

3.

Bölüm

PLEVRAL HASTALIKLARDA GÖRÜNTÜLEME YÖNTEMLERİ

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OLGU

68 yaşında kadın hasta ara ara olan öksürük, sağ yan ağrısı ve nefes darlığı şikayetleri ile hastanemize başvurdu. Öyküsünde semptomlarının 1 yıl öncesine dayandığı ve giderek artış gösterdiği öğrenildi. Fizik muayenesinde ateş: 36,5°C, nabız:80/dk, solunum sayısı: 25/dk olarak saptandı. Sağ alt zonda solunum seslerinin alınamaması dışında hastada diğer sistem muayenelerinde bulgu saptanmadı. İstenen kan değerleri normal olup solunum fonksiyon testleri FEV1: 1930 ml (%111), FVC: 2540 ml (%120), FEV1/FVC: %76 olarak sonuçlandı.

Hastadan iki yönlü akciğer grafisi elde olundu. Posterior-anterior (PA) akciğer grafisinde; sağ tarafta kostofrenik sinüste küntleşme ile beraber ‘menisküs işareti’ olarak tanımlanan parabol şeklinde opasite artışı izlendi (**Resim 1a**). Lateral grafide posterior kostofrenik sinüste benzer görünüm saptandı ve bulgular sağ plevral efüzyon lehine yorumlandı (**Resim 1b**). PA grafide ayrıca sağ akciğer üst zon periferinde 2. ve 3. kosta anterior yayı komşuluğunda devamlılık gösteren opasite artımı izlendi (**Resim 1a-b**). Daha sonra çekilen bilgisayarlı tomografi (BT)’de sağ plevral efüzyonla birlikte, grafide gözlenen sağ akciğer üst zondaki opasite artımının, 2. ve 3. kosta anterior yayı komşuluğunda kostal plevral yüzde yerleşimli olan, en kalın yerinde 12 mm kalınlığa ulaşan, iç yapısı homojen olarak izlenen, sıvı dansitesine yakın plevral plak tarzında yumuşak doku kalınlaşması ile uyumlu olduğu gözlemlendi. Dikkati çeken ek bulgu olarak, 2. kosta iç korteksinde devamsızlık oluşturan 6 mm boyutunda litik lezyonun bulgulara eşlik et-

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KAYNAKLAR

1. Savoca CJ, Gamsu G, Rohlfing BM. Chest radiography in intensive care units. *West J Med.* 1978;129(6):469-474.
2. Lell MM, Kachelrieß M. Recent and Upcoming Technological Developments in Computed Tomography: High Speed, Low Dose, Deep Learning, Multienergy. *Invest Radiol.* 2020;55(1):8-19. doi:10.1097/RLI.0000000000000601
3. Hallifax RJ, Talwar A, Wrightson JM, et al. State-of-the-art: Radiological investigation of pleural disease. *Respir Med.* 2017;124:88-99. doi:10.1016/j.rmed.2017.02.013
4. Hassan M, Mercer RM, Rahman NM. Thoracic ultrasound in the modern management of pleural disease. *Eur Respir Rev.* 2020;29(156):190136. Published 2020 Apr 29. doi:10.1183/16000617.0136-2019
5. Chaturvedi A, Lee S, Klionsky N, et al. Demystifying the persistent pneumothorax: role of imaging. *Insights Imaging.* 2016;7(3):411-429. doi:10.1007/s13244-016-0486-5
6. Kong A. The deep sulcus sign. *Radiology.* 2003;228(2):415-416. doi:10.1148/radiol.2282020524
7. Rierson D, Bueno J. Pneumothorax in the Supine Patient: Subtle Radiographic Signs. *J Thorac Imaging.* 2016;31(4):W16-W22. doi:10.1097/RTI.0000000000000216
8. Ayres J, Gleeson F. Imaging of the pleura. *Semin Respir Crit Care Med.* 2010;31(6):674-688. doi:10.1055/s-0030-1269827
9. Hilliard NJ, Marciniak SJ, Babar JL, et al. Evaluation of secondary spontaneous pneumothorax with multidetector CT. *Clin Radiol.* 2013;68(5):521-528. doi:10.1016/j.crad.2012.10.008
10. Topal U, Ediz B. Transthoracic needle biopsy: factors effecting risk of pneumothorax. *Eur J Radiol.* 2003;48(3):263-267. doi:10.1016/s0720-048x(03)00058-5
11. Baik JH, Ahn MI, Park YH, et al. High-resolution CT findings of re-expansion pulmonary edema. *Korean J Radiol.* 2010;11(2):164-168. doi:10.3348/kjr.2010.11.2.164
12. Ding W, Shen Y, Yang J, et al. Diagnosis of pneumothorax by radiography and ultrasonography: a meta-analysis. *Chest.* 2011;140(4):859-866. doi:10.1378/chest.10-2946
13. Husain LF, Hagopian L, Wayman D, et al. Sonographic diagnosis of pneumothorax. *J Emerg Trauma Shock.* 2012;5(1):76-81. doi:10.4103/0974-2700.93116
14. Qureshi NR, Gleeson FV. Imaging of pleural disease. *Clin Chest Med.* 2006;27(2):193-213. doi:10.1016/j.ccm.2006.02.001
15. Evans AL, Gleeson FV. Radiology in pleural disease: state of the art. *Respirology.* 2004;9(3):300-312. doi:10.1111/j.1440-1843.2004.00599.x
16. Poyraz N, Kalkan H, Ödev K, et al. Plevral hastalıkların görüntülenmesi: Akciğer grafisi temelinde görüntüleme yöntemlerinin değerlendirilmesi. *Tuberk Toraks.* 2017;65(1):41-55. doi:10.5578/tt.47546.
17. Lichtenstein DA. BLUE-protocol and FALLS-protocol: two applications of lung ultrasound in the critically ill. *Chest.* 2015;147(6):1659-1670. doi:10.1378/chest.14-1313
18. McLoud TC, Flower CD. Imaging the pleura: sonography, CT, and MR imaging. *AJR Am J Roentgenol.* 1991;156(6):1145-1153. doi:10.2214/ajr.156.6.2028857
19. Helm EJ, Matin TN, Gleeson FV. Imaging of the pleura. *J Magn Reson Imaging.* 2010;32(6):1275-1286. doi:10.1002/jmri.22372
20. Abramowitz Y, Simanovsky N, Goldstein MS, et al. Pleural effusion: characterization with CT attenuation values and CT appearance. *AJR Am J Roentgenol.* 2009;192(3):618-623. doi:10.2214/AJR.08.1286
21. Stark DD, Federle MP, Goodman PC, et al. Differentiating lung abscess and empyema: radiography and computed tomography. *AJR Am J Roentgenol.* 1983;141(1):163-167. doi:10.2214/ajr.141.1.163
22. Arenas-Jiménez JJ, García-Garrigós E, Escudero-Fresneda C, et al. Early and delayed phases of contrast-enhanced CT for evaluating patients with malignant pleural effusion. Results of pairwise comparison by multiple observers. *Br J Radiol.* 2018;91(1089):20180254. doi:10.1259/bjr.20180254

23. Usuda K, Iwai S, Funasaki A, et al. Diffusion-Weighted Imaging Can Differentiate between Malignant and Benign Pleural Diseases. *Cancers (Basel)*. 2019;11(6):811. Published 2019 Jun 12. doi:10.3390/cancers11060811
24. Porcel JM, Hernández P, Martínez-Alonso M, et al. Accuracy of fluorodeoxyglucose-PET imaging for differentiating benign from malignant pleural effusions: a meta-analysis. *Chest*. 2015;147(2):502-512. doi:10.1378/chest.14-0820
25. Harris EJA, Musk A, de Klerk N, et al. Diagnosis of asbestos-related lung diseases. *Expert Rev Respir Med*. 2019;13(3):241-249. doi:10.1080/17476348.2019.1568875
26. Müller NL. Imaging of the pleura. *Radiology*. 1993;186(2):297-309. doi:10.1148/radiology.186.2.8421723
27. Fletcher DE, Edge JR. The early radiological changes in pulmonary and pleural asbestosis. *Clin Radiol*. 1970;21(4):355-365. doi:10.1016/s0009-9260(70)80068-x
28. McLoud TC. CT and MR in pleural disease. *Clin Chest Med*. 1998;19(2):261-276. doi:10.1016/s0272-5231(05)70076-9
29. Norbet C, Joseph A, Rossi SS, et al. Asbestos-related lung disease: a pictorial review. *Curr Probl Diagn Radiol*. 2015;44(4):371-382. doi:10.1067/j.cpradiol.2014.10.002
30. Hansell DM, Bankier AA, MacMahon H, et al. Fleischner Society: glossary of terms for thoracic imaging. *Radiology*. 2008;246(3):697-722. doi:10.1148/radiol.2462070712
31. Galateau-Salle F, Churg A, Roggli V, et al; World Health Organization Committee for Tumors of the Pleura. The 2015 World Health Organization Classification of Tumors of the Pleura: Advances since the 2004 Classification. *J Thorac Oncol*. 2016;11(2):142-154. doi:10.1016/j.jtho.2015.11.005
32. Cardillo G, Lococo F, Carleo F, et al. Solitary fibrous tumors of the pleura. *Curr Opin Pulm Med*. 2012;18(4):339-346. doi:10.1097/MCP.0b013e328352f696
33. Reisenauer JS, Mneimneh W, Jenkins S, et al. Comparison of Risk Stratification Models to Predict Recurrence and Survival in Pleuropulmonary Solitary Fibrous Tumor. *J Thorac Oncol*. 2018;13(9):1349-1362. doi:10.1016/j.jtho.2018.05.040
34. Cardinale L, Ardisson F, Garetto I, et al. Imaging of benign solitary fibrous tumor of the pleura: a pictorial essay. *Rare Tumors*. 2010;2(1):e1. Published 2010 Mar 31. doi:10.4081/rt.2010.e1
35. Luciano C, Francesco A, Giovanni V, et al. CT signs, patterns and differential diagnosis of solitary fibrous tumors of the pleura [published correction appears in J Thorac Dis. 2014 Dec;6(12):E312]. *J Thorac Dis*. 2010;2(1):21-25.
36. Héléage S, Revel MP, Chabi ML, et al. Solitary fibrous tumor of the pleura: Can computed tomography features help predict malignancy? A series of 56 patients with histopathological correlates. *Diagn Interv Imaging*. 2016;97(3):347-353. doi:10.1016/j.diii.2015.04.013
37. Carter BW, Betancourt SL, Shroff GS, et al 3rd. MR Imaging of Pleural Neoplasms. *Top Magn Reson Imaging*. 2018;27(2):73-82. doi:10.1097/RMR.000000000000162
38. Garcia-Ortega DY, Martín-Tellez KS, Cuellar-Hubbe M, et al. Desmoid-Type Fibromatosis. *Cancers (Basel)*. 2020;12(7):1851. Published 2020 Jul 9. doi:10.3390/cancers12071851
39. Ganeshan D, Amini B, Nikolaidis P, et al. Current Update on Desmoid Fibromatosis. *J Comput Assist Tomogr*. 2019;43(1):29-38. doi:10.1097/RCT.0000000000000790
40. Edlin JC, Donovan LE, Alexander C, et al. Recurrent pleural effusion in a young woman: calcifying fibrous tumour of the pleura. *BMJ Case Rep*. 2018;2018:bcr2018226282. Published 2018 Sep 15. doi:10.1136/bcr-2018-226282
41. Attanoos RL, Pugh MR. The Diagnosis of Pleural Tumors Other Than Mesothelioma. *Arch Pathol Lab Med*. 2018;142(8):902-913. doi:10.5858/arpa.2017-0537-RA
42. Erb CT, Johnson KM, Kim AW. Rare pleural tumors. *Clin Chest Med*. 2013;34(1):113-136. doi:10.1016/j.ccm.2012.12.001
43. Lanphear BP, Buncher CR. Latent period for malignant mesothelioma of occupational origin. *J Occup Med*. 1992;34(7):718-721.
44. Alpert N, van Gerwen M, Taioli E. Epidemiology of mesothelioma in the 21st century in Euro-

- pe and the United States, 40 years after restricted/banned asbestos use. *Transl Lung Cancer Res.* 2020;9(Suppl 1):S28-S38. doi:10.21037/tlcr.2019.11.11
45. Emri S, Demir AU. Malignant pleural mesothelioma in Turkey, 2000-2002. *Lung Cancer.* 2004;45 Suppl 1:S17-S20. doi:10.1016/j.lungcan.2004.04.009
 46. Falaschi F, Romei C, Fiorini S, et al. Imaging of malignant pleural mesothelioma: is it possible a screening or early diagnosis program?-a systematic review about the use of screening programs in a population of asbestos exposed workers. *J Thorac Dis.* 2018;10(Suppl 2):S262-S268. doi:10.21037/jtd.2017.12.57
 47. Nickell LT Jr, Lichtenberger JP 3rd, Khorashadi L, et al. Multimodality imaging for characterization, classification, and staging of malignant pleural mesothelioma. *Radiographics.* 2014;34(6):1692-1706. doi:10.1148/rg.346130089
 48. Sinha S, Swift AJ, Kamil MA, et al. The role of imaging in malignant pleural mesothelioma: an update after the 2018 BTS guidelines. *Clin Radiol.* 2020;75(6):423-432. doi:10.1016/j.crad.2019.12.001
 49. Gill RR, Tsao AS, Kindler HL, et al. Radiologic Considerations and Standardization of Malignant Pleural Mesothelioma Imaging Within Clinical Trials: Consensus Statement from the NCI Thoracic Malignancy Steering Committee - International Association for the Study of Lung Cancer - Mesothelioma Applied Research Foundation Clinical Trials Planning Meeting. *J Thorac Oncol.* 2019;14(10):1718-1731. doi:10.1016/j.jtho.2019.08.012
 50. Ng CS, Munden RE, Libshitz HI. Malignant pleural mesothelioma: the spectrum of manifestations on CT in 70 cases. *Clin Radiol.* 1999;54(7):415-421. doi:10.1016/s0009-9260(99)90824-3
 51. Sahin AA, Cöplü L, Selçuk ZT, et al. Malignant pleural mesothelioma caused by environmental exposure to asbestos or erionite in rural Turkey: CT findings in 84 patients. *AJR Am J Roentgenol.* 1993;161(3):533-537. doi:10.2214/ajr.161.3.8394641
 52. Kim YK, Kim JS, Lee KW, et al. Multidetector CT Findings and Differential Diagnoses of Malignant Pleural Mesothelioma and Metastatic Pleural Diseases in Korea [published correction appears in Korean J Radiol. 2016 Sep-Oct;17(5):825]. *Korean J Radiol.* 2016;17(4):545-553. doi:10.3348/kjr.2016.17.4.545
 53. Bakhshayesh Karam M, Karimi S, Mosadegh L, et al. Malignant Mesothelioma Versus Metastatic Carcinoma of the Pleura: A CT Challenge. *Iran J Radiol.* 2016;13(1):e10949. Published 2016 Jan 14. doi:10.5812/iranjradiol.10949
 54. Cheng L, Tunariu N, Collins DJ, et al. Response evaluation in mesothelioma: Beyond RECIST. *Lung Cancer.* 2015;90(3):433-441. doi:10.1016/j.lungcan.2015.08.012
 55. Gill RR, Umeoka S, Mamata H, et al. Diffusion-weighted MRI of malignant pleural mesothelioma: preliminary assessment of apparent diffusion coefficient in histologic subtypes. *AJR Am J Roentgenol.* 2010;195(2):W125-W130. doi:10.2214/AJR.09.3519
 56. Treglia G, Sadeghi R, Annunziata S, et al. Diagnostic accuracy of 18F-FDG-PET and PET/CT in the differential diagnosis between malignant and benign pleural lesions: a systematic review and meta-analysis. *Acad Radiol.* 2014;21(1):11-20. doi:10.1016/j.acra.2013.09.015
 57. Kitajima K, Doi H, Kuribayashi K. Present and future roles of FDG-PET/CT imaging in the management of malignant pleural mesothelioma. *Jpn J Radiol.* 2016;34(8):537-547. doi:10.1007/s11604-016-0555-1
 58. Klabatsa A, Chicklore S, Barrington SF, et al. The association of 18F-FDG PET/CT parameters with survival in malignant pleural mesothelioma. *Eur J Nucl Med Mol Imaging.* 2014;41(2):276-282. doi:10.1007/s00259-013-2561-1
 59. Bligh MP, Borgaonkar JN, Burrell SC, et al. Spectrum of CT Findings in Thoracic Extranodal Non-Hodgkin Lymphoma. *Radiographics.* 2017;37(2):439-461. doi:10.1148/rg.2017160077
 60. Fois AG, Pirina P, Arcadu A, et al. Desmoplastic small round cell tumors of the pleura: a review of the clinical literature. *Multidiscip Respir Med.* 2017;12:22. Published 2017 Sep 9. doi:10.1186/s40248-017-0103-6
 61. Crotty EJ, McAdams HP, Erasmus JJ, et al. Epithelioid hemangioendothelioma of the pleura:

clinical and radiologic features. *AJR Am J Roentgenol.* 2000;175(6):1545-1549. doi:10.2214/ajr.175.6.1751545

62. Sedhai YR, Basnyat S, Golamari R, et al. Primary pleural angiosarcoma: Case report and literature review. *SAGE Open Med Case Rep.* 2020;8:2050313X20904595. Published 2020 Feb 10. doi:10.1177/2050313X20904595