

Granülomatöz Akciğer Hastalıkları

Aysun ŞENGÜL



© Copyright 2023

Bu kitabın, basım, yayın ve satış hakları Akademisyen Kitabevi A.Ş.'ye aittir. Anılan kuruluşun izni alınmadan kitabın tümü ya da bölümleri mekanik, elektronik, fotokopi, manyetik kağıt ve/veya başka yöntemlerle çoğaltılamaz, basılamaz, dağıtılamaz. Tablo, şekil ve grafikler izin alınmadan, ticari amaçlı kullanılamaz. Bu kitap T.C. Kültür Bakanhğı bandrolü ile satılmaktadır.

ISBN 978-625-399-021-3	Sayfa ve Kapak Tasarımı Akademisyen Dizgi Ünitesi
Kitap Adı Granülopatöz Akciğer Hastalıkları	Yayıncı Sertifika No 47518
Yazar Aysun ŞENGÜL ORCID iD: 0000-0002-8084-1322	Baskı ve Cilt Vadi Matbaacılık
Yayın Koordinatörü Yasin DİLMEN	Bisac Code MED062030
	DOI 10.37609/akya.2478

Kütüphane Kimlik Kartı

Şengül, Aysun.

Granülopatöz Akciğer Hastalıkları / Aysun Şengül.

Ankara : Akademisyen Yayınevi Kitabevi, 2023.

181 sayfa. : tablo, şekil ; 135x210 mm.

Kaynakça ve İndeks var.

ISBN 9786253990213

1. Onkoloji--Akciğer Kanseri.

UYARI

Bu üründe yer alan bilgiler sadece lisanslı tıbbi çalışanlar için kaynak olarak sunulmuştur. Herhangi bir konuda profesyonel tıbbi danışmanlık veya tıbbi tanı amacıyla kullanılmamalıdır. Akademisyen Kitabevi ve alıcı arasında herhangi bir şekilde doktor-hasta, terapist-hasta ve/veya başka bir sağlık sunum hizmeti ilişkisi oluşturmaz. Bu ürün profesyonel tıbbi kararların eşleniğı veya yedeğı değildir. Akademisyen Kitabevi ve bağılı şirketleri, yazarları, katılımcıları, partnerleri ve sponsorları ürün bilgilerine dayalı olarak yapılan bütün uygulamalardan doğan, insanlarda ve cihazlarda yaralanma ve/veya hasarlardan sorumlu değildir.

İlaçların veya başka kimyasalların reçete edildiğı durumlarda, tavsiye edilen dozumu, ilacın uygulanacak süresi, yöntemi ve kontraendikasyonlarını belirlemek için, okuyucuya üretici tarafından her ilaca dair sunulan güncel ürün bilgisini kontrol etmesi tavsiye edilmektedir. Dozun ve hasta için en uygun tedavinin belirlenmesi, tedavi eden hekimin hastaya dair bilgi ve tecrübelerine dayanak oluşturmaması, hekimin kendi sorumluluğundadır.

Akademisyen Kitabevi, üçüncü bir taraf tarafından yapılan ürüne dair değışiklikler, tekrar paketlemeler ve özelleştirmelerden sorumlu değildir.

GENEL DAĞITIM
Akademisyen Kitabevi A.Ş.

Halk Sokak 5 / A
Yenişehir / Ankara
Tel: 0312 431 16 33
siparis@akademisyen.com

www.akademisyen.com

ÖNSÖZ

Granülomatöz inflamasyon, tanı yöntemleri, tedavileri, seyirleri farklılık gösteren hem enfeksiyon hem enfeksiyon dışı onlarca hastalık nedeniyle gelişebilmektedir. Granülomatöz akciğer hastalıkları, birçok klinisyen için ayırıcı tanıda zorlanılan hastalıklardandır. Granülomatöz Akciğer Hastalıkları kitabının Göğüs Hastalıkları uzmanları başta olmak üzere tüm klinisyenlere, granülomatöz inflamasyon ile seyreden hastalıkların tanısı ve tedavi yaklaşımı konusunda katkısı olmasını umuyorum.

Aysun ŞENGÜL

Sakarya Üniversitesi Tıp Fakültesi
Göğüs Hastalıkları Ana Bilim Dalı

İÇİNDEKİLER

Bölüm 1	Granülomatöz Akciğer Hastalıkları	1
Bölüm 2	Akciğer Tüberkülozu	9
Bölüm 3	Akciğerin Nontüberküloz Mikobakteri Enfeksiyonları.....	33
Bölüm 4	Fungal Pnömoniler	45
Bölüm 5	Sarkoidoz.....	71
Bölüm 6	Hipersensitivite Pnömonisi.....	103
Bölüm 7	Kronik Berilyum Hastalığı.....	131
Bölüm 8	Pulmoner Langerhans Hücreli Histiositoz.....	139
Bölüm 9	ANCA ilişkili Granülomatöz Vaskülitler	149
Bölüm 10	Diğer Nonenfeksiyöz Granülomatöz Akciğer Hastalıkları.....	163

şumuna neden olabilmektedirler. Dikkatli klinik değerlendirme, laboratuvar testleri, solunum fonksiyon testi ve yüksek çözünürlüklü bilgisayarlı tomografi (HRCT) dahil olmak üzere radyolojik görüntüleme, granülatöz akciğer hastalıklarına tanısall yaklaşımda çok önemli adımlardır. Çoğu durumda, akciğer dokusu örneklerinin patolojik incelemesi için akciğer biyopsisi gereklidir.

Bu kitapta enfeksiyöz ve nonenfeksiyöz granülatöz akciğer hastalıklarından özellikle sık görülen hastalıkların klinik, laboratuvar, radyolojik özelliklerinin, tanı yöntemlerinin ve tedavilerinin tartışılması amaçlandı.

KAYNAKLAR

1. Timmermans WM, van Laar JA, van Hagen PM, van Zelm MC. Immunopathogenesis of granulomas in chronic autoinflammatory diseases. *Clinical & translational immunology*. 2016;5(12):e118.
2. Chopra A, Judson MA. How are cancer and connective tissue diseases related to sarcoidosis? *Current opinion in pulmonary medicine*. 2015;21(5):517-524.
3. Niles JL, McCluskey RT, Ahmad MF, Arnaut MA. Wegener's granulomatosis autoantigen is a novel neutrophil serine proteinase. *Blood*. 1989;74(6):1888-1893.
4. Dinayer MC. Chronic granulomatous disease and other disorders of phagocyte function. *Hematology*. American Society of Hematology. Education Program. 2005:89-95.
5. Hirsch CS, Ellner JJ, Russell DG, Rich EA. Complement receptor-mediated uptake and tumor necrosis factor-alpha-mediated growth inhibition of Mycobacterium tuberculosis by human alveolar macrophages. *Journal of immunology* (Baltimore, Md.: 1950). 1994;152(2):743-753.
6. Saunders BM, Tran S, Ruuls S, Sedgwick JD, Briscoe H, Britton WJ. Transmembrane TNF is sufficient to initiate cell migration and granuloma formation and provide acute, but not longterm, control of Mycobacterium tuberculosis infection. *Journal of immunology* (Baltimore, Md. : 1950). 2005;174(8):4852-4859.
7. Arango Duque G, Descoteaux A. Macrophage cytokines: involvement in immunity and infectious diseases. *Frontiers in immunology*. 2014;5:491.

8. Ly LH, Russell MI, McMurray DN. Microdissection of the cytokine milieu of pulmonary granulomas from tuberculous guinea pigs. *Cellular microbiology*. 2007;9(5):1127-1136.
9. Algood HM, Chan J, Flynn JL. Chemokines and tuberculosis. *Cytokine & growth factor reviews*. 2003;14(6):467-477
10. Guirado E, Schlesinger LS, Kaplan G. Macrophages in tuberculosis: friend or foe. *Semin Immunopathol*. 2013;35(5):563-583.
11. Ekkens MJ, Shedlock DJ, Jung E, et al. Th1 and Th2 cells help CD8 T-cell responses. *Infect Immun* 2007;75(5): 2291-2296.
12. Sarraf P, Kay J, Friday RP, Reginato AM. Wegener's granulomatosis: is biologic therapy useful? *Curr Rheumatol Rep* 2006;8(4):303-311.
13. Chopra A, Avadhani V, Tiwari A, Riemer EC, Sica G, Judson MA. Granulomatous lung disease: clinical aspects. *Expert Rev Respir Med*. 2020 Oct;14(10):1045-1063. doi: 10.1080/17476348.2020.1794827.
14. Naeem M, Ballard DH, Jawad H, et al. Noninfectious Granulomatous Diseases of the Chest. *Radiographics*. 2020 Jul-Aug;40(4):1003-1019. doi: 10.1148/rg.2020190180.
15. Jolly M, Molta C, Hoffman G. Wegener's granulomatosis: pitfalls in the management of pulmonary disease: a case of Wegener's granulomatosis with a hilar mass. *J Rheumatol* 2000;27:2511-2512
16. Stebbing J, Askin F, Fishman E, Stone J. Pulmonary manifestations of ulcerative colitis mimicking Wegener's granulomatosis. *J Rheumatol* 1999;26:1617-1621
17. Ohshimo S, Guzman J, Costabel U, et al. Differential diagnosis of granulomatous lung disease: clues and pitfalls. *Eur Respir Rev* 2017; 26: 170012 [https://doi.org/10.1183/16000617.0012-2017].
18. Woodard BH, Rosenberg SI, Farnham R, et al. Incidence and nature of primary granulomatous inflammation in surgically removed material. *Am J Surg Pathol* .1982; 6: 119-129.
19. Katzenstein AA, Askin FB. Surgical pathology of non-neoplastic lung disease. *Major Probl Pathol*. 1982;13:1-430. PMID: 7087547.
20. Kommareddi S, Abramowsky CR, Swinehart GL, et al. Nontuberculous mycobacterial infections: comparison of the fluorescent auramine-O and Ziehl-Neelsen techniques in tissue diagnosis. *Hum Pathol* 1984; 15: 1085-1089.

maz. RD/ ÇİD-TB saptandığında, hastanın birinci seçenek ilaçlarla TB tedavisi sonlandırılarak ikinci seçenek ilaçlarla tedaviye geçilir. Moleküler ve fenotipik yeni ilaç duyarlılık sonuçlarına göre tedavi rejimi yenilenir. Dirençli olgularının tedavisinde temel prensip, basilin duyarlı olduğu, üçten az olmamak şartıyla, olabildiğince fazla sayıda ilacı yan etkiler, ilaç etkileşimleri göz önünde bulundurularak uzun süre boyunca uygulama şeklindedir (13). İlaç direnci olan olgularda, kinolonlar (levofloksasin, moksifloksasin, gatifloksasin), parenteral ilaçlar (amikasin, kapreomisin, kanamisin), diğer temel ikinci seçenek ilaçlar (etyonamid/protionamid, sikloserin/terizidon, linezolid, klofazimin) ve bedakuilin, delamanid, paraaminosalisilik asit, imipenem-silastatin., meropenem, amoksisilin-klavulanat, thioasetazon gibi ilaçlardan oluşturulan tedavi rejimleri kullanılmaktadır (13).

KAYNAKLAR

1. Pfyffer GE. Mycobacterium: General Characteristics, Laboratory Detection, and Staining Procedures. In: Jorgensen JH, Pfaller MA, Carroll KC, Funke G, Landry ML, Richter SS, et al. editors. Manual of Clinical Microbiology, 11th ed. Washington, DC: ASM Press; 2015. p. 536-69.
2. Alexander KA, Laver PN, Michel AL, Williams M, van Helden PD, Warren RM, et al. Novel Mycobacterium tuberculosis complex pathogen, *M. mungi*. Emerg Infect Dis 2010; 16: 1296-9.
3. van Ingen J, Rahim Z, Mulder A, Boeree MJ, Simeone R, Brosch R, et al. Characterization of Mycobacterium orygis as *M. tuberculosis* complex subspecies. Emerg Infect Dis 2012; 18: 653-5.
4. Salyers AA, Whitt DD, editors. Tuberculosis. Bacterial Pathogenesis: A Molecular Approach. Washington, DC: ASM Press; 1994. p. 307-21
5. Fitzgerald DW, Sterling TR, Haas DW. Mycobacterium tuberculosis. In: Mandell GL, Bennett JE, Dolin R, editors. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 7th ed. Philadelphia, PA: Churchill Livingstone Elsevier; 2011. p. 3129-63.
6. Kunnath-Velayudhan S, Gennaro ML. Immunodiagnosis of tuberculosis: a dynamic view of biomarker discovery. Clin Microbiol Rev 2011; 24: 792-805

7. Houben RM, Dodd PJ. The Global Burden of Latent Tuberculosis Infection: A Re-estimation Using Mathematical Modelling. *PLoS Med* 2016; 13:e1002152.
8. World Health Organization. Global tuberculosis report 2020. <https://www.who.int/publications/i/item/9789240013131> (Accessed on April 05, 2021).
9. World Health Organization. Global tuberculosis report 2021. <https://www.who.int/publications/i/item/9789240037021> (Accessed on November 08, 2021).
10. Corbett EL, Marston B, Churchyard GJ, De Cock KM. Tuberculosis in sub-Saharan Africa: opportunities, challenges, and change in the era of antiretroviral treatment. *Lancet* 2006; 367:926.
11. Wright A, Zignol M, Van Deun A, et al. Epidemiology of antituberculosis drug resistance 2002-07: an updated analysis of the Global Project on Anti-Tuberculosis Drug Resistance Surveillance. *Lancet* 2009; 373:1861.
12. Türkiye'de Verem Savaşı 2020 Raporu. <https://hsgm.saglik.gov.tr/tr/tuberkuloz-haberler/turkiye-de-verem-savasi.html>
13. Tüberküloz Tanı ve Tedavi Rehberi. 2. Baskı Ankara, Mayıs 2019 ISBN: 978-975-590-717-8 Sağlık Bakanlığı Yayın No: 1129
14. Sia JK, Rengarajan J. Immunology of Mycobacterium tuberculosis Infections. *Microbiol Spectr*. 2019 Jul;7(4):10.1128/microbiolspec.GPP3-0022-2018. doi: 10.1128/microbiolspec.GPP3-0022-2018
15. Orme IM, Collins FM. Protection against Mycobacterium tuberculosis infection by adoptive immunotherapy. Requirement for T cell-deficient recipients. *J Exp Med* 1983; 158:74.
16. Centers for Disease Control and Prevention. Tuberculosis: Basic TB Facts. <http://www.cdc.gov/tb/topic/basics/risk.htm> (Accessed on March 10,2021).
17. Sloot R, Schim van der Loeff ME, Kouw PM, Borgdorff MW. Risk of tuberculosis after recent exposure. A 10-year follow-up study of contacts in Amsterdam. *Am J Respir Crit Care Med* 2014; 190:1044.
18. Comstock GW. Epidemiology of tuberculosis. *Am Rev Respir Dis* 1982; 125:8.
19. National action plan to combat multidrug-resistant tuberculosis. *MMWR Recomm Rep* 1992; 41:5.
20. Horsburgh CR Jr, Rubin EJ. Clinical practice. Latent tuberculosis infection in the United States. *N Engl J Med* 2011; 364:1441.
21. Leung AN. Pulmonary tuberculosis: the essentials. *Radiology* 1999; 210:307.
22. Ohshimo S, Guzman J, Costabel U, et al. Differential diagnosis of granulomatous lung disease: clues and pitfalls. *Eur Respir Rev* 2017; 26: 170012

23. Goodwin RA, Des Prez RM. Apical localization of pulmonary tuberculosis, chronic pulmonary histoplasmosis, and progressive massive fibrosis of the lung. *Chest* 1983; 83: 801-5.
24. Bates MN, Khalakdina A, Pai M, et al. Risk of tuberculosis from exposure to tobacco smoke: a systematic review and meta-analysis. *Arch Intern Med* 2007; 167:335.
25. Smith GS, Van Den Eeden SK, Baxter R, et al. Cigarette smoking and pulmonary tuberculosis in northern California. *J Epidemiol Community Health* 2015; 69:568.
26. Ponziak A. Clinical manifestations and complications of pulmonary tuberculosis. Uptodate. Available at: <https://pdfs.semanticscholar.org/7723/086f14ec71d45b527deb625d3f3d32c1bf61.pdf>. Accessed Jan 08, 2023
27. Şengül A. Evaluation of Clinic and Radiologic Findings and Side Effect Profiles in Pulmonary Tuberculosis Patients, A Single Center Experience. *Kocaeli Medical Journal* 11 (2), 14-21
28. Stumpe KD, Dazzi H, Schaffner A, von Schulthess GK. Infection imaging using whole-body FDG-PET. *Eur J Nucl Med* 2000; 27:822.
29. Goo JM, Im JG, Do KH, et al. Pulmonary tuberculoma evaluated by means of FDG PET: findings in 10 cases. *Radiology* 2000; 216:117.
30. Hara T, Kosaka N, Suzuki T, et al. Uptake rates of 18F-fluorodeoxyglucose and 11C-choline in lung cancer and pulmonary tuberculosis: a positron emission tomography study. *Chest* 2003; 124:893.
31. Vorster M, Maes A, Van de Wiele C, Sathekghe MM. 68Ga-citrate PET/CT in Tuberculosis: A pilot study. *Q J Nucl Med Mol Imaging* 2014.
32. Centers for Disease Control and Prevention. Report of an Expert Consultation on the Uses of Nucleic Acid Amplification Tests for the Diagnosis of Tuberculosis. https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.cdc.gov%2Ftb%2Fpublications%2Fguidelines%2Famplification_tests%2Fdefault.htm&data=04%7C01%7CEmily.Palmer%40wolterskluwer.com%7Cfd9f907fcc584072fc1008d9a44d9125%7C8ac76c91e7f141ffa89c3553b2da2c17%7C0%7C0%7C637721475944856445%7CUnkn (Accessed on November 10, 2021).
34. Nelson SM, Deike MA, Cartwright CP. Value of examining multiple sputum specimens in the diagnosis of pulmonary tuberculosis. *J Clin Microbiol* 1998; 36:467.
35. Rieder HL, Chiang CY, Rusen ID. A method to determine the utility of the third diagnostic and the second follow-up sputum smear examinations to diagnose tuberculosis cases and failures. *Int J Tuberc Lung Dis* 2005; 9:384.

36. Al Zahrani K, Al Jahdali H, Poirier L, et al. Yield of smear, culture and amplification tests from repeated sputum induction for the diagnosis of pulmonary tuberculosis. *Int J Tuberc Lung Dis* 2001; 5:855.
37. Davis JL, Cattamanchi A, Cuevas LE, et al. Diagnostic accuracy of same-day microscopy versus standard microscopy for pulmonary tuberculosis: a systematic review and meta-analysis. *Lancet Infect Dis* 2013; 13:147.
38. Schoch OD, Rieder P, Tueller C, et al. Diagnostic yield of sputum, induced sputum, and bronchoscopy after radiologic tuberculosis screening. *Am J Respir Crit Care Med* 2007; 175:80.
39. Brown M, Varia H, Bassett P, et al. Prospective study of sputum induction, gastric washing, and bronchoalveolar lavage for the diagnosis of pulmonary tuberculosis in patients who are unable to expectorate. *Clin Infect Dis* 2007; 44:1415.
40. Anderson C, Inhaber N, Menzies D. Comparison of sputum induction with fiber-optic bronchoscopy in the diagnosis of tuberculosis. *Am J Respir Crit Care Med* 1995; 152:1570.
41. Conde MB, Soares SL, Mello FC, et al. Comparison of sputum induction with fiberoptic bronchoscopy in the diagnosis of tuberculosis: experience at an acquired immune deficiency syndrome reference center in Rio de Janeiro, Brazil. *Am J Respir Crit Care Med* 2000; 162:2238.
42. Palomino JC. Newer diagnostics for tuberculosis and multi-drug resistant tuberculosis. *Curr Opin Pulm Med* 2006; 12:172.
43. Curry International Tuberculosis Center. Drug-Resistant Tuberculosis: A Survival Guide for Clinicians, Third Edition. CITC, Washington, DC 2016. http://www.currytbccenter.ucsf.edu/sites/default/files/tb_sg3_book.pdf (Accessed on July 12, 2016).
44. Hobby GL, Holman AP, Iseman MD, Jones JM. Enumeration of tubercle bacilli in sputum of patients with pulmonary tuberculosis. *Antimicrob Agents Chemother* 1973; 4:94.
45. Steingart KR, Henry M, Ng V, et al. Fluorescence versus conventional sputum smear microscopy for tuberculosis: a systematic review. *Lancet Infect Dis* 2006; 6:570.
46. Harries AD, Maher D, Nunn P. An approach to the problems of diagnosing and treating adult smear-negative pulmonary tuberculosis in high-HIV-prevalence settings in sub-Saharan Africa. *Bull World Health Organ* 1998; 76:651.
47. Perlman DC, El-Helou P, Salomon N. Tuberculosis in patients with human immunodeficiency virus infection. *Semin Respir Infect* 1999; 14:344.
48. Steingart KR, Ng V, Henry M, et al. Sputum processing methods to improve the sensitivity of smear microscopy for tuberculosis: a systematic review. *Lancet Infect Dis* 2006; 6:664.

49. Reid MJ, Shah NS. Approaches to tuberculosis screening and diagnosis in people with HIV in resource-limited settings. *Lancet Infect Dis* 2009; 9:173.
50. Peterson EM, Nakasone A, Platon-DeLeon JM, et al. Comparison of direct and concentrated acid-fast smears to identify specimens culture positive for *Mycobacterium* spp. *J Clin Microbiol* 1999; 37:3564.
51. Marais BJ, Brittle W, Painczyk K, et al. Use of light-emitting diode fluorescence microscopy to detect acid-fast bacilli in sputum. *Clin Infect Dis* 2008; 47:203.
52. Morgan MA, Horstmeier CD, DeYoung DR, Roberts GD. Comparison of a radiometric method (BACTEC) and conventional culture media for recovery of mycobacteria from smear-negative specimens. *J Clin Microbiol* 1983; 18:384.
53. Ichiyama S, Shimokata K, Takeuchi J. Comparative study of a biphasic culture system (Roche MB Check system) with a conventional egg medium for recovery of mycobacteria. *Aichi Mycobacteriosis Research Group. Tuber Lung Dis* 1993; 74:338.
54. Bernardo J. Diagnosis of pulmonary tuberculosis in adults. Uptodate. Available at: https://e1c9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/diagnosis-of-pulmonary-tuberculosis-in-adults?search=diagnosis%20tuberculosis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1. Accessed 01 Jan 2023
55. Marks SM, Cronin W, Venkatappa T, et al. The health-system benefits and cost-effectiveness of using *Mycobacterium tuberculosis* direct nucleic acid amplification testing to diagnose tuberculosis disease in the United States. *Clin Infect Dis* 2013; 57:532.
56. Cheng VC, Yew WW, Yuen KY. Molecular diagnostics in tuberculosis. *Eur J Clin Microbiol Infect Dis* 2005; 24:711.
57. Conaty SJ, Claxton AP, Enoch DA, et al. The interpretation of nucleic acid amplification tests for tuberculosis: do rapid tests change treatment decisions? *J Infect* 2005; 50:187.
58. Nakiyingi L, Moodley VM, Manabe YC, et al. Diagnostic accuracy of a rapid urine lipoarabinomannan test for tuberculosis in HIV-infected adults. *J Acquir Immune Defic Syndr* 2014; 66:270.
59. Peter JG, Theron G, van Zyl-Smit R, et al. Diagnostic accuracy of a urine lipoarabinomannan strip-test for TB detection in HIV-infected hospitalised patients. *Eur Respir J* 2012; 40:1211.
60. Peter JG, Zijenah LS, Chanda D, et al. Effect on mortality of point-of-care, urine-based lipoarabinomannan testing to guide tuberculosis treatment initiation in HIV-positive hospital inpatients: a pragmatic, paral-

- lel-group, multicountry, open-label, randomised controlled trial. *Lancet* 2016; 387:1187.
61. Broger T, Sossen B, du Toit E, et al. Novel lipoarabinomannan point-of-care tuberculosis test for people with HIV: a diagnostic accuracy study. *Lancet Infect Dis* 2019; 19:852.
 62. Shah M, Hanrahan C, Wang ZY, et al. Lateral flow urine lipoarabinomannan assay for detecting active tuberculosis in HIV-positive adults. *Cochrane Database Syst Rev* 2016; :CD011420.
 63. Nahid P, Dorman SE, Alipanah N, et al. Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis. *Clin Infect Dis* 2016; 63:e147.
 64. Carr W, Kurbatova E, Starks A, et al. Interim Guidance: 4-Month Rifapentine-Moxifloxacin Regimen for the Treatment of Drug-Susceptible Pulmonary Tuberculosis - United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022; 71:285.
 65. WHO Consolidated Guidelines on Tuberculosis, Module 4: Treatment - Drug-Susceptible Tuberculosis Treatment. World Health Organization. Available at: <https://www.who.int/publications/i/item/9789240048126> (Accessed on December 26, 2022).
 66. Dheda K, Barry CE 3rd, Maartens G. Tuberculosis. *Lancet* 2016; 387:1211.
 67. Horsburgh CR Jr, Barry CE 3rd, Lange C. Treatment of Tuberculosis. *N Engl J Med* 2015; 373:2149.
 68. Mitchison DA. The action of antituberculosis drugs in short-course chemotherapy. *Tubercle* 1985; 66:219-25.
 69. Mitchison DA. Modern methods for assessing the drugs used in the chemotherapy of mycobacterial disease. *Soc Appl Bacteriol Symp Ser.* 1996; 25:72S-80S.

KAYNAKLAR

1. Wolinsky E. Nontuberculous mycobacteria and associated diseases. *Am Rev Respir Dis* 1979; 119:107.
2. Griffith DE, Aksamit T, Brown-Elliott BA, et al. An official ATS/IDSA statement: diagnosis, treatment, and prevention of nontuberculous mycobacterial diseases. *Am J Respir Crit Care Med* 2007; 175:367.
3. Diagnosis and treatment of disease caused by nontuberculous mycobacteria. This official statement of the American Thoracic Society was approved by the Board of Directors, March 1997. Medical Section of the American Lung Association. *Am J Respir Crit Care Med* 1997; 156:S1.
4. Wolinsky E, Rynearson TK. Mycobacteria in soil and their relation to disease-associated strains. *Am Rev Respir Dis* 1968; 97:1032.
5. Phillips MS, von Reyn CF. Nosocomial infections due to nontuberculous mycobacteria. *Clin Infect Dis* 2001; 33:1363.
6. Chapman JS. *The Atypical Mycobacteria and Human Mycobacteriosis*, 16th Ed, Plenum, New York 1977.
7. Yeager H Jr, Raleigh JW. Pulmonary disease due to *Mycobacterium intracellulare*. *Am Rev Respir Dis* 1973; 108:547.
8. Davidson PT. The diagnosis and management of disease caused by *M. avium* complex, *M. kansasii*, and other mycobacteria. *Clin Chest Med* 1989; 10:431.
9. Woodring JH, Vandiviere HM. Pulmonary disease caused by nontuberculous mycobacteria. *J Thorac Imaging* 1990; 5:64.
10. Christensen EE, Dietz GW, Ahn CH, et al. Initial roentgenographic manifestations of pulmonary *Mycobacterium tuberculosis*, *M kansasii*, and *M intracellulare* infections. *Chest* 1981; 80:132.
11. Levin DL. Radiology of pulmonary *Mycobacterium avium*-intracellulare complex. *Clin Chest Med* 2002; 23:603.
12. Swensen SJ, Hartman TE, Williams DE. Computed tomographic diagnosis of *Mycobacterium avium*-intracellulare complex in patients with bronchiectasis. *Chest* 1994; 105:49.
13. Koh WJ, Lee KS, Kwon OJ, et al. Bilateral bronchiectasis and bronchiolitis at thin-section CT: diagnostic implications in nontuberculous mycobacterial pulmonary infection. *Radiology* 2005; 235:282.
14. Cappelluti E, Fraire AE, Schaefer OP. A case of "hot tub lung" due to *Mycobacterium avium* complex in an immunocompetent host. *Arch Intern Med* 2003; 163:845.
15. Khor A, Leslie KO, Tazelaar HD, et al. Diffuse pulmonary disease caused by nontuberculous mycobacteria in immunocompetent people (hot tub

- lung). *Am J Clin Pathol* 2001; 115:755.
16. Kahana LM, Kay JM, Yakrus MA, Wasserman S. *Mycobacterium avium* complex infection in an immunocompetent young adult related to hot tub exposure. *Chest* 1997; 111:242.
 17. Embil J, Warren P, Yakrus M, et al. Pulmonary illness associated with exposure to *Mycobacterium-avium* complex in hot tub water. Hypersensitivity pneumonitis or infection? *Chest* 1997; 111:813.
 18. Daley CL, Iaccarino JM, Lange C, et al. Treatment of Nontuberculous Mycobacterial Pulmonary Disease: An Official ATS/ERS/ESCMID/IDSA Clinical Practice Guideline. *Clin Infect Dis* 2020; 71:e1.

KAYNAKLAR

1. Ohshimo S, Guzman J, Costabel U, et al. Differential diagnosis of granulomatous lung disease: clues and pitfalls: Number 4 in the Series "Pathology for the clinician" Edited by Peter Dorfmueller and Alberto Cavazza. *Eur Respir Rev*. 2017 Aug 9;26(145):170012
2. Goodwin RA Jr, Shapiro JL, Thurman GH, et al. Disseminated histoplasmosis: clinical and pathologic correlations. *Medicine* 1980; 59: 1–33.,
3. Li Z, Lu G, Meng G. Pathogenic Fungal Infection in the Lung. *Front Immunol*. 2019 Jul 3;10:1524. doi: 10.3389/fimmu.2019.01524. PMID: 31333658; PMCID: PMC6616198.
4. Patterson T.F, Kirkpatrick W.R., White M., et. al.: Invasive aspergillosis. Disease spectrum, treatment practices, and outcomes. I3 Aspergillus Study Group. *Medicine (Baltimore)*. 2000; 79: pp. 250-260.
5. Panackal A.A., Li H., Kontoyiannis D.P., et. al.: Geoclimatic influences on invasive aspergillosis after hematopoietic stem cell transplantation. *Clin Infect Dis* 2010; 50: pp. 1588-1597.
6. Tracy MC, Okorie CUA, Foley EA, et al. Allergic bronchopulmonary aspergillosis. *J Fungi* 2016; 2: 17. doi:10.3390/jof2020017
7. Denning DW, Cadranel J, Beigelman-Aubry C, et al. Chronic pulmonary aspergillosis: rationale and clinical guidelines for diagnosis and management. *Eur Respir J* 2016; 47: 45–68. doi:10.1183/13993003.00583-2015Abstract
8. Cadena J, Thompson GR III, Patterson TF. Aspergillosis: epidemiology, diagnosis, and treatment. *Infect Dis Clin North Am* 2021; 35: 415–434. doi:10.1016/j.idc.2021.03.008
9. Klich M., Pitt J.: A laboratory guide to common Aspergillus species and their teleomorphs. 1988. Commonwealth Scientific and Industrial Research Organization North Ryde, New South Wales, Australia
10. O’Gorman C.M., Fuller H.T., Dyer P.S.: Discovery of a sexual cycle in the opportunistic fungal pathogen *Aspergillus fumigatus*. *Nature* 2009; 457: pp. 471-474.
11. Pitt J.I., Samson R.A.: Nomenclatural considerations in naming species of *Aspergillus* and its teleomorphs. *Stud Mycol* 2007; 59: pp. 67-70.
12. Frederic Lamoth, Thierry Calandra. Pulmonary aspergillosis: diagnosis and treatment. *European Respiratory Review* 2022 31: 220114; DOI: 10.1183/16000617.0114-2022
13. Jose Cadena, George R. Thompson and Thomas F. Patterson MD. Aspergillosis. *Infectious Disease Clinics of North America*, 2021-06-01, Volume 35, Issue 2, Pages 415-434,

14. Agarwal R, Sehgal IS, Dhoooria S, Aggarwal AN. Developments in the diagnosis and treatment of allergic bronchopulmonary aspergillosis. *Expert Rev Respir Med* 2016; 10:1317.
15. Wark PA, Gibson PG, Wilson AJ. Azoles for allergic bronchopulmonary aspergillosis associated with asthma. *Cochrane Database Syst Rev* 2004; :CD001108.
16. Gothe F, Schmutz A, Häusler K, et al. Treating Allergic Bronchopulmonary Aspergillosis with Short-Term Prednisone and Itraconazole in Cystic Fibrosis. *J Allergy Clin Immunol Pract* 2020; 8:2608.
17. Denning D.W., Riniotis K., Dobrashian R., et. al.: Chronic cavitary and fibrosing pulmonary and pleural aspergillosis: case series, proposed nomenclature change, and review. *Clin Infect Dis* 2003; 37: pp. S265-S280.
18. Muldoon EG, Sharman A, Page I, et al. Aspergillus nodules; another presentation of Chronic Pulmonary Aspergillosis. *BMC Pulm Med* 2016; 16:123.
19. Baxter CG, Bishop P, Low SE, et al. Pulmonary aspergillosis: an alternative diagnosis to lung cancer after positive [18F]FDG positron emission tomography. *Thorax* 2011; 66:638.
20. Farid S, Mohamed S, Devbhandari M, et al. Results of surgery for chronic pulmonary Aspergillosis, optimal antifungal therapy and proposed high risk factors for recurrence--a National Centre's experience. *J Cardiothorac Surg* 2013; 8:180.
21. Denning DW, Cadranell J, Beigelman-Aubry C, et al. Chronic pulmonary aspergillosis: rationale and clinical guidelines for diagnosis and management. *Eur Respir J* 2016; 47:45.
22. Denning DW, Riniotis K, Dobrashian R, Sambatakou H. Chronic cavitary and fibrosing pulmonary and pleural aspergillosis: case series, proposed nomenclature change, and review. *Clin Infect Dis* 2003; 37 Suppl 3:S265.
23. Kosmidis C, Newton P, Muldoon EG, Denning DW. Chronic fibrosing pulmonary aspergillosis: a cause of 'destroyed lung' syndrome. *Infect Dis (Lond)* 2017; 49:296.
24. Izumikawa K, Yamamoto Y, Mihara T, et al. Bronchoalveolar lavage galactomannan for the diagnosis of chronic pulmonary aspergillosis. *Med Mycol* 2012; 50:811.
25. Vergidis P, Moore CB, Novak-Frazer L, et al. High-volume culture and quantitative real-time PCR for the detection of Aspergillus in sputum. *Clin Microbiol Infect* 2020; 26: 935–940. doi:10.1016/j.cmi.2019.11.019Google Scholar
26. Moazam S, Eades CP, Muldoon EG, et al. Positive Aspergillus PCR as a marker of azole resistance or sub-therapeutic antifungal therapy in pa-

- tients with chronic pulmonary aspergillosis. *Mycoses* 2020; 63: 376–381. doi:10.1111/myc.13052
27. Agarwal R, Vishwanath G, Aggarwal AN, et al. Itraconazole in chronic cavitary pulmonary aspergillosis: a randomised controlled trial and systematic review of literature. *Mycoses* 2013; 56: 559–570. doi:10.1111/myc.12075
 28. Jain LR, Denning DW. The efficacy and tolerability of voriconazole in the treatment of chronic cavitary pulmonary aspergillosis. *J Infect* 2006; 52: e133–e137. doi:10.1016/j.jinf.2005.08.022
 29. Saito T, Fujiuchi S, Tao Y, et al. Efficacy and safety of voriconazole in the treatment of chronic pulmonary aspergillosis: experience in Japan. *Infection* 2012; 40: 661–667. doi:10.1007/s15010-012-0322-x
 30. Goyal RK. Voriconazole-associated phototoxic dermatoses and skin cancer. *Expert Rev Anti Infect Ther* 2015; 13: 1537–1546. doi:10.1586/14787210.2015.1102053
 31. Kohno S, Izumikawa K, Takeya H, et al. Clinical efficacy and safety of micafungin in Japanese patients with chronic pulmonary aspergillosis: a prospective observational study. *Med Mycol* 2011; 49: 688–693.
 32. Kravitz JN, Berry MW, Schabel SI, et al. A modern series of percutaneous intracavitary instillation of amphotericin B for the treatment of severe hemoptysis from pulmonary aspergilloma. *Chest* 2013; 143: 1414–1421. doi:10.1378/chest.12-1784
 33. Laursen CB, Davidsen JR, Van Acker L, et al. CPAnet registry—an international chronic pulmonary aspergillosis registry. *J Fungi* 2020; 6: 96. doi:10.3390/jof6030096
 34. Smith JA, Kauffman CA. Pulmonary fungal infections. *Respirology* 2012; 17: 913–26.
 35. Thompson G.R., Patterson T.F.: Pulmonary aspergillosis: recent advances. *Semin Respir Crit Care Med* 2011; 32: pp. 673–681.
 36. Caillot D., Couaillier J.F., Bernard A., et. al.: Increasing volume and changing characteristics of invasive pulmonary aspergillosis on sequential thoracic computed tomography scans in patients with neutropenia. *J Clin Oncol* 2001; 19: pp. 253–259.
 37. Greene R.: The radiological spectrum of pulmonary aspergillosis. *Med Mycol* 2005; 43: pp. S147–S154.
 38. Donnelly JP, Chen SC, Kauffman CA, et al. Revision and Update of the Consensus Definitions of Invasive Fungal Disease From the European Organization for Research and Treatment of Cancer and the Mycoses Study Group Education and Research Consortium. *Clin Infect Dis* 2020; 71:1367.

39. Mercier T, Castagnola E, Marr KA, et al. Defining Galactomannan Positivity in the Updated EORTC/MSGERC Consensus Definitions of Invasive Fungal Diseases. *Clin Infect Dis* 2021; 72:S89.
40. Odabasi Z, Mattiuzzi G, Estey E, et al. Beta-D-glucan as a diagnostic adjunct for invasive fungal infections: validation, cutoff development, and performance in patients with acute myelogenous leukemia and myelodysplastic syndrome. *Clin Infect Dis* 2004; 39:199.
41. Ostrosky-Zeichner L, Alexander BD, Kett DH, et al. Multicenter clinical evaluation of the (1->3) beta-D-glucan assay as an aid to diagnosis of fungal infections in humans. *Clin Infect Dis* 2005; 41:654.
42. Koo S, Bryar JM, Page JH, et al. Diagnostic performance of the (1->3)-beta-D-glucan assay for invasive fungal disease. *Clin Infect Dis* 2009; 49:1650.
43. Sulahian A, Porcher R, Bergeron A, et al. Use and limits of (1-3)- β -d-glucan assay (Fungitell), compared to galactomannan determination (*Platelia Aspergillus*), for diagnosis of invasive aspergillosis. *J Clin Microbiol* 2014; 52:2328.
44. White PL, Bretagne S, Caliendo AM, et al. *Aspergillus* Polymerase Chain Reaction-An Update on Technical Recommendations, Clinical Applications, and Justification for Inclusion in the Second Revision of the EORTC/MSGERC Definitions of Invasive Fungal Disease. *Clin Infect Dis* 2021; 72:S95.
45. Frederic Lamoth, Thierry Calandra. Pulmonary aspergillosis: diagnosis and treatment. *European Respiratory Review* 2022 31: 220114; DOI: 10.1183/16000617.0114-2022
46. Patterson TF, Thompson GR III, Denning DW, et al. Practice guidelines for the diagnosis and management of aspergillosis: 2016 update by the infectious diseases Society of America. *Clin Infect Dis* 2016; 63: e1-e60. doi:10.1093/cid/ciw326
47. Ullmann AJ, Aguado JM, Arikan-Akdagli S, et al. Diagnosis and management of *Aspergillus* diseases: executive summary of the 2017 ESCMID-ECMM-ERS guideline. *Clin Microbiol Infect* 2018; 24: Suppl 1, e1-e38. doi:10.1016/j.cmi.2018.01.002
48. Kauffman CA, Malani AN. Zygomycosis: an emerging fungal infection with new options for management. *Curr Infect Dis Rep* 2007; 9:435.
49. Roden MM, Zaoutis TE, Buchanan WL, et al. Epidemiology and outcome of zygomycosis: a review of 929 reported cases. *Clin Infect Dis* 2005; 41:634.
50. Marr KA, Carter RA, Crippa F, et al. Epidemiology and outcome of mould infections in hematopoietic stem cell transplant recipients. *Clin Infect Dis* 2002; 34:909.

51. Kontoyiannis DP, Lionakis MS, Lewis RE, et al. Zygomycosis in a tertiary-care cancer center in the era of Aspergillus-active antifungal therapy: a case-control observational study of 27 recent cases. *J Infect Dis* 2005; 191:1350.
52. Kontoyiannis DP. Decrease in the number of reported cases of zygomycosis among patients with diabetes mellitus: a hypothesis. *Clin Infect Dis* 2007; 44:1089.
53. Petrikkos G, Skiada A, Lortholary O, et al. Epidemiology and clinical manifestations of mucormycosis. *Clin Infect Dis* 2012; 54 Suppl 1:S23.
54. Farmakiotis D, Kontoyiannis DP. Mucormycoses. *Infect Dis Clin North Am* 2016; 30:143.
55. Helenglass G, Elliott JA, Lucie NP. An unusual presentation of opportunistic mucormycosis. *Br Med J (Clin Res Ed)* 1981; 282:108.
56. Tedder M, Spratt JA, Anstadt MP, et al. Pulmonary mucormycosis: results of medical and surgical therapy. *Ann Thorac Surg* 1994; 57:1044.
57. Brown RB, Johnson JH, Kessinger JM, Sealy WC. Bronchovascular mucormycosis in the diabetic: an urgent surgical problem. *Ann Thorac Surg* 1992; 53:854.
58. al-Abbadi MA, Russo K, Wilkinson EJ. Pulmonary mucormycosis diagnosed by bronchoalveolar lavage: a case report and review of the literature. *Pediatr Pulmonol* 1997; 23:222.
59. Latif S, Saffarian N, Bellovich K, Provenzano R. Pulmonary mucormycosis in diabetic renal allograft recipients. *Am J Kidney Dis* 1997; 29:461.
60. Chavanet P, Lefranc T, Bonnin A, et al. Unusual cause of pharyngeal ulcerations in AIDS. *Lancet* 1990; 336:383.
61. Chamilos G, Marom EM, Lewis RE, et al. Predictors of pulmonary zygomycosis versus invasive pulmonary aspergillosis in patients with cancer. *Clin Infect Dis* 2005; 41:60.
62. Wahba H, Truong MT, Lei X, et al. Reversed halo sign in invasive pulmonary fungal infections. *Clin Infect Dis* 2008; 46:1733.
63. Georgiadou SP, Sipsas NV, Marom EM, Kontoyiannis DP. The diagnostic value of halo and reversed halo signs for invasive mold infections in compromised hosts. *Clin Infect Dis* 2011; 52:1144.
64. Legouge C, Caillot D, Chrétien ML, et al. The reversed halo sign: pathognomonic pattern of pulmonary mucormycosis in leukemic patients with neutropenia? *Clin Infect Dis* 2014; 58:672.
65. al-Abbadi MA, Russo K, Wilkinson EJ. Pulmonary mucormycosis diagnosed by bronchoalveolar lavage: a case report and review of the literature. *Pediatr Pulmonol* 1997; 23:222.
66. McCarthy M, Rosengart A, Schuetz AN, et al. Mold infections of the central nervous system. *N Engl J Med* 2014; 371:150.

67. Cornely OA, Alastruey-Izquierdo A, Arenz D, et al. Global guideline for the diagnosis and management of mucormycosis: an initiative of the European Confederation of Medical Mycology in cooperation with the Mycoses Study Group Education and Research Consortium. *Lancet Infect Dis* 2019; 19:e405.
68. Sun HY, Aguado JM, Bonatti H, et al. Pulmonary zygomycosis in solid organ transplant recipients in the current era. *Am J Transplant* 2009; 9:2166.
69. Coc GM. Mucormycosis (zygomycosis). Uptodate. https://e1c-9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/mucormycosis-zygomycosis?search=PULMONARY%20MUCOMYCOsis&source=search_result&selectedTitle=1~85&usage_type=default&display_rank=1. Accessed 03 Jan 2023.
70. Chu JH, Feudtner C, Heydon K, et al. Hospitalizations for endemic mycoses: a population-based national study. *Clin Infect Dis* 2006; 42:822.
71. Kauffman CA. Histoplasmosis: a clinical and laboratory update. *Clin Microbiol Rev* 2007; 20:115.
72. Benedict K, Mody RK. Epidemiology of Histoplasmosis Outbreaks, United States, 1938-2013. *Emerg Infect Dis* 2016; 22:370.
73. Wheat LJ, Conces D, Allen SD, et al. Pulmonary histoplasmosis syndromes: recognition, diagnosis, and management. *Semin Respir Crit Care Med* 2004; 25:129.
74. Gustafson TL, Kaufman L, Weeks R, et al. Outbreak of acute pulmonary histoplasmosis in members of a wagon train. *Am J Med* 1981; 71:759.
75. Ward JI, Weeks M, Allen D, et al. Acute histoplasmosis: clinical, epidemiologic and serologic findings of an outbreak associated with exposure to a fallen tree. *Am J Med* 1979; 66:587.
76. Centers for Disease Control and Prevention (CDC). Outbreak of histoplasmosis among industrial plant workers--Nebraska, 2004. *MMWR Morb Mortal Wkly Rep* 2004; 53:1020.
77. Luby JP, Southern PM Jr, Haley CE, et al. Recurrent exposure to *Histoplasma capsulatum* in modern air-conditioned buildings. *Clin Infect Dis* 2005; 41:170.
78. Centers for Disease Control and Prevention (CDC). Histoplasmosis outbreak associated with the renovation of an old house - Quebec, Canada, 2013. *MMWR Morb Mortal Wkly Rep* 2014; 62:1041.
79. Kataria YP, Campbell PB, Burlingham BT. Acute pulmonary histoplasmosis presenting as adult respiratory distress syndrome: effect of therapy on clinical and laboratory features. *South Med J* 1981; 74:534.
80. Wynne JW, Olsen GN. Acute histoplasmosis presenting as the adult respiratory distress syndrome. *Chest* 1974; 66:158.

81. Wheat LJ, Freifeld AG, Kleiman MB, Baddley JW, McKinsey DS, Loyd JE, et al. Clinical practice guidelines for the management of patients with histoplasmosis: 2007 update by the Infectious Diseases Society of America. *Clin Infect Dis* 2007; 45: 807-25.
82. Azar MM, Hage CA. Clinical Perspectives in the Diagnosis and Management of Histoplasmosis. *Clin Chest Med* 2017; 38: 403-15.
83. Yu J, Chen M, Huang Y, et al. A report of seven cases of histoplasmosis and literature review. *Chinese Journal of Infection and Chemotherapy* 2014; 14: 408-14.
84. Wang L, Guo L, Zhu M. CT features of primary pulmonary histoplasmosis. *Journal of Clinical Radiology* 2012; 31: 1727-9.
85. Valdivia L, Nix D, Wright M, Lindberg E, et al. Coccidioidomycosis as a common cause of community-acquired pneumonia. *Emerg Infect Dis* 2006; 12: 958-62.
86. Blair JE, Chang YH, Cheng MR, et al. Characteristics of patients with mild to moderate primary pulmonary coccidioidomycosis. *Emerg Infect Dis* 2014; 20: 983-90.
87. Galgiani JN, Ampel NM, Blair JE, et al. 2016 Infectious Diseases Society of America (IDSA) Clinical Practice Guideline for the Treatment of Coccidioidomycosis. *Clin Infect Dis* 2016; 63:e112.
88. Limper AH, Knox KS, Sarosi GA, Ampel NM, Bennett JE, Catanzaro A, et al. An official American Thoracic Society statement: Treatment of fungal infections in adult pulmonary and critical care patients. *Am J Respir Crit Care Med* 2011; 183: 96-128.
89. Pappas PG, Kauffman CA, Andes DR, Clancy CJ, Marr KA, Ostrosky-Zeichner L, et al. Clinical Practice Guideline for the Management of Candidiasis: 2016 Update by the Infectious Diseases Society of America. *Clin Infect Dis* 2016; 62: e1-50.

KAYNAKLAR

1. Baughman RP, Field S, Costabel U, et al. Sarcoidosis in America. Analysis Based on Health Care Use. *Ann Am Thorac Soc* 2016; 13:1244.
2. Arkema EV, Grunewald J, Kullberg S, et al. Sarcoidosis incidence and prevalence: a nationwide register-based assessment in Sweden. *Eur Respir J* 2016; 48:1690.
3. Arkema EV, Cozier YC. Sarcoidosis epidemiology: recent estimates of incidence, prevalence and risk factors. *Curr Opin Pulm Med* 2020; 26:527.
4. Thomas KW, Hunninghake GW. Sarcoidosis. *JAMA* 2003; 289:3300.
5. Fidler LM, Balter M, Fisher JH, et al. Epidemiology and health outcomes of sarcoidosis in a universal healthcare population: a cohort study. *Eur Respir J* 2019; 54.
6. Brito-Zerón P, Kostov B, Superville D, et al. Geoepidemiological big data approach to sarcoidosis: geographical and ethnic determinants. *Clin Exp Rheumatol* 2019; 37:1052.
7. Rybicki BA, Major M, Popovich J Jr, et al. Racial differences in sarcoidosis incidence: a 5-year study in a health maintenance organization. *Am J Epidemiol* 1997; 145:234.
8. Dumas O, Abramovitz L, Wiley AS, et al. Epidemiology of Sarcoidosis in a Prospective Cohort Study of U.S. Women. *Ann Am Thorac Soc* 2016; 13:67.
9. Musellim B. Epidemiological features of Turkish patients with sarcoidosis. *Respir Med*. 2009 Jun;103(6):907-12. doi: 10.1016/j.rmed.2008.12.011 Newman LS, Rose CS, Maier LA. Sarcoidosis. *N Engl J Med* 1997; 336:1224.
10. Morimoto T, Azuma A, Abe S, et al. Epidemiology of sarcoidosis in Japan. *Eur Respir J* 2008; 31:372.
11. Ungprasert P, Carmona EM, Utz JP, et al. Epidemiology of Sarcoidosis 1946-2013: A Population-Based Study. *Mayo Clin Proc* 2016; 91:183.
12. Ungprasert P, Crowson CS, Matteson EL. Influence of Gender on Epidemiology and Clinical Manifestations of Sarcoidosis: A Population-Based Retrospective Cohort Study 1976-2013. *Lung* 2017; 195:87.
13. Hattori T, Konno S, Shijubo N, et al. Nationwide survey on the organ-specific prevalence and its interaction with sarcoidosis in Japan. *Sci Rep* 2018; 8:9440.
14. Soler P, Basset F. Bir sarkoid granülom hücrelerinin morfolojisi ve dağılımı: seri bölümlerin ultrastrüktürel çalışması. *Ann NY Acad Sci* 1976; 278:147.
15. Rossi G, Cavazza A, Colby TV. Sarkoidoz Patolojisi. *Clin Rev Allergy Immunol* 2015; 49:36.

16. Ma Y, Gal A, Koss MN. Pulmoner sarkoidoz patolojisi: güncelleme. *Semin Diagn Pathol* 2007; 24:150.
17. Rybicki BA, Harrington D, Major M, et al. Heterogeneity of familial risk in sarcoidosis. *Genet Epidemiol* 1996; 13:23.
18. Brennan NJ, Crean P, Long JP, Fitzgerald MX. High prevalence of familial sarcoidosis in an Irish population. *Thorax* 1984; 39:14.
19. Rybicki BA, Kirkey KL, Major M, et al. Familial risk ratio of sarcoidosis in African-American sibs and parents. *Am J Epidemiol* 2001; 153:188.
20. Sverrild A, Backer V, Kyvik KO, et al. Heredity in sarcoidosis: a registry-based twin study. *Thorax* 2008; 63:894.
21. Müller-Quernheim J, Schürmann M, Hofmann S, et al. Genetics of sarcoidosis. *Clin Chest Med* 2008; 29:391.
22. Greene CM, Meachery G, Taggart CC, et al. Role of IL-18 in CD4+ T lymphocyte activation in sarcoidosis. *J Immunol* 2000; 165:4718.
23. large white and black cohort in the United States. *Sarcoidosis Vasc Diffuse Lung Dis* 2012; 29:119.
24. Baughman RP, Teirstein AS, Judson MA, et al. Clinical characteristics of patients in a case control study of sarcoidosis. *Am J Respir Crit Care Med* 2001; 164:1885.
25. Rizzato G, Tinelli C. Unusual presentation of sarcoidosis. *Respiration* 2005; 72:3.
26. Rizzato G, Palmieri G, Agrati AM, Zanussi C. The organ-specific extrapulmonary presentation of sarcoidosis: a frequent occurrence but a challenge to an early diagnosis. A 3-year-long prospective observational study. *Sarcoidosis Vasc Diffuse Lung Dis* 2004; 21:119.
27. Judson MA. The Clinical Features of Sarcoidosis: A Comprehensive Review. *Clin Rev Allergy Immunol* 2015; 49:63.
28. Sharma OP. Fatigue and sarcoidosis. *Eur Respir J* 1999; 13:713.
29. Chevalet P, Clément R, Rodat O, et al. Sarcoidosis diagnosed in elderly subjects: retrospective study of 30 cases. *Chest* 2004; 126:1423.
30. Spruit MA, Thomeer MJ, Gosselink R, et al. Skeletal muscle weakness in patients with sarcoidosis and its relationship with exercise intolerance and reduced health status. *Thorax* 2005; 60:32.
31. Delobbe A, Perrault H, Maitre J, et al. Impaired exercise response in sarcoid patients with normal pulmonary function. *Sarcoidosis Vasc Diffuse Lung Dis* 2002; 19:148.
32. Miller A, Brown LK, Sloane MF, et al. Cardiorespiratory responses to incremental exercise in sarcoidosis patients with normal spirometry. *Chest* 1995; 107:323.
33. Thillai M, Atkins CP, Crawshaw A, et al. BTS Clinical Statement on pulmonary sarcoidosis. *Thorax* 2021; 76:4.

34. Statement on sarcoidosis. Joint Statement of the American Thoracic Society (ATS), the European Respiratory Society (ERS) and the World Association of Sarcoidosis and Other Granulomatous Disorders (WASOG) adopted by the ATS Board of Directors and by the ERS Executive Committee, February 1999. *Am J Respir Crit Care Med* 1999; 160:736.
35. Judson MA. The diagnosis of sarcoidosis. *Clin Chest Med* 2008; 29:415.
36. de Prost N, Kerrou K, Sibony M, et al. Fluorine-18 fluorodeoxyglucose with positron emission tomography revealed bone marrow involvement in sarcoidosis patients with anaemia. *Respiration* 2010; 79:25.
37. Lower EE, Smith JT, Martelo OJ, Baughman RP. The anemia of sarcoidosis. *Sarcoidosis* 1988; 5:51.
38. Yanardağ H, Pamuk GE, Karayel T, Demirci S. Bone marrow involvement in sarcoidosis: an analysis of 50 bone marrow samples. *Haematologia (Budap)* 2002; 32:419.
39. Renston JP, Goldman ES, Hsu RM, Tomaszefski JF Jr. Peripheral blood eosinophilia in association with sarcoidosis. *Mayo Clin Proc* 2000; 75:586.
40. Spagnolo P, Cullinan P, duBois RM. Sarcoidosis. In: *Interstitial Lung Disease*, 5th, Schwarz MI, King TE Jr (Eds), People's Medical Publishing House, Shelton, CT 2011. p.433.
41. Marcellis RG, Lenssen AF, Elfferich MD, et al. Exercise capacity, muscle strength and fatigue in sarcoidosis. *Eur Respir J* 2011; 38:628.
42. McDonnell MJ, Saleem MI, Wall D, et al. Predictive value of C-reactive protein and clinically relevant baseline variables in sarcoidosis. *Sarcoidosis Vasc Diffuse Lung Dis* 2016; 33:331.
43. Sweiss NJ, Barnathan ES, Lo K, et al. C-reactive protein predicts response to infliximab in patients with chronic sarcoidosis. *Sarcoidosis Vasc Diffuse Lung Dis* 2010; 27:49.
44. Gungor S, Ozseker F, Yalcinsoy M, et al. Conventional markers in determination of activity of sarcoidosis. *Int Immunopharmacol* 2015; 25:174.
45. Studdy PR, Bird R. Serum angiotensin converting enzyme in sarcoidosis--its value in present clinical practice. *Ann Clin Biochem* 1989; 26 (Pt 1):13.
46. Baughman RP. Pulmonary sarcoidosis. *Clin Chest Med* 2004; 25:521.
47. Ungprasert P, Carmona EM, Crowson CS, Matteson EL. Diagnostic Utility of Angiotensin-Converting Enzyme in Sarcoidosis: A Population-Based Study. *Lung* 2016; 194:91.
48. Wang W, Ma Y, Zhang Y, et al. Diagnostic and Staging Value of Serum Angiotensin-Converting Enzyme in Sarcoidosis. *Comput Math Methods Med* 2022; 2022:4657502.

49. Grutters JC, Fellrath JM, Mulder L, et al. Serum soluble interleukin-2 receptor measurement in patients with sarcoidosis: a clinical evaluation. *Chest* 2003; 124:186.
50. Bennett D, Cameli P, Lanzarone N, et al. Chitotriosidase: a biomarker of activity and severity in patients with sarcoidosis. *Respir Res* 2020; 21:6.
51. Bargagli E, Bennett D, Maggiorelli C, et al. Human chitotriosidase: a sensitive biomarker of sarcoidosis. *J Clin Immunol* 2013; 33:264.
52. Kraaijvanger R, Janssen Bonás M, Vorselaars ADM, Veltkamp M. Biomarkers in the Diagnosis and Prognosis of Sarcoidosis: Current Use and Future Prospects. *Front Immunol* 2020; 11:1443.
53. Baughman RP. Pulmonary sarcoidosis. *Clin Chest Med* 2004; 25:521.
54. Hours S, Nunes H, Kambouchner M, et al. Pulmonary cavitary sarcoidosis: clinico-radiologic characteristics and natural history of a rare form of sarcoidosis. *Medicine (Baltimore)* 2008; 87:142.
55. Navaneethan SD, Venkatesh S, Shrivastava R, et al. Recurrent pleural and pericardial effusions due to sarcoidosis. *PLoS Med* 2005; 2:e63.
56. Huggins JT, Doelken P, Sahn SA, et al. Pleural effusions in a series of 181 outpatients with sarcoidosis. *Chest* 2006; 129:1599.
57. Soskel NT, Sharma OP. Pleural involvement in sarcoidosis. *Curr Opin Pulm Med* 2000; 6:455.
58. Malaisamy S, Dalal B, Bimenyuy C, Soubani AO. The clinical and radiologic features of nodular pulmonary sarcoidosis. *Lung* 2009; 187:9.
59. Sileo C, Epaud R, Mahloul M, et al. Sarcoidosis in children: HRCT findings and correlation with pulmonary function tests. *Pediatr Pulmonol* 2014; 49:1223.
60. Koyama T, Ueda H, Togashi K, et al. Radiologic manifestations of sarcoidosis in various organs. *Radiographics* 2004; 24:87.
61. Ganeshan D, Menias CO, Lubner MG, et al. Sarcoidosis from Head to Toe: What the Radiologist Needs to Know. *Radiographics* 2018; 38:1180.
62. Keijsers RG, Veltkamp M, Grutters JC. Chest Imaging. *Clin Chest Med* 2015; 36:603.
63. Criado E, Sánchez M, Ramírez J, et al. Pulmonary sarcoidosis: typical and atypical manifestations at high-resolution CT with pathologic correlation. *Radiographics* 2010; 30:1567.
64. Maturu VN, Rayamajhi SJ, Agarwal R, et al. Role of serial F-18 FDG PET/CT scans in assessing treatment response and predicting relapses in patients with symptomatic sarcoidosis. *Sarcoidosis Vasc Diffuse Lung Dis* 2016; 33:372.
65. Teirstein AS, Machac J, Almeida O, et al. Results of 188 whole-body fluorodeoxyglucose positron emission tomography scans in 137 patients with sarcoidosis. *Chest* 2007; 132:1949.

66. Chen H, Jin R, Wang Y, et al. The Utility of 18F-FDG PET/CT for Monitoring Response and Predicting Prognosis after Glucocorticoids Therapy for Sarcoidosis. *Biomed Res Int* 2018; 2018:1823710.
67. Kaira K, Oriuchi N, Otani Y, et al. Diagnostic usefulness of fluorine-18-alpha-methyltyrosine positron emission tomography in combination with 18F-fluorodeoxyglucose in sarcoidosis patients. *Chest* 2007; 131:1019.
68. Keijsers RG, van den Heuvel DA, Grutters JC. Imaging the inflammatory activity of sarcoidosis. *Eur Respir J* 2013; 41:743.
69. Braun JJ, Kessler R, Constantinesco A, Imperiale A. 18F-FDG PET/CT in sarcoidosis management: review and report of 20 cases. *Eur J Nucl Med Mol Imaging* 2008; 35:1537.
70. Nobashi T, Nakamoto Y, Kubo T, et al. The utility of PET/CT with (68) Ga-DOTATOC in sarcoidosis: comparison with (67)Ga-scintigraphy. *Ann Nucl Med* 2016; 30:544.
71. Gormsen LC, Haraldsen A, Kramer S, et al. A dual tracer (68)Ga-DOTANOC PET/CT and (18)F-FDG PET/CT pilot study for detection of cardiac sarcoidosis. *EJNMMI Res* 2016; 6:52.
72. Kamphuis LS, Kwekkeboom DJ, Missotten TO, et al. Somatostatin receptor scintigraphy patterns in patients with sarcoidosis. *Clin Nucl Med* 2015; 40:925.
73. Dunn TL, Watters LC, Hendrix C, et al. Gas exchange at a given degree of volume restriction is different in sarcoidosis and idiopathic pulmonary fibrosis. *Am J Med* 1988; 85:221.
74. Baughman RP, Sparkman BK, Lower EE. Six-minute walk test and health status assessment in sarcoidosis. *Chest* 2007; 132:207.
75. Alhamad EH, Idrees MM, Alanezi MO, et al. Sarcoidosis-associated pulmonary hypertension: Clinical features and outcomes in Arab patients. *Ann Thorac Med* 2010; 5:86.
76. Shorr AF, Helman DL, Davies DB, Nathan SD. Pulmonary hypertension in advanced sarcoidosis: epidemiology and clinical characteristics. *Eur Respir J* 2005; 25:783.
77. Karetzky M, McDonough M. Exercise and resting pulmonary function in sarcoidosis. *Sarcoidosis Vasc Diffuse Lung Dis* 1996; 13:43.
78. Semenzato C, Facco M, Agostini C. Immunologic events in the pathogenesis of interstitial lung disease: the paradigm of sarcoidosis. In: *Interstitial Lung Disease*, 5th, Schwarz, MI, King, TE JR (Eds), People's Medical Publishing House, Shelton, CT 2011. p.407.
79. Lin YH, Haslam PL, Turner-Warwick M. Chronic pulmonary sarcoidosis: relationship between lung lavage cell counts, chest radiograph, and results of standard lung function tests. *Thorax* 1985; 40:501.

80. Ward K, O'Connor C, Odlum C, Fitzgerald MX. Prognostic value of bronchoalveolar lavage in sarcoidosis: the critical influence of disease presentation. *Thorax* 1989; 44:6.
81. Winterbauer RH, Lammert J, Selland M, et al. Bronchoalveolar lavage cell populations in the diagnosis of sarcoidosis. *Chest* 1993; 104:352.
82. Agostini C, Trentin L, Zambello R, et al. CD8 alveolitis in sarcoidosis: incidence, phenotypic characteristics, and clinical features. *Am J Med* 1993; 95:466.
83. Kantrow SP, Meyer KC, Kidd P, Raghu G. The CD4/CD8 ratio in BAL fluid is highly variable in sarcoidosis. *Eur Respir J* 1997; 10:2716.
84. Meyer KC, Raghu G, Baughman RP, et al. An official American Thoracic Society clinical practice guideline: the clinical utility of bronchoalveolar lavage cellular analysis in interstitial lung disease. *Am J Respir Crit Care Med* 2012; 185:1004.
85. Polychronopoulos VS, Prakash UBS. Airway involvement in sarcoidosis. *Chest* 2009; 136:1371.
86. Barreiro TJ. Cobblestone Airways. *Mayo Clin Proc* 2016; 91:1849.
87. Bradley B, Branley HM, Egan JJ, et al. Interstitial lung disease guideline: the British Thoracic Society in collaboration with the Thoracic Society of Australia and New Zealand and the Irish Thoracic Society. *Thorax* 2008; 63 Suppl 5:v1.
88. Bjermer L, Thunell M, Rosenhall L, Stjernberg N. Endobronchial biopsy positive sarcoidosis: relation to bronchoalveolar lavage and course of disease. *Respir Med* 1991; 85:229.
89. Crouser ED, Maier LA, Wilson KC, et al. Diagnosis and Detection of Sarcoidosis. An Official American Thoracic Society Clinical Practice Guideline. *Am J Respir Crit Care Med* 2020; 201:e26.
90. Crombag LMM, Mooij-Kalverda K, Szlubowski A, et al. EBUS versus EUS-B for diagnosing sarcoidosis: The International Sarcoidosis Assessment (ISA) randomized clinical trial. *Respirology* 2022; 27:152.
91. Roethe RA, Fuller PB, Byrd RB, Hafermann DR. Transbronchoscopic lung biopsy in sarcoidosis. Optimal number and sites for diagnosis. *Chest* 1980; 77:400.
92. Jacob M, Bastos HN, Mota PC, et al. Diagnostic yield and safety of transbronchial cryobiopsy in sarcoidosis. *ERJ Open Res* 2019; 5.
93. King TE. Clinical manifestations and diagnosis of pulmonary sarcoidosis. Uptodate. https://e1c9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/clinical-manifestations-and-diagnosis-of-pulmonary-sarcoidosis?search=sarcoidosis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1. Accessed Jan 01 2023.

94. Keogh BA, Hunninghake GW, Line BR, Crystal RG. The alveolitis of pulmonary sarcoidosis. Evaluation of natural history and alveolitis-dependent changes in lung function. *Am Rev Respir Dis* 1983; 128:256.
95. Takemura T, Hiraga Y, Oomichi M, et al. Ultrastructural features of alveolitis in sarcoidosis. *Am J Respir Crit Care Med* 1995; 152:360.
96. Ma Y, Gal A, Koss MN. The pathology of pulmonary sarcoidosis: update. *Semin Diagn Pathol* 2007; 24:150.
97. Myers JL, Tazelaar HD. Challenges in pulmonary fibrosis: 6--Problematic granulomatous lung disease. *Thorax* 2008; 63:78.
98. Mukhopadhyay S, Wilcox BE, Myers JL, et al. Pulmonary necrotizing granulomas of unknown cause: clinical and pathologic analysis of 131 patients with completely resected nodules. *Chest* 2013; 144:813.
99. Aubry MC. Necrotizing granulomatous inflammation: what does it mean if your special stains are negative? *Mod Pathol* 2012; 25 Suppl 1:S31.
100. Brincker H. Coexistence of sarcoidosis and malignant disease: causality or coincidence? *Sarcoidosis* 1989; 6:31.
101. Ojeda H, Sardi A, Totoonchie A. Sarcoidosis of the breast: implications for the general surgeon. *Am Surg* 2000; 66:1144.
102. Toner GC, Bosl GJ. Sarcoidosis, "Sarcoid-like lymphadenopathy," and testicular germ cell tumors. *Am J Med* 1990; 89:651.
103. Nakamura M, Iemura A, Kojiro M, et al. Leiomyosarcoma of the rectum with sarcoid-like reaction--a case report. *Kurume Med J* 1990; 37:171.
104. Campbell F, Douglas-Jones AG. Sarcoid-like granulomas in primary renal cell carcinoma. *Sarcoidosis* 1993; 10:128.
105. Burke RR, Rybicki BA, Rao DS. Calcium and vitamin D in sarcoidosis: how to assess and manage. *Semin Respir Crit Care Med* 2010; 31:474.
106. Khan NA, Donatelli CV, Tonelli AR, et al. Toxicity risk from glucocorticoids in sarcoidosis patients. *Respir Med* 2017; 132:9.
107. Entrop JP, Kullberg S, Grunewald J, et al. Type 2 diabetes risk in sarcoidosis patients untreated and treated with corticosteroids. *ERJ Open Res* 2021; 7.
108. Baughman RP, Valeyre D, Korsten P, et al. ERS clinical practice guidelines on treatment of sarcoidosis. *Eur Respir J* 2021; 58.
109. Pietinalho A, Tukiainen P, Haahtela T, et al. Oral prednisolone followed by inhaled budesonide in newly diagnosed pulmonary sarcoidosis: a double-blind, placebo-controlled multicenter study. Finnish Pulmonary Sarcoidosis Study Group. *Chest* 1999; 116:424.
110. Zaki MH, Lyons HA, Leilop L, Huang CT. Corticosteroid therapy in sarcoidosis. A five-year, controlled follow-up study. *N Y State J Med* 1987; 87:496.

111. Kirkil G, Lower EE, Baughman RP. Predictors of Mortality in Pulmonary Sarcoidosis. *Chest* 2018; 153:105.
112. Walsh SL, Wells AU, Sverzellati N, et al. An integrated clinoradiological staging system for pulmonary sarcoidosis: a case-cohort study. *Lancet Respir Med* 2014; 2:123.
113. DeRemee RA. The present status of treatment of pulmonary sarcoidosis: a house divided. *Chest* 1977; 71:388.
114. Hunninghake GW, Gilbert S, Pueringer R, et al. Outcome of the treatment for sarcoidosis. *Am J Respir Crit Care Med* 1994; 149:893.
115. Takada K, Ina Y, Noda M, et al. The clinical course and prognosis of patients with severe, moderate or mild sarcoidosis. *J Clin Epidemiol* 1993; 46:359.
116. Harper LJ, Gerke AK, Wang XF, et al. Income and Other Contributors to Poor Outcomes in U.S. Patients with Sarcoidosis. *Am J Respir Crit Care Med* 2020; 201:955.
117. Mirsaeidi M, Machado RF, Schraufnagel D, et al. Racial difference in sarcoidosis mortality in the United States. *Chest* 2015; 147:438.
118. King TE. Treatment of pulmonary sarcoidosis: Initial approach to treatment. Uptodate. Treatment of pulmonary sarcoidosis: Initial approach to treatment. https://e1c9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/treatment-of-pulmonary-sarcoidosis-initial-approach-to-treatment?search=sarcoidosis&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3. Accessed Jan 01 2023.
119. Bradley B, Branley HM, Egan JJ, et al. Interstitial lung disease guideline: the British Thoracic Society in collaboration with the Thoracic Society of Australia and New Zealand and the Irish Thoracic Society. *Thorax* 2008; 63 Suppl 5:v1.
120. Malaisamy S, Dalal B, Bimenyuy C, Soubani AO. The clinical and radiologic features of nodular pulmonary sarcoidosis. *Lung* 2009; 187:9.
121. Newman LS, Rose CS, Maier LA. Sarcoidosis. *N Engl J Med* 1997; 336:1224.
122. Wijsenbeek MS, Culver DA. Treatment of Sarcoidosis. *Clin Chest Med* 2015; 36:751.
123. McKinzie BP, Bullington WM, Mazur JE, Judson MA. Efficacy of short-course, low-dose corticosteroid therapy for acute pulmonary sarcoidosis exacerbations. *Am J Med Sci* 2010; 339:1.

iyi tanımlanmıştır. Genel olarak, cerrahi akciğer biyopsisinde pulmoner fibroz kanıtı olan hastaların prognozu, bu tür değişiklikleri olmayanlara göre daha kötüdür (96-98). Fibrotik akciğer hastalığı olan büyük bir hasta kohortunda, hem kronik fibrotik HP'li hem de idiyopatik pulmoner fibrozlu hastaların yaklaşık %60'ında hastalıkta ilerleme görülmüştür (99) Kötü prognozla ilişkili diğer özellikler arasında sigara içme, başlangıçta daha düşük VC, BAL'da lenfositoz olmaması, tetikleyici ajana sürekli maruziyet ve/veya tetikleyici ajanın tanımlanamaması yer almaktadır.

KAYNAKLAR

1. Fernández Pérez ER, Kong AM, Raimundo K, et al. Epidemiology of Hypersensitivity Pneumonitis among an Insured Population in the United States: A Claims-based Cohort Analysis. *Ann Am Thorac Soc* 2018; 15:460.
2. Solaymani-Dodaran M, West J, Smith C, Hubbard R. Extrinsic allergic alveolitis: incidence and mortality in the general population. *QJM* 2007; 100:233.
3. Lalancette M, Carrier G, Laviolette M, et al. Farmer's lung. Long-term outcome and lack of predictive value of bronchoalveolar lavage fibrosing factors. *Am Rev Respir Dis* 1993; 148:216.
4. Cormier, Y, Lacasse, Y. Keys to the diagnosis of hypersensitivity pneumonitis: The role of serum precipitins, lung biopsy, and high-resolution computed tomography. *Clin Pulm Med* 1996; 3:72.
5. Rose C, King TE Jr. Controversies in hypersensitivity pneumonitis. *Am Rev Respir Dis* 1992; 145:1.
6. Selman M. Hypersensitivity pneumonitis. In: *Interstitial Lung Disease*, 5th ed, Schwarz MI, King TE Jr (Eds), People's Medical Publishing House, Shelton, CT, USA 2011. p.597.
7. Lopez M, Salvaggio JE. Epidemiology of hypersensitivity pneumonitis/allergic alveolitis. *Monogr Allergy* 1987; 21:70.
8. Patel AM, Ryu JH, Reed CE. Hypersensitivity pneumonitis: current concepts and future questions. *J Allergy Clin Immunol* 2001; 108:661.
9. Rose C, King TE Jr. Controversies in hypersensitivity pneumonitis. *Am Rev Respir Dis* 1992; 145:1.
10. Selman M, Pardo A, King TE Jr. Hypersensitivity pneumonitis: insights in diagnosis and pathobiology. *Am J Respir Crit Care Med* 2012; 186:314.

11. Salvaggio JE. The identification of hypersensitivity pneumonitis. *Hosp Pract* (1995) 1995; 30:57.
12. Dalphin JC, Debieuvre D, Pernet D, et al. Prevalence and risk factors for chronic bronchitis and farmer's lung in French dairy farmers. *Br J Ind Med* 1993; 50:941.
13. Arya A, Roychoudhury K, Bredin CP. Farmer's lung is now in decline. *Ir Med J* 2006; 99:203.
14. Bourke SJ, Dalphin JC, Boyd G, et al. Hypersensitivity pneumonitis: current concepts. *Eur Respir J Suppl* 2001; 32:81s.
15. Boyd G, McSharry CP, Banham SW, Lynch PP. A current view of pigeon fancier's lung. A model for pulmonary extrinsic allergic alveolitis. *Clin Allergy* 1982; 12 Suppl:53.
16. Salisbury ML, Myers JL, Belloli EA, et al. Diagnosis and Treatment of Fibrotic Hypersensitivity Pneumonia. Where We Stand and Where We Need to Go. *Am J Respir Crit Care Med* 2017; 196:690.
17. Agostini C, Trentin L, Facco M, Semenzato G. New aspects of hypersensitivity pneumonitis. *Curr Opin Pulm Med* 2004; 10:378.
18. Lacasse Y, Selman M, Costabel U, et al. Clinical diagnosis of hypersensitivity pneumonitis. *Am J Respir Crit Care Med* 2003; 168:952.
19. Terho EO, Husman K, Vohlonen I. Prevalence and incidence of chronic bronchitis and farmer's lung with respect to age, sex, atopy, and smoking. *Eur J Respir Dis Suppl* 1987; 152:19.
20. Malmberg P, Rask-Andersen A, Höglund S, et al. Incidence of organic dust toxic syndrome and allergic alveolitis in Swedish farmers. *Int Arch Allergy Appl Immunol* 1988; 87:47.
21. Salvaggio JE. The identification of hypersensitivity pneumonitis. *Hosp Pract* (1995) 1995; 30:57.
22. Ganier M, Lieberman P, Fink J, Lockwood DG. Humidifier lung. An outbreak in office workers. *Chest* 1980; 77:183.
23. Rose CS, Martyny JW, Newman LS, et al. "Lifeguard lung": endemic granulomatous pneumonitis in an indoor swimming pool. *Am J Public Health* 1998; 88:1795.
24. Simpson C, Garabrant D, Torrey S, et al. Hypersensitivity pneumonitis-like reaction and occupational asthma associated with 1,3-bis(isocyanatomethyl) cyclohexane pre-polymer. *Am J Ind Med* 1996; 30:48.
25. Banaszak EF, Thiede WH, Fink JN. Hypersensitivity pneumonitis due to contamination of an air conditioner. *N Engl J Med* 1970; 283:271.
26. Iijima Y, Sugiyama Y, Suzuki E, et al. The Relationship between the Incidence of Summer-type Hypersensitivity Pneumonitis and Environmental Factors in Southern Tochigi Prefecture. *Intern Med* 2017; 56:1023.

27. Asai N, Kaneko N, Ohkuni Y, et al. Familial Summer-type Hypersensitivity Pneumonitis: A Review of 25 Families and 50 Cases in Japan. *Intern Med* 2016; 55:279.
28. Murin S, Bilello KS, Matthay R. Other smoking-affected pulmonary diseases. *Clin Chest Med* 2000; 21:121.
29. Arima K, Ando M, Ito K, et al. Effect of cigarette smoking on prevalence of summer-type hypersensitivity pneumonitis caused by *Trichosporon cutaneum*. *Arch Environ Health* 1992; 47:274.
30. McSharry C, Banham SW, Boyd G. Effect of cigarette smoking on the antibody response to inhaled antigens and the prevalence of extrinsic allergic alveolitis among pigeon breeders. *Clin Allergy* 1985; 15:487.
31. Cano-Jiménez E, Acuña A, Botana MI, et al. Farmer's Lung Disease. A Review. *Arch Bronconeumol* 2016; 52:321.
32. Gomes ML, Morais A, Cavaleiro Rufo J. The association between fungi exposure and hypersensitivity pneumonitis: a systematic review. *Porto Biomed J* 2021; 6:e117.
33. James PL, Cannon J, Barber CM, et al. Metal worker's lung: spatial association with *Mycobacterium avium*. *Thorax* 2018; 73:151.
34. Khor A, Leslie KO, Tazelaar HD, et al. Diffuse pulmonary disease caused by nontuberculous mycobacteria in immunocompetent people (hot tub lung). *Am J Clin Pathol* 2001; 115:755.
35. Kahana LM, Kay JM, Yakrus MA, Wasserman S. *Mycobacterium avium* complex infection in an immunocompetent young adult related to hot tub exposure. *Chest* 1997; 111:242.
36. Myers JL, Tazelaar HD. Challenges in pulmonary fibrosis: 6--Problematic granulomatous lung disease. *Thorax* 2008; 63:78.
37. Sood A, Sreedhar R, Kulkarni P, Nawoor AR. Hypersensitivity pneumonitis-like granulomatous lung disease with nontuberculous mycobacteria from exposure to hot water aerosols. *Environ Health Perspect* 2007; 115:262.
38. Embil J, Warren P, Yakrus M, et al. Pulmonary illness associated with exposure to *Mycobacterium-avium* complex in hot tub water. Hypersensitivity pneumonitis or infection? *Chest* 1997; 111:813.
39. Hanak V, Golbin JM, Ryu JH. Causes and presenting features in 85 consecutive patients with hypersensitivity pneumonitis. *Mayo Clin Proc* 2007; 82:812.
40. Morell F, Roger A, Reyes L, et al. Bird fancier's lung: a series of 86 patients. *Medicine (Baltimore)* 2008; 87:110.
41. Chan AL, Juarez MM, Leslie KO, et al. Bird fancier's lung: a state-of-the-art review. *Clin Rev Allergy Immunol* 2012; 43:69.

42. Cramer C, Schlünssen V, Bendstrup E, et al. Risk of hypersensitivity pneumonitis and interstitial lung diseases among pigeon breeders. *Eur Respir J* 2016; 48:818.
43. Inase N, Ohtani Y, Sumi Y, et al. A clinical study of hypersensitivity pneumonitis presumably caused by feather duvets. *Ann Allergy Asthma Immunol* 2006; 96:98.
44. Mitsuhashi M, Tamura H, Morikawa A, Kuroume T. A unique substance from the granary weevil: nonspecific immunoglobulin binding substance. *Int Arch Allergy Appl Immunol* 1983; 72:310.
45. Cockcroft DW, Berscheid BA, Ramshaw IA, Dolovich J. Sporobolomyces: a possible cause of extrinsic allergic alveolitis. *J Allergy Clin Immunol* 1983; 72:305.
46. Miedinger D, Malo JL, Cartier A, Labrecque M. Malt can cause both occupational asthma and allergic alveolitis. *Allergy* 2009; 64:1228.
47. Alegre J, Morell F, Cobo E. Respiratory symptoms and pulmonary function of workers exposed to cork dust, toluene diisocyanate and conidia. *Scand J Work Environ Health* 1990; 16:175.
48. Gamboa PM, de las Marinas MD, Antépara I, et al. Extrinsic allergic alveolitis caused by esparto (*Stipa tenacissima*). *Allergol Immunopathol (Madr)* 1990; 18:331.
49. Zamarrón C, del Campo F, Paredes C. Extrinsic allergic alveolitis due to exposure to esparto dust. *J Intern Med* 1992; 232:177.
50. Hamaguchi R, Saito H, Kegasawa K, et al. [A case of hypersensitivity pneumonitis resulting from inhalation of *Aspergillus niger* in a greenhouse worker who raised roses]. *Nihon Kokyuki Gakkai Zasshi* 2009; 47:205.
51. Braun M, Klingelhöfer D, Groneberg DA. Sooty bark disease of maples: the risk for hypersensitivity pneumonitis by fungal spores not only for woodman. *J Occup Med Toxicol* 2021; 16:2.
52. Vandenplas O, Malo JL, Dugas M, et al. Hypersensitivity pneumonitis-like reaction among workers exposed to diphenylmethane [correction to piperphenylmethane] diisocyanate (MDI). *Am Rev Respir Dis* 1993; 147:338.
53. Yoshizawa Y, Ohtsuka M, Noguchi K, et al. Hypersensitivity pneumonitis induced by toluene diisocyanate: sequelae of continuous exposure. *Ann Intern Med* 1989; 110:31.
54. Bernstein DI, Lummus ZL, Santilli G, et al. Machine operator's lung. A hypersensitivity pneumonitis disorder associated with exposure to metalworking fluid aerosols. *Chest* 1995; 108:636.
55. Centers for Disease Control and Prevention (CDC). Biopsy-confirmed hypersensitivity pneumonitis in automobile production workers exposed

- to metalworking fluids--Michigan, 1994-1995. *MMWR Morb Mortal Wkly Rep* 1996; 45:606.
56. Robertson W, Robertson AS, Burge CB, et al. Clinical investigation of an outbreak of alveolitis and asthma in a car engine manufacturing plant. *Thorax* 2007; 62:981.
 57. Vandenas O, Malo JL, Dugas M, et al. Hypersensitivity pneumonitis-like reaction among workers exposed to diphenylmethane [correction to piperonyl methylcarbamate] diisocyanate (MDI). *Am Rev Respir Dis* 1993; 147:338.
 58. Yoshizawa Y, Ohtsuka M, Noguchi K, et al. Hypersensitivity pneumonitis induced by toluene diisocyanate: sequelae of continuous exposure. *Ann Intern Med* 1989; 110:31.
 59. Bernstein DI, Lummus ZL, Santilli G, et al. Machine operator's lung. A hypersensitivity pneumonitis disorder associated with exposure to metalworking fluid aerosols. *Chest* 1995; 108:636.
 60. Centers for Disease Control and Prevention (CDC). Biopsy-confirmed hypersensitivity pneumonitis in automobile production workers exposed to metalworking fluids--Michigan, 1994-1995. *MMWR Morb Mortal Wkly Rep* 1996; 45:606.
 61. Spagnolo P, Rossi G, Cavazza A, et al. Hypersensitivity Pneumonitis: A Comprehensive Review. *J Investig Allergol Clin Immunol* 2015; 25:237.
 62. Villar A, Muñoz X, Sanchez-Vidaurre S, et al. Bronchial inflammation in hypersensitivity pneumonitis after antigen-specific inhalation challenge. *Respirology* 2014; 19:891.
 63. Andrews K, Abdelsamed H, Yi AK, et al. TLR2 regulates neutrophil recruitment and cytokine production with minor contributions from TLR9 during hypersensitivity pneumonitis. *PLoS One* 2013; 8:e73143.
 64. Park Y, Oh SJ, Chung DH. CD4(+)CD25(+) regulatory T cells attenuate Hypersensitivity Pneumonitis by suppressing IFN-gamma production by CD4(+) and CD8(+) T cells. *J Leukoc Biol* 2009; 86:1427.
 65. Girard M, Israël-Assayag E, Cormier Y. Impaired function of regulatory T-cells in hypersensitivity pneumonitis. *Eur Respir J* 2011; 37:632.
 66. Simonian PL, Roark CL, Born WK, et al. Gammadelta T cells and Th17 cytokines in hypersensitivity pneumonitis and lung fibrosis. *Transl Res* 2009; 154:222.
 67. King TE. Hypersensitivity pneumonitis (extrinsic allergic alveolitis): Epidemiology, causes, and pathogenesis. https://e1c9b1a9cc9b-2679354d789c7627a4c889c411cc.vetisonline.com/contents/hypersensitivity-pneumonitis-extrinsic-allergic-alveolitis-epidemiology-causes-and-pathogenesis?search=hypersensitivity%20pneumonitis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1. Accessed 01 Jan 2023.

68. Raghu G, Remy-Jardin M, Ryerson CJ, et al. Diagnosis of Hypersensitivity Pneumonitis in Adults. An Official ATS/JRS/ALAT Clinical Practice Guideline. *Am J Respir Crit Care Med* 2020; 202:e36.
69. Hanak V, Golbin JM, Ryu JH. Causes and presenting features in 85 consecutive patients with hypersensitivity pneumonitis. *Mayo Clin Proc* 2007; 82:812.
70. Reich JM. Chirping rales in bird-fancier's lung. *Chest* 1993; 104:326.
71. Ohtani Y, Saiki S, Sumi Y, et al. Clinical features of recurrent and insidious chronic bird fancier's lung. *Ann Allergy Asthma Immunol* 2003; 90:604.
72. Schlueter DP. Response of the lung to inhaled antigens. *Am J Med* 1974; 57:476.
73. Wang LJ, Cai HR, Xiao YL, et al. Clinical characteristics and outcomes of hypersensitivity pneumonitis: a population-based study in China. *Chin Med J (Engl)* 2019; 132:1283.
74. Fenoglio CM, Reboux G, Sudre B, et al. Diagnostic value of serum precipitins to mould antigens in active hypersensitivity pneumonitis. *Eur Respir J* 2007; 29:706.
75. Van Hoeyveld E, Dupont L, Bossuyt X. Quantification of IgG antibodies to *Aspergillus fumigatus* and pigeon antigens by ImmunoCAP technology: an alternative to the precipitation technique? *Clin Chem* 2006; 52:1785.
76. Rodrigo MJ, Benavent MI, Cruz MJ, et al. Detection of specific antibodies to pigeon serum and bloom antigens by enzyme linked immunosorbent assay in pigeon breeder's disease. *Occup Environ Med* 2000; 57:159.
77. Suhara K, Miyazaki Y, Okamoto T, et al. Utility of immunological tests for bird-related hypersensitivity pneumonitis. *Respir Investig* 2015; 53:13.
78. Millerick-May ML, Mulks MH, Gerlach J, et al. Hypersensitivity pneumonitis and antigen identification--An alternate approach. *Respir Med* 2016; 112:97.
79. Morell F, Roger A, Cruz MJ, et al. Suberosis: clinical study and new etiologic agents in a series of eight patients. *Chest* 2003; 124:1145.
80. Morell F, Roger A, Cruz MJ, et al. Suberosis: clinical study and new etiologic agents in a series of eight patients. *Chest* 2003; 124:1145.
81. Ohtani Y, Saiki S, Kitaichi M, et al. Chronic bird fancier's lung: histopathological and clinical correlation. An application of the 2002 ATS/ERS consensus classification of the idiopathic interstitial pneumonias. *Thorax* 2005; 60:665.
82. Bourke SJ, Carter R, Anderson K, et al. Obstructive airways disease in non-smoking subjects with pigeon fanciers' lung. *Clin Exp Allergy* 1989; 19:629.

83. Fernández Pérez ER, Swigris JJ, Forssén AV, et al. Identifying an inciting antigen is associated with improved survival in patients with chronic hypersensitivity pneumonitis. *Chest* 2013; 144:1644.
84. Braun SR, doPico GA, Tsiatis A, et al. Farmer's lung disease: long-term clinical and physiologic outcome. *Am Rev Respir Dis* 1979; 119:185.
85. Sema M, Miyazaki Y, Tsutsui T, et al. Environmental levels of avian antigen are relevant to the progression of chronic hypersensitivity pneumonitis during antigen avoidance. *Immun Inflamm Dis* 2018; 6:154.
86. Nogueira R, Melo N, Novais E Bastos H, et al. Hypersensitivity pneumonitis: Antigen diversity and disease implications. *Pulmonology* 2019; 25:97.
87. Mooney JJ, Elicker BM, Urbana TH, et al. Radiographic fibrosis score predicts survival in hypersensitivity pneumonitis. *Chest* 2013; 144:586.
88. Chung JH, Zhan X, Cao M, et al. Presence of Air Trapping and Mosaic Attenuation on Chest Computed Tomography Predicts Survival in Chronic Hypersensitivity Pneumonitis. *Ann Am Thorac Soc* 2017; 14:1533.
89. Lalancette M, Carrier G, Laviolette M, et al. Farmer's lung. Long-term outcome and lack of predictive value of bronchoalveolar lavage fibrosing factors. *Am Rev Respir Dis* 1993; 148:216.
90. King TE. Hypersensitivity pneumonitis (extrinsic allergic alveolitis): Treatment, prognosis, and prevention. Uptodate. https://e1c9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/hypersensitivity-pneumonitis-extrinsic-allergic-alveolitis-treatment-prognosis-and-prevention?search=hypersensitivity%20pneumonia&source=search_result&selectedTitle=2~150&usage_type=default&display_rank=2. Accessed 03 Jan 2023.
91. Kokkarinen JI, Tukiainen HO, Terho EO. Recovery of pulmonary function in farmer's lung. A five-year follow-up study. *Am Rev Respir Dis* 1993; 147:793.
92. Raghu G, Remy-Jardin M, Richeldi L, et al. Idiopathic Pulmonary Fibrosis (an Update) and Progressive Pulmonary Fibrosis in Adults: An Official ATS/ERS/JRS/ALAT Clinical Practice Guideline. *Am J Respir Crit Care Med*. 2022 May 1;205(9):e18-e47. doi: 10.1164/rccm.202202-0399ST.
93. Buschman DL, Gamsu G, Waldron JA Jr, et al. Chronic hypersensitivity pneumonitis: use of CT in diagnosis. *AJR Am J Roentgenol* 1992; 159:957.
94. Hamblin M, Prosch H, Vašáková M. Diagnosis, course and management of hypersensitivity pneumonitis. *Eur Respir Rev*. 2022 Feb 9;31(163):210169. doi: 10.1183/16000617.0169-2021. PMID: 35140104; PMCID: PMC9488722.

95. Vasakova M, Morell F, Walsh S, et al. Hypersensitivity Pneumonitis: Perspectives in Diagnosis and Management. *Am J Respir Crit Care Med* 2017; 196:680.
96. Vourlekis JS, Schwarz MI, Cherniack RM, et al. The effect of pulmonary fibrosis on survival in patients with hypersensitivity pneumonitis. *Am J Med* 2004; 116:662.
97. Sahin H, Brown KK, Curran-Everett D, et al. Chronic hypersensitivity pneumonitis: CT features comparison with pathologic evidence of fibrosis and survival. *Radiology* 2007; 244:591.
98. Wang P, Jones KD, Urisman A, et al. Pathologic Findings and Prognosis in a Large Prospective Cohort of Chronic Hypersensitivity Pneumonitis. *Chest* 2017; 152:502.
99. Hambly N, Farooqi MM, Dvorkin-Gheva A, et al. Prevalence and characteristics of progressive fibrosing interstitial lung disease in a prospective registry. *Eur Respir J* 2022; 60.

Sigara kullanılıyorsa bırakma danışmanlığı, pnömokok ve grip aşısı, gerekliyse oksijen kullanılması ve pulmoner rehabilitasyonu da diğer tedavi önerileridir (23).

KAYNAKLAR

1. Balmes JR, Abraham JL, Dweik RA, et al. An official American Thoracic Society statement: diagnosis and management of beryllium sensitivity and chronic beryllium disease. *Am J Respir Crit Care Med* 2014; 190:e34.
2. Infante PF, Newman LS. Beryllium exposure and chronic beryllium disease. *Lancet* 2004; 363:415.
3. Kreiss K, Wasserman S, Mroz MM, Newman LS. Beryllium disease screening in the ceramics industry. Blood lymphocyte test performance and exposure-disease relations. *J Occup Med* 1993; 35:267.
4. Kreiss K, Mroz MM, Zhen B, et al. Epidemiology of beryllium sensitization and disease in nuclear workers. *Am Rev Respir Dis* 1993; 148:985.
5. MacMurdo MG, Mroz MM, Culver DA, et al. Chronic Beryllium Disease: Update on a Moving Target. *Chest* 2020; 158:2458.
6. Schuler CR, Kent MS, Deubner DC, et al. Process-related risk of beryllium sensitization and disease in a copper-beryllium alloy facility. *Am J Ind Med* 2005; 47:195.
7. Henneberger PK, Cumro D, Deubner DD, et al. Beryllium sensitization and disease among long-term and short-term workers in a beryllium ceramics plant. *Int Arch Occup Environ Health* 2001; 74:167.
8. Stange AW, Hilmas DE, Furman FJ, Gatcliffe TR. Beryllium sensitization and chronic beryllium disease at a former nuclear weapons facility. *Appl Occup Environ Hyg* 2001; 16:405.
9. Kelleher PC, Martyny JW, Mroz MM, et al. Beryllium particulate exposure and disease relations in a beryllium machining plant. *J Occup Environ Med* 2001; 43:238.
10. Sawyer RT, Abraham JL, Daniloff E, Newman LS. Secondary ion mass spectroscopy demonstrates retention of beryllium in chronic beryllium disease granulomas. *J Occup Environ Med* 2005; 47:1218.
11. Stoeckle JD, Hardy HL, Weber AL. Chronic beryllium disease. Long-term follow-up of sixty cases and selective review of the literature. *Am J Med* 1969; 46:545.
12. Marchand-Adam S, El Khatib A, Guillon F, et al. Short- and long-term response to corticosteroid therapy in chronic beryllium disease. *Eur Respir J* 2008; 32:687.

13. Kelleher PC, Martyny JW, Mroz MM, et al. Beryllium particulate exposure and disease relations in a beryllium machining plant. *J Occup Environ Med* 2001; 43:238.
14. Sharma N, Patel J, Mohammed TL. Chronic beryllium disease: computed tomographic findings. *J Comput Assist Tomogr* 2010; 34:945.
15. Newman LS, Kreiss K. Nonoccupational beryllium disease masquerading as sarcoidosis: identification by blood lymphocyte proliferative response to beryllium. *Am Rev Respir Dis* 1992; 145:1212.
16. Middleton DC, Lewin MD, Kowalski PJ, et al. The BeLPT: algorithms and implications. *Am J Ind Med* 2006; 49:36.
17. Fireman E, Haimsky E, Noiderfer M, et al. Misdiagnosis of sarcoidosis in patients with chronic beryllium disease. *Sarcoidosis Vasc Diffuse Lung Dis* 2003; 20:144.
18. Middleton D, Kowalski P. Advances in identifying beryllium sensitization and disease. *Int J Environ Res Public Health* 2010; 7:115.
19. Naccache JM, Marchand-Adam S, Kambouchner M, et al. Ground-glass computed tomography pattern in chronic beryllium disease: pathologic substratum and evolution. *J Comput Assist Tomogr* 2003; 27:496.
20. Handa T, Nagai S, Kitaichi M, et al. Long-term complications and prognosis of chronic beryllium disease. *Sarcoidosis Vasc Diffuse Lung Dis* 2009; 26:24.
21. Sharma N, Patel J, Mohammed TL. Chronic beryllium disease: computed tomographic findings. *J Comput Assist Tomogr* 2010; 34:945.
22. Newman LS, Mroz MM, Balkissoon R, Maier LA. Beryllium sensitization progresses to chronic beryllium disease: a longitudinal study of disease risk. *Am J Respir Crit Care Med* 2005; 171:54.
23. Newman LS. Chronic beryllium disease (berylliosis). Uptodate. https://e1c9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/chronic-beryllium-disease-berylliosis?search=beriliosis&source=search_result&selectedTitle=1~22&usage_type=default&display_rank=1. Accessed 05 Jan 2023.

KAYNAKLAR

1. Tazi A. Adult pulmonary Langerhans' cell histiocytosis. *Eur Respir J* 2006; 27: 1272–1285.
2. Suri HS, Yi ES, Nowakowski GS, et al. Pulmonary Langerhans cell histiocytosis. *Orphanet J Rare Dis* 2012; 7: 16.
3. DeMartino E, Go RS, Vassallo R. Langerhans cell histiocytosis and other histiocytic diseases of the lung. *Clin Chest Med* 2016; 37: 421–430.
4. Wei P, Lu HW, Jiang S, et al. Pulmonary langerhans cell histiocytosis: case series and literature review. *Medicine (Baltimore)* 2014; 93:e141.
5. Elia D, Torre O, Cassandro R, et al. Pulmonary Langerhans cell histiocytosis: a comprehensive analysis of 40 patients and literature review. *Eur J Intern Med* 2015; 26:351.
6. Watanabe R, Tatsumi K, Hashimoto S, et al. Clinico-epidemiological features of pulmonary histiocytosis X. *Intern Med* 2001; 40:998.
7. Thomeer M, Demedts M, Vandeurzen K, VRGT Working Group on Interstitial Lung Diseases. Registration of interstitial lung diseases by 20 centres of respiratory medicine in Flanders. *Acta Clin Belg* 2001; 56:163.
8. Vassallo R, Limper AH, Ryu JH. Smoking-related interstitial lung disease. In: *Interstitial Lung Disease*, 5th ed, Schwarz MI, King TE Jr (Eds), People's Medical Publishing House, Shelton, CT, USA 2011. p.961.
9. Roden AC, Yi ES. Pulmonary Langerhans Cell Histiocytosis: An Update From the Pathologists' Perspective. *Arch Pathol Lab Med* 2016; 140:230.
10. Brown NA, Elenitoba-Johnson KSJ. Clinical implications of oncogenic mutations in pulmonary Langerhans cell histiocytosis. *Curr Opin Pulm Med* 2018; 24:281.
11. Vassallo R, Ryu JH, Schroeder DR, et al. Clinical outcomes of pulmonary Langerhans'-cell histiocytosis in adults. *N Engl J Med* 2002; 346:484.
12. Götz G, Fichter J. Langerhans'-cell histiocytosis in 58 adults. *Eur J Med Res* 2004; 9:510.
13. Mason RH, Foley NM, Branley HM, et al. Pulmonary Langerhans cell histiocytosis (PLCH): a new UK register. *Thorax* 2014; 69:766.
14. Schönfeld N, Frank W, Wenig S, et al. Clinical and radiologic features, lung function and therapeutic results in pulmonary histiocytosis X. *Respiration* 1993; 60:38.
15. Benattia A, Bugnet E, Walter-Petrich A, et al. Long-term outcomes of adult pulmonary Langerhans cell histiocytosis: a prospective cohort. *Eur Respir J* 2022; 59.
16. Vassallo R, Ryu JH, Colby TV, et al. Pulmonary Langerhans'-cell histiocytosis. *N Engl J Med* 2000; 342:1969.

17. Lorillon G, Tazi A. How I manage pulmonary Langerhans cell histiocytosis. *Eur Respir Rev* 2017; 26.
18. Gupta N, Langenderfer D, McCormack FX, et al. Chest Computed Tomographic Image Screening for Cystic Lung Diseases in Patients with Spontaneous Pneumothorax Is Cost Effective. *Ann Am Thorac Soc* 2017; 14:17.
19. Aguayo SM, Schwarz MI, Mortenson RL. The role of the chest radiograph in the evaluation of disease severity and clinical course in eosinophilic granuloma. *Am Rev Respir Dis* 1990; 141:A61.
20. Kulwicz EL, Lynch DA, Aguayo SM, et al. Imaging of pulmonary histiocytosis X. *Radiographics* 1992; 12:515.
21. Castoldi MC, Verrioli A, De Juli E, Vanzulli A. Pulmonary Langerhans cell histiocytosis: the many faces of presentation at initial CT scan. *Insights Imaging* 2014; 5:483.
22. Lacronique J, Roth C, Battesti JP, et al. Chest radiological features of pulmonary histiocytosis X: a report based on 50 adult cases. *Thorax* 1982; 37:104.
23. Krajicek BJ, Ryu JH, Hartman TE, et al. Abnormal fluorodeoxyglucose PET in pulmonary Langerhans cell histiocytosis. *Chest* 2009; 135:1542.
24. Jessop S, Crudgington D, London K, et al. FDG PET-CT in pediatric Langerhans cell histiocytosis. *Pediatr Blood Cancer* 2020; 67:e28034.
25. Obert J, Vercellino L, Van Der Gucht A, et al. 18F-fluorodeoxyglucose positron emission tomography-computed tomography in the management of adult multisystem Langerhans cell histiocytosis. *Eur J Nucl Med Mol Imaging* 2017; 44:598.
26. Crausman RS, Jennings CA, Tuder RM, et al. Pulmonary histiocytosis X: pulmonary function and exercise pathophysiology. *Am J Respir Crit Care Med* 1996; 153:426.
27. Harari S, Comel A. Pulmonary Langerhans cell Histiocytosis. *Sarcoidosis Vasc Diffuse Lung Dis* 2001; 18:253.
28. Auerswald U, Barth J, Magnussen H. Value of CD-1-positive cells in bronchoalveolar lavage fluid for the diagnosis of pulmonary histiocytosis X. *Lung* 1991; 169:305.
29. Baqir M, Vassallo R, Maldonado F, et al. Utility of bronchoscopy in pulmonary Langerhans cell histiocytosis. *J Bronchology Interv Pulmonol* 2013; 20:309.
30. Harari S, Torre O, Cassandro R, et al. Bronchoscopic diagnosis of Langerhans cell histiocytosis and lymphangioleiomyomatosis. *Respir Med* 2012; 106:1286.

31. Housini I, Tomashefski JF Jr, Cohen A, et al. Transbronchial biopsy in patients with pulmonary eosinophilic granuloma. Comparison with findings on open lung biopsy. *Arch Pathol Lab Med* 1994; 118:523.
32. Lau SK, Chu PG, Weiss LM. Immunohistochemical expression of Langerin in Langerhans cell histiocytosis and non-Langerhans cell histiocytic disorders. *Am J Surg Pathol* 2008; 32:615.
33. Xu X, Liu WP, Yang QP, et al. [Langerhans cell histiocytosis: a clinicopathologic and immunohistochemical analysis of 258 cases]. *Zhonghua Bing Li Xue Za Zhi* 2012; 41:91.
34. Vassallo R, Harari S, Tazi A. Current understanding and management of pulmonary Langerhans cell histiocytosis. *Thorax* 2017; 72:937.
35. Lazor R, Etienne-Mastroianni B, Khouatra C, et al. Progressive diffuse pulmonary Langerhans cell histiocytosis improved by cladribine chemotherapy. *Thorax* 2009; 64:274.
36. Aerni MR, Aubry MC, Myers JL, Vassallo R. Complete remission of nodular pulmonary Langerhans cell histiocytosis lesions induced by 2-chlorodeoxyadenosine in a non-smoker. *Respir Med* 2008; 102:316.
37. Lorillon G, Bergeron A, Detournignies L, et al. Cladribine is effective against cystic pulmonary Langerhans cell histiocytosis. *Am J Respir Crit Care Med* 2012; 186:930.
38. Epaud R, Ducou Le Pointe H, Fasola S, et al. Cladribine improves lung cysts and pulmonary function in a child with histiocytosis. *Eur Respir J* 2015; 45:831.
39. Dauriat G, Mal H, Thabut G, et al. Lung transplantation for pulmonary langerhans' cell histiocytosis: a multicenter analysis. *Transplantation* 2006; 81:746.
40. Gabbay E, Dark JH, Ashcroft T, et al. Recurrence of Langerhans' cell granulomatosis following lung transplantation. *Thorax* 1998; 53:326.
41. TE King. Pulmonary Langerhans cell histiocytosis. Uptodate. https://e1c-9b1a9cc9b2679354d789c7627a4c889c411cc.vetisonline.com/contents/pulmonary-langerhans-cell-histiocytosis?search=pulmonary%20langerhans&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1. Accessed on 05 Jan 2023.

İndüksiyon için rituksimab alan hastalar için, başka bir ajana geçmek yerine rituksimab tedavisine devam edilmesini önerilir.

Mepolizumab ile remisyona ulaşan hastalarda, bir immüno-supresif ajana geçmek yerine mepolizumab tedavisine devam edilmesini önerilir. Glukokortikoid dozu, aktif EGPA semptom ve bulgularının kontrolü için gereken en düşük doza kademeli olarak azaltılır.

İdame immüno-supresif tedavi 12 ila 18 ay devam eder. Çok sayıda relapsları olan hastalarda daha uzun süreli veya süresiz idame tedavisi düşünülmelidir (29).

KAYNAKLAR

1. Hoffman GS, Kerr GS, Leavitt RY, et al. Wegener granulomatosis: an analysis of 158 patients. *Ann Intern Med* 1992; 116:488.
2. Falk RJ, Gross WL, Guillevin L, et al. Granulomatosis with polyangiitis (Wegener's): an alternative name for Wegener's granulomatosis. *Arthritis Rheum* 2011; 63:863.
3. Specks, U. Pulmonary vasculitis. In: *Interstitial Lung Disease*, 5th, Schwarz, MI, King, TE Jr (Eds), People's Medical Publishing House, Shelton, CT, USA 2011. p.765.
4. Lally L, Spiera RF. Pulmonary vasculitis. *Rheum Dis Clin North Am* 2015; 41:315.
5. Jennette JC, Falk RJ. Small-vessel vasculitis. *N Engl J Med* 1997; 337:1512.
6. Sugimoto T, Sakaguchi M, Deji N, et al. The occurrence of sensorineural hearing loss in a patient with myeloperoxidase-anti-neutrophil cytoplasmic antibody-related microscopic polyangiitis. *Rheumatol Int* 2007; 27:503.
7. Okura T, Miyoshi K, Jotoku M, et al. A patient with myeloperoxidase antineutrophil cytoplasmic antibody-positive polyangiitis who developed sensorineural hearing loss and scleritis. *Intern Med* 2011; 50:1725.
8. Cannady SB, Batra PS, Koenig C, et al. Sinonasal Wegener granulomatosis: a single-institution experience with 120 cases. *Laryngoscope* 2009; 119:757.
9. Polychronopoulos VS, Prakash UB, Golbin JM, et al. Airway involvement in Wegener's granulomatosis. *Rheum Dis Clin North Am* 2007; 33:755.

10. Bahrami B, Curragh D, McNab AA, et al. Primary Nasocutaneous Fistulae in Granulomatosis With Polyangiitis: A Case Series and Literature Review. *Ophthalmic Plast Reconstr Surg* 2021; 37:55.
11. Solans-Laqué R, Bosch-Gil J, Canela M, et al. Clinical features and therapeutic management of subglottic stenosis in patients with Wegener's granulomatosis. *Lupus* 2008; 17:832.
12. Taylor SC, Clayburgh DR, Rosenbaum JT, Schindler JS. Progression and management of Wegener's granulomatosis in the head and neck. *Laryngoscope* 2012; 122:1695.
13. Screaton NJ, Sivasothy P, Flower CD, et al. Tracheal involvement in Wegener's granulomatosis: evaluation using spiral CT. *Clin Radiol* 1998; 53:809.
14. Lee PY, Adil EA, Irace AL, et al. The presentation and management of granulomatosis with polyangiitis (Wegener's Granulomatosis) in the pediatric airway. *Laryngoscope* 2017; 127:233.
15. Horta-Baas G, Hernández-Cabrera MF, Catana R, et al. Subglottic stenosis in granulomatosis with polyangiitis (Wegener's granulomatosis): Report of 4 cases. *Reumatol Clin* 2016; 12:267.
16. Yamada H. ANCA: associated lung fibrosis. *Semin Respir Crit Care Med* 2011; 32:322.
17. Hervier B, Pagnoux C, Agard C, et al. Pulmonary fibrosis associated with ANCA-positive vasculitides. Retrospective study of 12 cases and review of the literature. *Ann Rheum Dis* 2009; 68:404.
18. Sebastiani M, Manfredi A, Vacchi C, et al. Epidemiology and management of interstitial lung disease in ANCA-associated vasculitis. *Clin Exp Rheumatol* 2020; 38 Suppl 124:221.
19. Falk RJ, Hogan S, Carey TS, Jennette JC. Clinical course of anti-neutrophil cytoplasmic autoantibody-associated glomerulonephritis and systemic vasculitis. The Glomerular Disease Collaborative Network. *Ann Intern Med* 1990; 113:656.
20. Bosch X, López-Soto A, Mirapeix E, et al. Antineutrophil cytoplasmic autoantibody-associated alveolar capillaritis in patients presenting with pulmonary hemorrhage. *Arch Pathol Lab Med* 1994; 118:517.
21. Cartin-Ceba R, Diaz-Caballero L, Al-Qadi MO, et al. Diffuse Alveolar Hemorrhage Secondary to Antineutrophil Cytoplasmic Antibody-Associated Vasculitis: Predictors of Respiratory Failure and Clinical Outcomes. *Arthritis Rheumatol* 2016; 68:1467.
22. Colby, TV. Diffuse pulmonary hemorrhage in Wegener's granulomatosis. *Semin Respir Med* 1989; 10:136.

23. Pesci A, Pavone L, Buzio C, Manganelli P. Respiratory system involvement in ANCA-associated systemic vasculitides. *Sarcoidosis Vasc Diffuse Lung Dis* 2005; 22 Suppl 1:S40.
24. Schwarz MI, Brown KK. Small vessel vasculitis of the lung. *Thorax* 2000; 55:502.
25. Mohammad AJ, Mortensen KH, Babar J, et al. Pulmonary Involvement in Antineutrophil Cytoplasmic Antibodies (ANCA)-associated Vasculitis: The Influence of ANCA Subtype. *J Rheumatol* 2017; 44:1458.
26. Lohrmann C, Uhl M, Warnatz K, et al. Sinonasal computed tomography in patients with Wegener's granulomatosis. *J Comput Assist Tomogr* 2006; 30:122.
27. Ananthakrishnan L, Sharma N, Kanne JP. Wegener's granulomatosis in the chest: high-resolution CT findings. *AJR Am J Roentgenol* 2009; 192:676.
28. Russell B, Mohan S, Chahal R, et al. Prognostic Significance of Cavitary Lung Nodules in Granulomatosis With Polyangiitis (Wegener's): A Clinical Imaging Study of 225 Patients. *Arthritis Care Res (Hoboken)* 2018; 70:1082.
29. Chung SA, Langford CA, Maz M, et al. 2021 American College of Rheumatology/Vasculitis Foundation Guideline for the Management of Antineutrophil Cytoplasmic Antibody-Associated Vasculitis. *Arthritis Care Res (Hoboken)* 2021; 73:1088.
30. Kidney Disease: Improving Global Outcomes (KDIGO) Glomerular Diseases Work Group. KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases. *Kidney Int* 2021; 100:S1.
31. Sinico RA, Bottero P. Churg-Strauss angitis. *Best Pract Res Clin Rheumatol* 2009; 23:355.
32. Pagnoux C, Guilpain P, Guillevin L. Churg-Strauss syndrome. *Curr Opin Rheumatol* 2007; 19:25.
33. Keogh KA, Specks U. Churg-Strauss syndrome. *Semin Respir Crit Care Med* 2006; 27:148.
34. Guillevin L, Cohen P, Gayraud M, et al. Churg-Strauss syndrome. Clinical study and long-term follow-up of 96 patients. *Medicine (Baltimore)* 1999; 78:26.
35. Jennette JC, Falk RJ, Bacon PA, et al. 2012 revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides. *Arthritis Rheum* 2013; 65:1.
36. Comarmond C, Pagnoux C, Khellaf M, et al. Eosinophilic granulomatosis with polyangiitis (Churg-Strauss): clinical characteristics and long-term followup of the 383 patients enrolled in the French Vasculitis Study Group cohort. *Arthritis Rheum* 2013; 65:270.

37. Cottin V, Bel E, Bottero P, et al. Revisiting the systemic vasculitis in eosinophilic granulomatosis with polyangiitis (Churg-Strauss): A study of 157 patients by the Groupe d'Etudes et de Recherche sur les Maladies Orphelines Pulmonaires and the European Respiratory Society Taskforce on eosinophilic granulomatosis with polyangiitis (Churg-Strauss). *Autoimmun Rev* 2017; 16:1.
38. Lanham JG, Elkon KB, Pusey CD, Hughes GR. Systemic vasculitis with asthma and eosinophilia: a clinical approach to the Churg-Strauss syndrome. *Medicine (Baltimore)* 1984; 63:65.
39. Pagnoux C, Guillevin L. Churg-Strauss syndrome: evidence for disease subtypes? *Curr Opin Rheumatol* 2010; 22:21.

normaldir. Göğüs görüntüleme çalışmaları tipik olarak, ağırlıklı olarak akciğer tabanlarında olmak üzere çok sayıda kötü tanımlanmış nodüler opasiteler gösterir. Lenfadenopati tipik olarak yoktur. PLG'nin histopatolojik tanısı tipik olarak bir polimorfik lenfoid infiltrat üçlüsü, lenfoid hücreler tarafından arterlerin ve damarların transmural infiltrasyonu ve lenfoid infiltratlar içindeki fokal nekroz alanları izlenir, iyi biçimli olmayan granüloomlar şeklinde görülür. Ek özellikler, in-situ hibridizasyon çalışmalarında EBV-pozitif B hücrelerinin varlığı, T hücrelerinin poliklonalitesi ve genellikle B hücrelerinin monoklonalitesidir. Tedavi seçimi, semptomların varlığına, tetikleyici bir ilaç kullanma öyküsüne, ekstrapulmoner tutulumun derecesine ve lezyonun histopatolojik derecesinin dikkatli bir şekilde değerlendirilmesine dayanmalıdır. Akciğerlerle sınırlı düşük dereceli (derece 1 ve 2) hastalığı olan asemptomatik hastalar için, bu hastalardan bazıları spontan remisyon yaşayabileceğinden tedavi yerine gözlem önerilir. Semptomatik hastalar, daha yaygın hastalığı olan hastalar (özellikle nörolojik tutulumu olanlar) ve yüksek dereceli (3. derece) lezyonları olan hastalar, immünkemoterapi ile tedavi konusunda konsültasyon için bir hematoloji onkoloji uzmanına yönlendirilmelidir (38,39). Genel olarak, yüksek dereceli PLG için tedavi seçenekleri diffüz büyük B hücreli lenfoma (DLBCL) için olanlara benzerlik göstermektedir.

KAYNAKLAR

1. Rosen Y. Four decades of necrotizing sarcoid granulomatosis: what do we know now? Arch Pathol Lab Med 2015;139: 252–262
2. Liebow AA. The J. Burns Amberson Lecture – pulmonary angitis and granulomatosis. Am Rev Respir Dis 1973;108: 1–18.
3. Katzenstein A-LA. Katzenstein and Askin's Surgical Pathology of Non-Neoplastic Lung Disease. 4th Edn. Philadelphia, WB Saunders, 2006.
4. Ohshimo S, Guzman J, Costabel U, Bonella F. Differential diagnosis of granulomatous lung disease: clues and pitfalls: Number 4 in the Series

- “Pathology for the clinician” Edited by Peter Dorfmueller and Alberto Cavazza. *Eur Respir Rev* 2017 Aug 9;26(145):170012
5. Eom JS, Mok JH, Lee MK, et al. Efficacy of TB-PCR using EBUS-TBNA samples in patients with intrathoracicgranulomatous lymphadenopathy. *BMC Pulm Med* 2015; 15: 166.
 6. Ferrer J, Montes JF, Villarino MA, et al. Influence of particle size on extrapleural talc dissemination after talc slurry pleurodesis. *Chest* 2002; 122:1018.
 7. Paré JP, Cote G, Fraser RS. Long-term follow-up of drug abusers with intravenous talcosis. *Am Rev Respir Dis* 1989; 139:233.
 8. Schmidt RA, Glenn RW, Godwin JD, et al. Panlobular emphysema in young intravenous Ritalin abusers. *Am Rev Respir Dis* 1991; 143:649.
 9. Groth DH, Mackay GR, Crable JV, Cochran TH. Intravenous injection of talc in a narcotics addict. *Arch Pathol* 1972; 94:171.
 10. Vevaina JR, Civantos F, Viamonte M Jr, Avery WG. Emphysema associated with talcum granulomatosis in a drug addict. *South Med J* 1974; 67:113.
 11. Stern EJ, Frank MS, Schmutz JF, et al. Panlobular pulmonary emphysema caused by i.v. injection of methylphenidate (Ritalin): findings on chest radiographs and CT scans. *AJR Am J Roentgenol* 1994; 162:555.
 12. Vital Durand D, Durieu I, Rousset H. [Toxic or drug-induced granulomatous reactions]. *Rev Med Interne* 2008; 29:33.
 13. Howard L, Gopalan D, Griffiths M, Mahadeva R. Sirolimus-induced pulmonary hypersensitivity associated with a CD4 T-cell infiltrate. *Chest* 2006; 129:1718.
 14. de Kerviler E, Trédaniel J, Revlon G, et al. Fluoxetine-induced pulmonary granulomatosis. *Eur Respir J* 1996; 9:615.
 15. Chang H, Klein JS, Norotsky M, Cooper K. Granulomatous chest disease following intravesical bacillus Calmette-Guerin immunotherapy. *J Thorac Imaging* 2004; 19:60.
 16. Chopra A, Nautiyal A, Kalkanis A, Judson MA. Drug-Induced Sarcoidosis-Like Reactions. *Chest* 2018; 154:664.
 17. Gkiozos I, Kopitopoulou A, Kalkanis A, et al. Sarcoidosis-Like Reactions Induced by Checkpoint Inhibitors. *J Thorac Oncol* 2018; 13:1076.
 18. Kovacs A, Baksay B, Cserenyecz A, et al. Occurrence of pulmonary rheumatoid nodules following biologicaltherapies. *Clin Rheumatol* 2015; 34: 1639–1642.
 19. 127 Churg A. Pulmonary angiitis and granulomatosis revisited. *Hum Pathol* 1983; 14: 868–883.

20. Cunningham-Rundles C, Bodian C. Common variable immunodeficiency: clinical and immunological features of 248 patients. *Clin Immunol* 1999; 92: 34–48.
21. Verbsky JW, Hintermeyer MK, Simpson PM, et al. Rituximab and anti-metabolite treatment of granulomatous and lymphocytic interstitial lung disease in common variable immunodeficiency. *J Allergy Clin Immunol*. 2021 Feb;147(2):704-712.e17
22. Hurst JR, Verma N, Lowe D, et al. British Lung Foundation/United Kingdom Primary Immunodeficiency Network Consensus Statement on the Definition, Diagnosis, and Management of Granulomatous-Lymphocytic Interstitial Lung Disease in Common Variable Immunodeficiency Disorders. *J Allergy Clin Immunol Pract* 2017; in press [<https://doi.org/10.1016/j.jaip.2017.01.021>].
23. Jolles S, Carne E, Brouns M, et al. FDG PET-CT imaging of therapeutic response in granulomatous lymphocytic interstitial lung disease (GLILD) in common variable immunodeficiency (CVID). *Clin Exp Immunol* 2017; 187:138–145.
24. Mechanic LJ, Dikman S, Cunningham-Rundles C. Granulomatous disease in common variable immunodeficiency. *Ann Intern Med* 1997; 127: 613–617.
25. Mukhopadhyay S, Katzenstein AL. Pulmonary disease due to aspiration of food and other particulate matter: a clinicopathologic study of 59 cases diagnosed on biopsy or resection specimens. *Am J Surg Pathol* 2007; 31: 752–759.
26. Liebow AA. The J. Burns Amberson lecture--pulmonary angiitis and granulomatosis. *Am Rev Respir Dis* 1973; 108:1.
27. Clee MD, Lamb D, Clark RA. Bronchocentric granulomatosis: a review and thoughts on pathogenesis. *Br J Dis Chest* 1983; 77:227.
28. Myers JL. Bronchocentric granulomatosis. Disease or diagnosis? *Chest* 1989; 96: 3–4.
29. Katzenstein AL, Liebow AA, Friedman PJ. Bronchocentric granulomatosis, mucoid impaction, and hypersensitivity reactions to fungi. *Am Rev Respir Dis* 1975; 111: 497–537.
30. Ward S, Heyneman LE, Flint JD, et al. Bronchocentric granulomatosis: computed tomographic findings in five patients. *Clin Radiol* 2000; 55: 296–300.
31. Robinson RG, Wehunt WD, Tsou E, et al. Bronchocentric granulomatosis: roentgenographic manifestations. *Am Rev Respir Dis* 1982; 125: 751–756.

32. Liebow AA, Carrington CR, Friedman PJ. Lymphomatoid granulomatosis. *Hum Pathol* 1972; 3:457.
33. Pittaluga S, Wilson WH, Jaffe ES. Lymphomatoid granulomatosis. In: WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. Revised Fourth Edition, Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J (Eds), IARC, Lyon 2017. p.312.
34. Nicholson AG, Wotherspoon AC, Diss TC, et al. Lymphomatoid granulomatosis: evidence that some cases represent Epstein-Barr virus-associated B-cell lymphoma. *Histopathology* 1996; 29:317.
35. Myers JL, Kurtin PJ, Katzenstein AL, et al. Lymphomatoid granulomatosis. Evidence of immunophenotypic diversity and relationship to Epstein-Barr virus infection. *Am J Surg Pathol* 1995; 19:1300.
36. Guinee D Jr, Jaffe E, Kingma D, et al. Pulmonary lymphomatoid granulomatosis. Evidence for a proliferation of Epstein-Barr virus infected B-lymphocytes with a prominent T-cell component and vasculitis. *Am J Surg Pathol* 1994; 18:753.
37. Melani C, Jaffe ES, Wilson WH. Pathobiology and treatment of lymphomatoid granulomatosis, a rare EBV-driven disorder. *Blood* 2020; 135:1344.
38. Song JY, Pittaluga S, Dunleavy K, et al. Lymphomatoid granulomatosis--a single institute experience: pathologic findings and clinical correlations. *Am J Surg Pathol* 2015; 39:141.
39. Roschewski M, Wilson WH. Lymphomatoid granulomatosis. *Cancer J* 2012; 18:469.