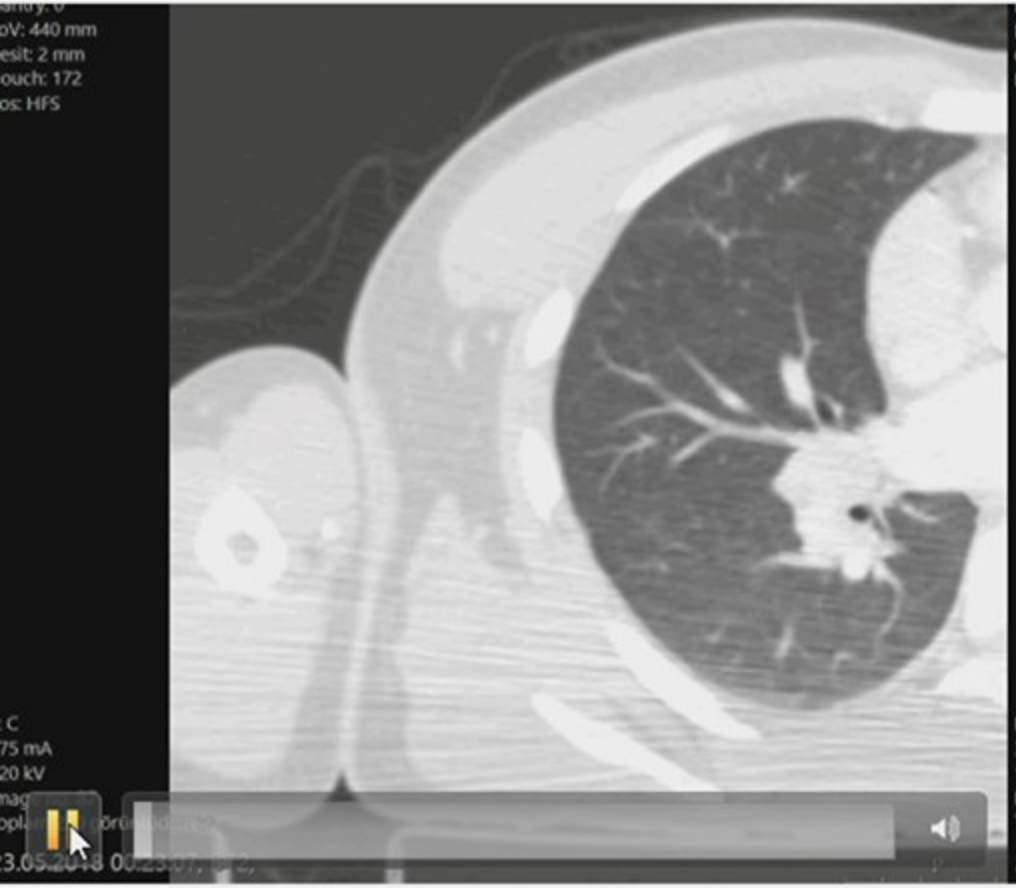

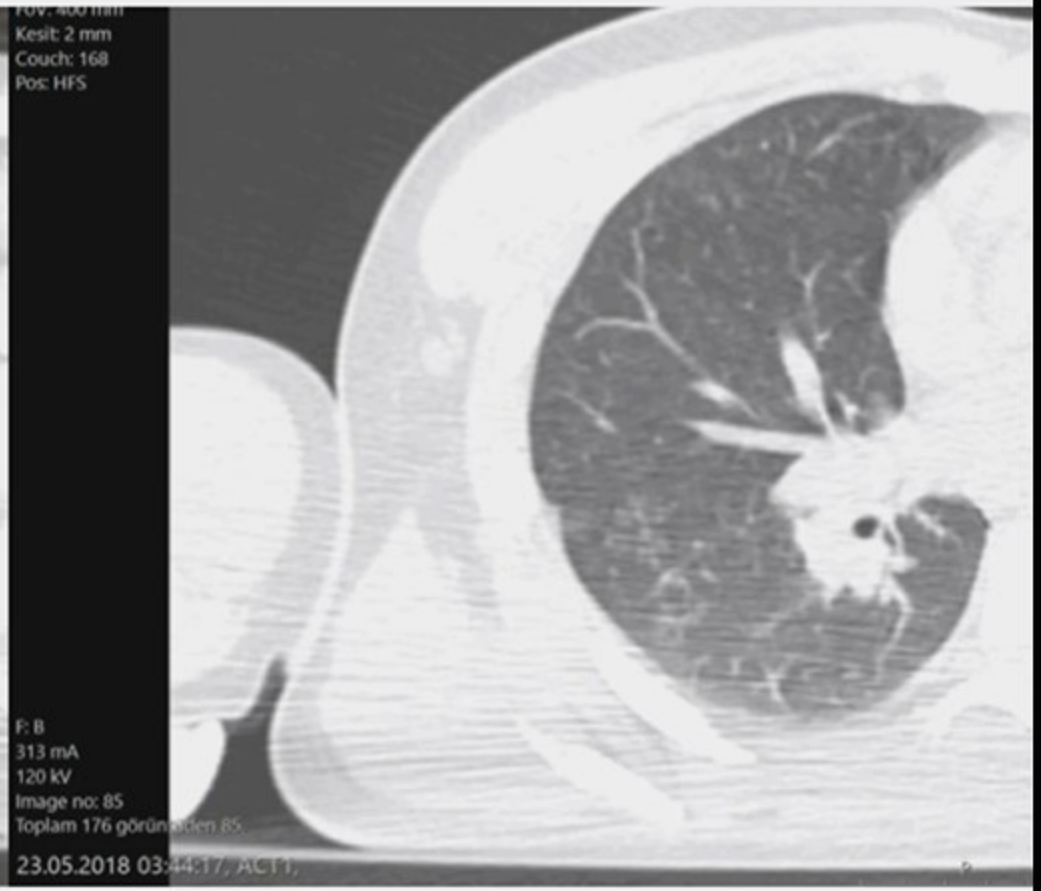

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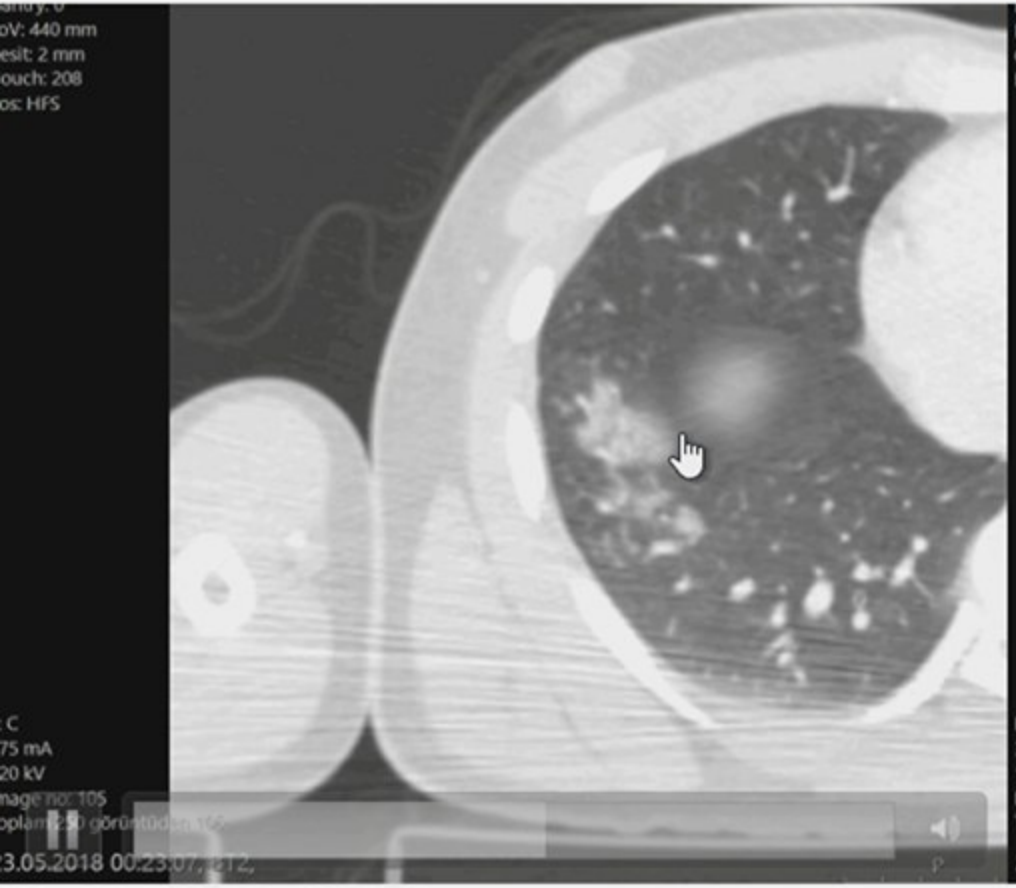

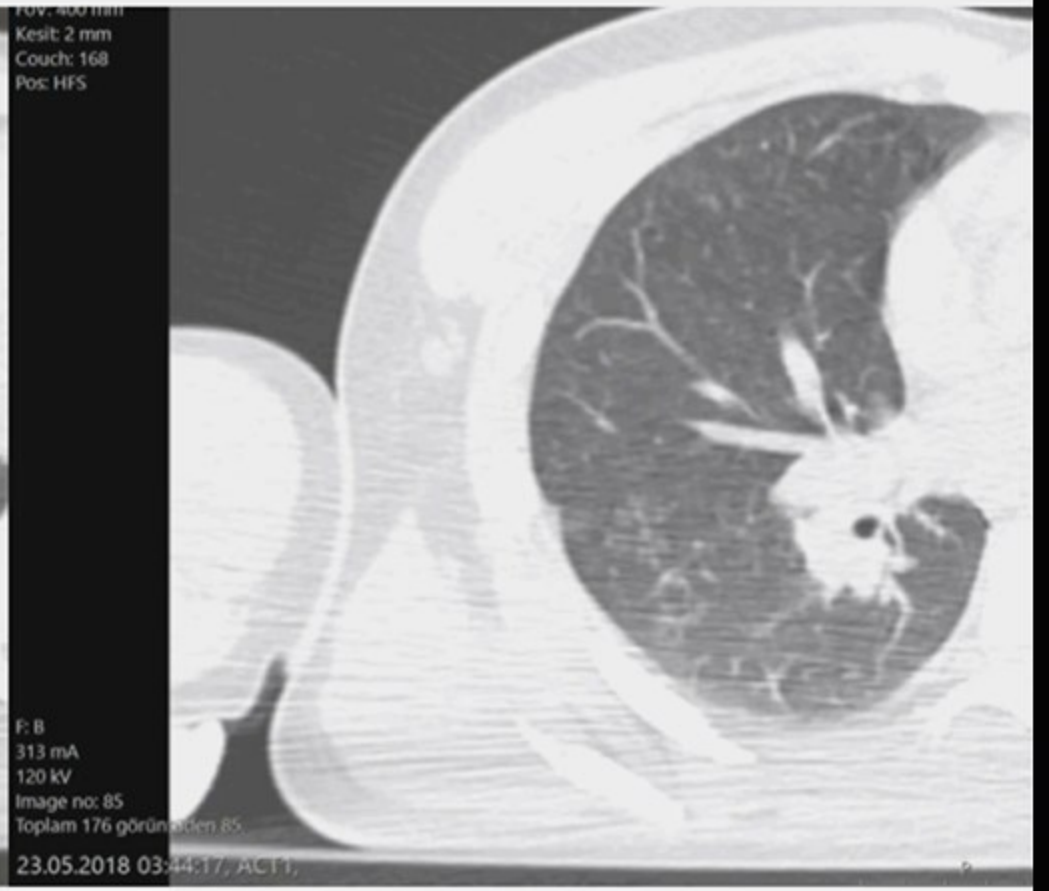

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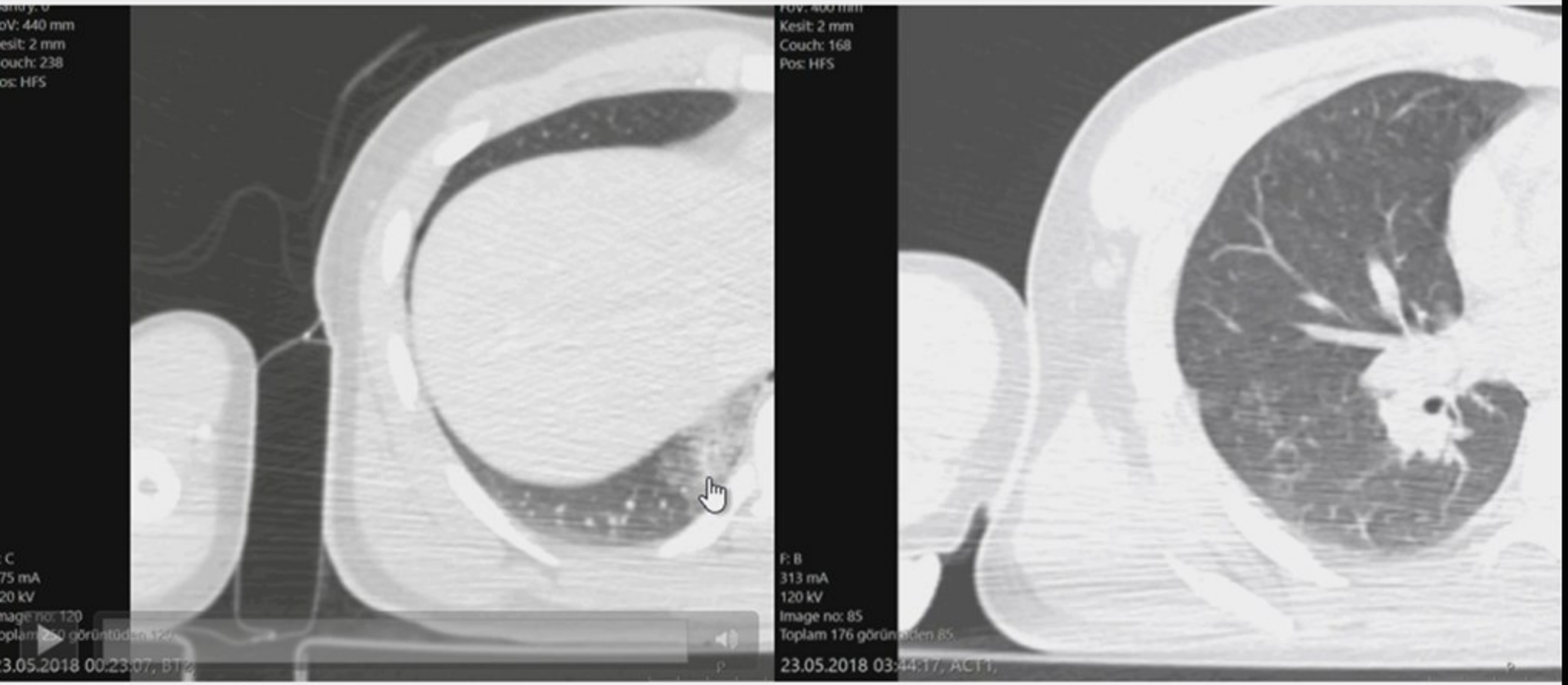

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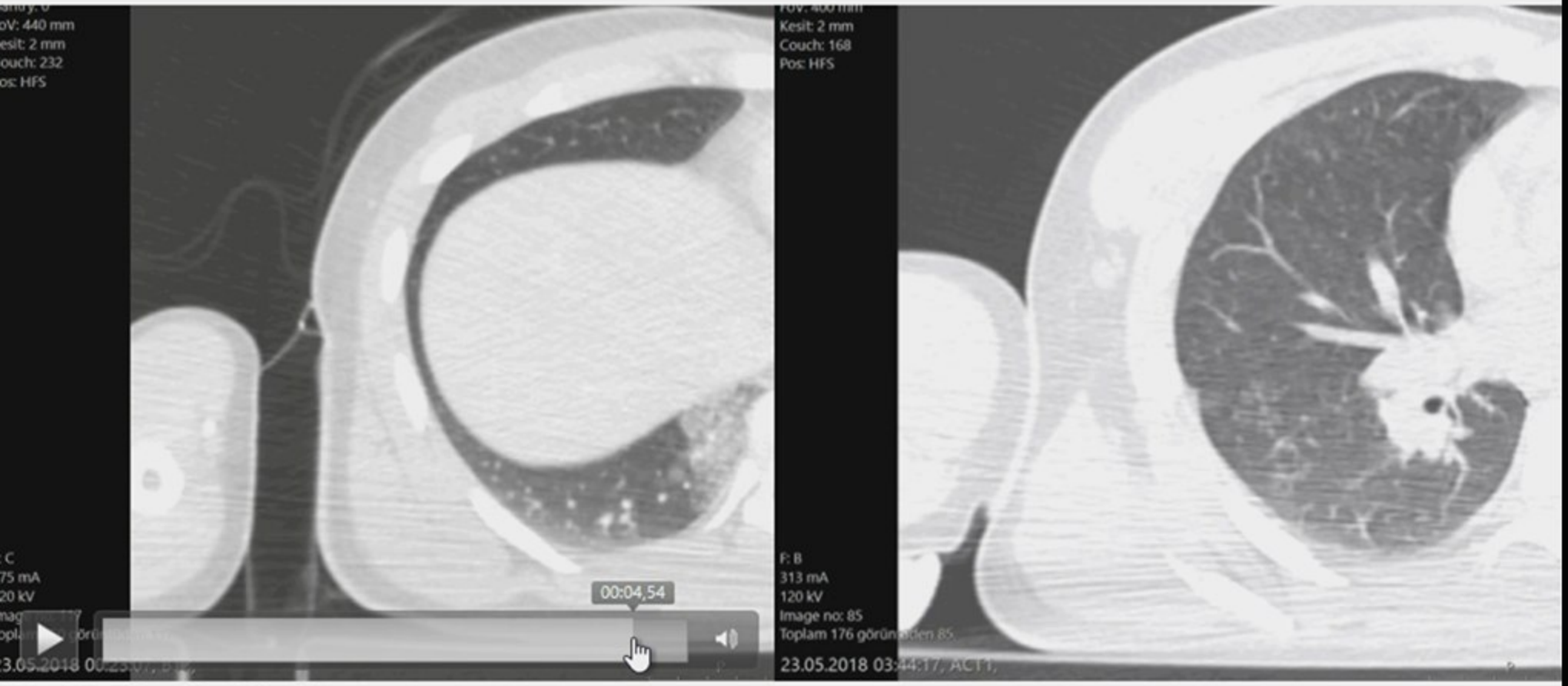

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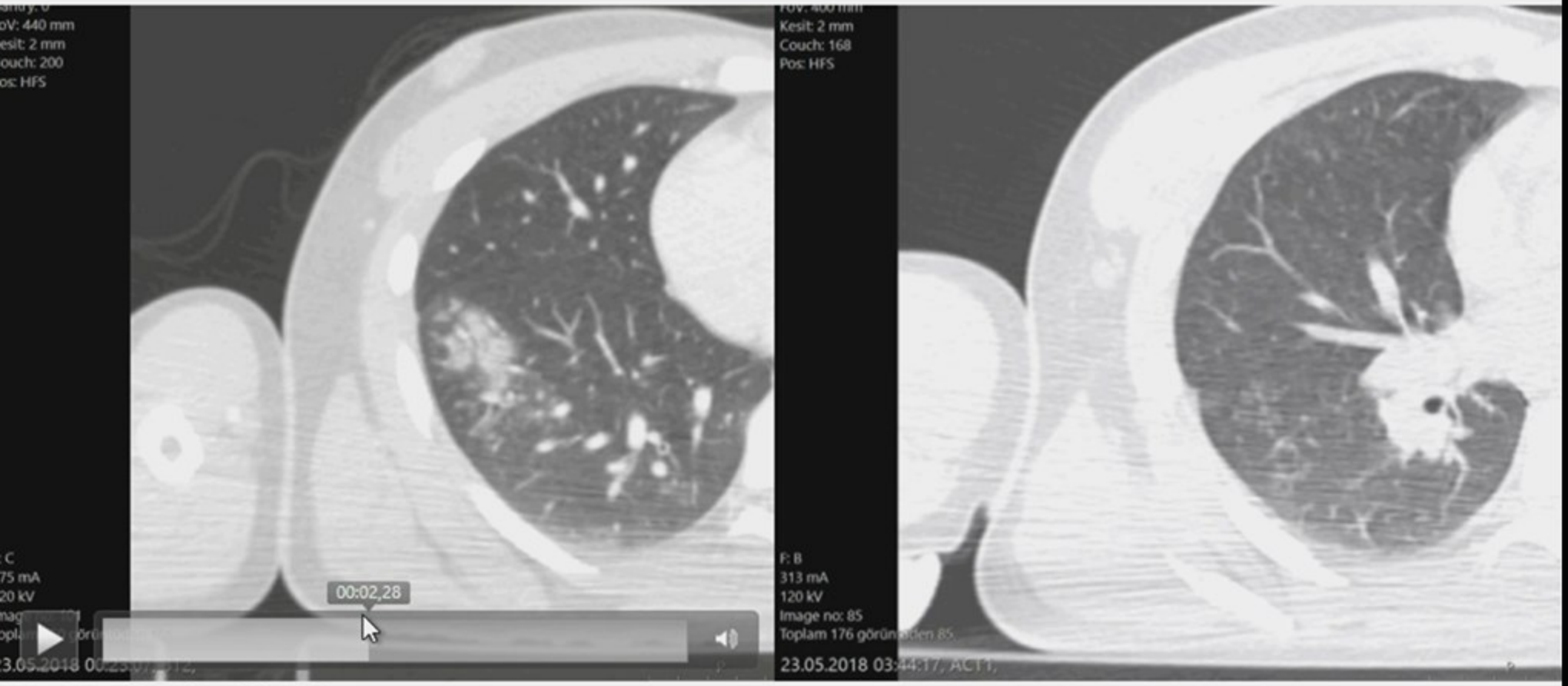

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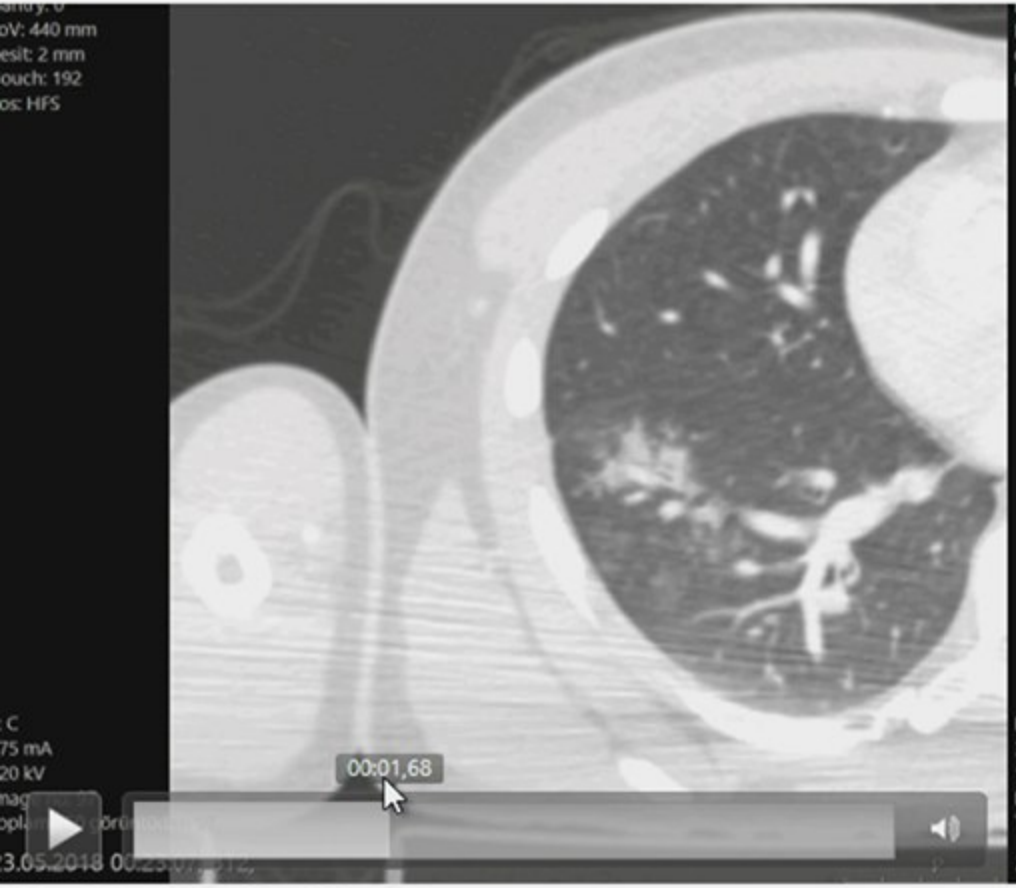
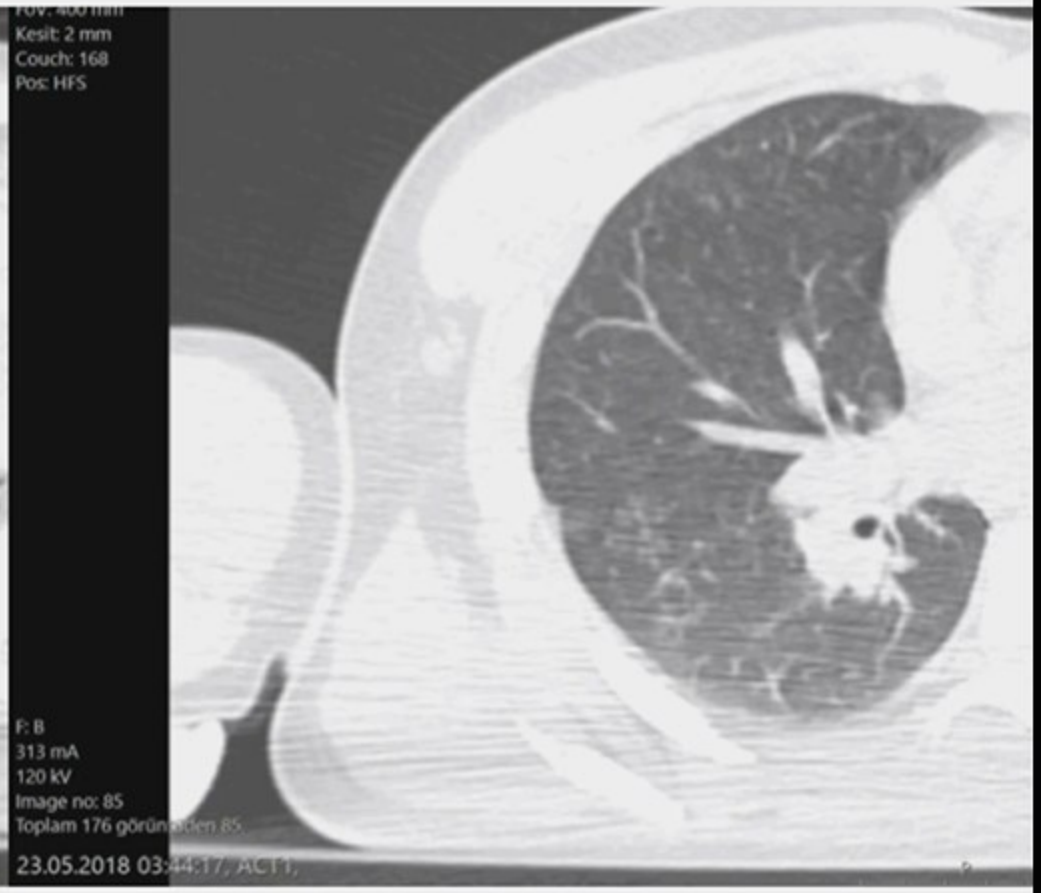
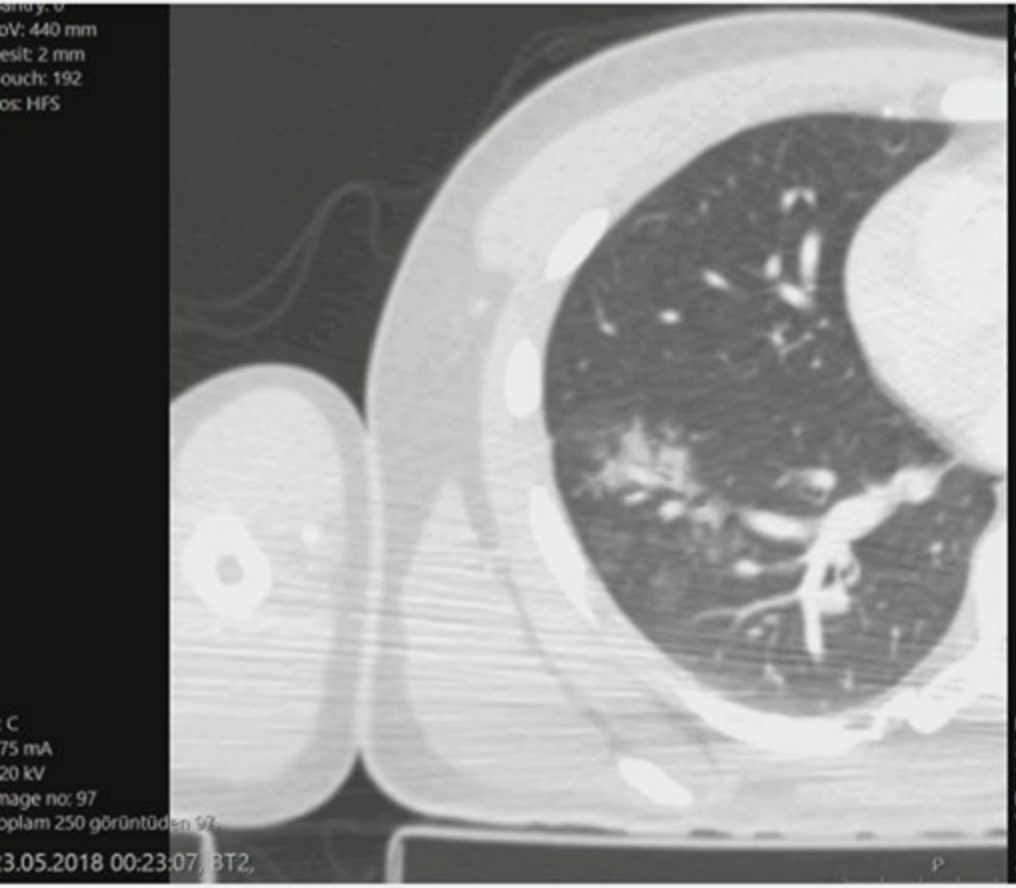
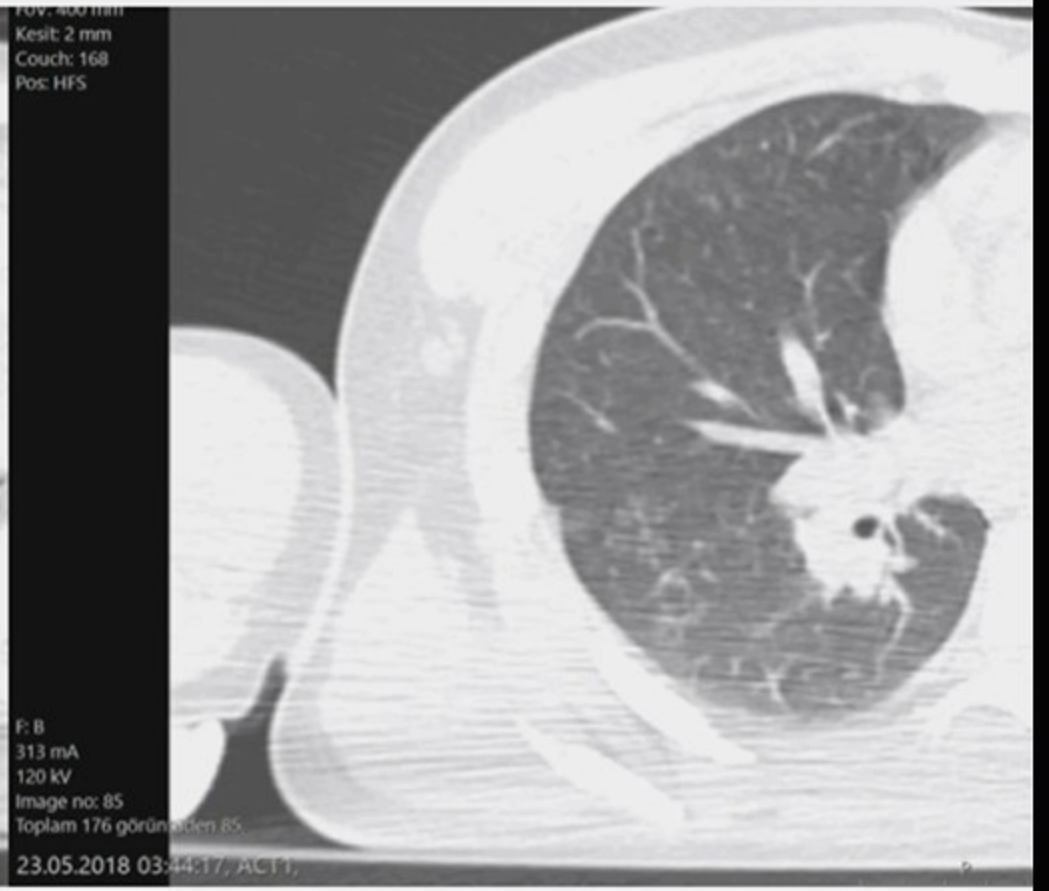


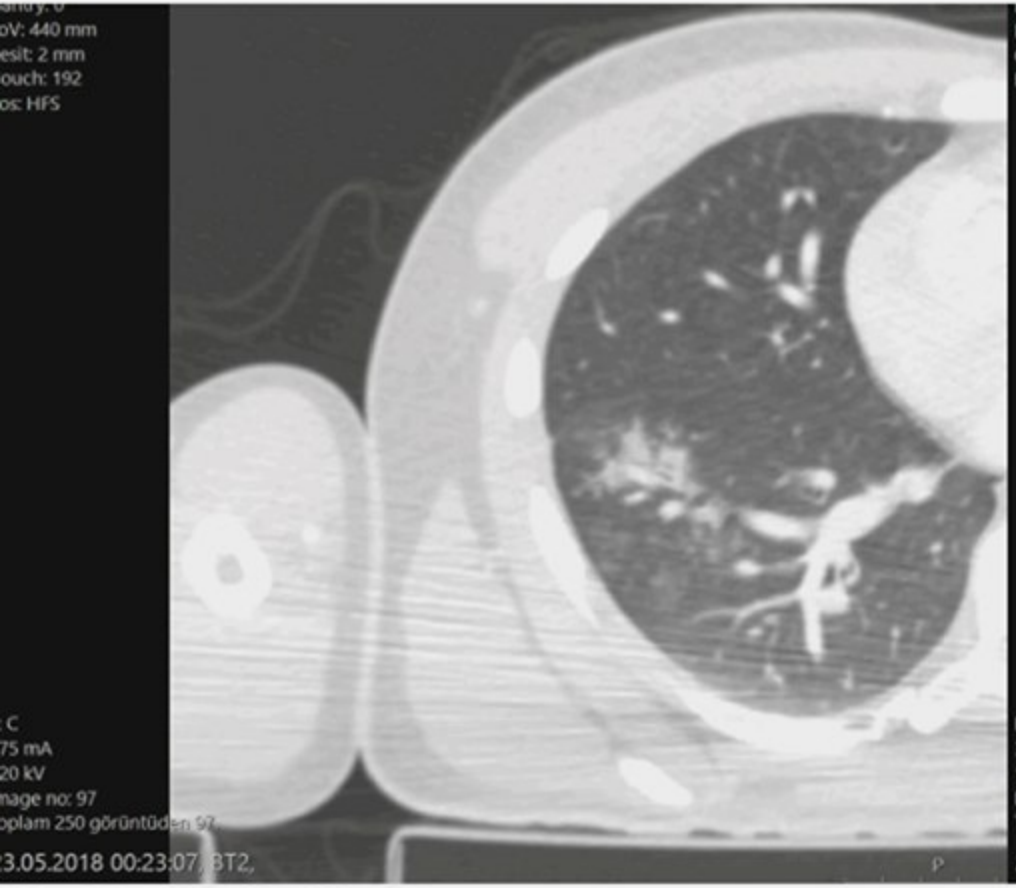


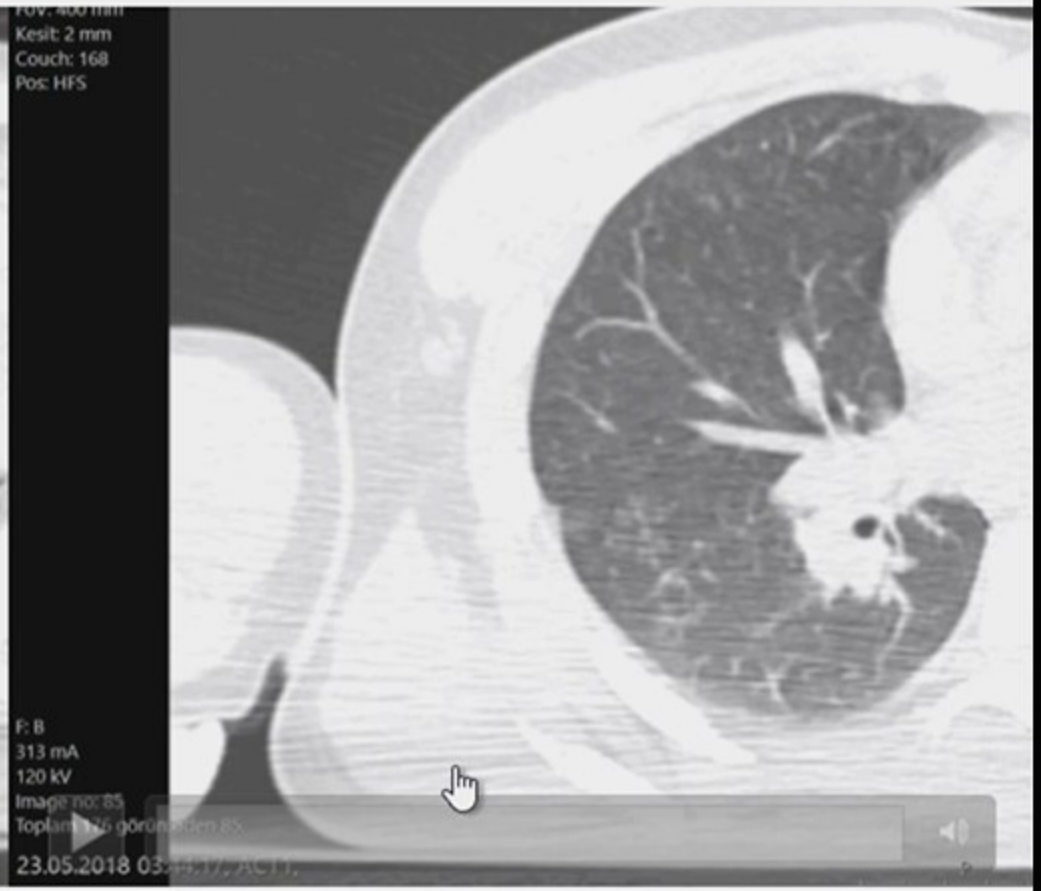
Pnömoni? Kontüzyon?





Pnömoni? Kontüzyon?





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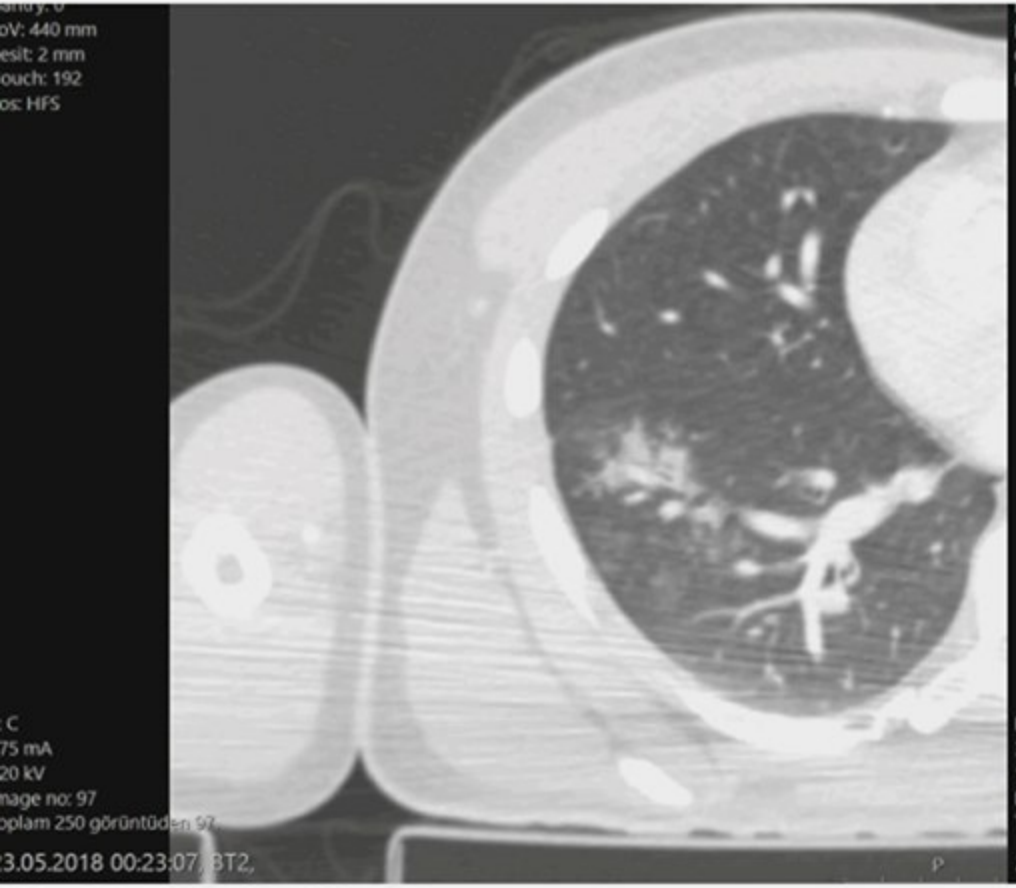

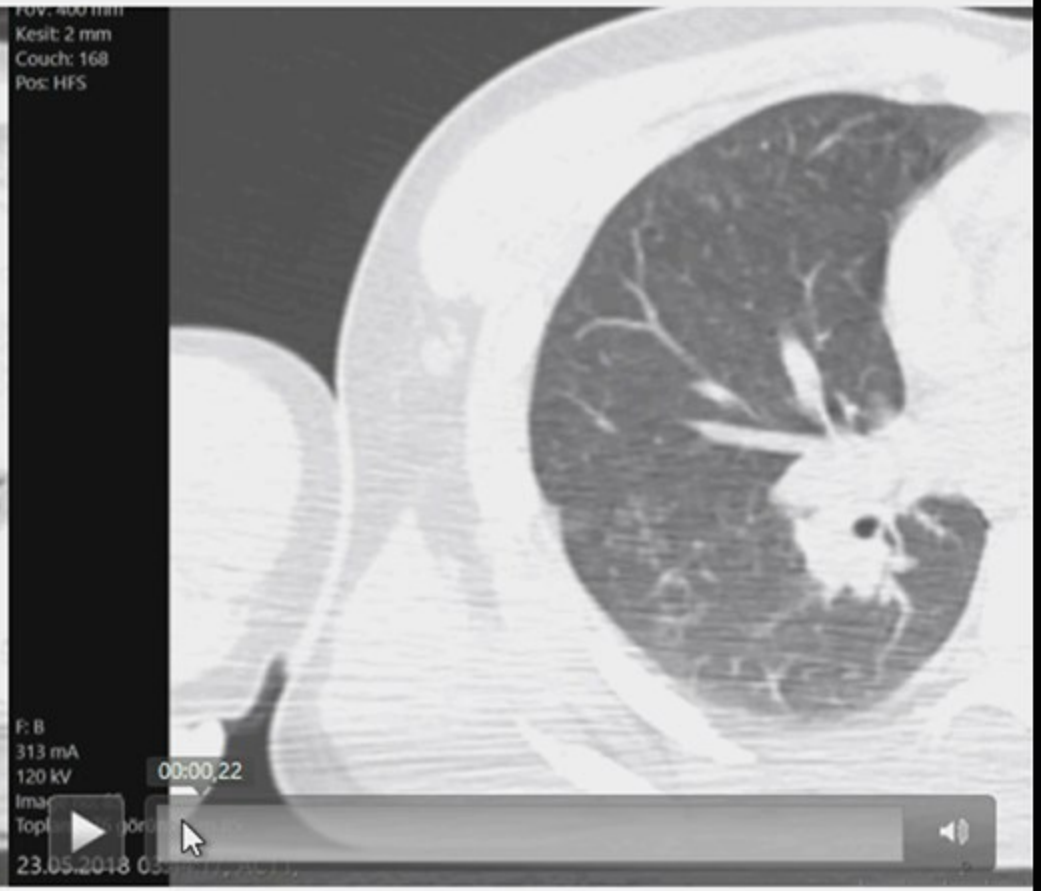

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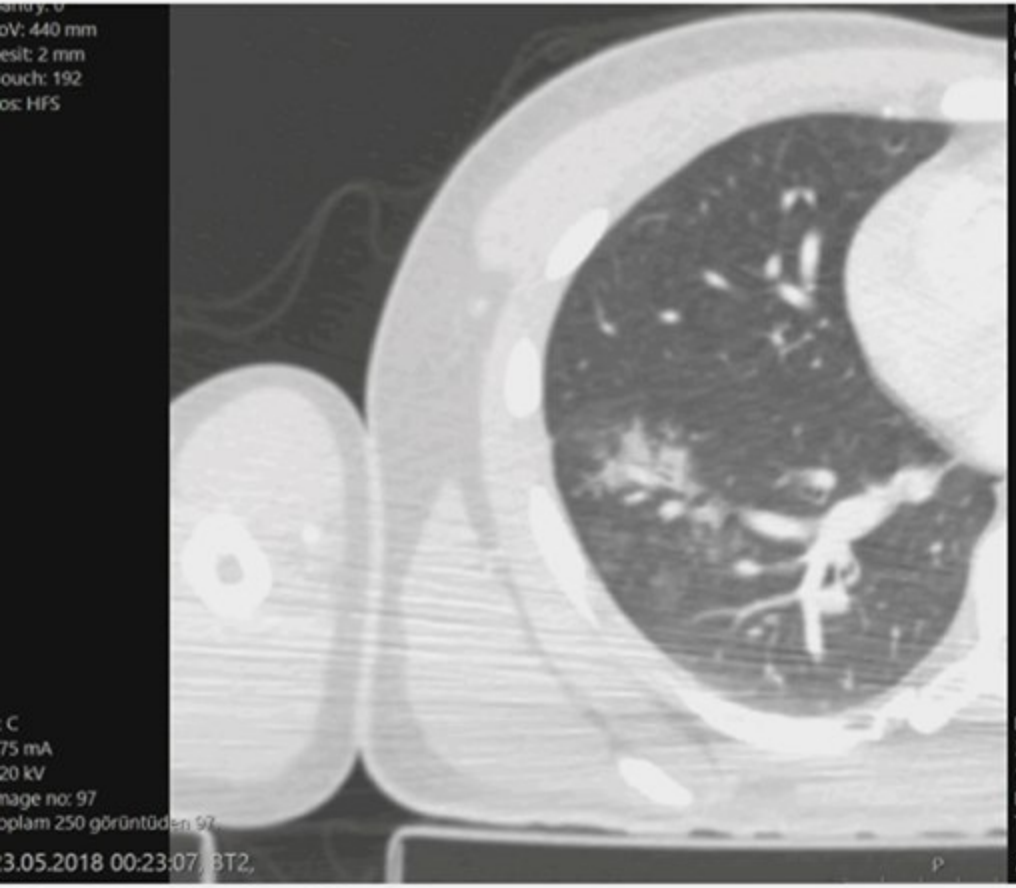
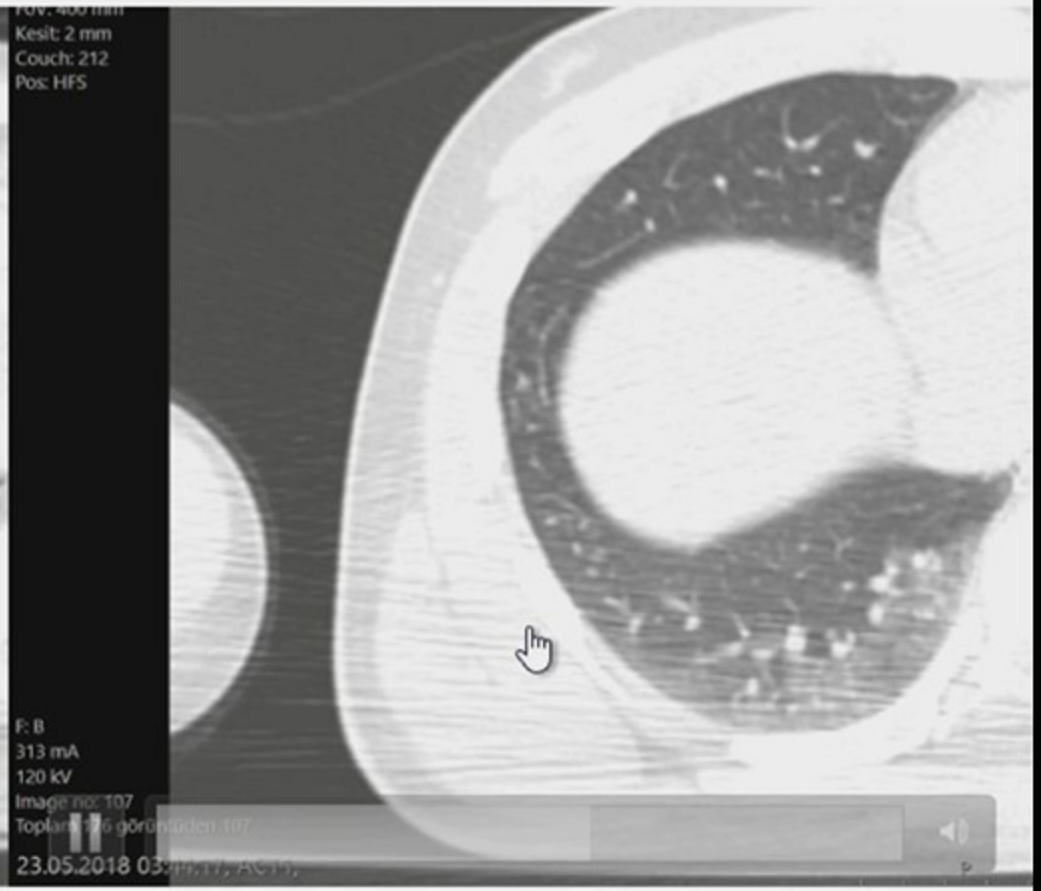
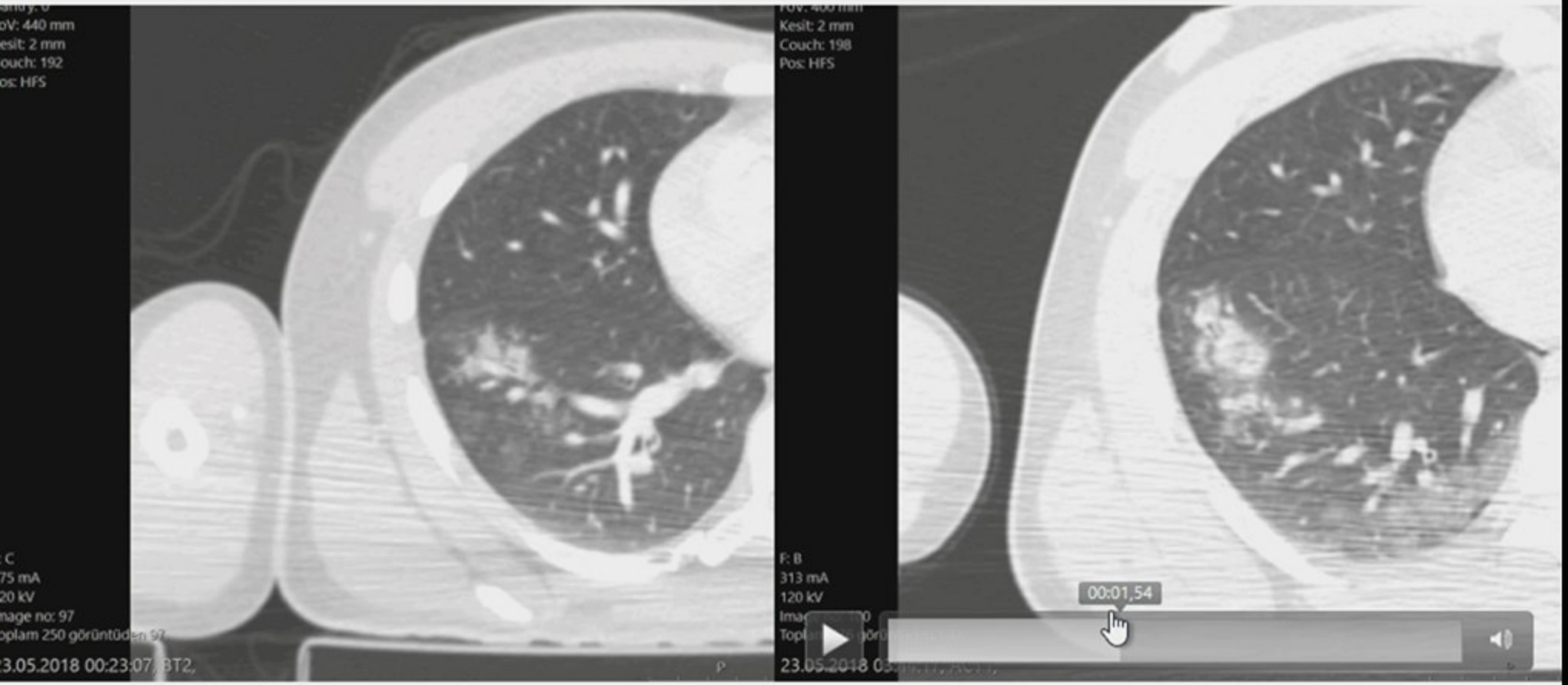
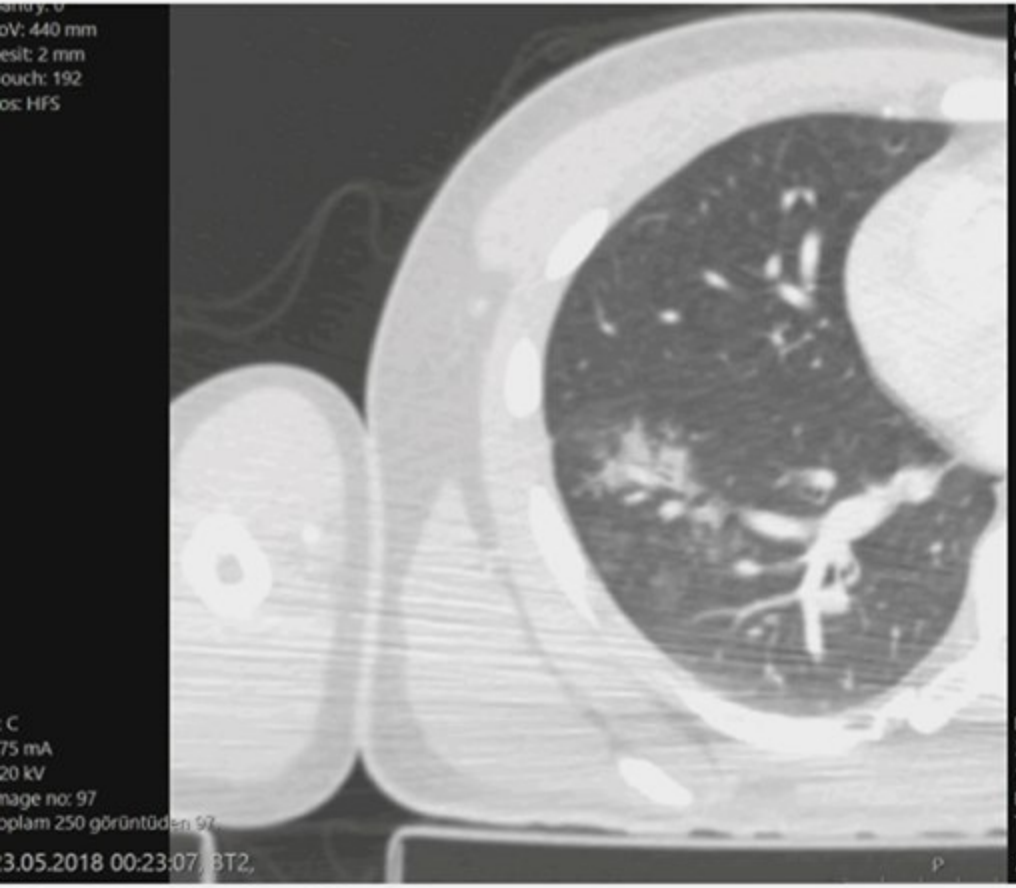


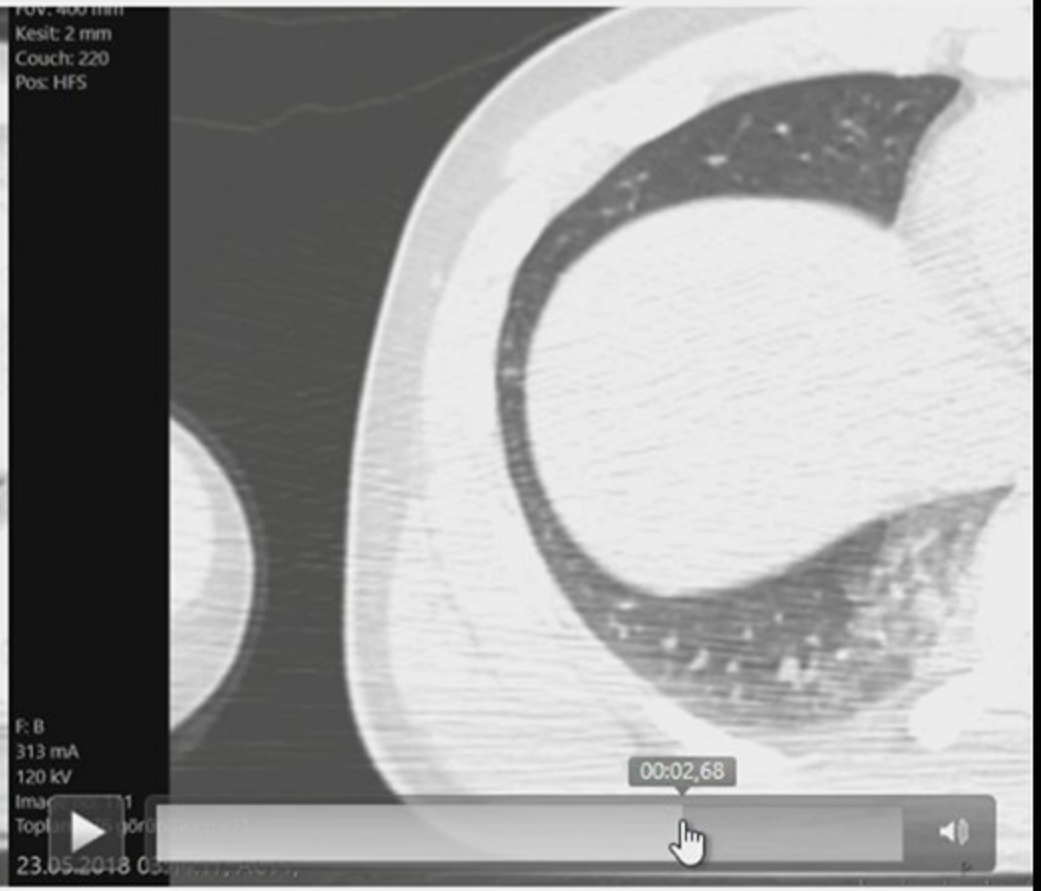


Pnömoni? Kontüzyon?

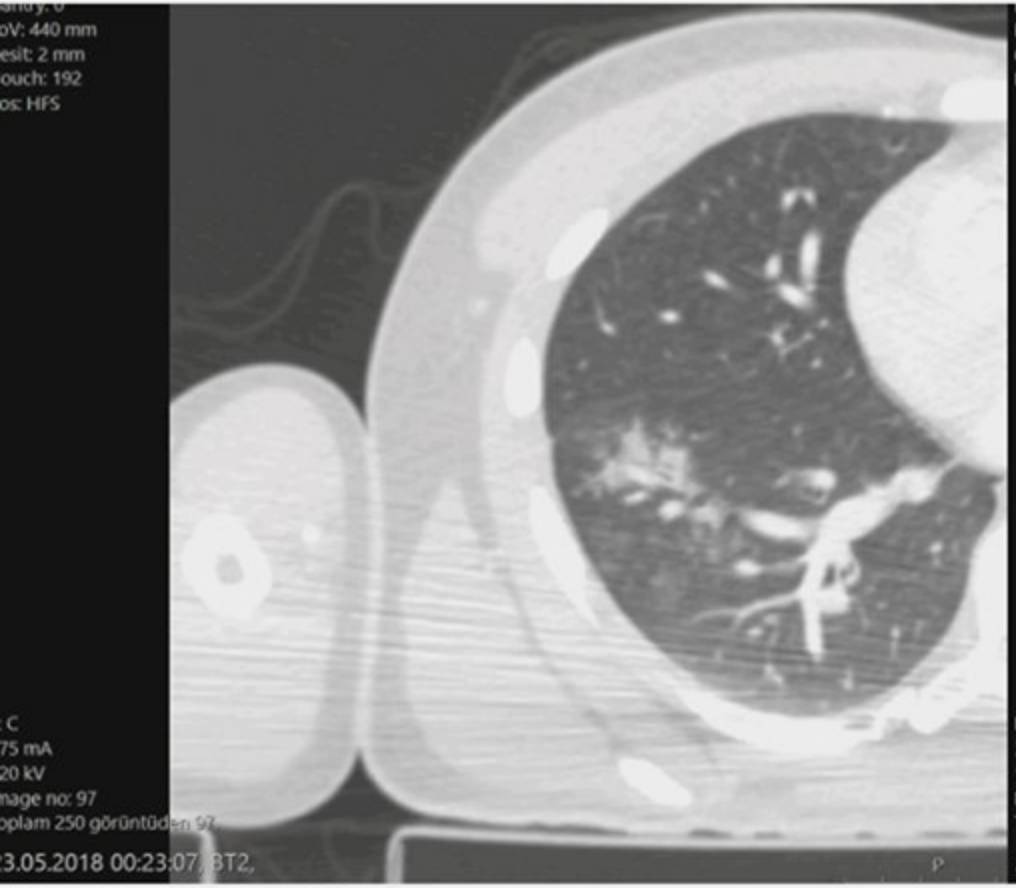


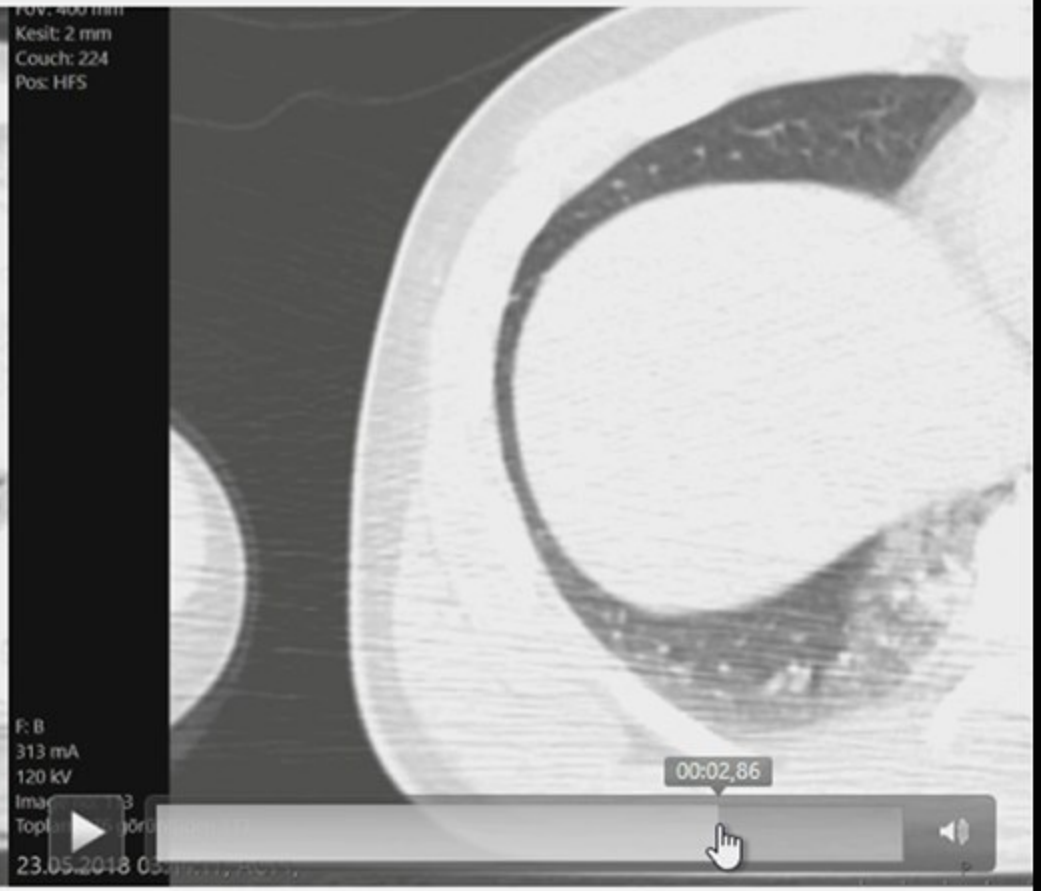
Pnömoni? Kontüzyon?



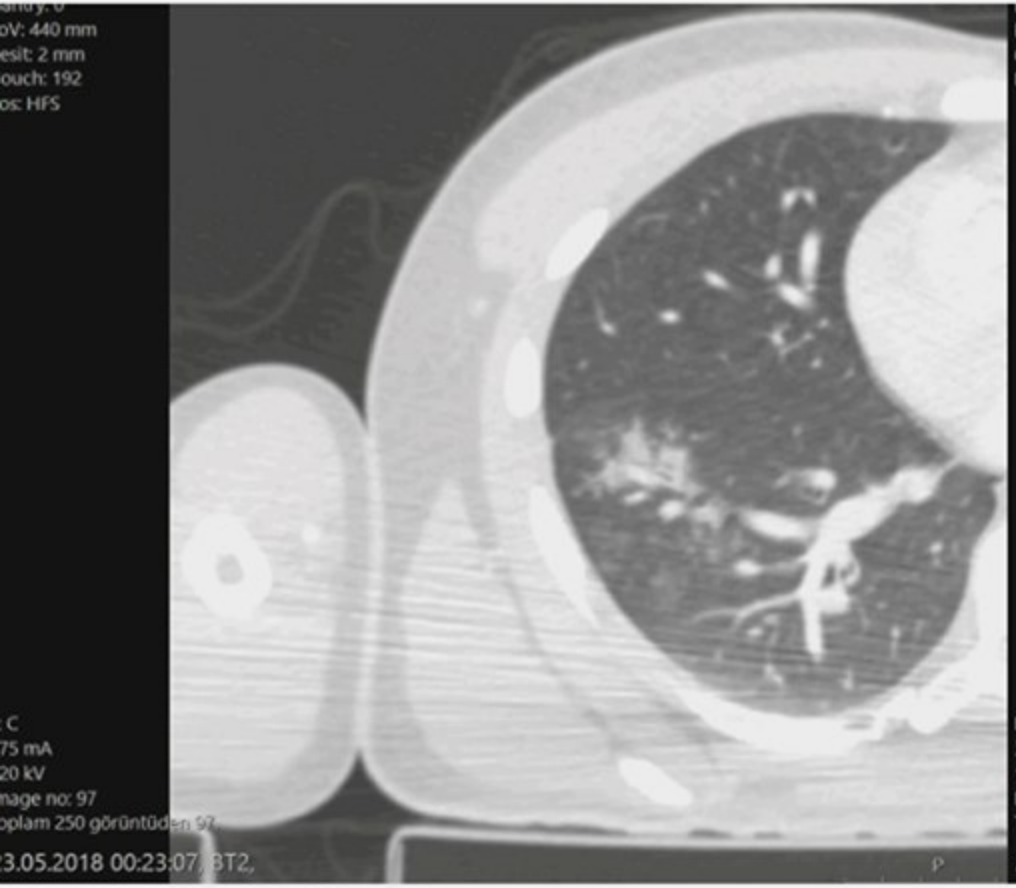


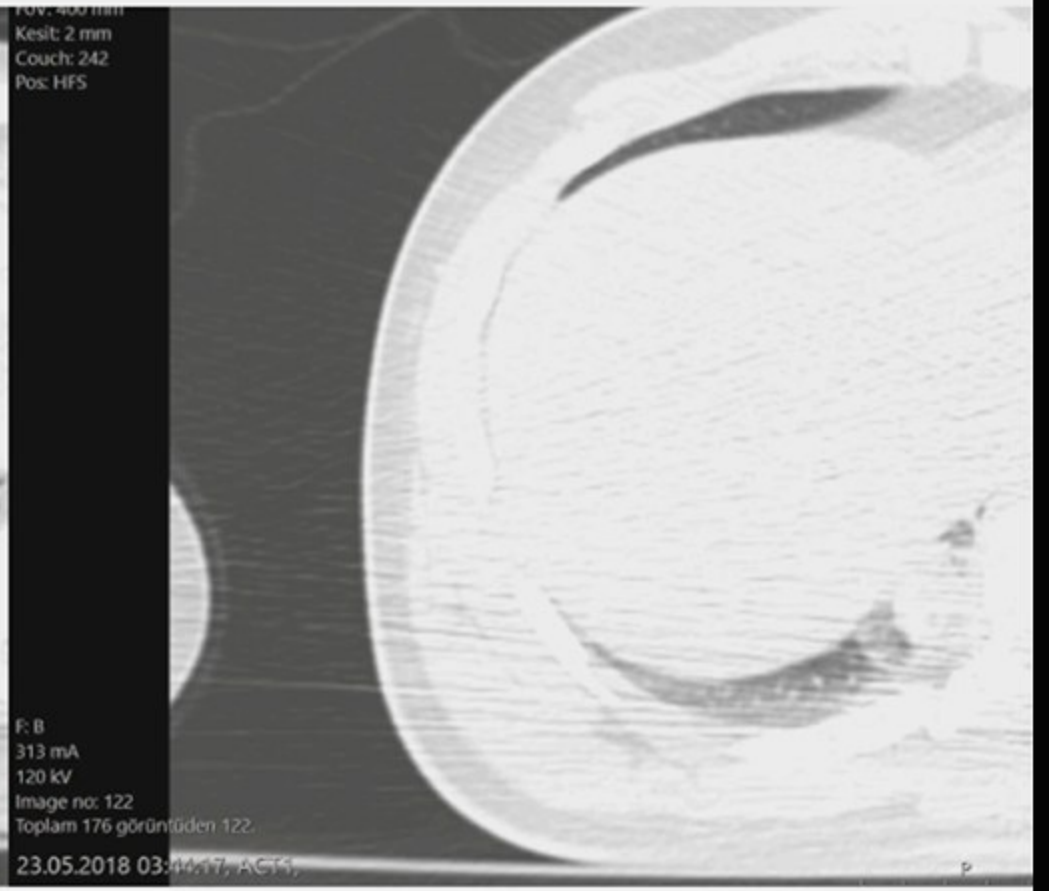
Pnömoni? Kontüzyon?



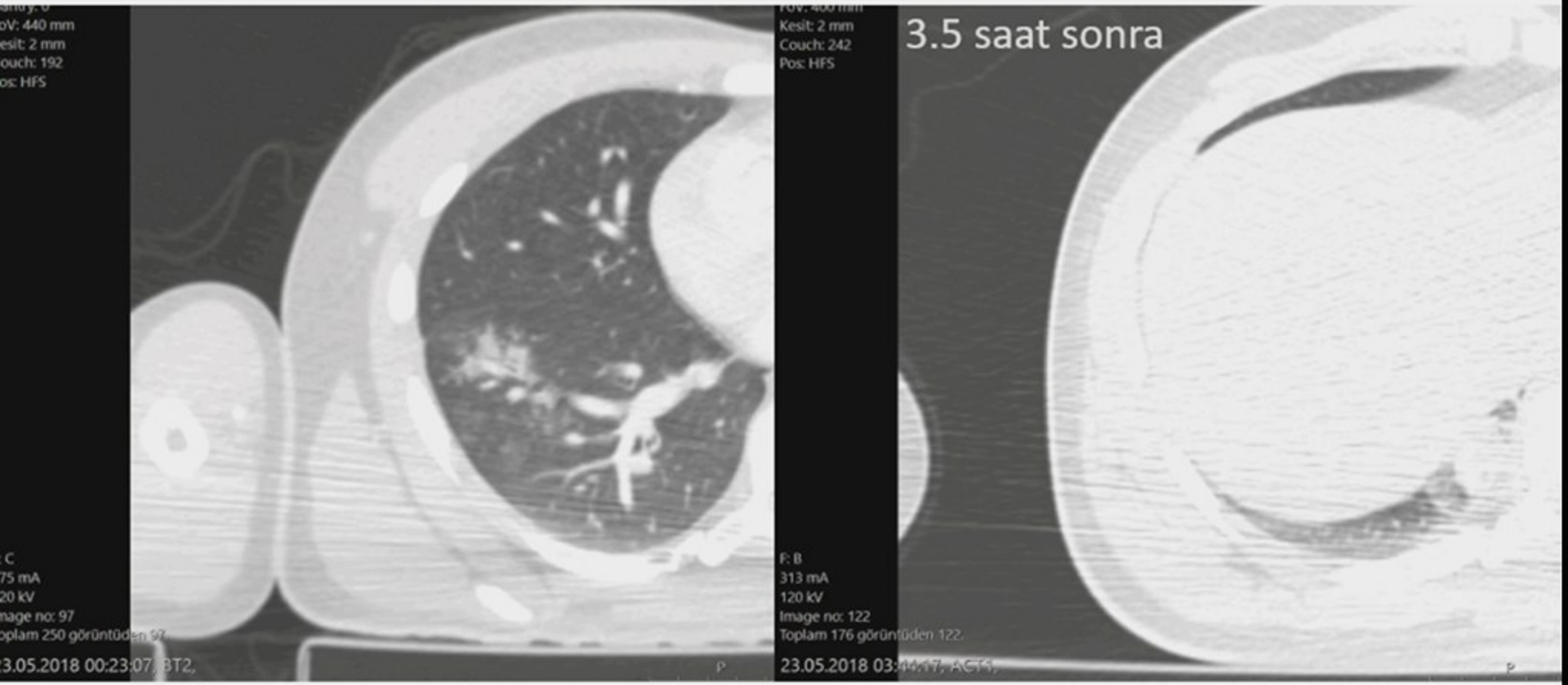


Pnömoni? Kontüzyon?





Pnömotoraks? Kontüzyon



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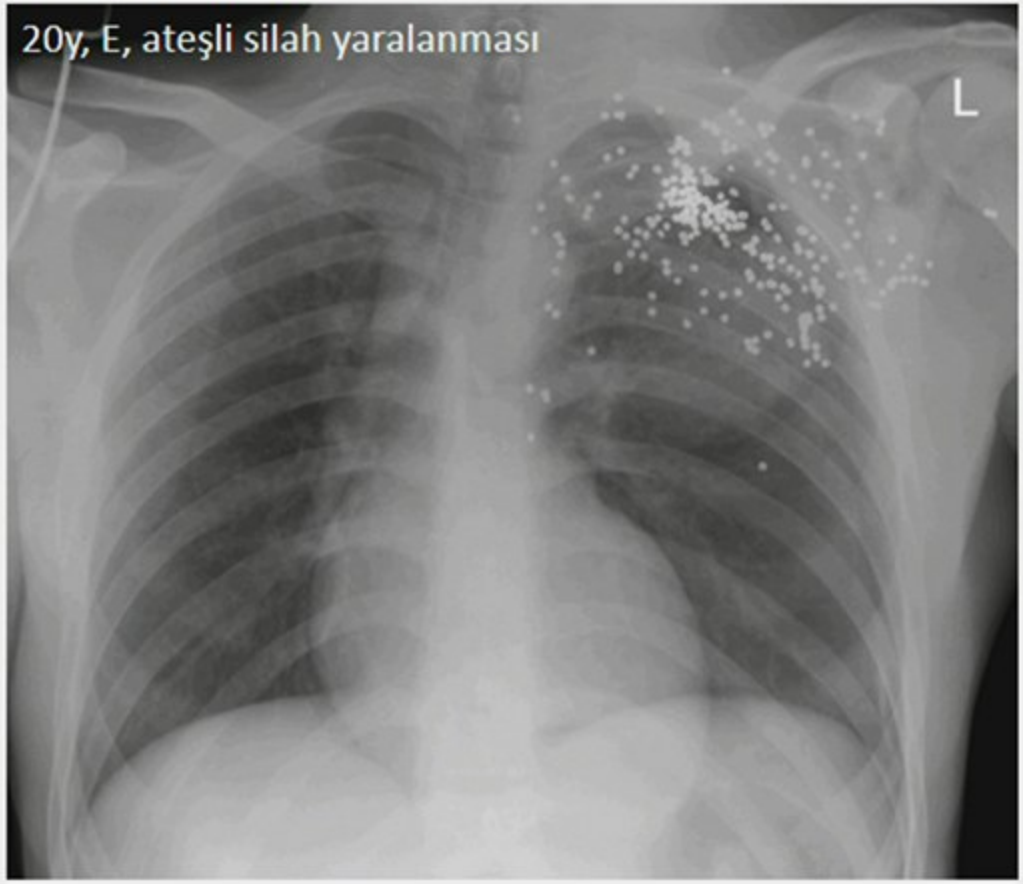

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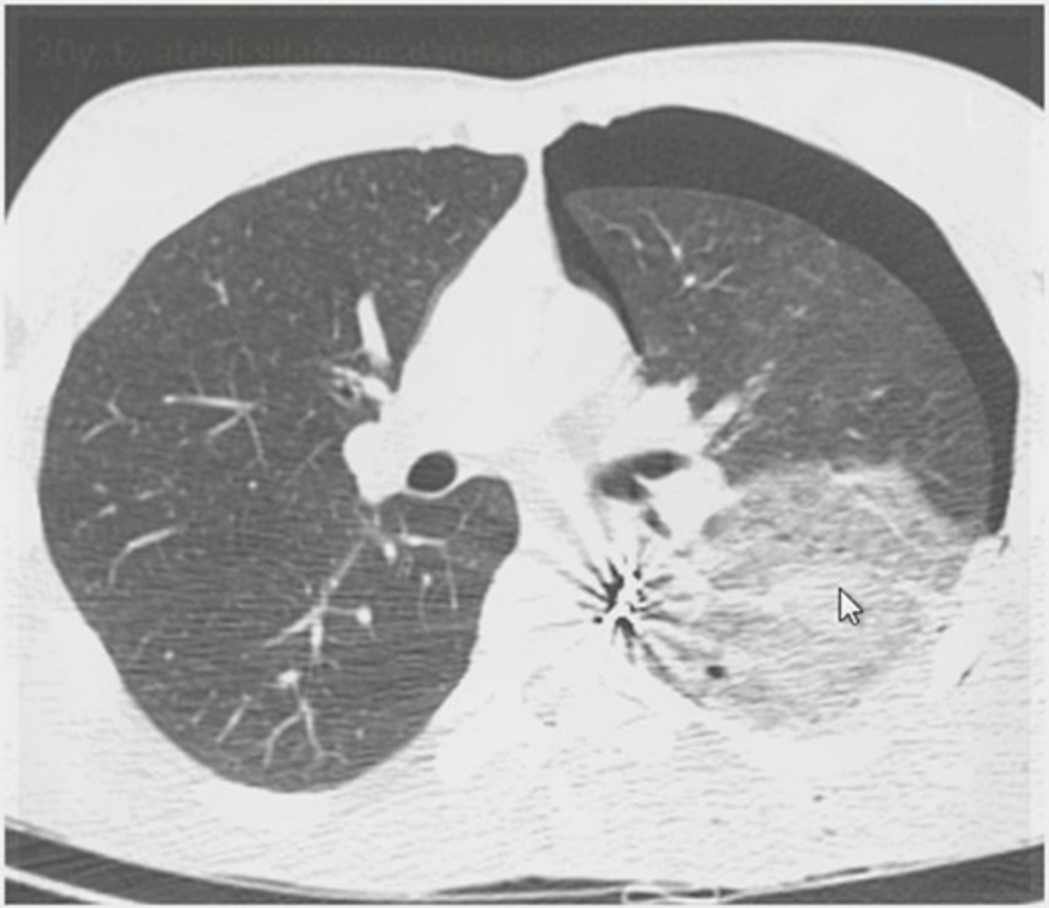

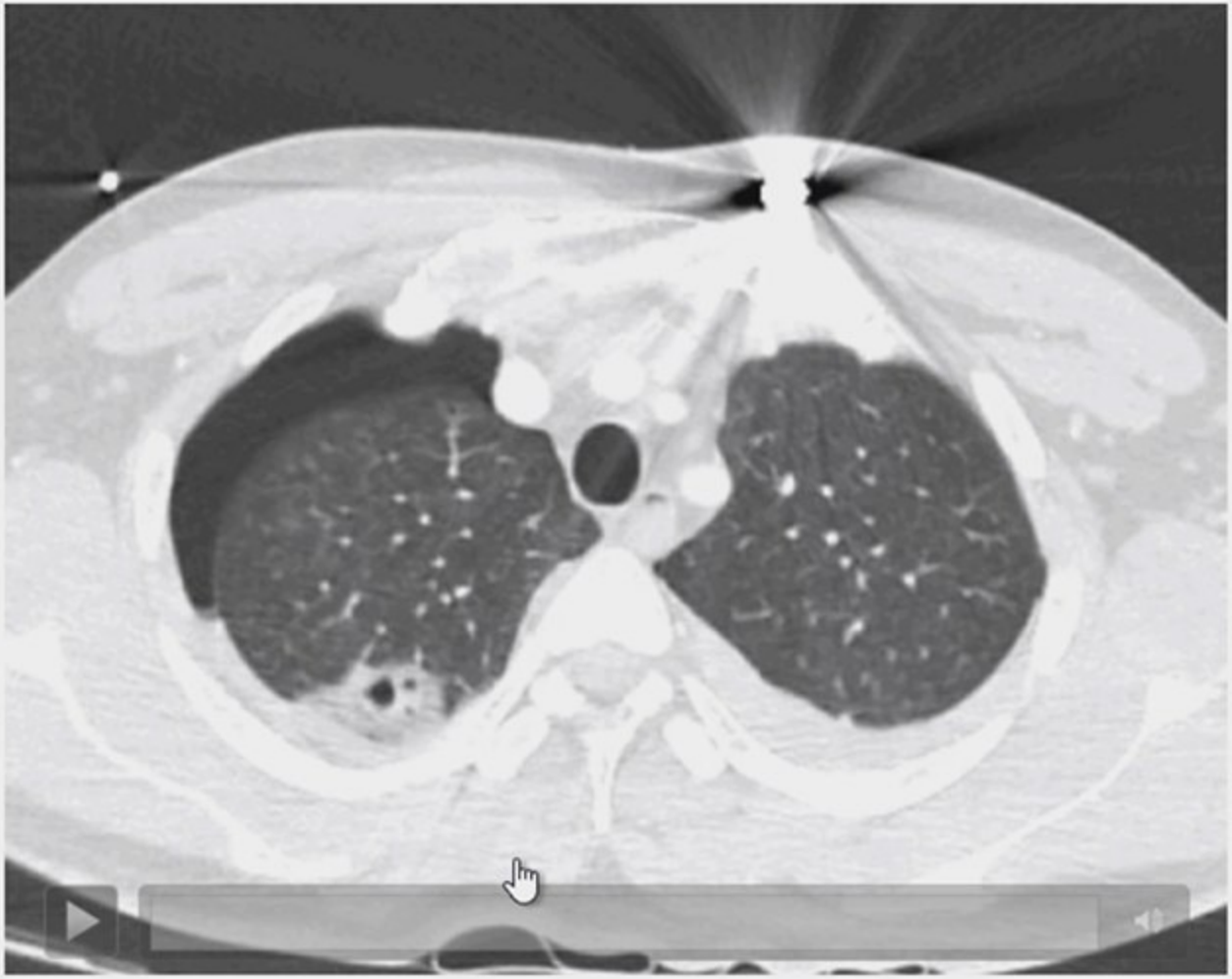

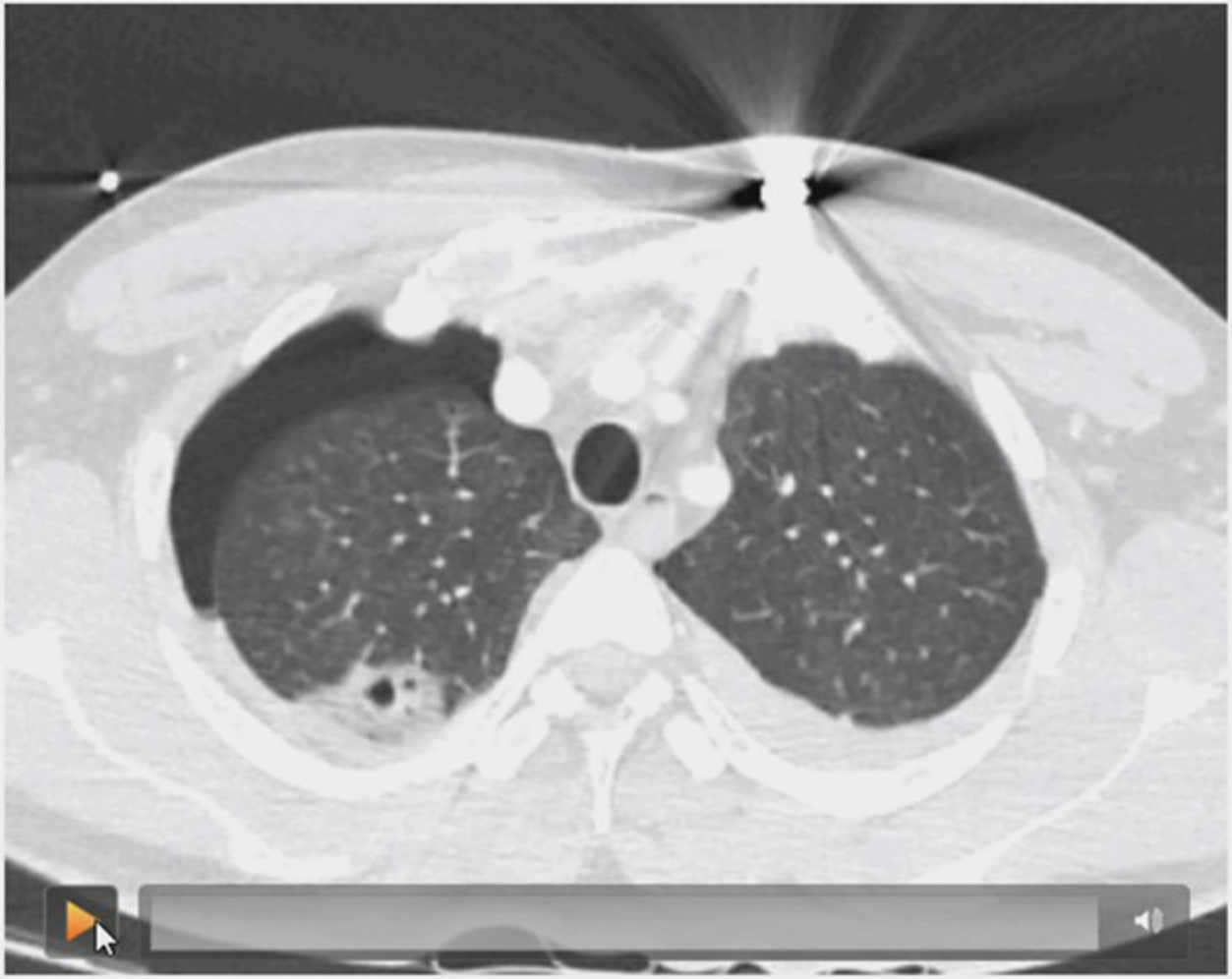

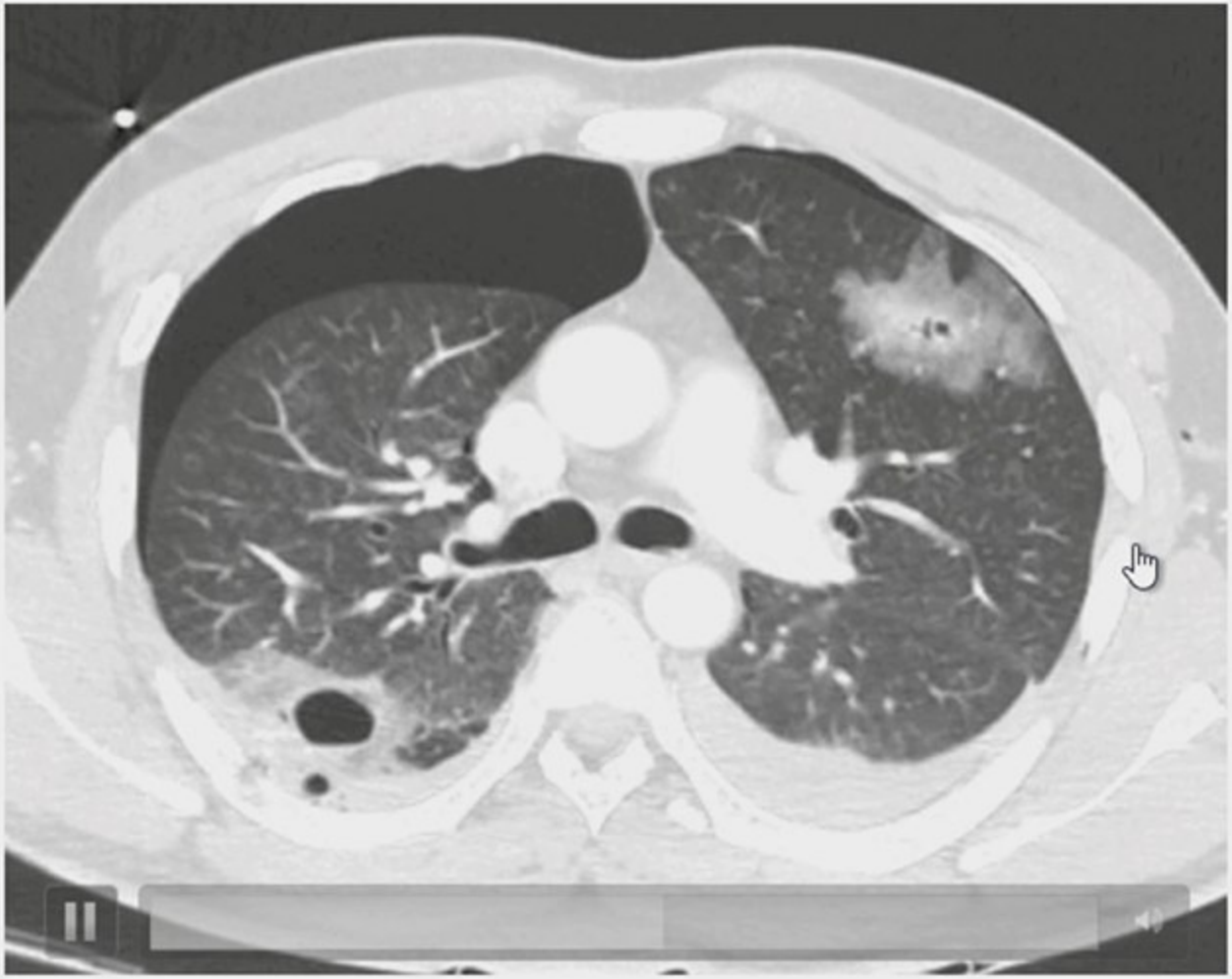

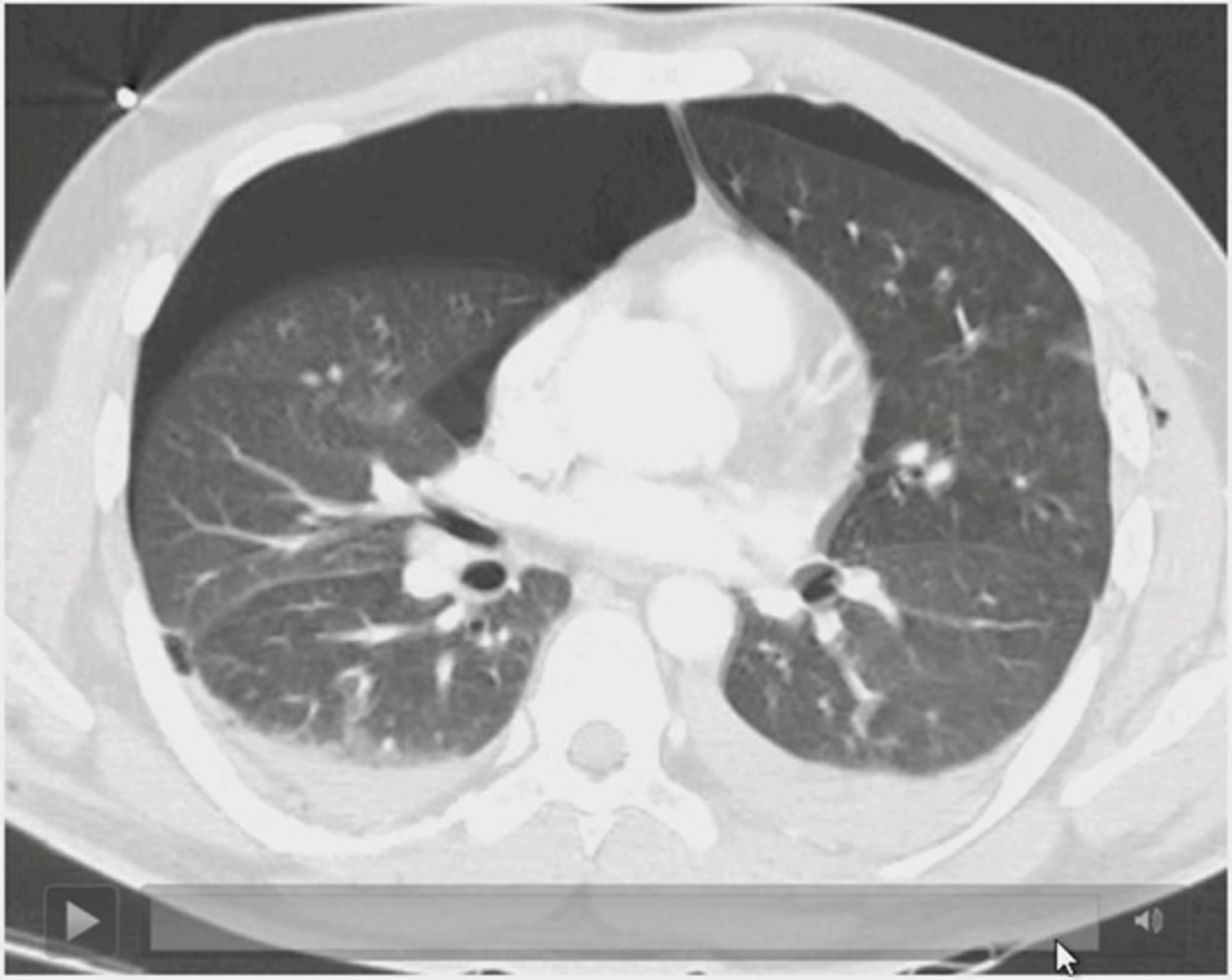

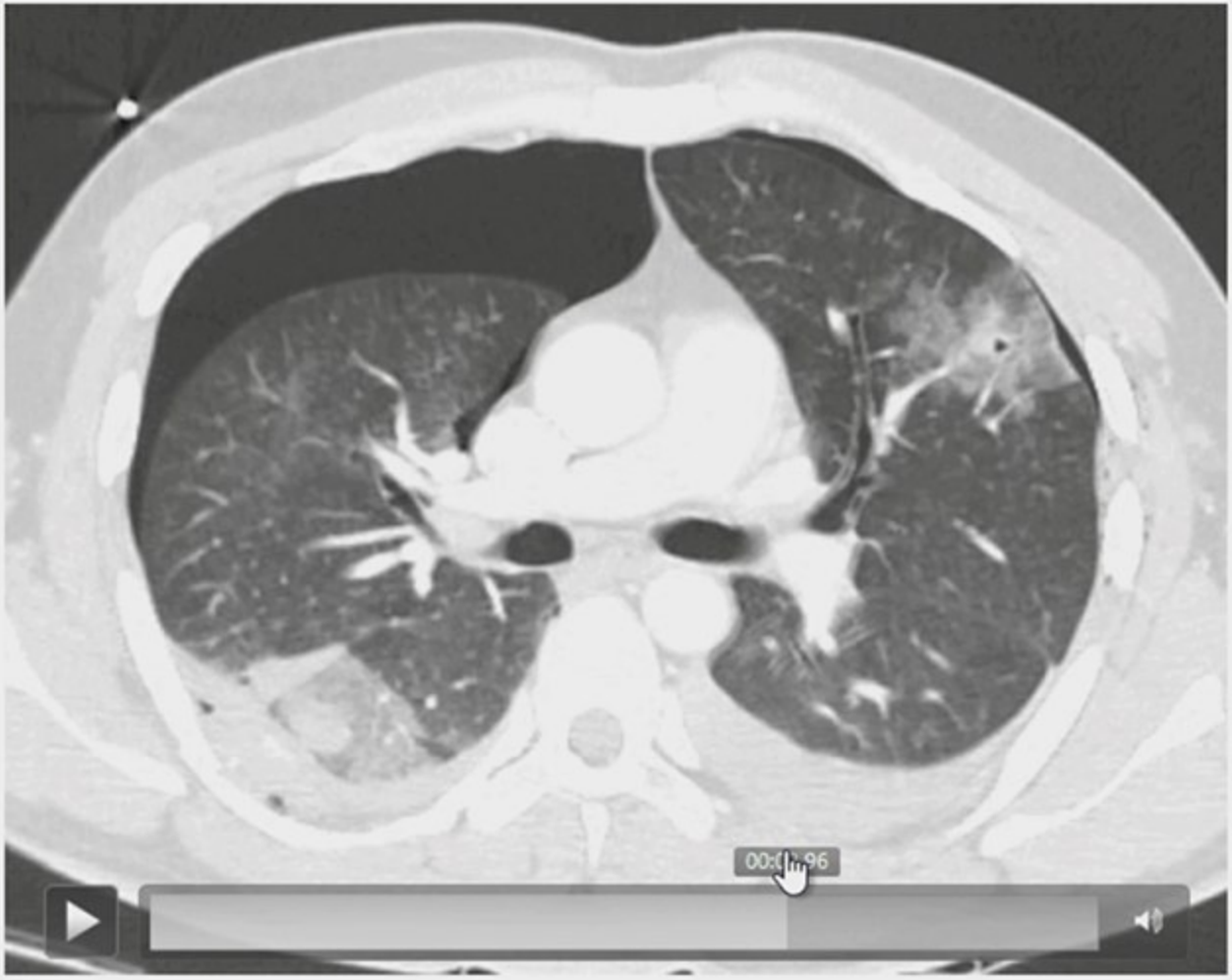

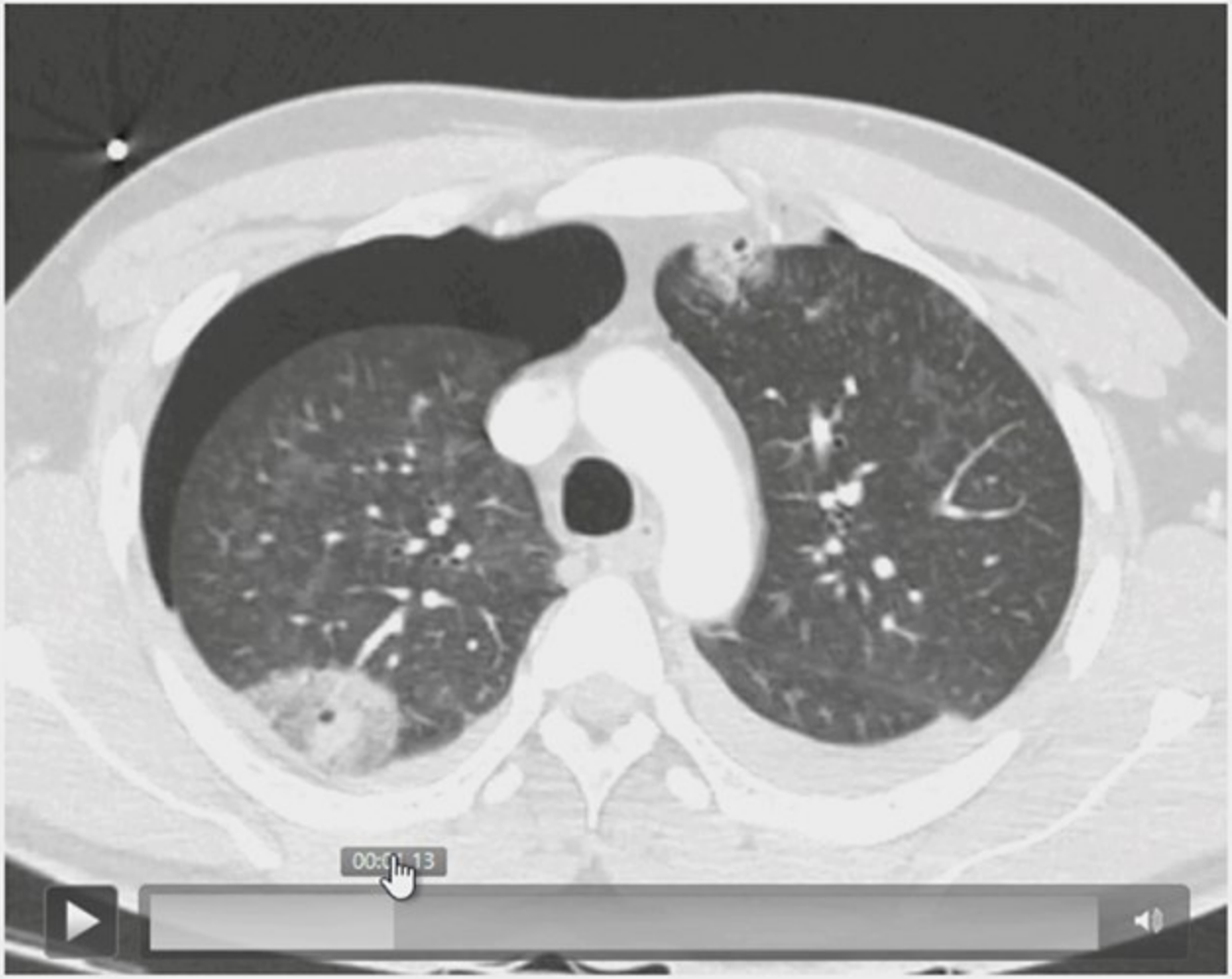

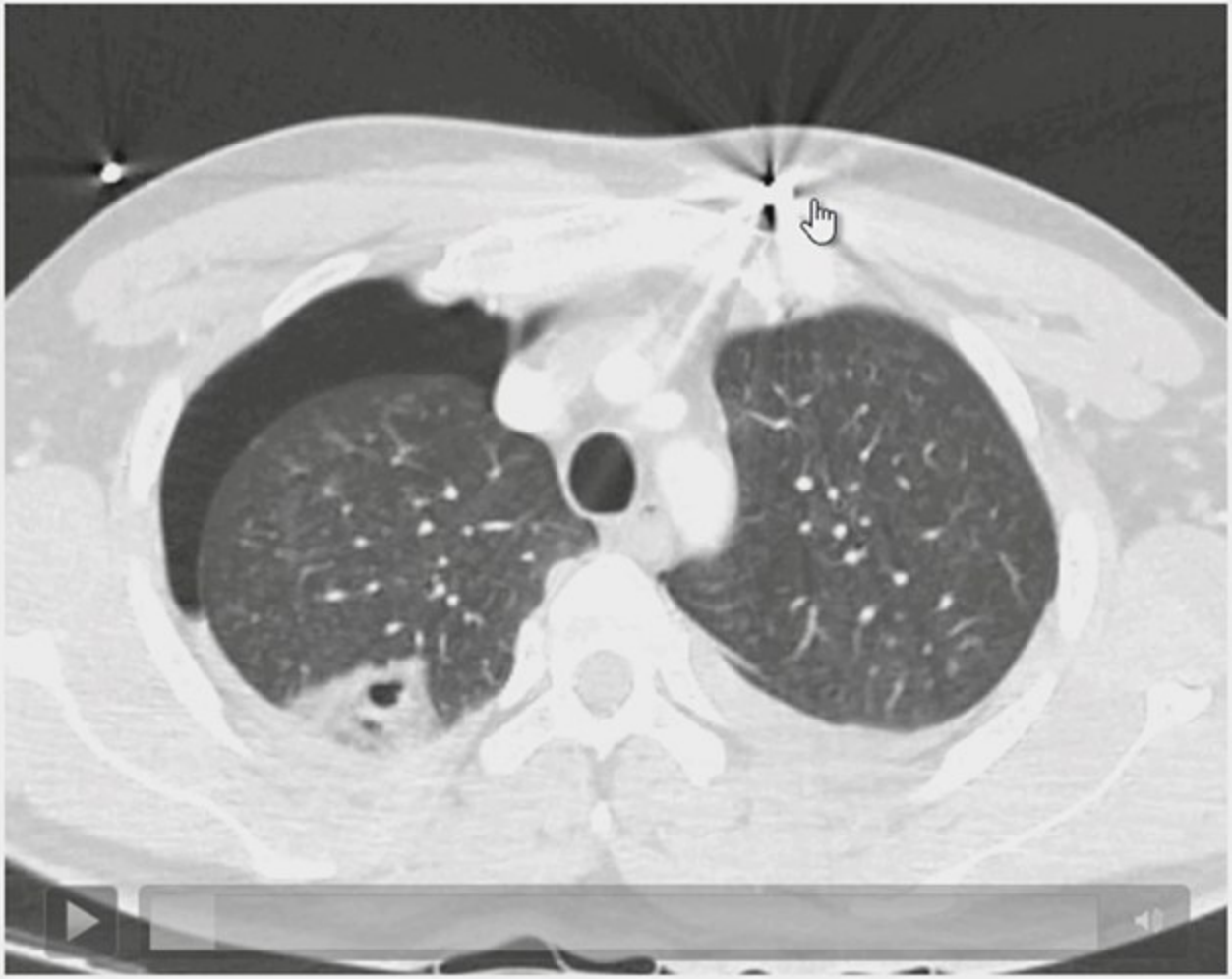

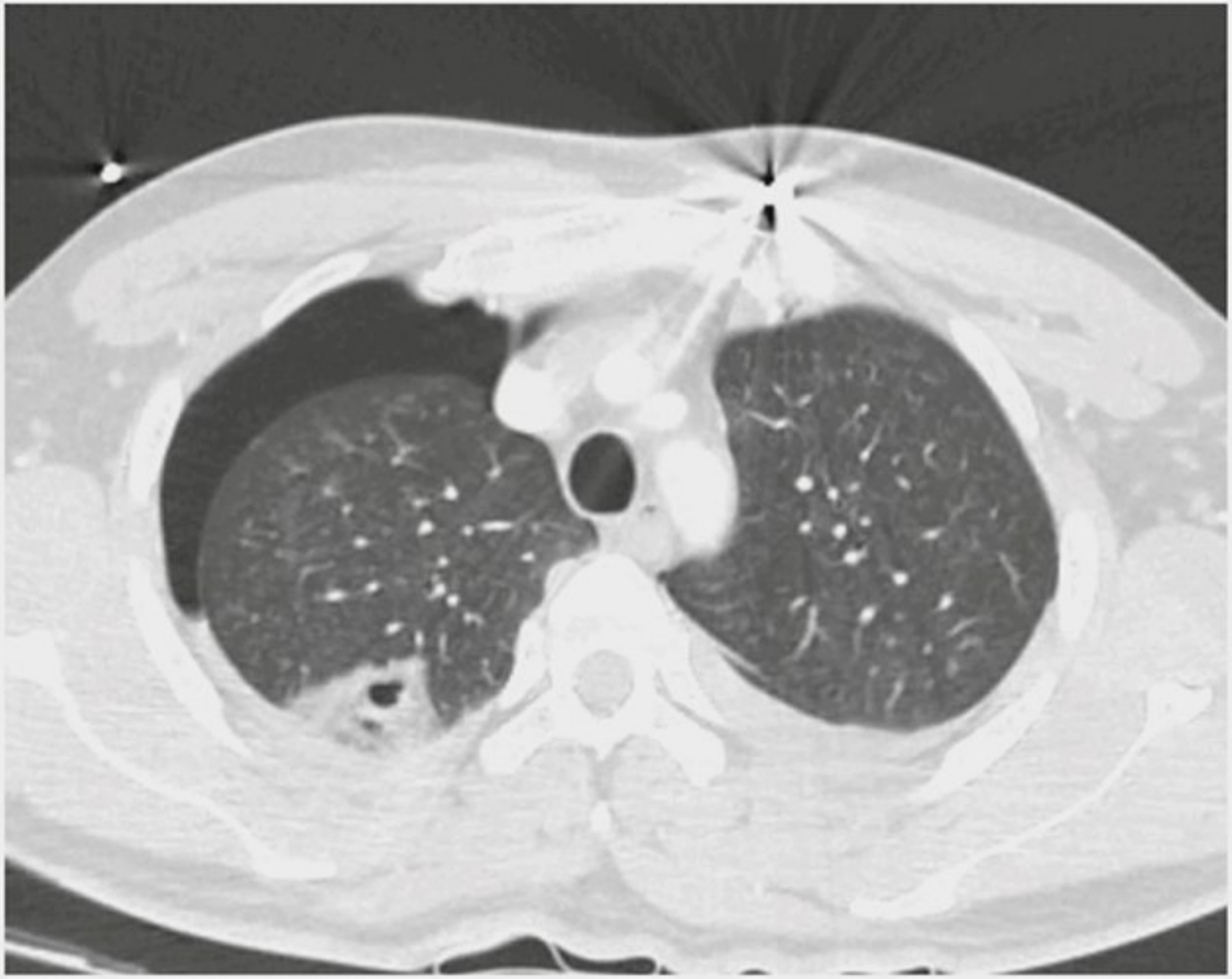

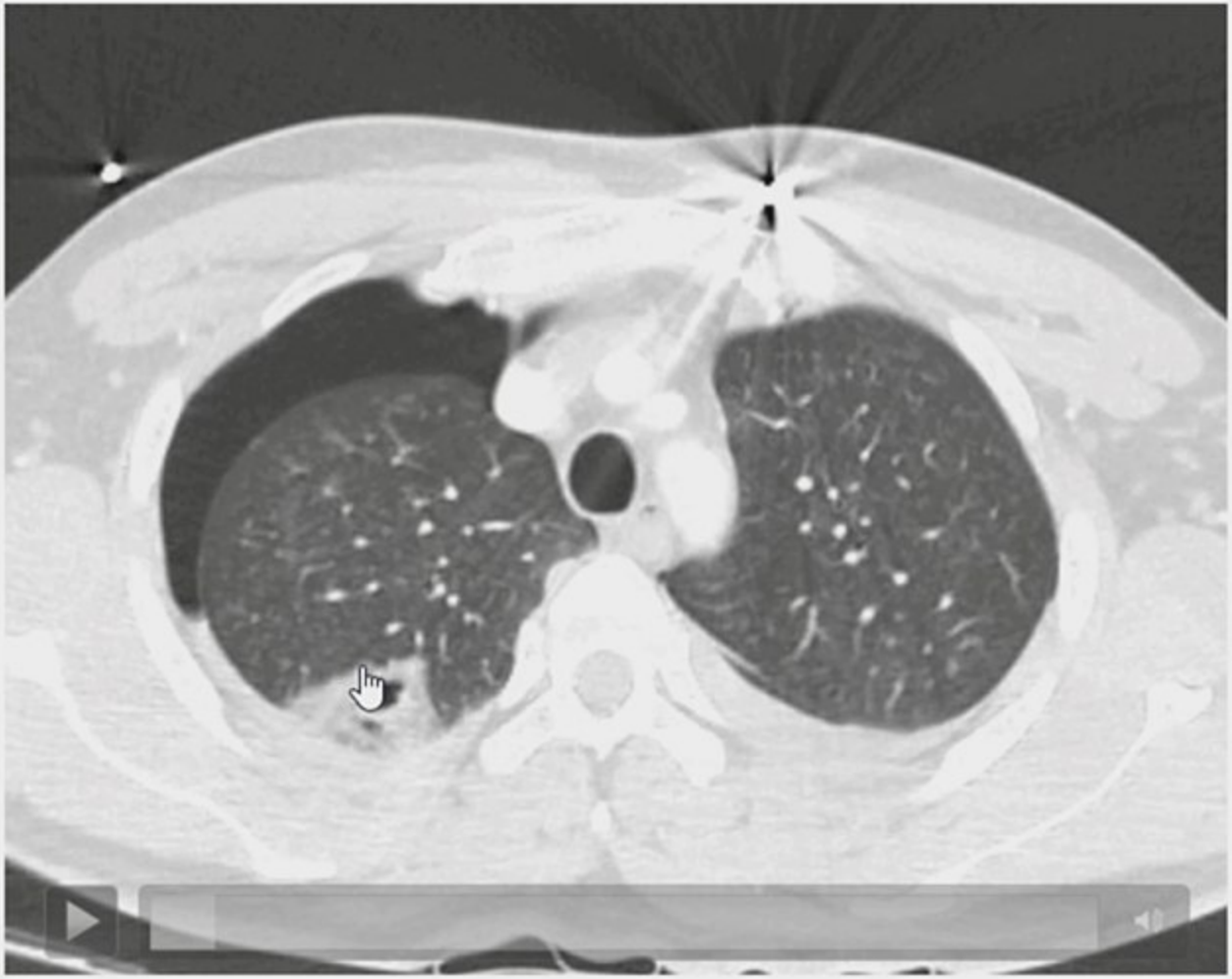

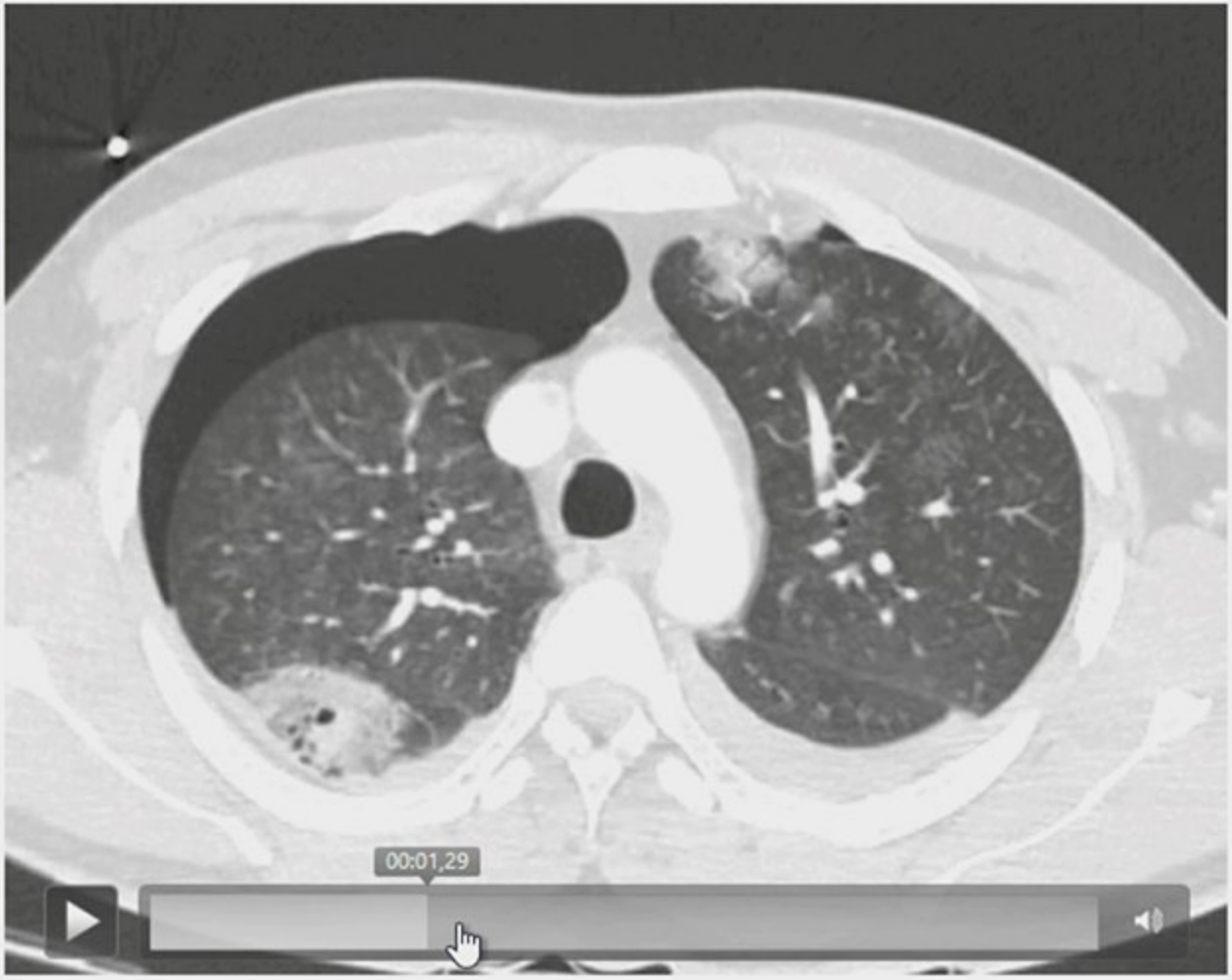
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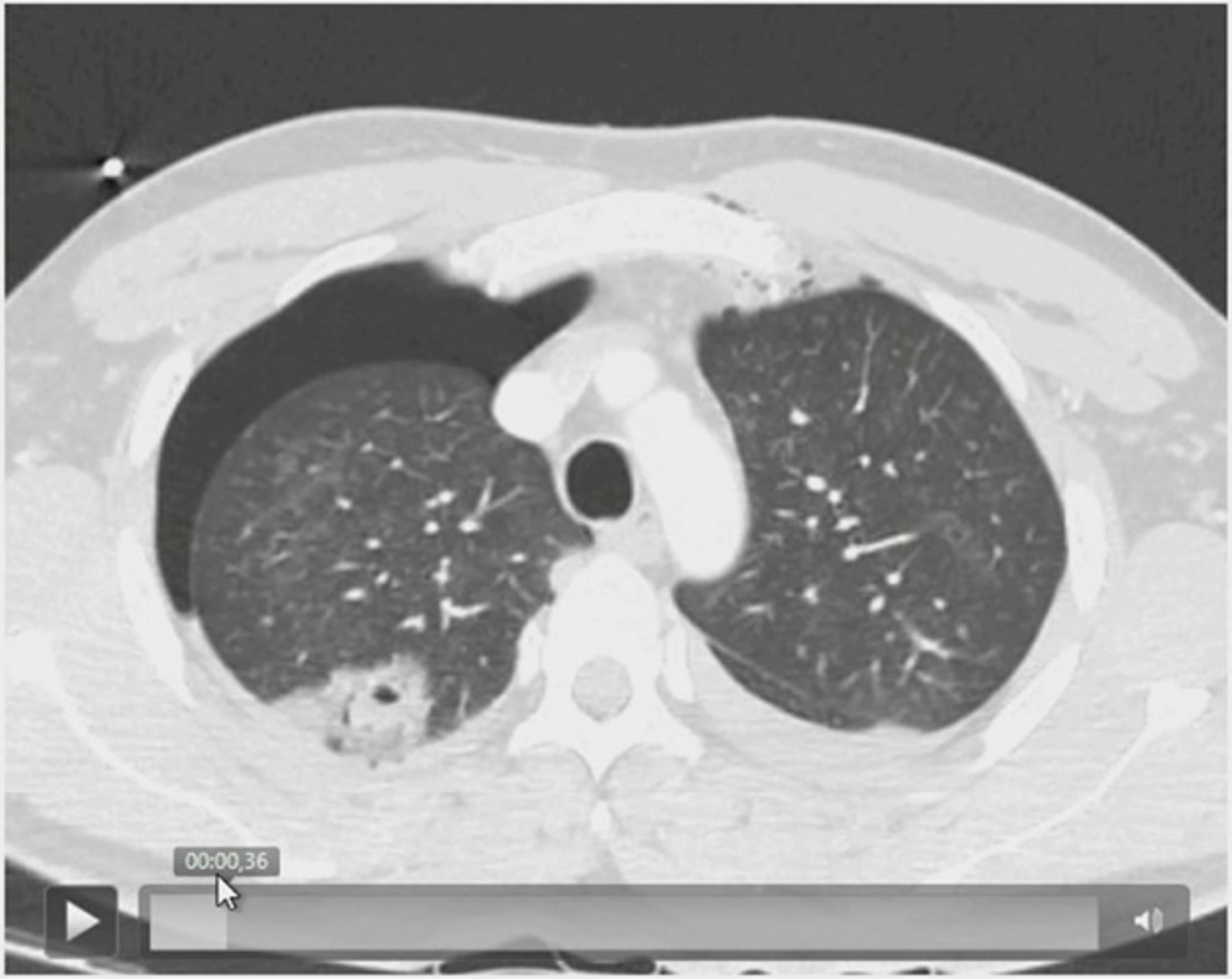
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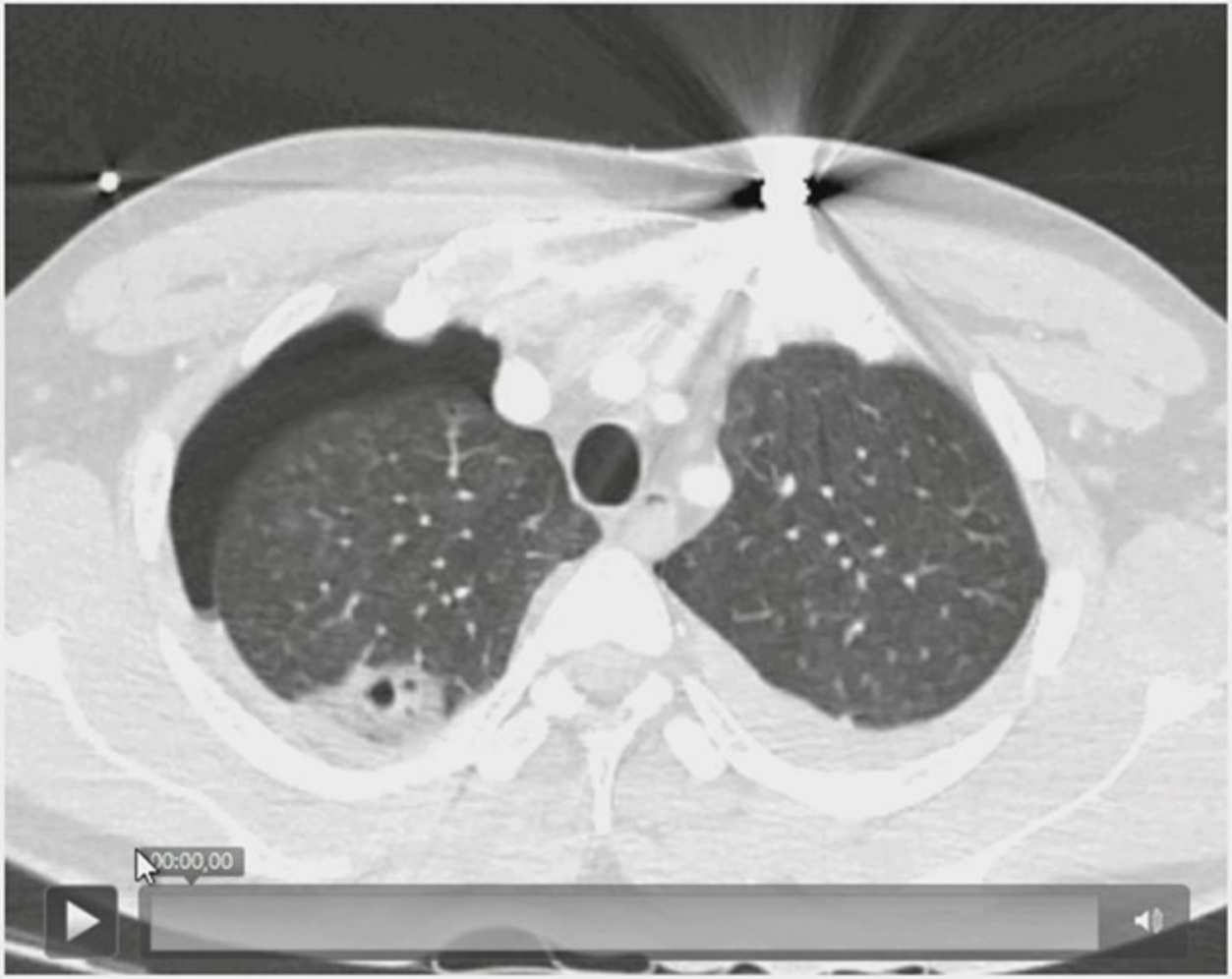
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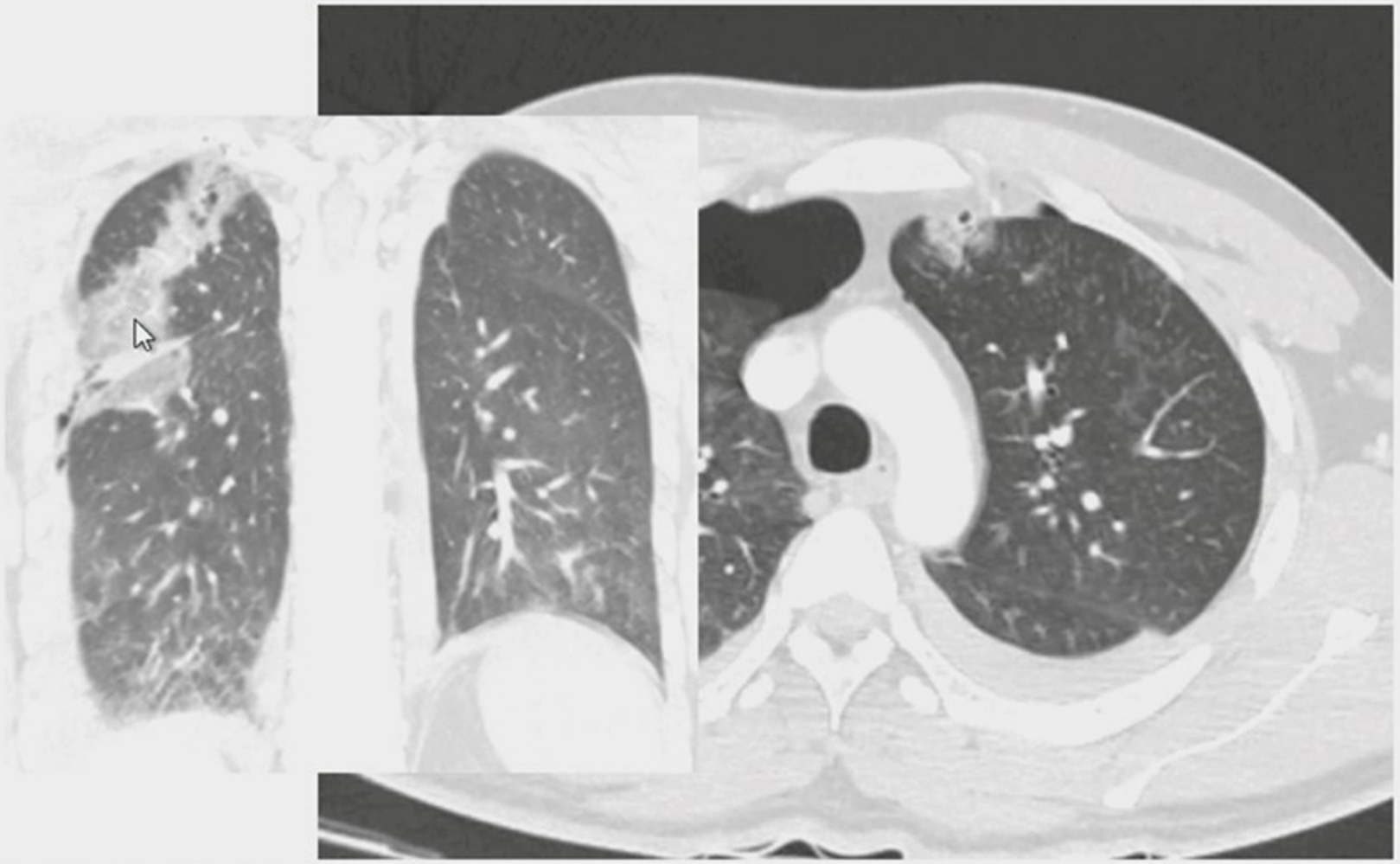

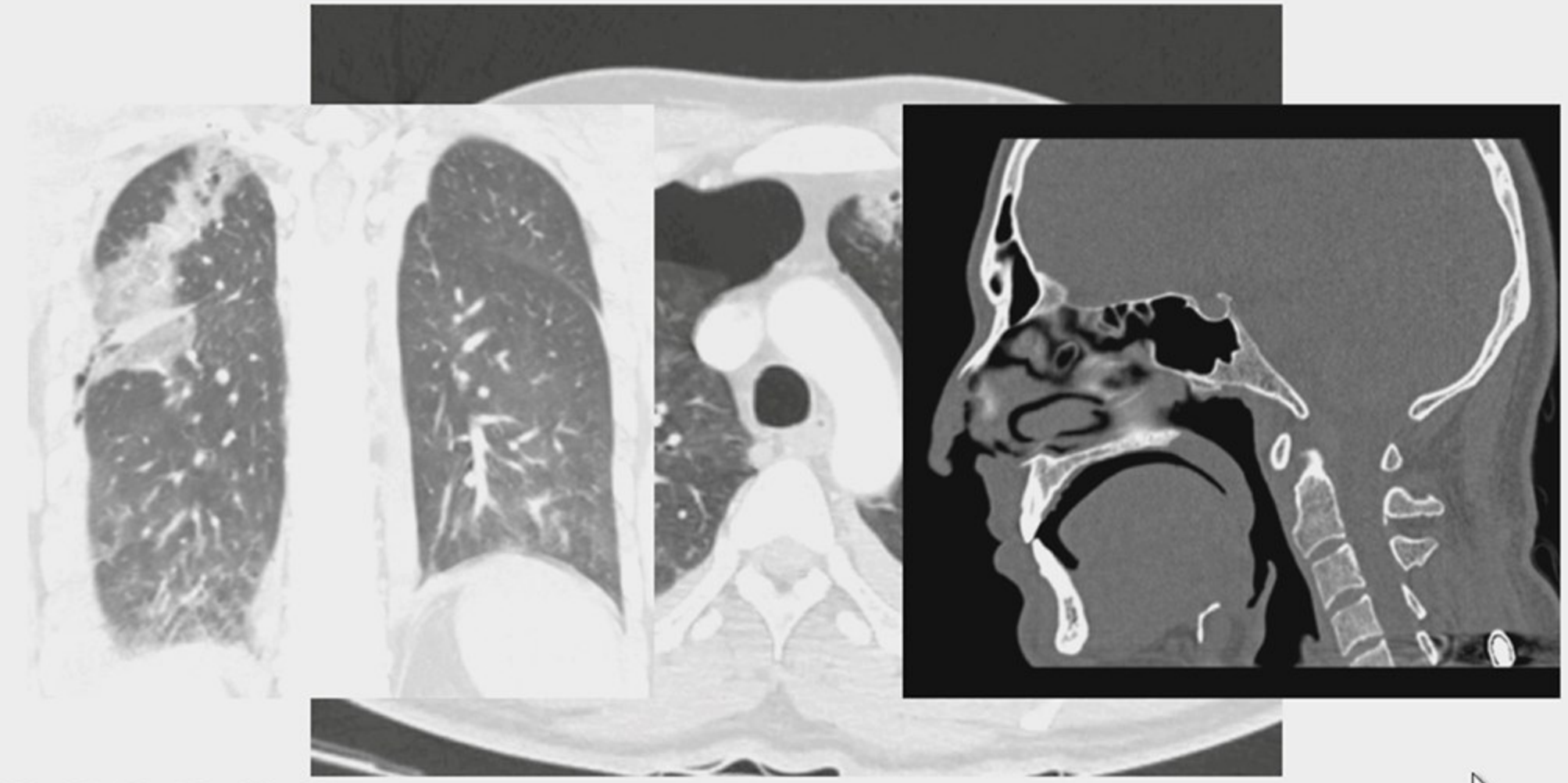

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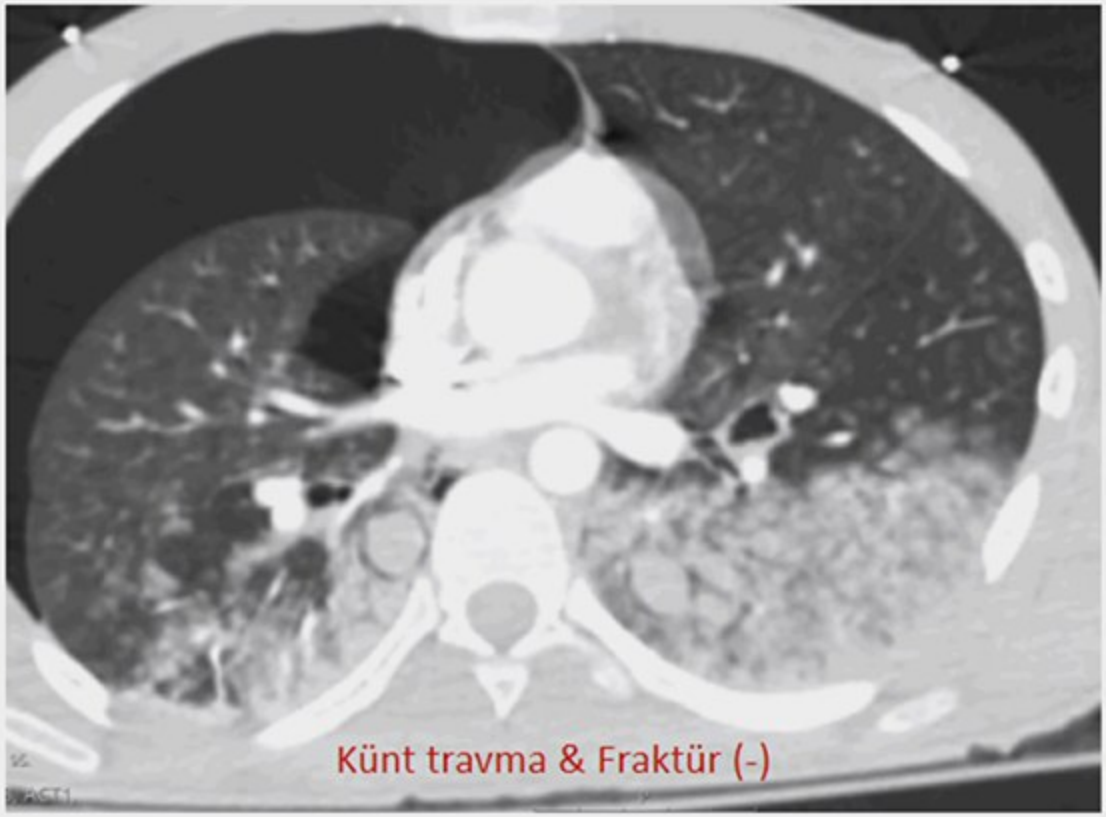

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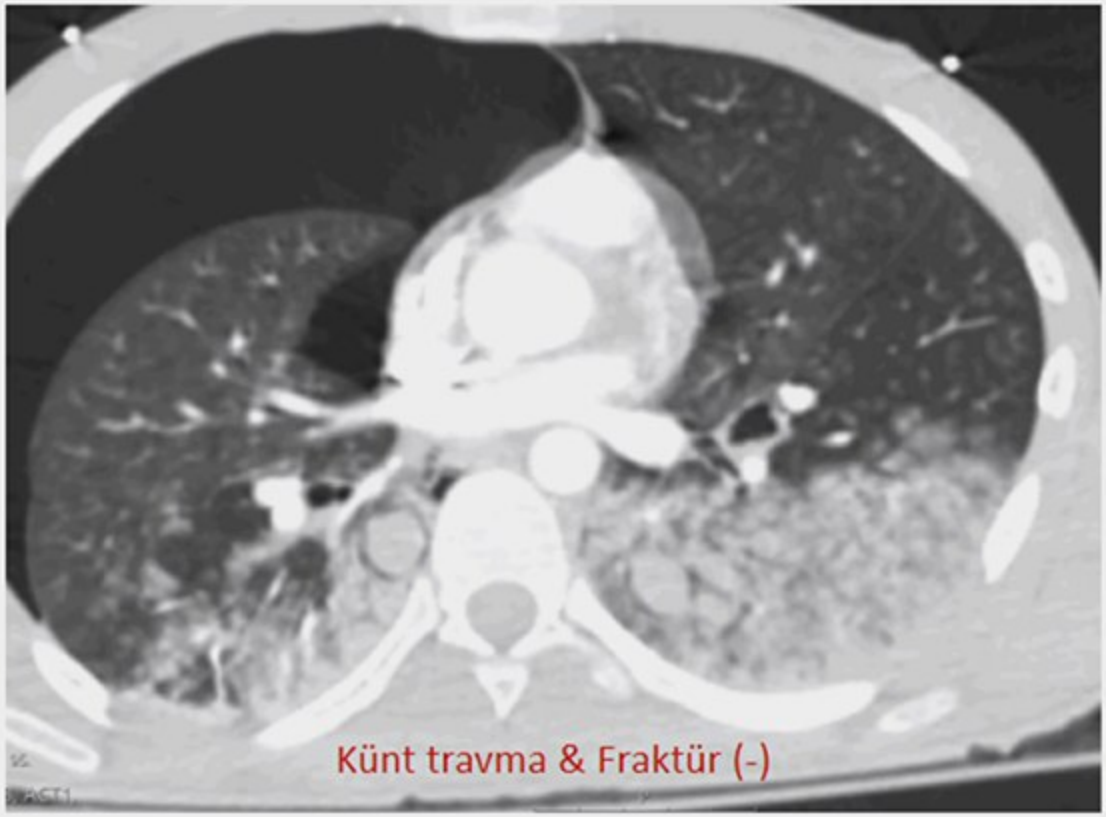

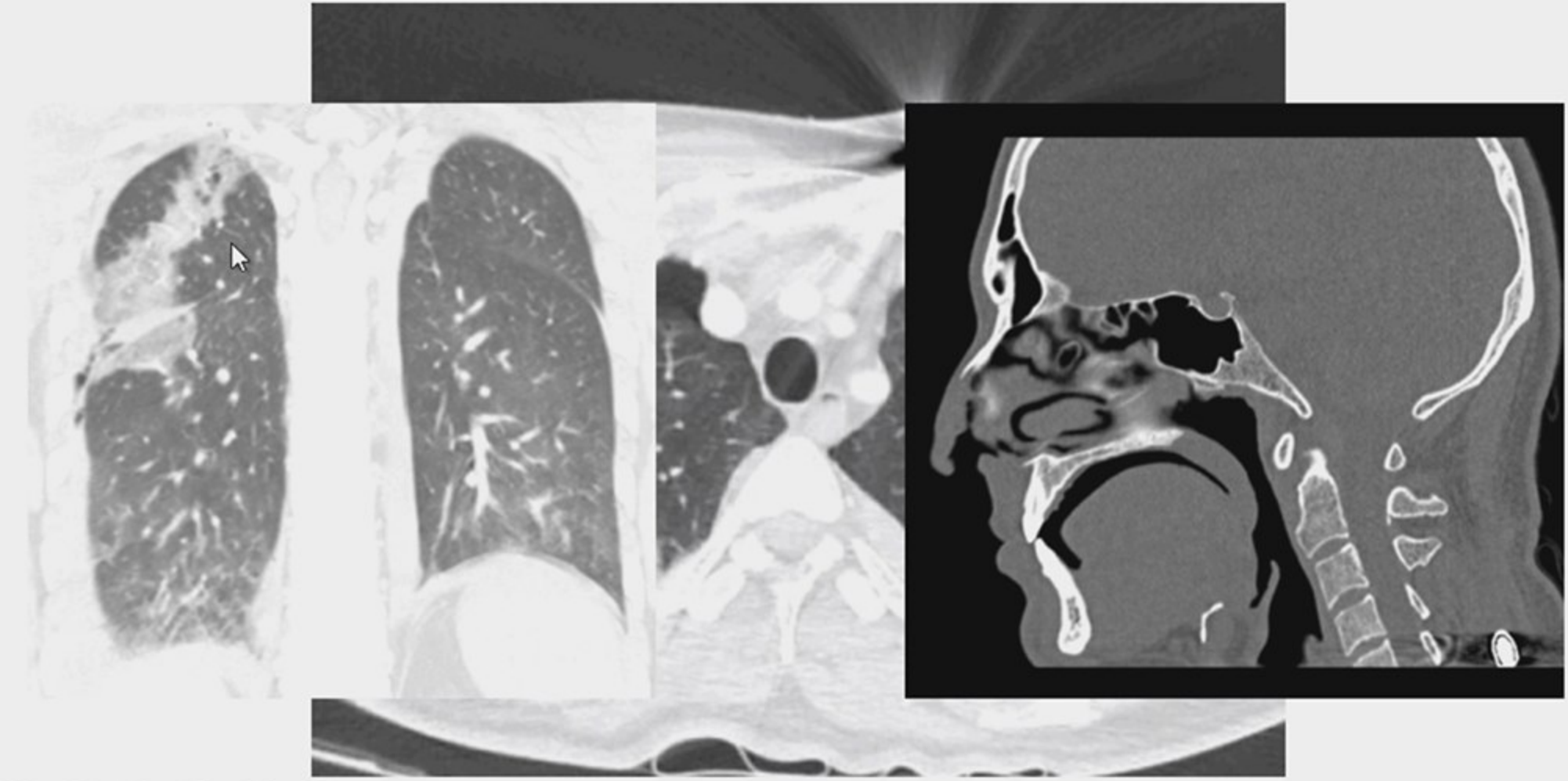

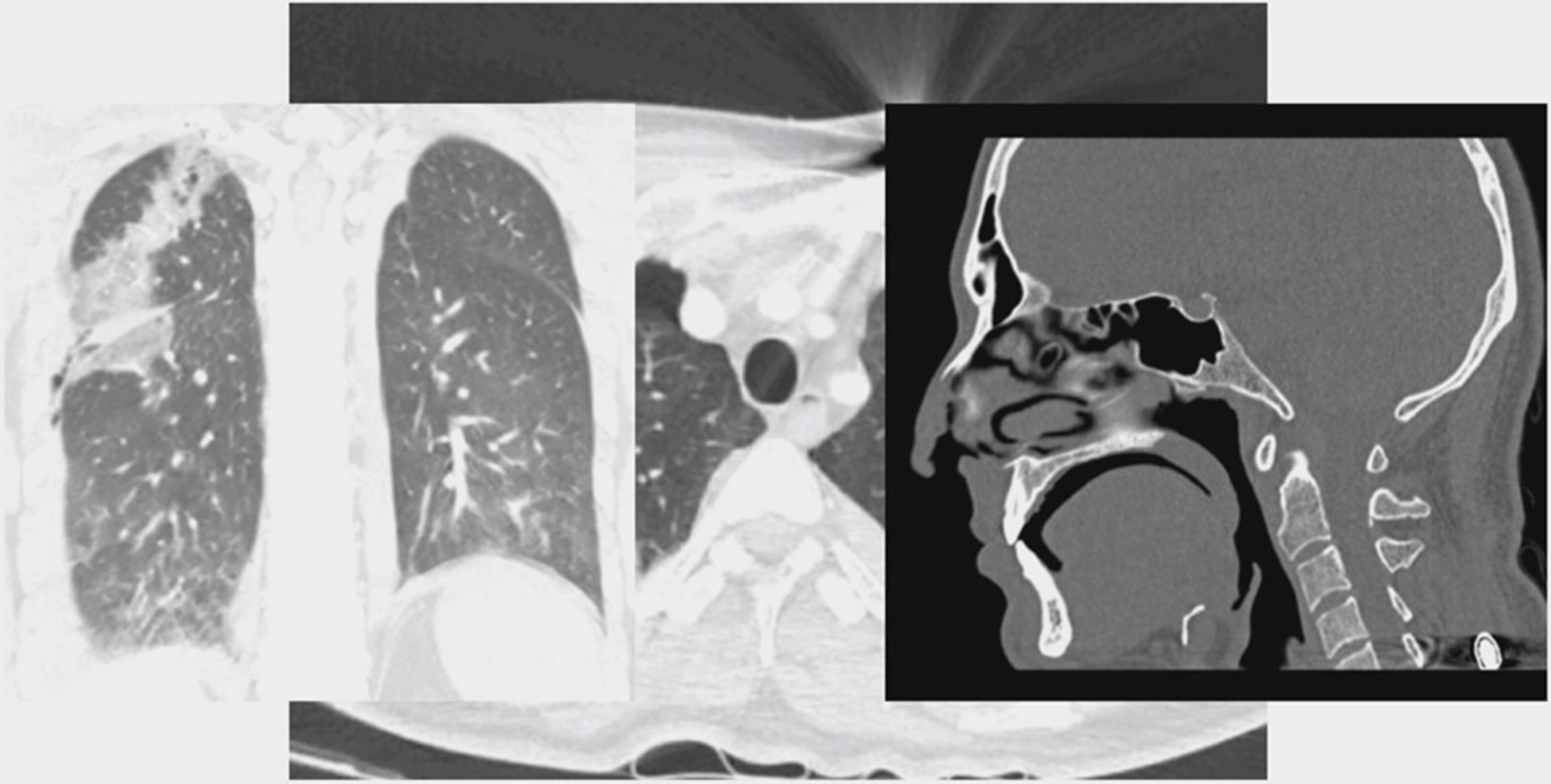

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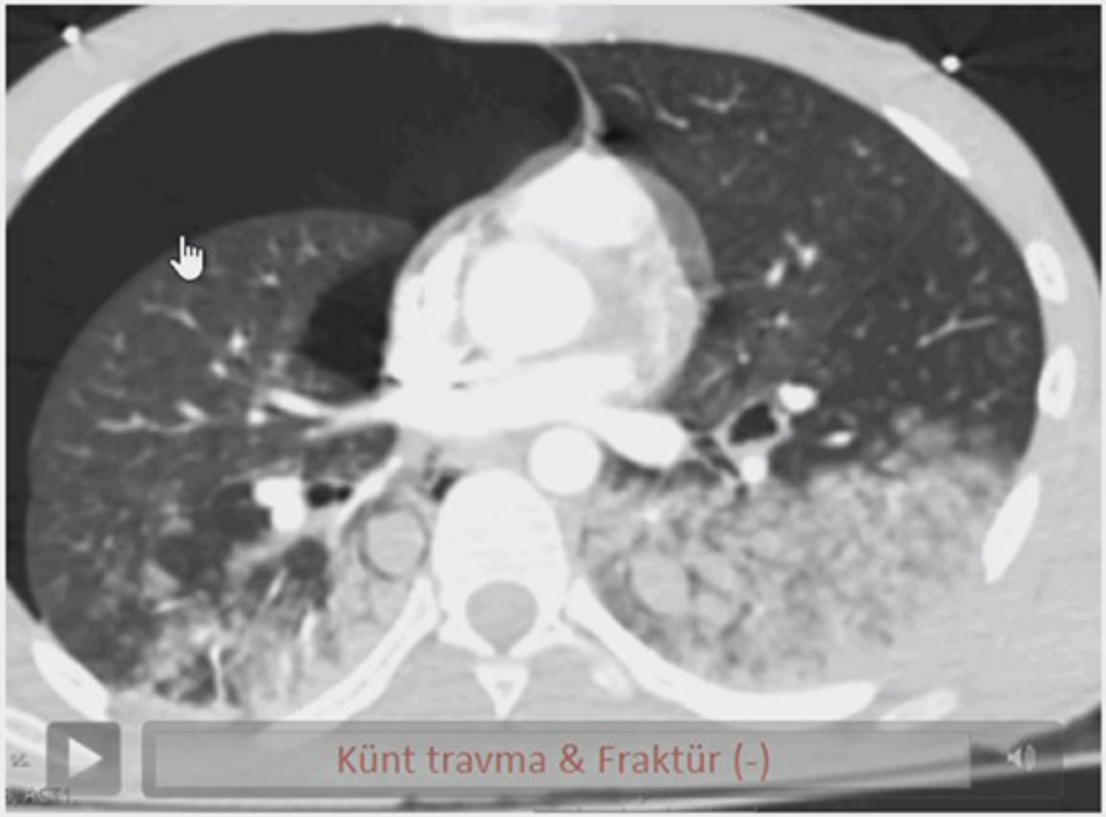

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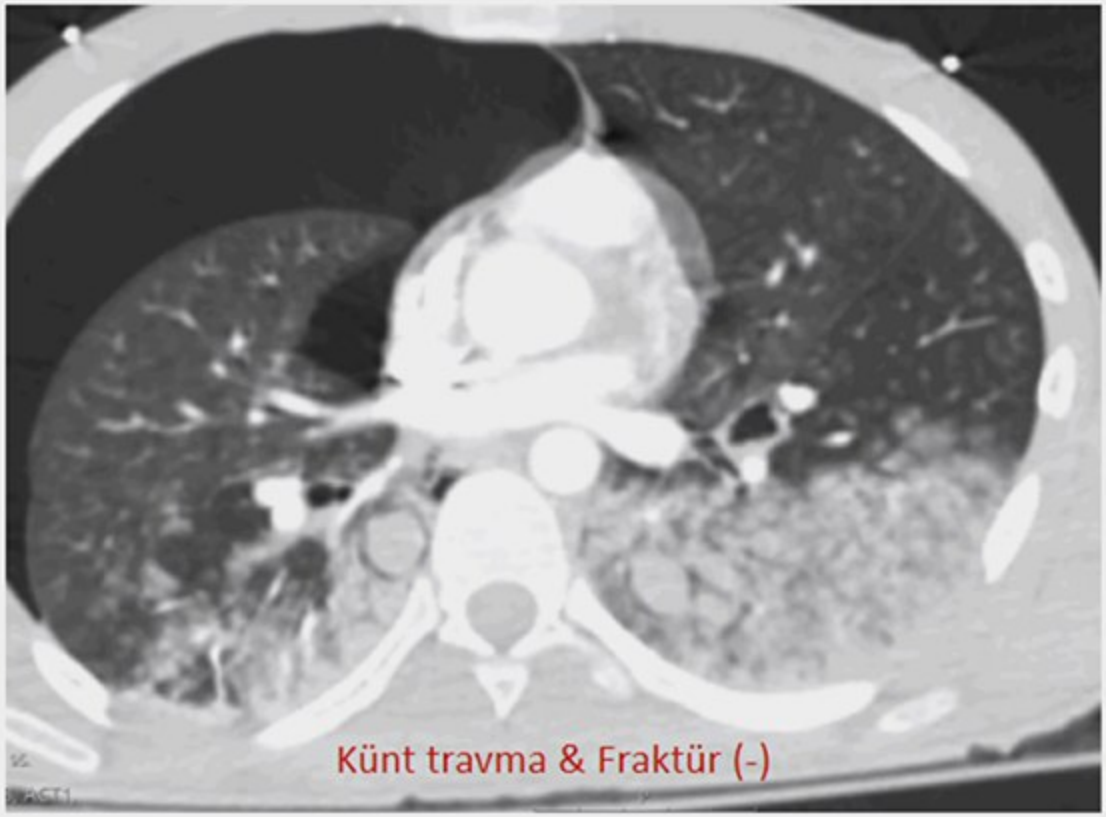

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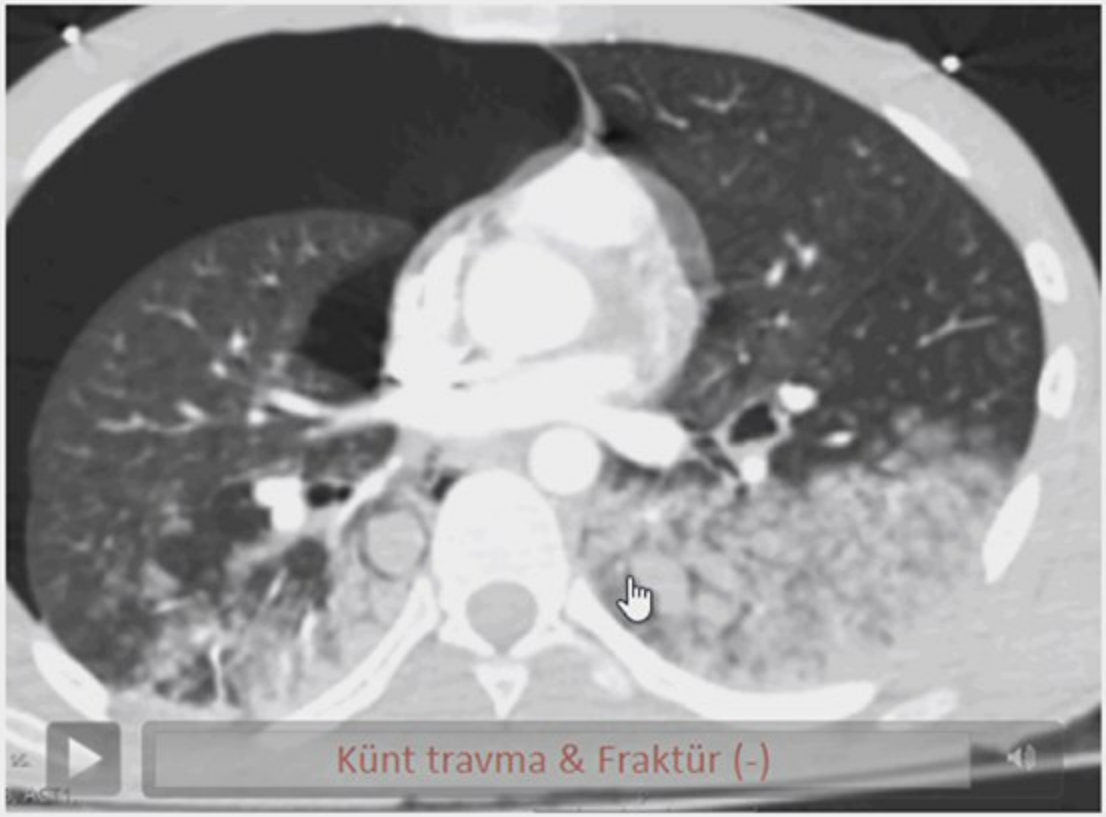

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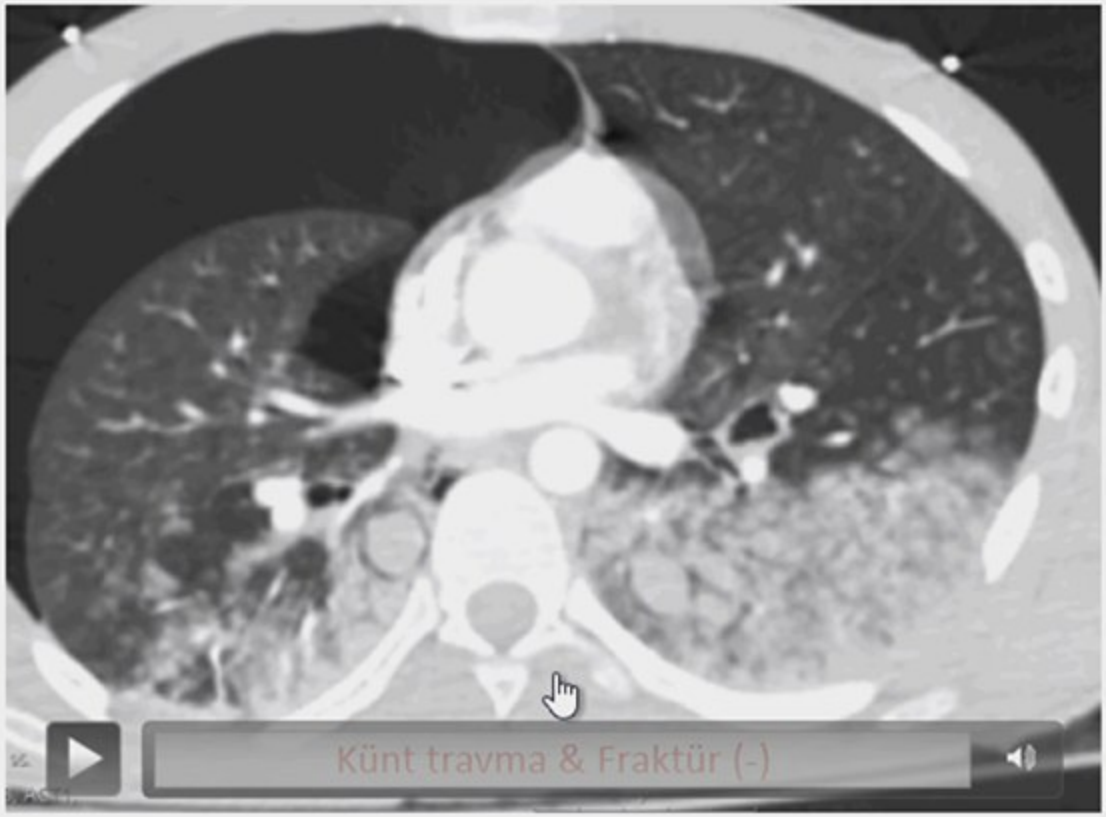

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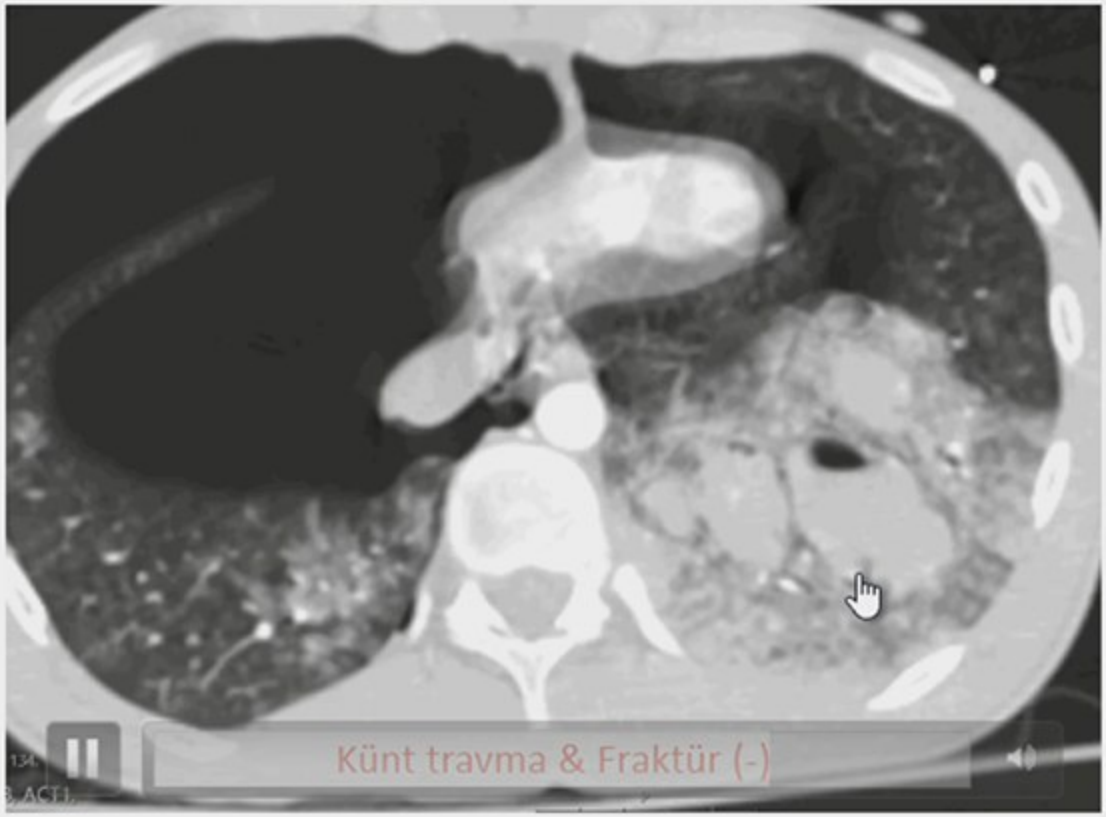

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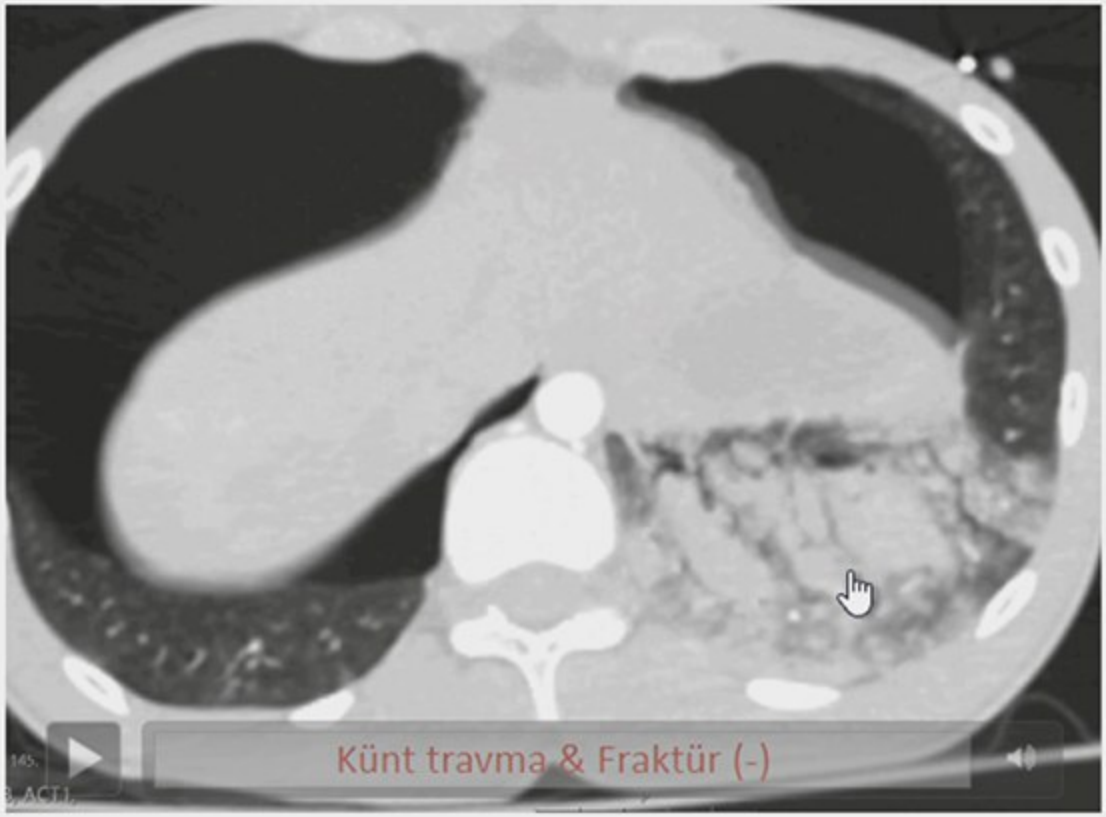

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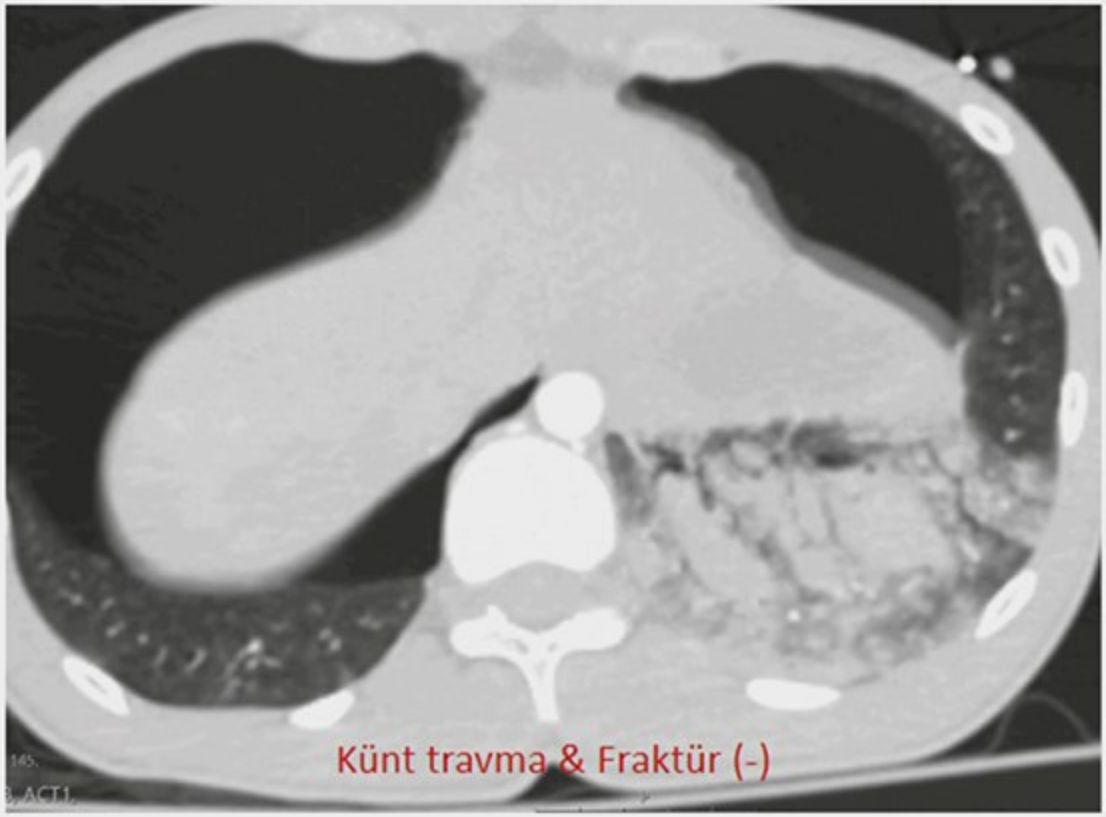

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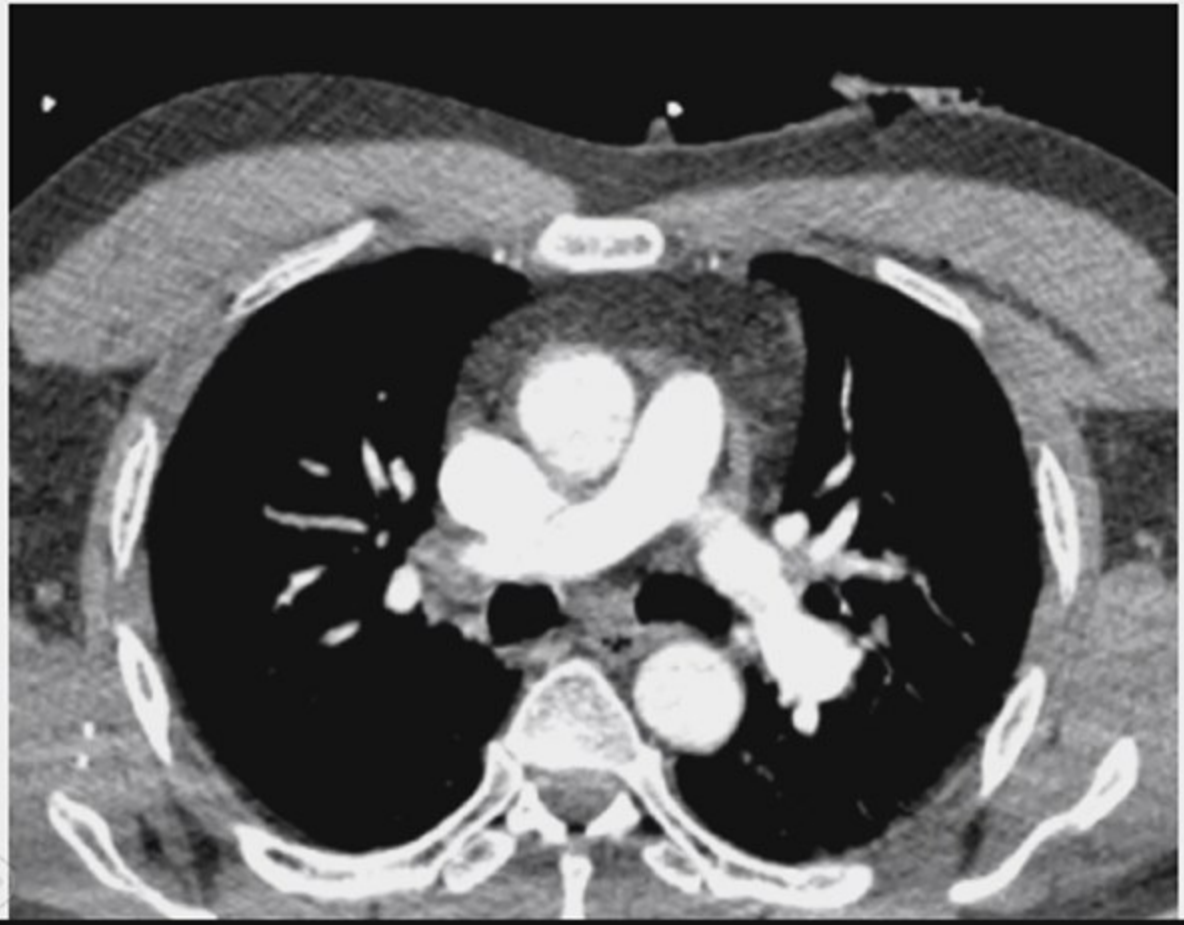

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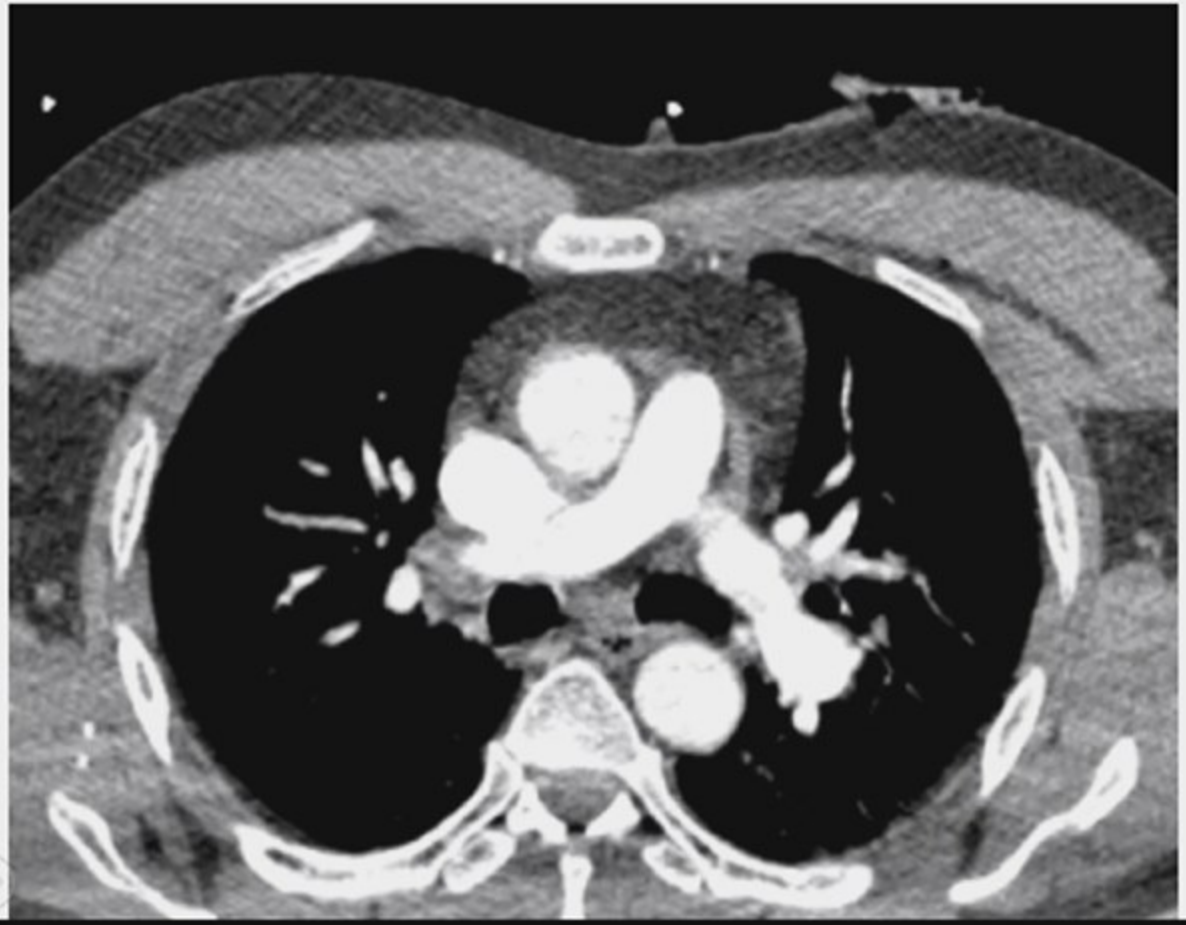

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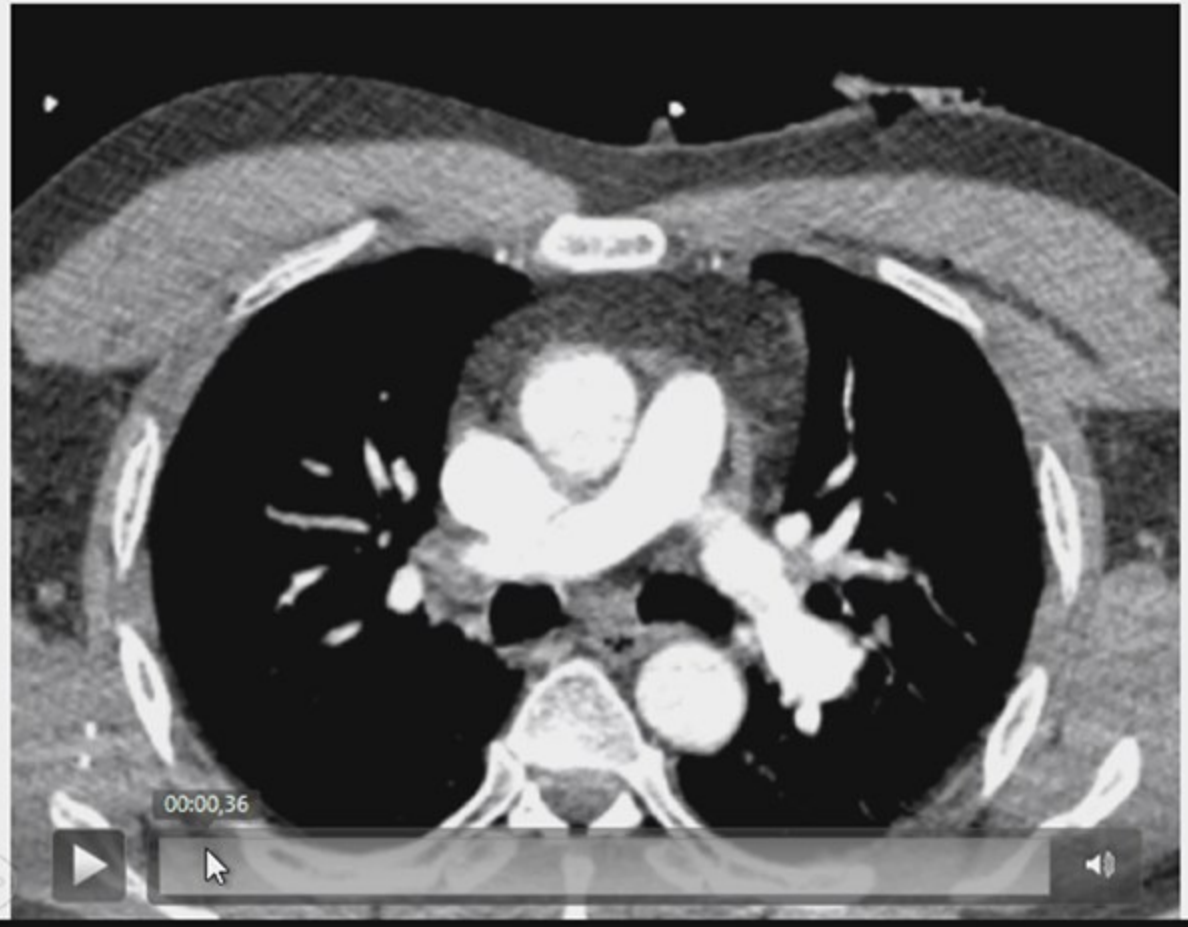

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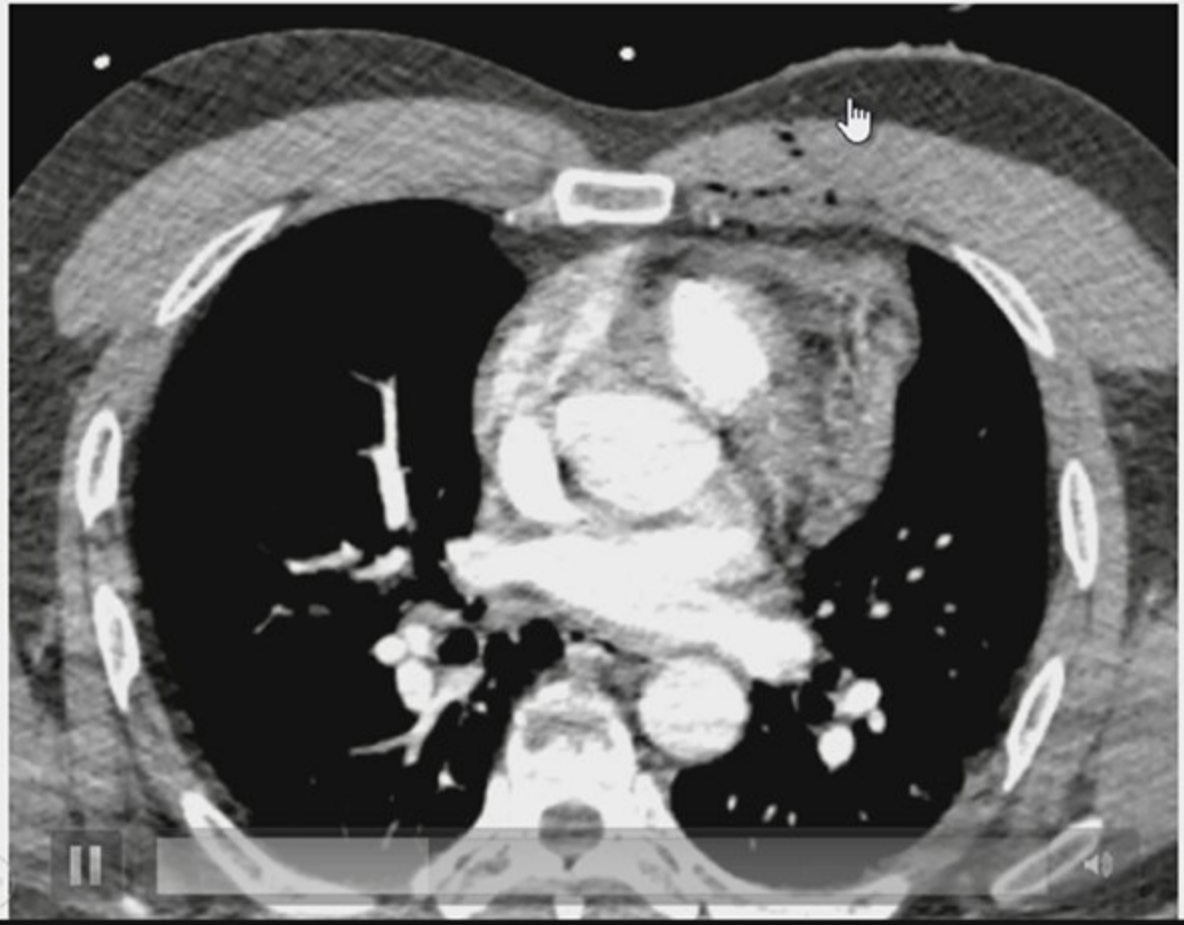

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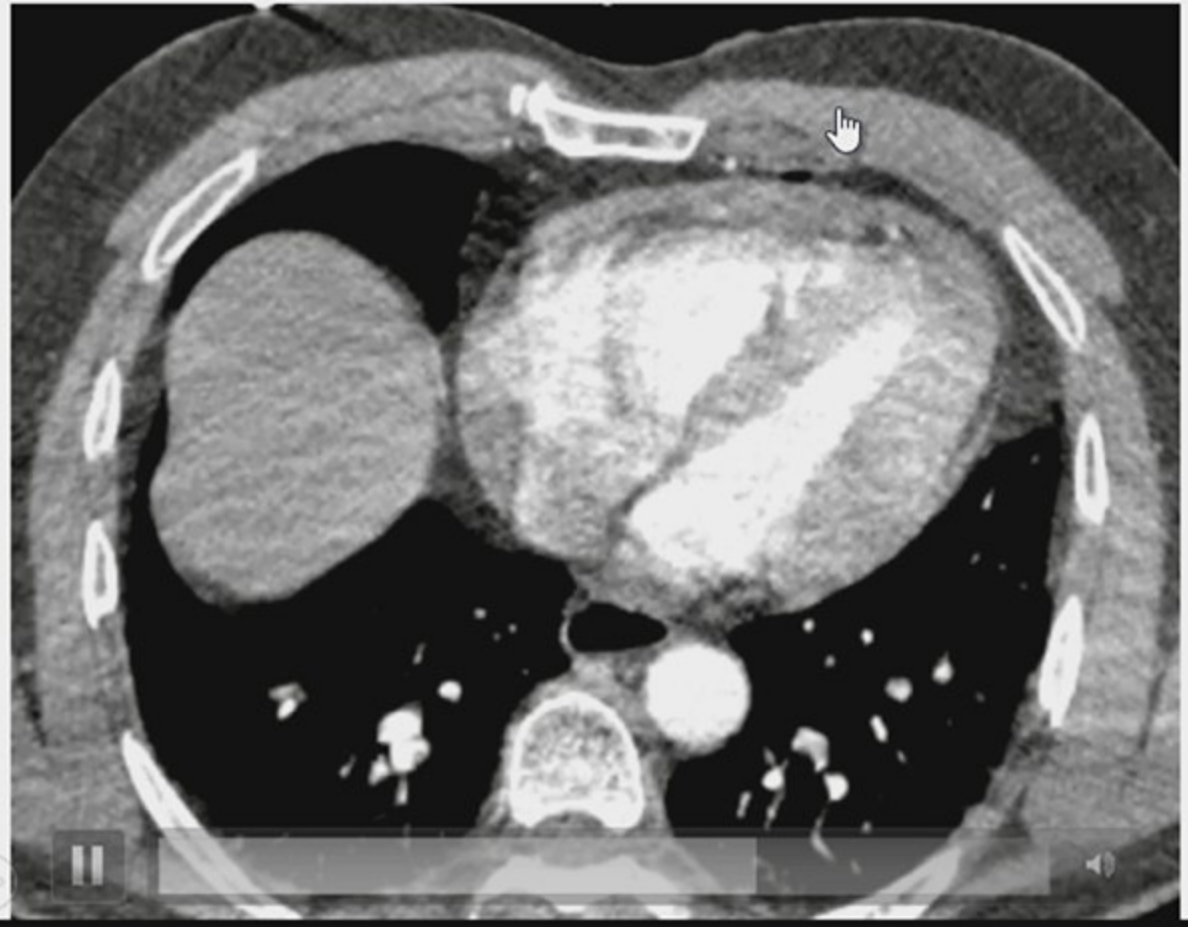

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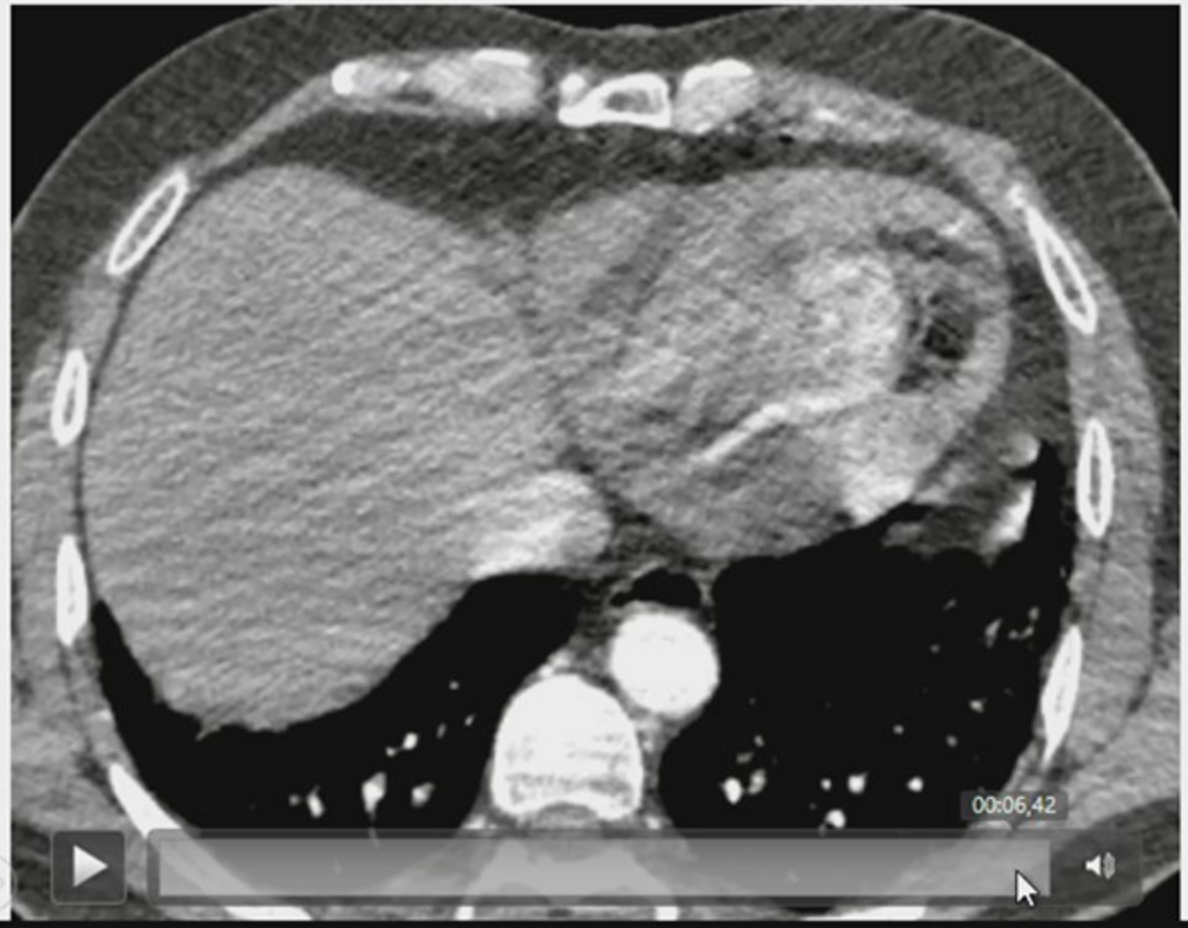

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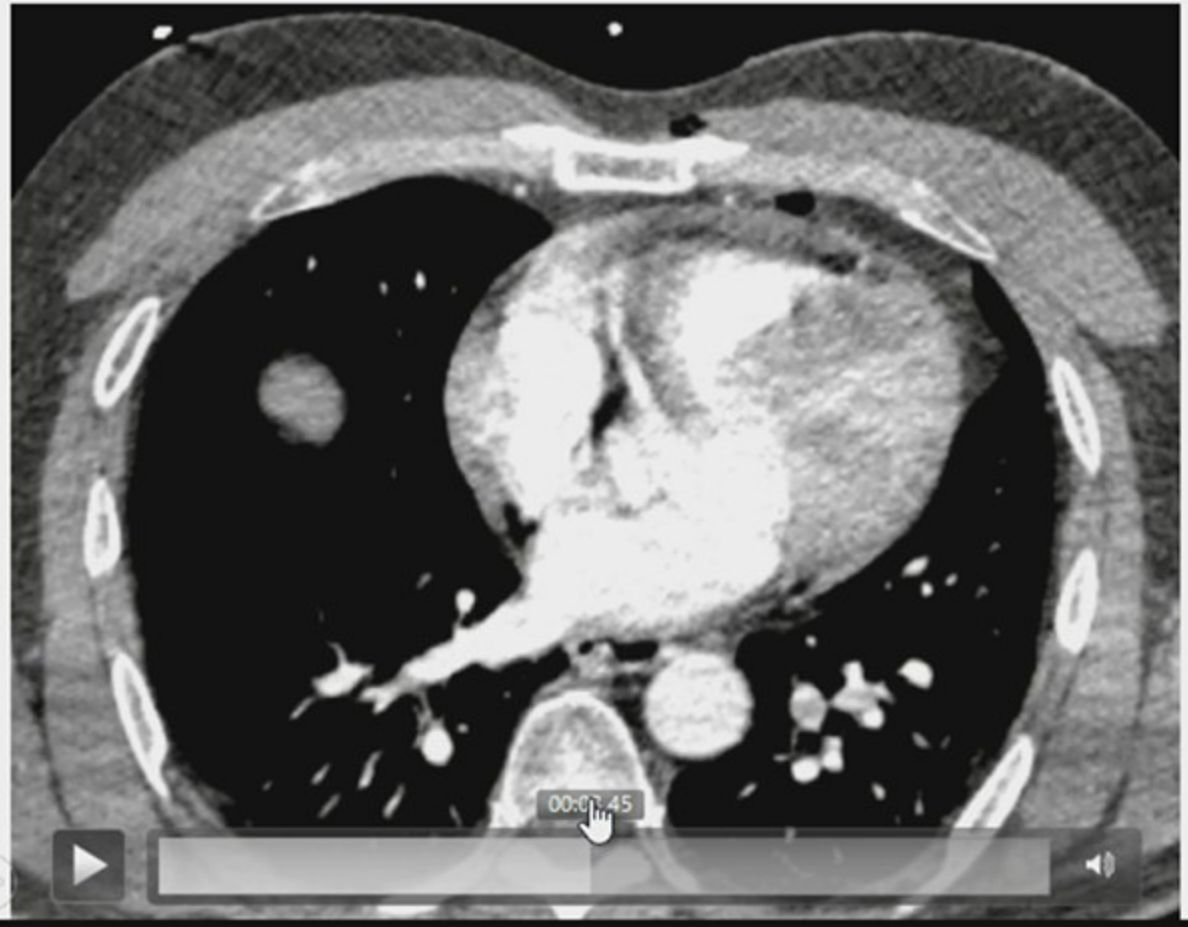

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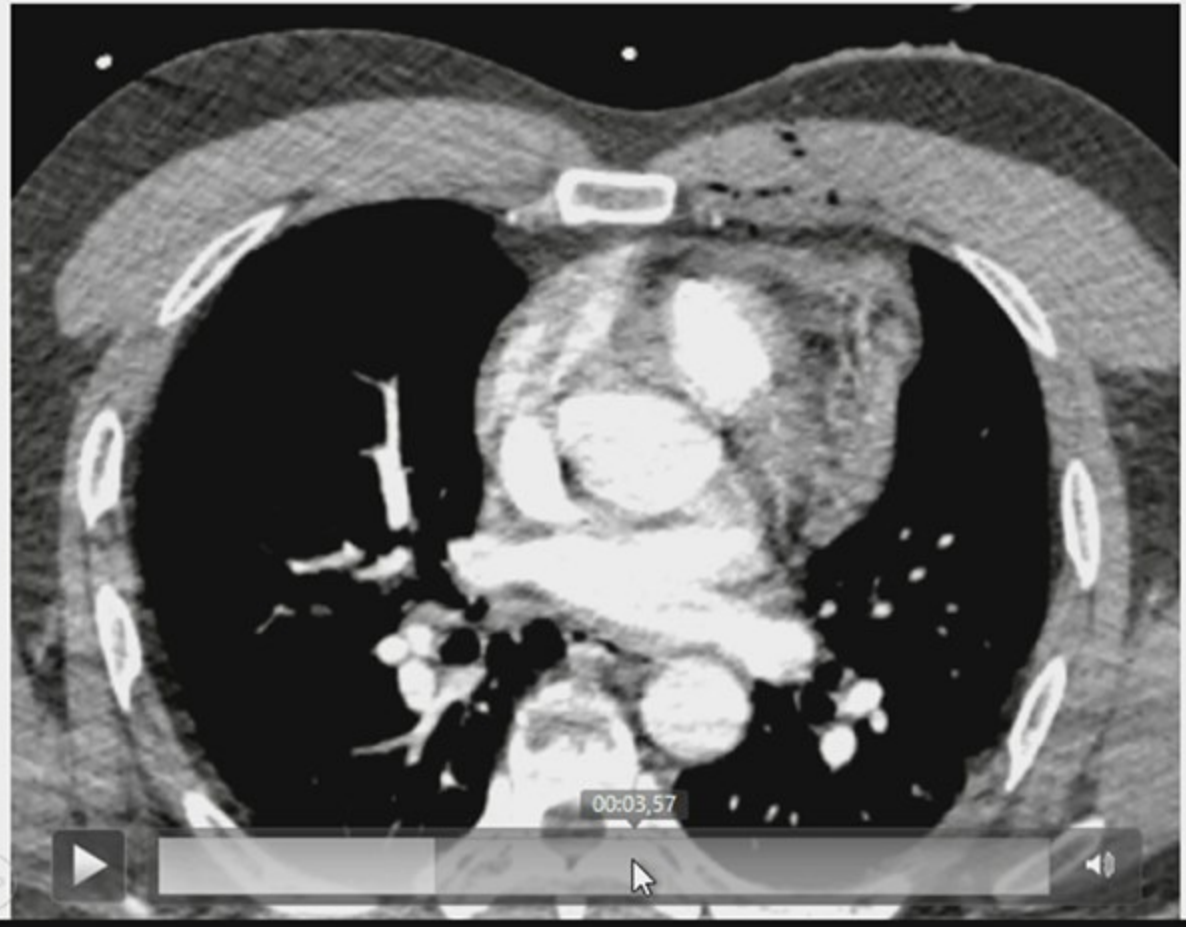

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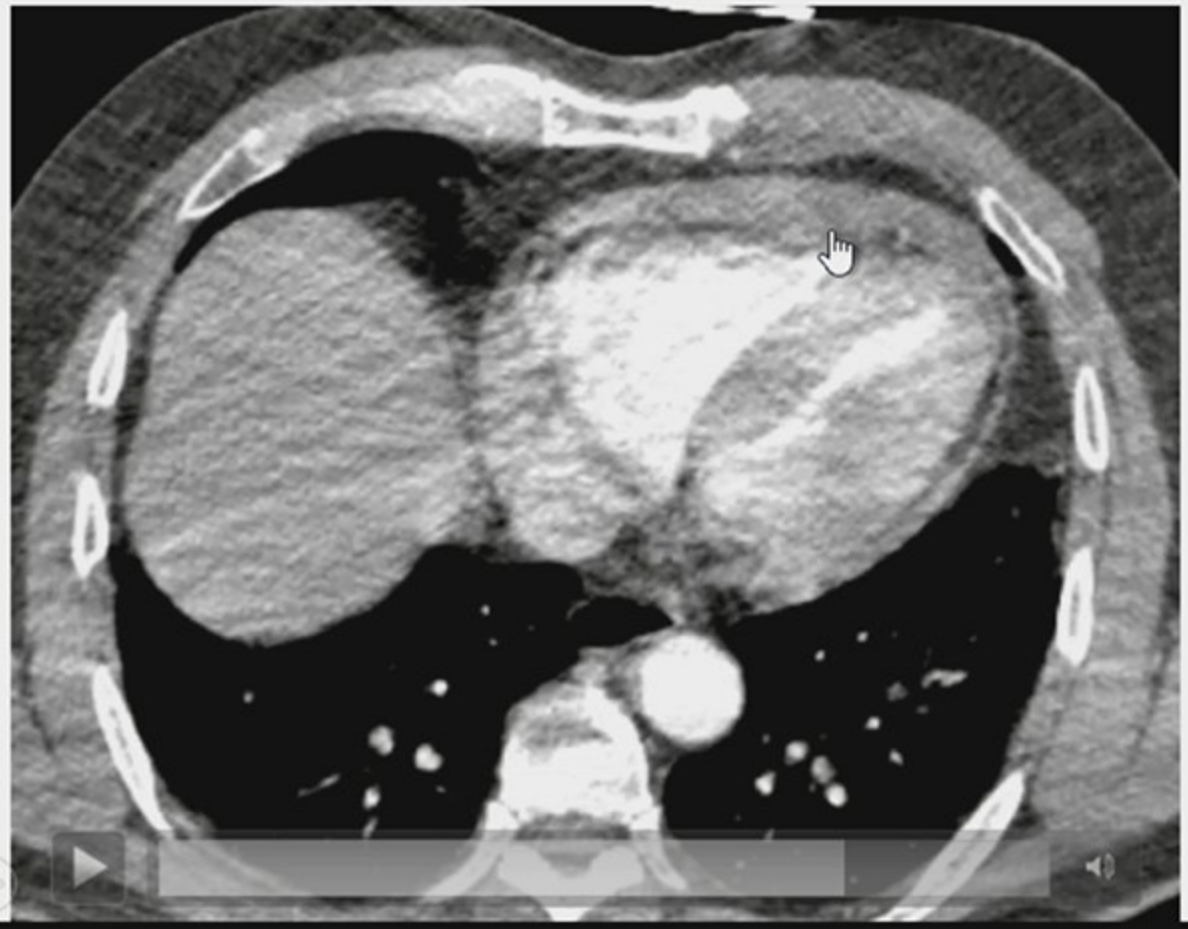

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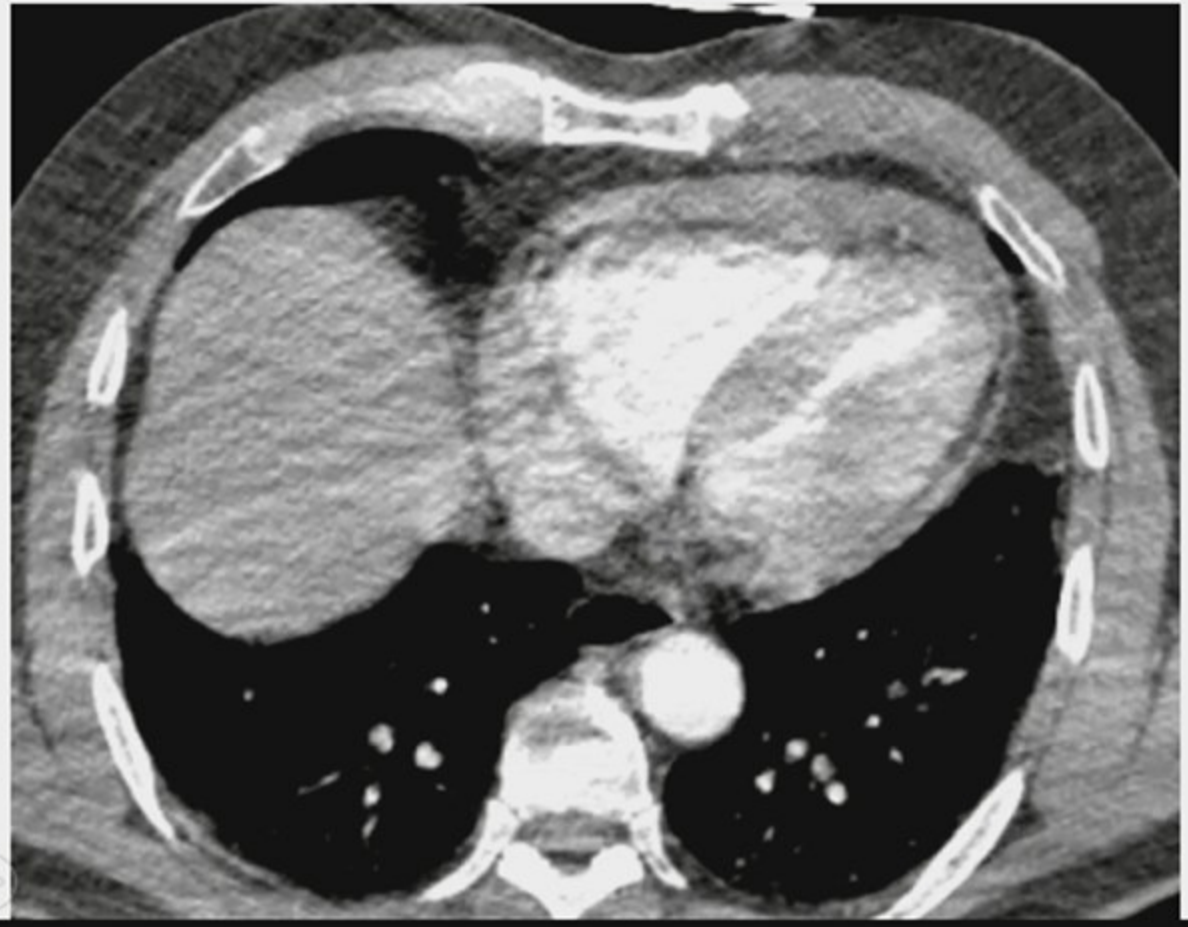

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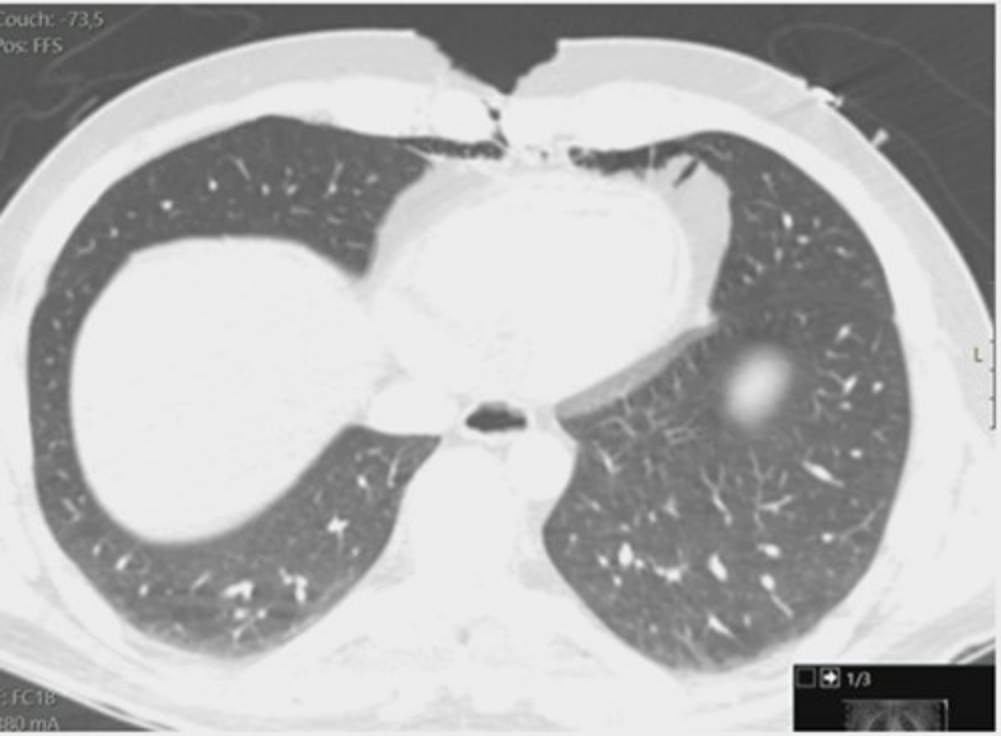

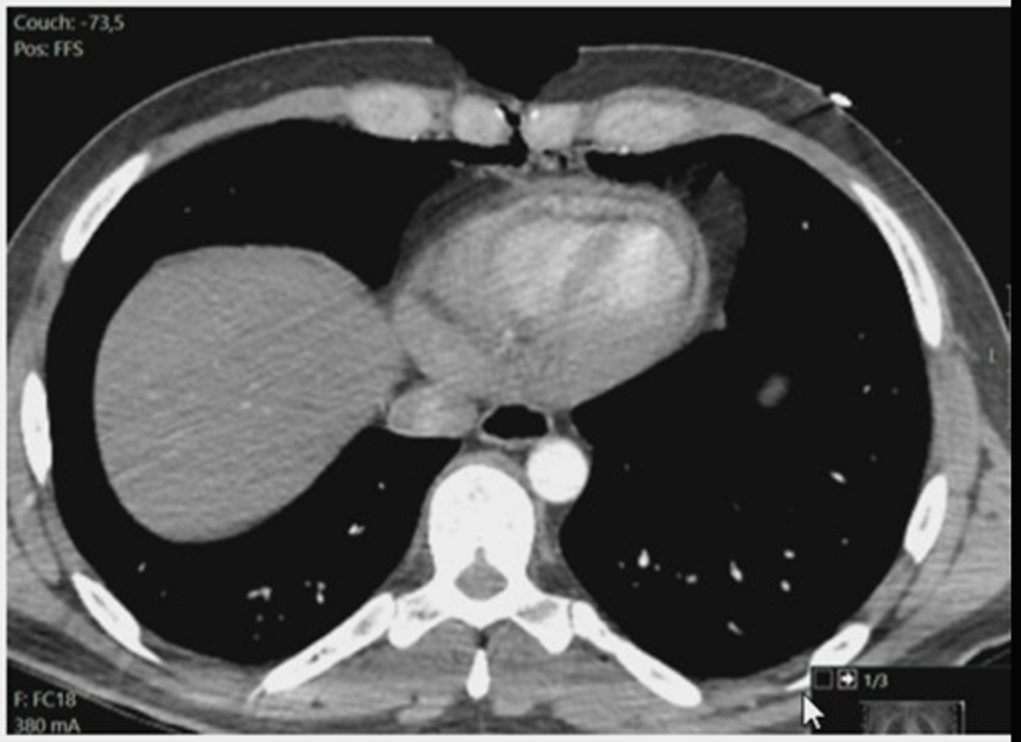

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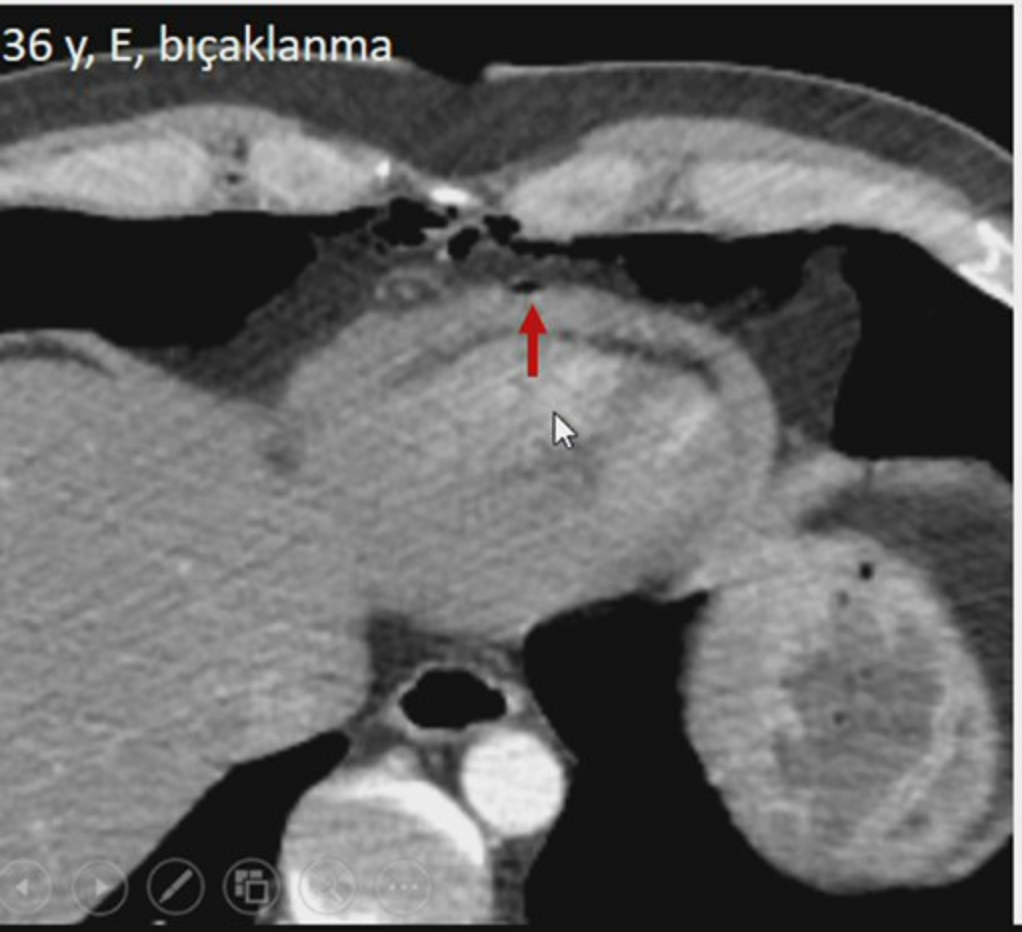

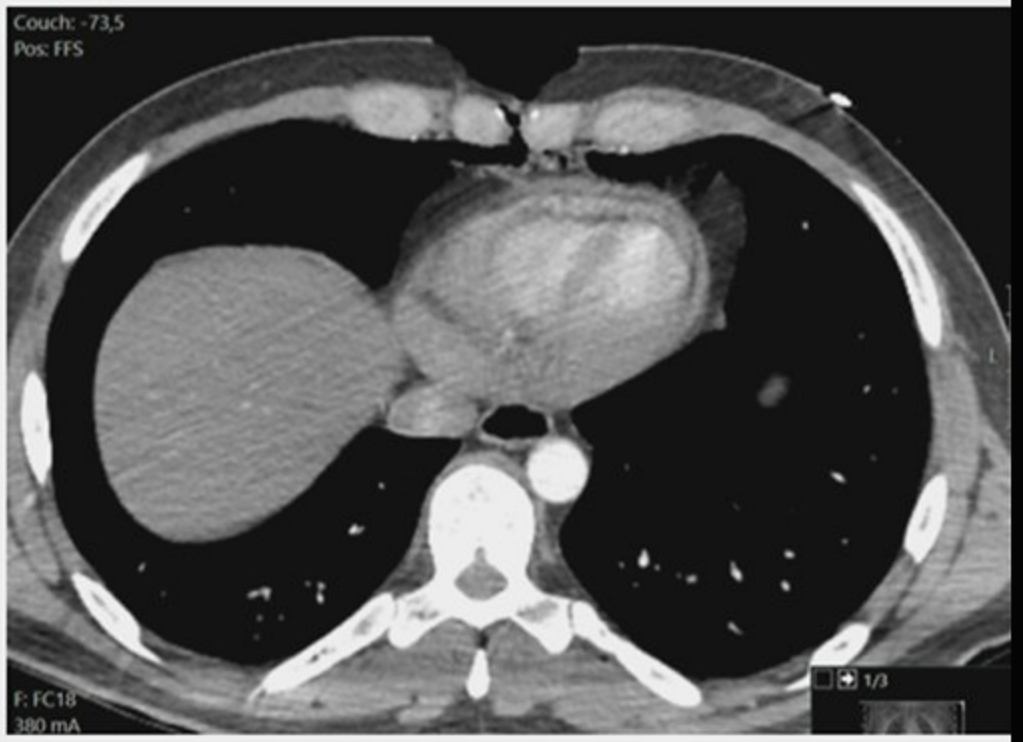

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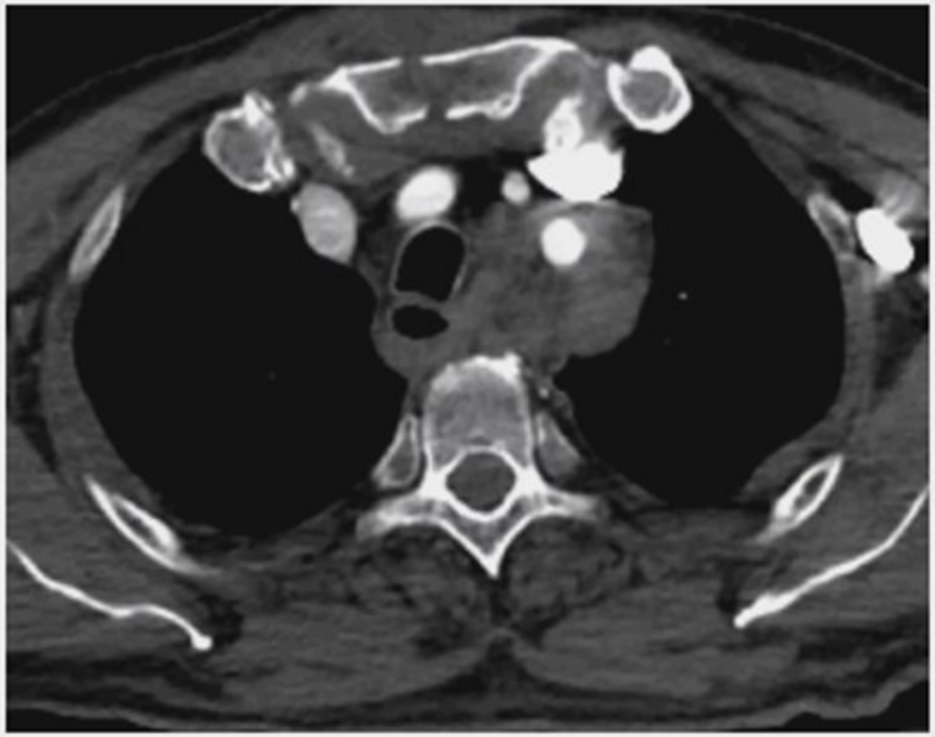

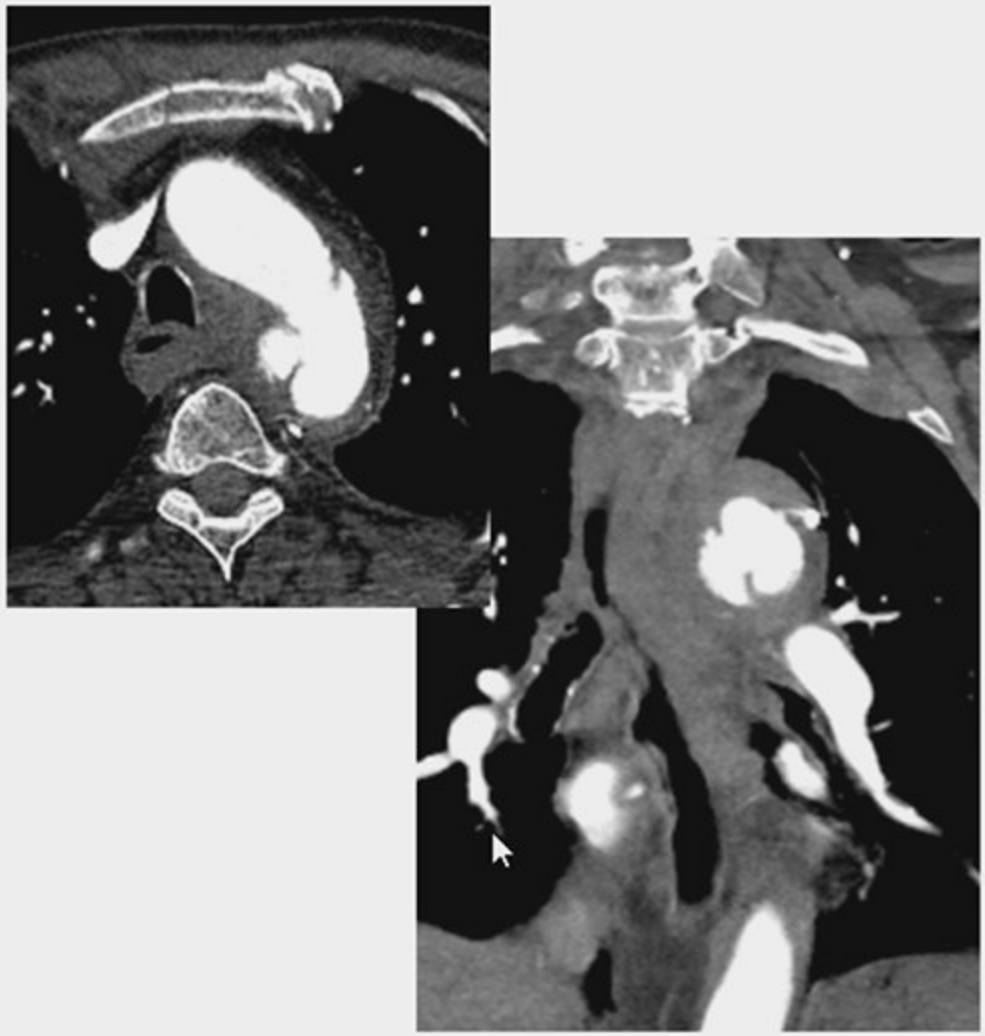

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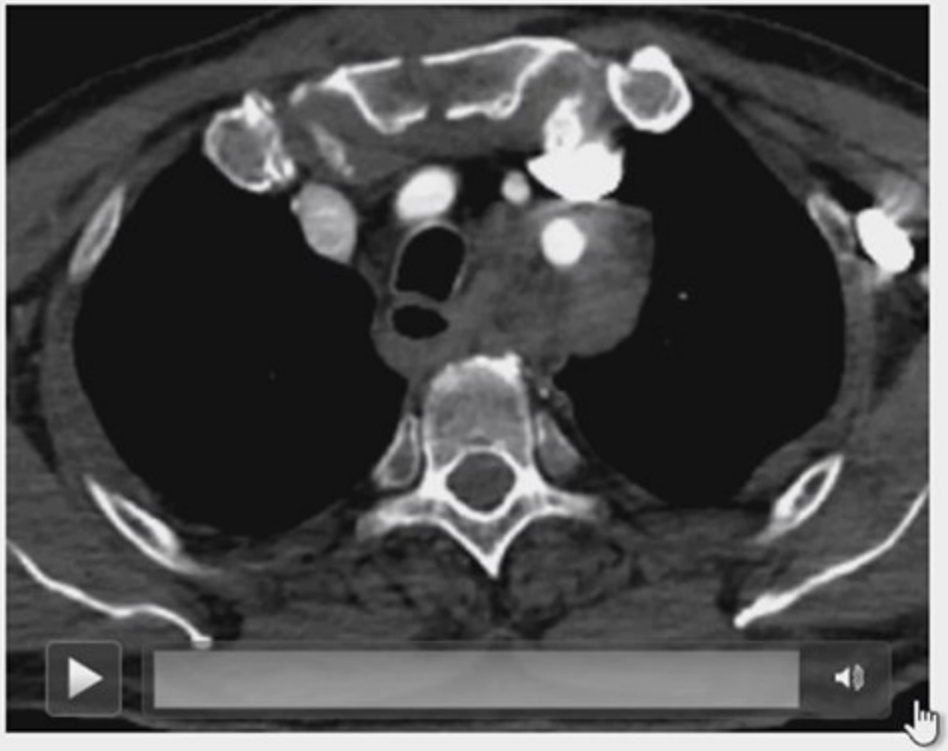

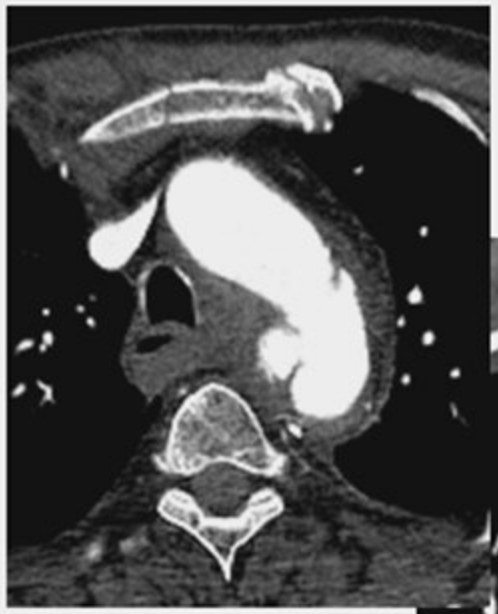

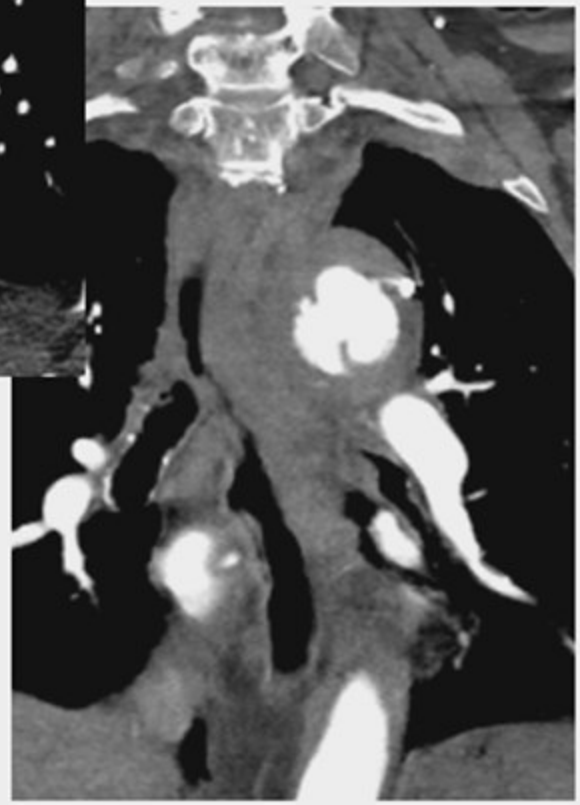

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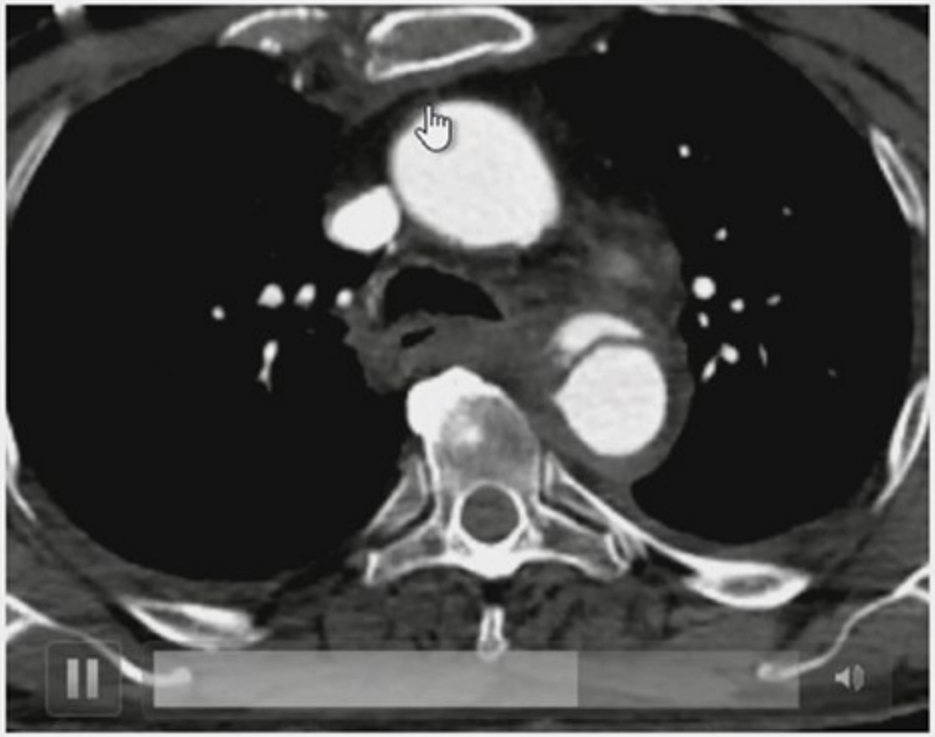

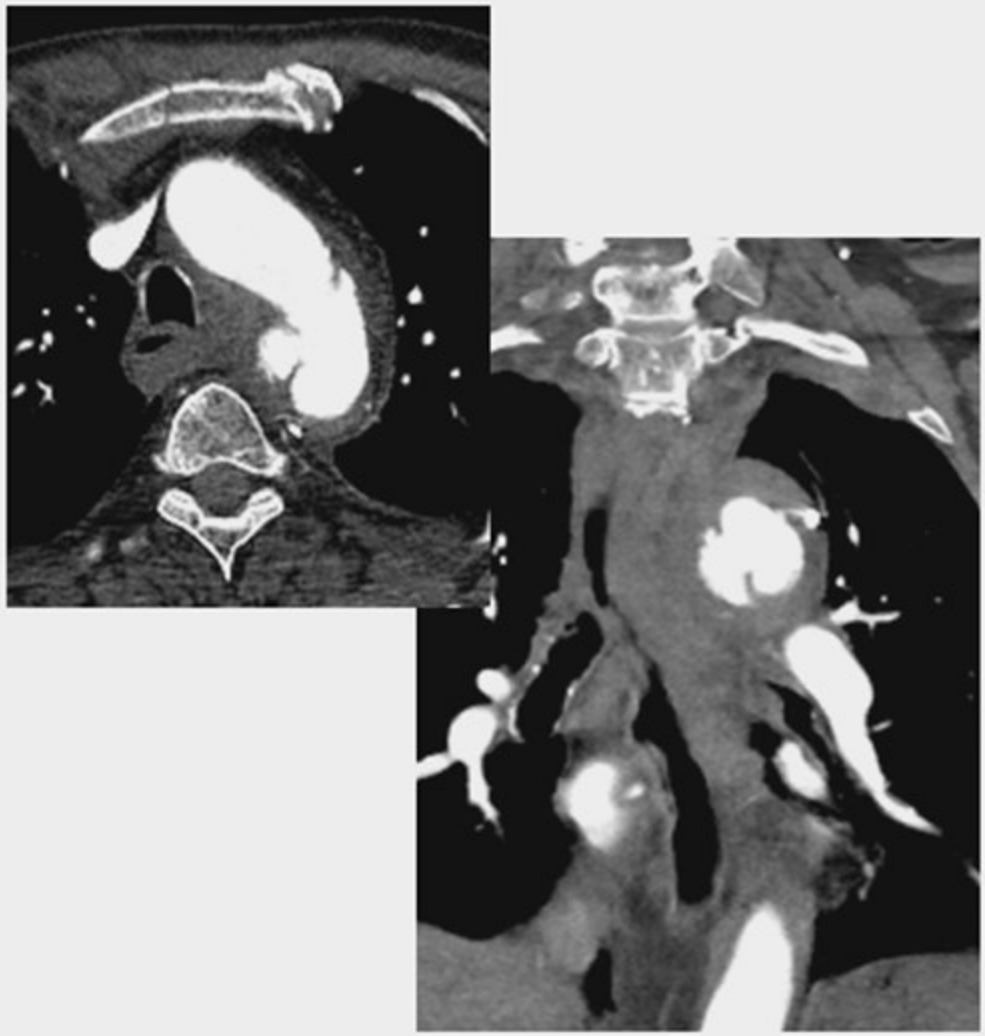

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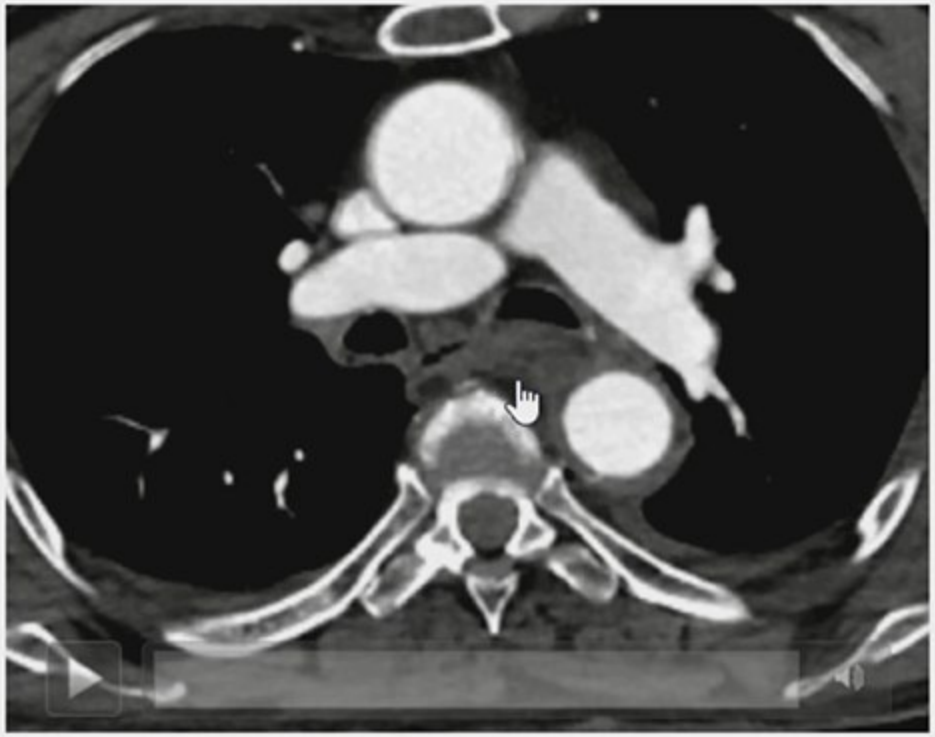

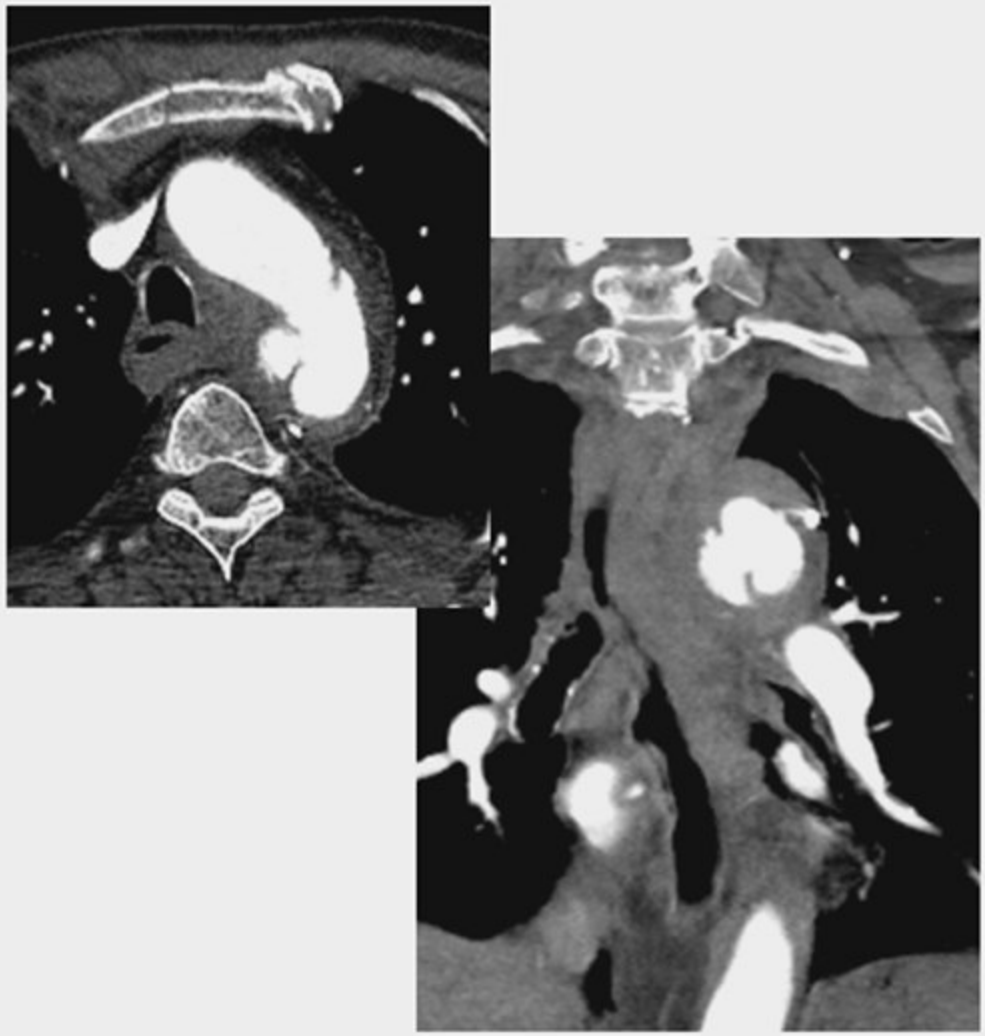

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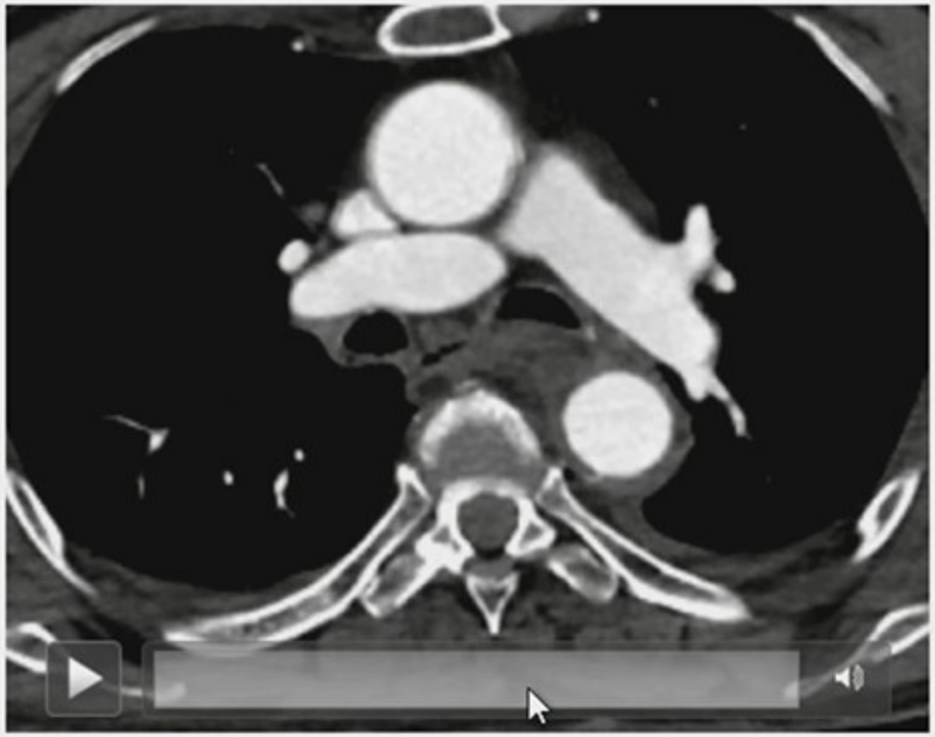

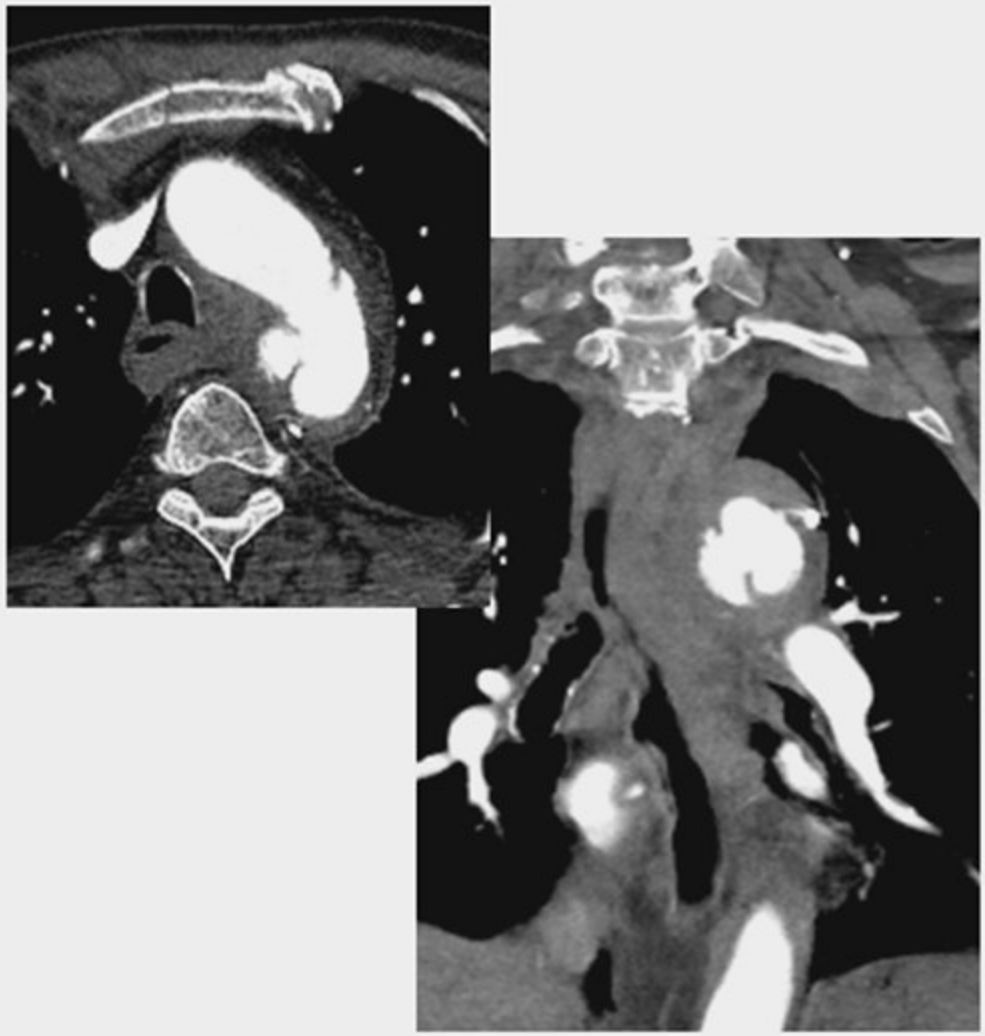

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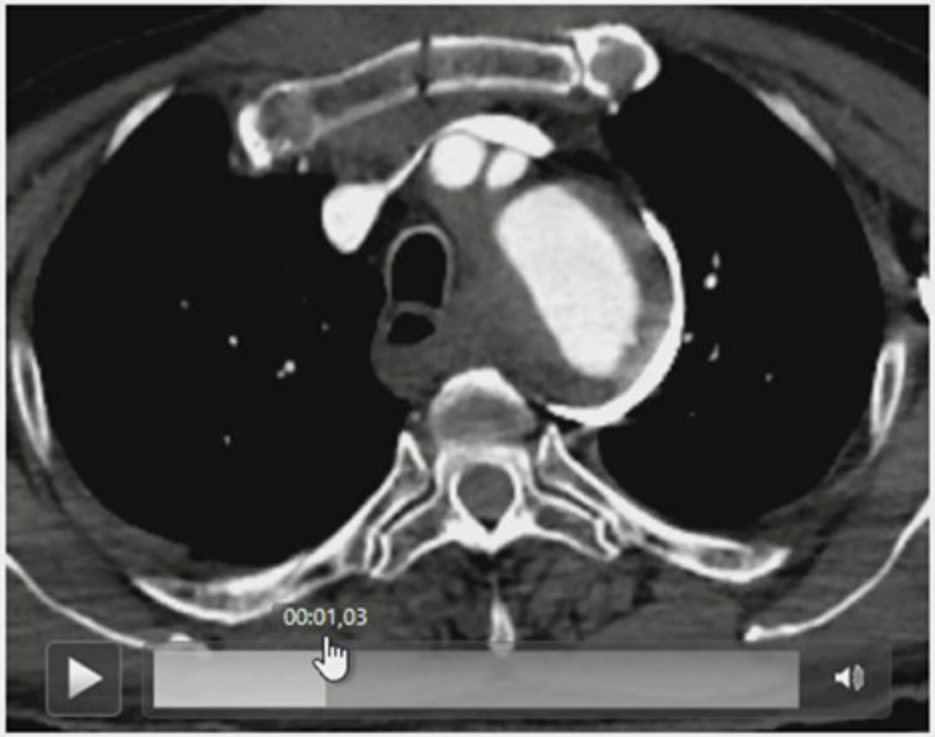

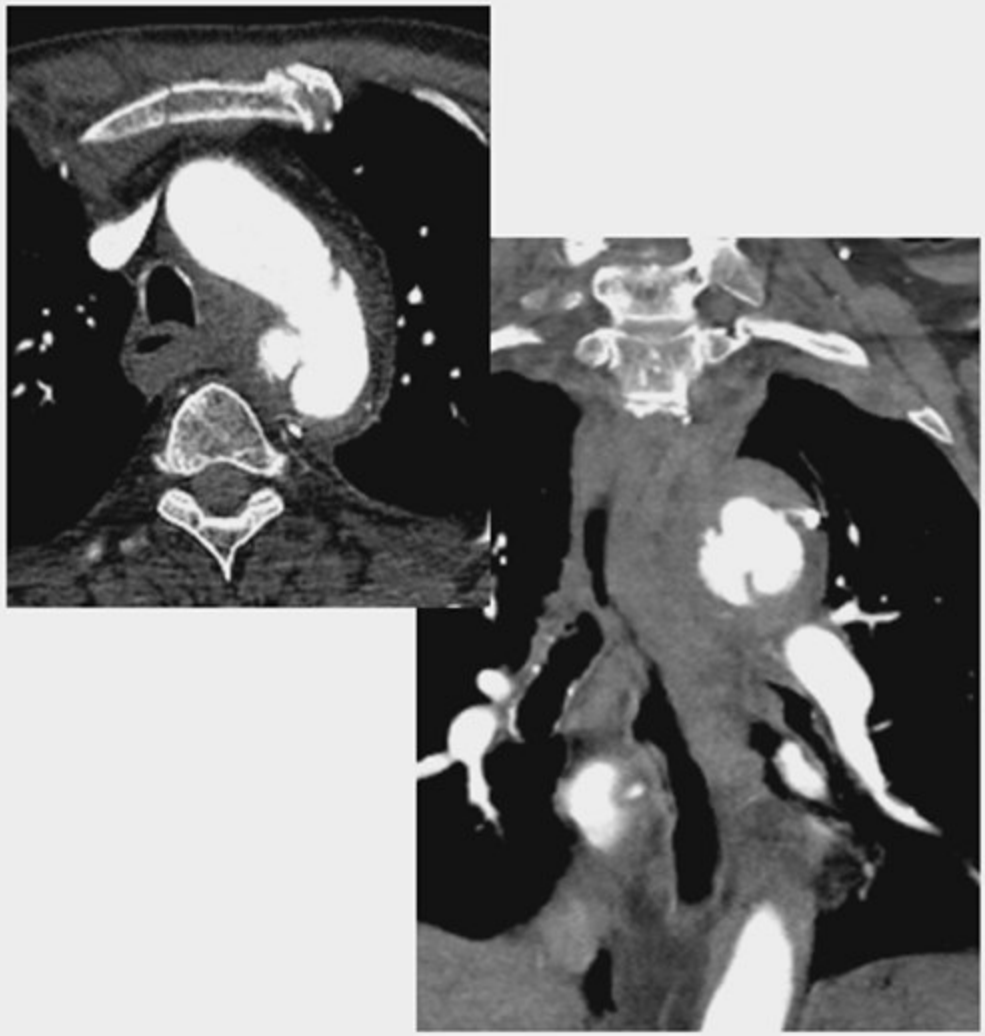

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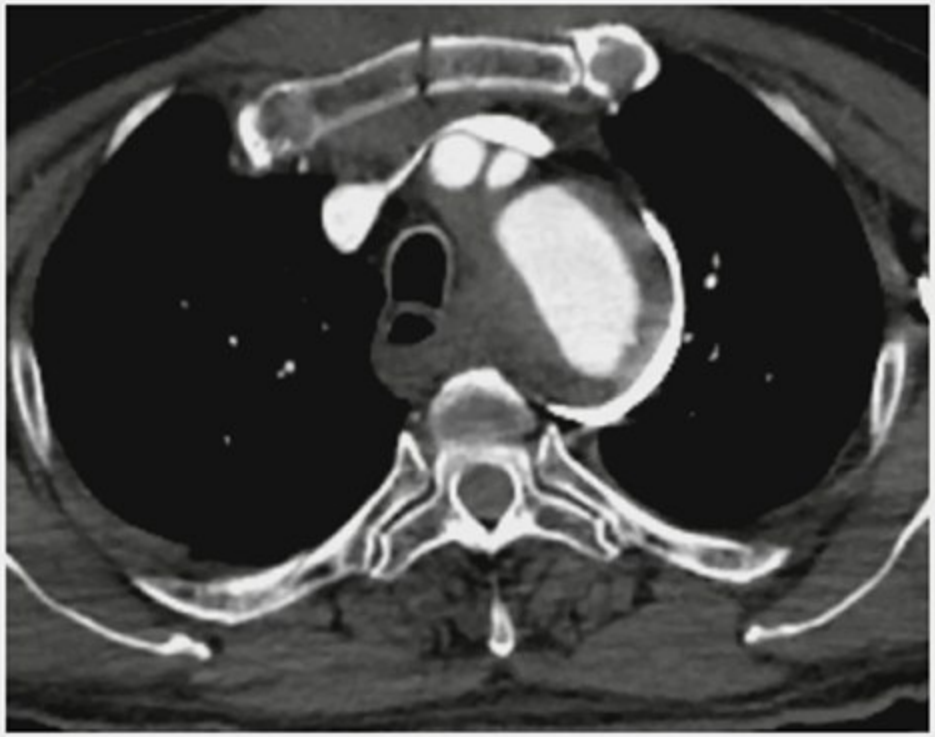
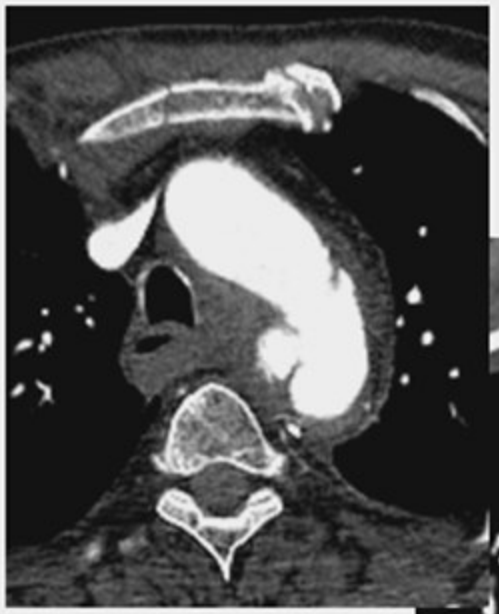
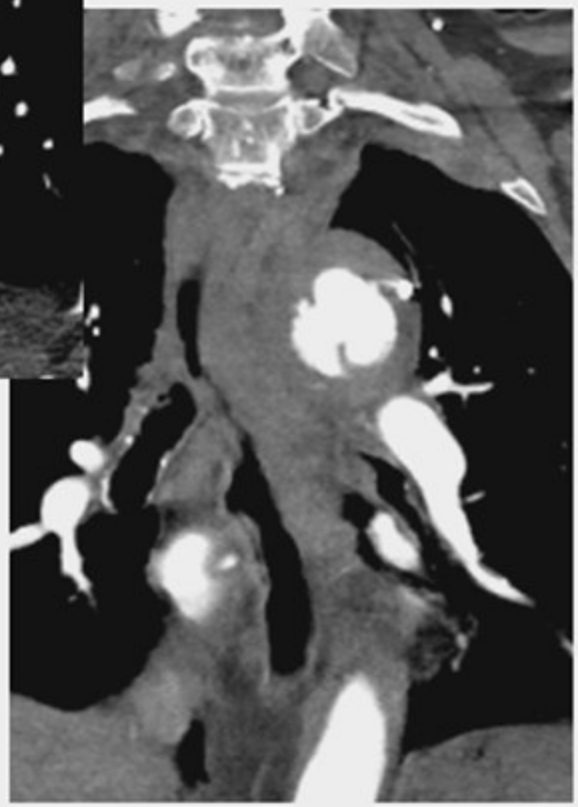
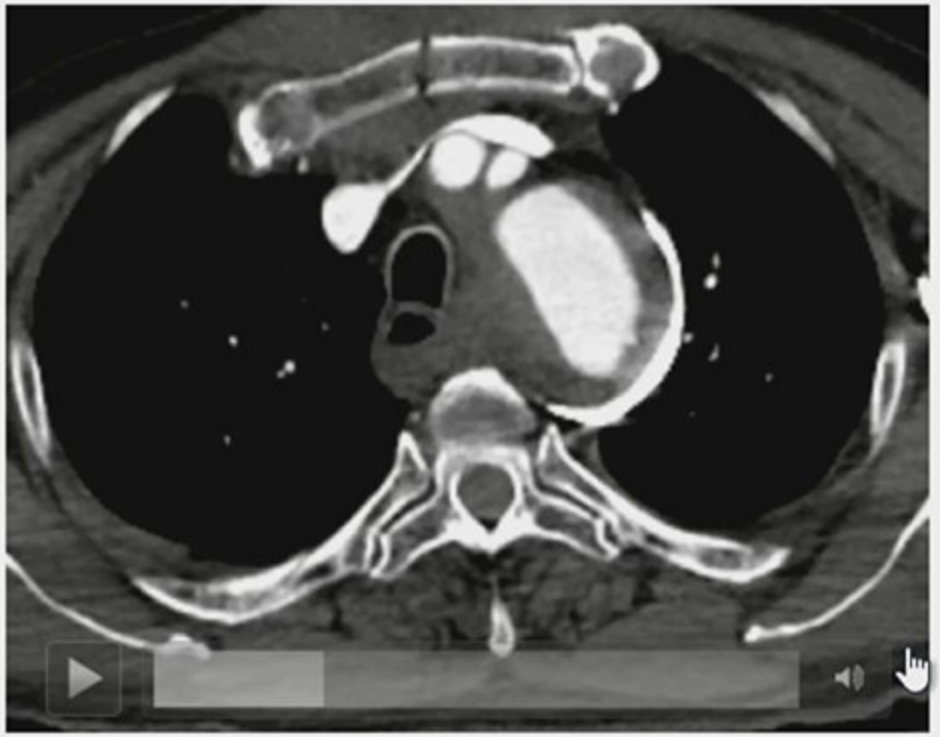
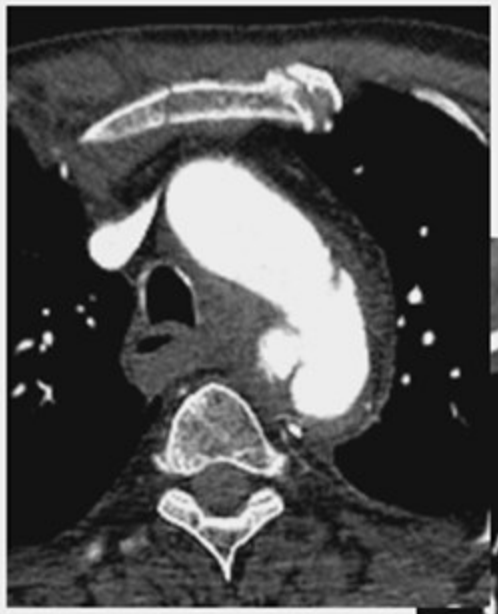


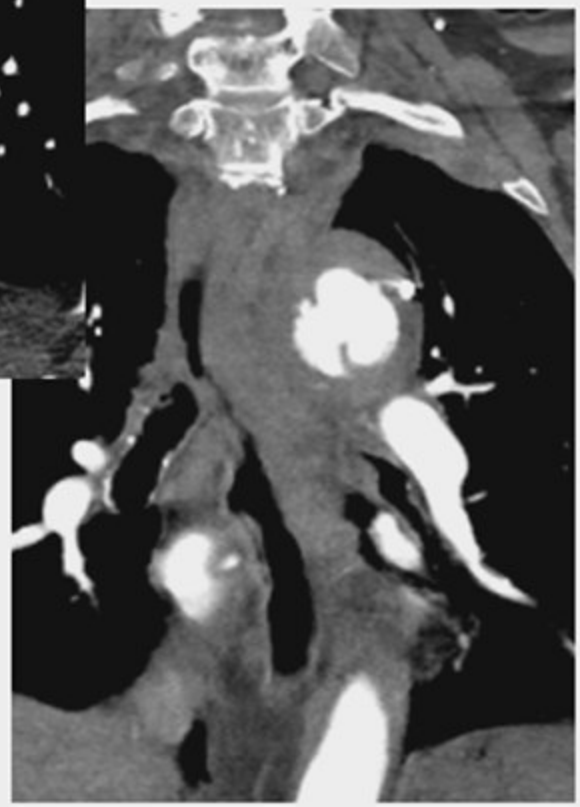




69 y, E, düşme







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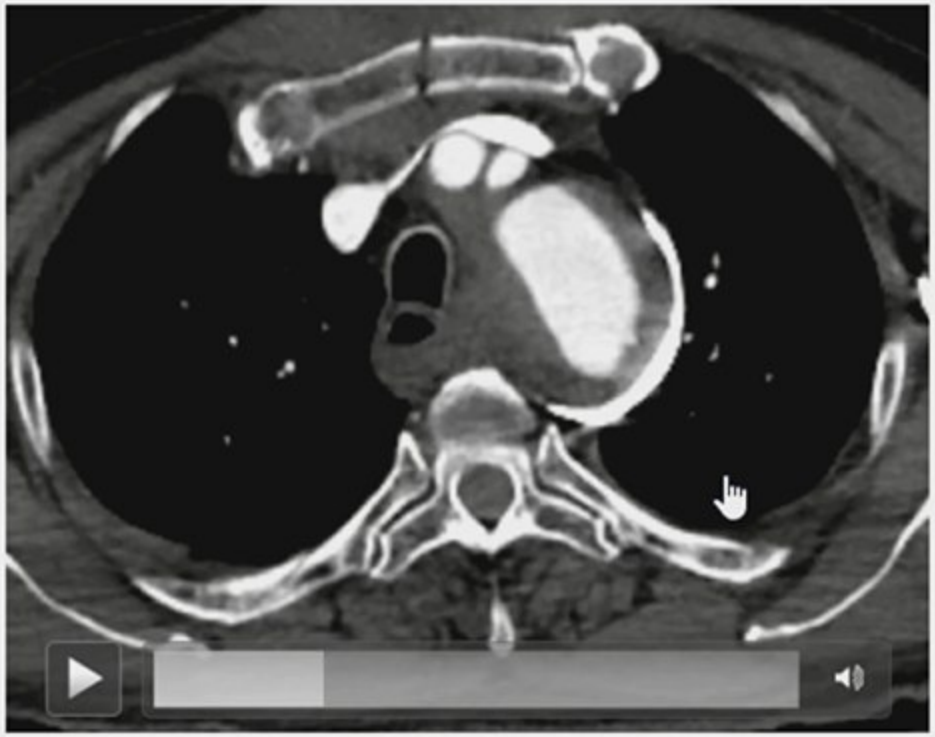

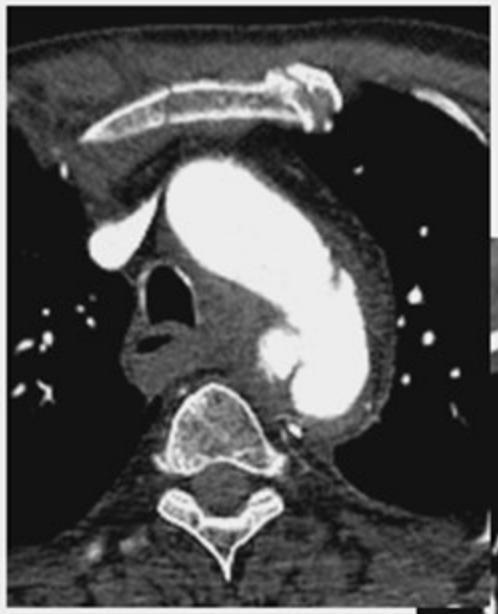

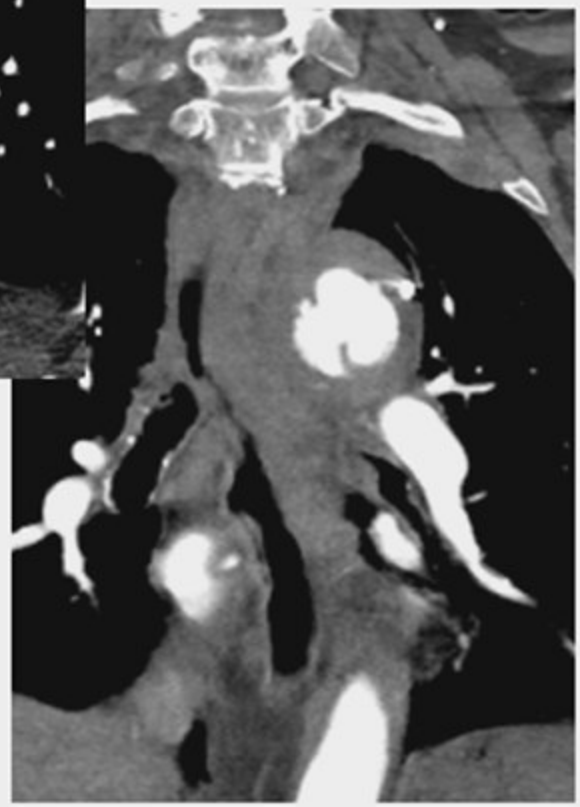

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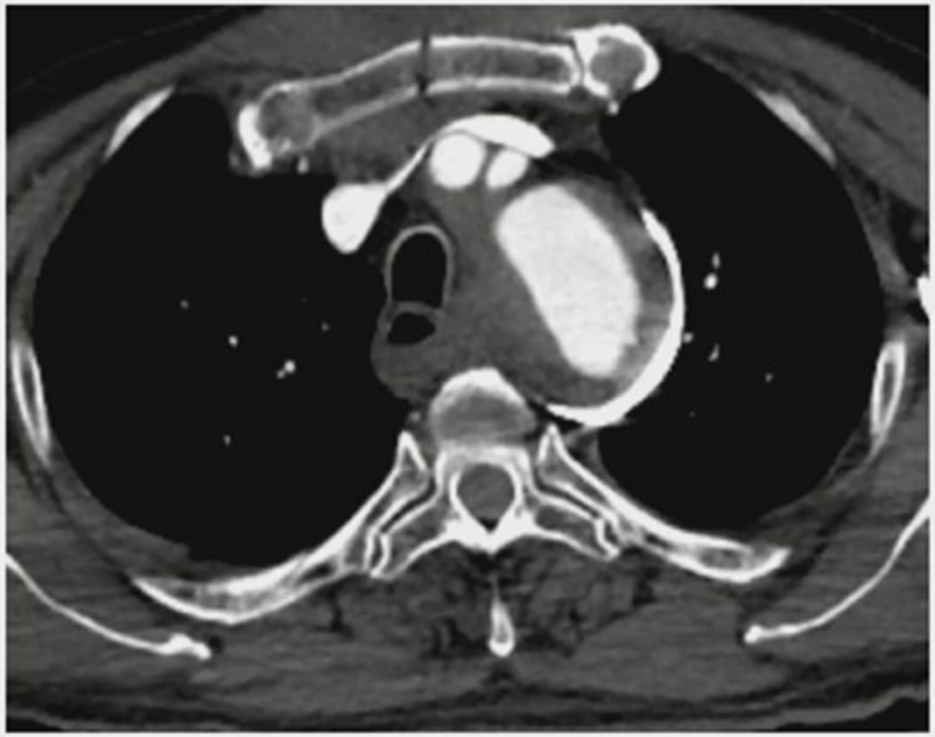
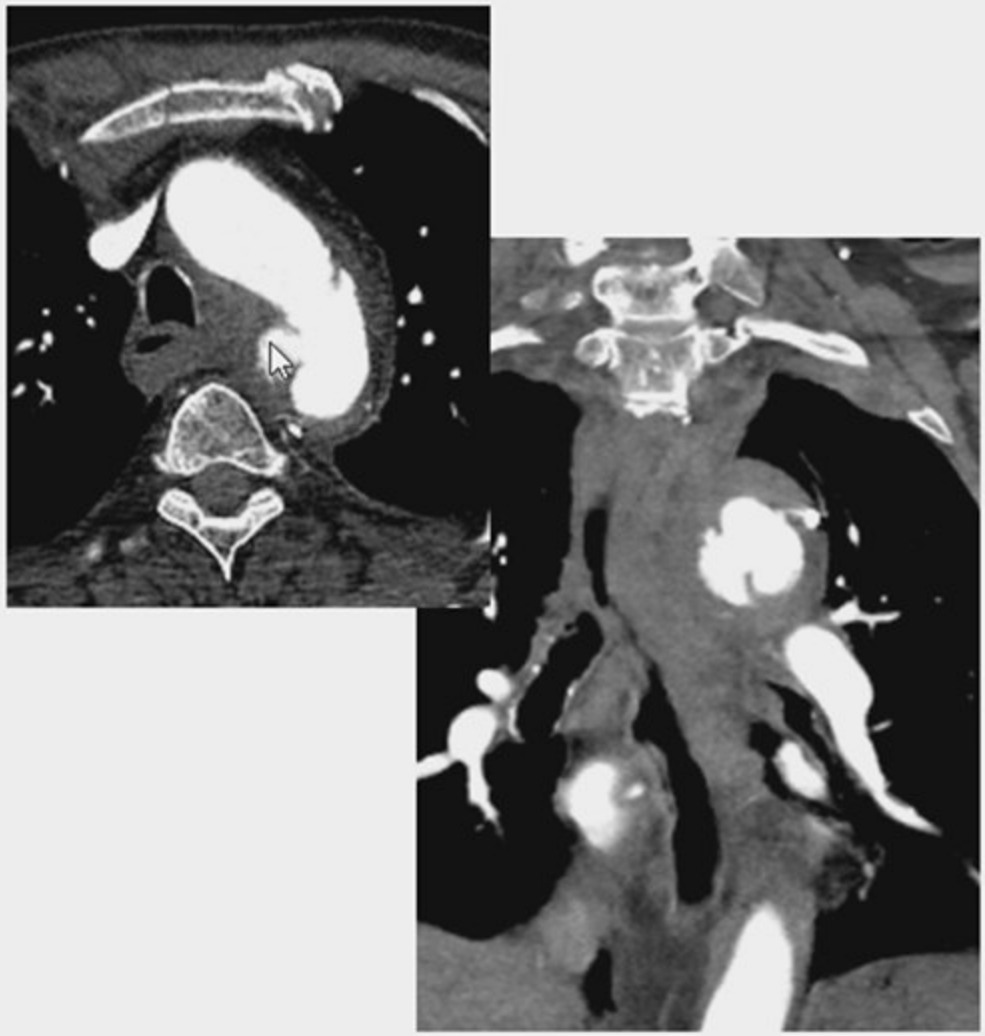
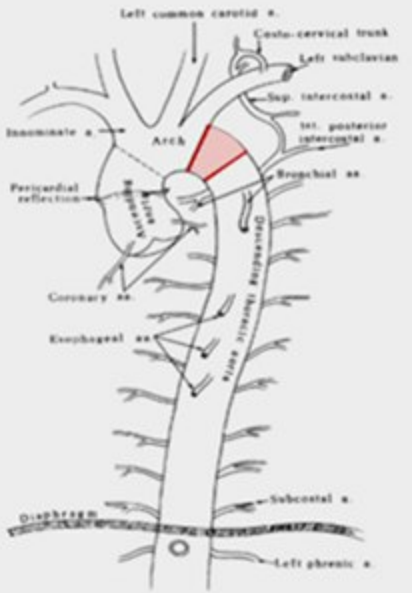


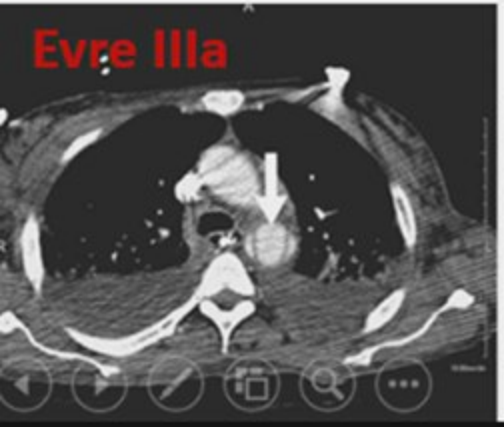


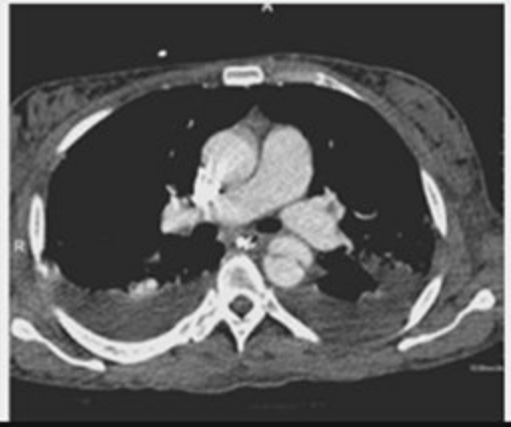
Aorta Yaralanmaları

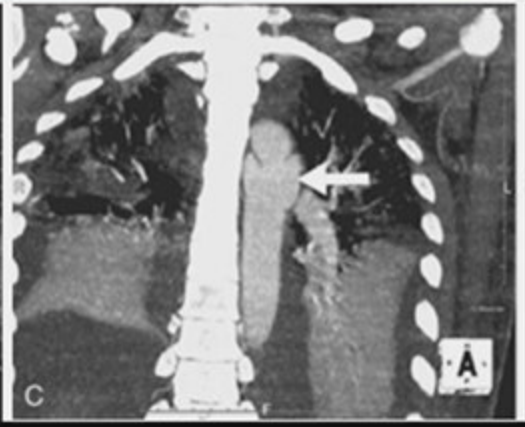
Künt travmalarda torasik aorta yaralanması

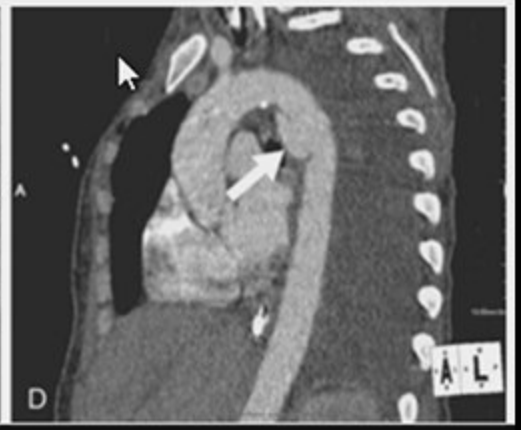
Evre	Tanım
Ia	İntimal yırtık
Ib	İntramural hematom
II	İntimal hasar ve periaortik hematom
IIIa	Parsiyel aortik transeksiyon ve psödoanevrizma
IIIb	Multiple aortik yaralama
IV	Serbest rüptür

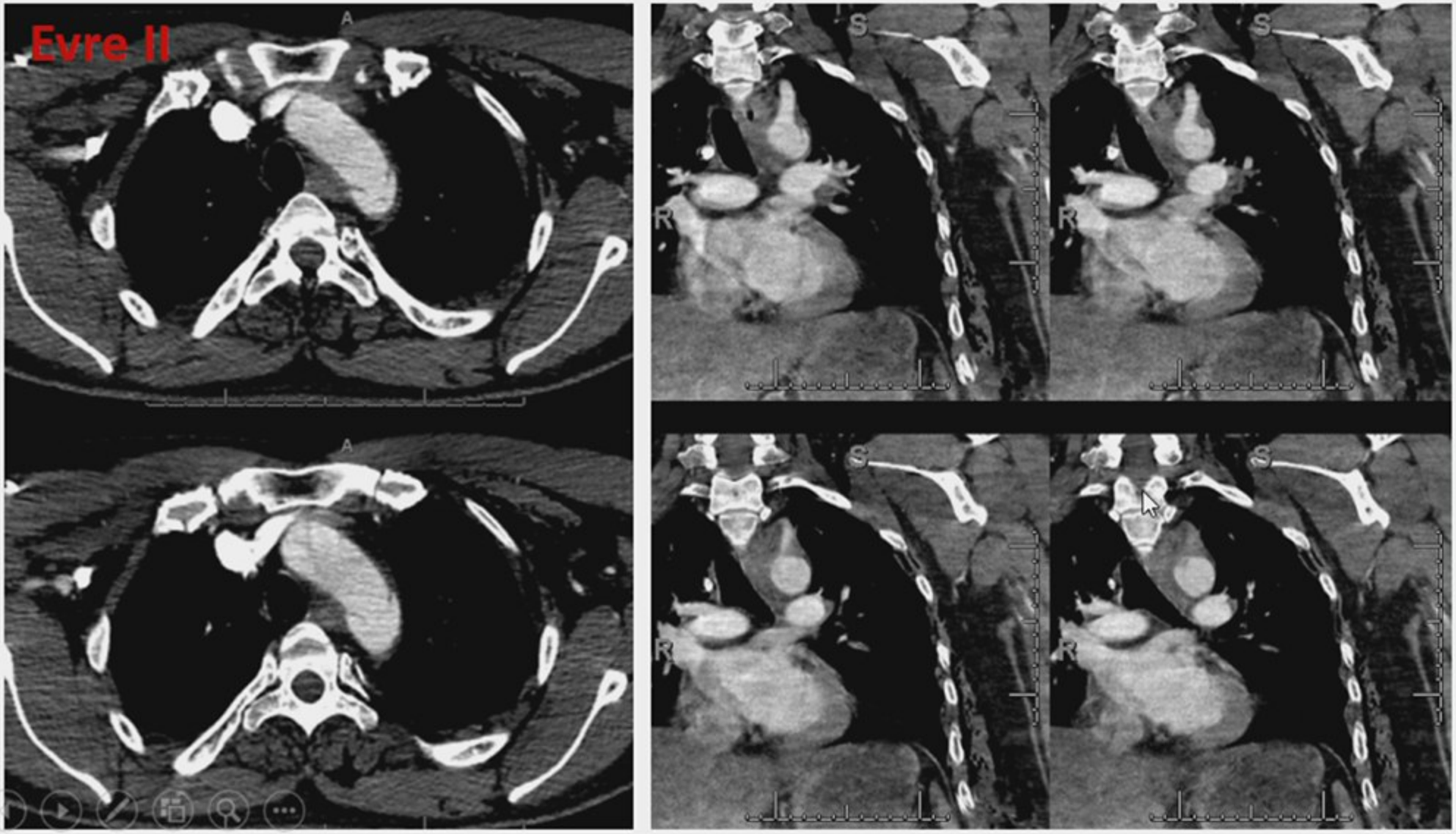




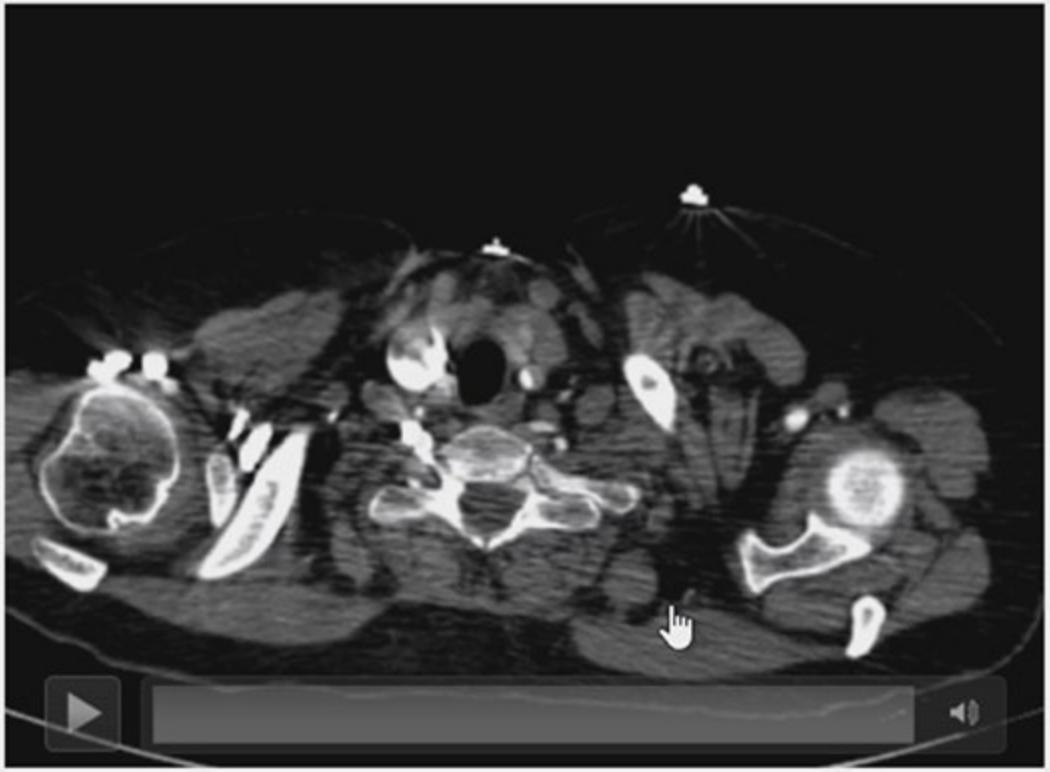


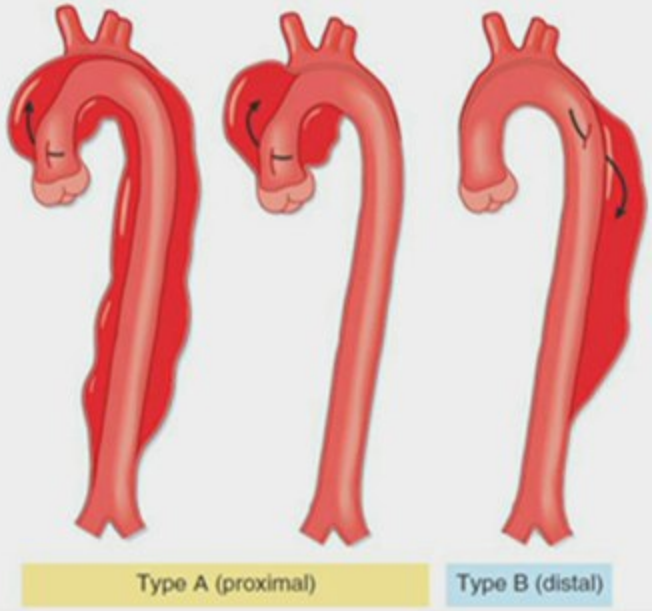





Evre II
A
A
S
R
S
R
S
R
S
R

Aort Diseksiyonu





- De Bakey
  - Tip I
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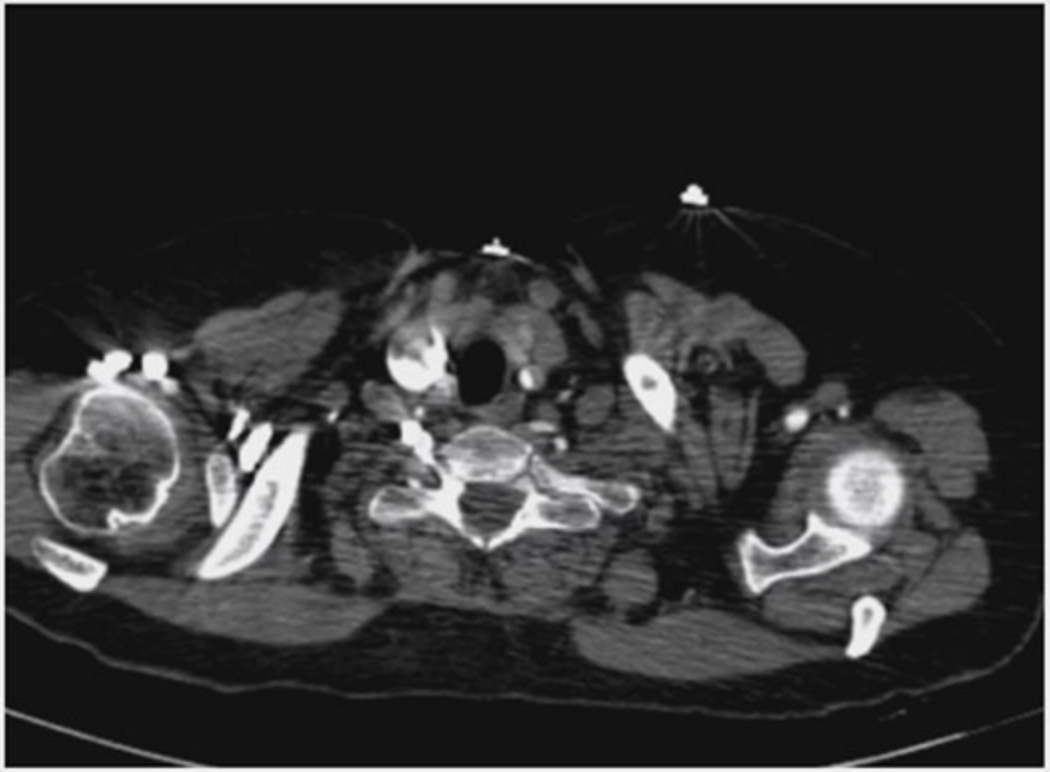
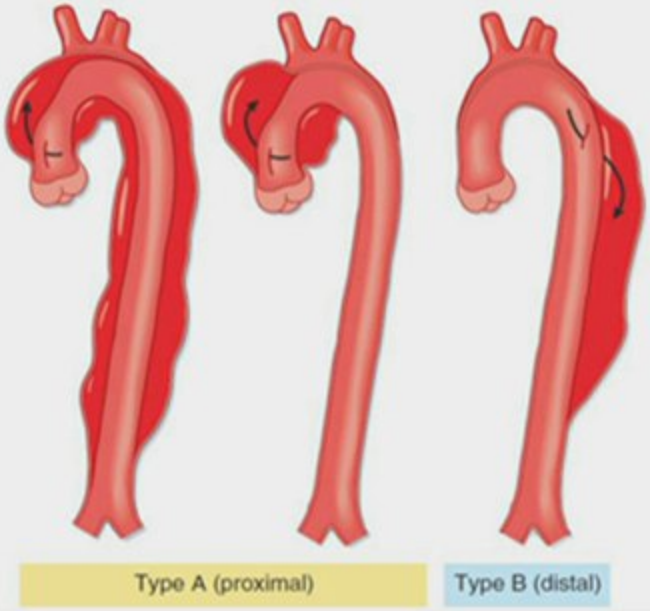
- Stanford
  - Tip A (Asendan Aortu içeriyor)
  - Tip B (Asendan Aortu içermiyor)

Aort Diseksiyonu





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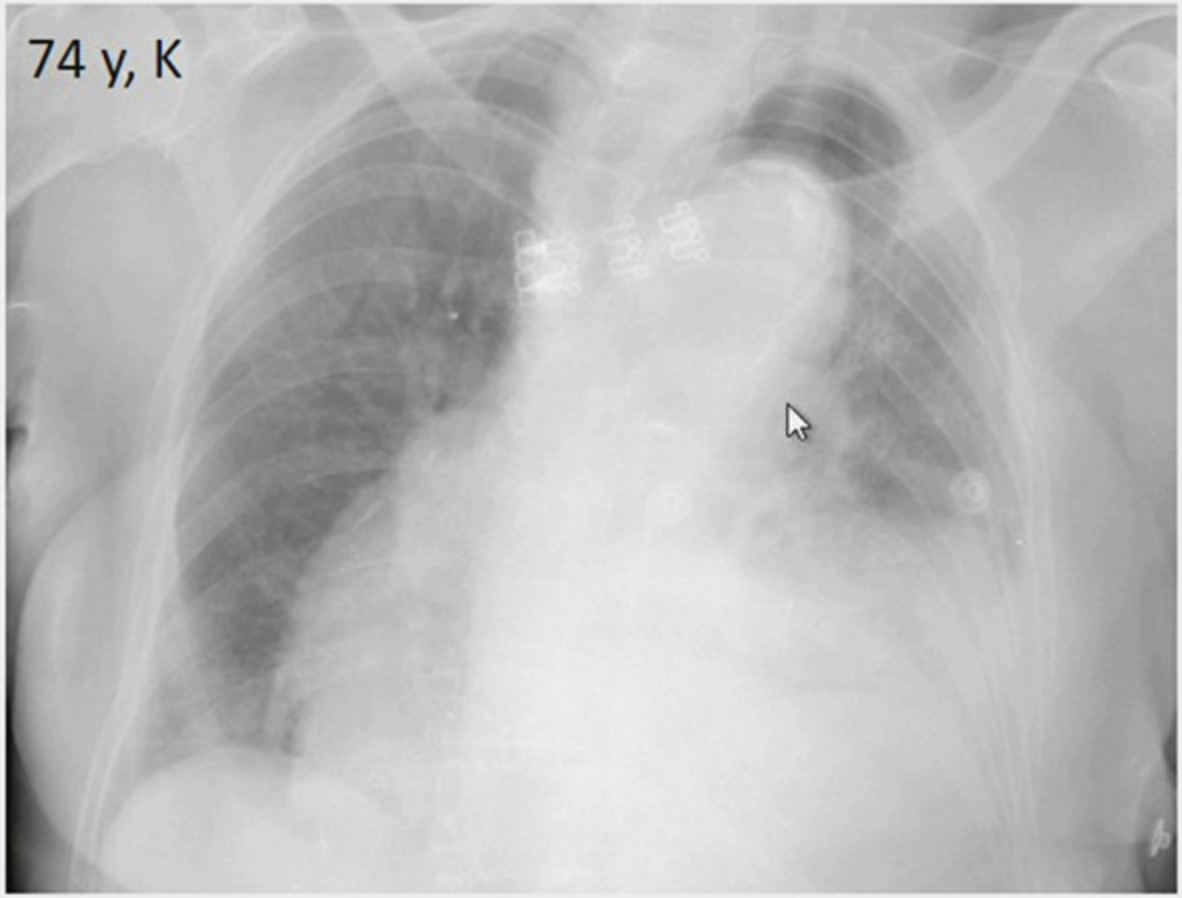
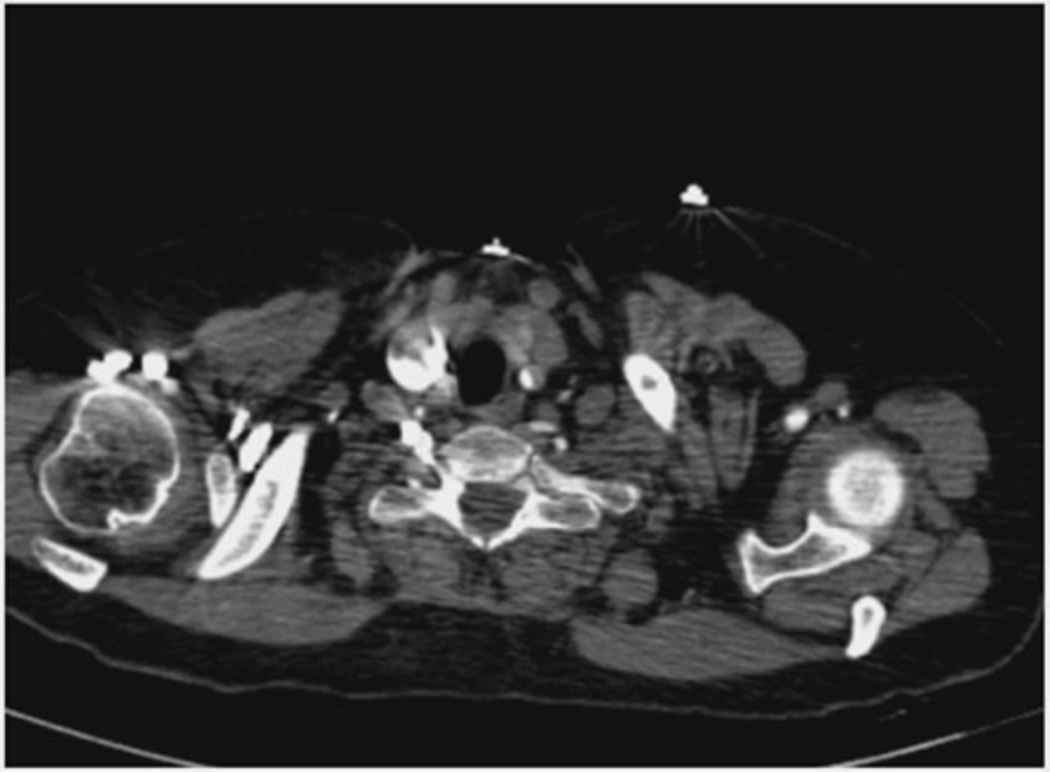
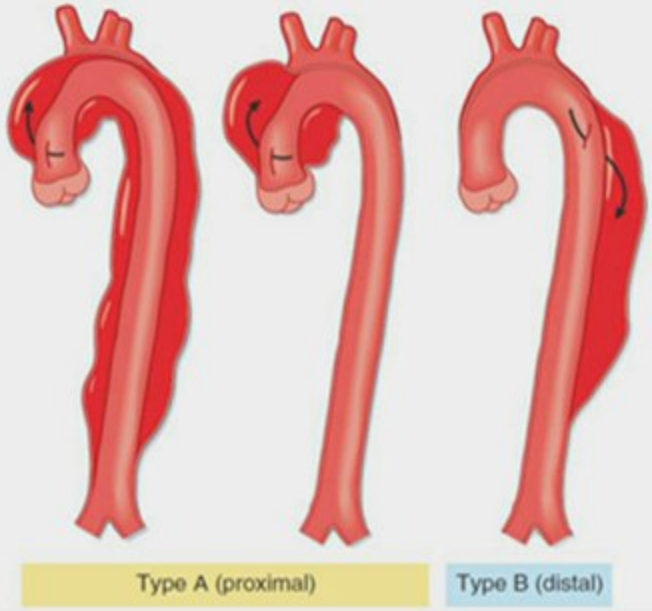
  - Tip B (Asendan Aortu içermiyor)

Aort Anevrizma Rüptürü



Aort Diseksiyonu





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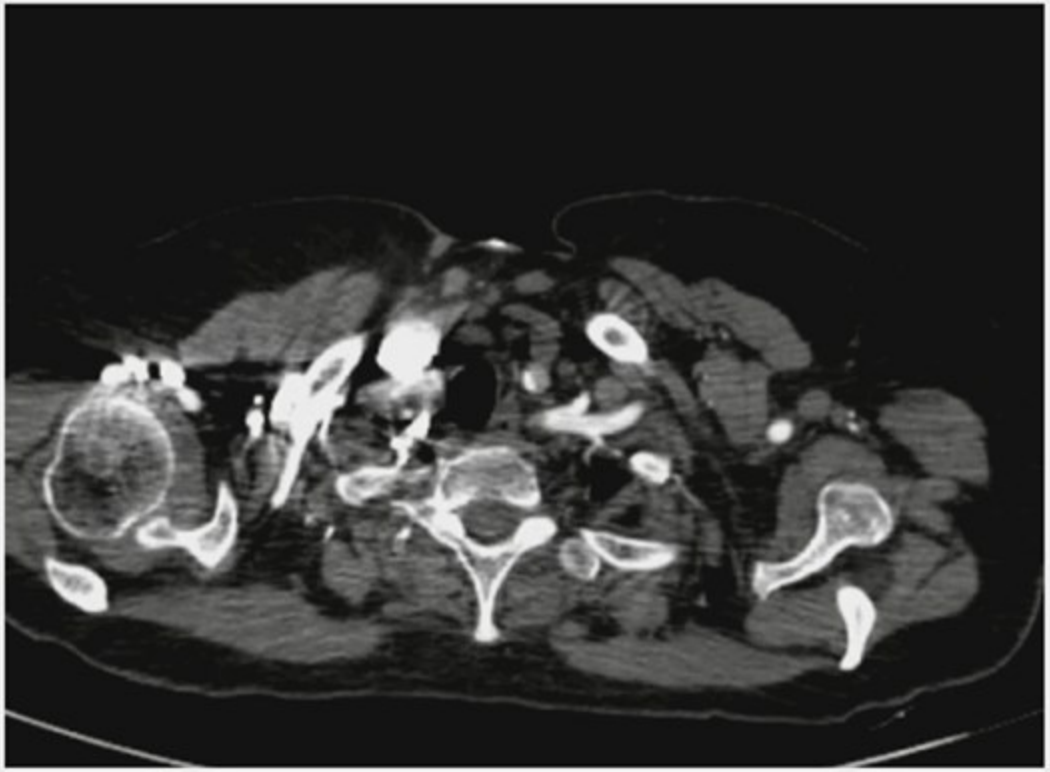
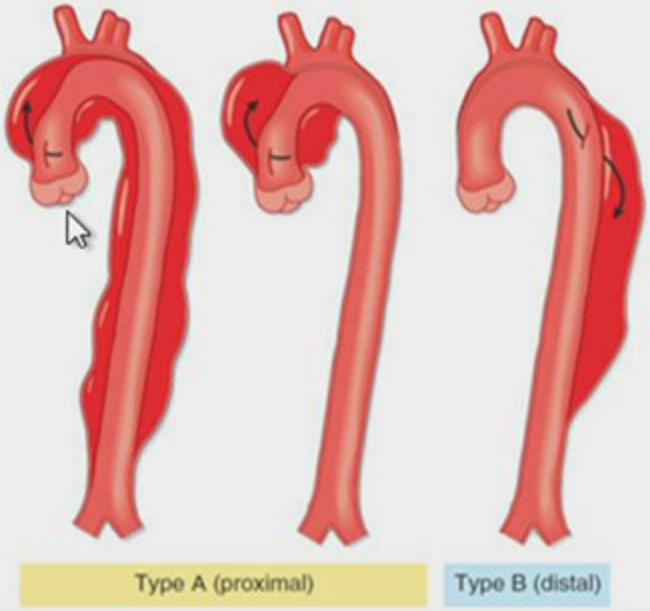
Aort Diseksiyonu





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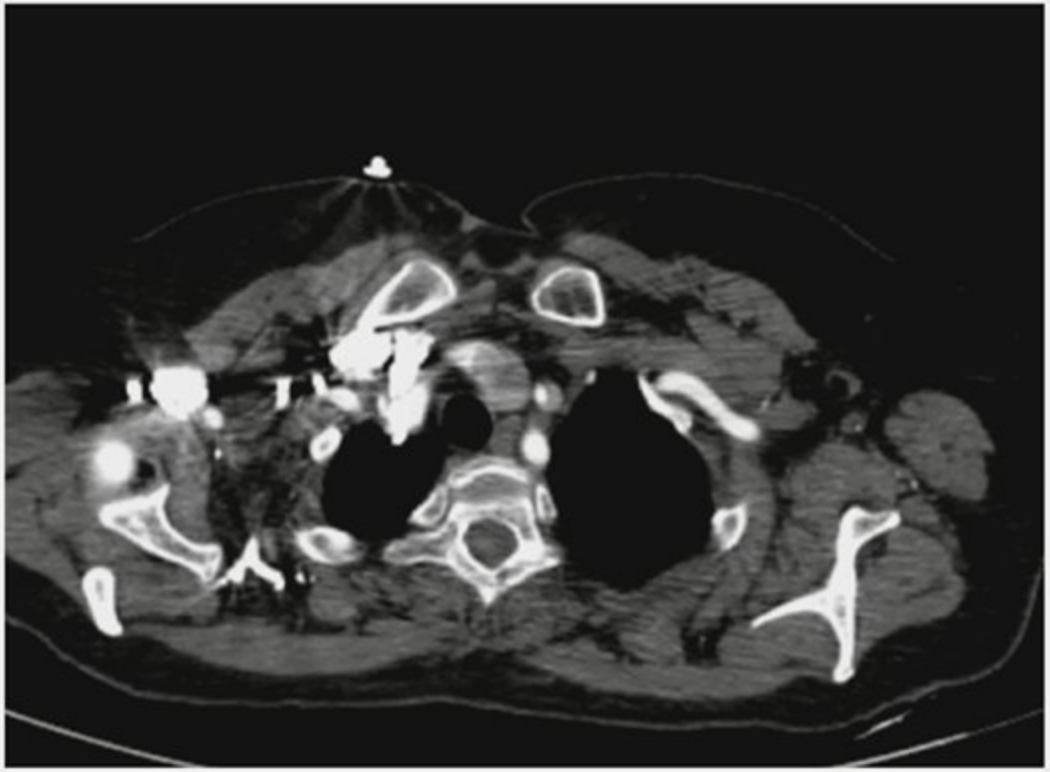

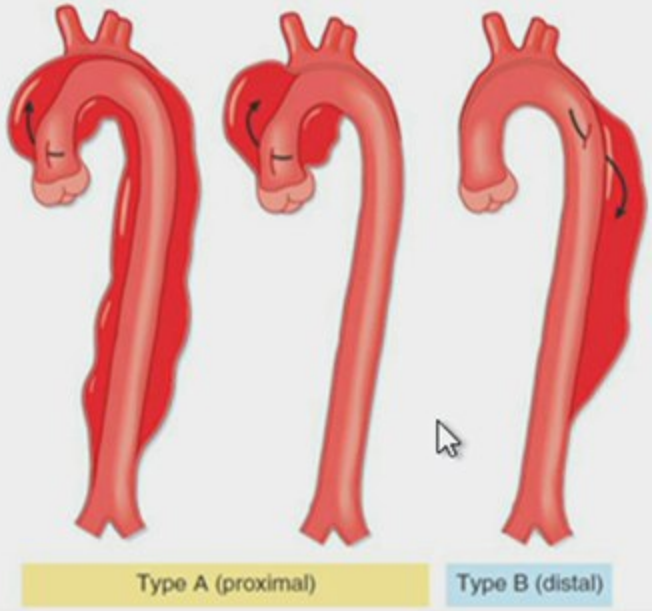

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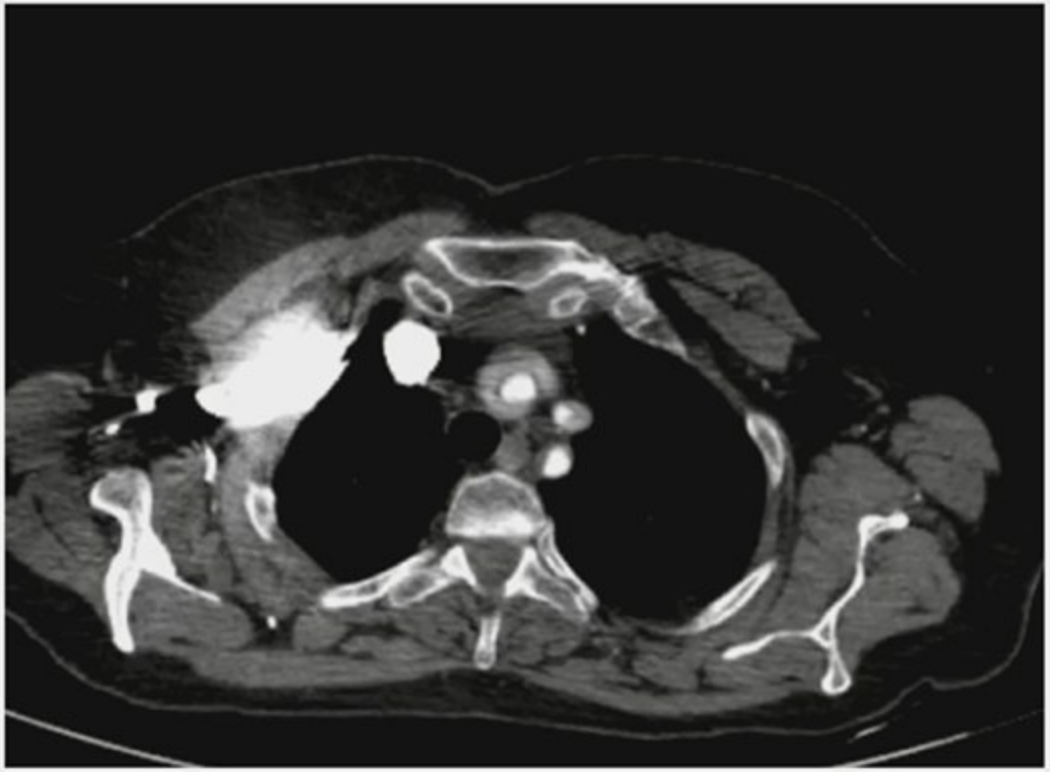

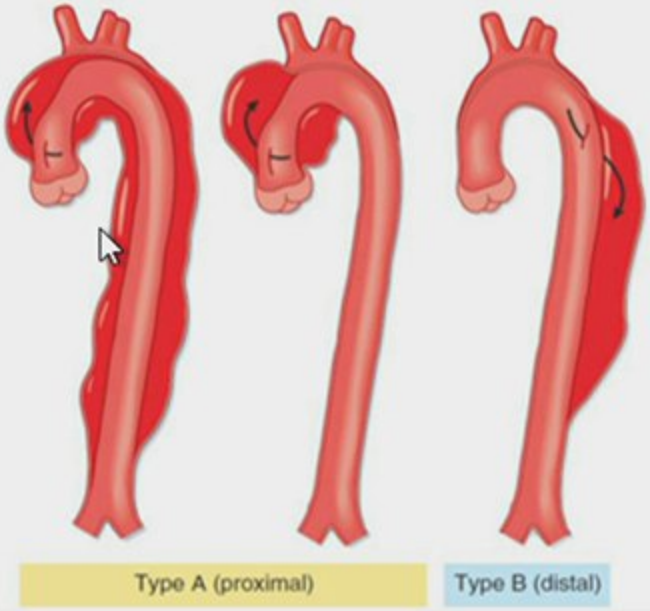

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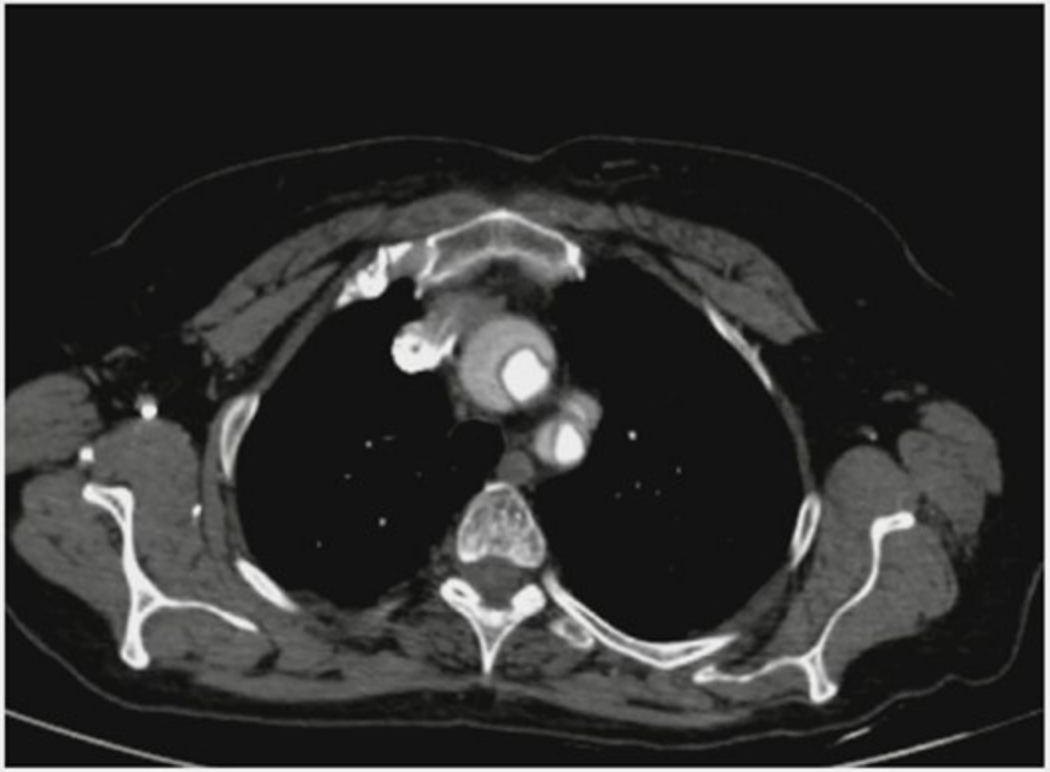

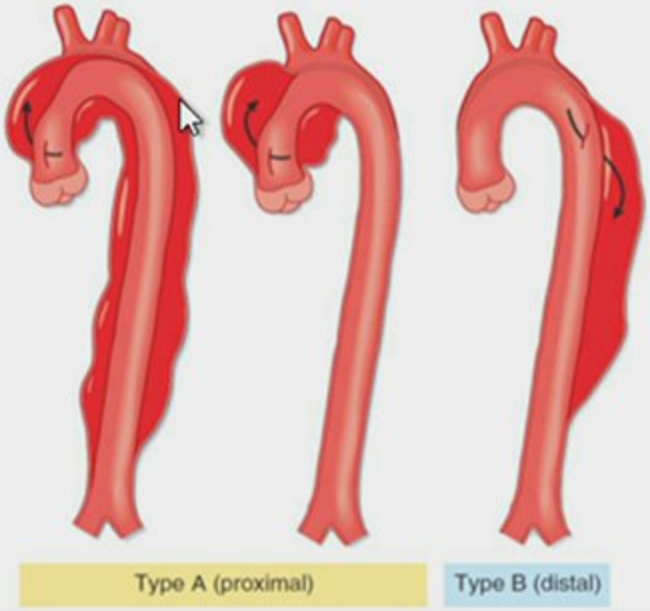

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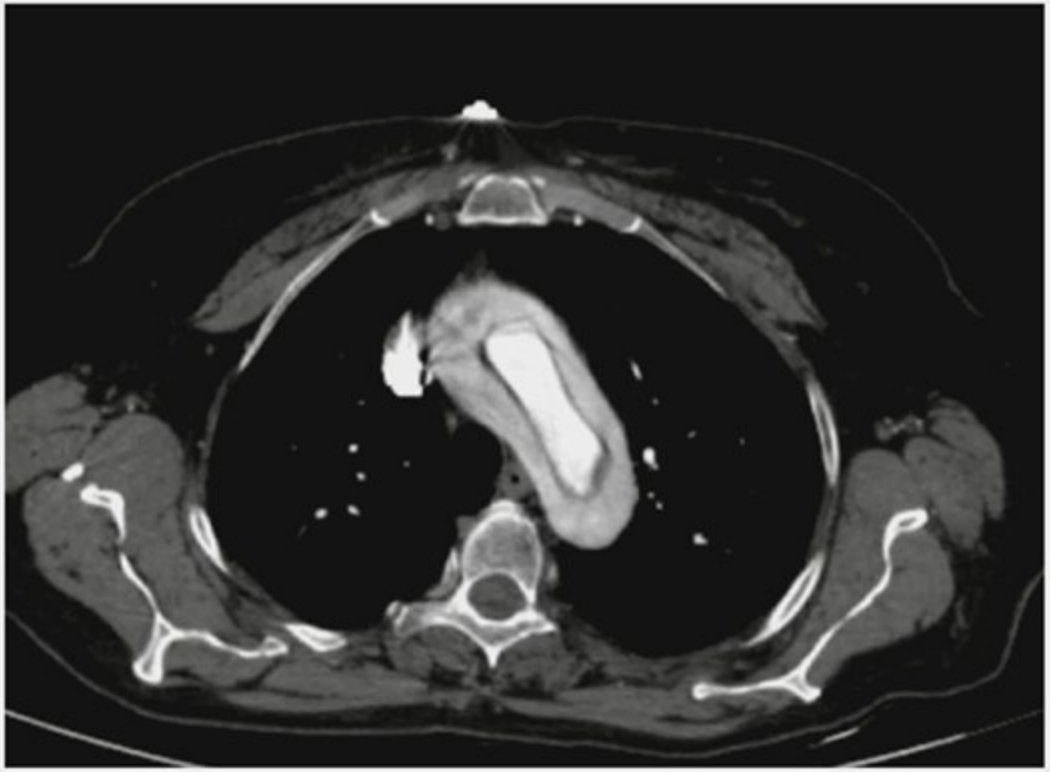

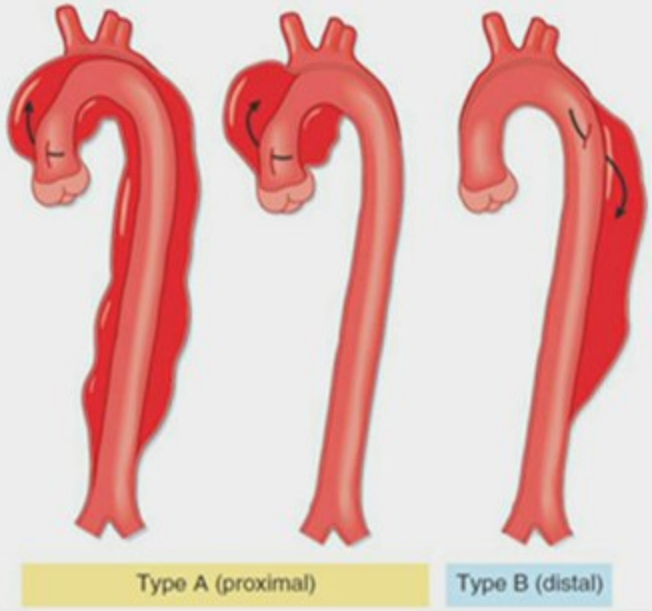

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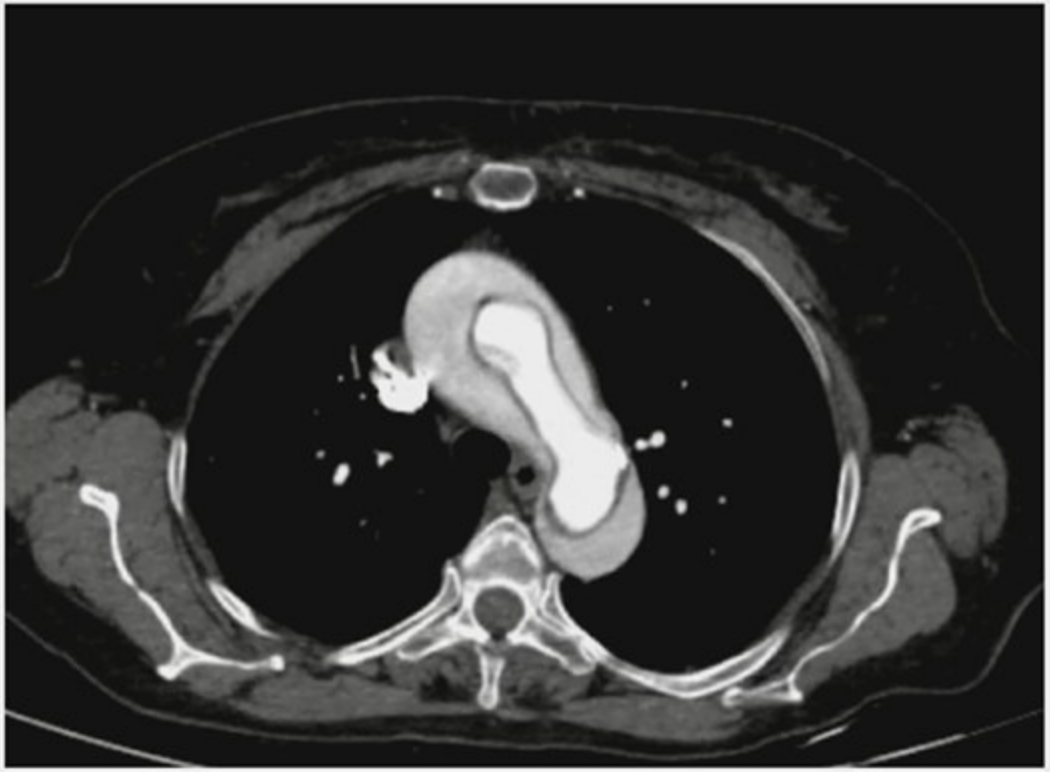

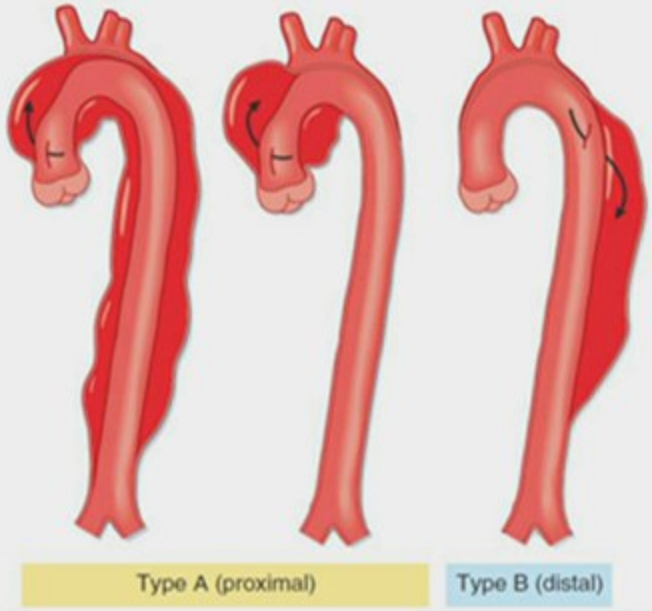

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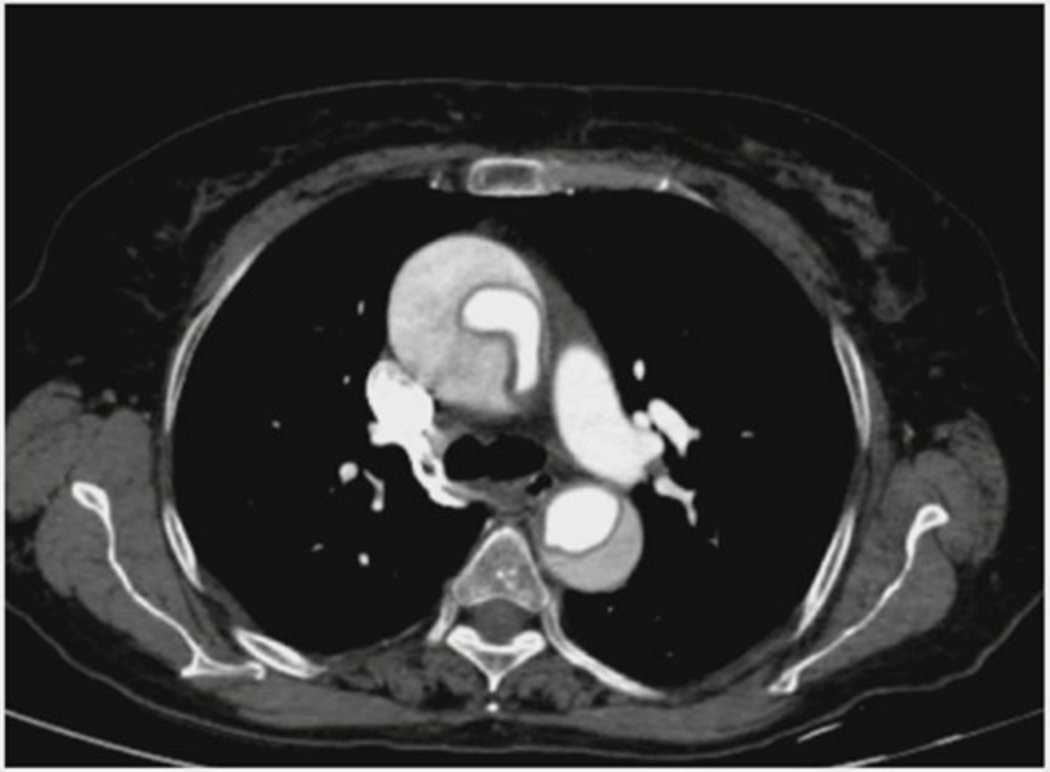

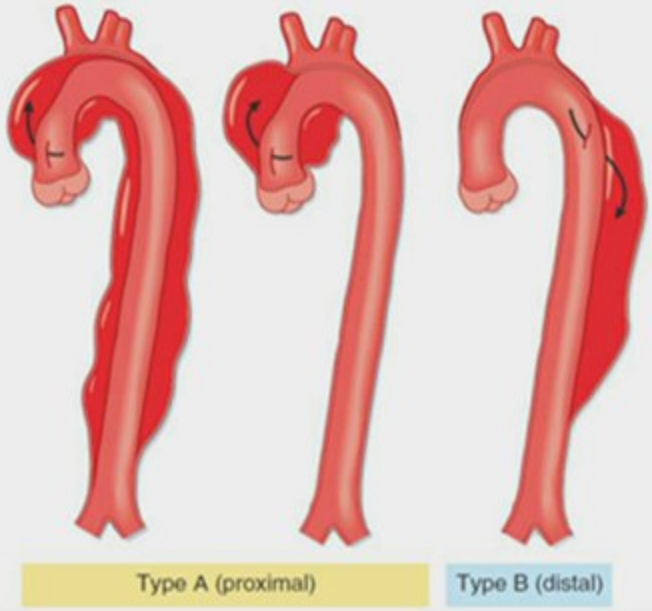

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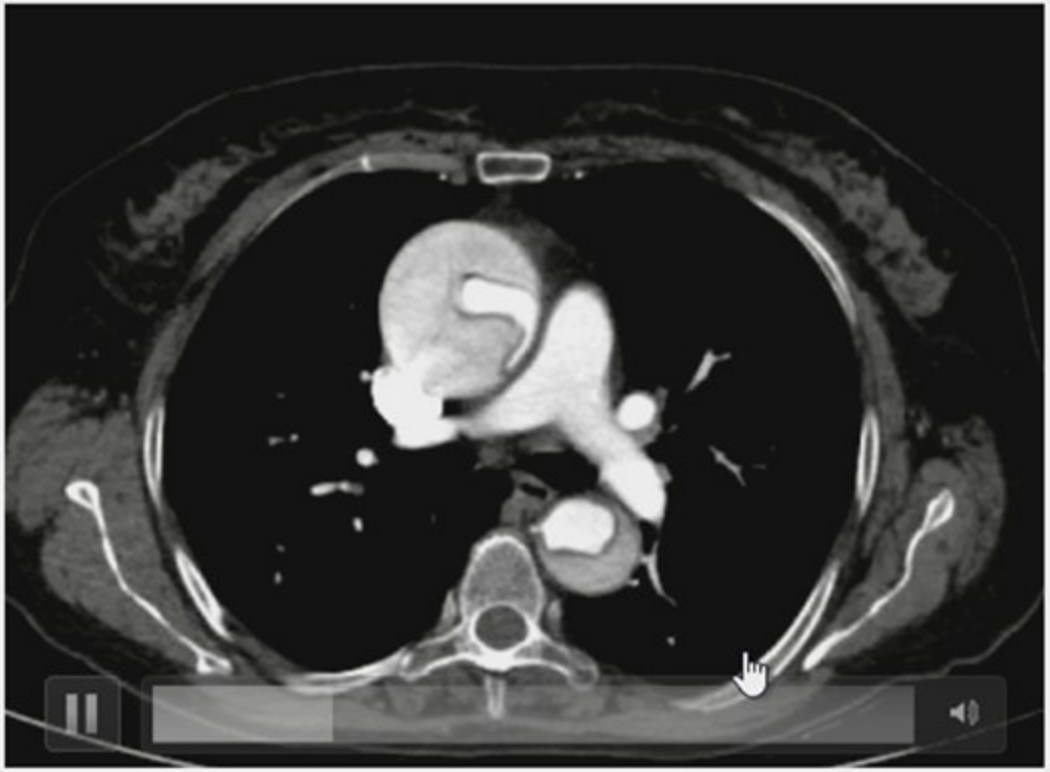

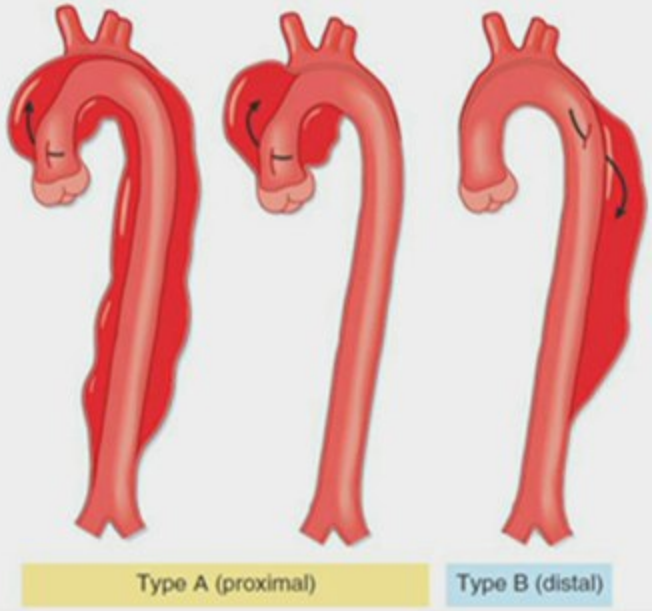

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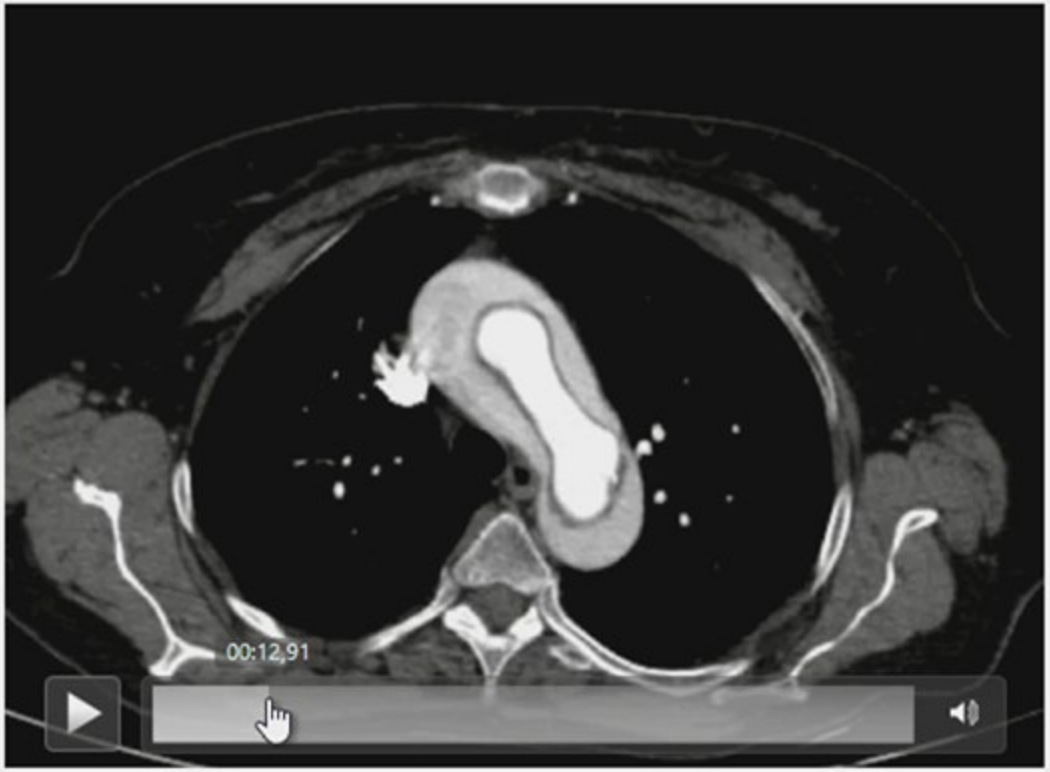

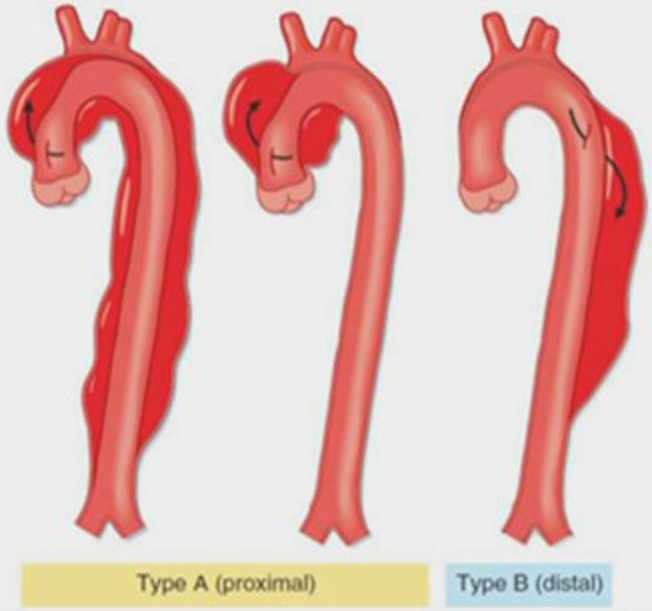

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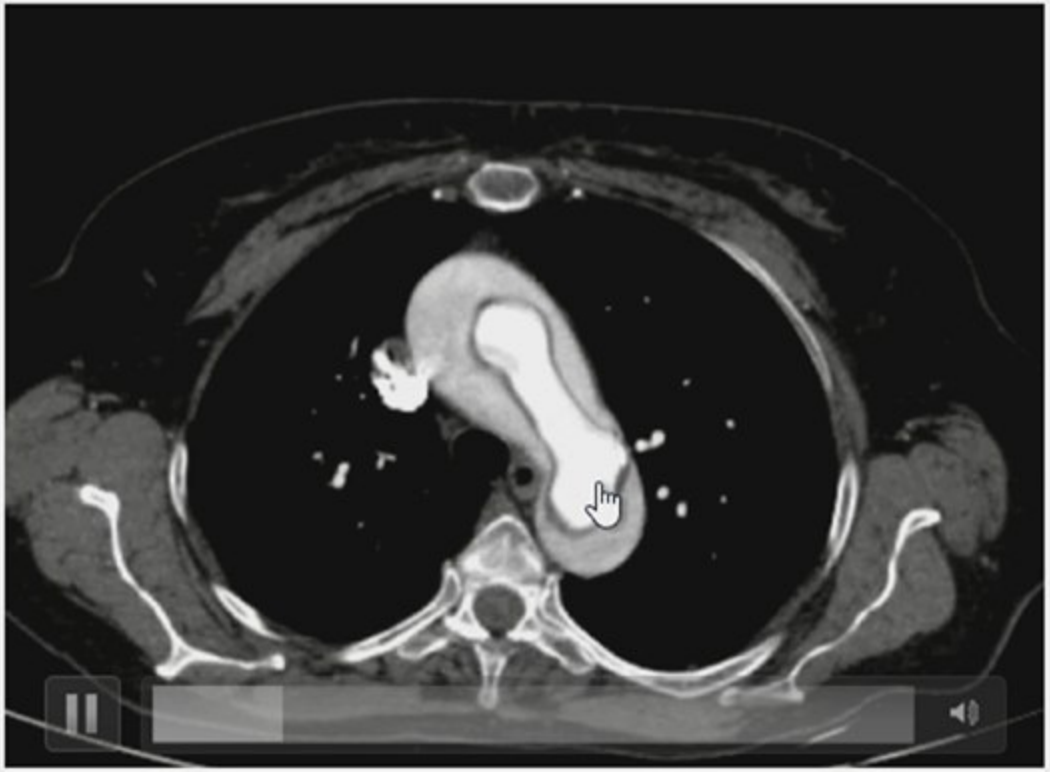

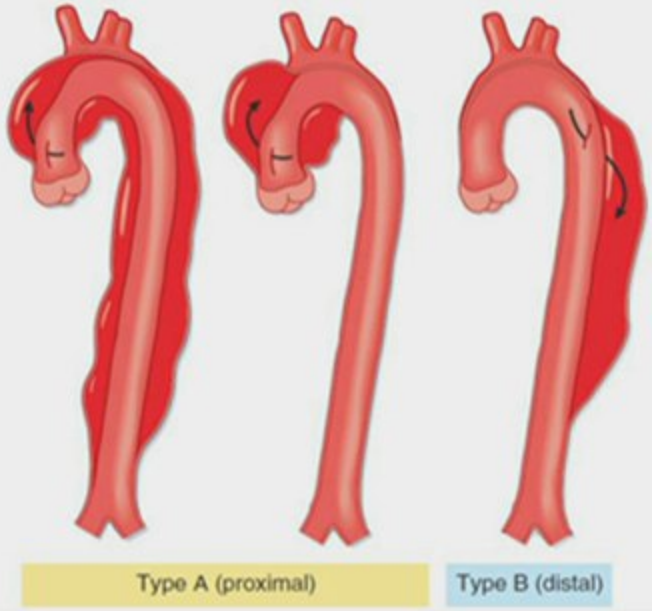

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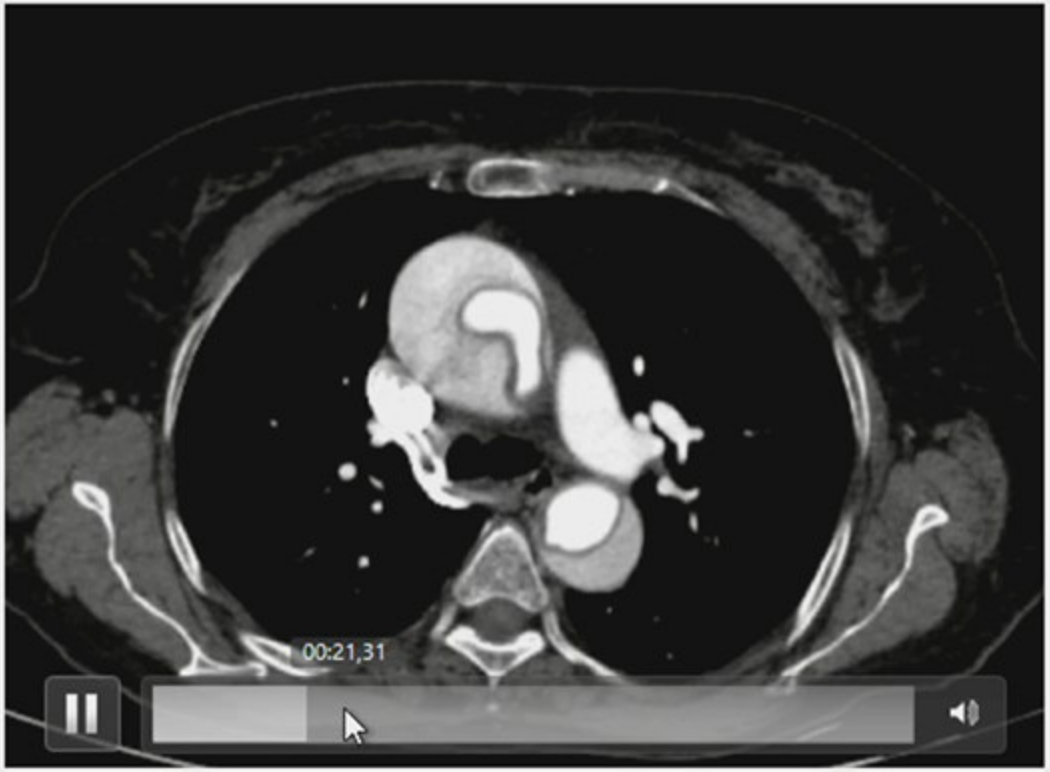

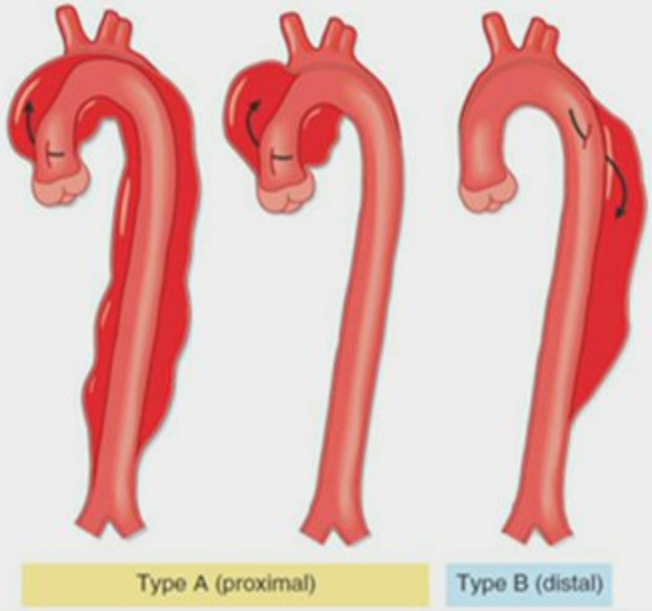

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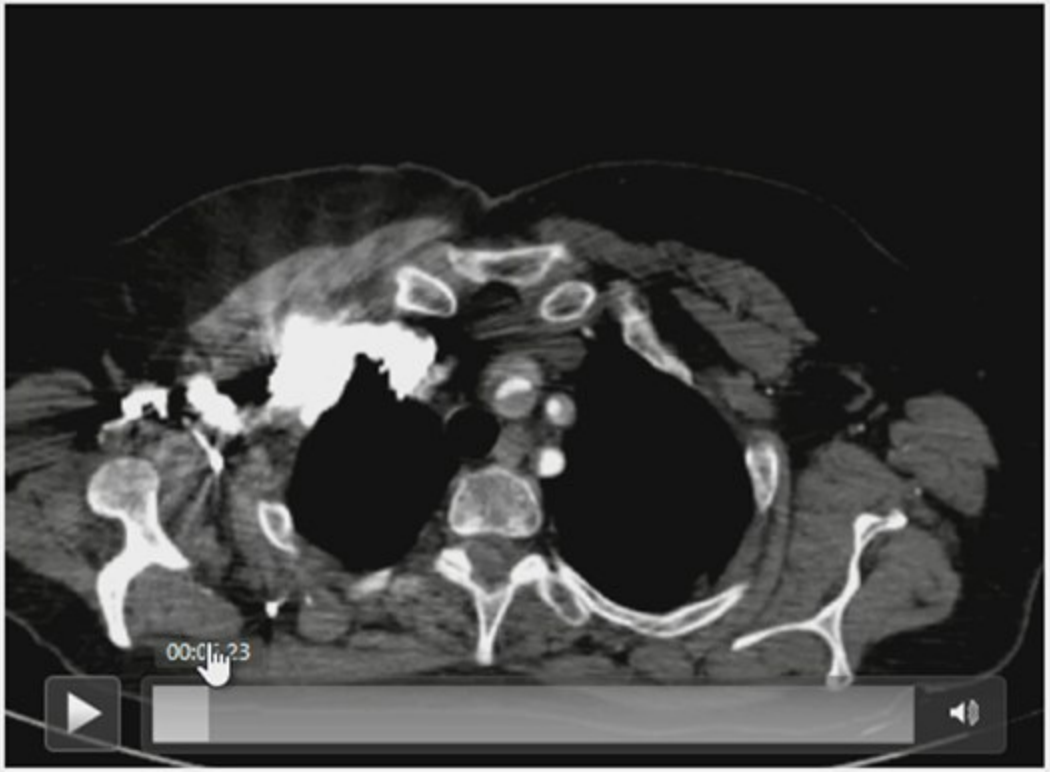

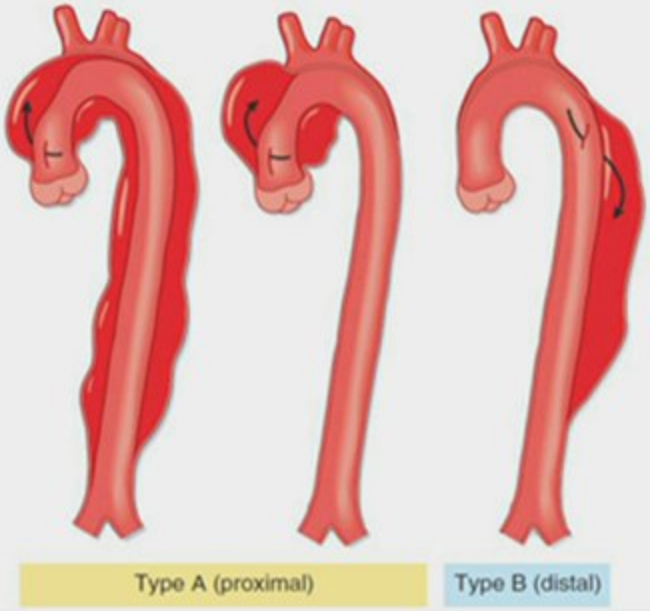

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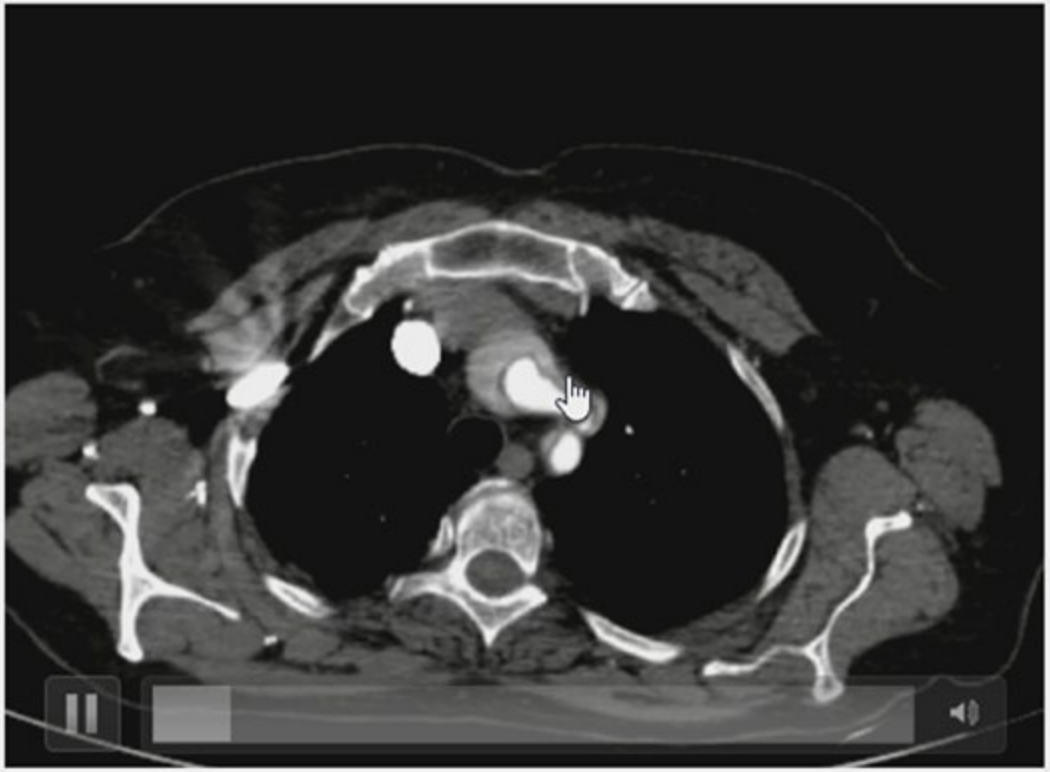

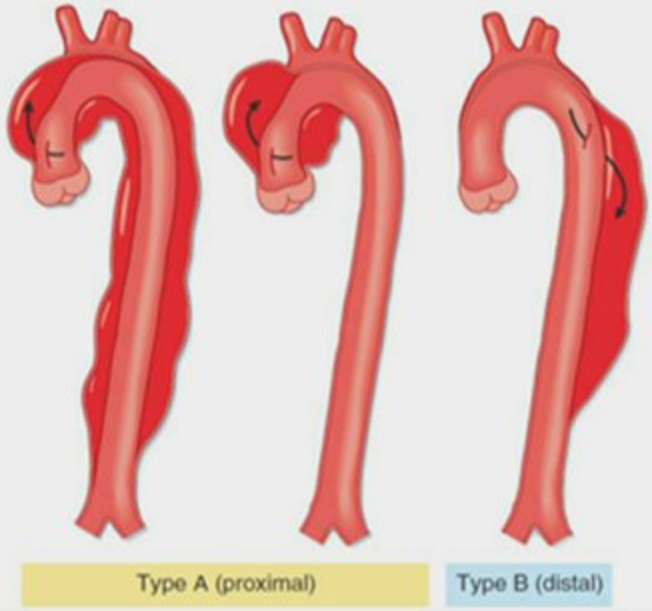

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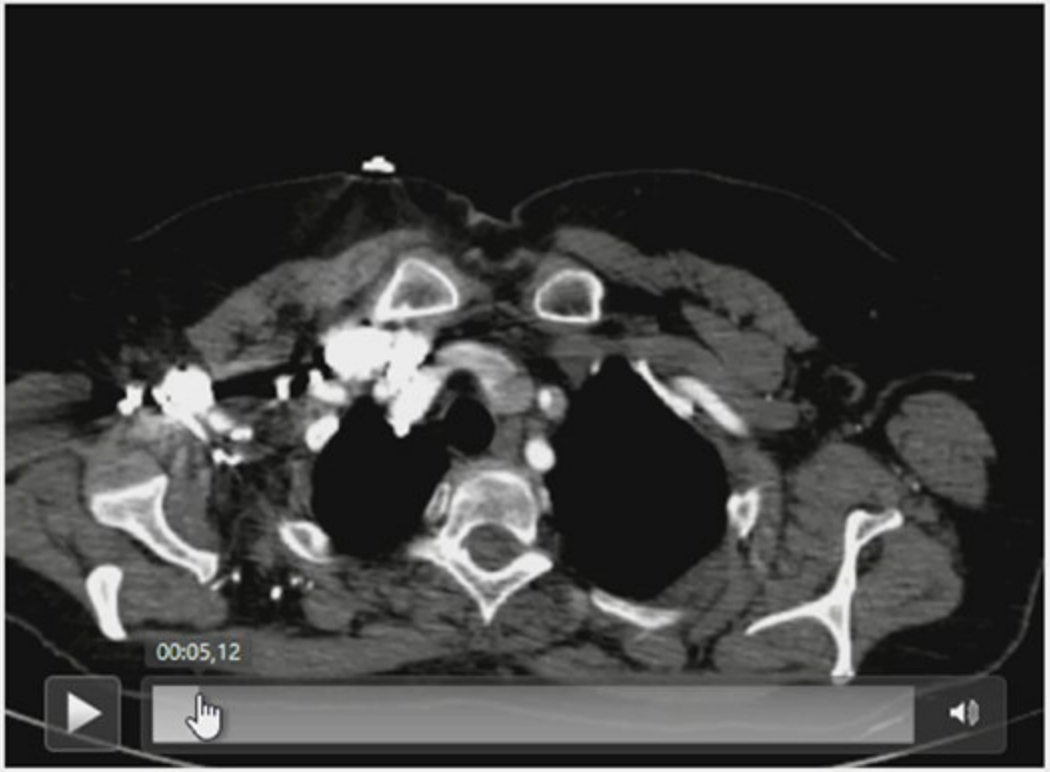
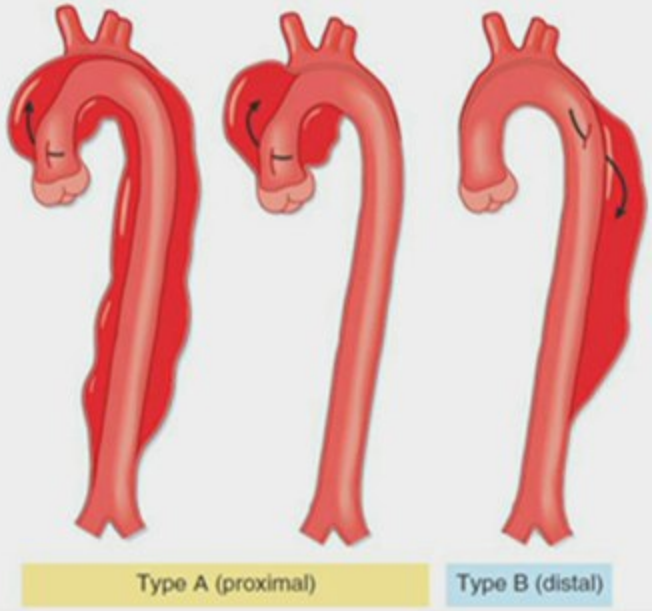
Aort Diseksiyonu





- De Bakey
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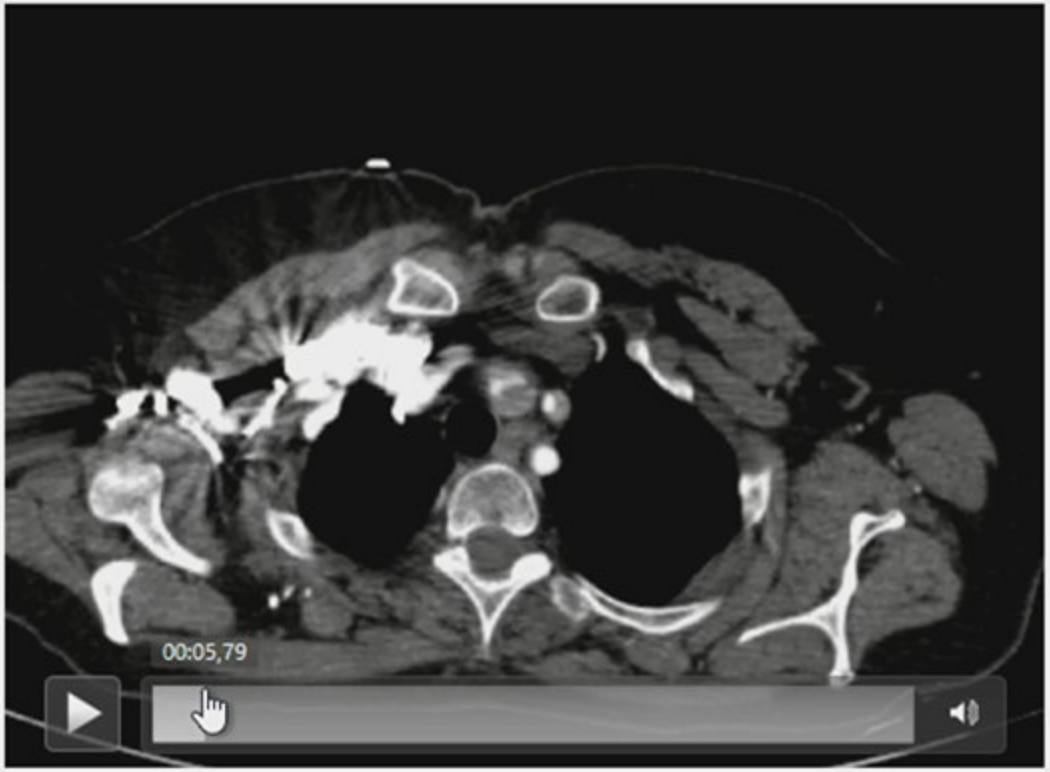

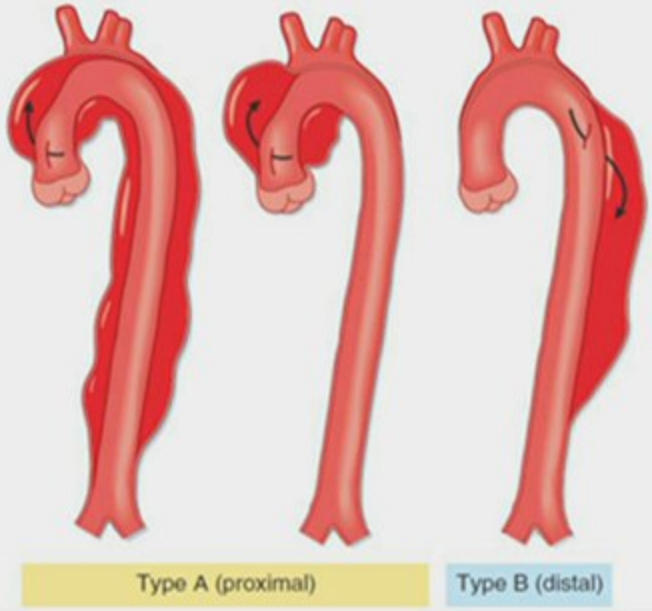

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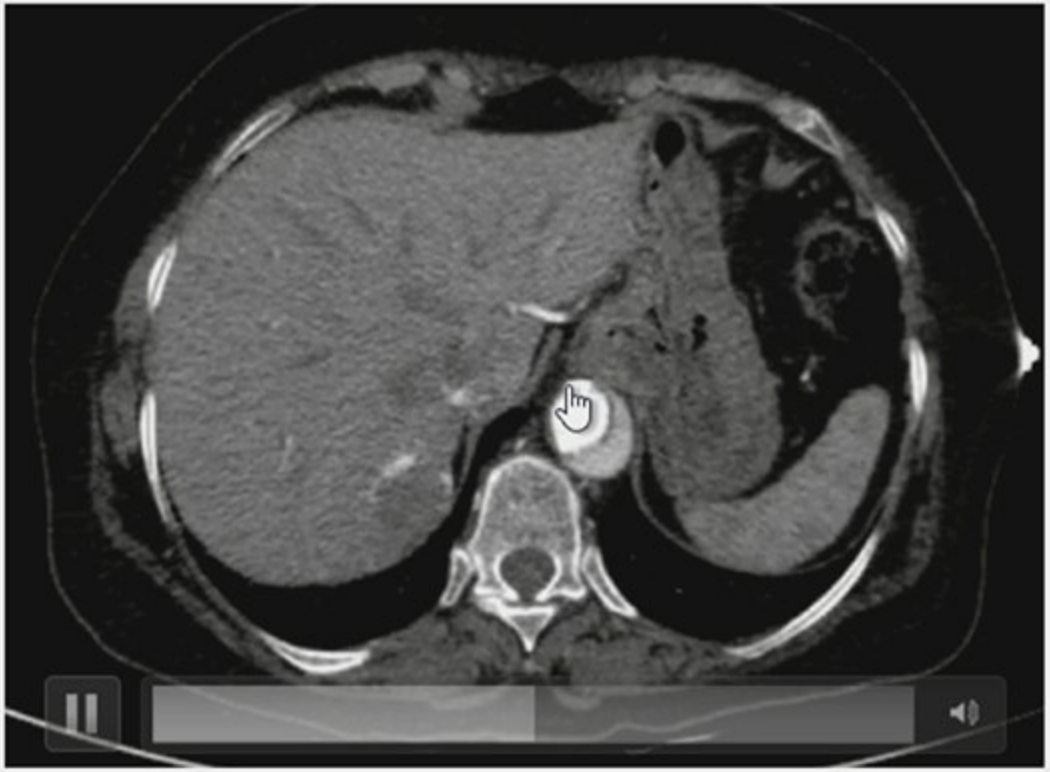

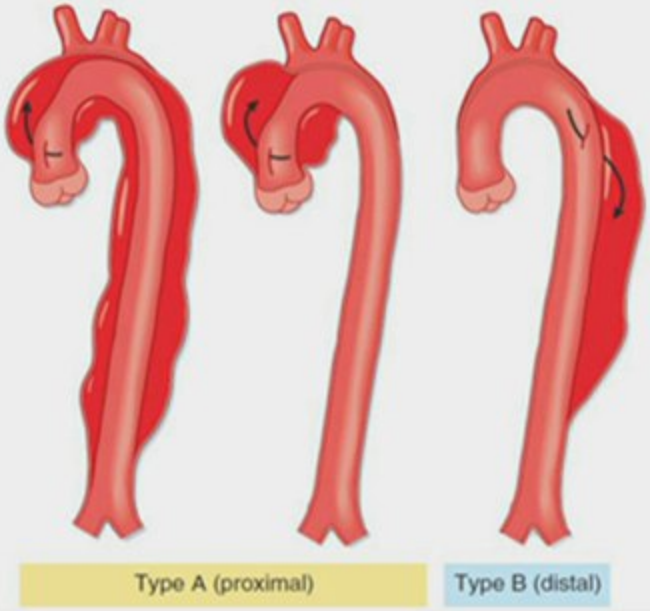

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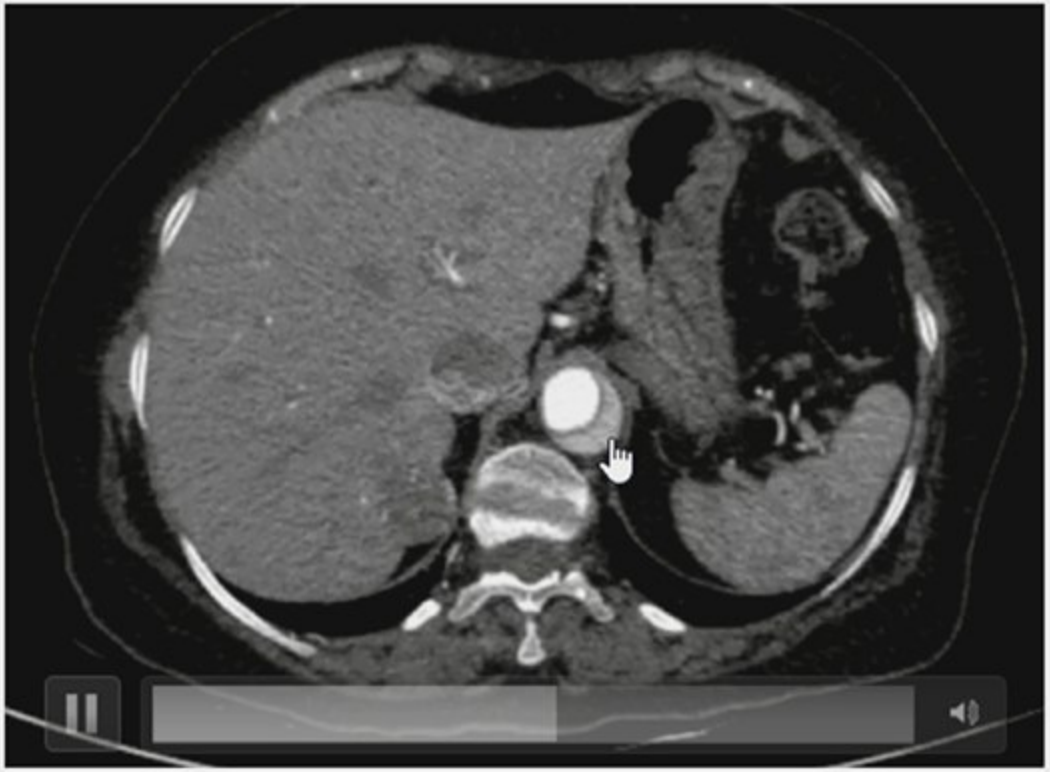

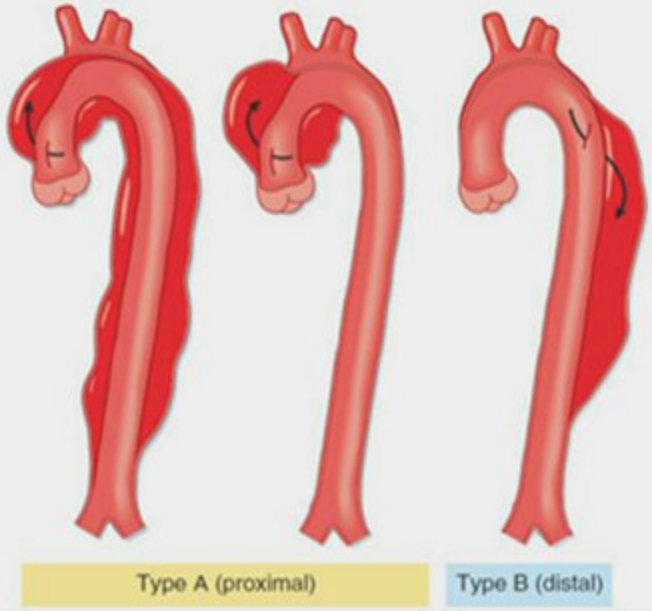

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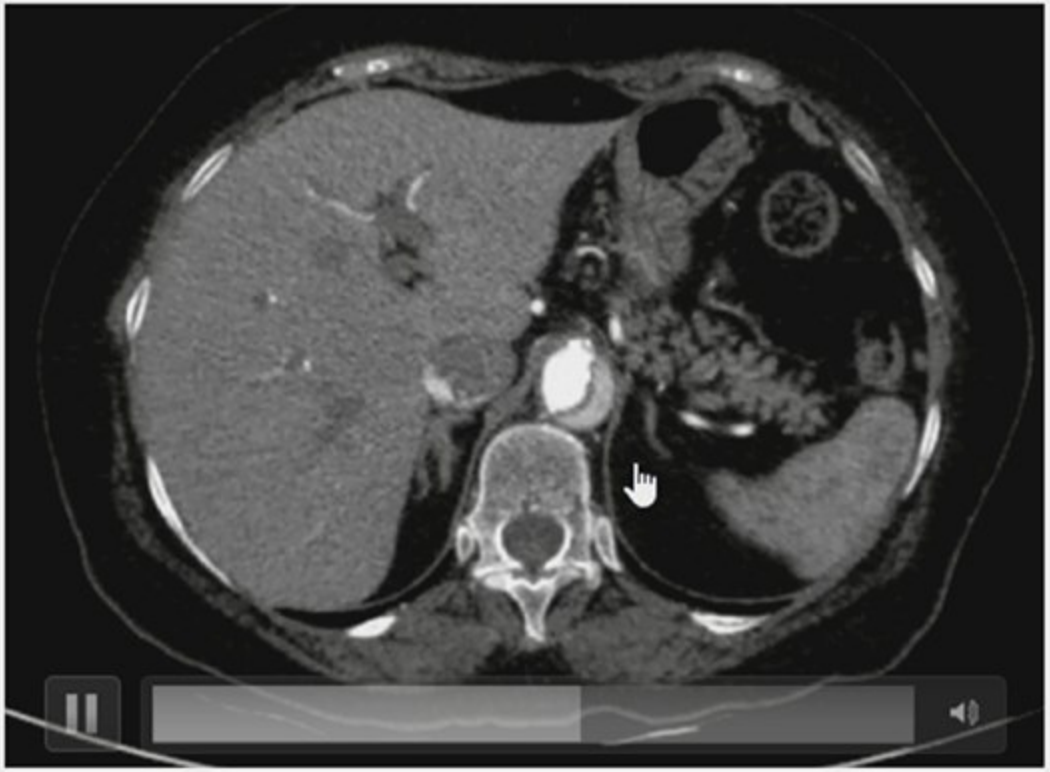

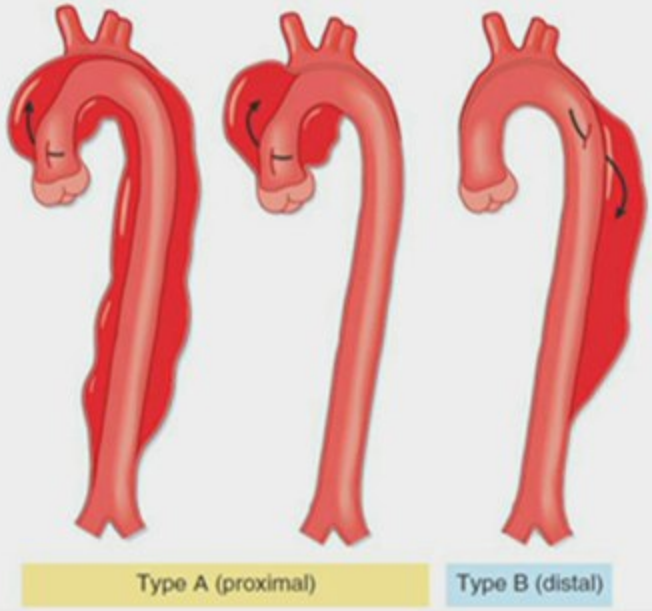

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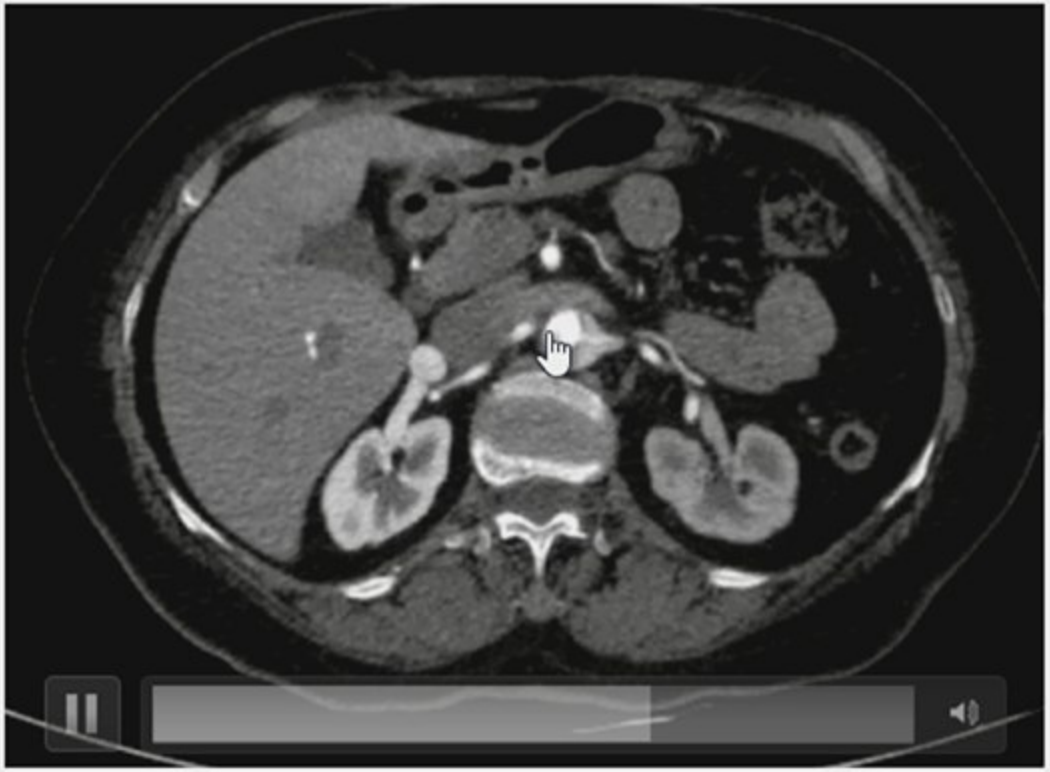

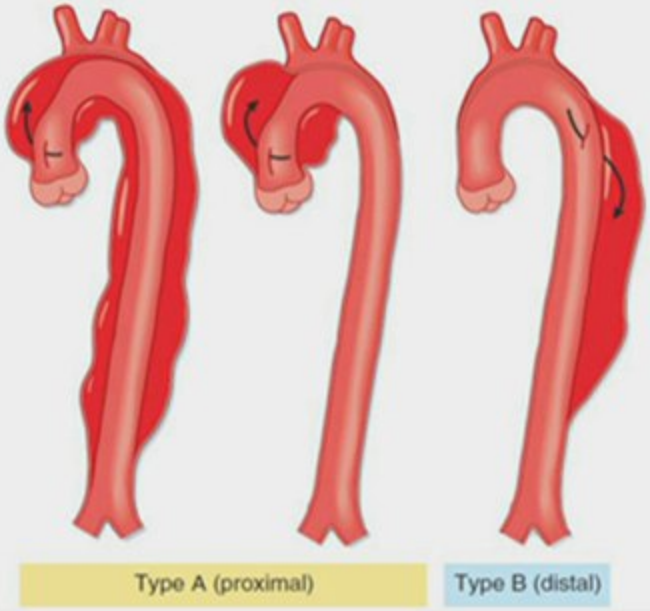

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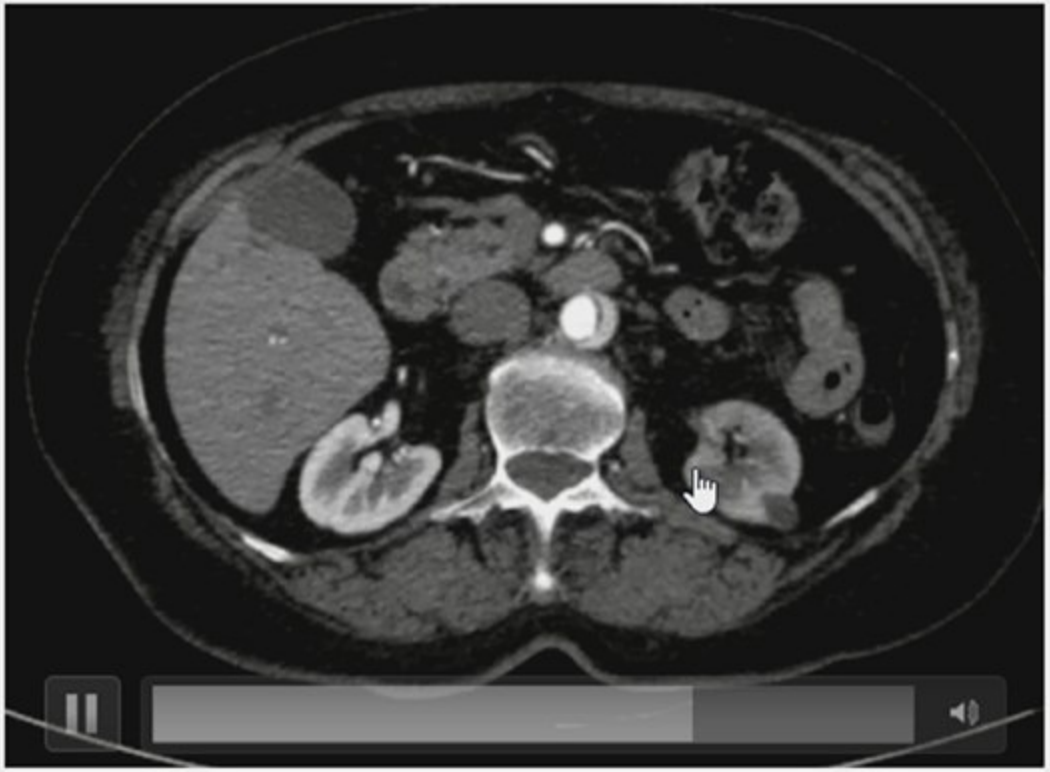

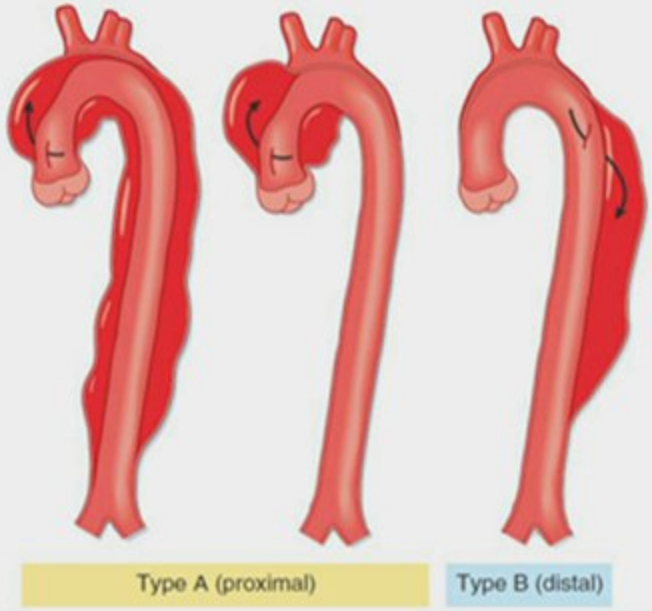

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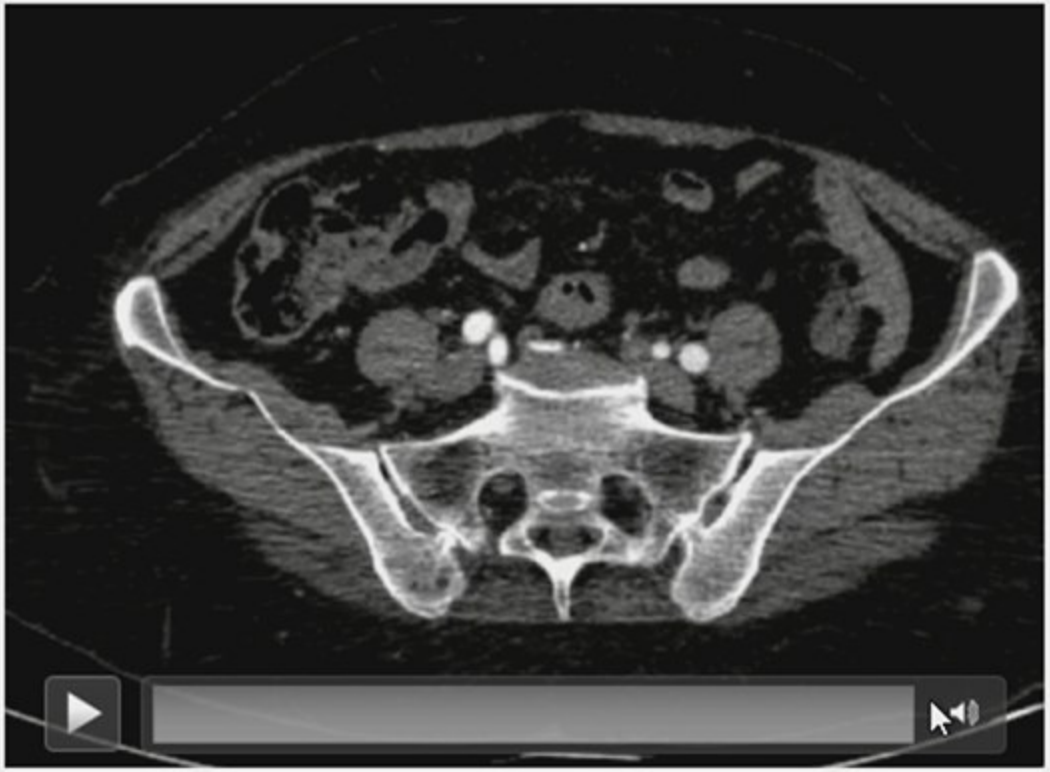

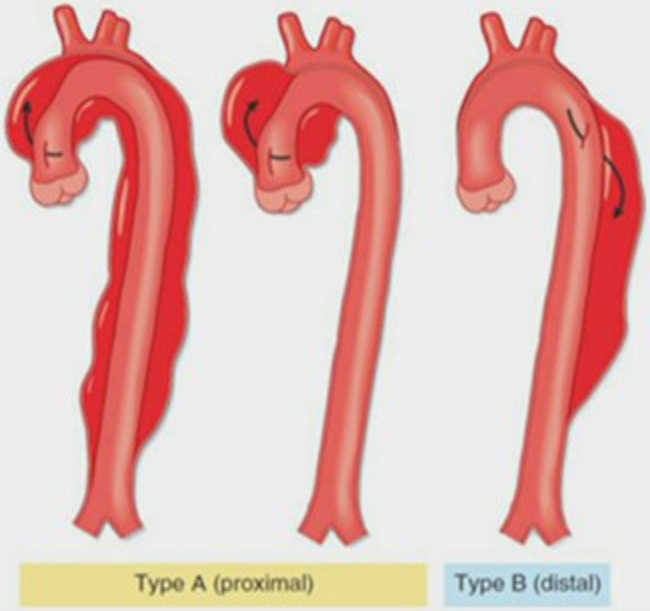

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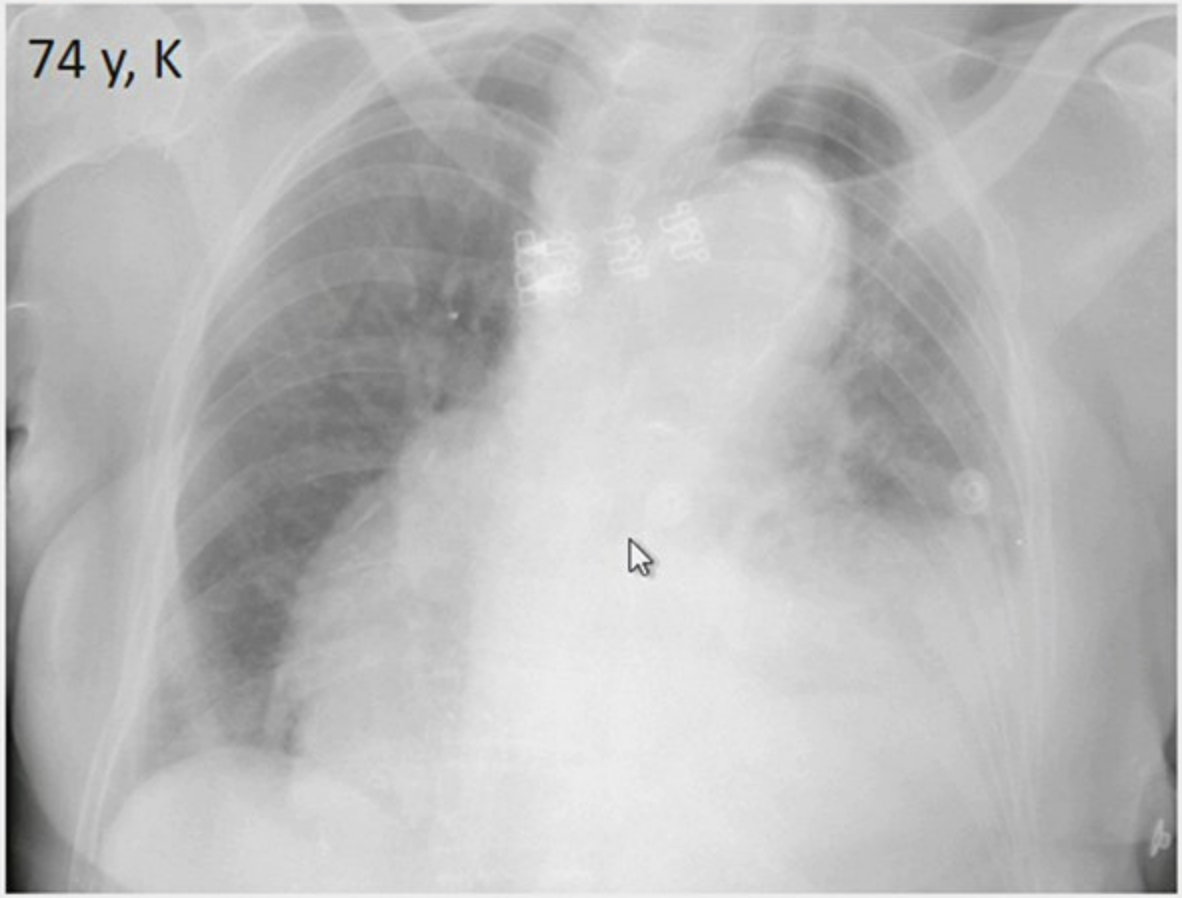
Aort Anevrizma Rüptürü



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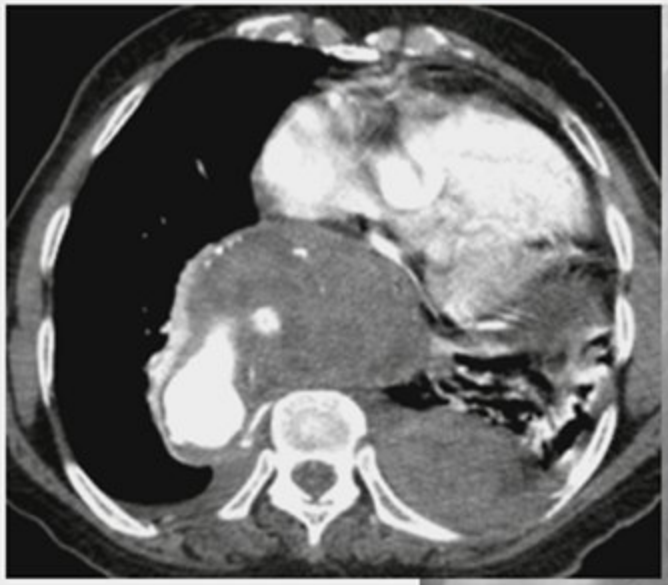

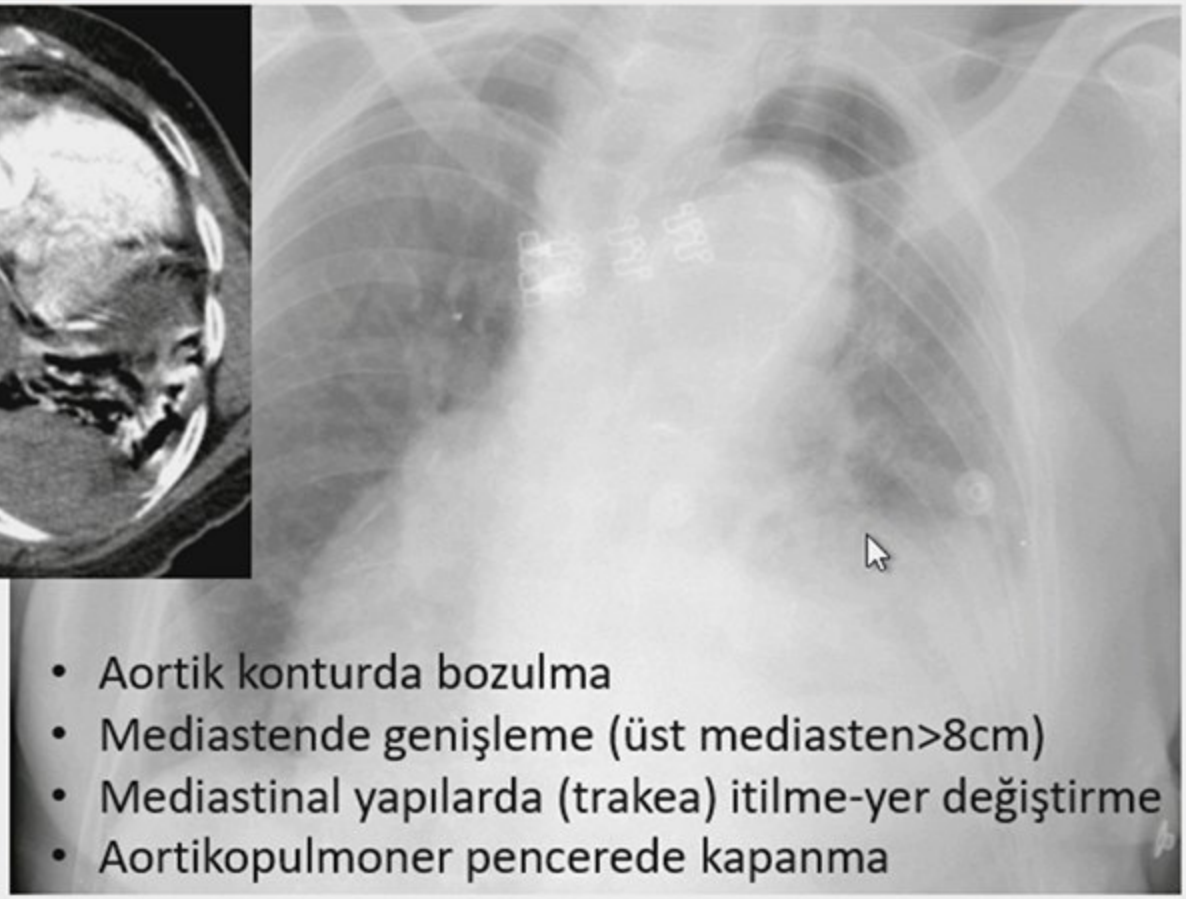

- Aortik konturda bozulma
- Mediastende genişleme (üst mediasten>8cm)
- Mediastinal yapılarda (trakea) itilme-yer değiştirme
- Aortikopulmoner pencerede kapanma

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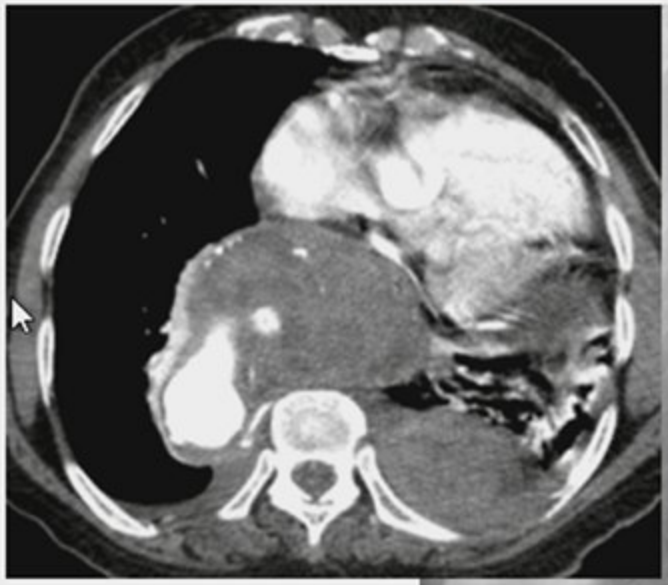

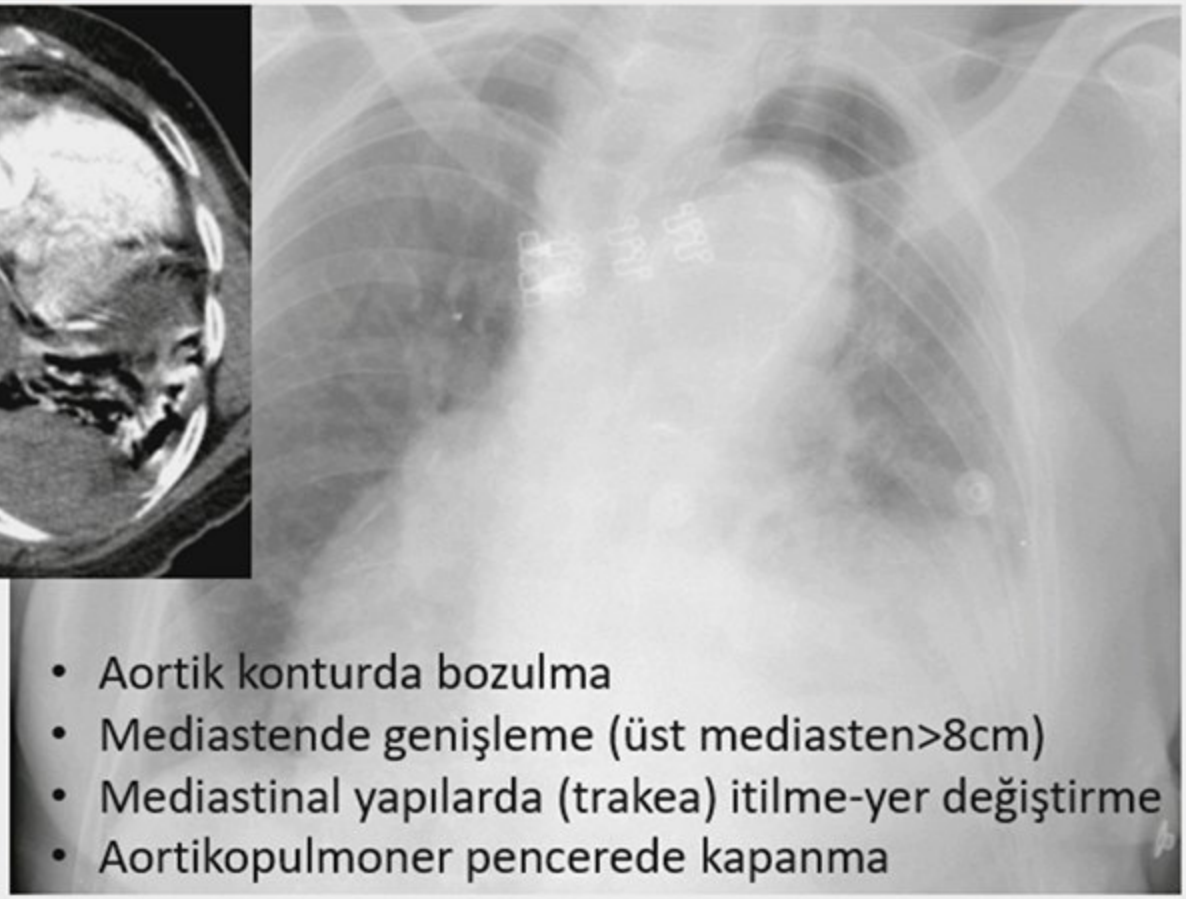

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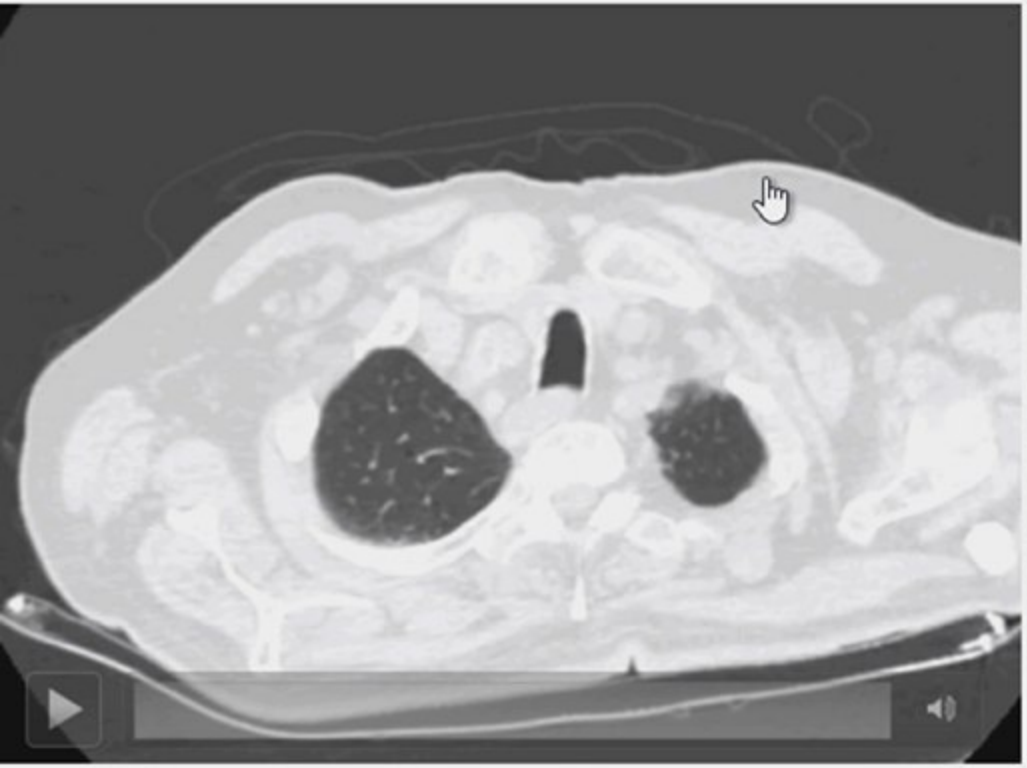

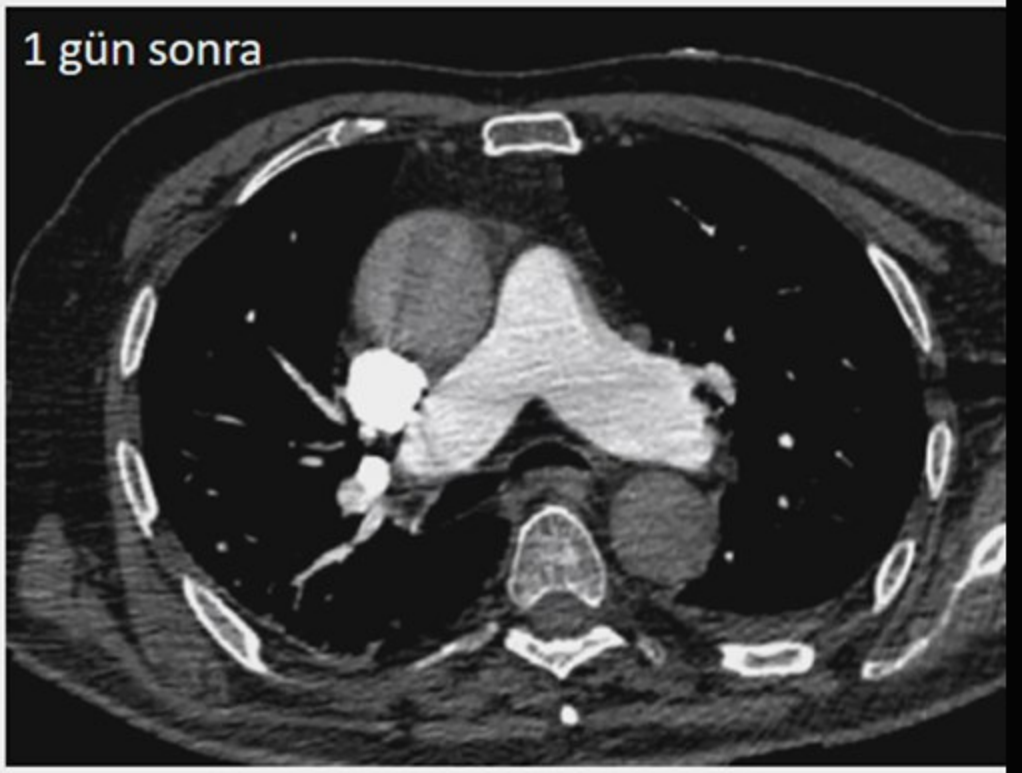

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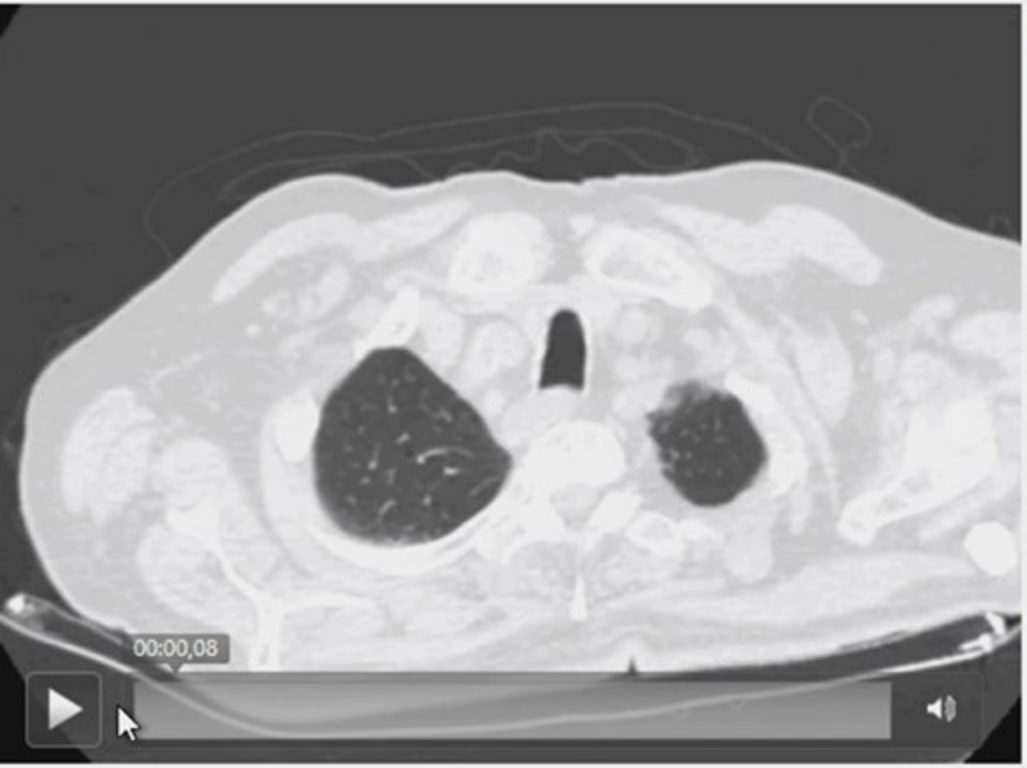

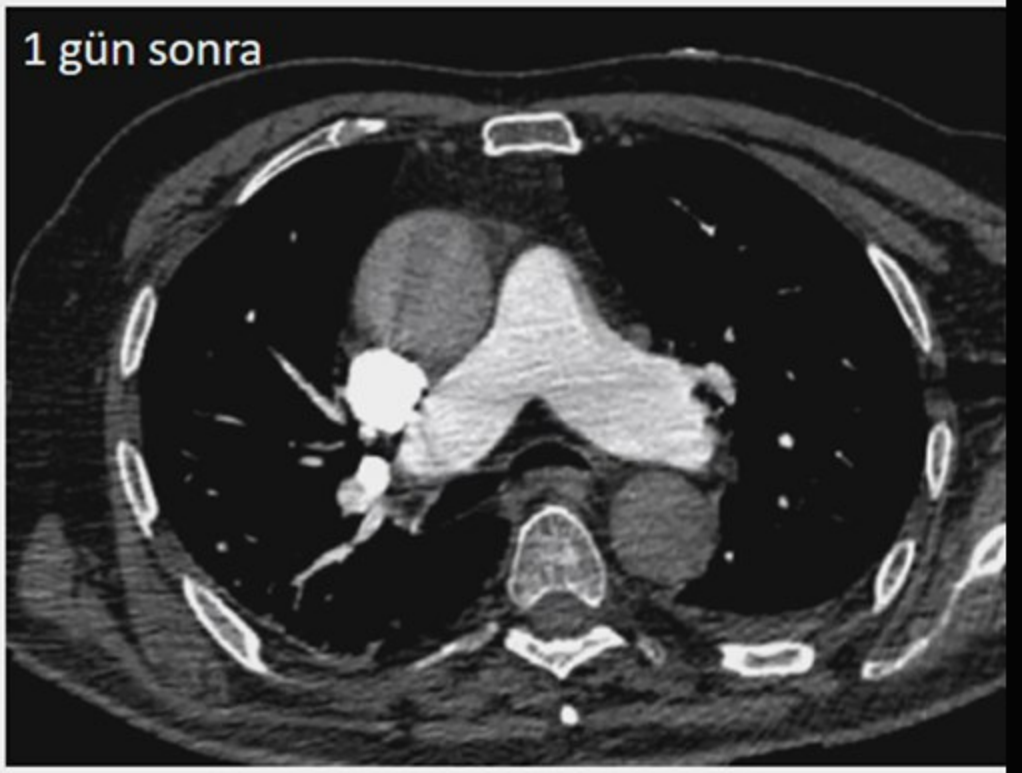

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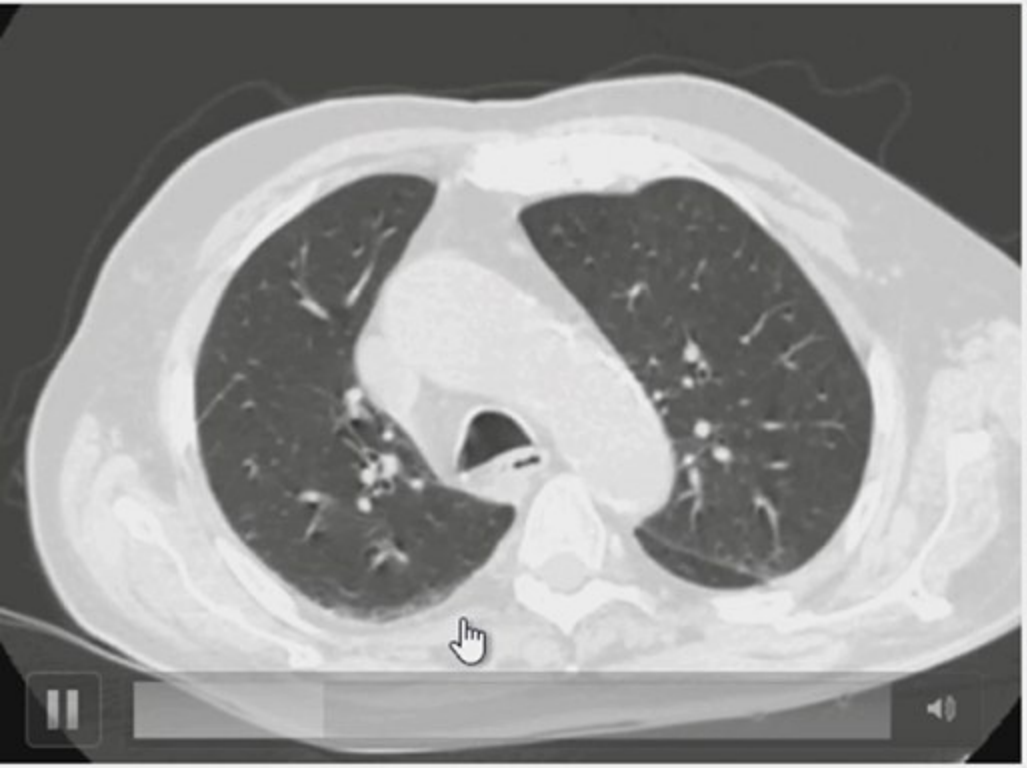

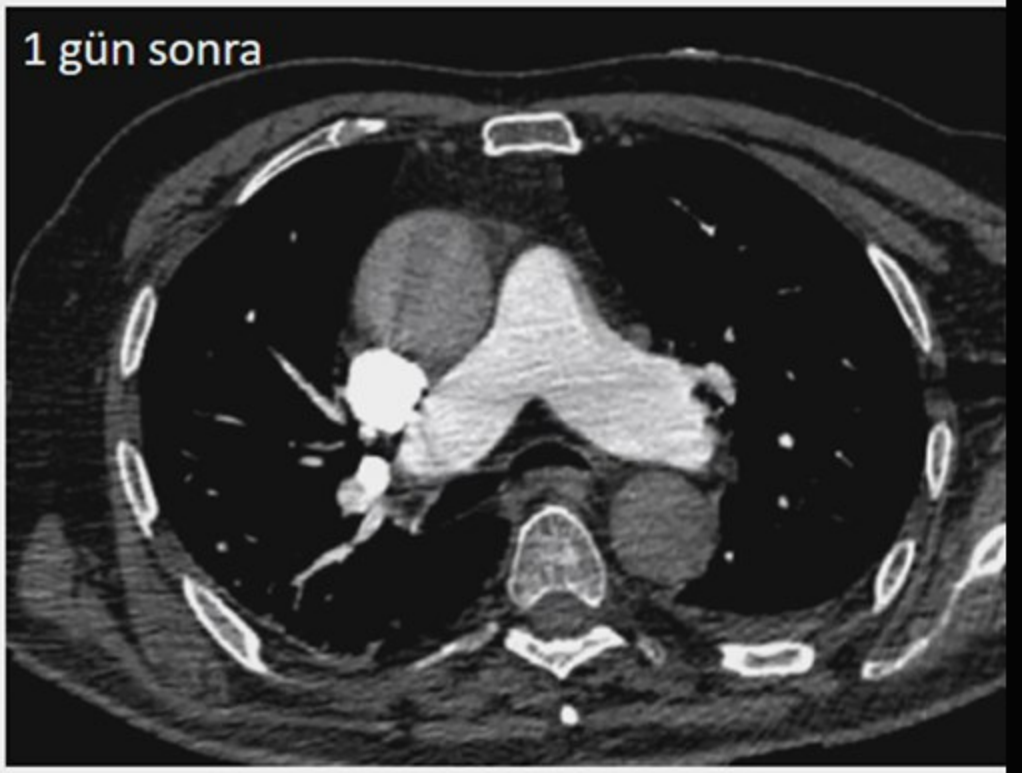

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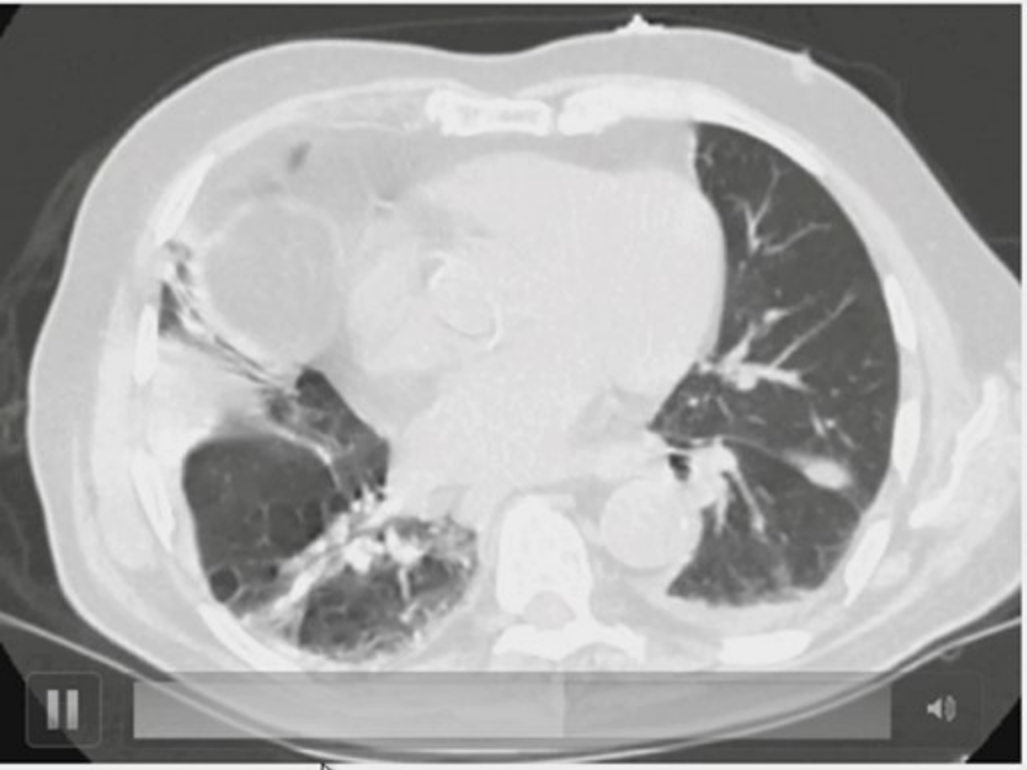

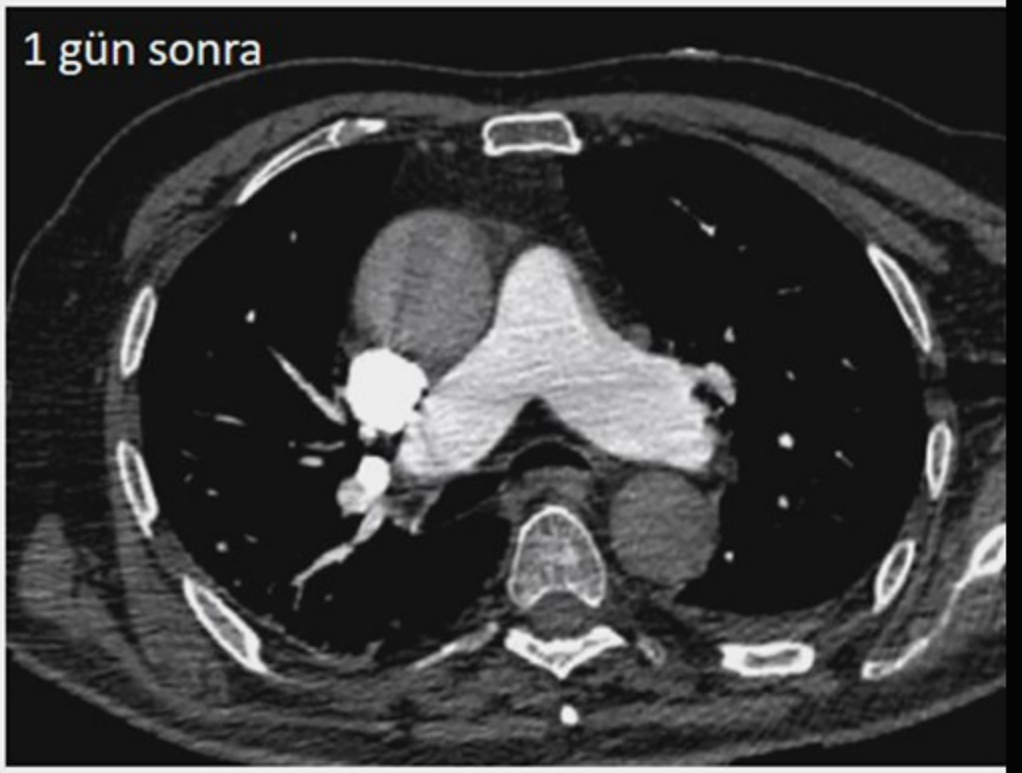

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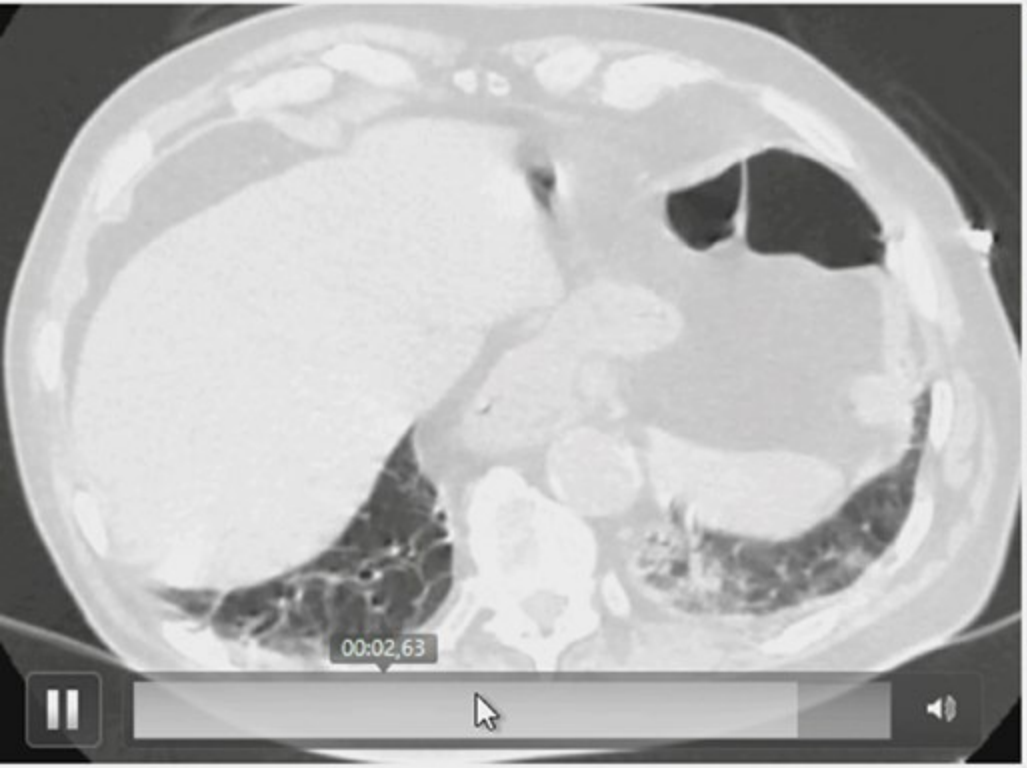

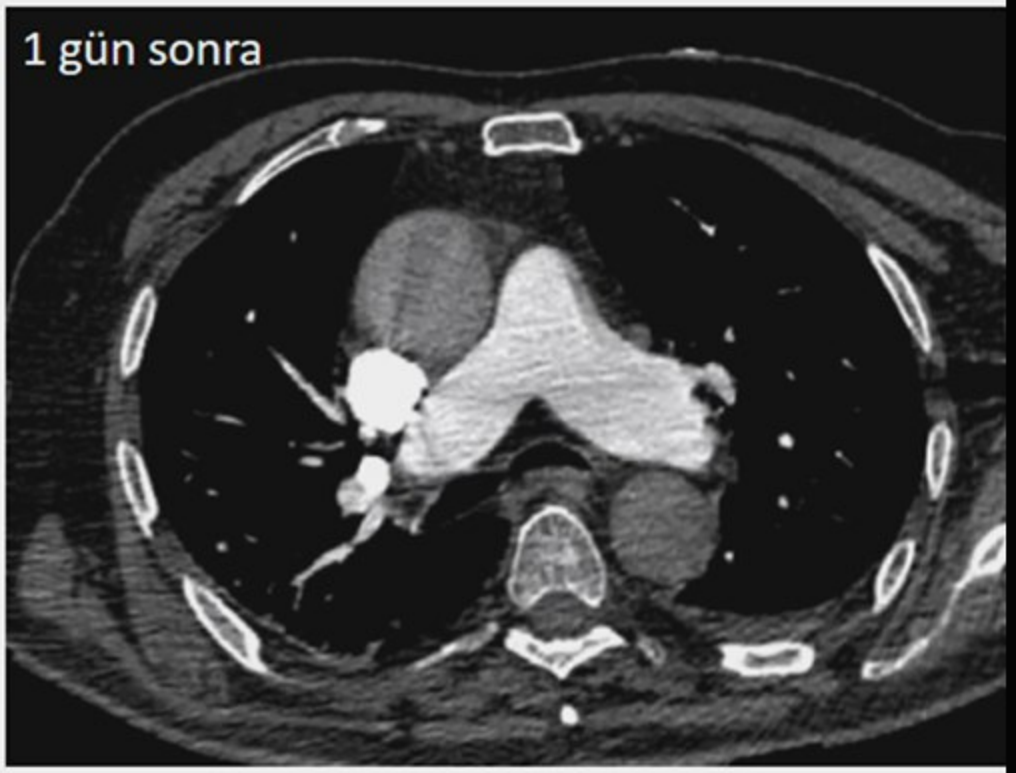

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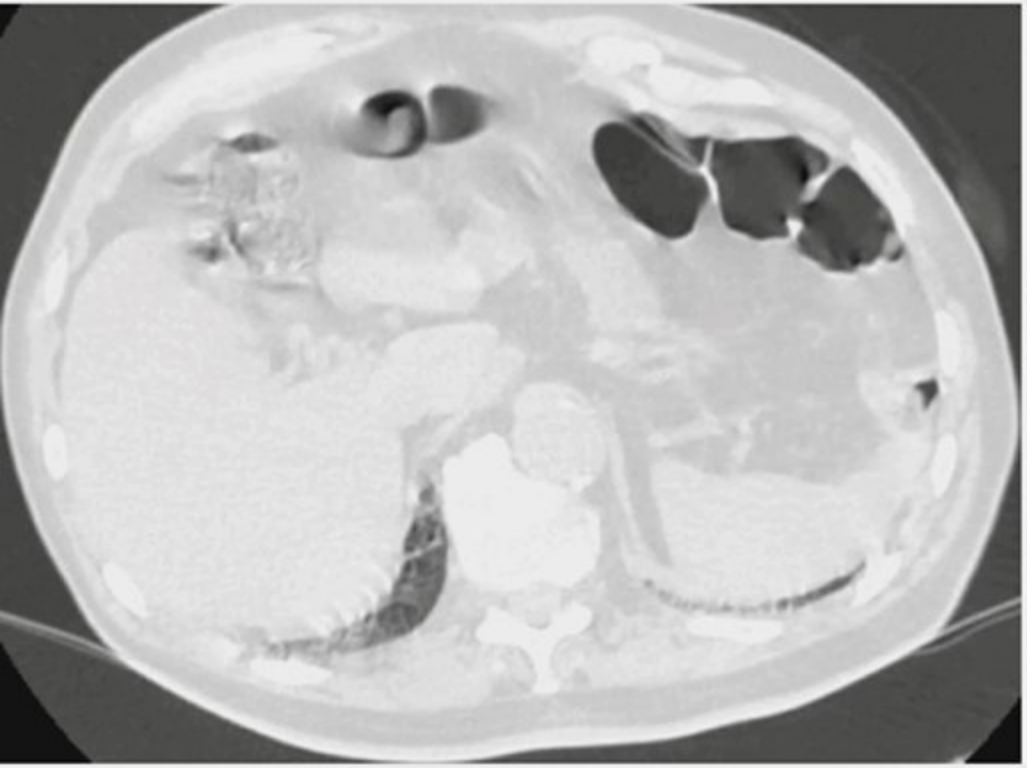

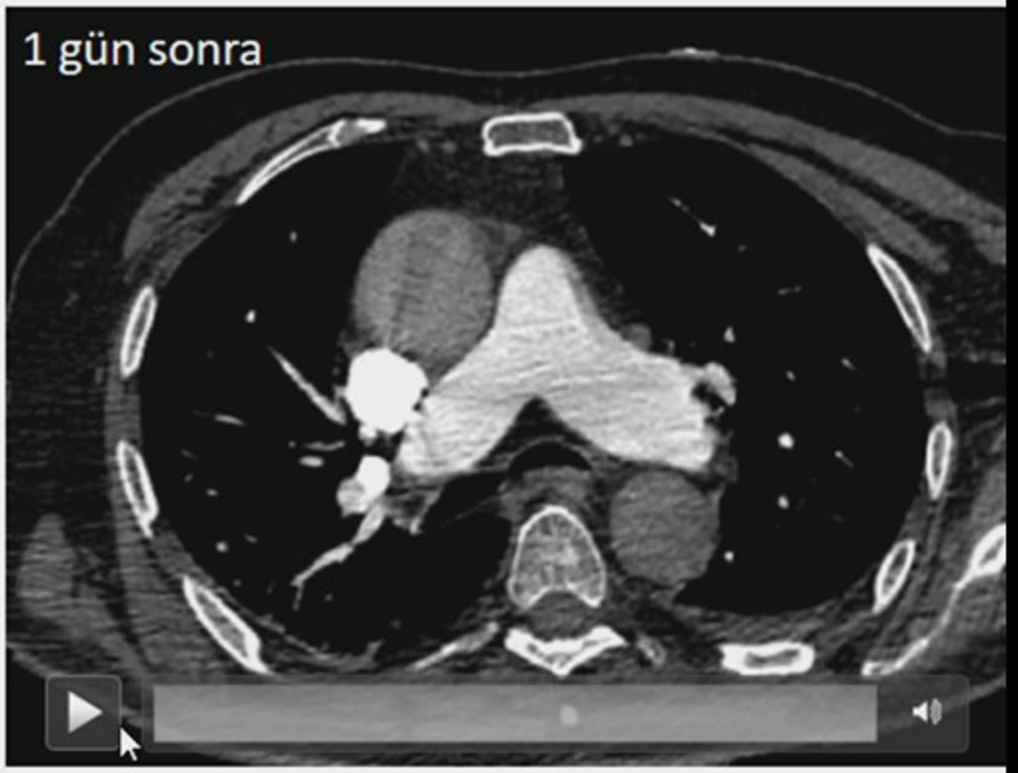

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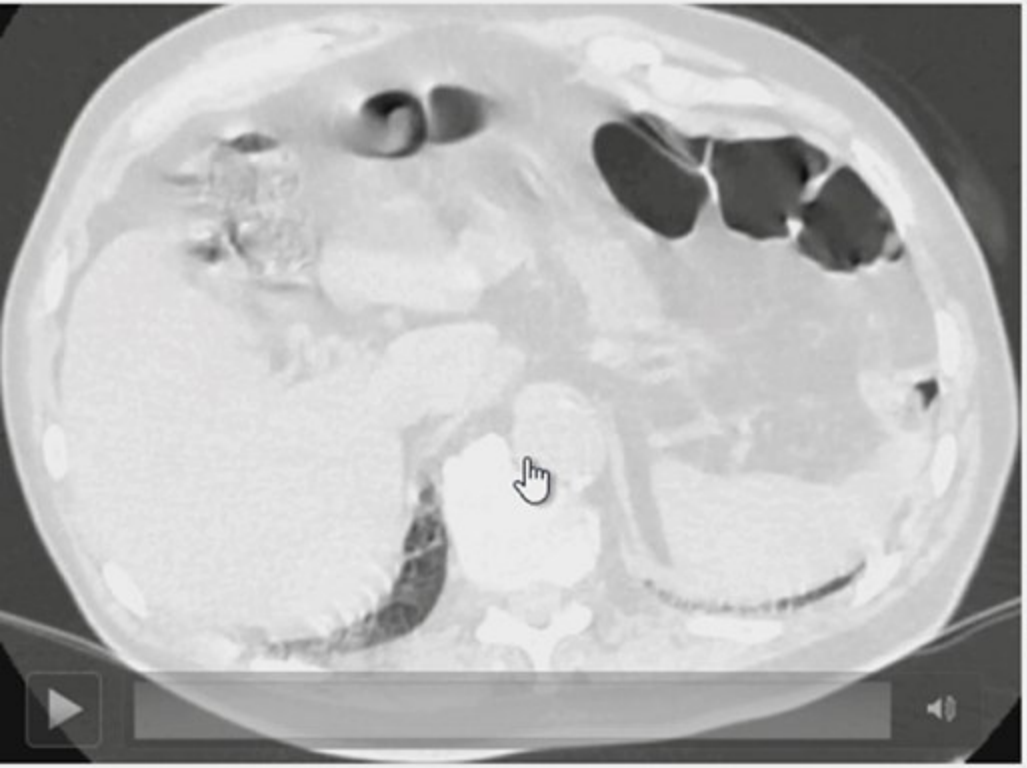

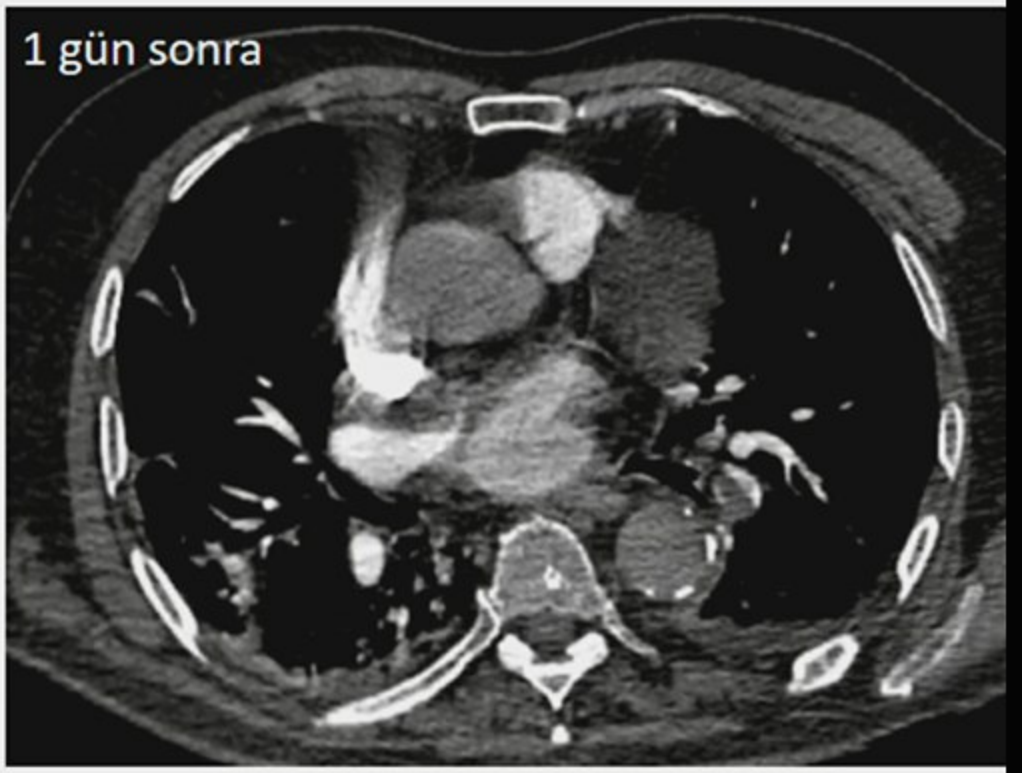

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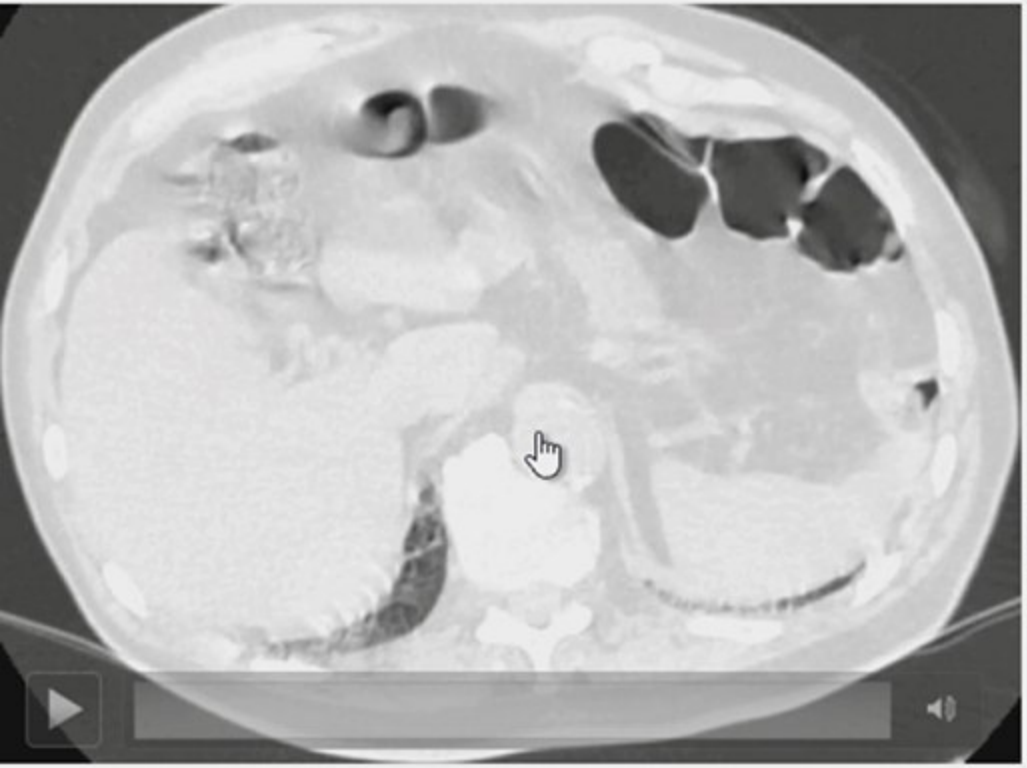

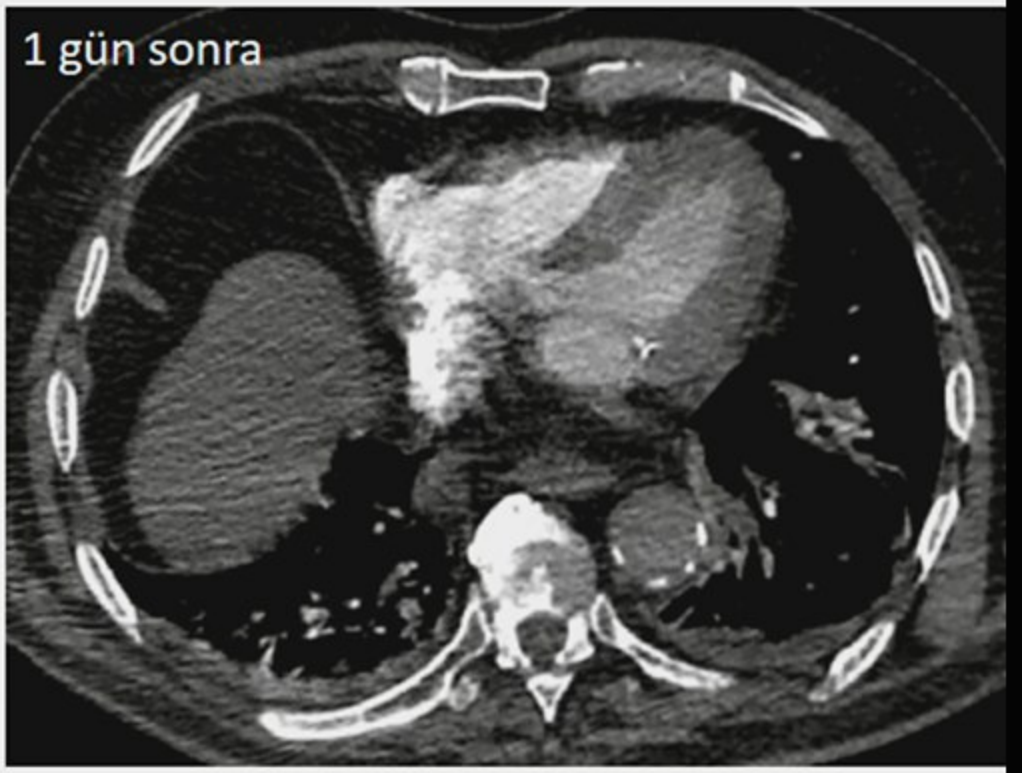

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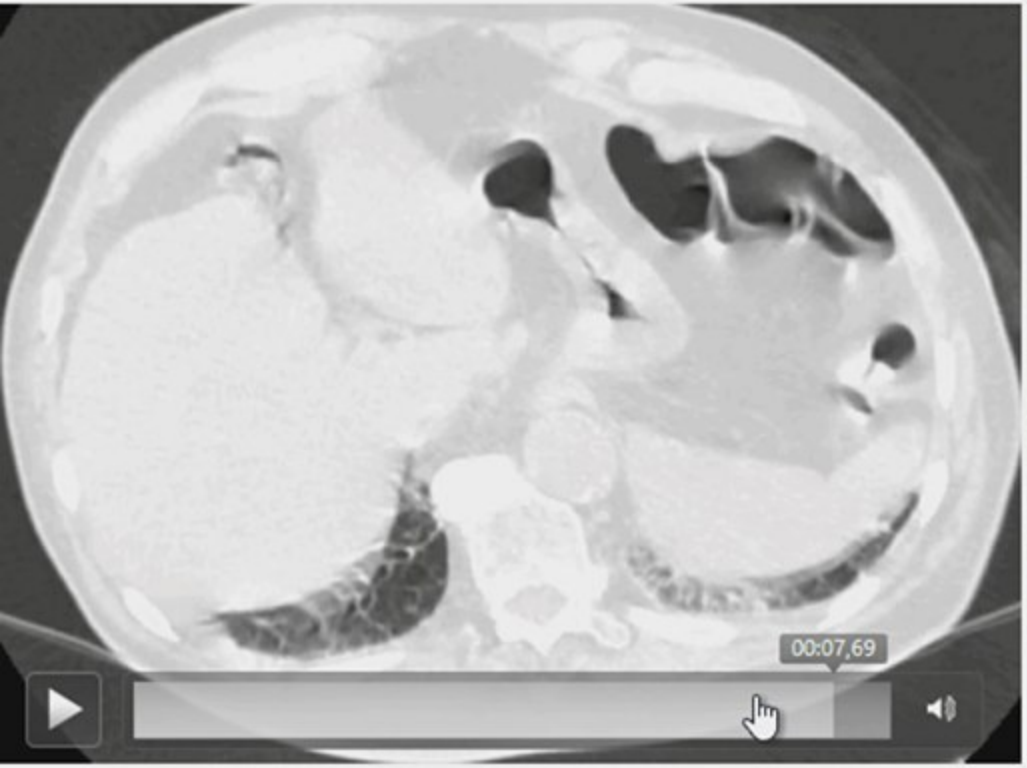

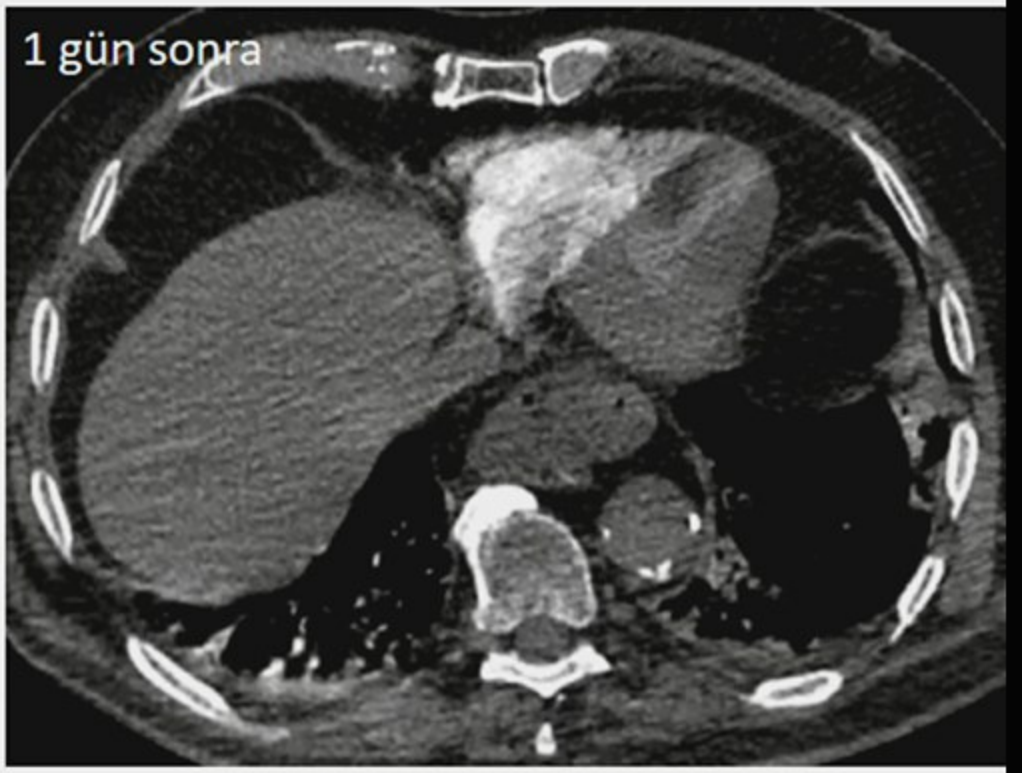

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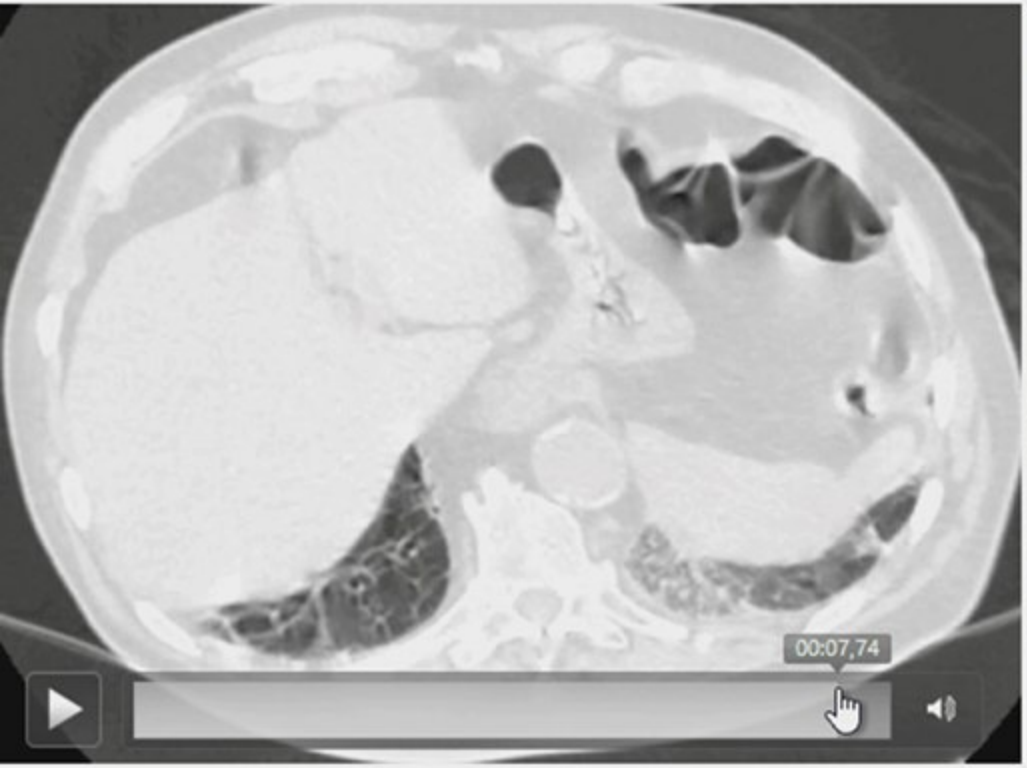

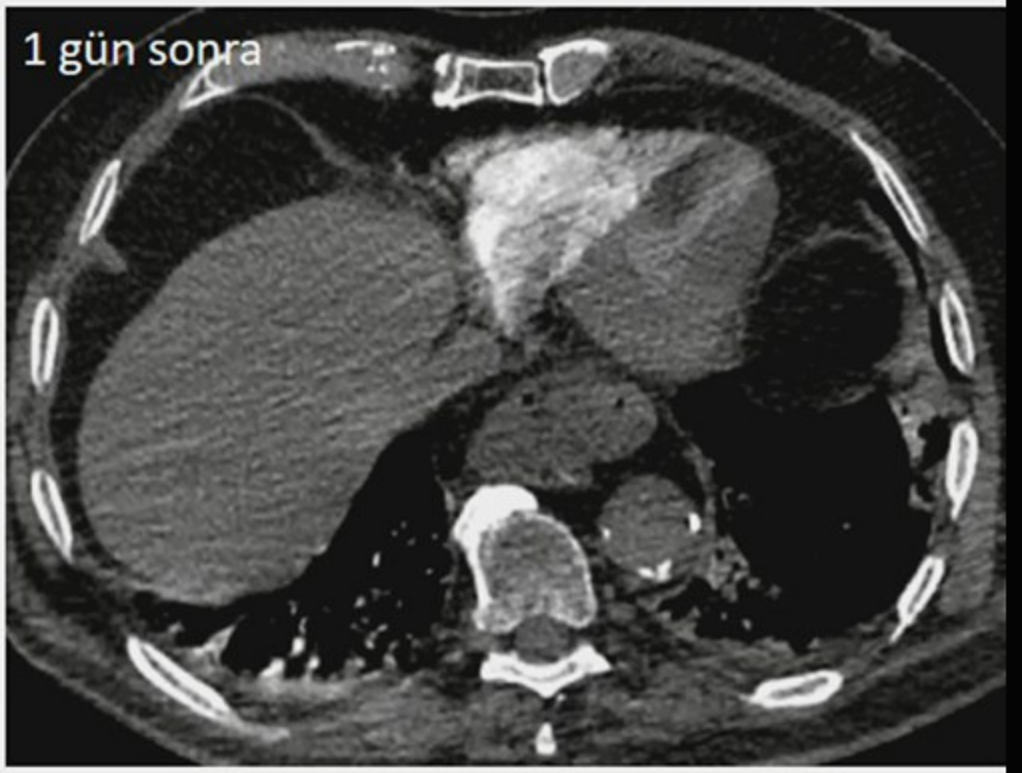

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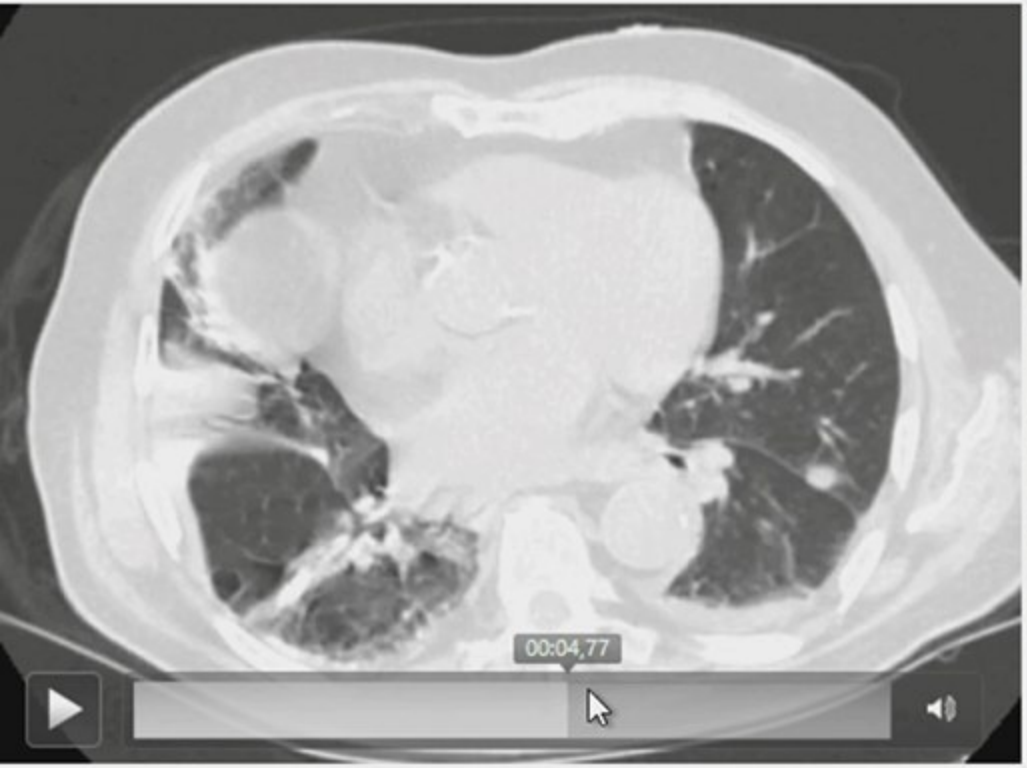

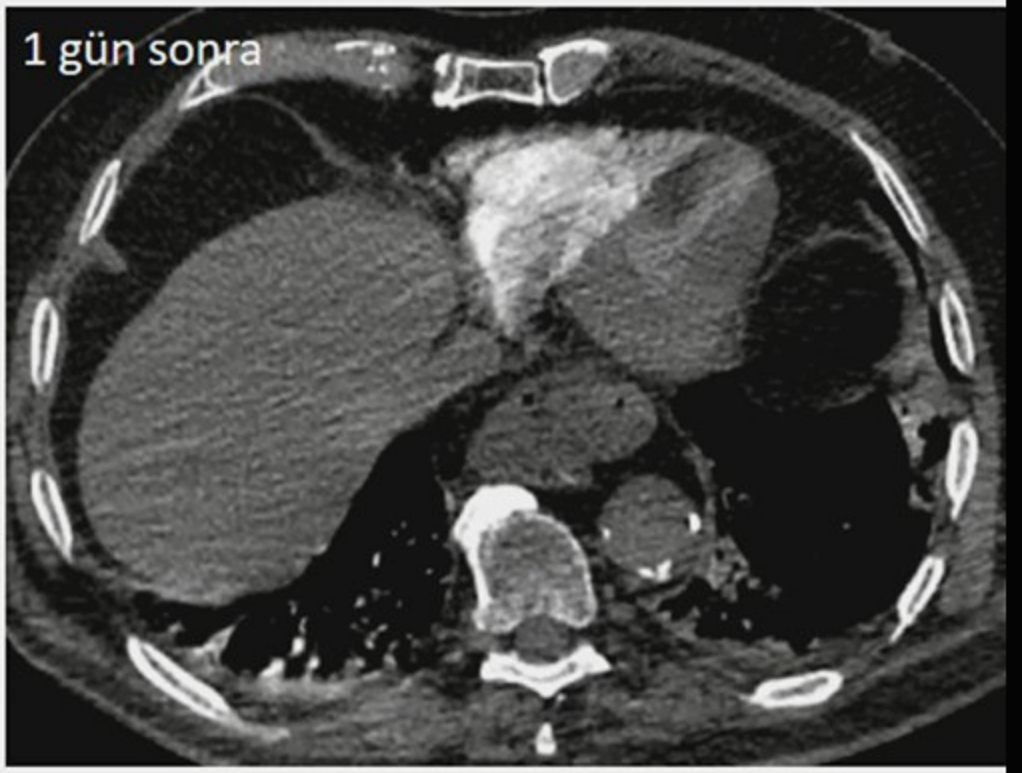

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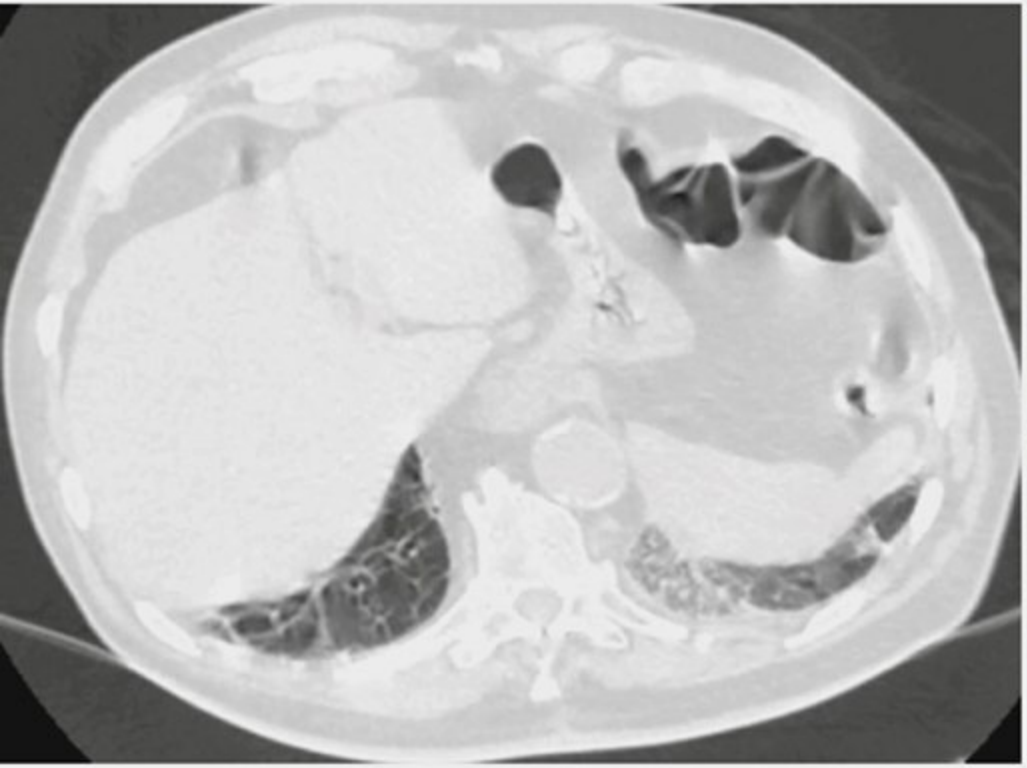

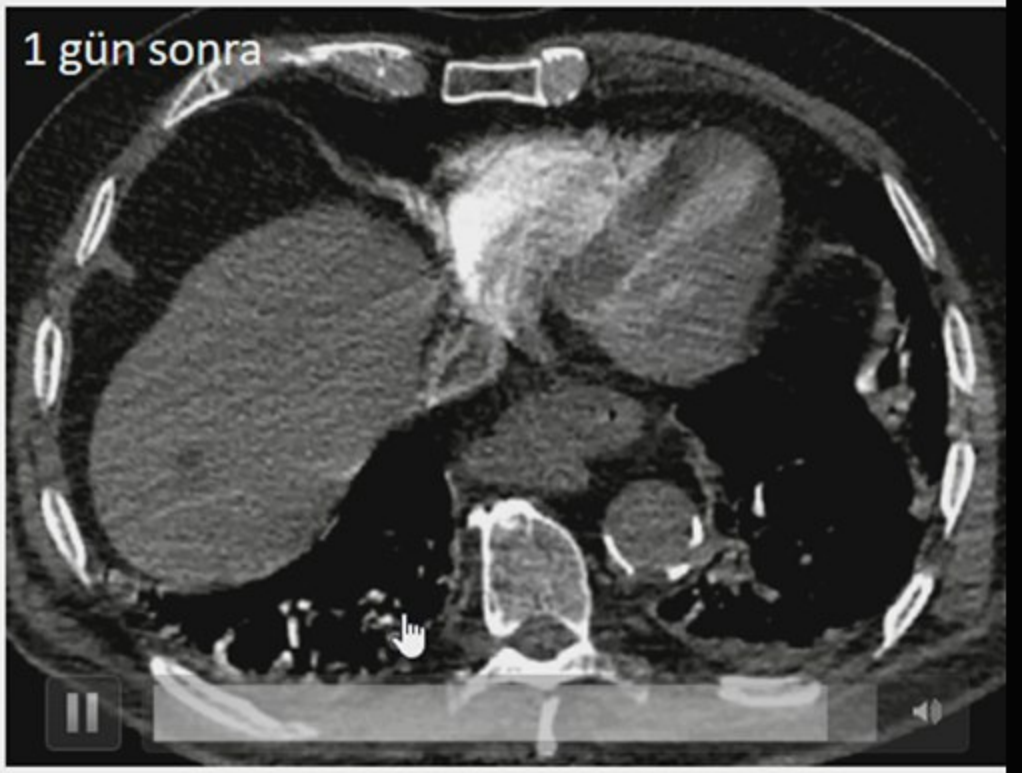

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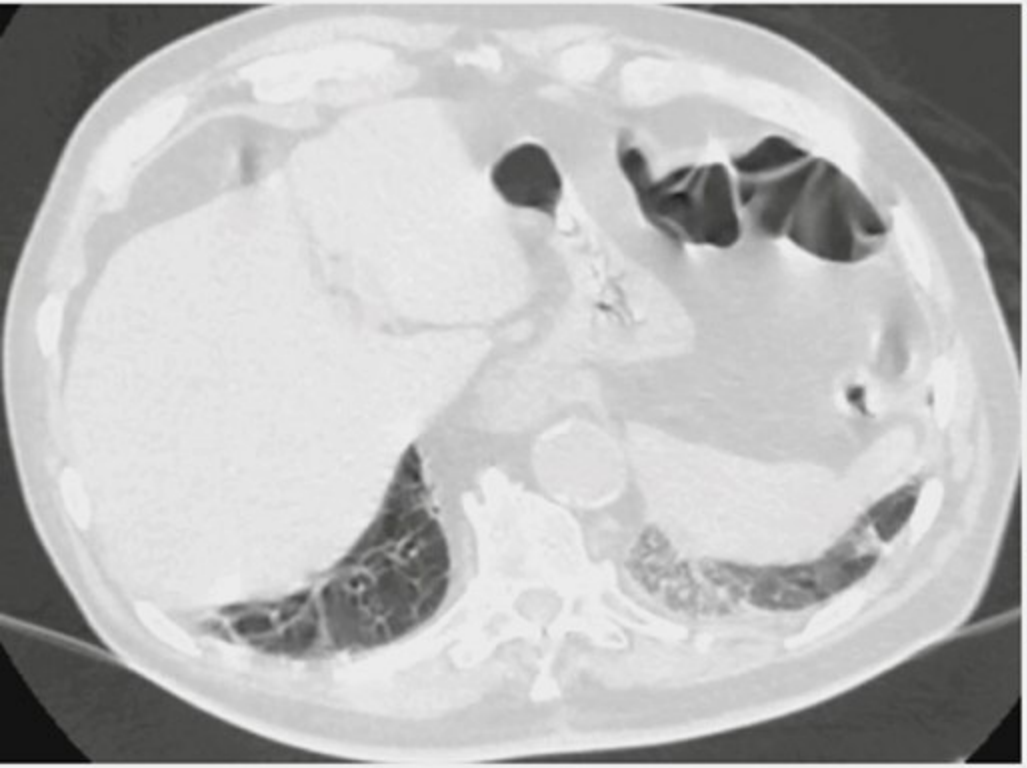
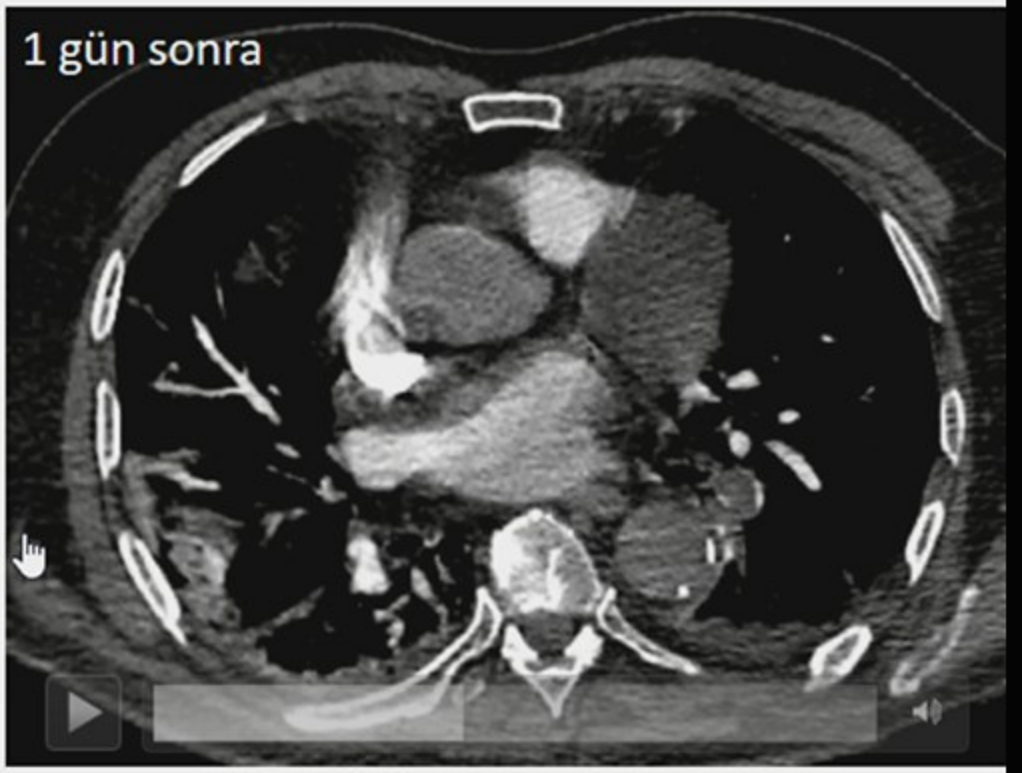
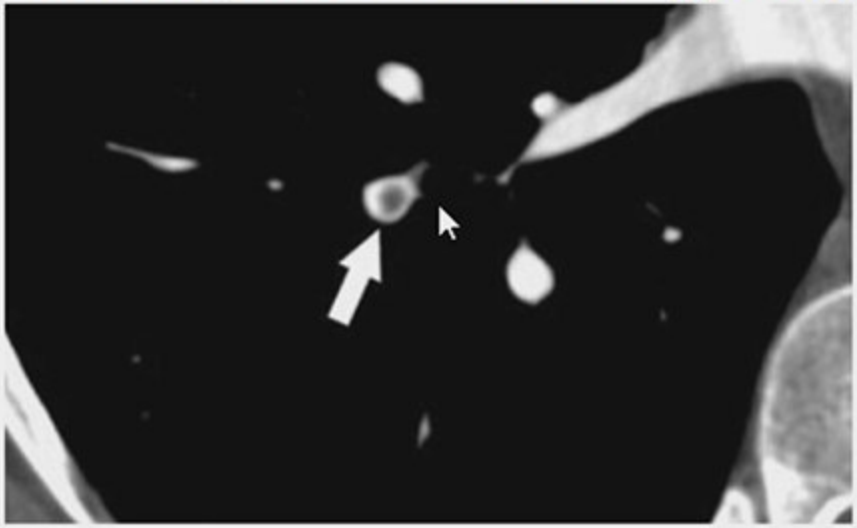


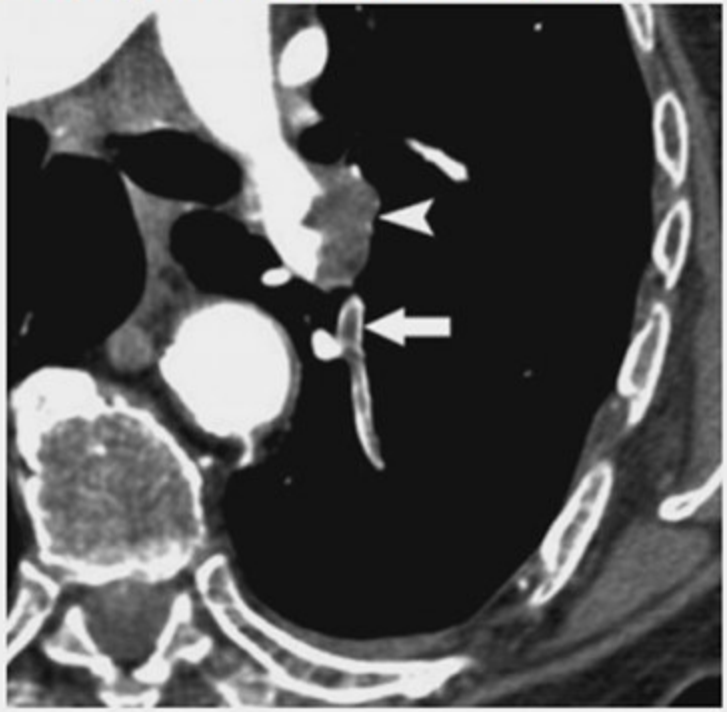


PTE Tanısında Pulmoner BT anjiyografi

Akut PTE'de;

- Lümen içi serbest trombus (polo mint sign / railway track sign)





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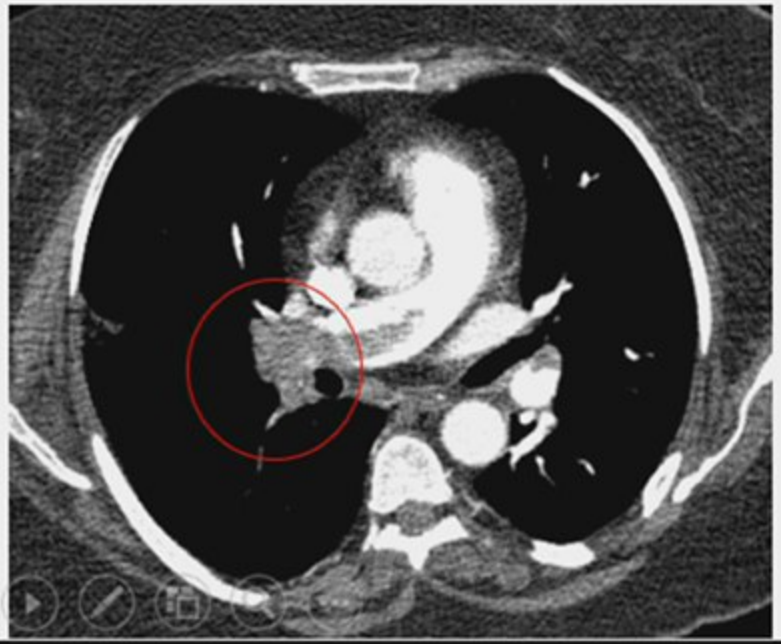

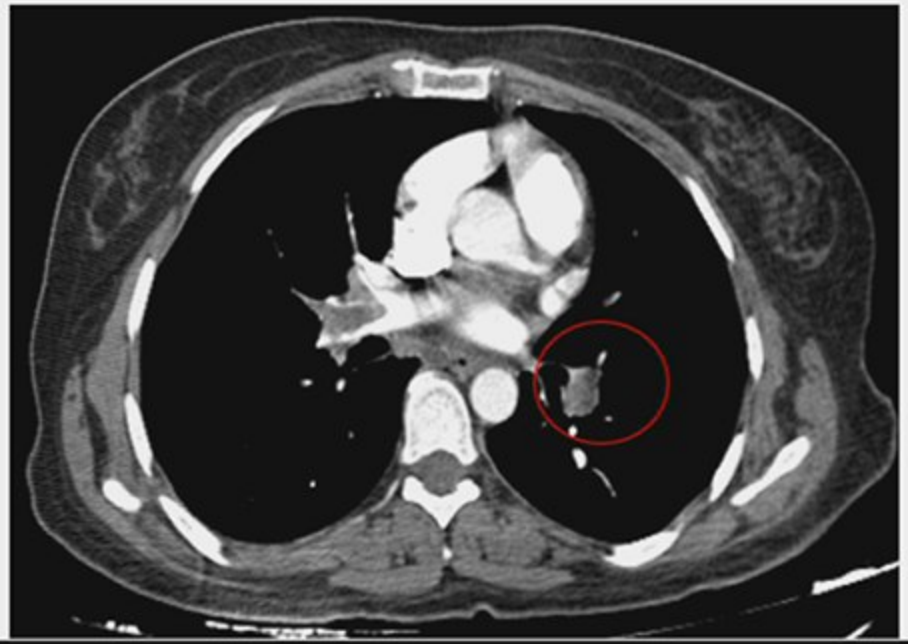

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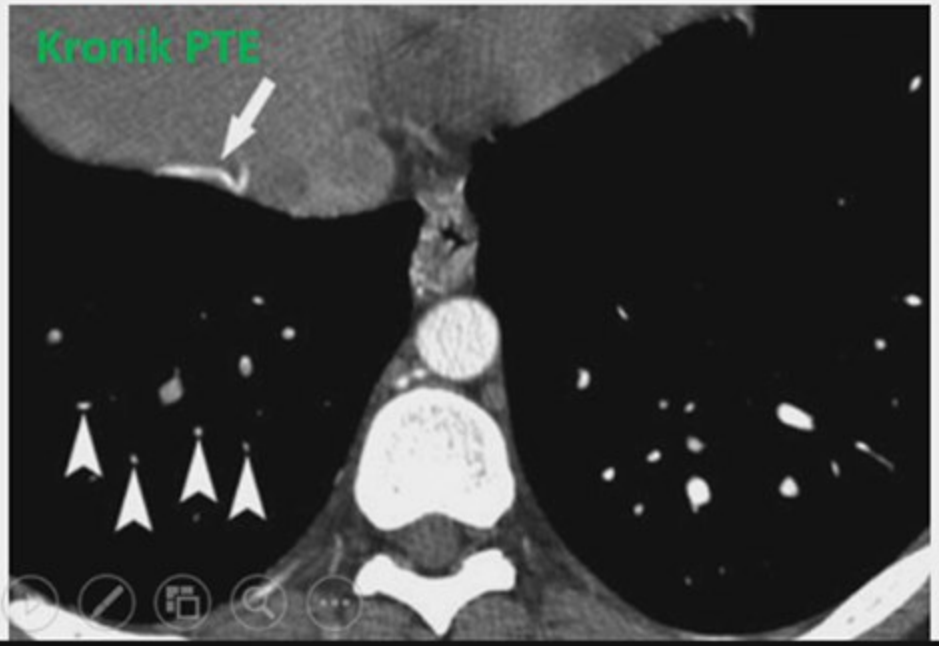

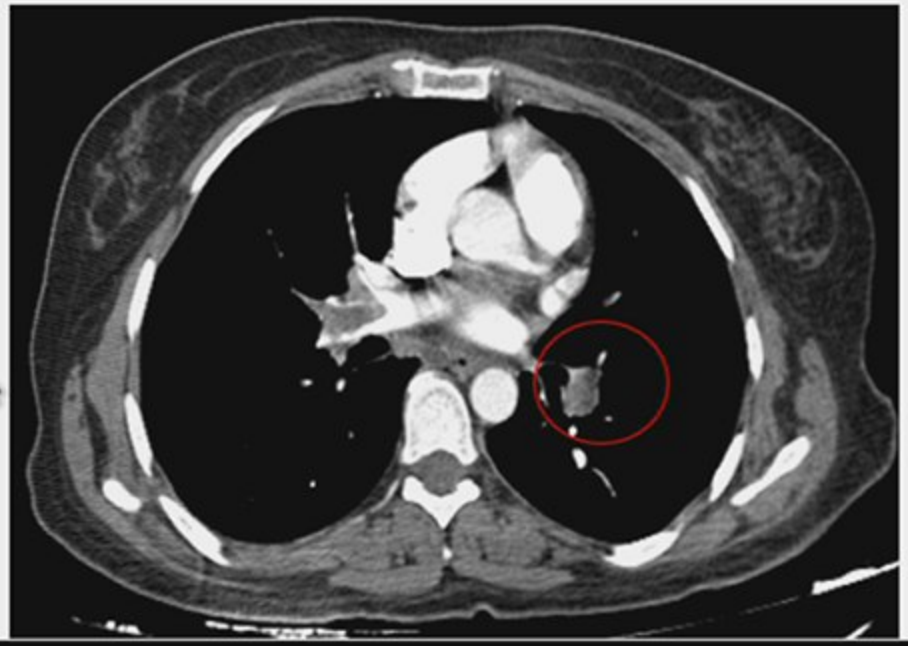

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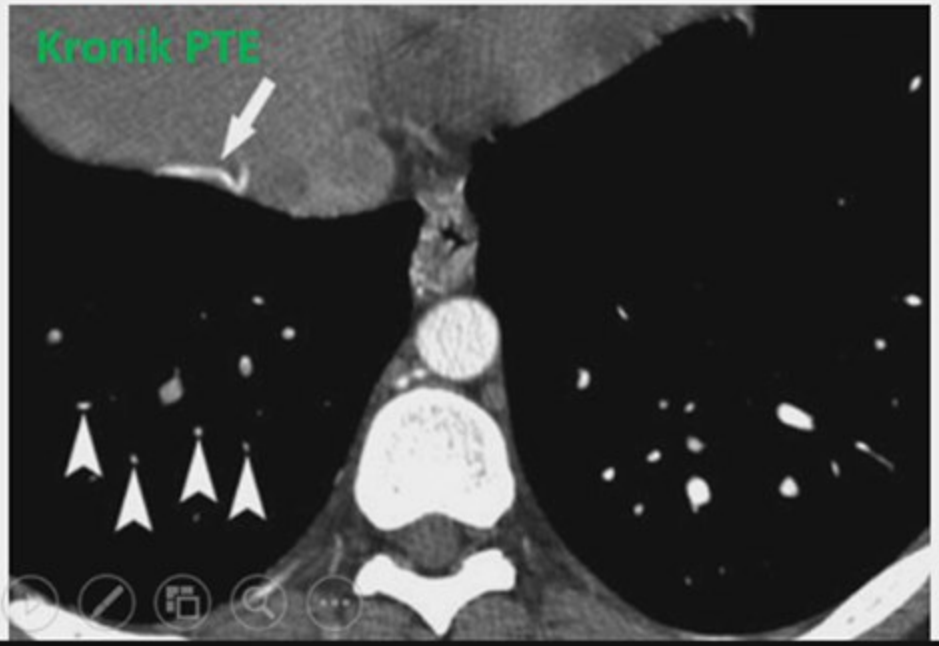
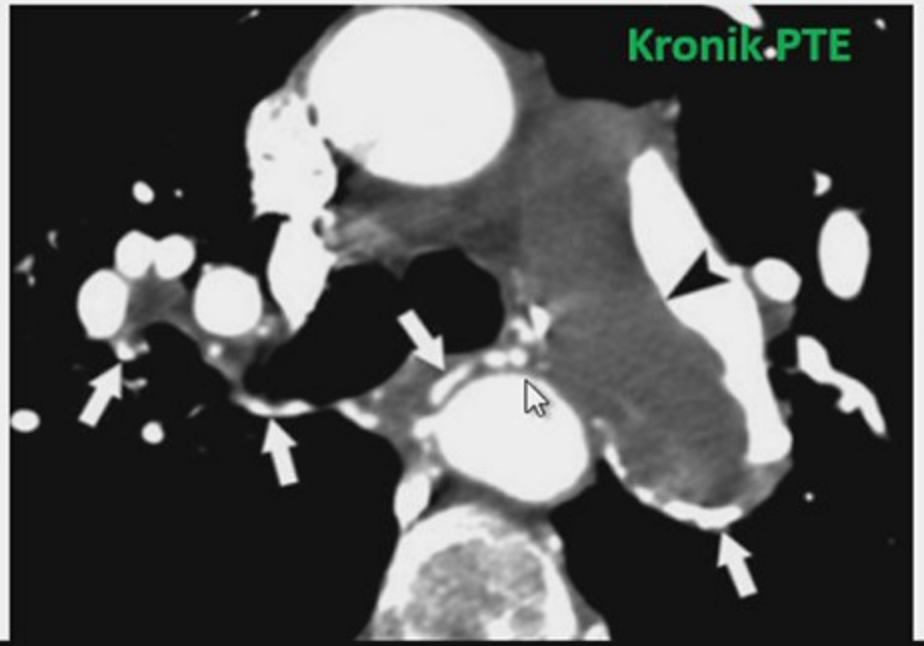
Akut PTE'de;

- Oklüzyon tüm lümeni kaplayarak damarda genişlemeye neden olur

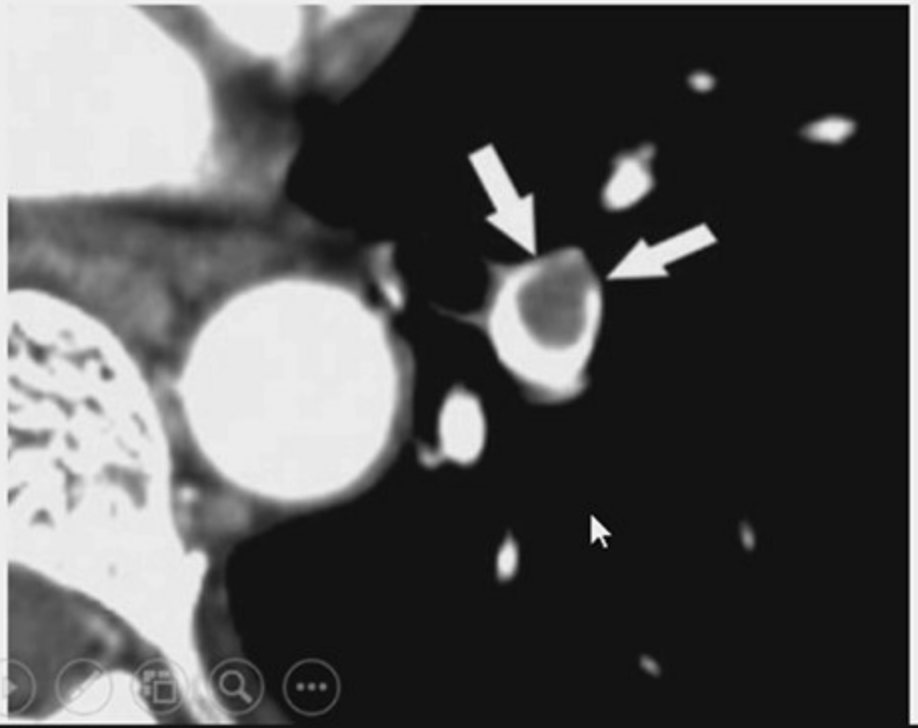


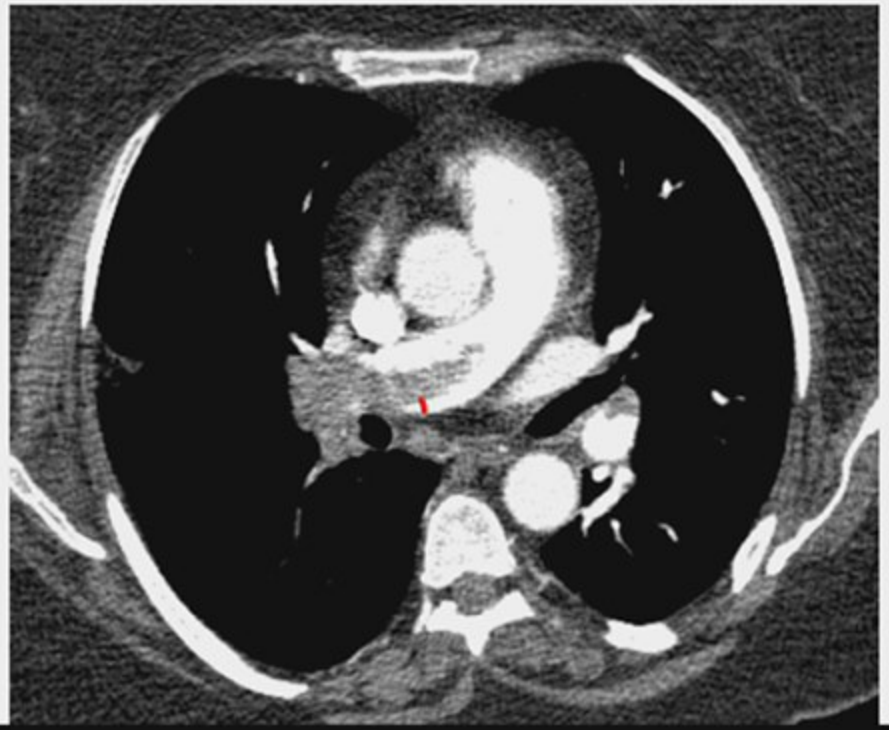


PTE Tanısında Pulmoner BT anjiyografi

Akut PTE'de;

- Arter duvarı ile trombüs arasındaki açı sıklıkla dar





PTE Tanısında Pulmoner BT anjiyografi

Akut PTE'de;

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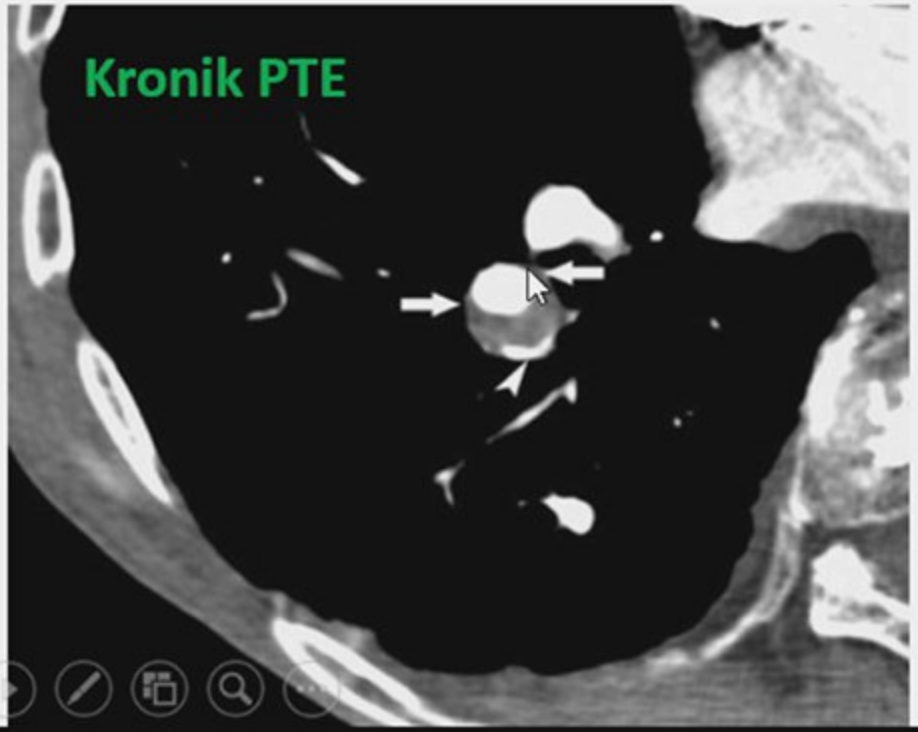

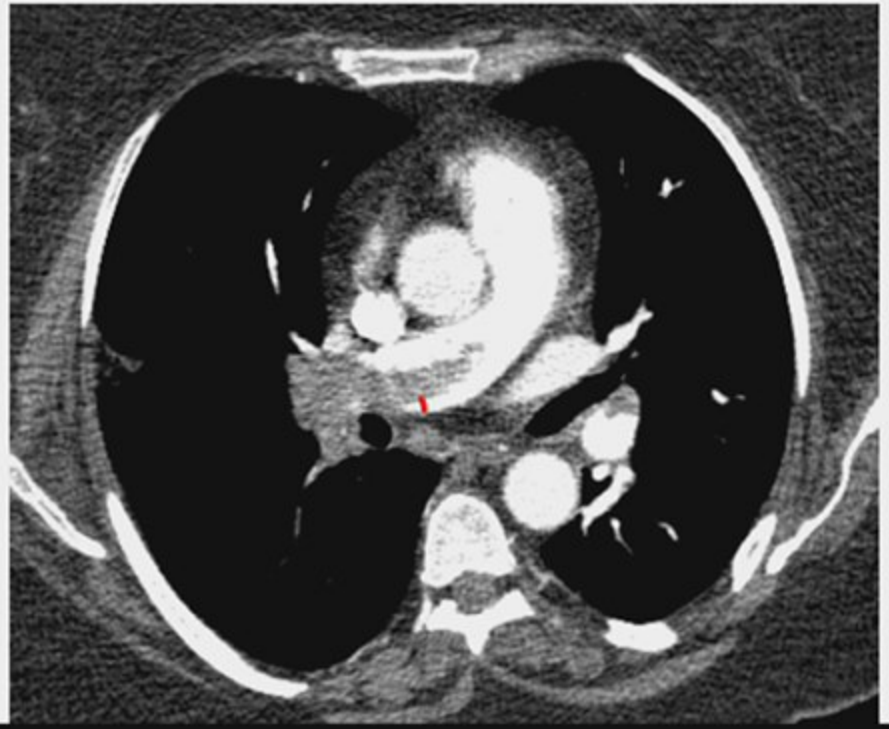

PTE Tanısında Pulmoner BT anjiyografi

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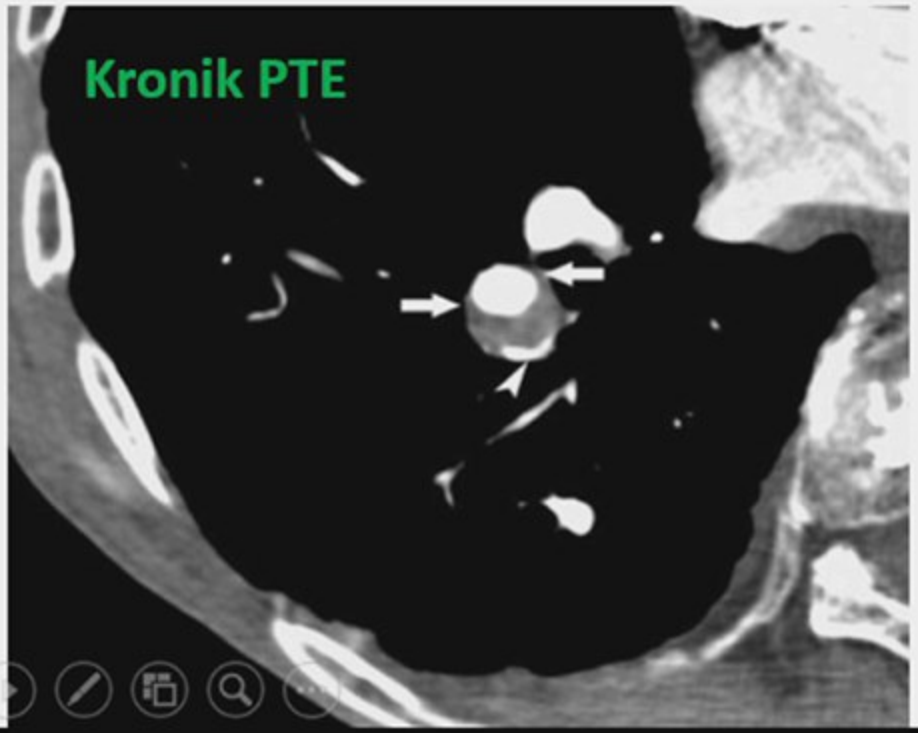
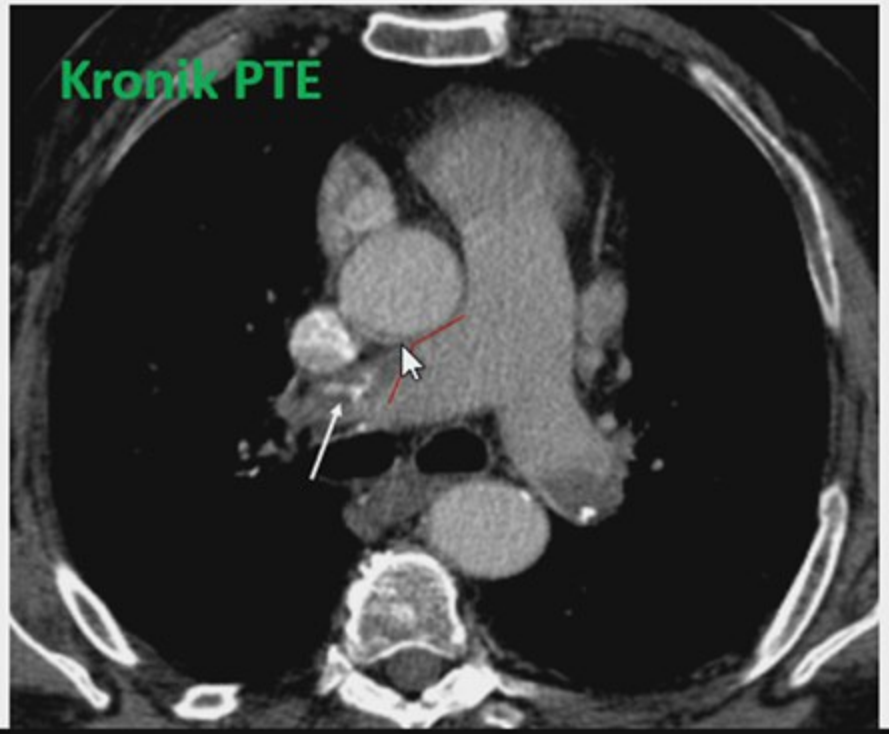
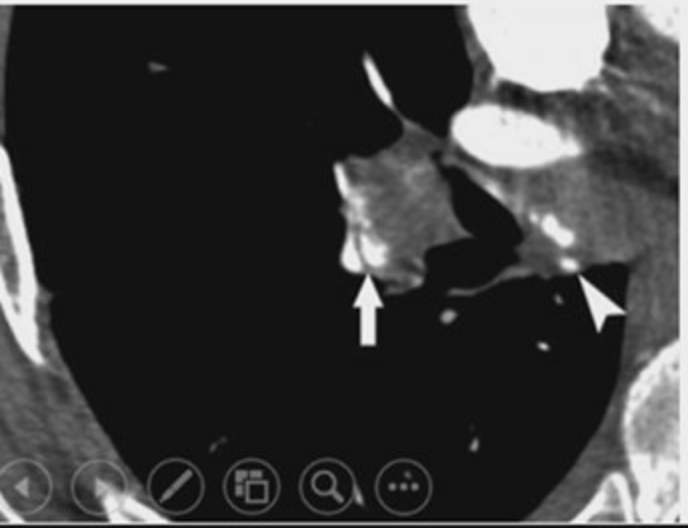


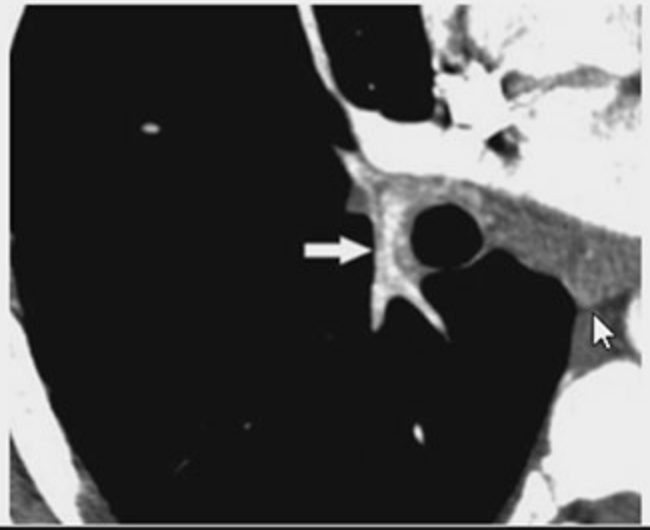


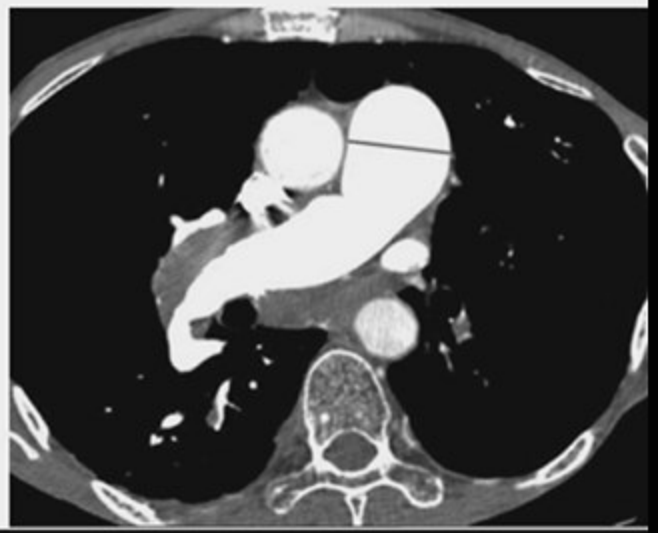
PTE Tanısında Pulmoner BT anjiyografi

Kronik PTE'de;

- İncelmiş damar içerisinde rekanalizasyon
- Etkilenen damarda flep veya ağ oluşumu
- Pulmoner HT bulguları







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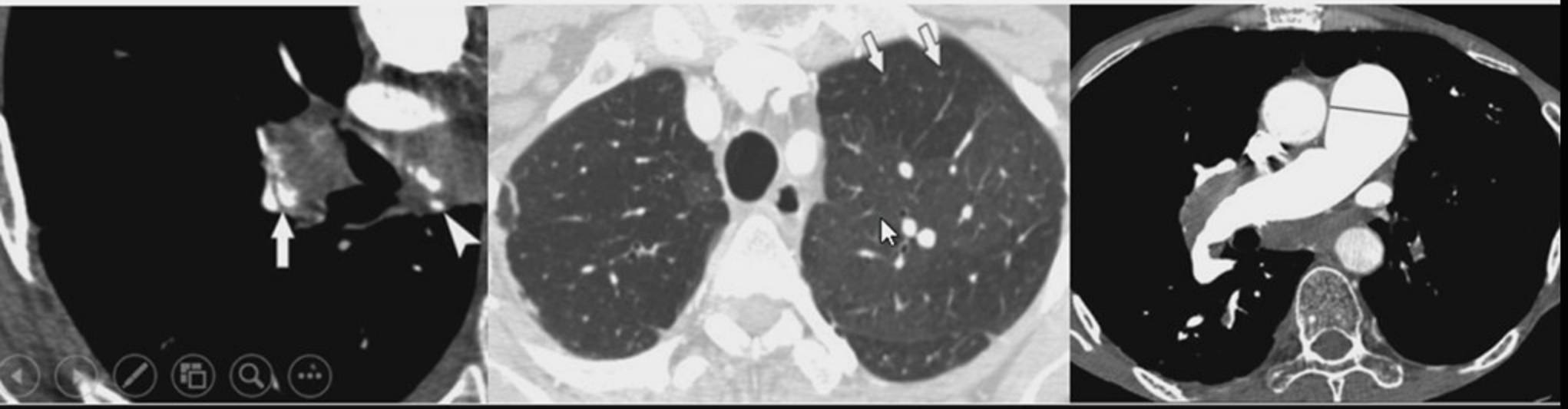

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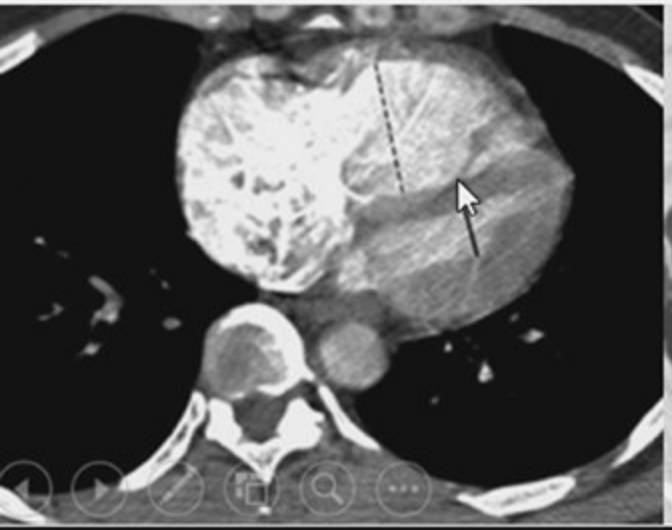
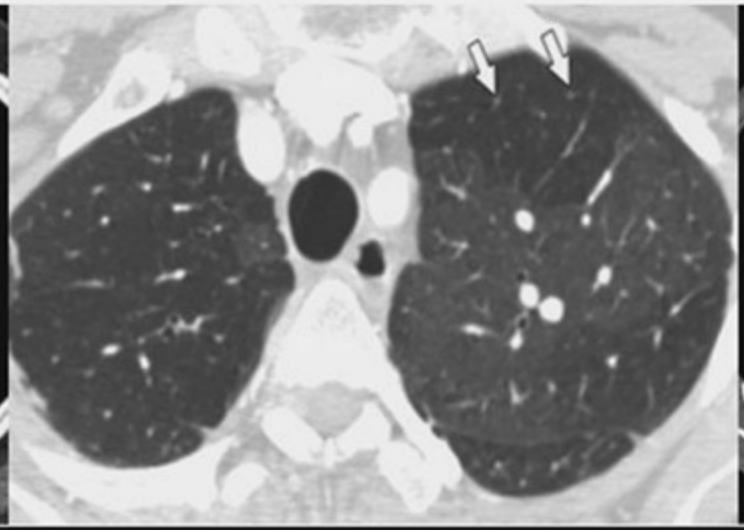
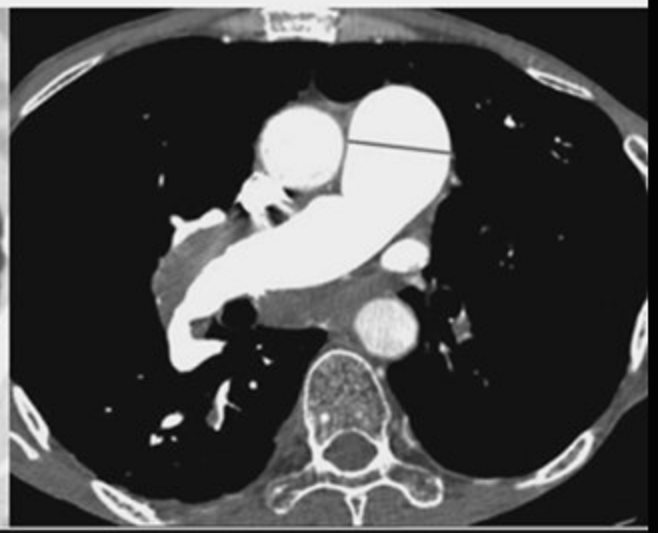


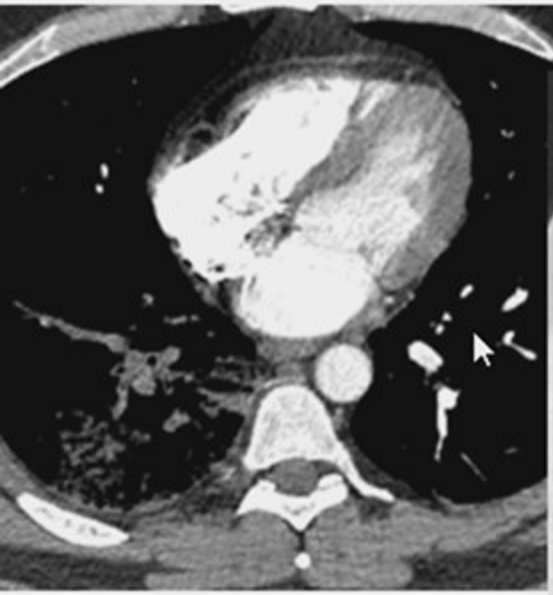


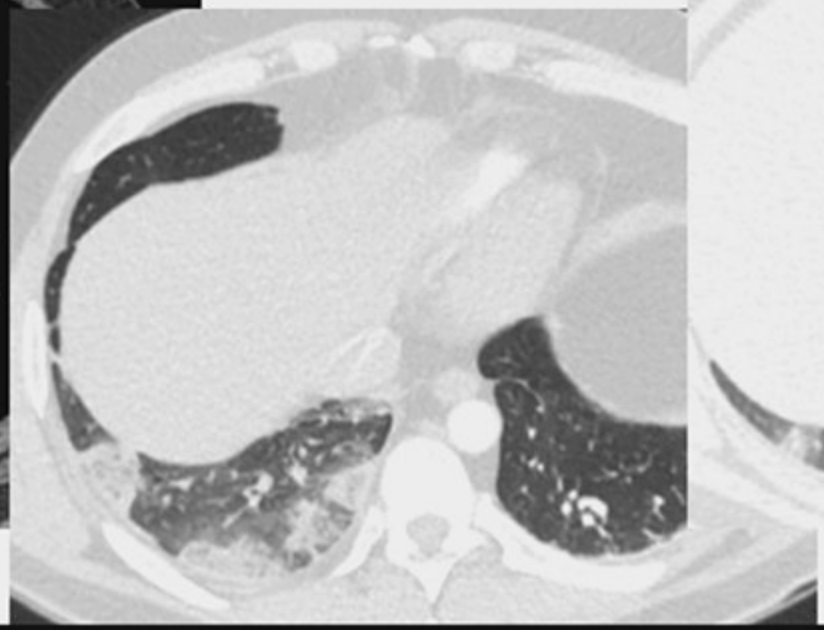


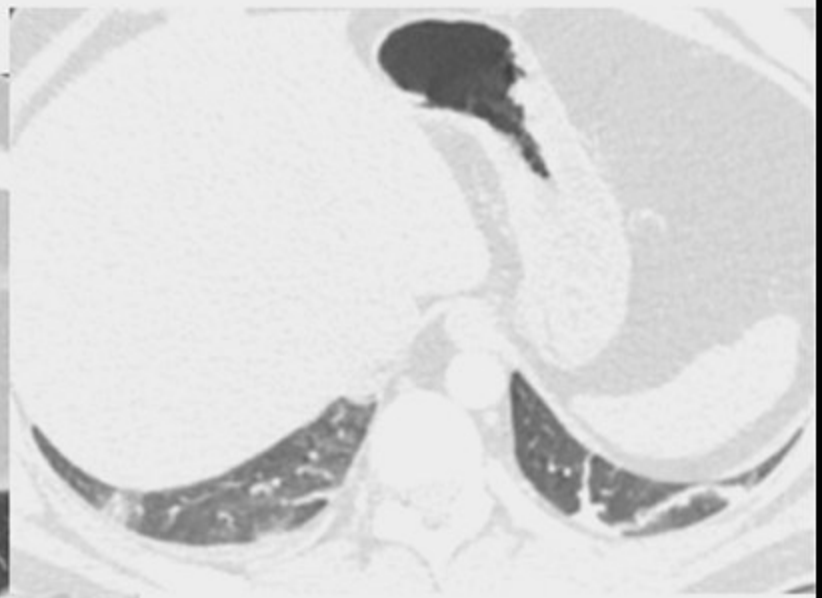
PTE Tanısında Pulmoner BT anjiyografi

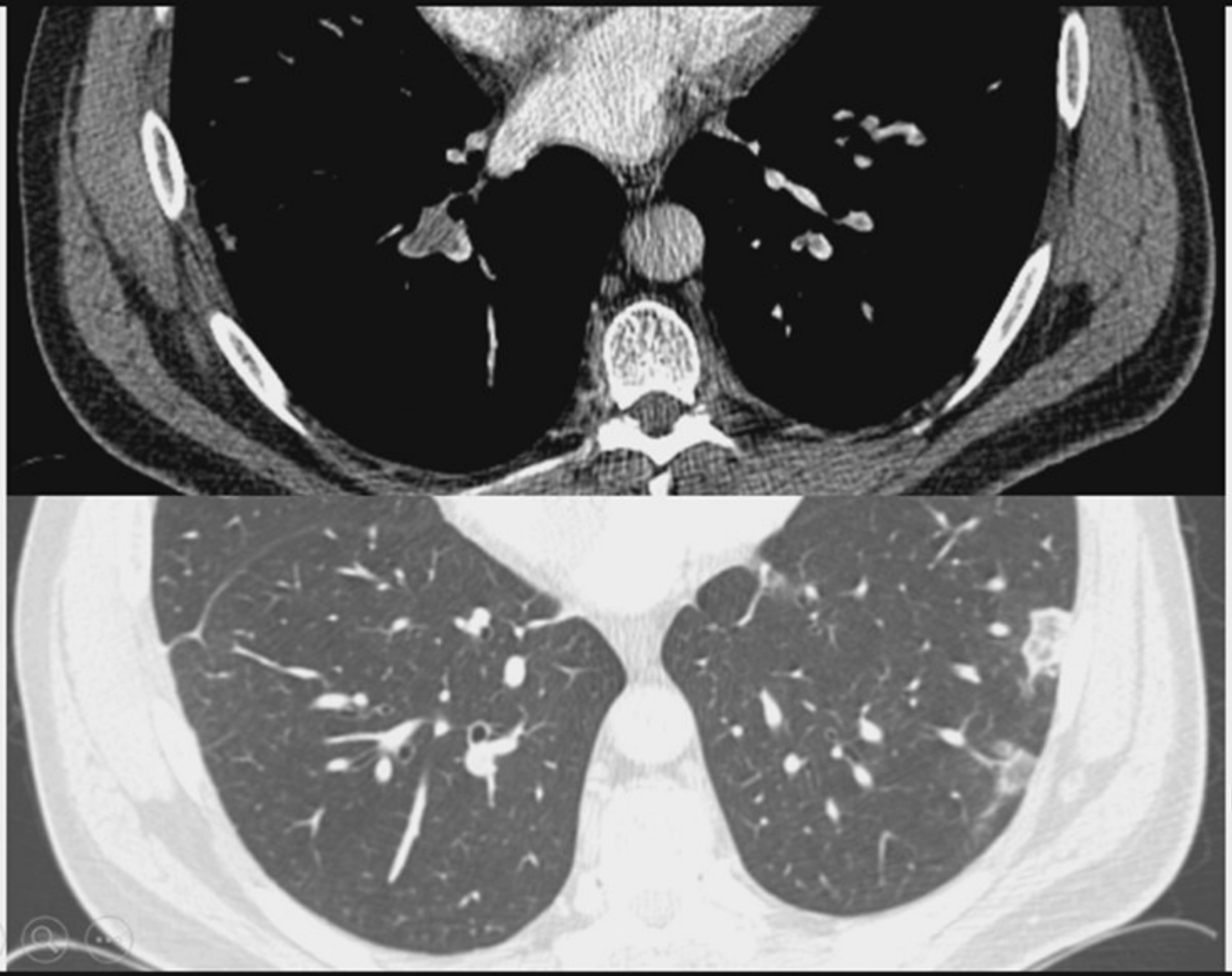
Akut PTE'de;

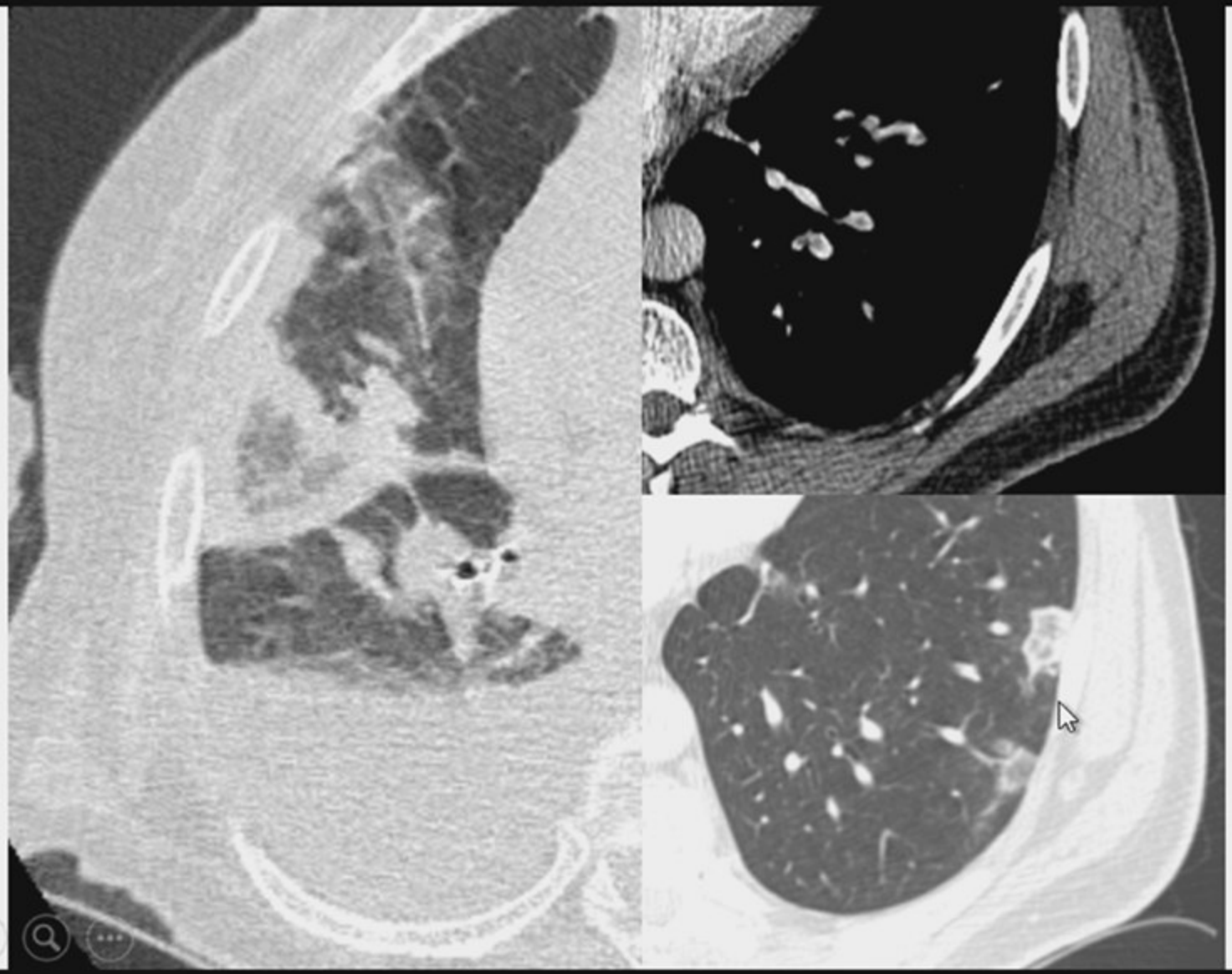
- Akciğer parankiminde kama şeklinde infarkt alanları veya çizgisel bantlar

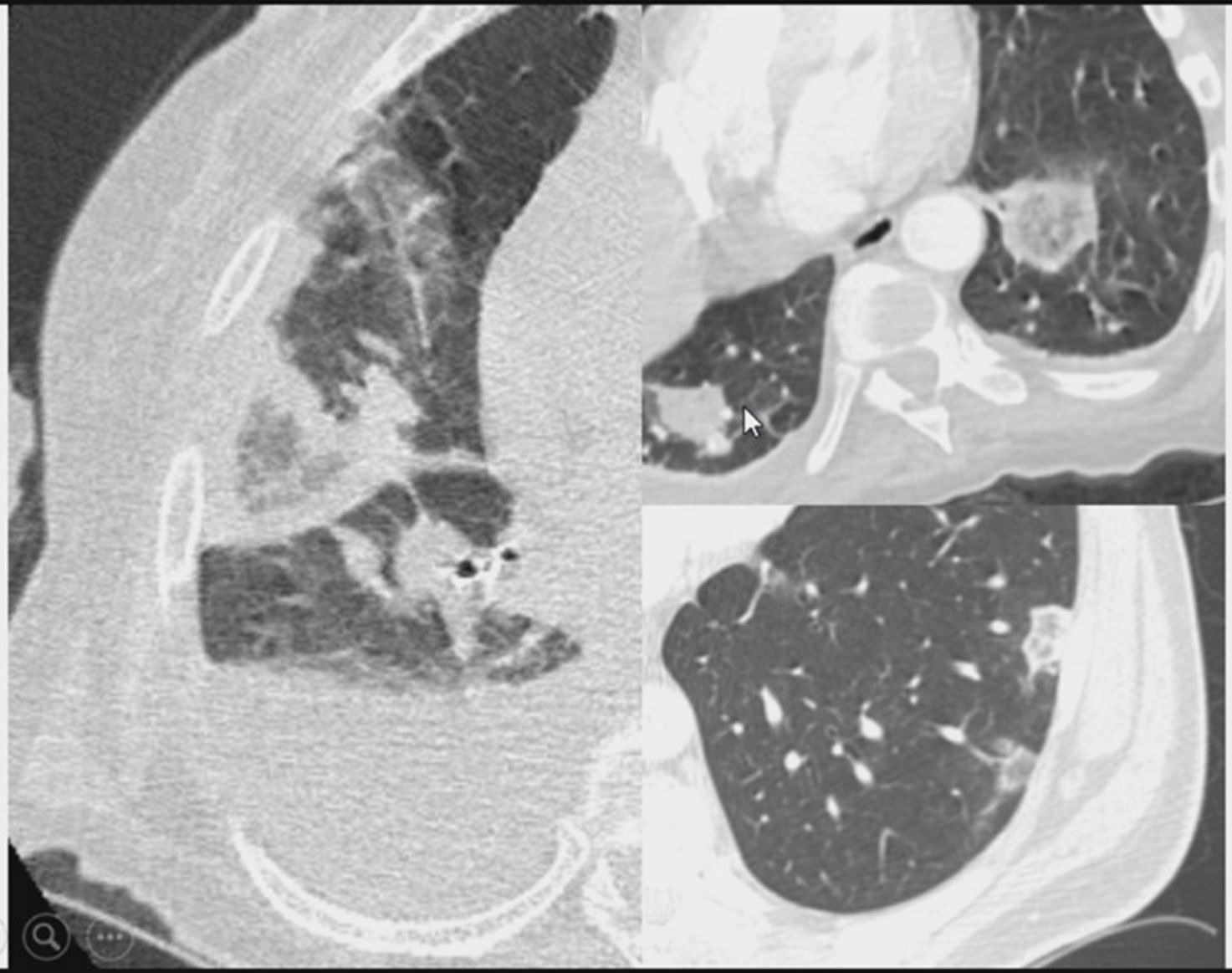






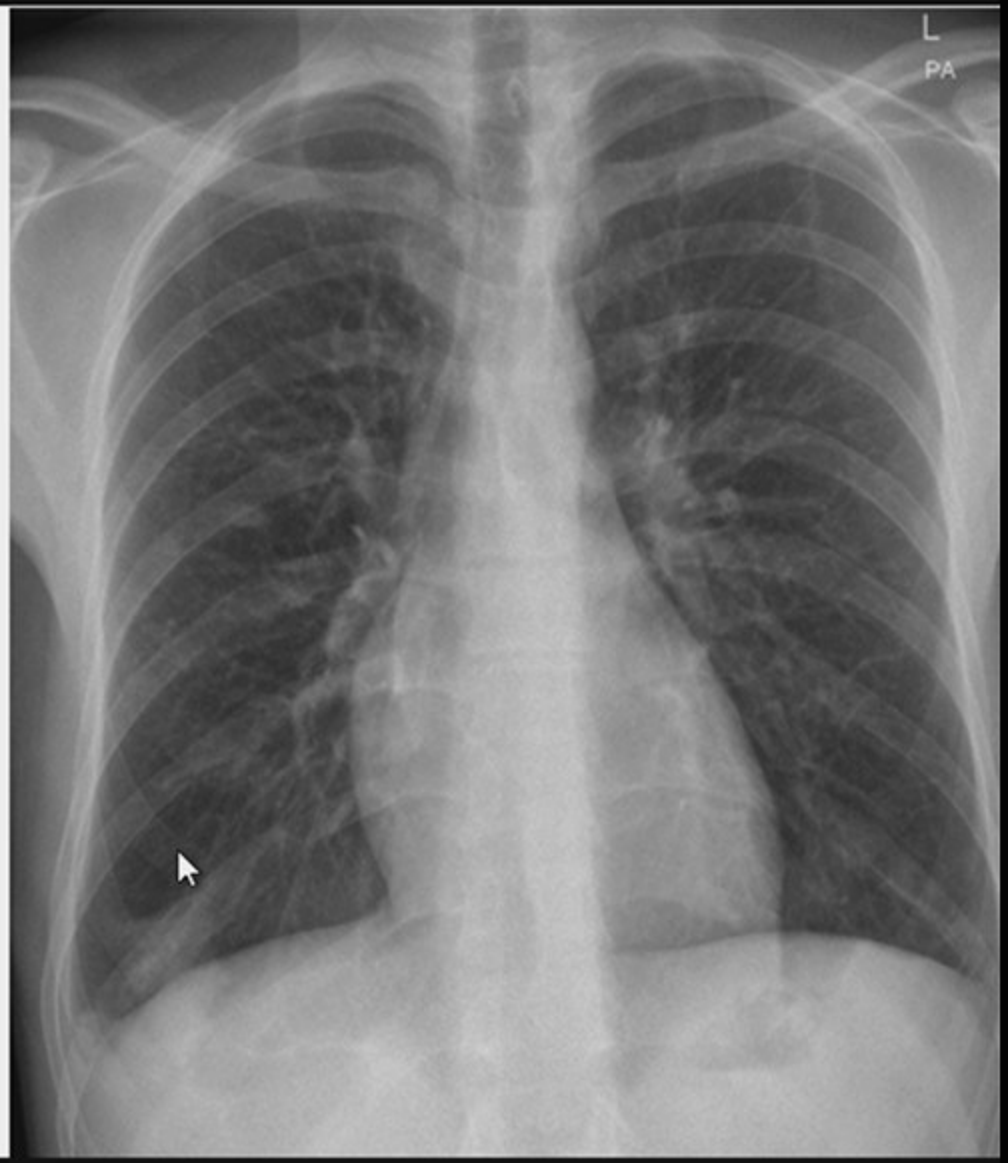






PTE Tanısında Akciğer Radyogramı

- **%14 Normal olabilir!**
- %68 Subsegmenter atelektazi
- %48 Az miktarda plevral efüzyon
- %35 Tabanı plevrada konsolidasyon (Hampton's Humps)
  - Emboliden 12-24 saat sonra ortaya çıkar
  - Enfarkt / kanama
- %24 Hemidiyaframda elevasyon
- Pulmoner arterde ani kesilme (Knuckle)
- Proksimalinde dilatasyon (Palla)
- Parankimde oligemi (Westermark)
- Sağ kalp odacıklarında dilatasyon



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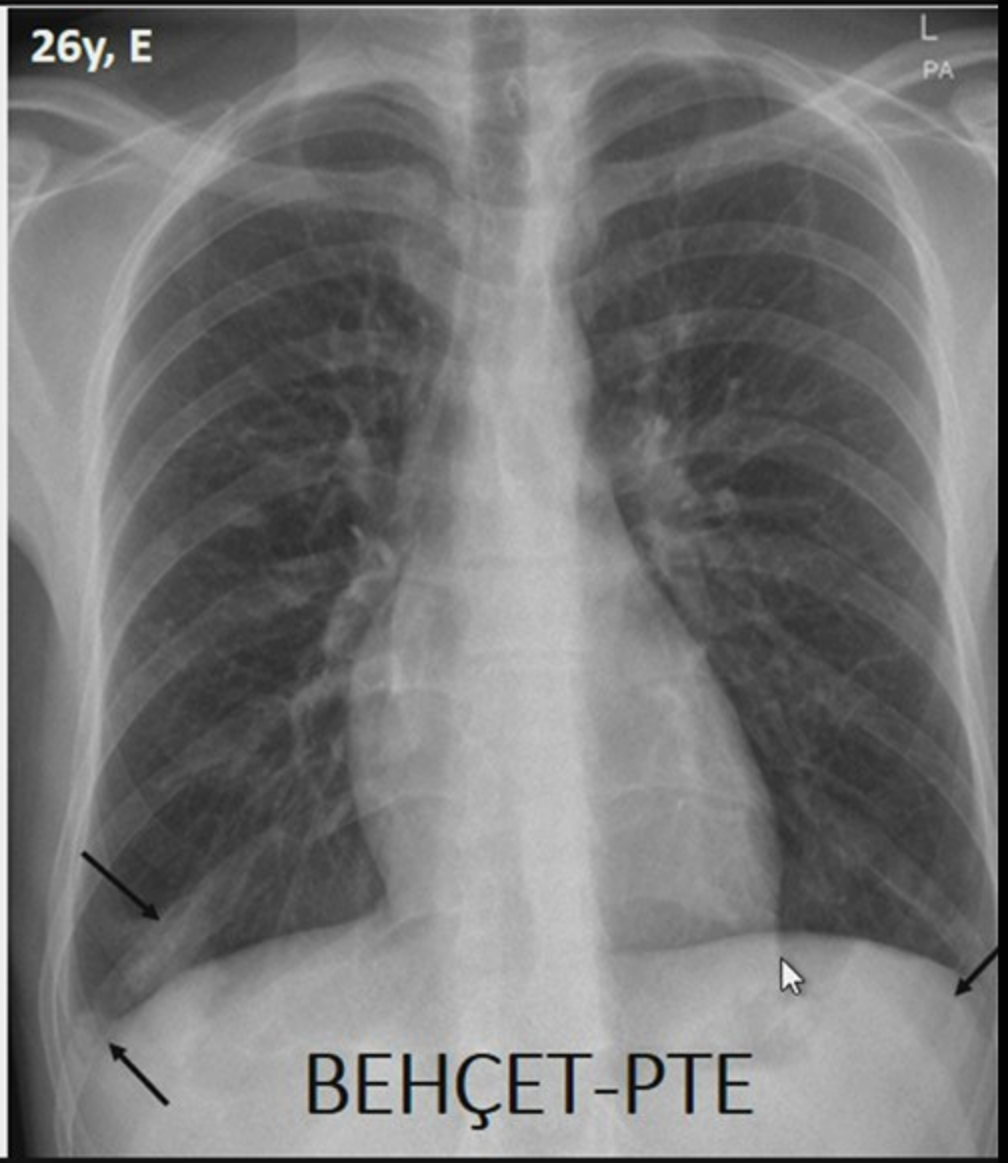

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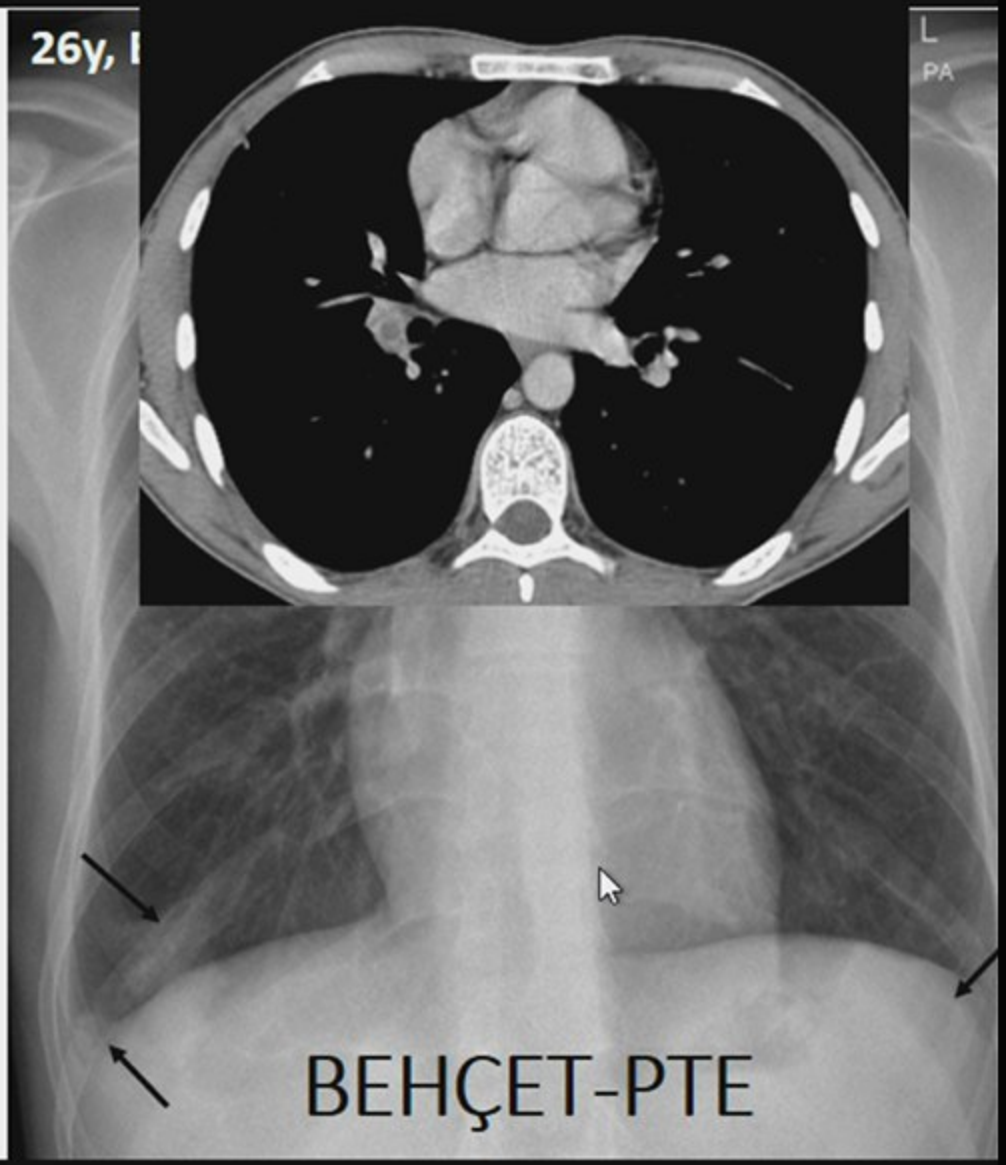

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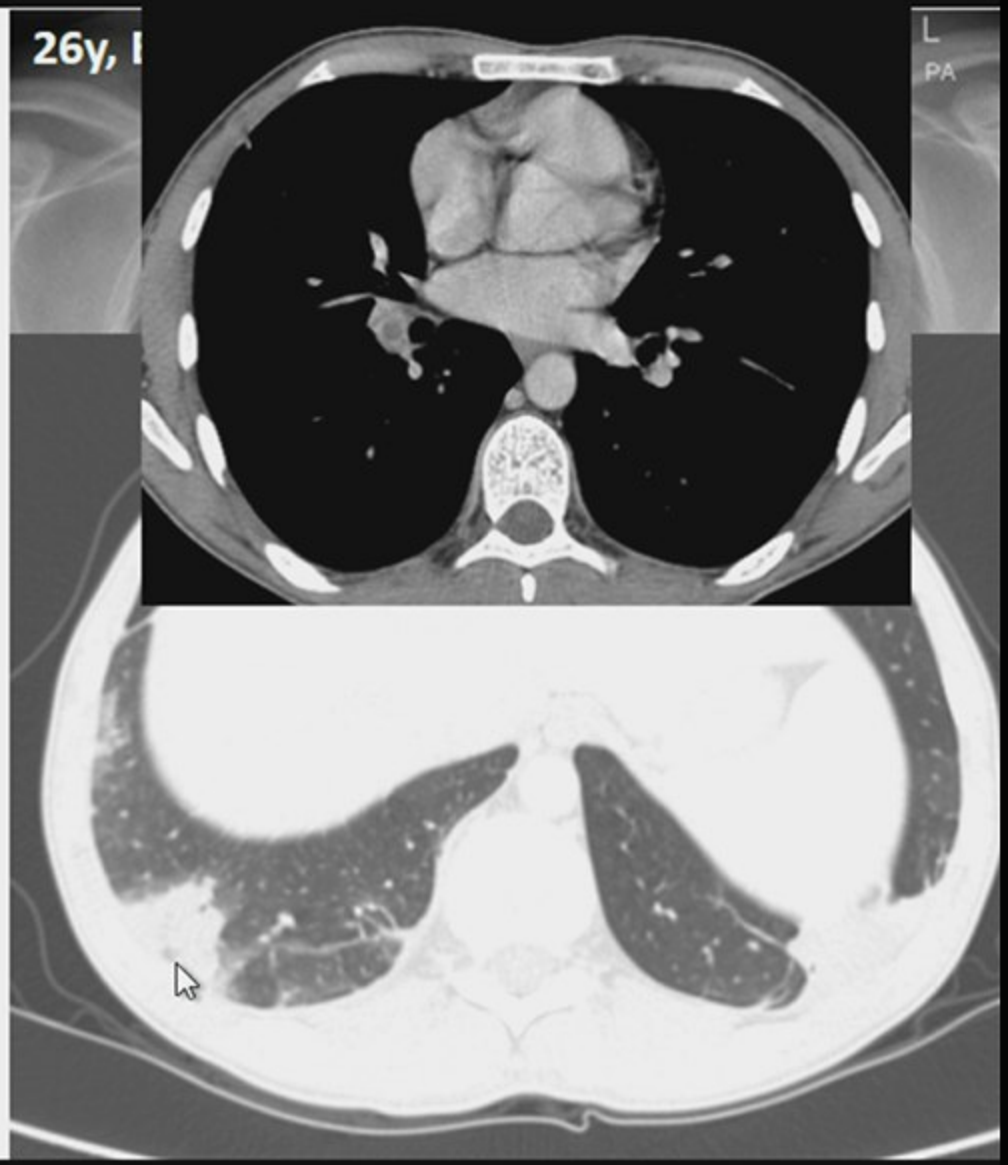
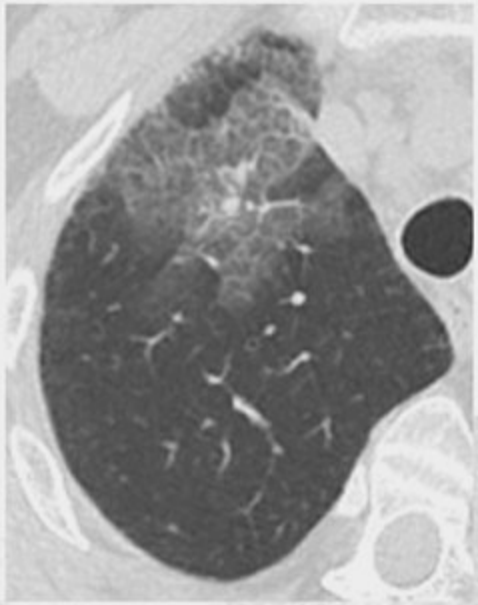
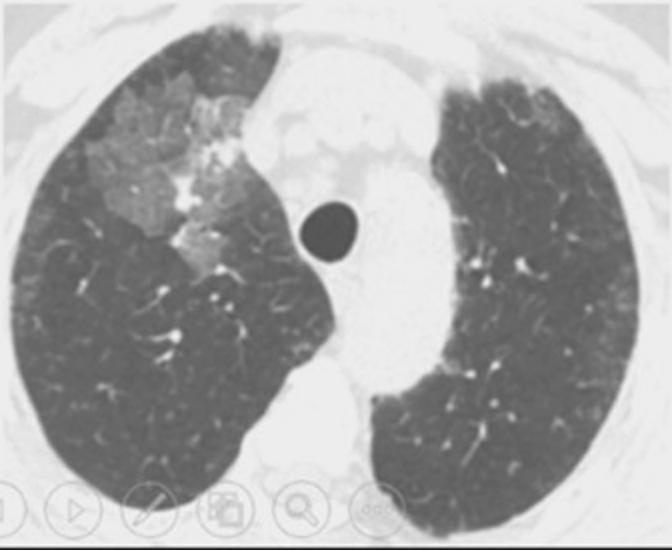
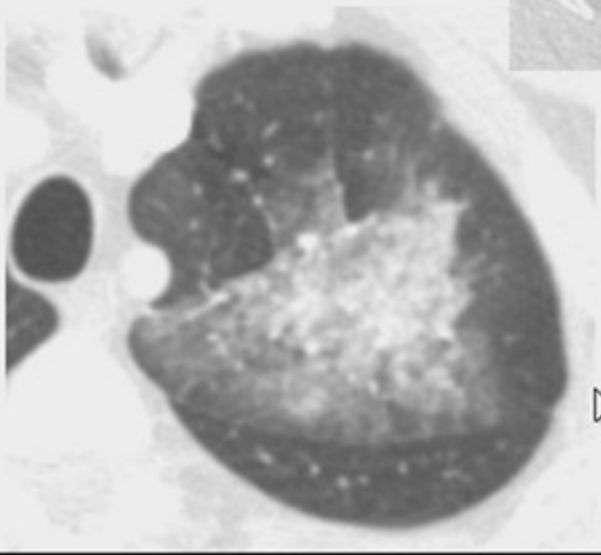


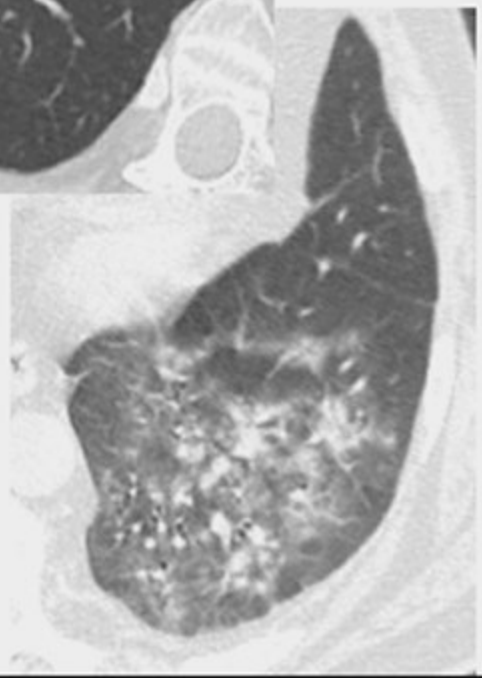
Lokalize Pulmoner Hemoraji

- Vaskülitler; Granulomatosis with polyangitis
  Microscopic polyangitis
- Bronşektazi, tümör, enfeksiyon
- Pulmoner vasküler tümör invazyonu
- AMV





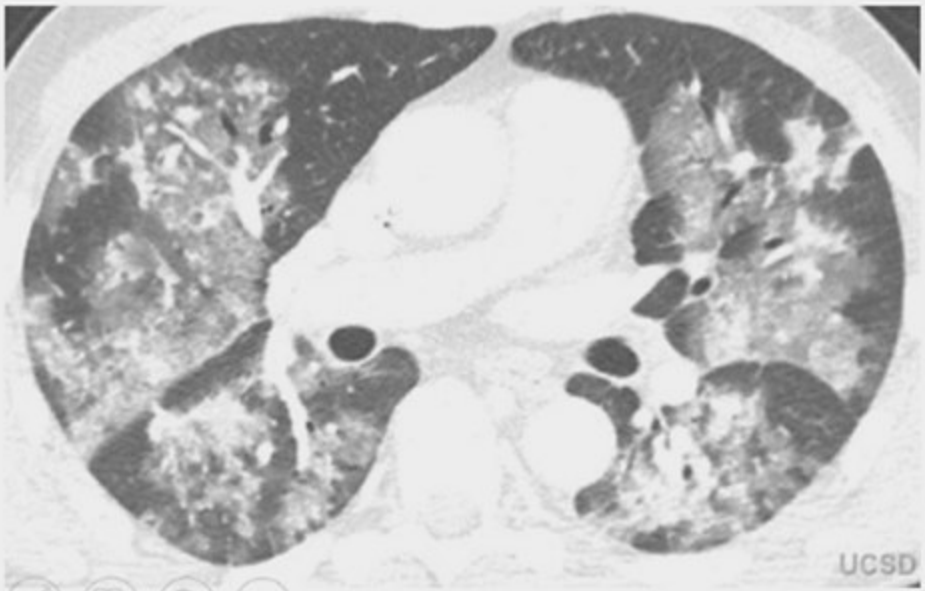




Vaskülitler
Diffüz Alveolar Hemoraji

Pulmoner kapillerit;

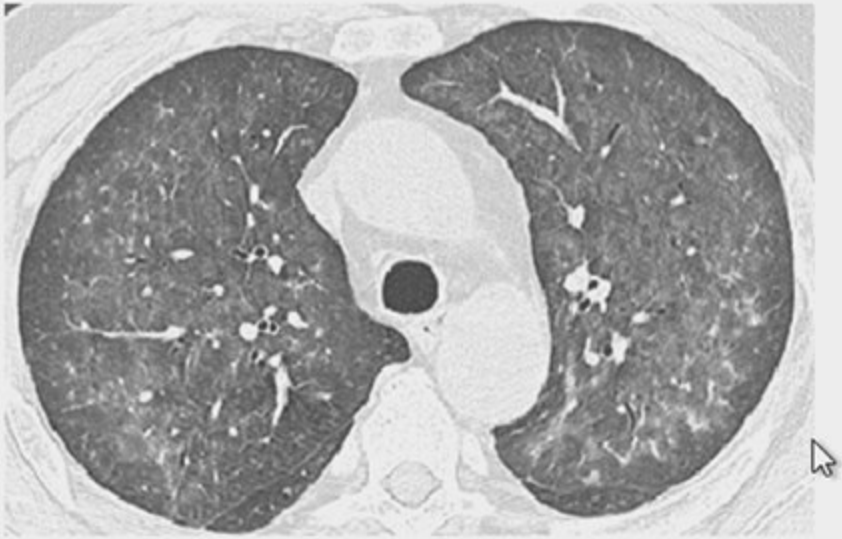
Kapiller ve venüllerin nötrofillerle infiltrasyonu

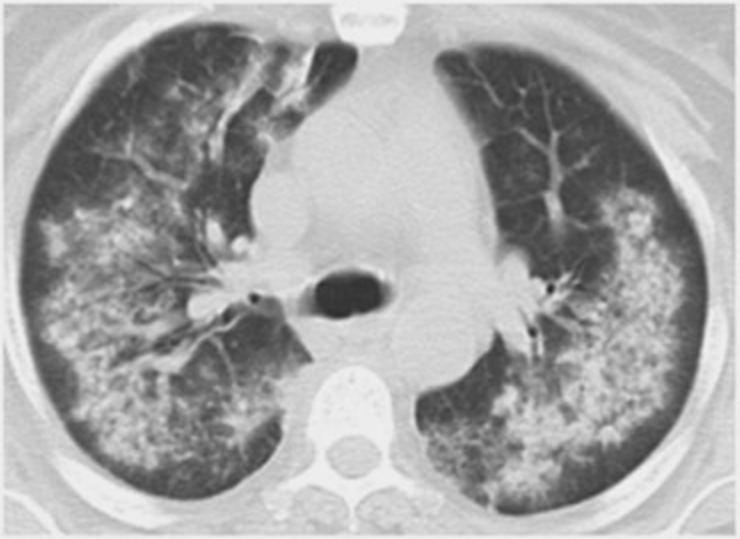


Causes of DAH

- With pathologic capillaritis
  - Primary idiopathic small-vessel vasculitis
    - Wegener granulomatosis
    - CSS
    - Microscopic polyangiitis
  - Primary immune complex–mediated vasculitis
    - Goodpasture syndrome
    - Henoch-Schönlein purpura
  - Secondary vasculitis
    - Classic autoimmune disease
      - Systemic lupus erythematosus
      - Rheumatoid arthritis
      - Antiphospholipid antibody syndrome
      - Mixed connective tissue disease
      - Polymyositis, dermatomyositis
    - Essential cryoglobulinemic vasculitis
    - Behçet disease
    - Lung transplantation
    - Bone marrow transplantation
    - Drug induced (eg, chemotherapy)
    - Infection
- Without pathologic capillaritis
  - Idiopathic pulmonary hemosiderosis
  - Coagulopathy
  - Mitral stenosis
  - Inhalation injury
  - Goodpasture syndrome
  - Systemic lupus erythematosus
  - Bone marrow transplantation
  - Drug-associated disease (eg, chemotherapy)

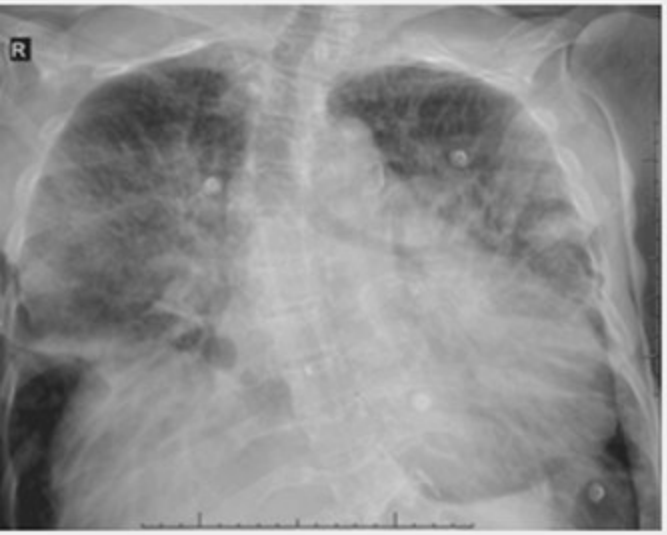
Diffüz Alveolar Hemoraji

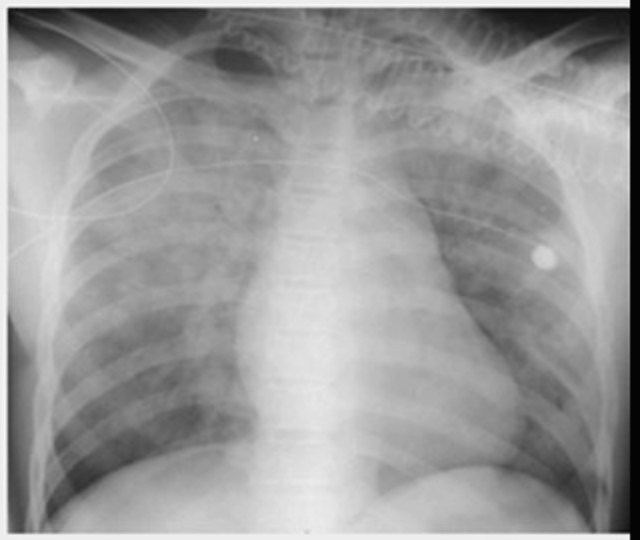




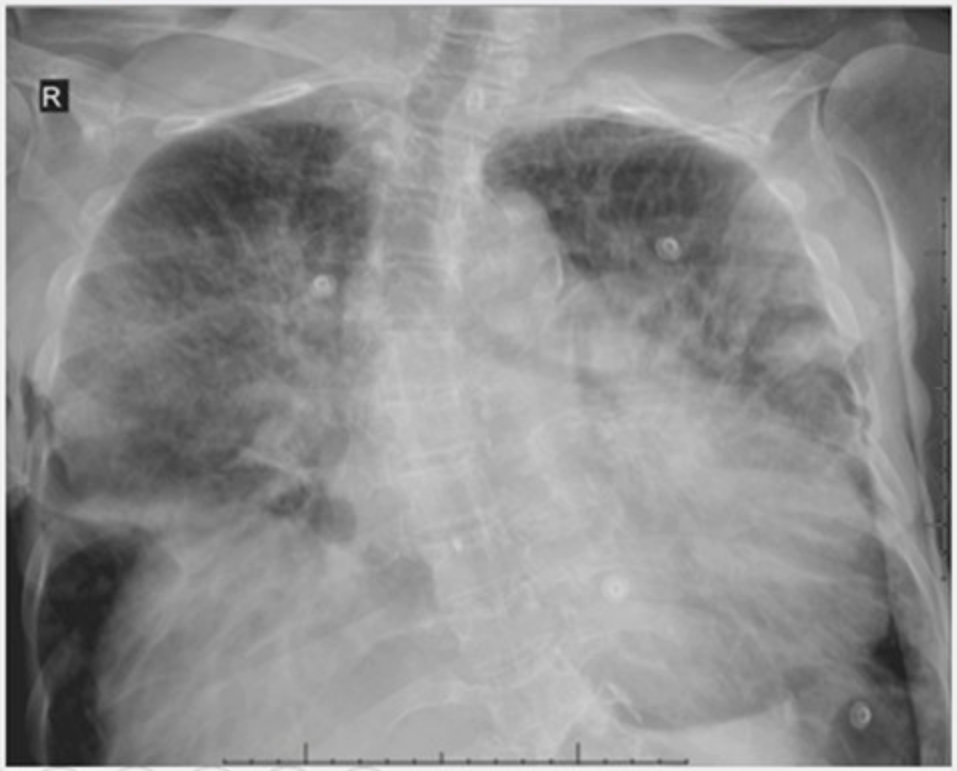
- Bilateral yaygın buzlu cam / konsolidasyon alanları (perihiler ağırlıklı)
- Yamasal /diffüz bilateral alveolar opasiteler
- Silik sınırlı sentrilobuler nodüller

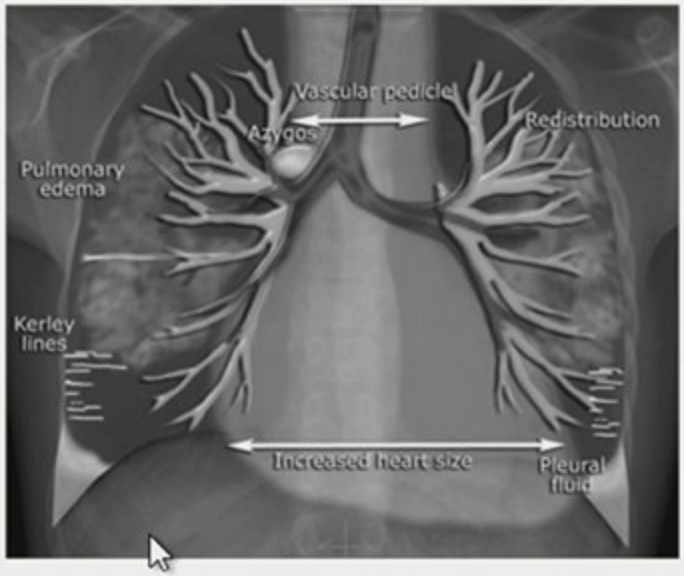
Kardiyak yetmezlik? - Diffüz Pnömoni? - ARDS?





Kardiyojenik Pulmoner Ödem





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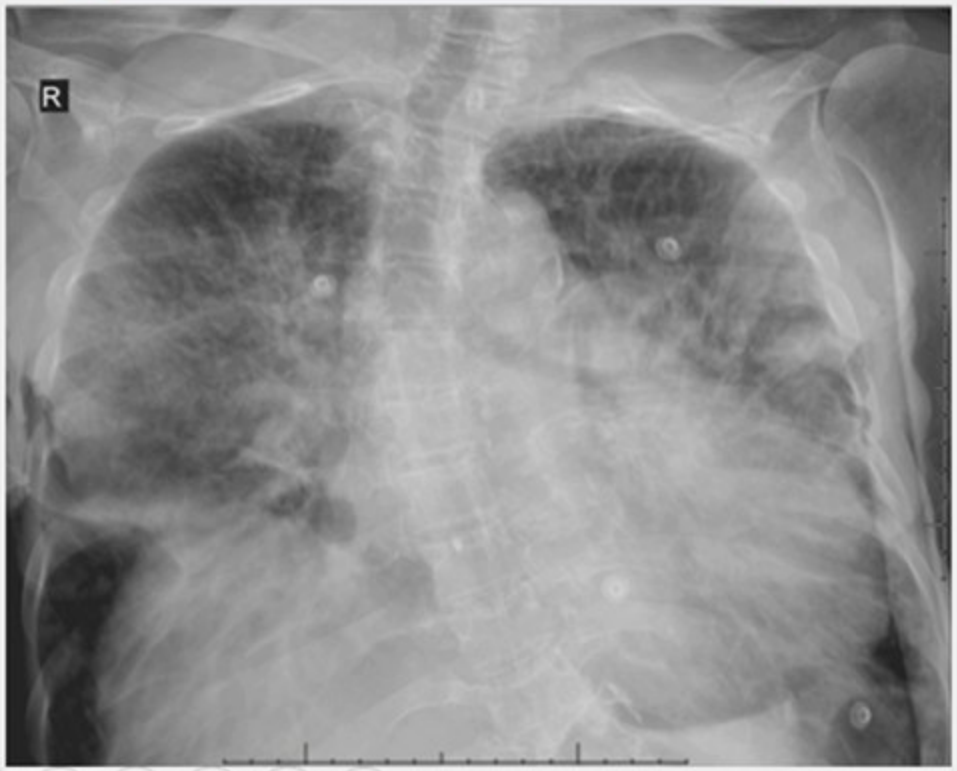
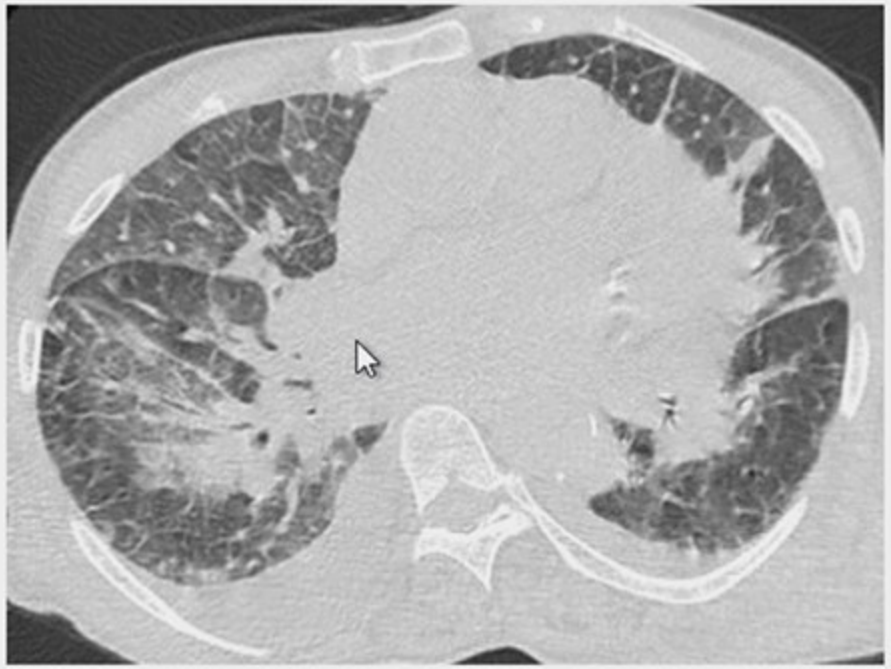
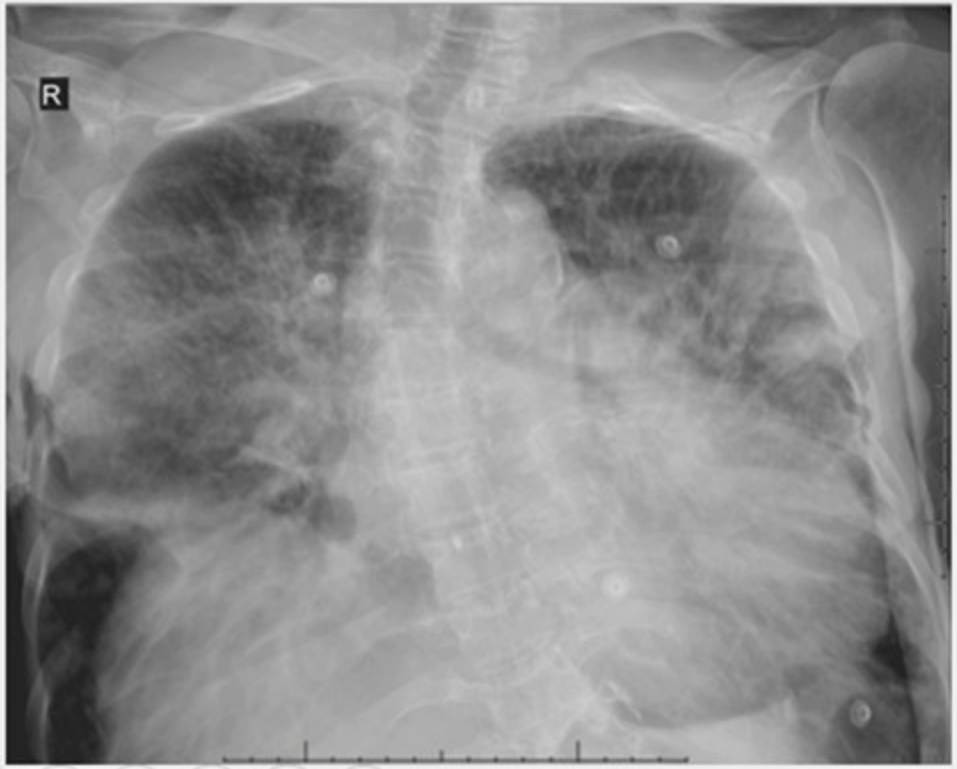
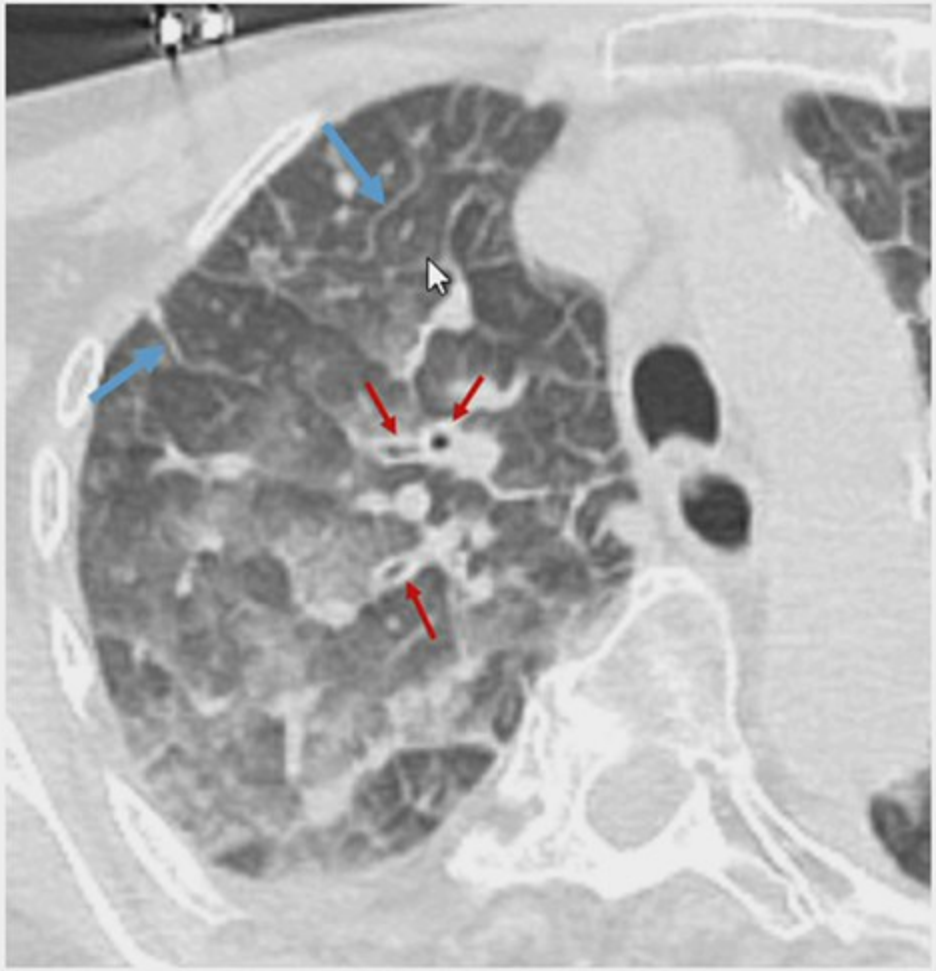


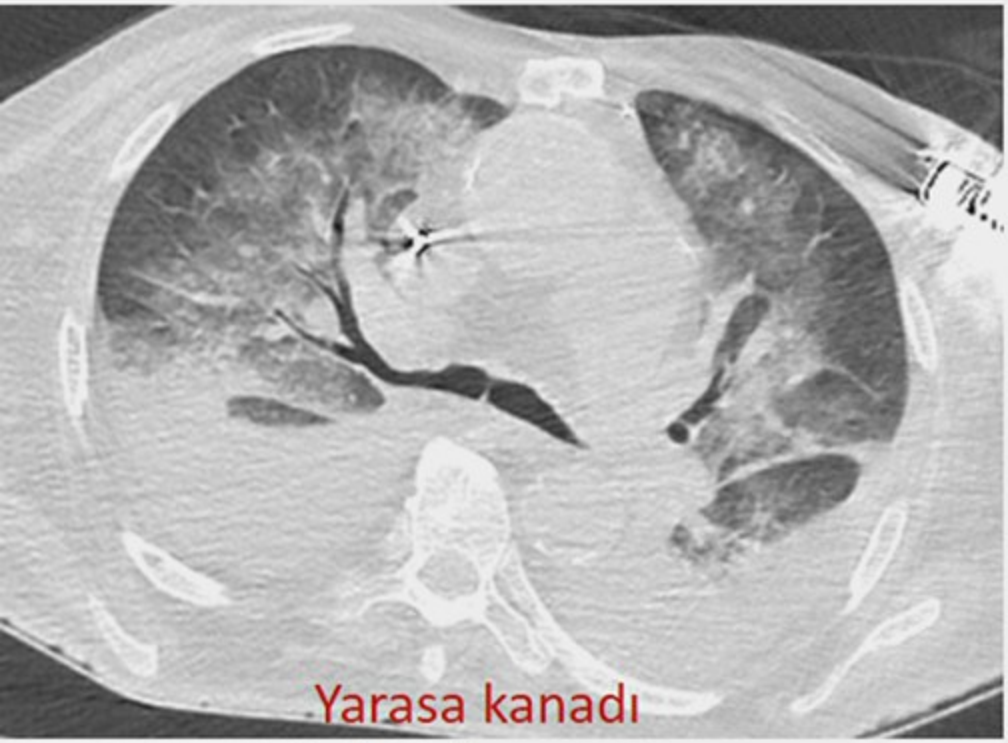


Kardiyojenik Pulmoner Ödem





Kardiyojenik Pulmoner Ödem



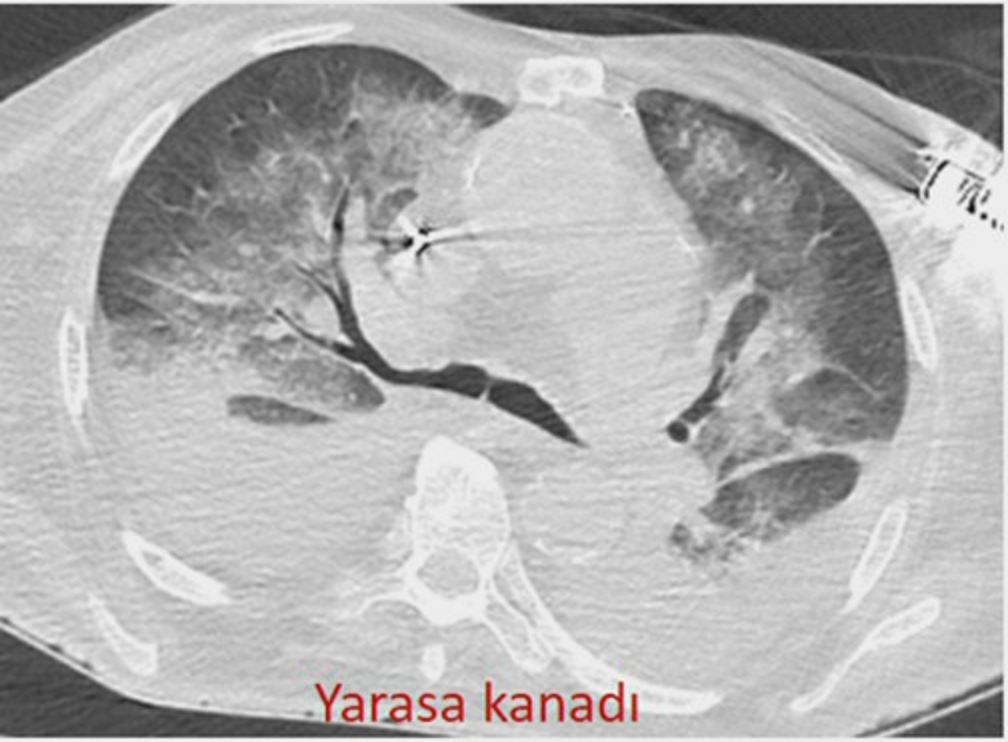
Yarasa kanadı

Hızlı gelişen KKY

Bazallerde ve graviteye bağlı gradient

Kronik KKY

Kardiyojenik Pulmoner Ödem

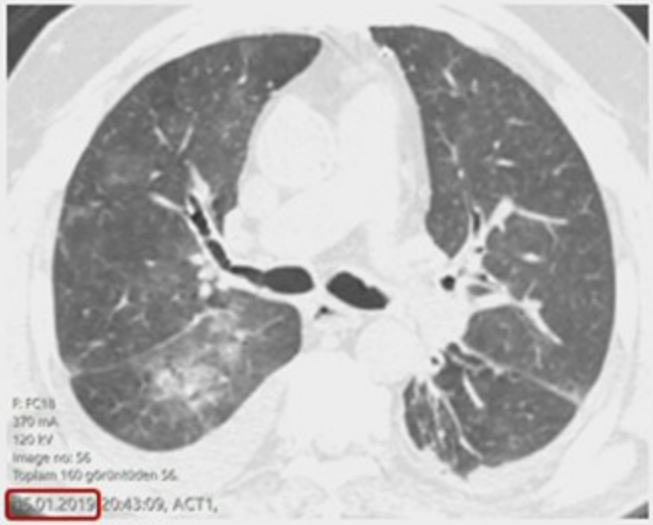


Yarasa kanadı

Hızlı gelişen KKY

Bazallerde ve graviteye bağlı gradient

Kronik KKY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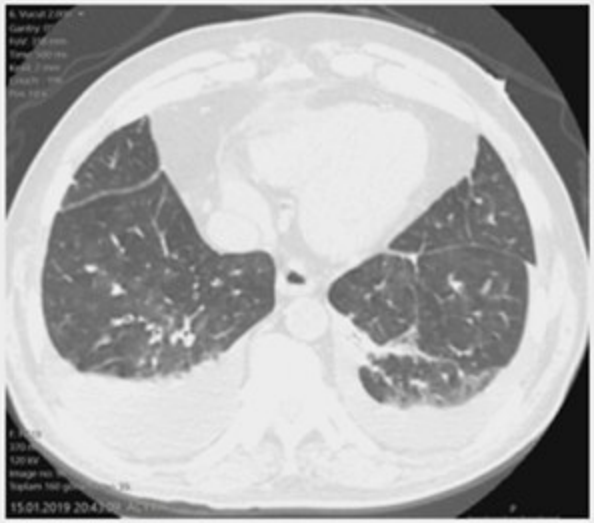
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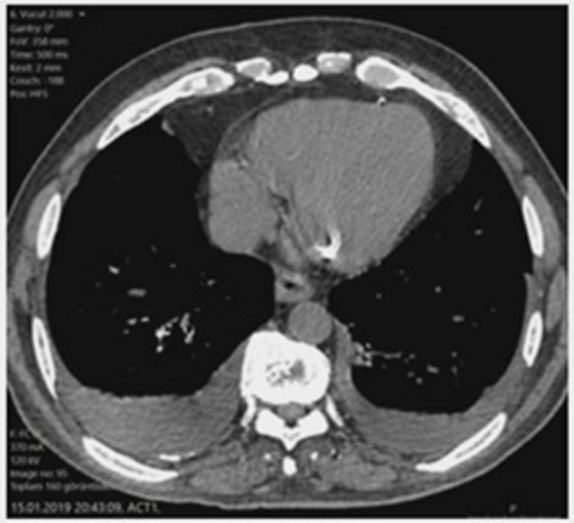
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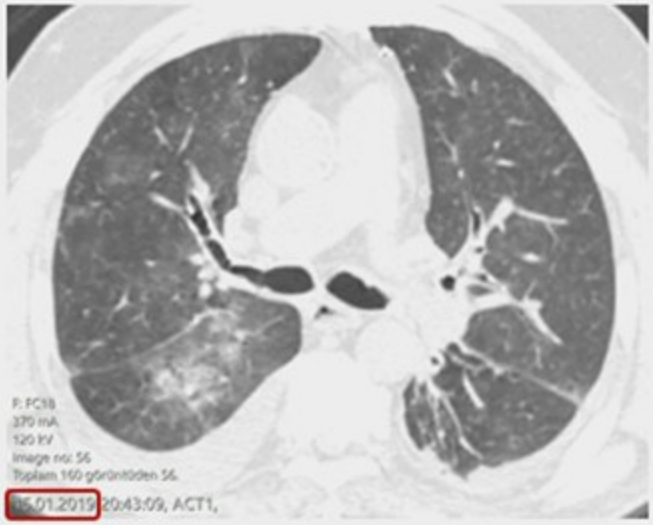
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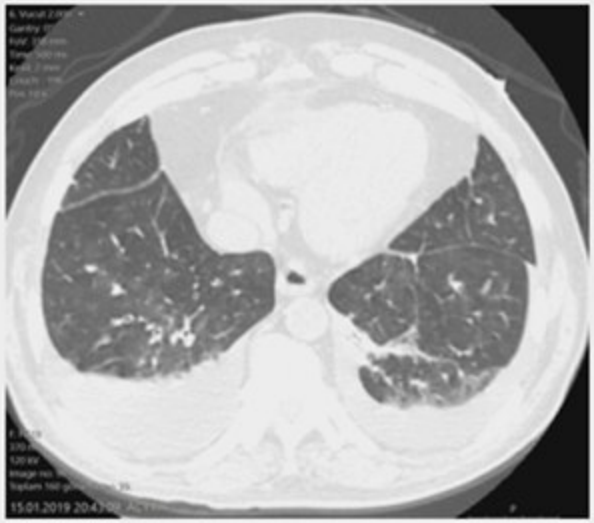
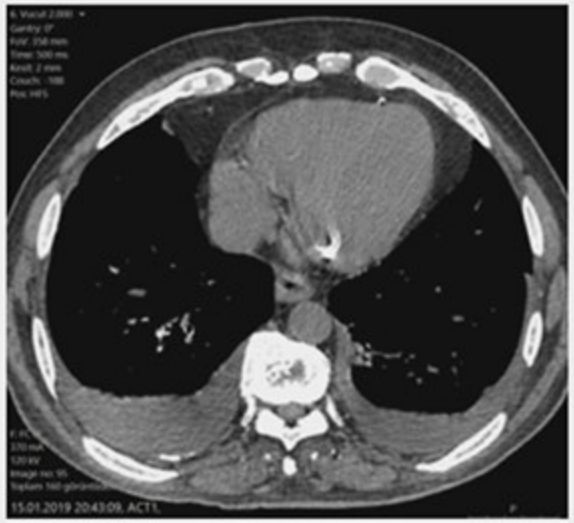
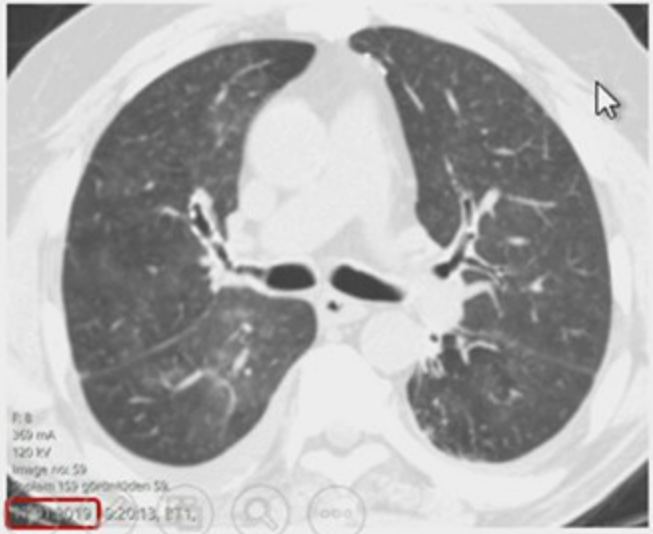
Toplam 160 görüntüden 56.






F: B
359 mA
120 kV
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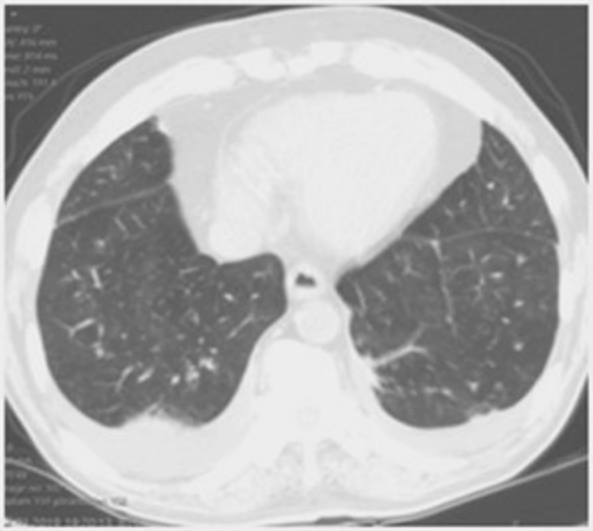
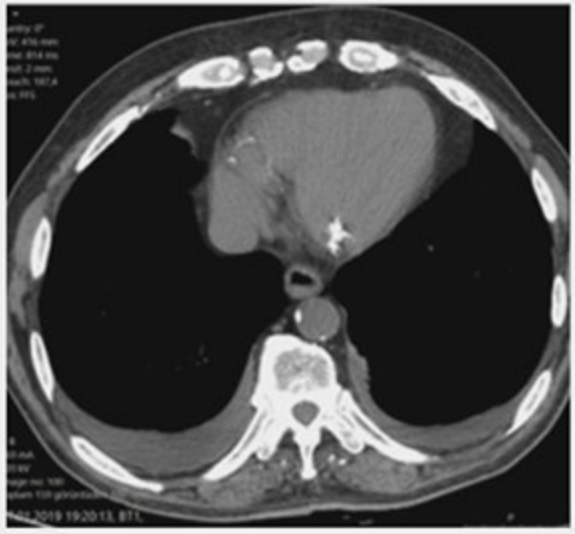
Toplam 159 görüntüden 59.





Akut Respiratuar Distres Sendromu

- Nonkardiojenik pulmoner ödem
  (Kardiak yetmezlik / yüklenme Ø)

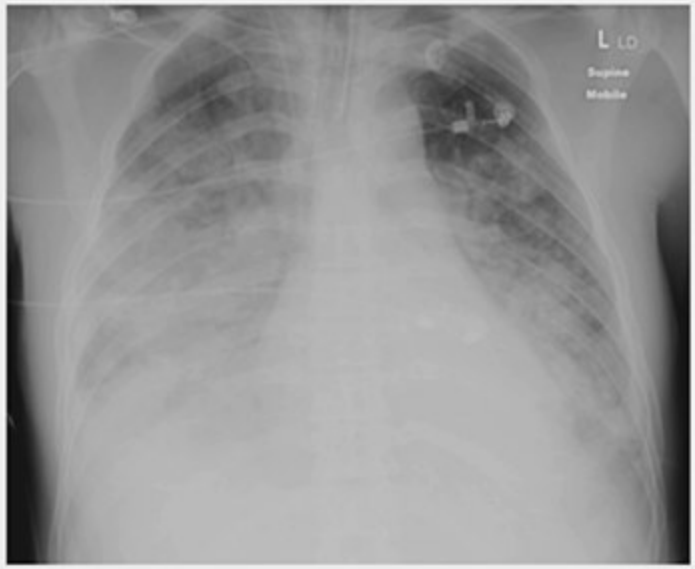
- Akut (1 hafta) pulmoner hasarlanma ve solunum yetmezliği

- ***Pulmoner nedenler;*** doğrudan alveol hasarı

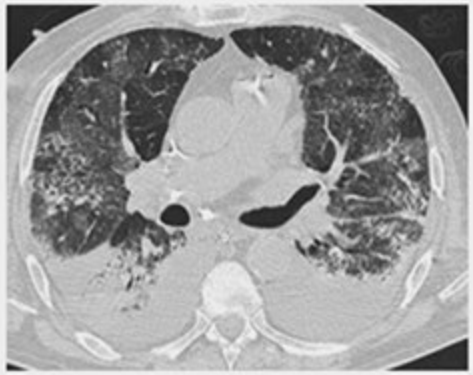
Viral pnömoniler, oksijen toksisitesi, gastik içerik aspirasyonu, boğulayazma, kontüzyon, yağ embolisi

- ***Ekstrapulmoner nedenler;*** sistemik hasara yanıt

Pankreatit, yanık, travma, sepsis, hipovolemik şok, DIC
kafa travması, transfüzyon reaksiyonu, kardiopulmoner bypass



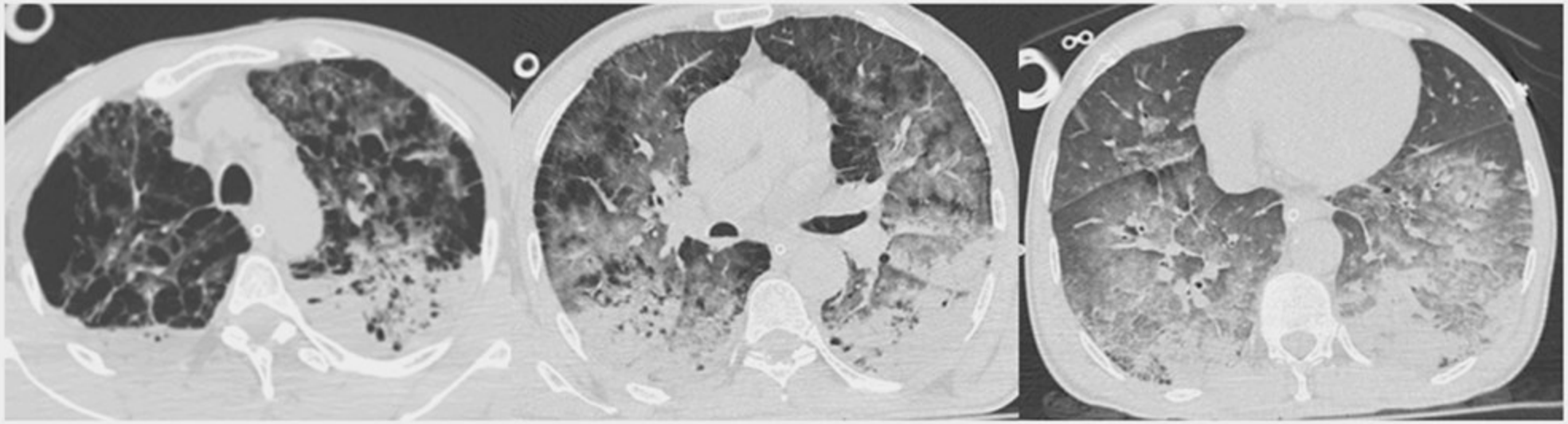
ARDS



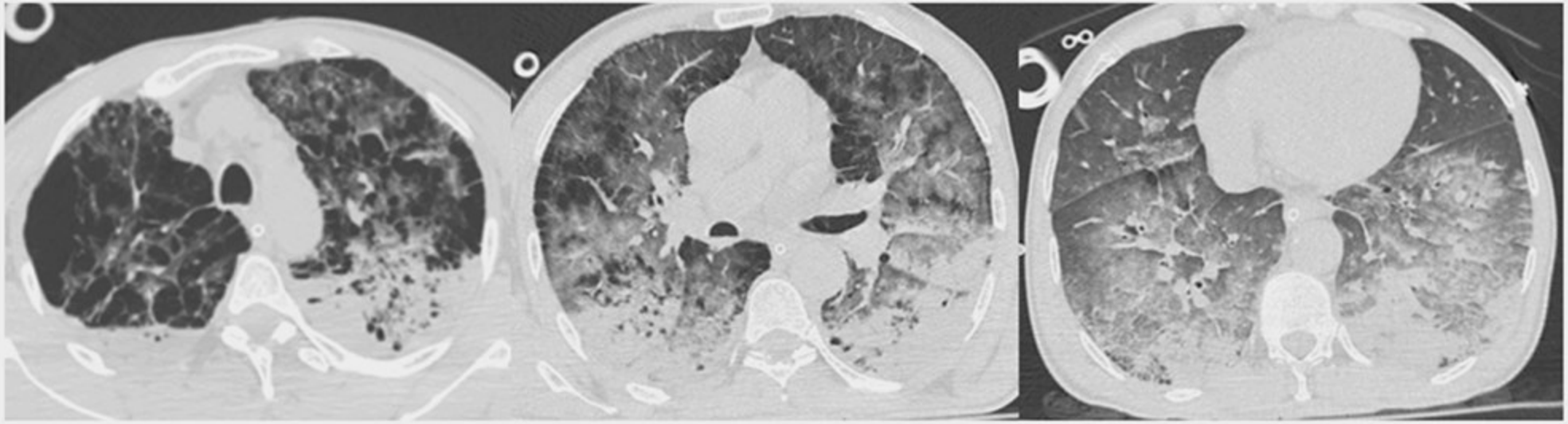
- Opasiteler; Pulmoner kökenli ise asimetrik, sistemik ise simetrik
- Buzlu cam alanları içinde bronşektaziler
- Geç dönemde, nadiren erken dönemde kistler

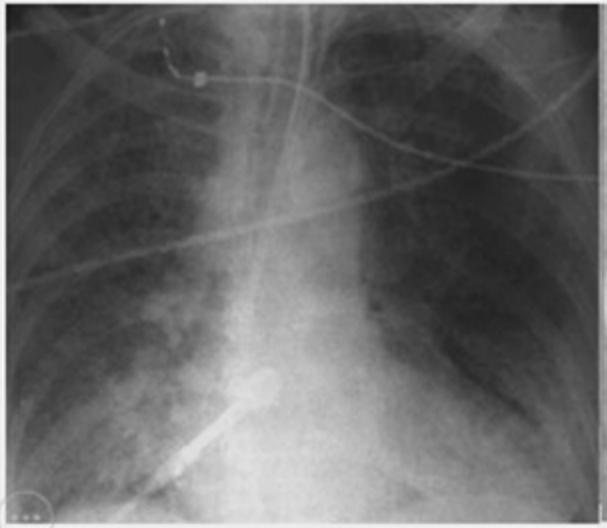
12-24 s	24-48 s	5-7 gün	1 hafta
• Bilateral yamasal alveolar infiltrasyon • Periferal (%45) • Eşit dağılım (%35)	• Birleşme eğilimi • Bilateral geniş konsolidasyon • Hava bronkogramları	• Temizlenme • Bulgularda gerileme	• İnterstisyel fibrozis

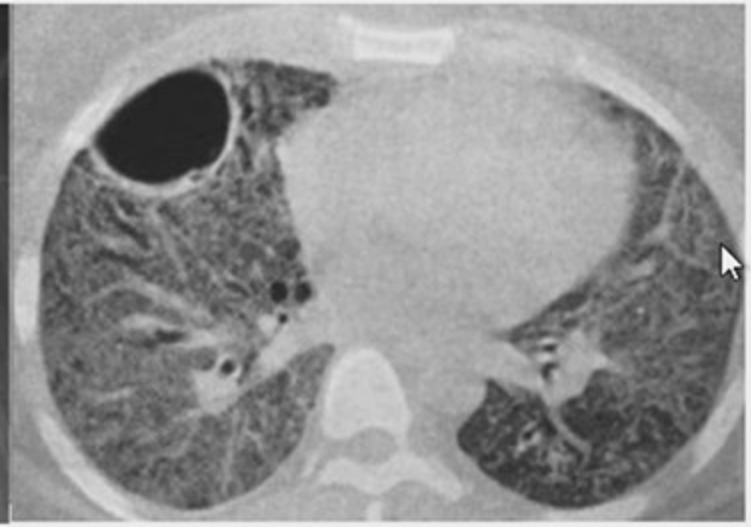
EKSUDATİF FAZ

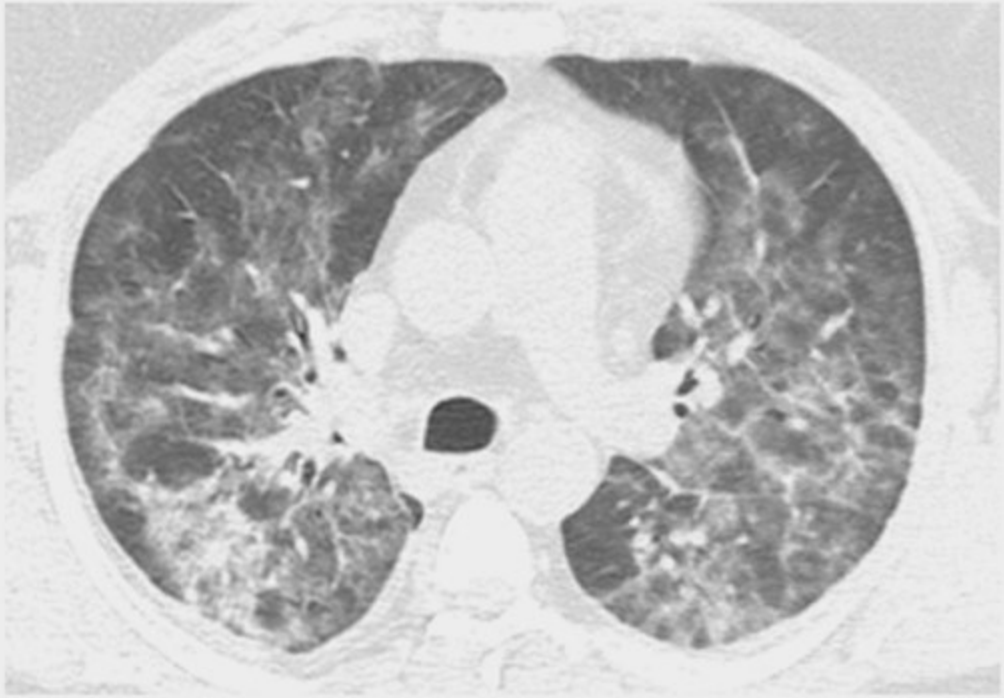


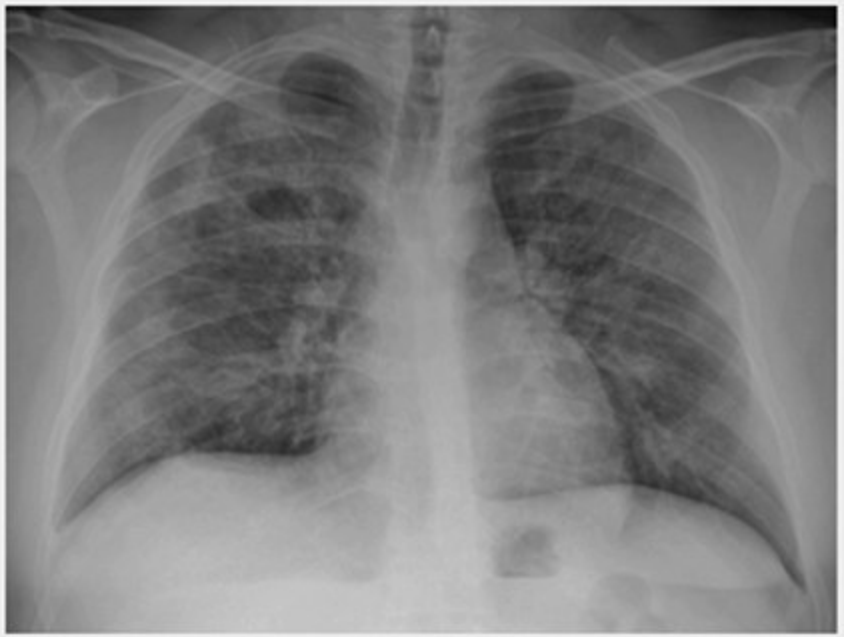
	ARDS	Kardiojenik Pulmoner Ödem
Kardiomegali	Unusual	Var
Kerley B	Unusual	Var
Masif plevral efüzyon	Unusual	Var
Opasiteler	Nadir	Diffüz
Hiler bulanıklık	Infrequent	Var



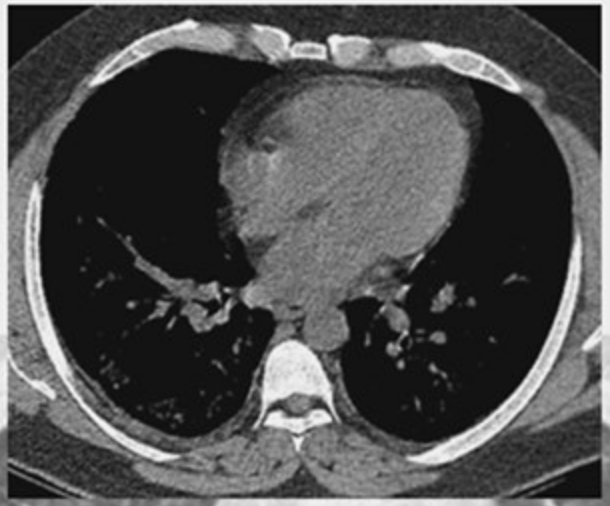


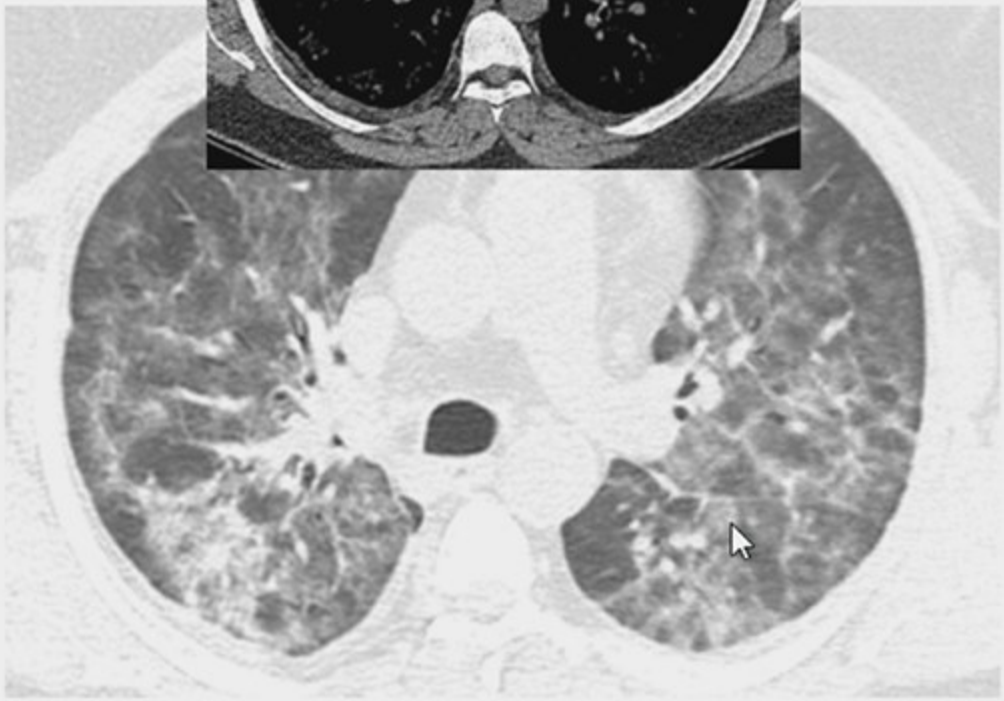


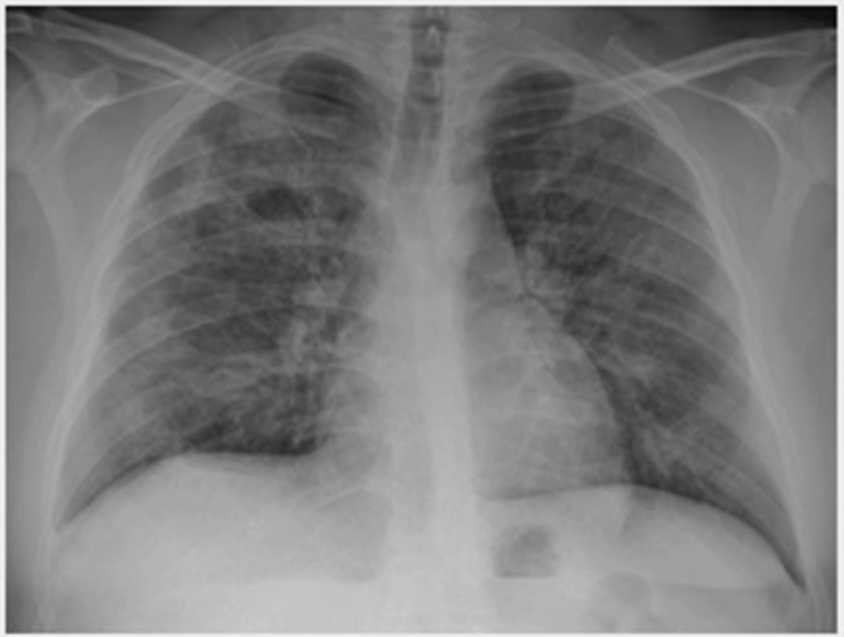




Diffüz Pnömoni

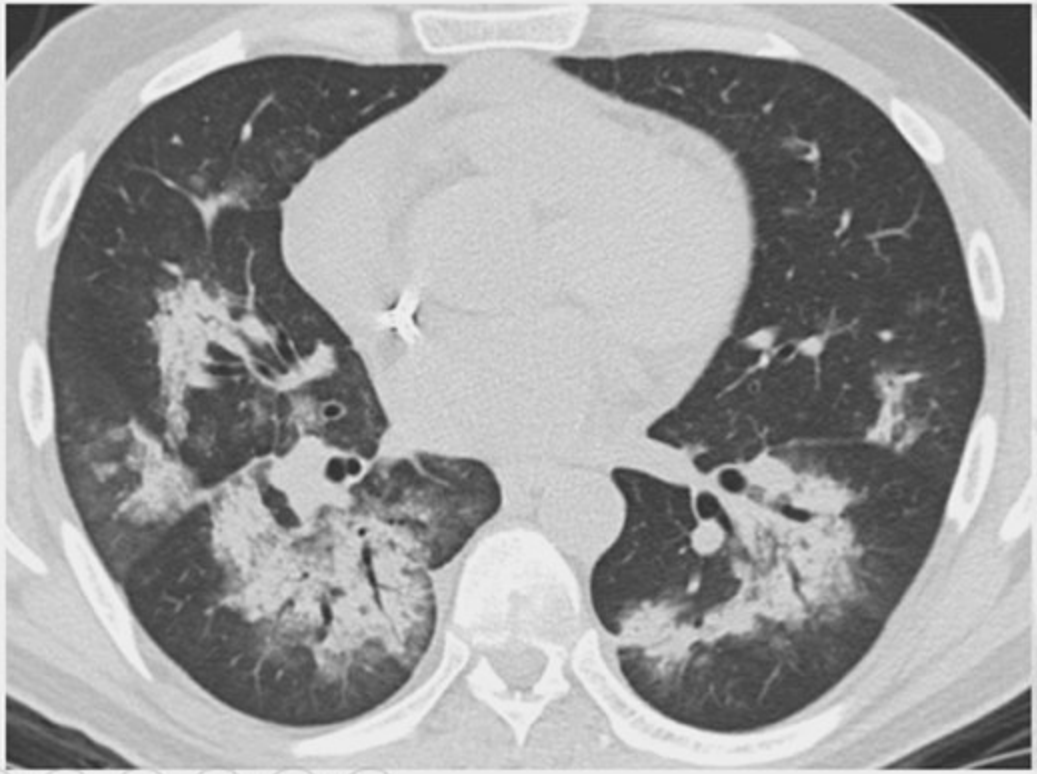


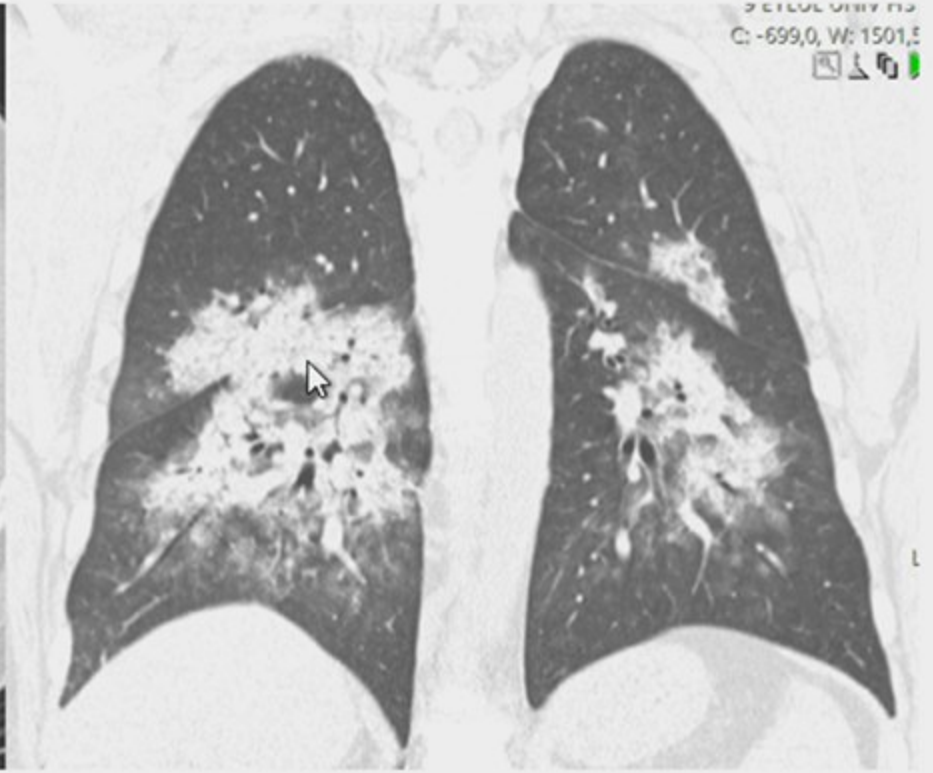




Diffüz Pnömoni

Diffüz Pnömoni





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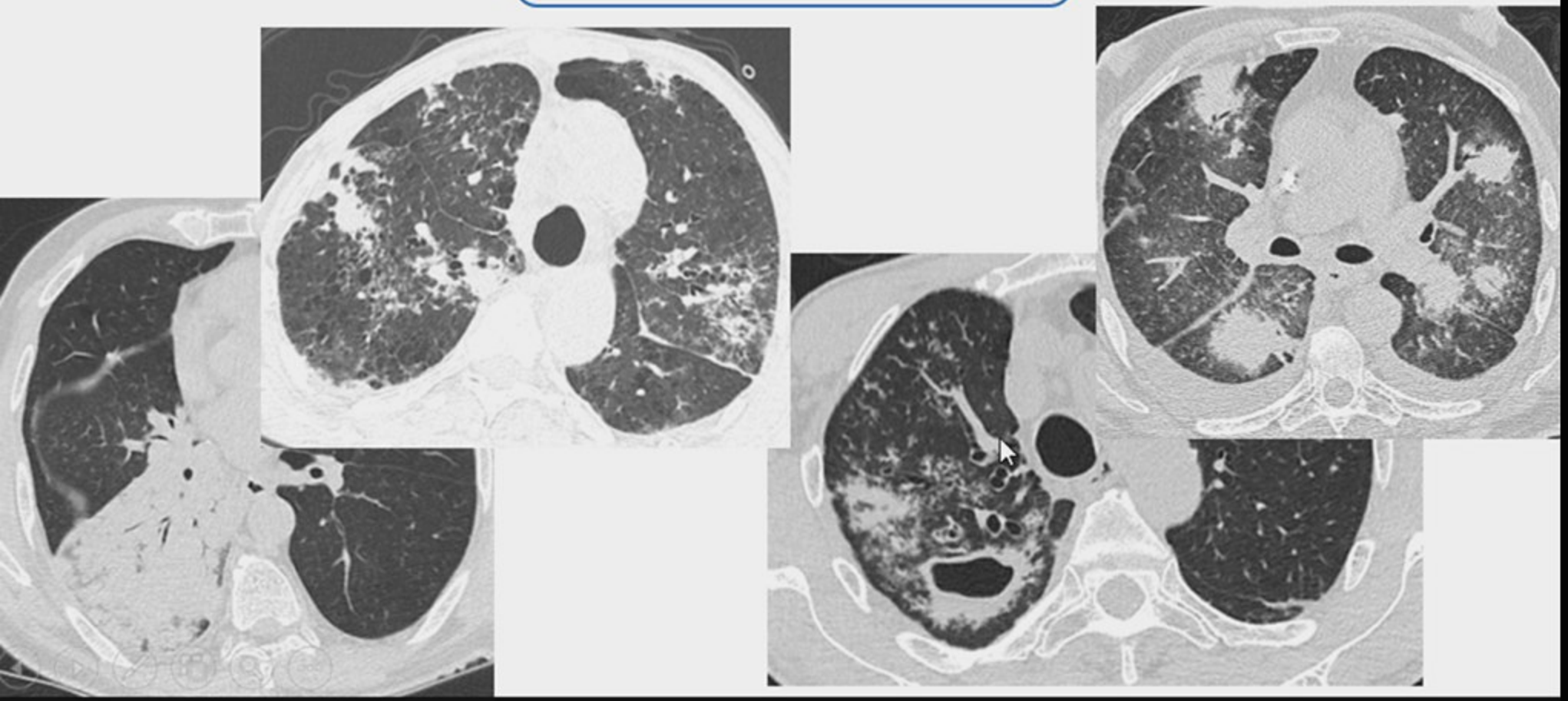
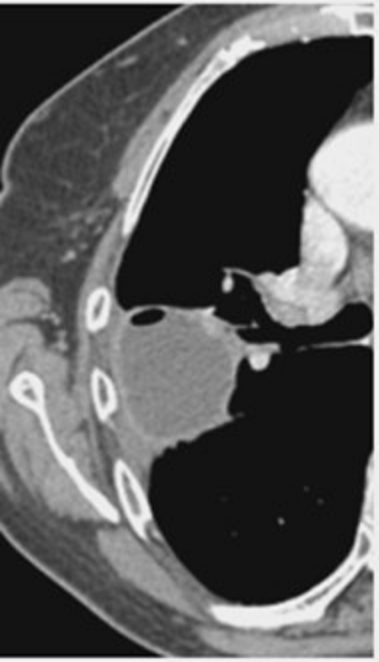
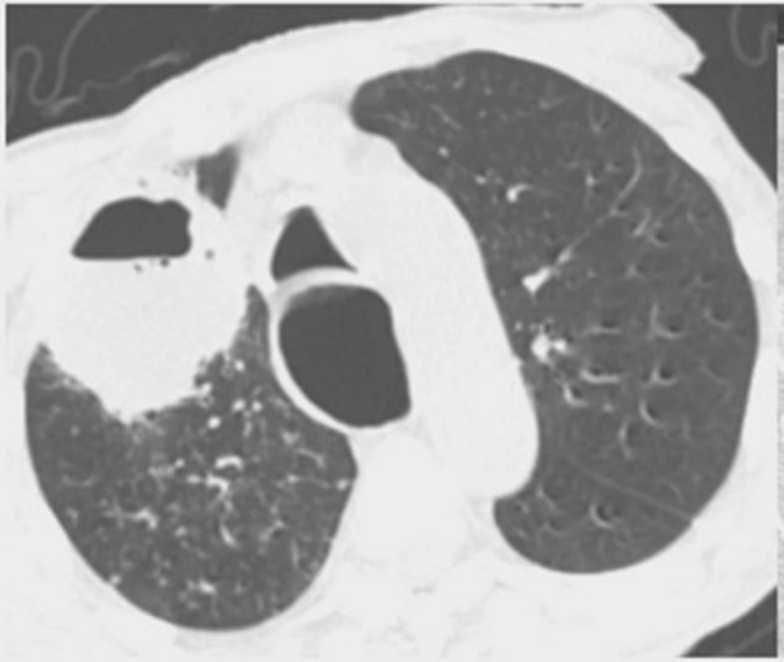
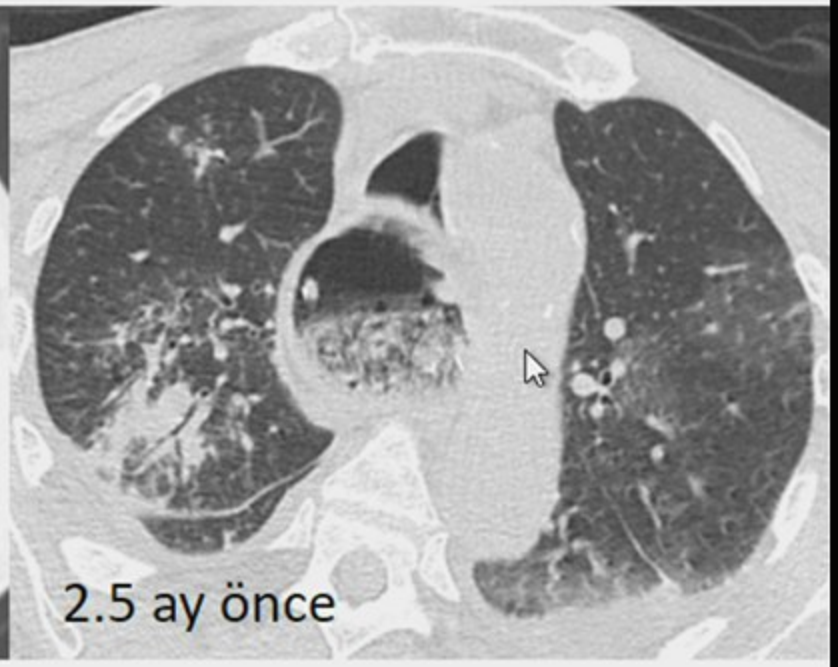


Akciğer Absesi







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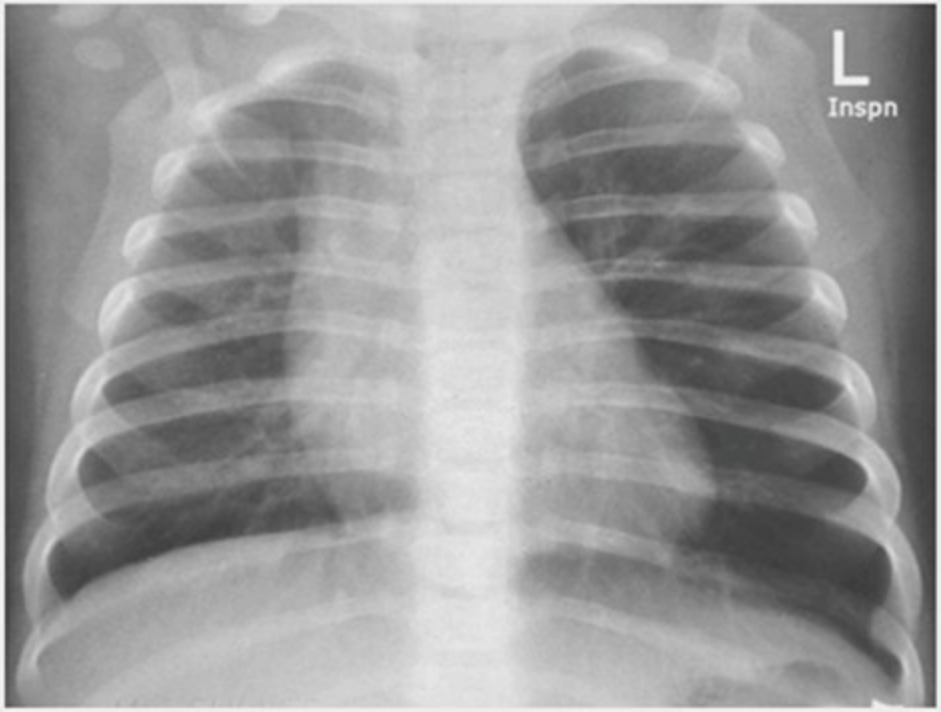
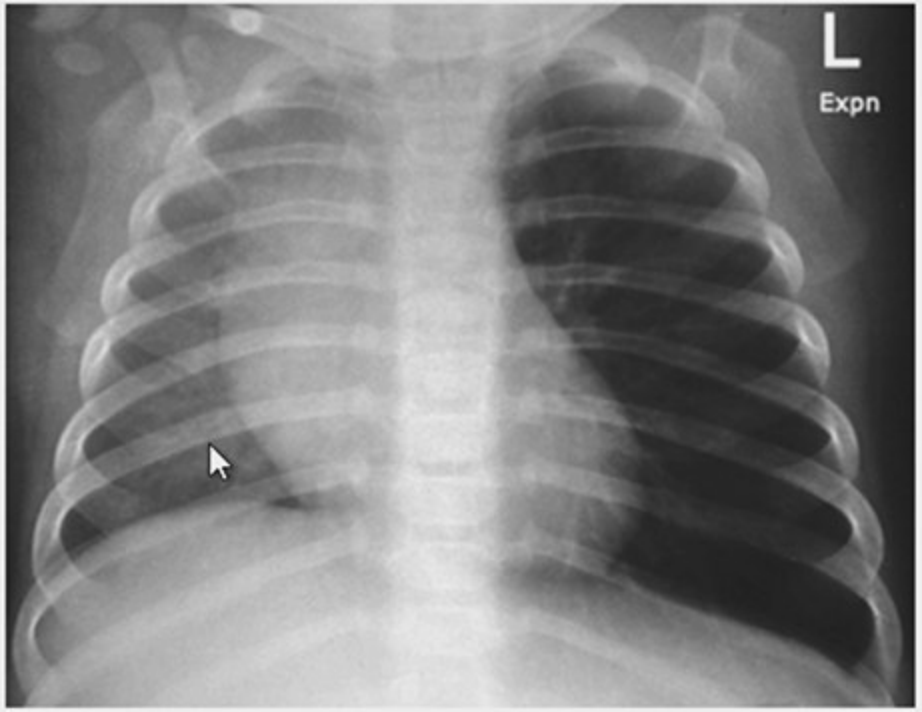
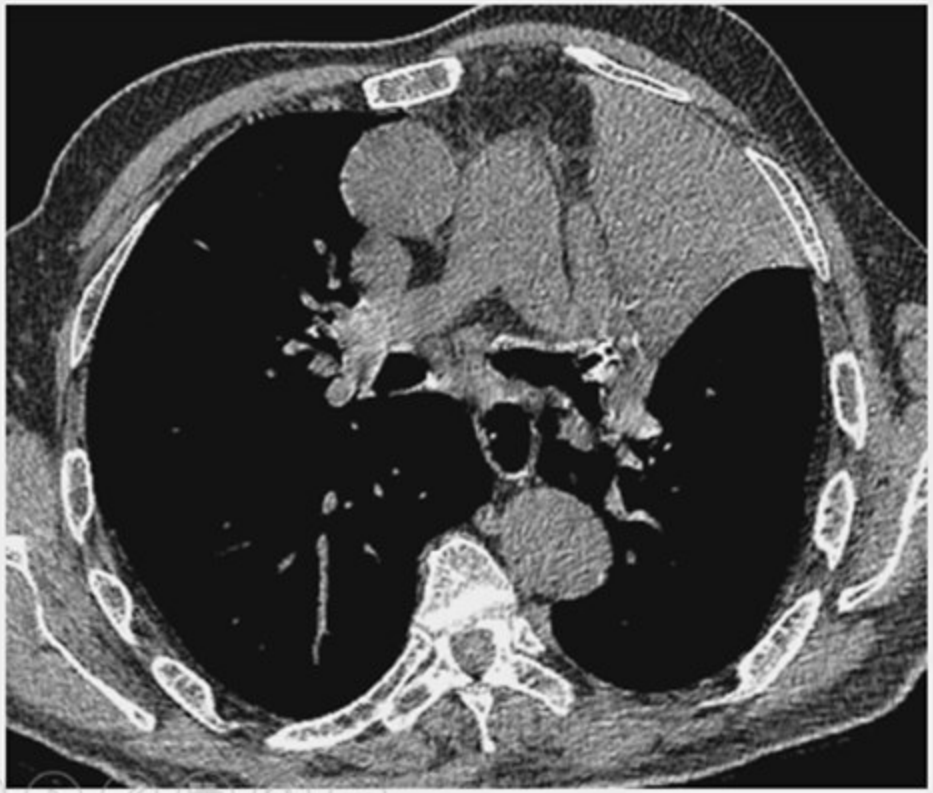
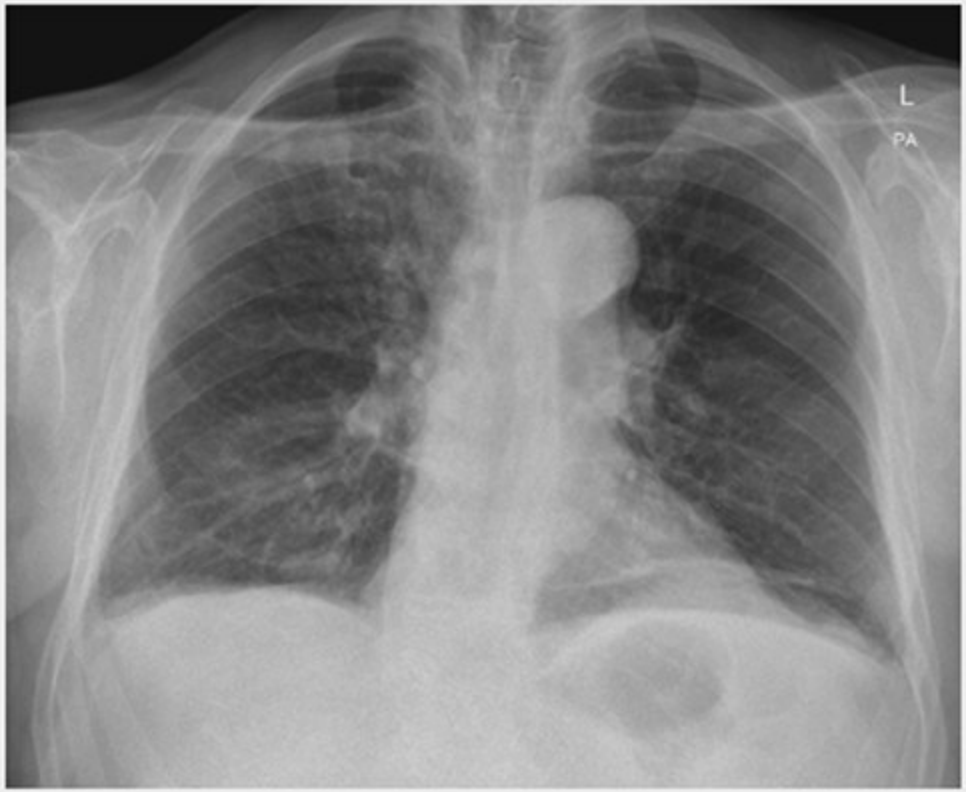
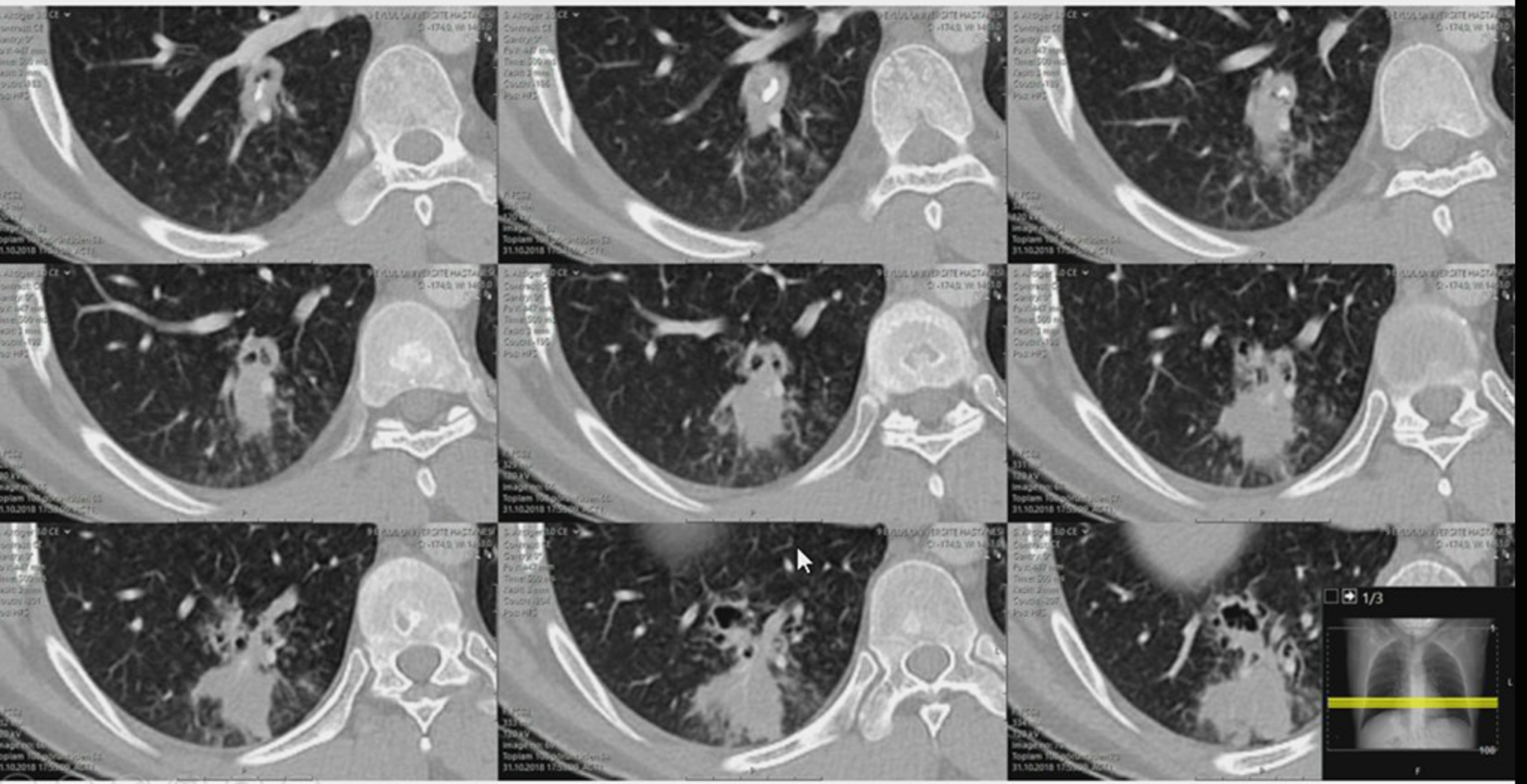




Yabancı Cisim Aspirasyonu



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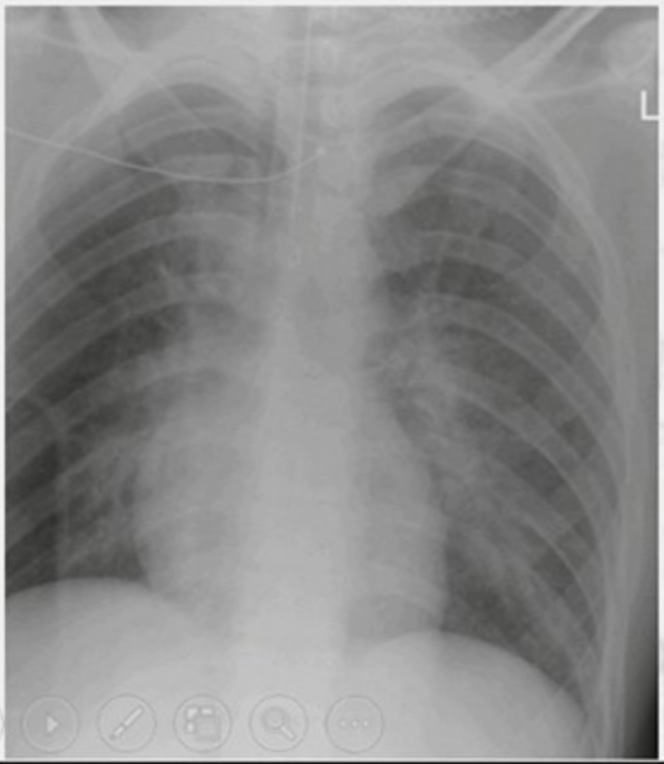
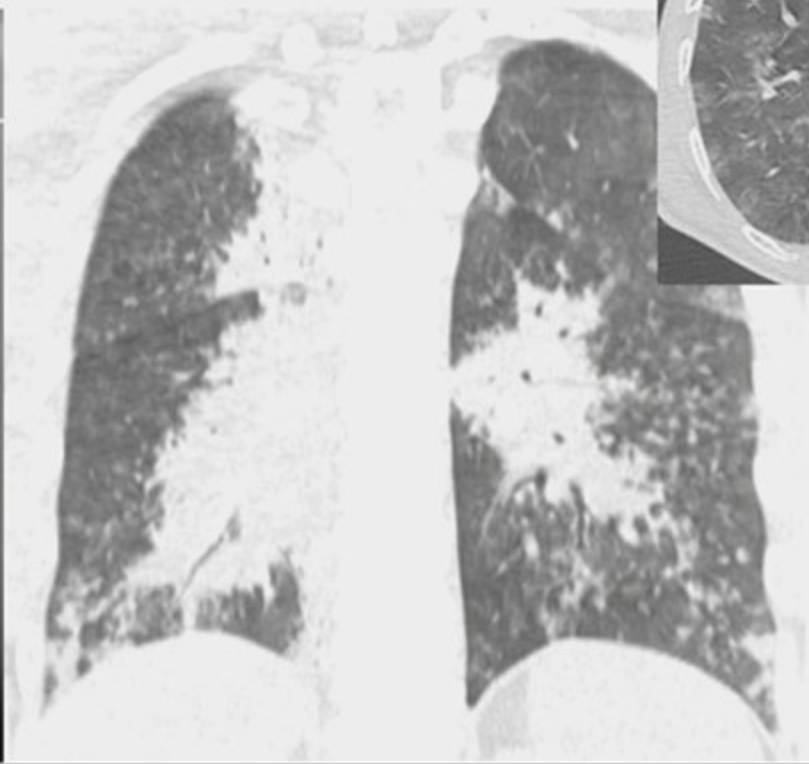
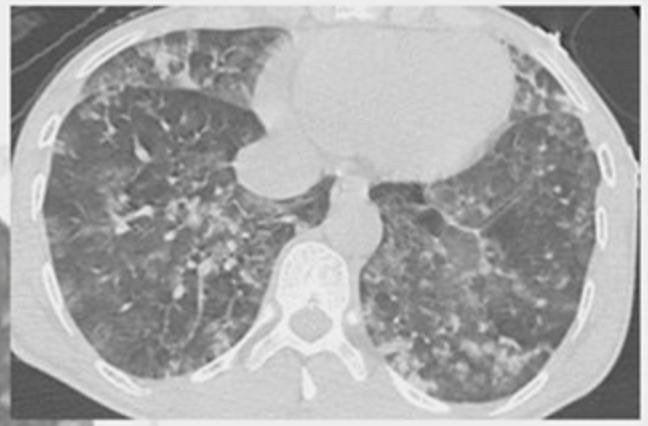
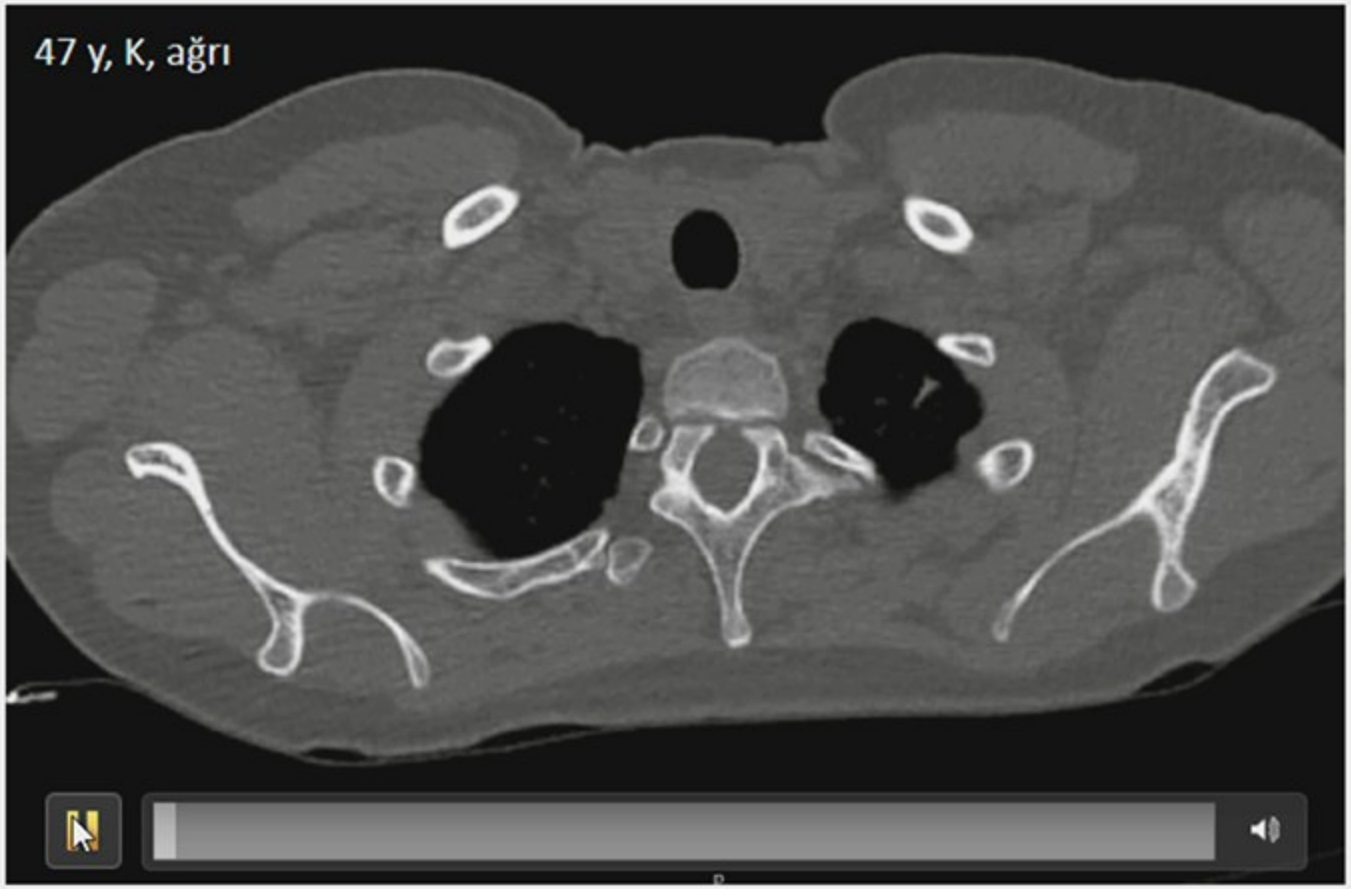
Boğulayazma





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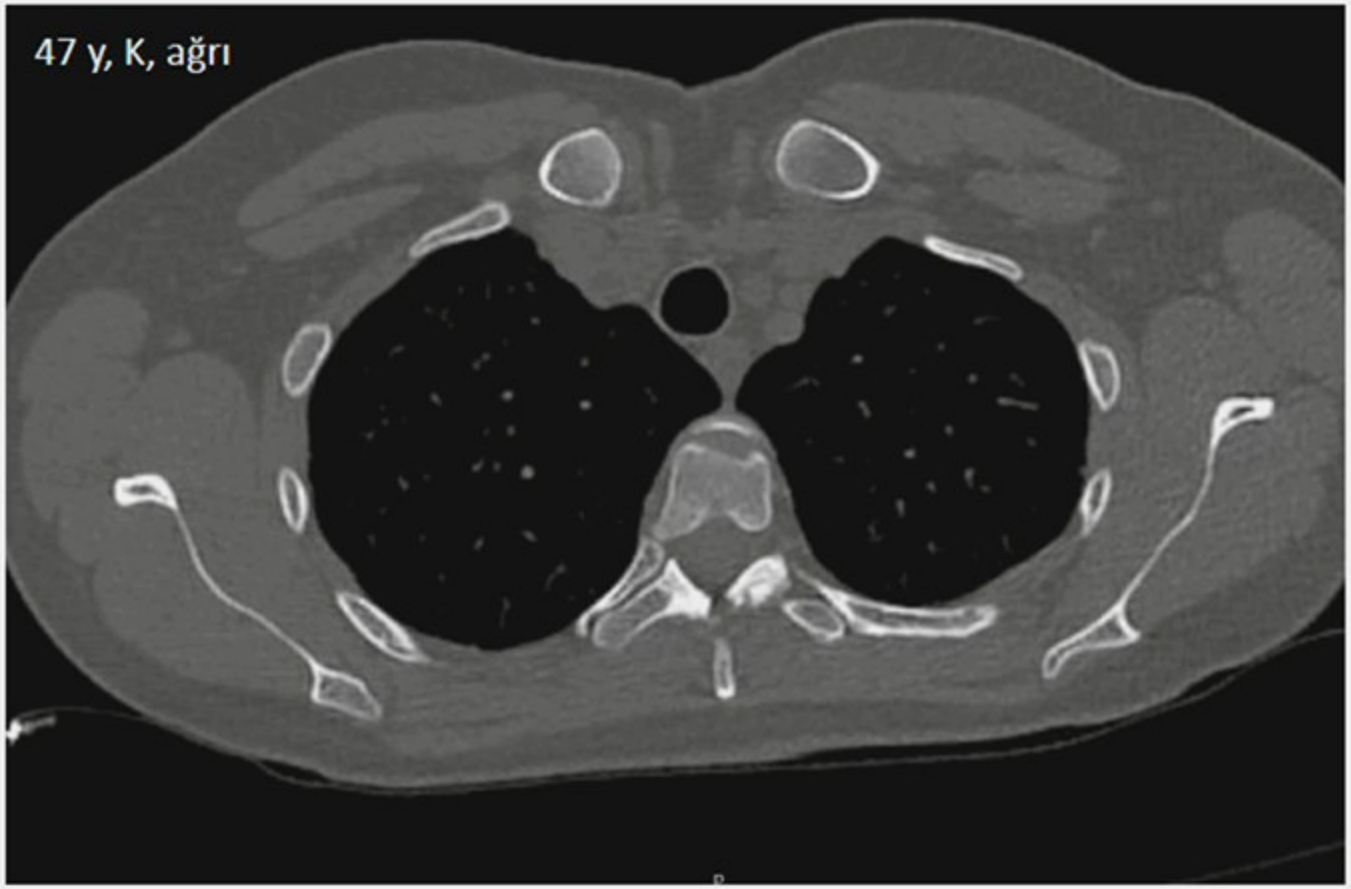
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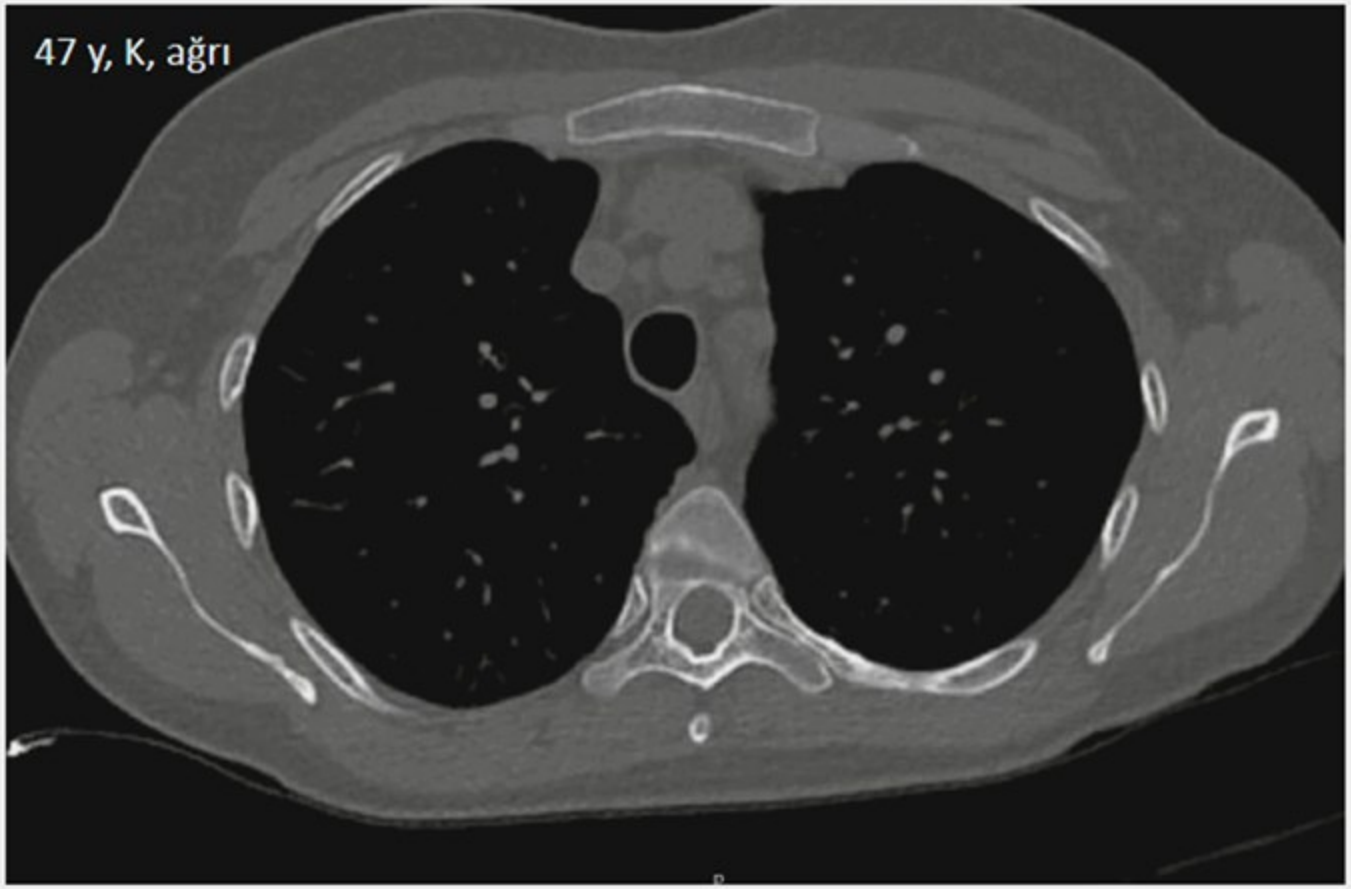
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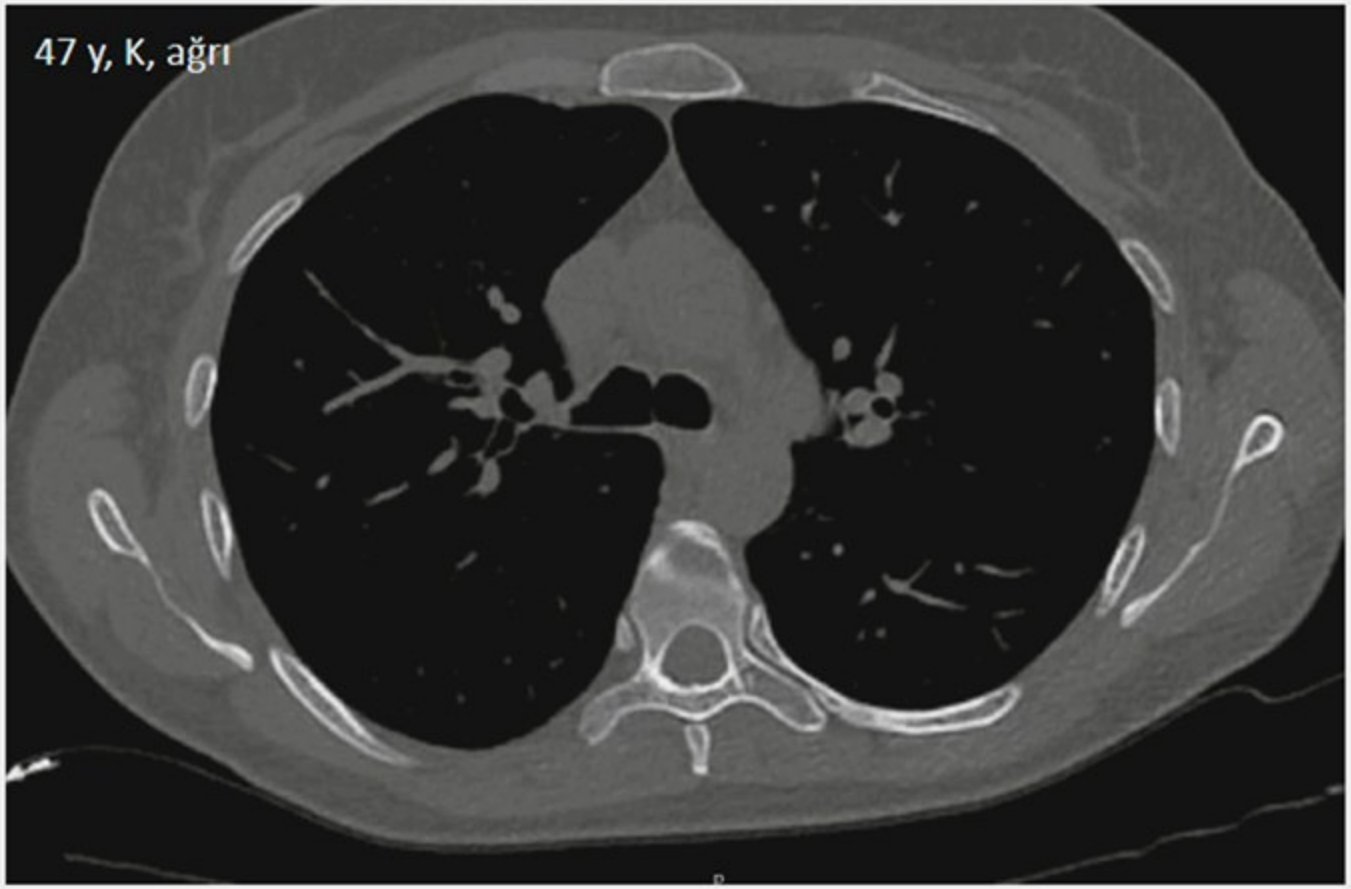
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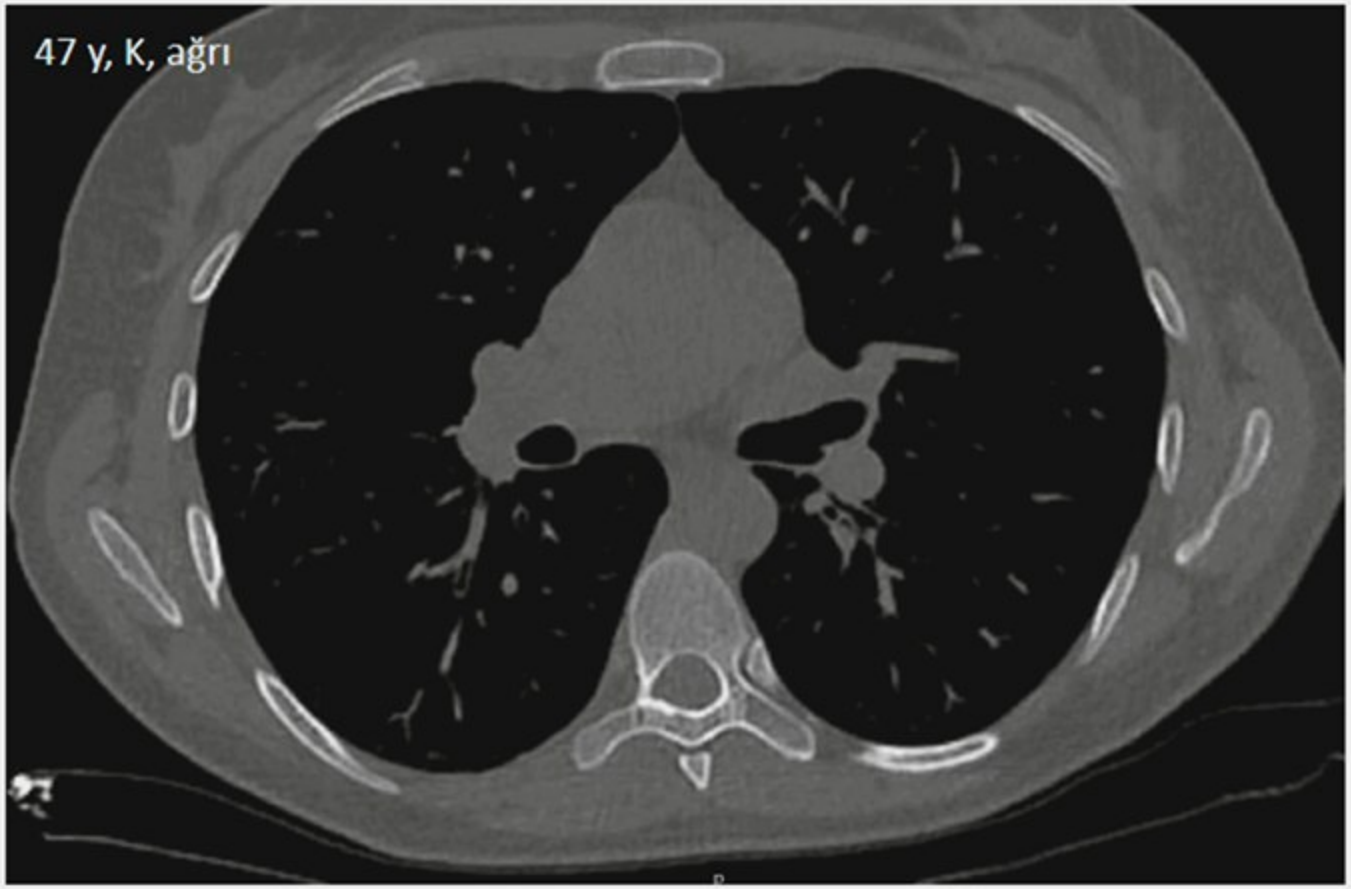
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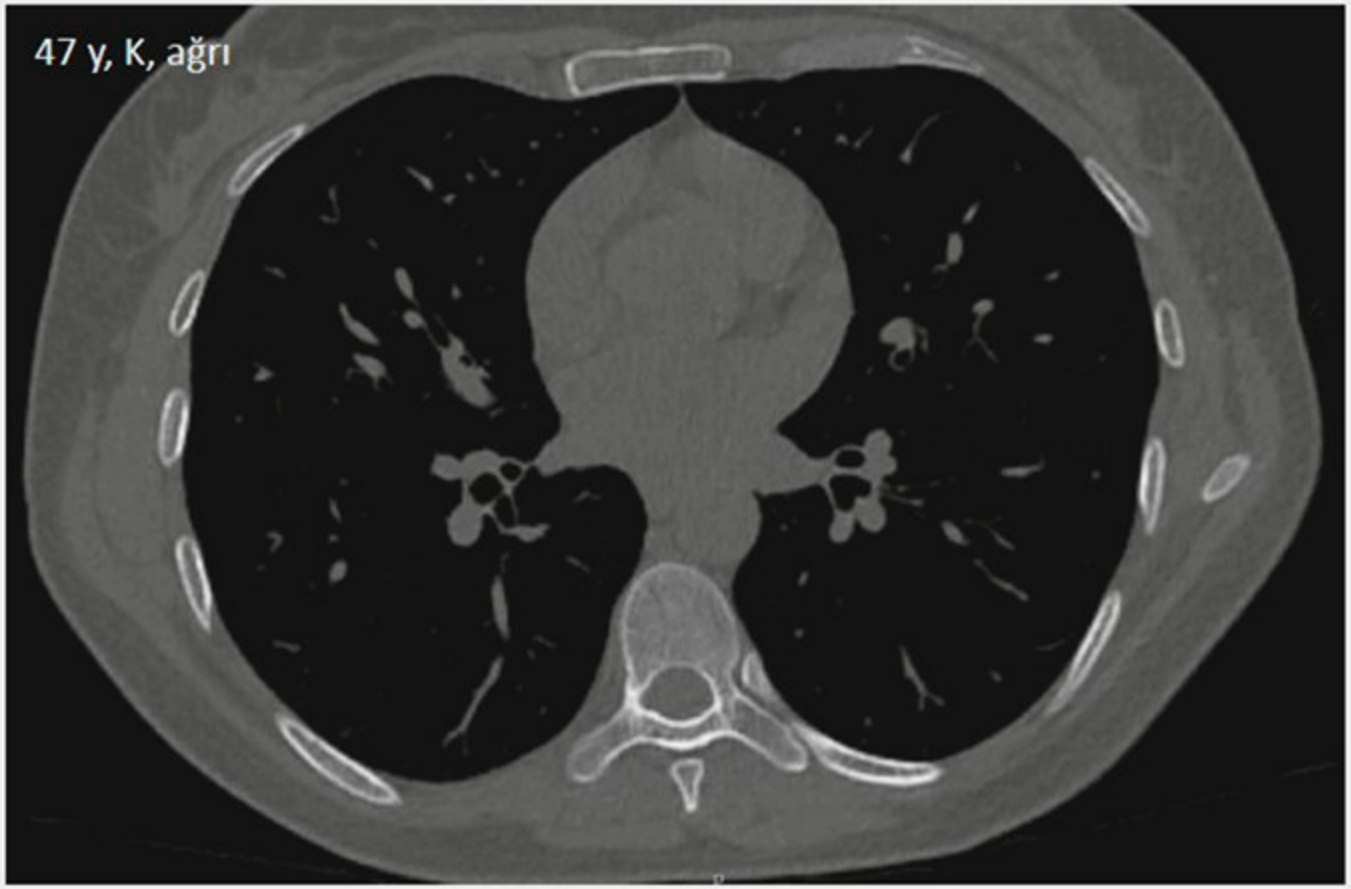
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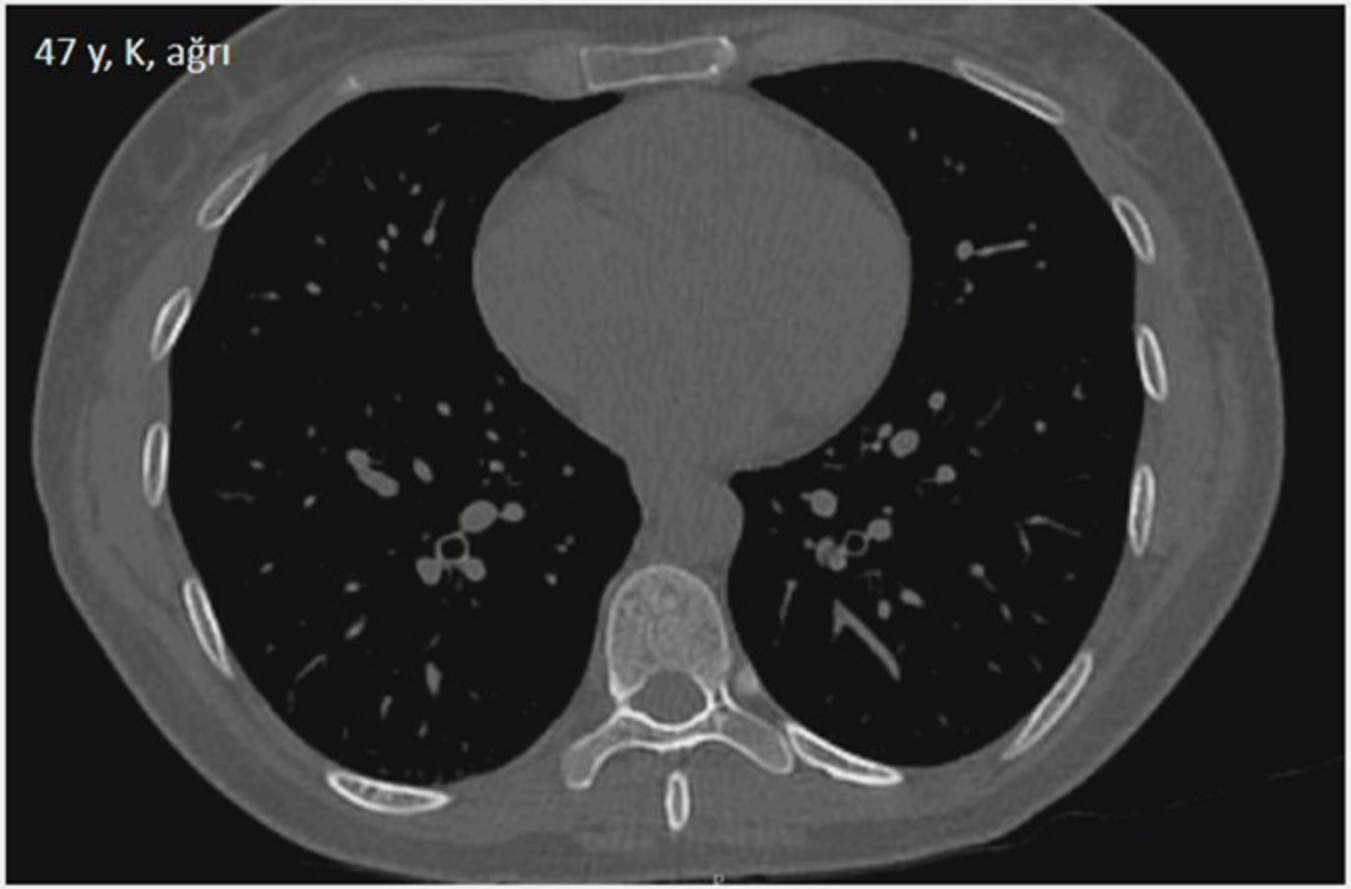
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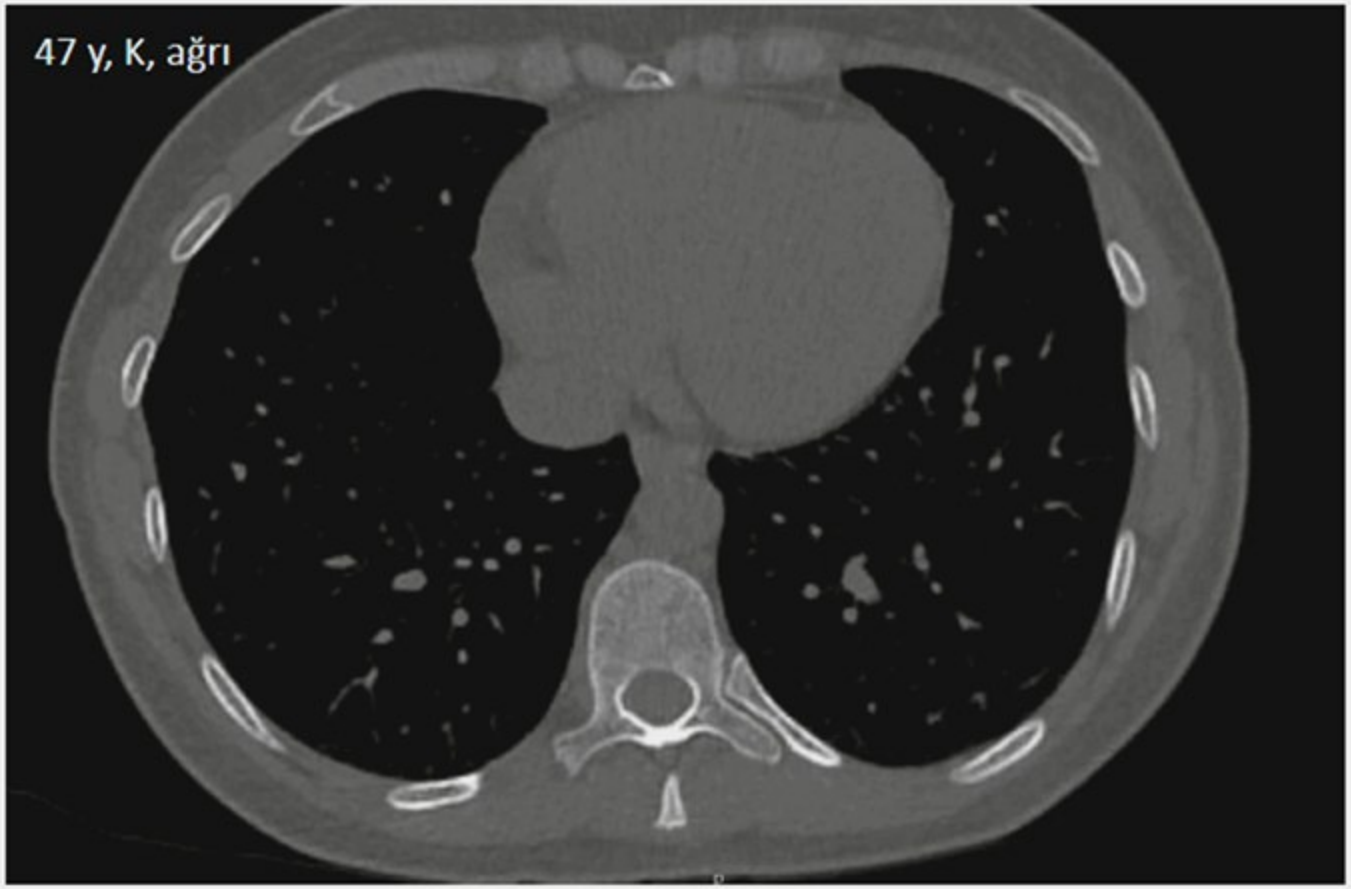
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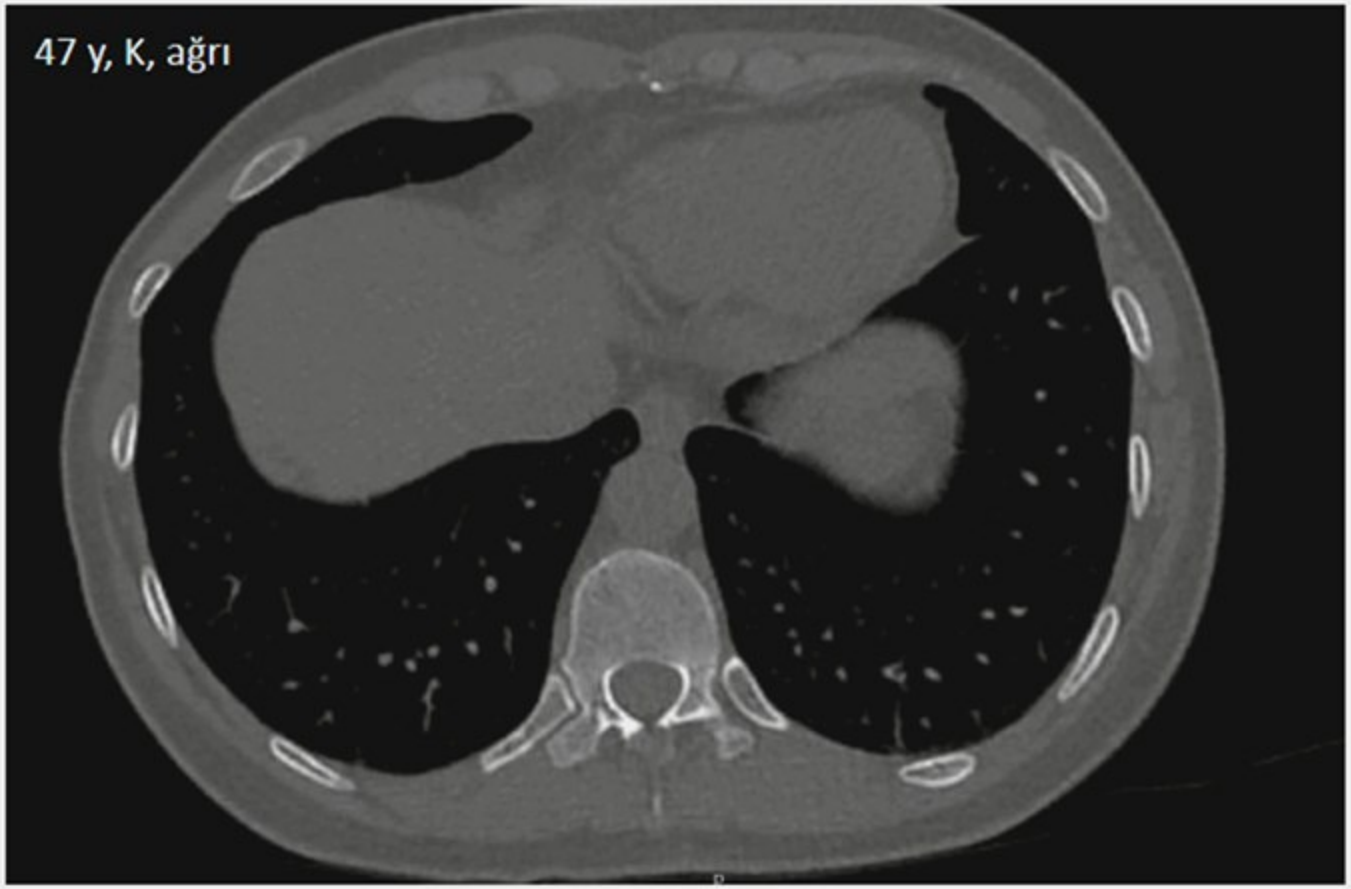
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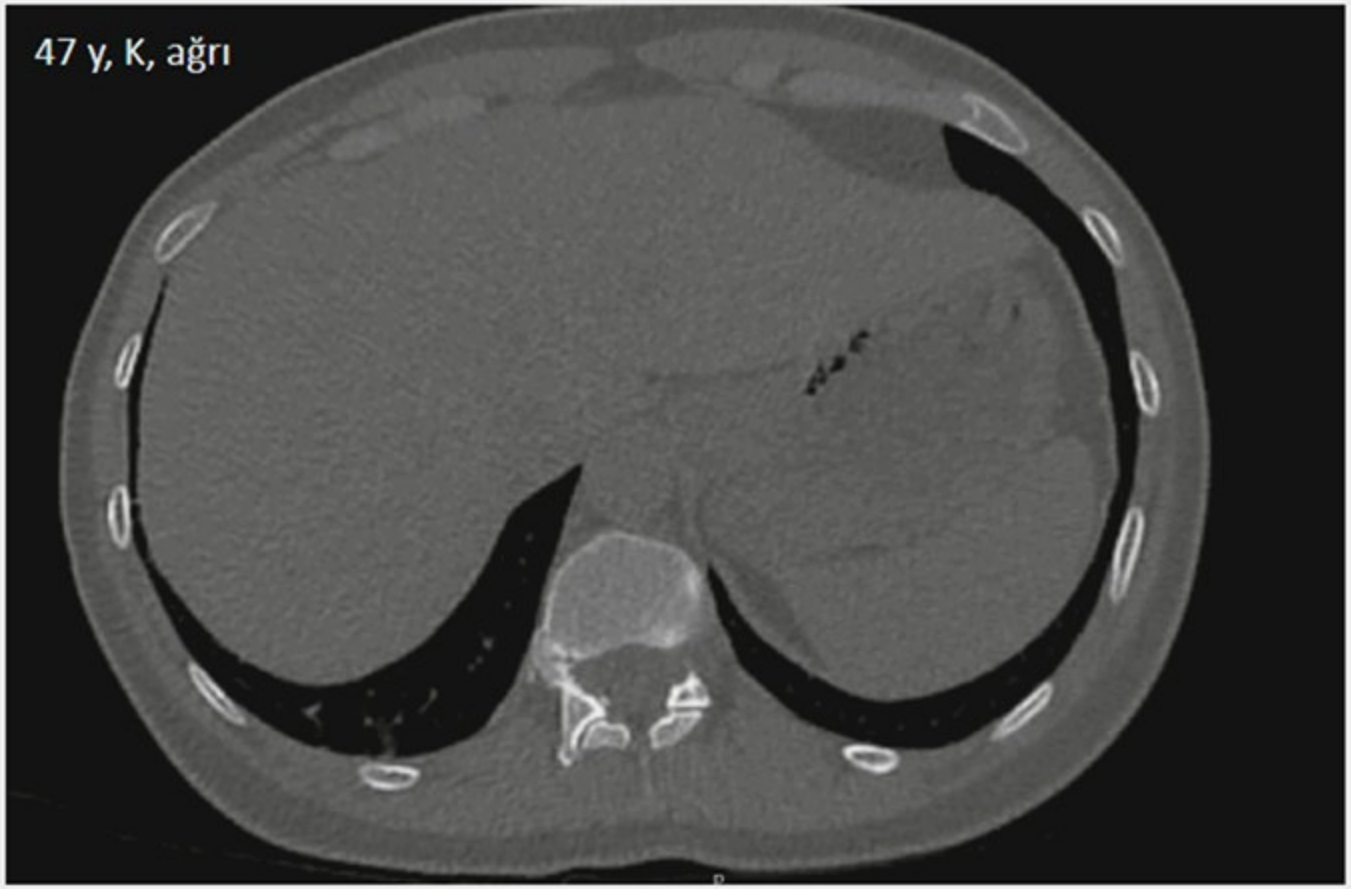
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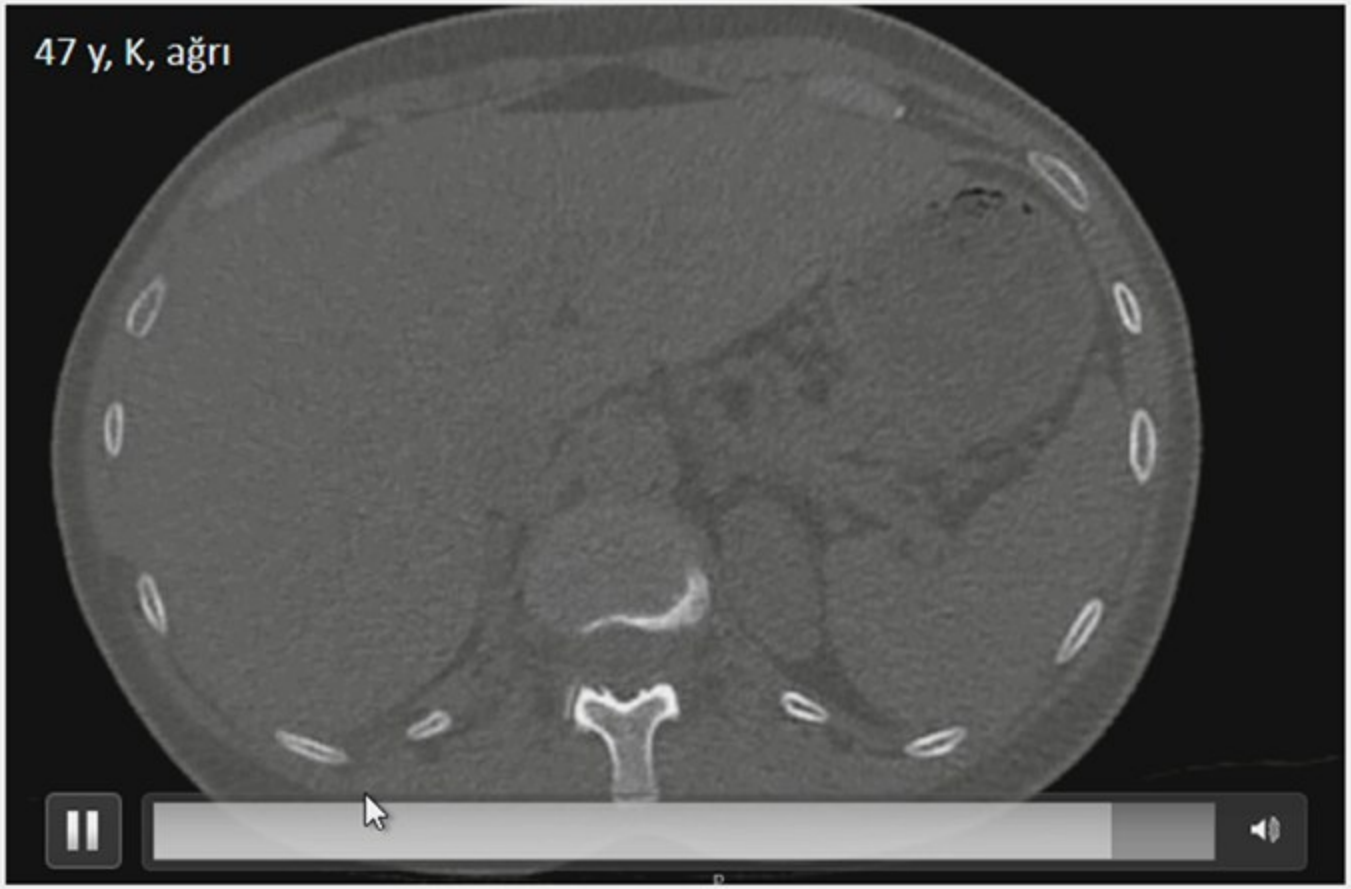
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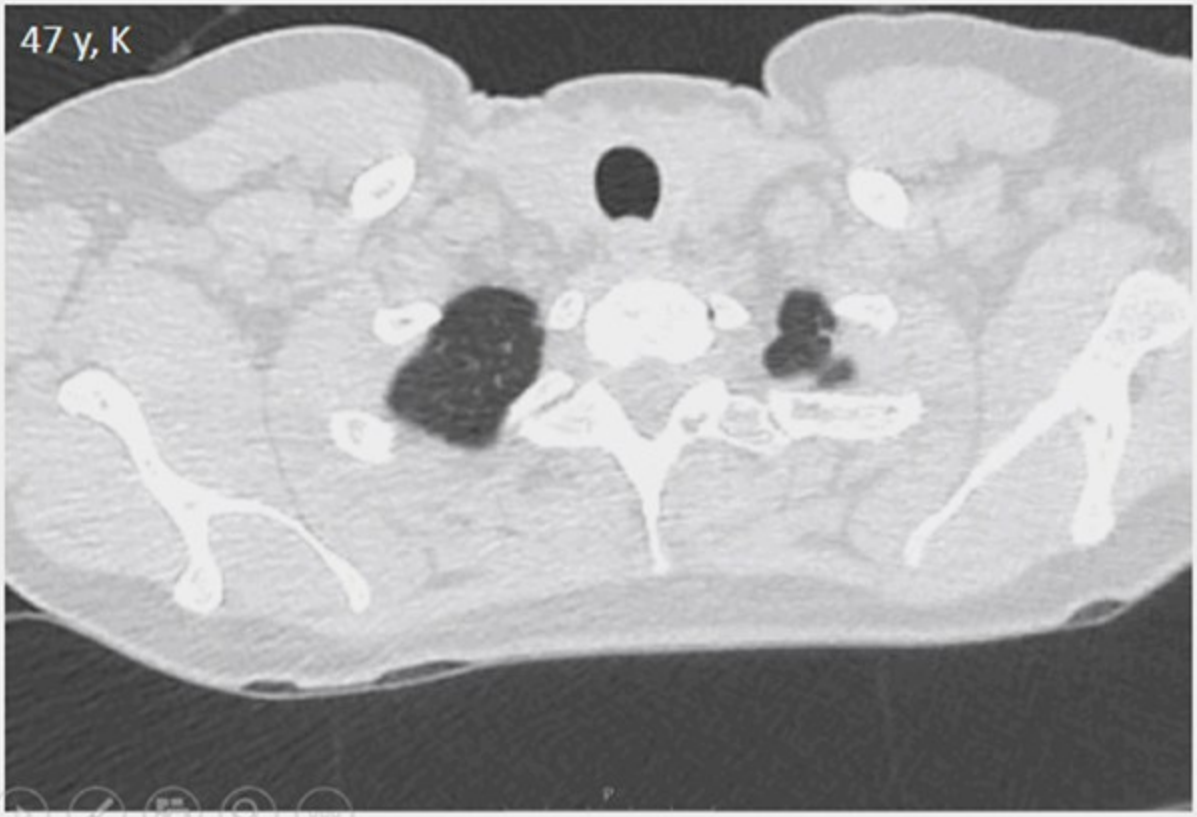
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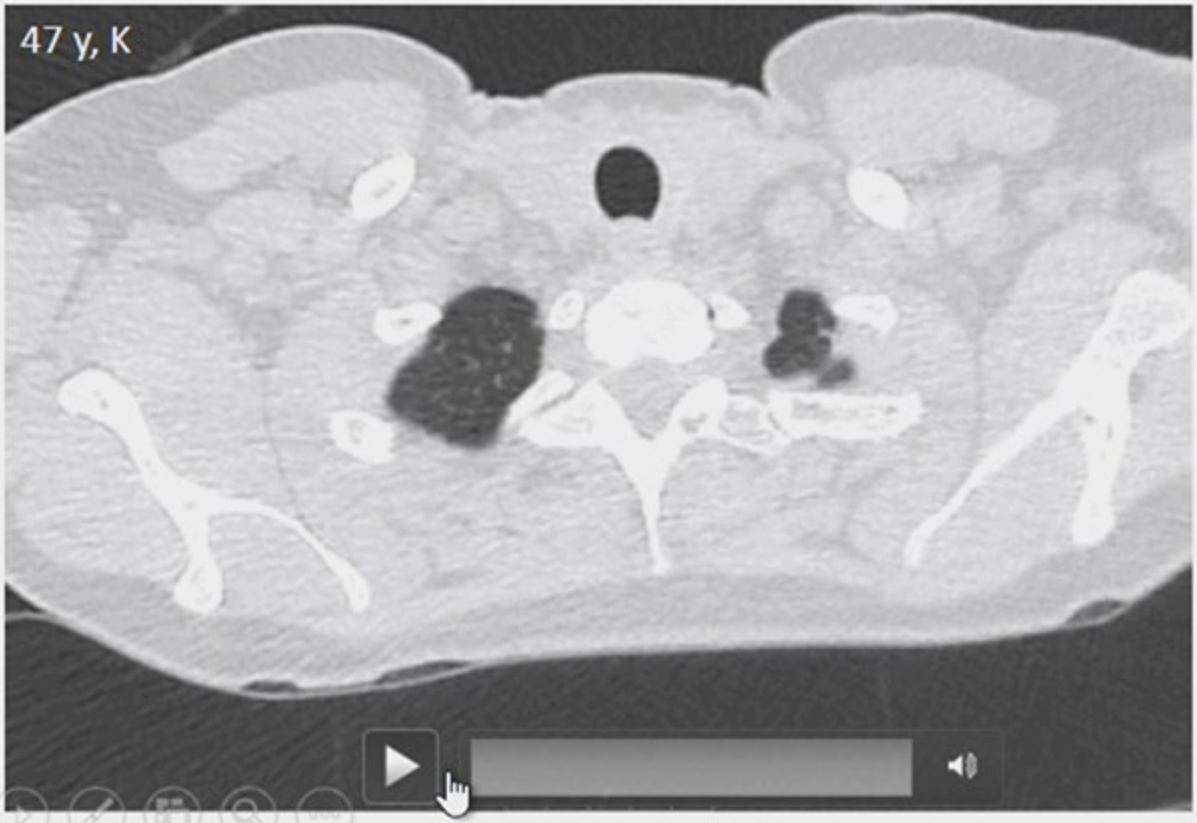
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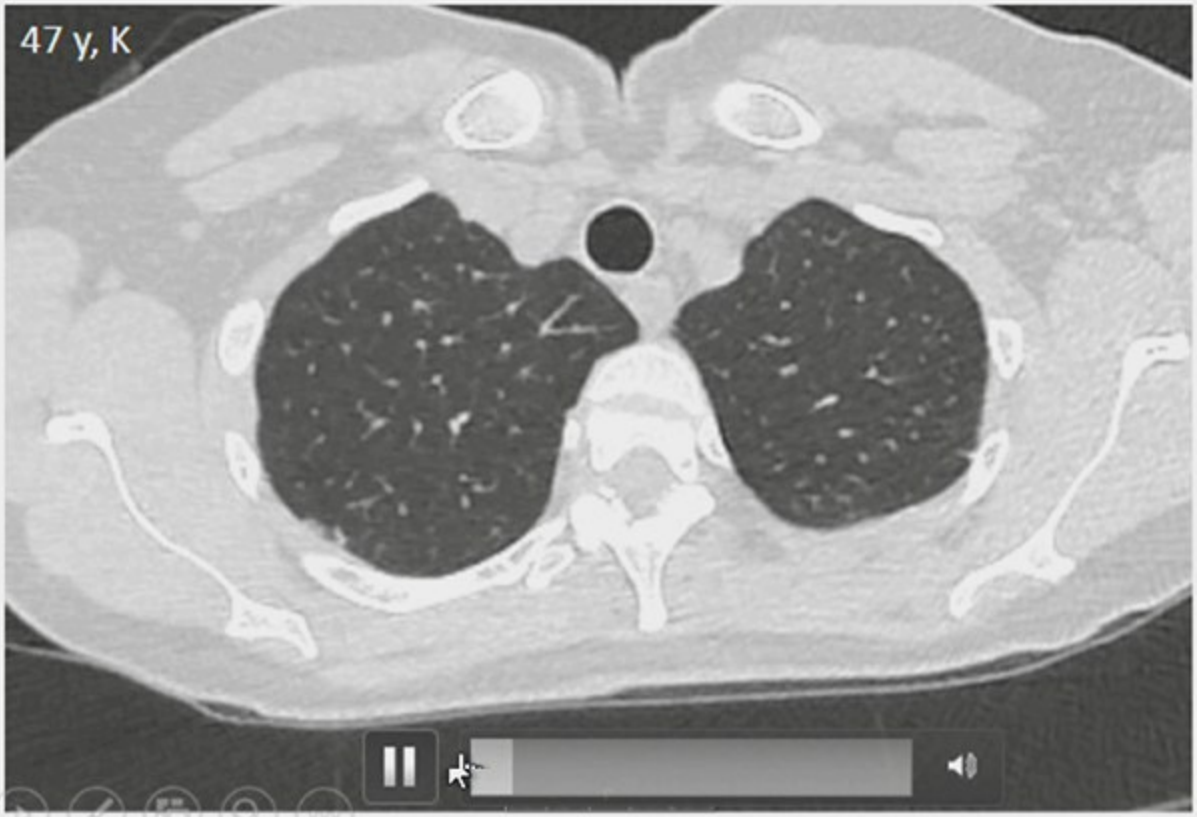
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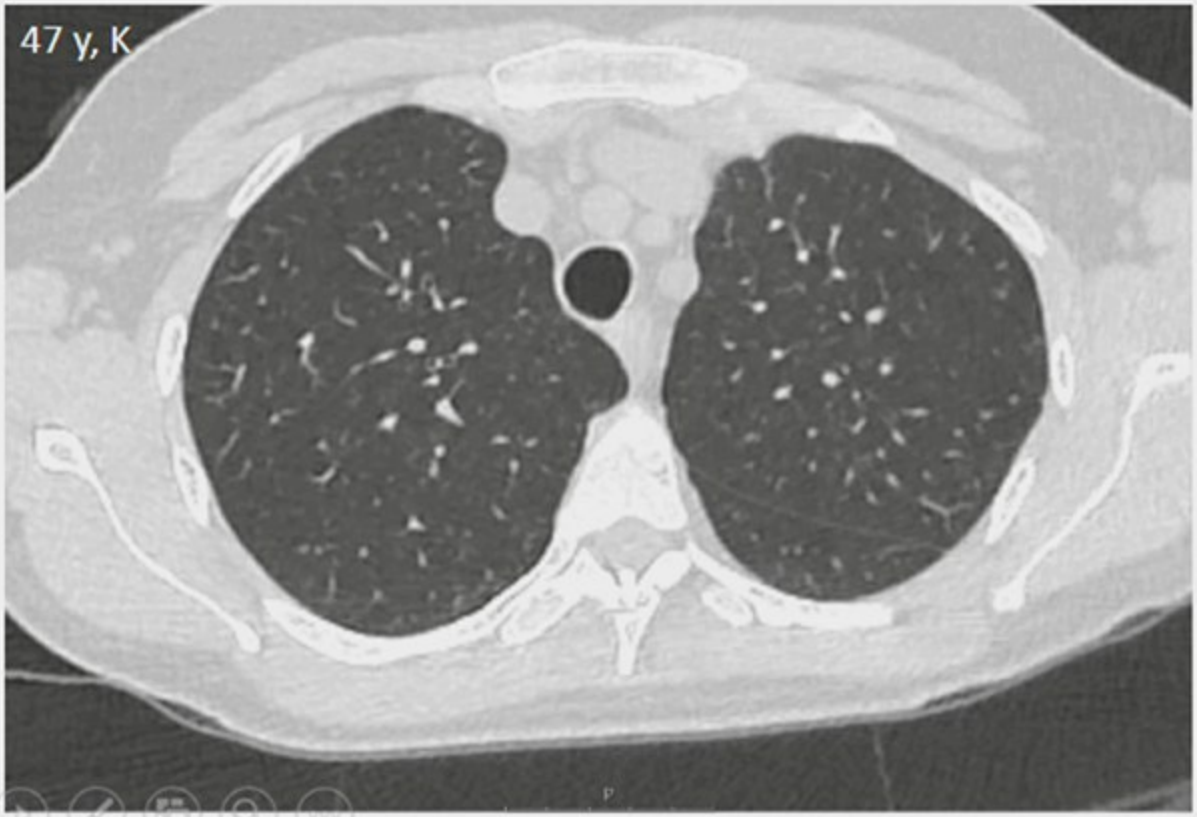
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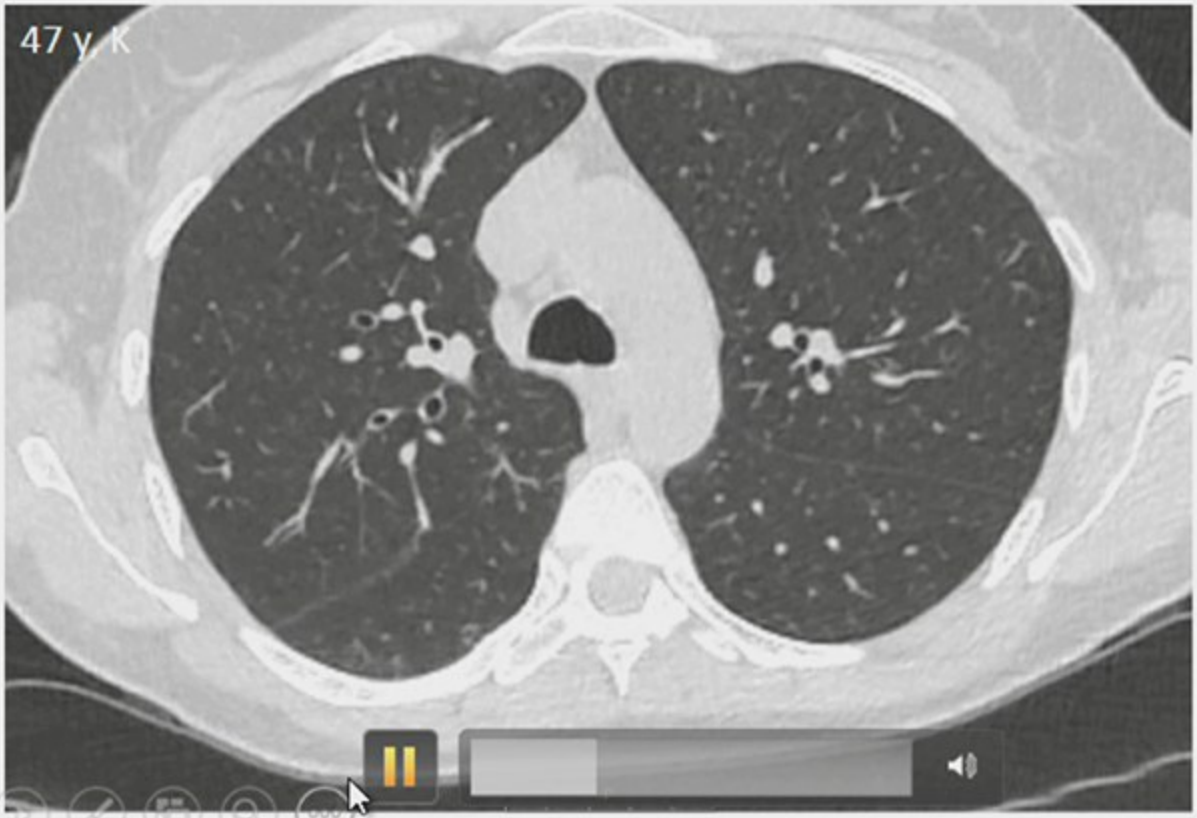
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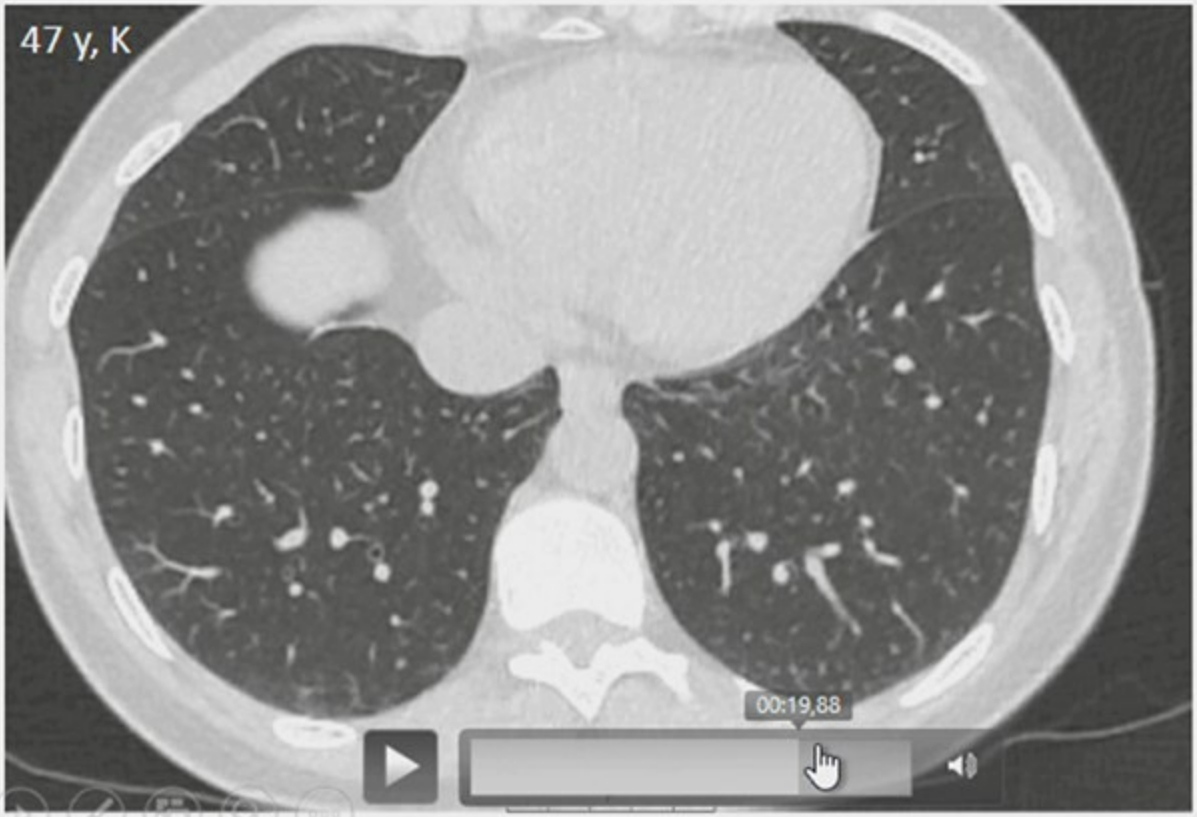
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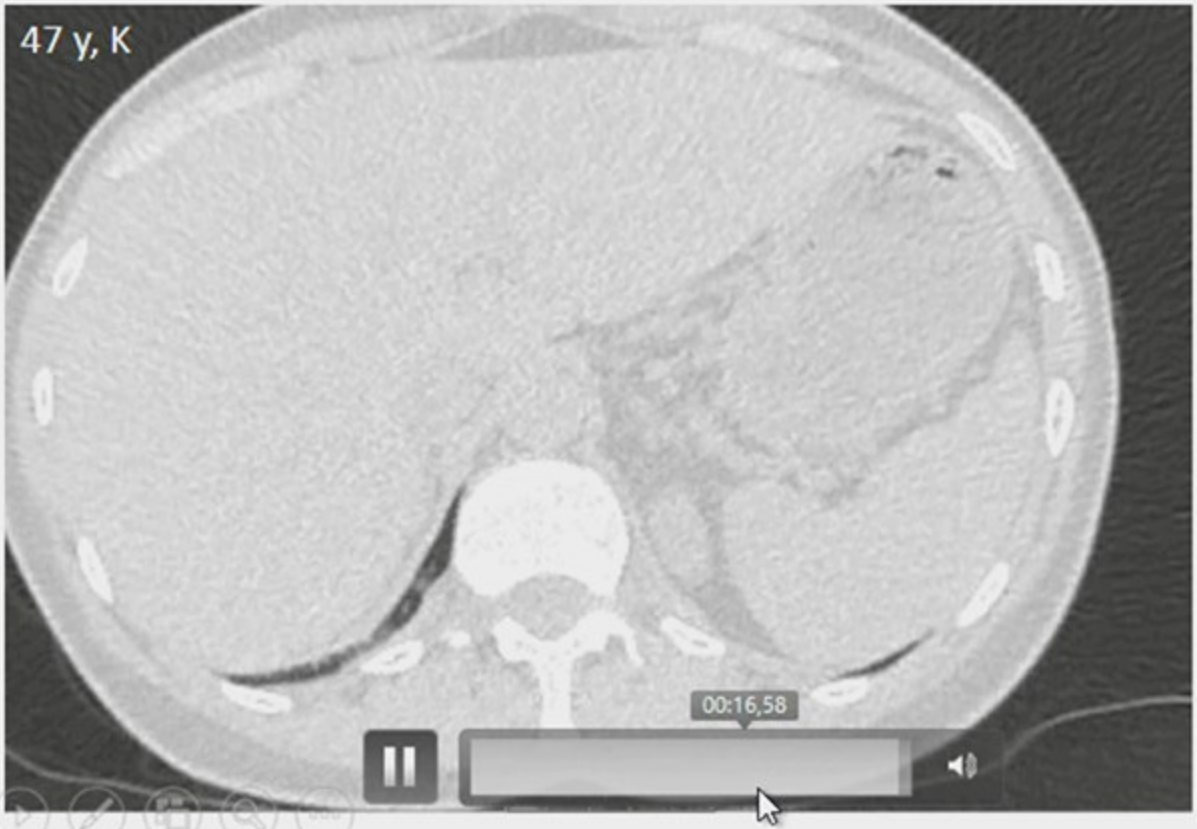
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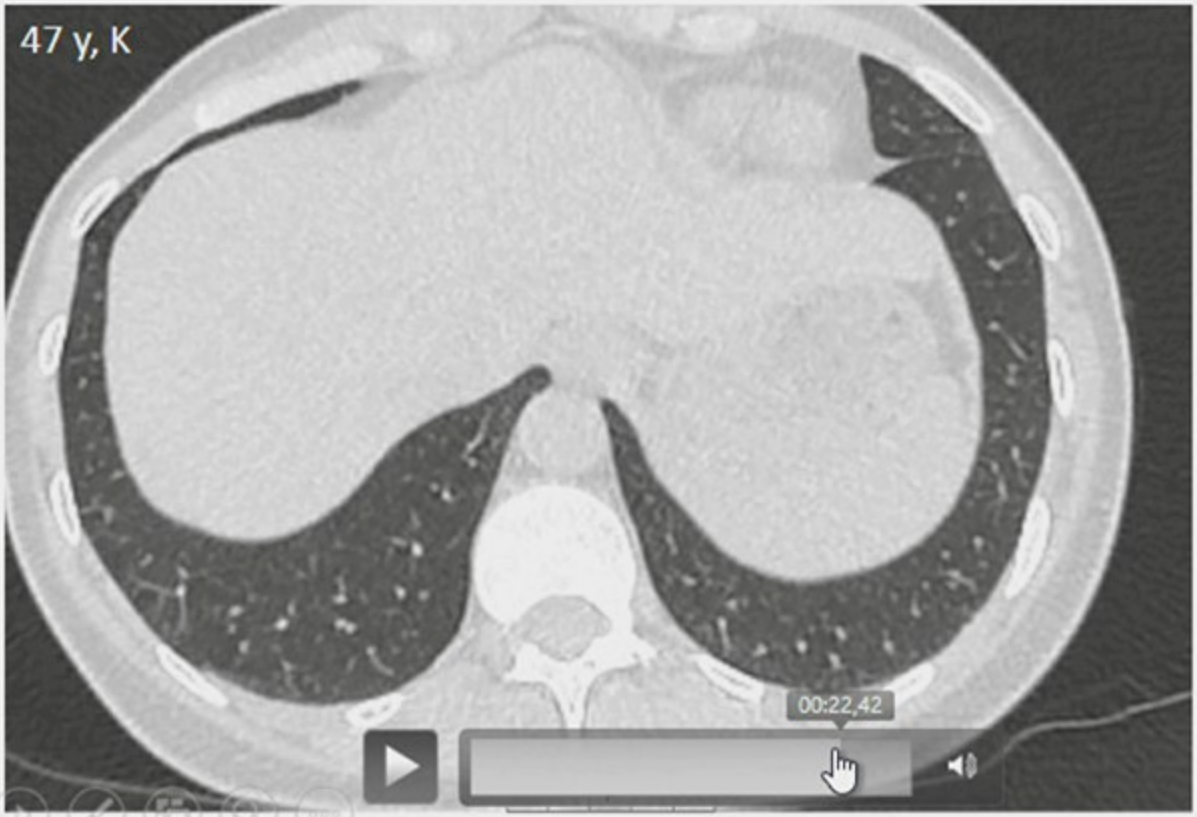
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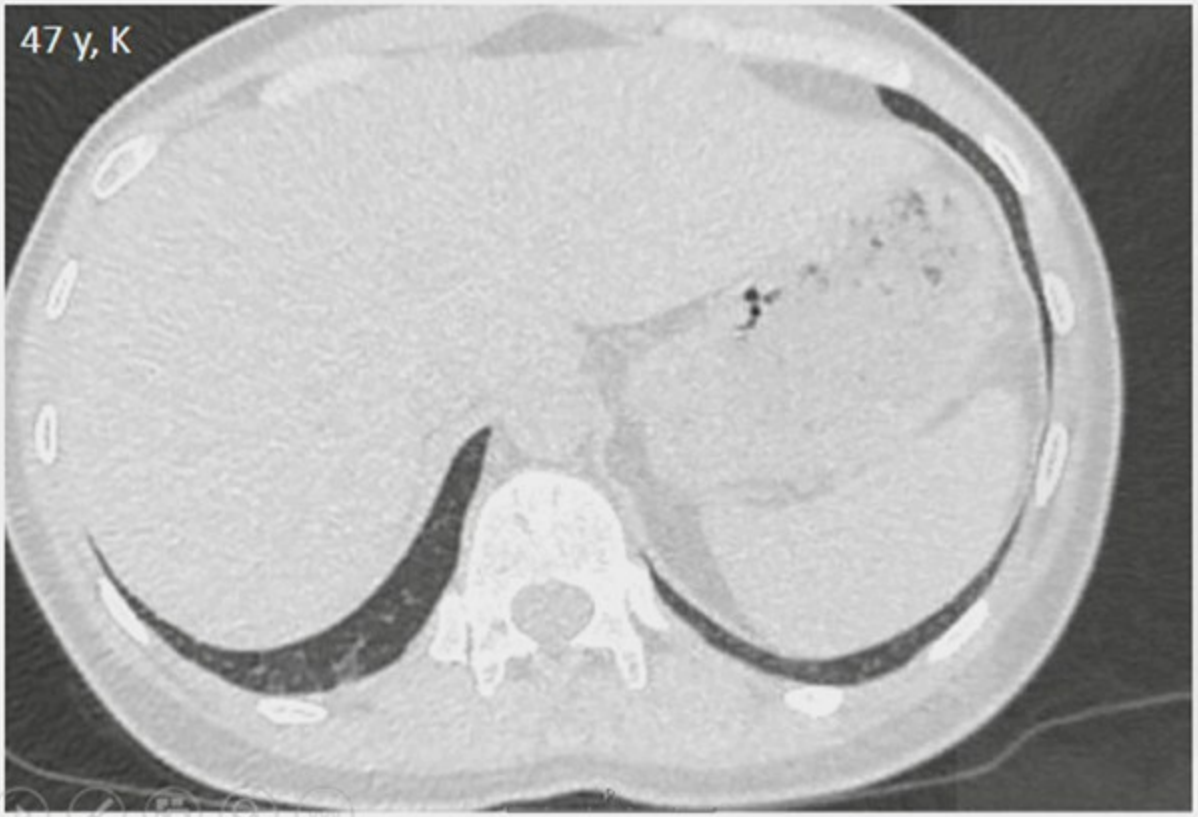
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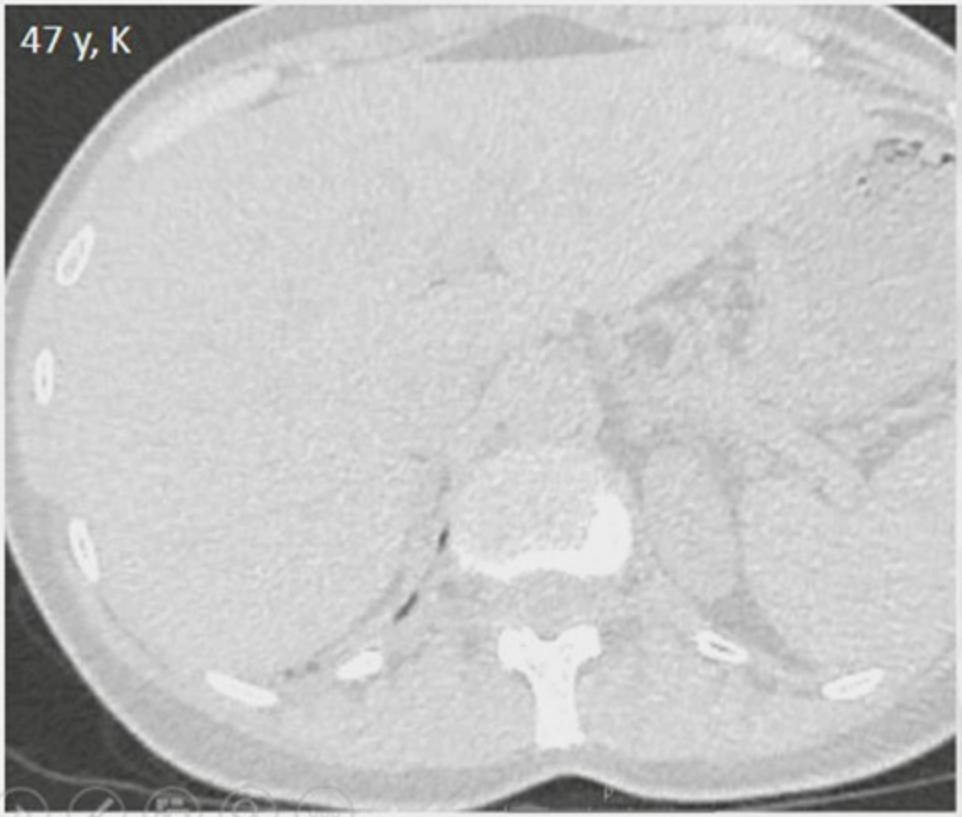
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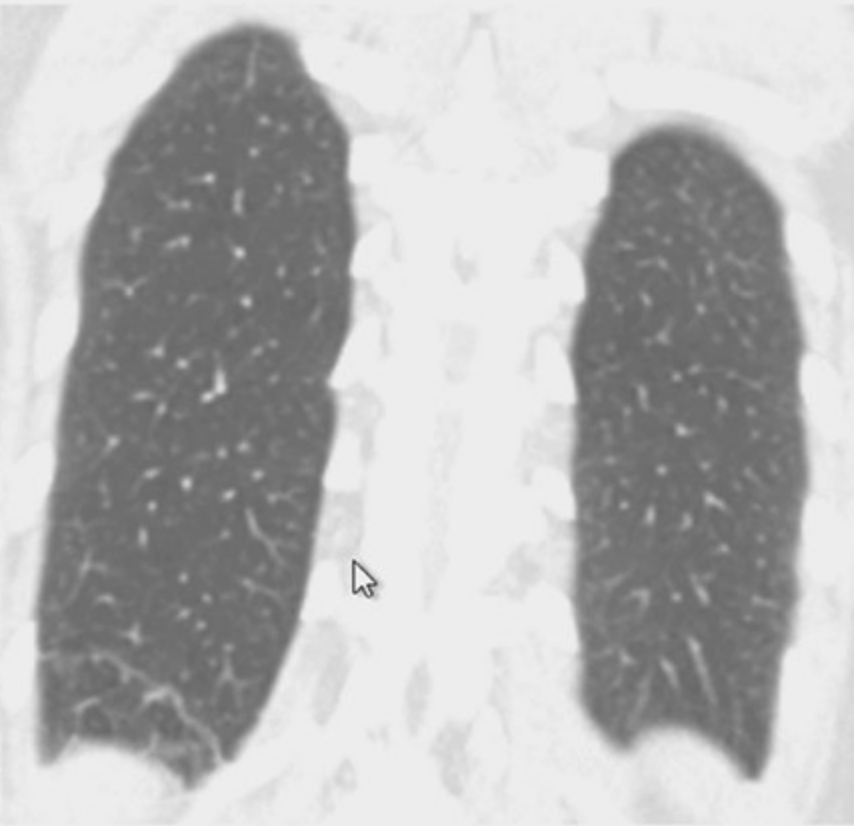

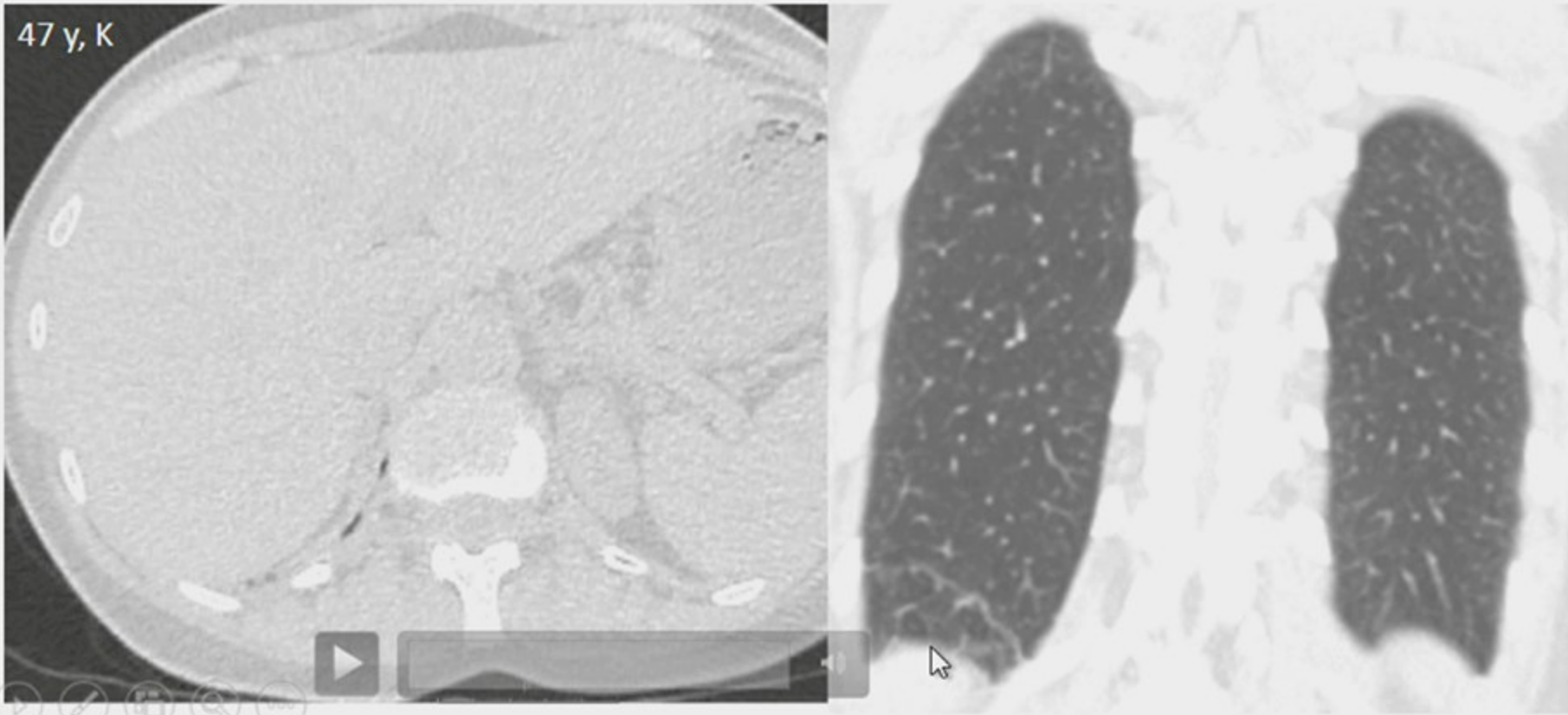
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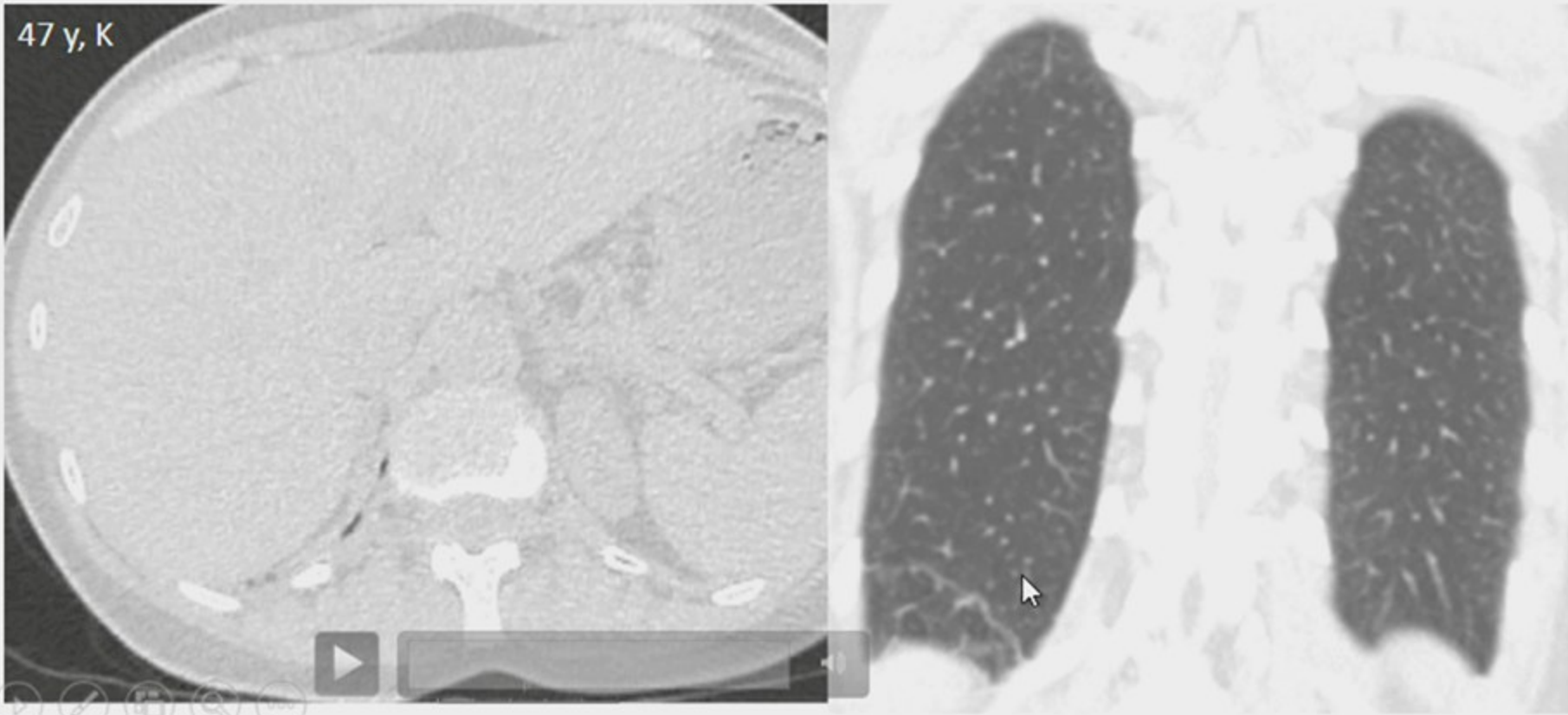
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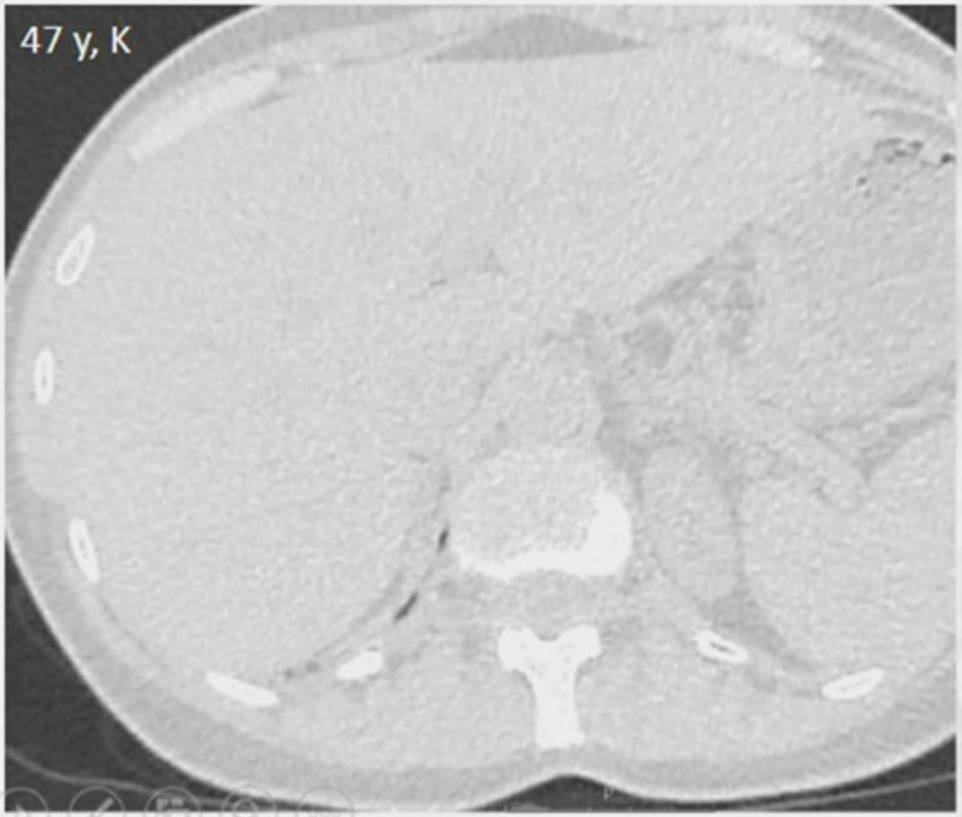
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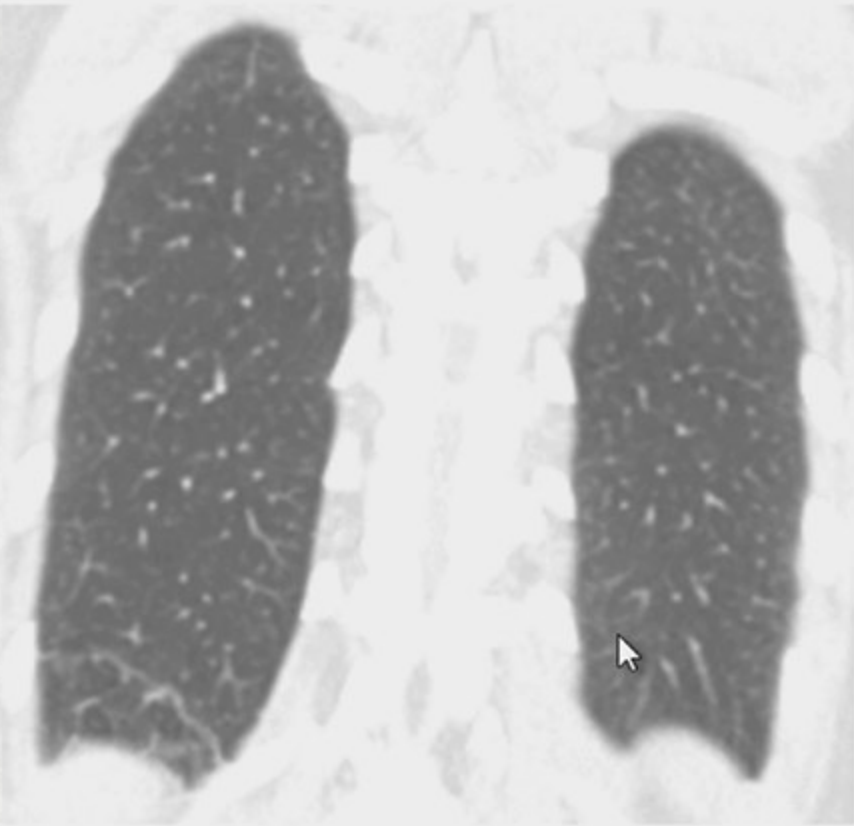
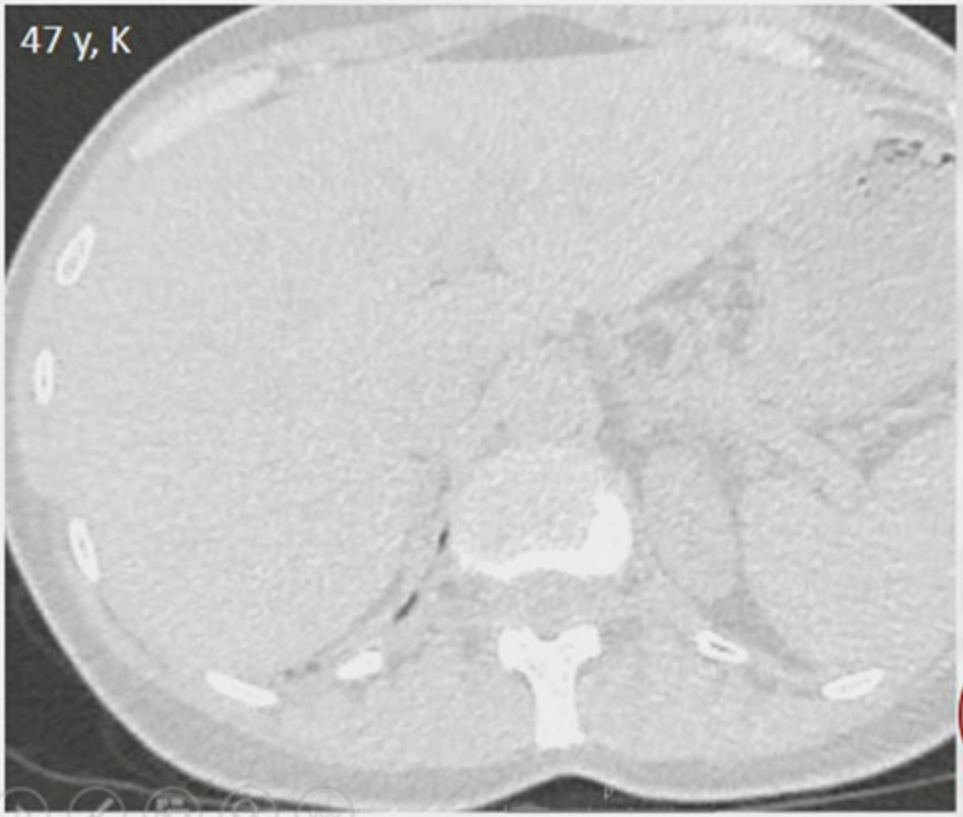
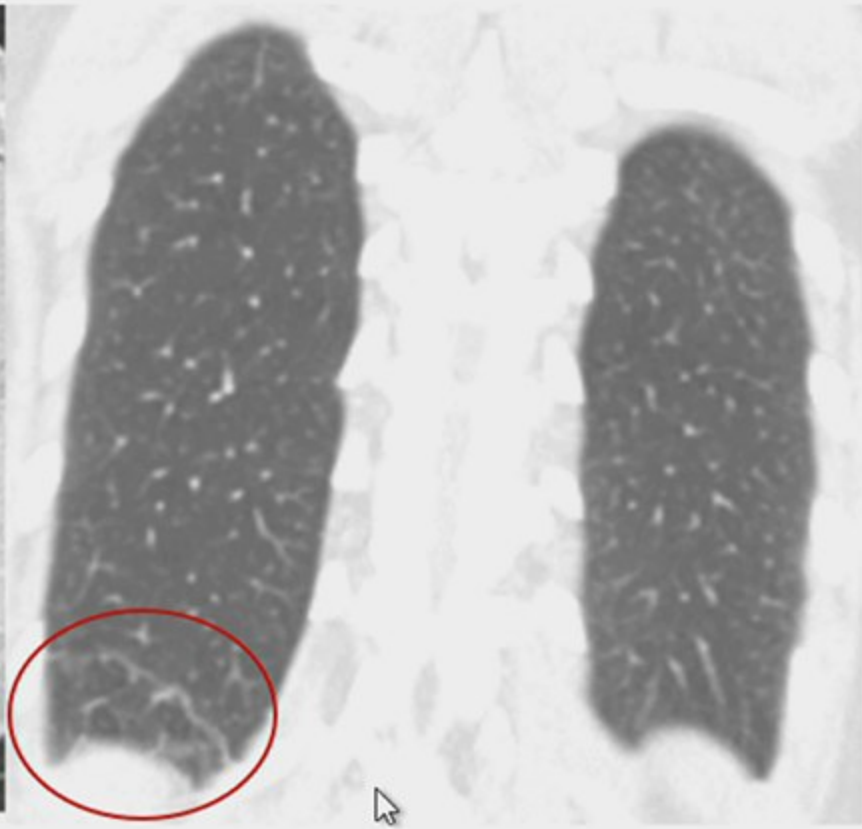
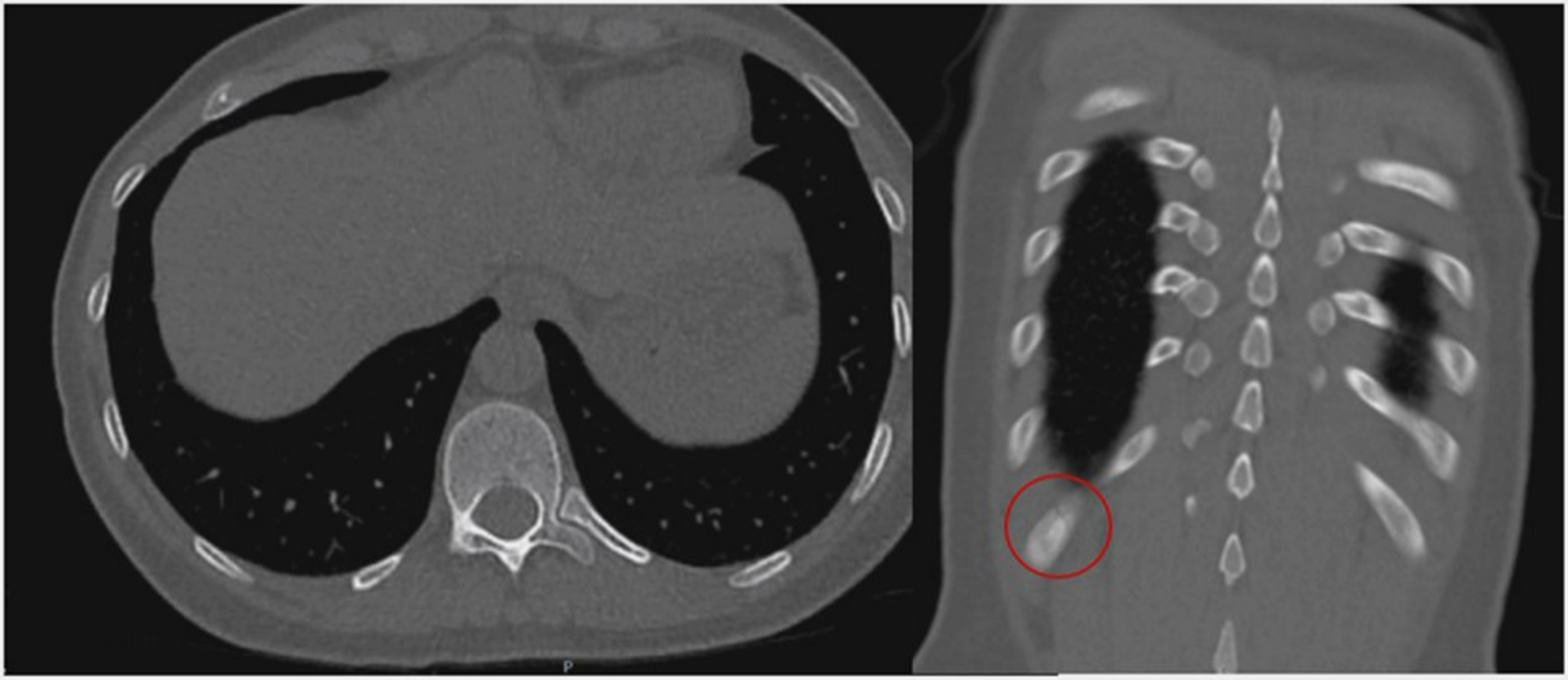
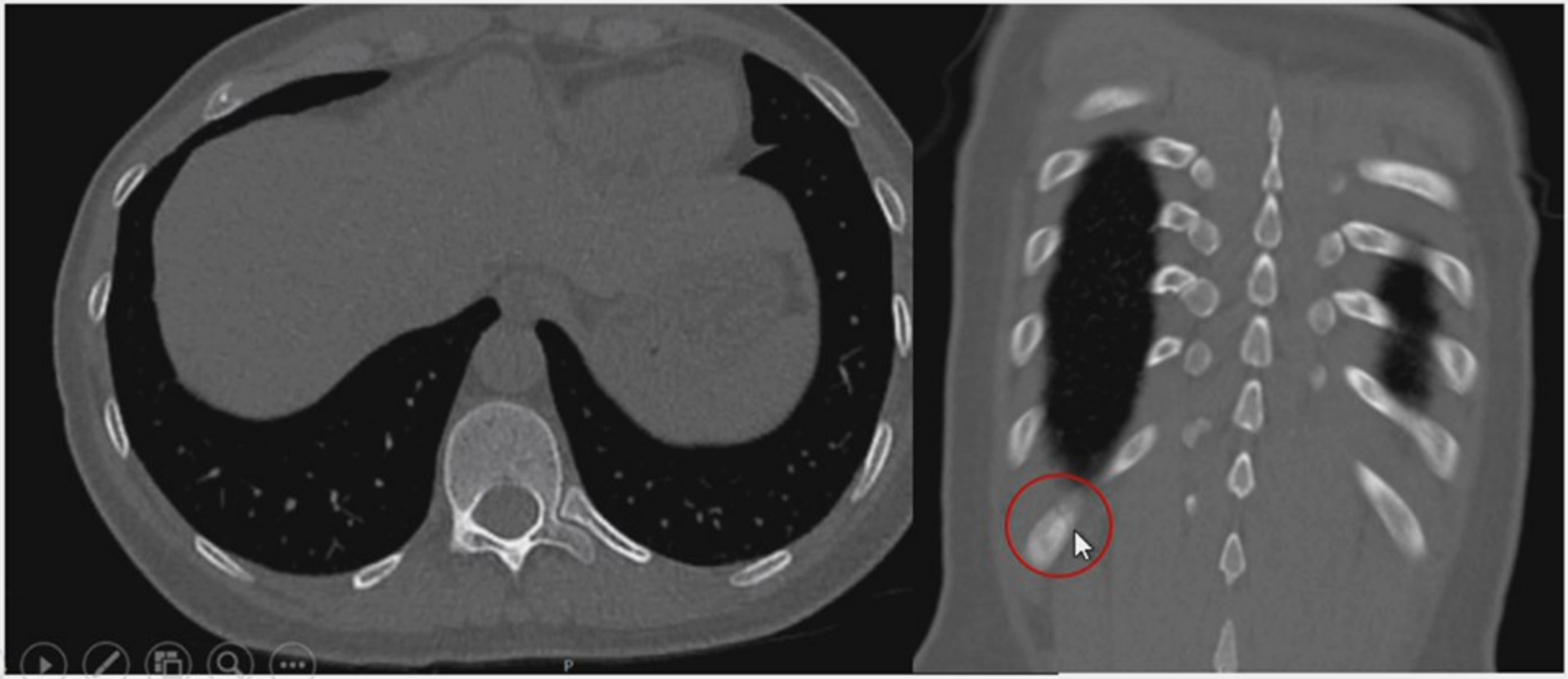


Bulduğumuz şey, aradığımız şeyin kendisi olmayabilir ☹

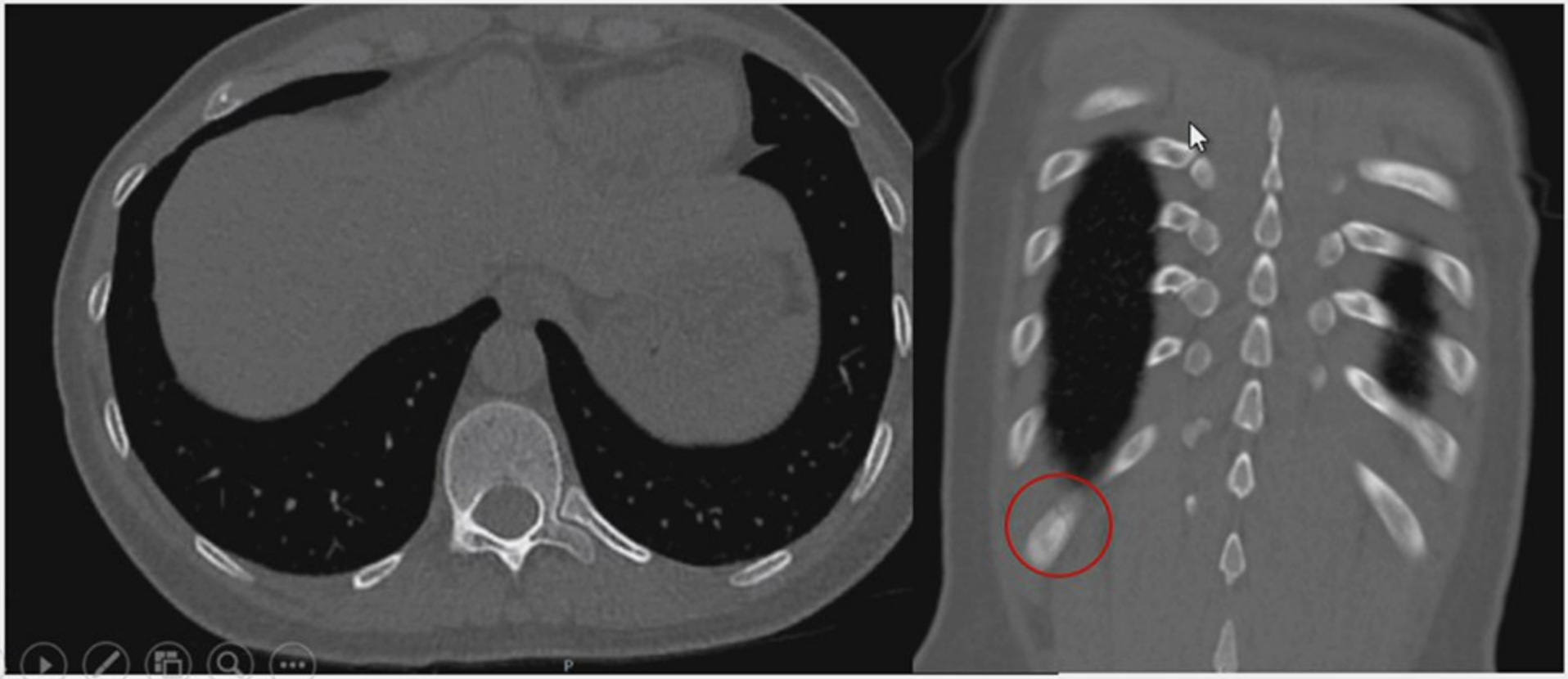


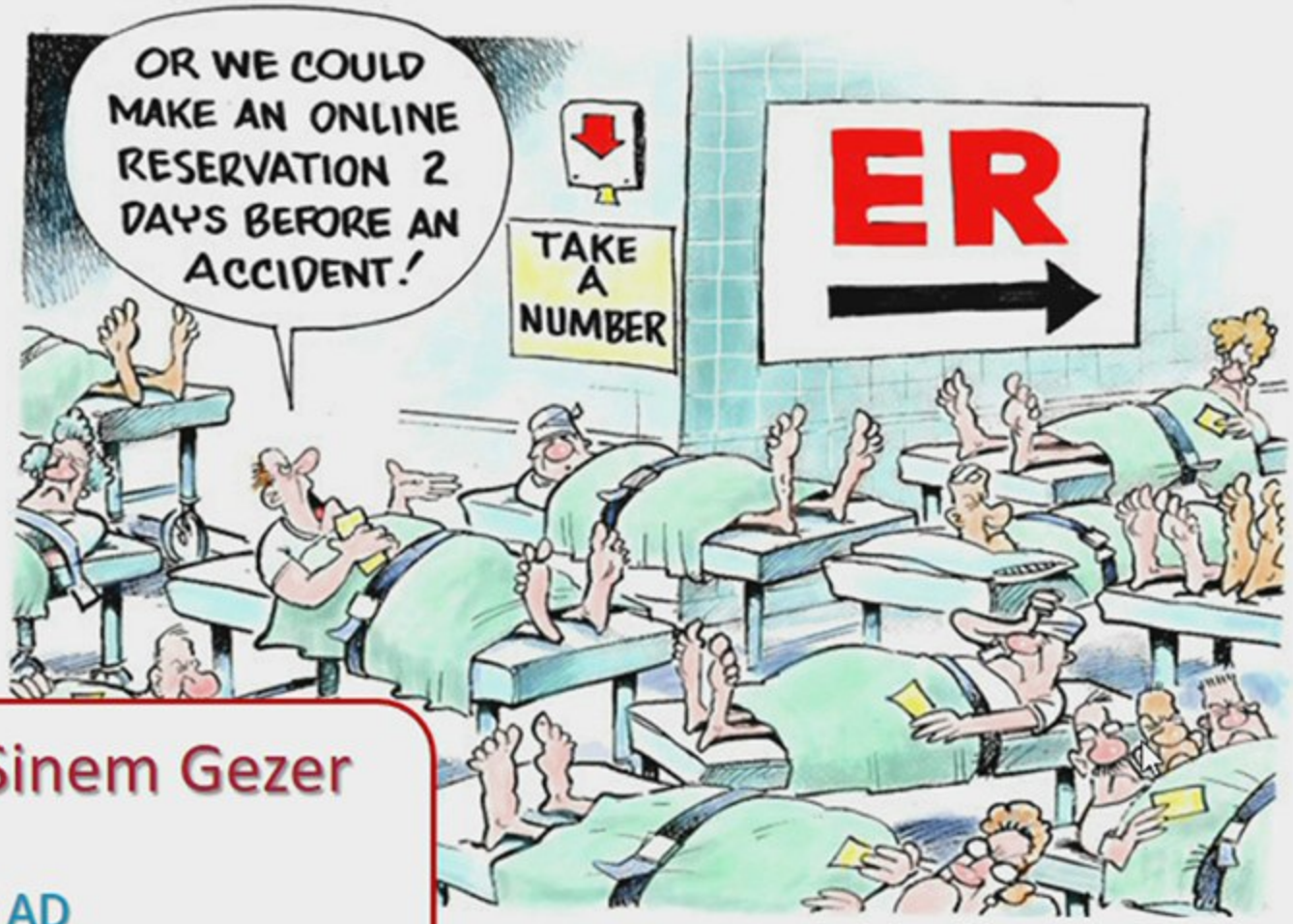






Bakış açımızı değiştirmek işe yarayabilir ☺





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