

BÖLÜM 21

KARDİYOPULMONER ACİLLERDE TORAKS TOMOGRAFİSİ YORUMLAMA

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GİRİŞ

Toraksta yer alan yapıları değerlendirmek için kontrastsız toraks Bilgisayarlı Tomografi (BT), yüksek çözünürlüklü BT (High Resolution Computed Tomography, HRCT), kontrastlı venöz fazda toraks BT, kontrastlı arteriyel fazda (anjiyo) toraks BT, oral kontrastlı BT çekilebilir (1).

Kontrast madde ilişkili alerjik reaksiyon, nefropati başta olmak üzere diğer yan etkileri nedeni ile **kontrastsız toraks BT** tercih edilebilir. Toraksta 5 mm aralıklarla kesitler elde edilir. Kalsifikasyonlar ile pulmoner, mediastinal, göğüs duvarı kitle ve nodüllerini tespit edebilir ve sınıflandırabiliriz. Bronşektazi veya küçük hava yolu hastalıkları, pnömoni, kaburga kırıklarını, pnömotoraks, pulmoner amfizem, mediastinal amfizem, yumuşak doku amfizemi, ateletazi, yabancı cisim tespit edebiliriz. Ayrıca radyasyon maruziyetini azaltmak için düşük doz BT tercih edilebilir (1,2).

Ayrııcı tanı listemiz için kontrast madde ile görüntüleme gerekiyorsa iki defa radyasyon vermemek için kontrastlı görüntüleme tercih edilebilir. “Hastalık yoktur hasta vardır” genel kabulüne göre hareket etmek, hastanın ek hastalıkları, alerjileri, kanser yatkınlığı, böbrek yetmezliği, ayrııcı tanıları dikkate alınarak en etkin tetkik istemi yapılmalıdır.

Bir diğer kontrastsız toraks BT görüntüleme yöntemi de HRCT’dir. Toraksta 0.625-1.25 mm aralıklarla kesitler elde edilir. Kontrastsız toraks BT’ye göre daha ince kesitler elde edilmiş olur ve daha ayrıntılı inceleme imkânı sunsa da daha fazla radyasyon maruziyetine neden olur. Toraks BT’de saptanabilen tanılara ek olarak interstisyel akciğer hastalığı tanısı için yardımcı olur (3).

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nılarda ilk tercih olarak ya da diğer tetkiklerin yetersiz kaldığı durumlarda çekilmesi gerektiğinde bu bölümde bahsi geçen hastalıklar ve diğer sistemlere ait hastalıklar açısından da tomografinin değerlendirilmesi tanıya ulaşmamızda faydalı olacaktır. Bu nedenle bu bölümde sunulan hastalıklara ait tomografi bulguları da akılda tutulmalıdır.

KAYNAKLAR

1. Bhalla AS, Das A, Naranje P, Irodi A, Raj V, Goyal A. Imaging protocols for CT chest: A recommendation. *Indian J Radiol Imaging* [Internet]. 2019 Jul [cited 2023 Mar 27];29(3):236–46. Available from: <https://pubmed.ncbi.nlm.nih.gov/31741590/>
2. Kalra MK, Homayounieh F, Arru C, Holmberg O, Vassileva J. Chest CT practice and protocols for COVID-19 from radiation dose management perspective. *Eur Radiol* [Internet]. 2020 Dec 1 [cited 2023 Mar 27];30(12):6554–60. Available from: <https://pubmed.ncbi.nlm.nih.gov/32621238/>
3. Sundaram B, Chughtai AR, Kazerooni EA. Multidetector high-resolution computed tomography of the lungs: protocols and applications. *J Thorac Imaging* [Internet]. 2010 May [cited 2023 Mar 27];25(2):125–41. Available from: <https://pubmed.ncbi.nlm.nih.gov/20463532/>
4. Iezzi R, Larici AR, Franchi P, Marano R, Magarelli N, Posa A, et al. Tailoring protocols for chest CT applications: when and how? *Diagn Interv Radiol* [Internet]. 2017 Nov 1 [cited 2023 Mar 27];23(6):420–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/29097345/>
5. Awais M, Qamar S, Rehman A, Baloch NUA, Shafqat G. Accuracy of CT chest without oral contrast for ruling out esophageal perforation using fluoroscopic esophagography as reference standard: a retrospective study. *Eur J Trauma Emerg Surg* [Internet]. 2019 Jun 1 [cited 2023 Mar 27];45(3):517–25. Available from: <https://pubmed.ncbi.nlm.nih.gov/29484462/>
6. Tintinalli JE, Ma JO, Yealy D, Meckler G, Stapczynski J, Cline D, et al. Tintinalli's emergency medicine : A comprehensive study guide 9th Edition [Internet]. 9th Edition. McGraw Hill; 2020 [cited 2023 Mar 27]. 329–471 p. Available from: <https://www.nobelkitabevi.com.tr/acil-tip/7255-tintinalli-s-emergency-medicine-a-comprehensive-study-guide-9781260461350.html>
7. Miller StephenW. Cardiac Imaging: The Requisites 2nd Edition [Internet]. Mosby; 2004 [cited 2023 Mar 27]. Available from: <https://www.amazon.com/Cardiac-Imaging-Requisites-Stephen-Miller/dp/032301755X>
8. Kalra DK, Heo R, Valenti V, Nakazato R, Min JK. Role of Computed Tomography for Diagnosis and Risk Stratification of Patients with Suspected or Known Coronary Artery Disease. *Arterioscler Thromb Vasc Biol* [Internet]. 2014 [cited 2023 Apr 18];34(6):1144. Available from: <https://pubmed.ncbi.nlm.nih.gov/25494818/>
9. Gulati M, Levy PD, Mukherjee D, Amsterdam E, Bhatt DL, Birtcher KK, et al. 2021 AHA/ACC/AASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *J Am Coll Cardiol* [Internet]. 2021 Nov 30 [cited 2023 Apr 18];78(22):e187–285. Available from: <https://pubmed.ncbi.nlm.nih.gov/34756653/>
10. Divakaran S, Cheezum MK, Hulthen EA, Bittencourt MS, Silverman MG, Nasir K, et al. Use of cardiac CT and calcium scoring for detecting coronary plaque: implications on prognosis and patient management. *Br J Radiol* [Internet]. 2015 Feb 1 [cited 2023 Apr 18];88(1046). Available from: <https://pubmed.ncbi.nlm.nih.gov/25494818/>
11. Adler Y, Charron P, Imazio M, Badano L, Barón-Esquivias G, Bogaert J, et al. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Di-

- agnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC) Endorsed by: The European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J* [Internet]. 2015 Nov 7 [cited 2023 Mar 27];36(42):2921–64. Available from: <https://pubmed.ncbi.nlm.nih.gov/26320112/>
12. Munden RF, Carter BW, Chiles C, MacMahon H, Black WC, Ko JP, et al. Managing Incidental Findings on Thoracic CT: Mediastinal and Cardiovascular Findings. A White Paper of the ACR Incidental Findings Committee. *J Am Coll Radiol* [Internet]. 2018 Aug 1 [cited 2023 Apr 18];15(8):1087–96. Available from: <https://pubmed.ncbi.nlm.nih.gov/29941240/>
 13. Kalisz K, Rajiah P. Computed tomography of cardiomyopathies. *Cardiovasc Diagn Ther* [Internet]. 2017 Oct 1 [cited 2023 Mar 27];7(5):539. Available from: <https://pubmed.ncbi.nlm.nih.gov/305716950/>
 14. Blount KJ, Hagspiel KD. Aortic diameter, true lumen, and false lumen growth rates in chronic type B aortic dissection. *AJR Am J Roentgenol* [Internet]. 2009 May [cited 2023 Mar 27];192(5). Available from: <https://pubmed.ncbi.nlm.nih.gov/19380527/>
 15. Macura KJ, Corl FM, Fishman EK, Bluemke DA. Pathogenesis in acute aortic syndromes: aortic dissection, intramural hematoma, and penetrating atherosclerotic aortic ulcer. *AJR Am J Roentgenol* [Internet]. 2003 Aug 1 [cited 2023 Mar 27];181(2):309–16. Available from: <https://pubmed.ncbi.nlm.nih.gov/12876003/>
 16. LePage MA, Quint LE, Sonnad SS, Deeb GM, Williams DM. Aortic dissection: CT features that distinguish true lumen from false lumen. *AJR Am J Roentgenol* [Internet]. 2001 [cited 2023 Mar 27];177(1):207–11. Available from: <https://pubmed.ncbi.nlm.nih.gov/11418429/>
 17. Weissleder Ralph, Wittenberg Jack, Harisinghani MG, Chen JW. *Primer of diagnostic imaging 4th Edition* [Internet]. Mosby; 2007 [cited 2023 Mar 27]. Available from: https://books.google.com.tr/books/about/Primer_of_Diagnostic_Imaging.html?id=V7H4QQAACAAJ&redir_esc=y
 18. Sebastià C, Pallisa E, Quiroga S, Alvarez-Castells A, Dominguez R, Evangelista A. Aortic dissection: diagnosis and follow-up with helical CT. *Radiographics* [Internet]. 1999 [cited 2023 Mar 27];19(1):45–60. Available from: <https://pubmed.ncbi.nlm.nih.gov/9925391/>
 19. Ko JP, Goldstein JM, Latson LA, Azour L, Gozansky EK, Moore W, et al. Chest CT Angiography for Acute Aortic Pathologic Conditions: Pearls and Pitfalls. *Radiographics* [Internet]. 2021 [cited 2023 Mar 27];41(2):399–424. Available from: <https://pubmed.ncbi.nlm.nih.gov/33646903/>
 20. Marotta R, Franchetto AA. The CT appearance of aortic transection. *AJR Am J Roentgenol* [Internet]. 1996 [cited 2023 Mar 27];166(3):647–51. Available from: <https://pubmed.ncbi.nlm.nih.gov/8623643/>
 21. Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation* [Internet]. 2022 May 3 [cited 2023 Apr 25];145(18):E895–1032. Available from: www.ahajournals.org/journal/circ
 22. Knudsen CW, Omland T, Clopton P, Westheim A, Abraham WT, Storrow AB, et al. Diagnostic Value of B-Type Natriuretic Peptide and Chest Radiographic Findings in Patients with Acute Dyspnea. *American Journal of Medicine* [Internet]. 2004 Mar 15 [cited 2023 Apr 25];116(6):363–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/15006584/>
 23. Gluecker T, Capasso P, Schnyder P, Gudinchet F, Schaller MD, Revelly JP, et al. Clinical and radiologic features of pulmonary edema. *Radiographics* [Internet]. 1999 [cited 2023 Apr 25];19(6):1507–31. Available from: <https://pubmed.ncbi.nlm.nih.gov/10555672/>
 24. Tatco VR, Piedad HH. The validity of hyperdense lumen sign in non-contrast chest CT scans in the detection of pulmonary thromboembolism. *Int J Cardiovasc Imaging* [Internet]. 2011 Mar [cited 2023 Mar 30];27(3):433–40. Available from: <https://pubmed.ncbi.nlm.nih.gov/20658266/>
 25. Lu GM, Wu SY, Yeh BM, Zhang LJ. Dual-energy computed tomography in pulmonary embolism. *Br J Radiol* [Internet]. 2010 Aug [cited 2023 Mar 30];83(992):707–18. Available from: <https://pubmed.ncbi.nlm.nih.gov/20551257/>

26. Han D, Lee KS, Franquet T, Müller NL, Kim TS, Kim H, et al. Thrombotic and nonthrombotic pulmonary arterial embolism: spectrum of imaging findings. *Radiographics* [Internet]. 2003 [cited 2023 Mar 30];23(6):1521–39. Available from: <https://pubmed.ncbi.nlm.nih.gov/14615562/>
27. Castañer E, Gallardo X, Ballesteros E, Andreu M, Pallardó Y, Mata JM, et al. CT diagnosis of chronic pulmonary thromboembolism. *Radiographics* [Internet]. 2009 Jan [cited 2023 Mar 30];29(1):31–50. Available from: <https://pubmed.ncbi.nlm.nih.gov/19168835/>
28. Humbert M, Kovacs G, Hoeper MM, Badagliacca R, Berger RMF, Brida M, et al. 2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension. Developed by the task force for the diagnosis and treatment of pulmonary hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS). Endorsed by the International Society for Heart and Lung Transplantation (ISHLT) and the European Reference Network on rare respiratory diseases (ERN-LUNG). *Eur Heart J* [Internet]. 2022 Oct 11 [cited 2023 Apr 18];43(38):3618–731. Available from: <https://academic.oup.com/eurheartj/article/43/38/3618/6673929>
29. Remy-Jardin M, Ryerson CJ, Schiebler ML, Leung ANC, Wild JM, Hoeper MM, et al. Imaging of pulmonary hypertension in adults: a position paper from the Fleischner Society. *Eur Respir J* [Internet]. 2021 Jan 1 [cited 2023 Apr 18];57(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/33402372/>
30. Truong QA, Bhatia HS, Szymonifka J, Zhou Q, Lavender Z, Waxman AB, et al. A four-tier classification system of pulmonary artery metrics on computed tomography for the diagnosis and prognosis of pulmonary hypertension. *J Cardiovasc Comput Tomogr* [Internet]. 2018 Jan 1 [cited 2023 Apr 19];12(1):60–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/29254655/>
31. Swift AJ, Dwivedi K, Johns C, Garg P, Chin M, Currie BJ, et al. Diagnostic accuracy of CT pulmonary angiography in suspected pulmonary hypertension. *Eur Radiol* [Internet]. 2020 Sep 1 [cited 2023 Apr 18];30(9):4918–29. Available from: <https://pubmed.ncbi.nlm.nih.gov/32342182/>
32. Tan RT, Kuzo R, Goodman LR, Siegel R, Haasler GB, Presberg KW. Utility of CT scan evaluation for predicting pulmonary hypertension in patients with parenchymal lung disease. *Medical College of Wisconsin Lung Transplant Group. Chest* [Internet]. 1998 [cited 2023 Apr 19];113(5):1250–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/9596302/>
33. Dong C, Zhou M, Liu D, Long X, Guo T, Kong X. Diagnostic accuracy of computed tomography for chronic thromboembolic pulmonary hypertension: a systematic review and meta-analysis. *PLoS One* [Internet]. 2015 Apr 29 [cited 2023 Apr 18];10(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/25923810/>
34. Ende-Verhaar YM, Meijboom LJ, Kroft LJM, Beenen LFM, Boon GJAM, Middeldorp S, et al. Usefulness of standard computed tomography pulmonary angiography performed for acute pulmonary embolism for identification of chronic thromboembolic pulmonary hypertension: results of the InShape III study. *J Heart Lung Transplant* [Internet]. 2019 Jul 1 [cited 2023 Apr 18];38(7):731–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/30962147/>
35. Community-acquired Pneumonia in Adults [Internet]. [cited 2023 Apr 19]. Available from: https://www.dynamed.com/condition/community-acquired-pneumonia-in-adults#COMPUTED_TOMOGRAPHY
36. Cavitating pneumonia | Radiology Reference Article | Radiopaedia.org [Internet]. [cited 2023 Apr 19]. Available from: <https://radiopaedia.org/articles/cavitating-pneumonia?lang=us>
37. Tanaka N, Matsumoto T, Kuramitsu T, Nakaki H, Ito K, Uchisako H, et al. High resolution CT findings in community-acquired pneumonia. *J Comput Assist Tomogr* [Internet]. 1996 [cited 2023 Mar 30];20(4):600–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/8708064/>
38. Kim YW, Donnelly LF. Round pneumonia: imaging findings in a large series of children. *Pediatr Radiol* [Internet]. 2007 Dec [cited 2023 Mar 30];37(12):1235–40. Available from: <https://pubmed.ncbi.nlm.nih.gov/17952428/>

39. Wagner AL, Szabunio M, Hazlett KS, Wagner SG. Radiologic manifestations of round pneumonia in adults. *AJR Am J Roentgenol* [Internet]. 1998 [cited 2023 Mar 30];170(3):723–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/9490962/>
40. Komiya K, Ishii H, Umeki K, Kawamura T, Okada F, Okabe E, et al. Computed tomography findings of aspiration pneumonia in 53 patients. *Geriatr Gerontol Int* [Internet]. 2013 Jul [cited 2023 Mar 30];13(3):580–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/22994842/>
41. Nagarsheth K, Kurek S. Ultrasound detection of pneumothorax compared with chest X-ray and computed tomography scan. *Am Surg* [Internet]. 2011 Apr [cited 2023 Mar 30];77(4):480–3. Available from: <https://pubmed.ncbi.nlm.nih.gov/21679560/>
42. Karacabey S, Sanri E, Metin B, Erkoc F, Yildirim S, Intepe YS, et al. Use of ultrasonography for differentiation between bullae and pneumothorax. *Emerg Radiol* [Internet]. 2019 Feb 14 [cited 2023 Mar 30];26(1):15–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/30178311/>
43. van Berkel V, Kuo E, Meyers BF. Pneumothorax, bullous disease, and emphysema. *Surg Clin North Am* [Internet]. 2010 [cited 2023 Mar 30];90(5):935–53. Available from: <https://pubmed.ncbi.nlm.nih.gov/20955876/>
44. Abramowitz Y, Simanovsky N, Goldstein MS, Hiller N. Pleural effusion: characterization with CT attenuation values and CT appearance. *AJR Am J Roentgenol* [Internet]. 2009 Mar [cited 2023 Mar 30];192(3):618–23. Available from: <https://pubmed.ncbi.nlm.nih.gov/19234255/>
45. Hounsfield GN. Computed medical imaging. Nobel lecture, Decemberr 8, 1979. *J Comput Assist Tomogr* [Internet]. 1980 [cited 2023 Mar 30];4(5):665–74. Available from: <https://pubmed.ncbi.nlm.nih.gov/6997341/>
46. Young CA, Menias CO, Bhalla S, Prasad SR. CT features of esophageal emergencies. *Radiographics* [Internet]. 2008 Oct [cited 2023 Mar 30];28(6):1541–53. Available from: <https://pubmed.ncbi.nlm.nih.gov/18936020/>