

13. BÖLÜM

Genitoüriner Tüberküloz

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Giriş

Tüberküloz (TBC), dünya çapında bulaşıcı hastalıklardan kaynaklanan en yaygın ölüm nedenlerinden biridir (1). Dünya Sağlık Örgütü (DSÖ) Küresel Tüberküloz Raporu 2017 yılında tahminen 10 milyon kişinin (5,8 milyon erkek, 3,2 milyon kadın ve 1 milyon çocuk) TBC geliştirdiğini ve 4 milyon TBC' nin teşhis edilmemiş ve tedavi edilmemiş olarak kaldığını belirtmektedir (2). TBC olan 10 milyon kişinin üçte ikisi sekiz ülkeyedeydi: Hindistan (%27), Çin (%9), Endonezya (%8), Filipinler (%6), Pakistan (%5), Nijerya (4%), Bangladeş (%4) ve Güney Afrika (%3). Küresel insidansın yalnızca %6' sı DSÖ Avrupa Bölgesi'nde (%3) ve DSÖ Amerika Bölgesi' nde (%3) olmuştur. Genel olarak, 464.633 HIV' li kişide de TBC vardı ve bunların %72' si Afrika' daydı. TBC, tüm ülkelerde ve yaş gruplarında görülür ve %90' i yetişkinlerde (>15 yaş) rapor edilmiştir. Yaklaşık 558.000 kişi, rifampisine dirençli TBC geliştirmiştir; bunların tahmini 458.000' i çoklu ilaca dirençli TBC' ye (MDR-TBC) sahiptir (rifampisin ve izoniazide direnç) (2). MDR-TBC hastalarının yalnızca %50' si WHO onaylı rejimlerle tedavi sonrasında iyileşmektedir (3,4). TBC vücudun herhangi bir bölümünü etkileyebilir (5,6). 10 milyon yıllık TBC vakasının %5 ile %45' i vücudun tüm organlarını etkileyen akciğer dışı

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Tedavi sırasında komplikasyonlar

Antitüberküloz tedavi sırasında üst üriner sistem obstrüksiyonu (UTO) ortaya çıkabilir (114). Antitüberküloz tedavinin ilk birkaç haftasında ortaya çıkabilecek bu durumu saptamak için UTO' nun yan ağrısı, renal kolik, hidronefroz gibi belirti ve semptomları izlenmelidir. İnfiamasyon, ardından fibrozis ve toplayıcı sistemin tıkanmasından kaynaklanır (111). Üreteral darlıklar, tedaviden önceki hastalık sürecinden kaynaklanabilir, ancak skar ve ardından lumen daralması tedavi sırasında da oluşabilir (115). Bu genellikle tedavinin ilk iki ayında ortaya çıkar (116). Kapasitesi azalmış mesane duvarının fibrozisi hastaların %9'unda görülür (111). Ciddi ve ihmali edilmiş vakalarda kontrakte mesane bile gelişebilir (117).

Komplikasyonların tedavisi

Obstrüksyon ve kontraksiyonlar cerrahi rekonstrüksiyon gerektirebilir (117). Bazı raporlar, büyük bir Hindistan kohortunda UGTBC' li erkek vakaların %32' sine kadar çok sık cerrahi ihtiyacı olduğunu göstermektedir (100). Üriner obstrüksiyon ortaya çıktığında, anti-tüberküloz tedavi her zaman yeterli değildir ve rekonstruktif cerrahi gerekebilir (115). Tüm cerrahi müdahaleler, medikal tedavi ile beraber gerçekleştirilmelidir. Özellikle minör darlıklarda prednisolon 50 mg başlanıp hafta içinde azaltılarak kesilebilir. Kortikosteroidlerle tamamlayııcı tedavi UGTBC' de rutin olarak önerilmemektedir, ancak hasta etkili tedavi gördükten sonra kortikosteroid eklenmesinden korkmak için bir neden yoktur (118). Pulmoner TBC' de bile kortikosteroid kullanımı dissemine hastalık riskini artırmamaktadır (119).

Kaynakça

- WHO. The top 10 causes of death. WHO <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death> (2019)
- WHO Global Tuberculosis report 2018. WHO http://www.who.int/tb/publications/global_report/en/ (2018).
- Floyd, K., Glazou, P., Zumla, et al.. The global tuberculosis epidemic and progress in care, prevention, and research: an overview in year 3 of the End TB era. *Lancet Respir. Med.* **6**, 299–314 (2018).
- WHO. Guidelines for the treatment of drug-susceptible tuberculosis and patient care. 2017 update.
- Lawn, S. D., Zumla, A. I. Tuberculosis (Seminar). *Lancet* **378**, 57–72 (2011).
- Furin, J., Cox, H., Pai, M. Tuberculosis. *Lancet* **393**, 1642–1656 (2019).

7. Kulchavanya, E. Extrapulmonary tuberculosis: are statistical reports accurate? *Ther. Adv. Infect. Dis.* **2**, 61–70 (2014)
8. Porter, M. F. III Uro-genital tuberculosis in the male. *Ann. Surg.* **20**, 396–405 (1894)
9. Kulchavanya, E., Naber, K., Bjerklund Johansen, T. E. Urogenital tuberculosis: classification, diagnosis, and treatment. *Eur. Urol.* **15**, 112–121 (2016)
10. Nogales-Ortiz, F., Tarancón, I., Nogales, F. F. Jr. The pathology of female genital tuberculosis. A 31-year study of 1436 cases. *Obstet. Gynecol.* **53**, 422 (1979)
11. Silva MR, Rocha ADS, Araújo FR, et al. Risk factors for human *Mycobacterium bovis* infections in an urban area of Brazil. *Mem Inst Oswaldo Cruz.* 2018;113(8):e170445. Published 2018 Jun 11.
12. Schubert, G. E., Haltaufderheide, T., Golz, R. Frequency of urogenital tuberculosis in an unselected autopsy series from 1928 to 1949 and 1976 to 1989. *Eur. Urol.* **21**, 216–223 (1992)
13. Vithalani, N., Udani, P. M. A study of 292 autopsies proved cases of tuberculosis. *Indian J. Tuber.* **29**, 93–97 (1982)
14. Grace, G. A., Devaleenal, D. B., Natrajan, M. Genital tuberculosis in females. *Indian J. Med. Res.* **145**, 425–436 (2017)
15. Figueiredo, A. A., Lucon, A. M., Junior, R. F. Epidemiology of urogenital tuberculosis worldwide. *Int. J. Urol.* **15**, 827–832 (2008).
16. Grange, J. M. in *Tuberculosis — A Comprehensive Clinical Reference*. 44–59 (eds Schaff, S. & Alimuddin Zumla, A.) (Saunders Elsevier, 2009).
17. Chang, C. W. Congenital tuberculosis: case report and review of the literature. *Pediatr. Int. Child Health.* **19**, 1–4 (2017)
18. Raj, P., Sarin, Y. K. Congenital tuberculosis in a neonate: a diagnostic dilemma. *J. Neonatal Surg.* **3**, 49 (2014)
19. Angus, B. J., Yates, M., Conlon, C. et al. Cutaneous tuberculosis of the penis and sexual transmission of tuberculosis confirmed by molecular typing. *Clin. Infect. Dis.* **33**, E132–E134 (2001)
20. Venyo, A. K. Tuberculosis of the penis: a review of the literature. *Scientifica* **2015**, 601–624 (2015)
21. Von Reyn, C.F. Disseminated tuberculosis in human immunodeficiency virus infection: ineffective immunity, polyclonal disease and high mortality. *Int. J. Tuberc. Lung Dis.* **8**, 1087–1089 (2011)
22. Sihra, N., Diasuke, N., Thurairaja, R., et al. Renal tuberculosis following intravesical bacillus Calmette-Guérin for high-grade non-muscle- invasive bladder cancer. *Urology* **107**, e3–e4 (2017).
23. Hunter, R. L. Tuberculosis as a three-act play: A new paradigm for the pathogenesis of pulmonary tuberculosis. *Tuberculosis* **97**, 8–17 (2016)
24. Simmons, J. D. Immunological mechanisms of human resistance to persistent *Mycobacterium tuberculosis* infection. *Nat. Rev. Immunol.* **18**, 575–589 (2018)
25. Lamba, H., Byrne, M., Goldin, R. et al. Tuberculosis of the cervix: case presentation and a review of the literature. *Sex. Transm. Infect.* **78**, 62–63 (2002)
26. Bezuidenhout, J., Schneider, J. W. in *Tuberculosis— A Comprehensive Clinical Reference* 117–128 (eds Schaff, S. & Alimuddin Zumla, A.) (Saunders Elsevier, 2009)
27. Zachoval, R. The incidence of subclinical forms of urogenital tuberculosis in patients with pulmonary tuberculosis. *J. Infect. Publ. Health* **11**, 243–245 (2018)

28. Houben, R. M., Dodd, P. J. The global burden of latent tuberculosis infection: a re-estimation using mathematical modelling. *PLOS Med.* **13**, e1002152 (2016)
29. Chattopadhyay A, Bhatnagar V, Agarwala S, et al. Genitourinary tuberculosis in pediatric surgical practice. *J Pediatr Surg.* 1997;32(9):1283-1286.
30. Figueiredo, A. A., Lucon, A. Urogenital tuberculosis: update and review of 8961 cases from the world literature. *Rev. Urol.* **10**, 207–217 (2008)
31. Wildbolz, H. Ueber urogenital tuberkulose. *Schweiz. Med. Wochenschr.* **67**, 1125 (1937)
32. Abbara, A., Davidson, R. N. Etiology and management of genitourinary tuberculosis. *Nat. Rev. Urol.* **8**, 678–688 (2011)
33. Soriano-Rosas J, Avila-Casado MC, Carrera-Gonzalez E, et al. AIDS-associated nephropathy: 5-year retrospective morphologic analysis of 87 cases. *Pathol Res Pract.* 1998;194(8):567-570.
34. Krishnamoorthy, S. Aspects of evolving genito urinary tuberculosis – a profile of genito urinary tuberculosis (GUTB) in 110 patients. *J. Clin. Diagn. Res.* **11**, PC01–PC05 (2017)
35. Prakash, J., Goel, A., Sankhwar, Singh, B. Extensive renal and ureteral calcification due to tuberculosis: rare images for an uncommon condition. *BMJ Case Rep.* **2013**, bcr2012008508 (2013)
36. Kulchavanya, E. V., Shevchenko, S. Y., Cherednichenko, A. G. Diagnosis and treatment of cystitis: more questions than answers? *Urologiia* **5**, 37–42 (2016)
37. Oliverira, J. L., Silva Junior, G. B., Daher, E. F. Tuberculosis associated chronic kidney disease. *Am. J. Trop. Med. Hyg.* **84**, 843–844 (2011)
38. Puigvert, A. The ureter in renal tuberculosis. *Br. J. Urol.* **27**, 258–262 (1955)
39. Merchant, S., Bharati, A. & Merchant, N. Tuberculosis of the uro-genital system — urinary tract tuberculosis: renal tuberculosis. I. *Indian J. Radiol. Imaging* **23**, 46–63 (2013)
40. Gibson, M. S., Puckett, M. L., Shelly, M. E. Renal tuberculosis. *Radiographics* **24**, 1 (2004)
41. Roylance, J., Penry, B., Rhys Davies, E. et al. Radiology in the management of urinary tract tuberculosis. *Br. J. Urol.* **42**, 679–687 (1970)
42. Johnstone, A. S. Tuberculous cystitis; notes on three cases. *Br. J. Radiol.* **20**, 61–62 (1947)
43. Zumla, A., James, D. G. Granulomatous infections: etiology and classification. *Clin. Infect. Dis.* **23**, 146–158 (1996)
44. Kulchavanya, E., Brizhatyuk, E., Khomyakov, V. Diagnosis and therapy for prostate tuberculosis. *Ther. Adv. Urol.* **6**, 129–134 (2014)
45. Lee, S. Y., Choi, S. H. Treatment experience for incidentally diagnosed asymptomatic prostate tuberculosis in a patient with history of BCG intravesical therapy. *Urol. Case Rep.* **17**, 39–41 (2017)
46. Aphonin, A. B., Perezmanas, E. O., Toporkova, E. E. et al . Tuberculous infection as sexually transmitted infection. *Vestn. Poslediplomnogo Obrazovaniya* **3**, 69–71 (2006)
47. Hosamirudsari, H., Mohammadizia, F. Unilateral tuberculous epididymo-orchitis with scrotal fistula: a case report. *Iran. J. Pathol.* **10**, 165–168 (2015)
48. Lee, I. K., Yang, W. C., Liu, J. W. Scrotal tuberculosis in adult patients: a 10-year clinical experience. *Am. J. Trop. Med. Hyg.* **77**, 714–718 (2007)

49. Riehle, R. A., Jayraman, K. Tuberculosis of testis. *Urology* **1**, 43–46 (1982)
50. Ross JC, Gow JG, St Hill CA. Tuberculous epididymitis. A review of 170 patients. *Br J Surg.* 1961 May;48:663-6.
51. Falkensammer C, Gozzi C, Hager M, et al. Late occurrence of bilateral tuberculous-like epididymo-orchitis after intravesical bacille Calmette-Guérin therapy for superficial bladder carcinoma. *Urology*. 2005;65(1):175.
52. Borthwick, W. The pathogenesis of tuberculous epididymitis. *Edin. Med. J.* **53**, 55–70 (1946)
53. Viswaroop, B. S., Kekre, N., Gopalakrishnan, G. Isolated tuberculous epididymitis: a review of forty cases. *J. Postgrad. Med.* **51**, 109–111 (2005)
54. Heaton, N. D., Hogan, B., Michell, M., et al. Tuberculous epididymo-orchitis: clinical and ultrasound observations. *Br. J. Urol.* **64**, 305–309 (1989)
55. Premkumar, A., Newhouse, J. Seminal vesicle tuberculosis: CT appearance. *J. Comput. Assist. Tomogr* **12**, 676–677 (1988)
56. Bouchikhi, A. A., Khalouk, A., El Fassi, M. J. et al. Atypical isolated urethral tuberculosis associated with inflammatory stenosis and fistulas. *Urol. Ann.* **6**, 270–271 (2014)
57. Buppasiri, P., Temtanakitpaisan, T., Somboonporn, W. Tuberculosis at vulva and vagina. *J. Med. Assoc. Thai.* **93**, 613–615 (2010)
58. Das, P., Ahuja, A., Gupta, S. D. Incidence, etiopathogenesis and pathological aspects of genitourinary tuberculosis in India: a journey revisited. *Indian J. Urol.* **24**, 356–361 (2008)
59. Sharma, C., Shekhar, S., Sharma, V., et al. Paucibacillary tubercular vulval ulcer in a sexually inactive pubertal girl: role of therapeutic trial. *J. Pediatr. Adolesc. Gynecol.* **25**, e123–e124 (2012)
60. Davis JL, Cattamanchi A, Cuevas LE, Diagnostic accuracy of same-day microscopy versus standard microscopy for pulmonary tuberculosis: a systematic review and meta-analysis. *Lancet Infect. Dis.* **13**, 147–154 (2013)
61. Colabawalla, B. N. Reflections on urogenital tuberculosis. *Indian J. Urol.* **6**, 51–59 (1990)
62. Berta M, Sturm G, Juri L, et al. Diagnóstico bacteriológico de tuberculosis renal: experiencia del Laboratorio Regional de Tuberculosis de la provincia de Córdoba [Bacteriological diagnosis of renal tuberculosis: an experience at the regional tuberculosis laboratory in Córdoba Province, Argentina]. *Rev Argent Microbiol.* 2011;43(3):191-194.
63. Hemal, A. K. Polymerase chain reaction in clinically suspected genitourinary tuberculosis: comparison with intravenous urography, bladder biopsy, and urine acid fast bacilli culture. *Urology* **56**, 570–574 (2000)
64. World Health Organization. *Policy statement: automated real-time nucleic acid amplification technology for rapid and simultaneous detection of tuberculosis and rifampicin resistance: Xpert MTB/RIF system* (WHO, Geneva, 2011)
65. Green, C. Rapid diagnosis of tuberculosis through the detection of mycobacterial DNA in urine by nucleic acid amplification methods. *Lancet Infect. Dis.* **9**, 505–511 (2009)
66. Cek, M. EAU guidelines for the management of genitourinary tuberculosis. *Eur. Urol.* **48**, 353–362 (2005)

67. Dyer, R. B., Chen, M. Y., Zagoria, R. J. Abnormal calcifications in the urinary tract. *Radiographics* **18**, 1405–1424 (1998)
68. Vijayaraghavan, S. B. Spectrum of high- resolution sonographic features of urinary tuberculosis. *J. Ultrasound Med.* **23**, 585–594 (2004)
69. Rui, X., Li, X. D., Cai S., et al. Ultrasonographic diagnosis and typing of renal tuberculosis. *Int. J. Urol.* **15**, 135–139 (2008)
70. Yang, D. M. Comparison of tuberculous and pyogenic epididymal abscesses: clinical, gray-scale sonographic, and color doppler sonographic features. *AJR Am. J. Roentgenol.* **177**, 1131–1135 (2001)
71. Engin, G., Acunas, B., Acunas, G. et al. Imaging of extrapulmonary tuberculosis. *Radiographics* **20**, 471–488 (2000)
72. Chung, J. J., Kim, M.-J., Lee, T., et al. Sonographic findings in tuberculous epididymitis and epididymo-orchitis. *J. Clin. Ultrasound* **25**, 390–394 (1997)
73. Shah, H. U., Sannanjan, B., Baheti, A. et al. Hysterosalpingography and ultrasonography findings of female genital tuberculosis. *Diagn. Interv. Radiol.* **21**, 10–15 (2015)
74. Navarro-Vilasaró, M. Genitourinary mycobacteriosis: retrospective study of 45 cases in a general hospital. *Enferm. Infect. Microbiol. Clin.* **9**, 540–545 (2008)
75. Kapoor, R., Ansari, M. S., Mandhani, et al. Clinical presentation and diagnostic approach in cases of uro-genital tuberculosis. *Indian J. Urol.* **24**, 401–405 (2008)
76. Kollins, S. A., Hartman, G. W., Carr, D. T., et al. Roentgenographic findings in urinary tract tuberculosis. A 10-year review. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* **121**, 487–499 (1974)
77. Kenney, P. J. Imaging of chronic renal infections. *Am. J. Roentgenol.* **3**, 485–494 (1990)
78. Goel, A., Dalela, D. Options in the management of tuberculous ureteric stricture. *Indian J. Urol.* **24**, 376–381 (2008)
79. Aswathaman K, Devasia A. Thimble bladder ANZ J Surg 78. 1049 (2008)
80. Wang LJ, Wong YC, Chen CJ, et al. CT features of genitourinary tuberculosis. J Comput Assist Tomogr. 1997;21(2):254-258.
81. Wang, L. J. Imaging findings of urinary tuberculosis on excretory urography and computerized tomography. *J. Urol.* **169**, 524–528 (2003)
82. Kukrej, N., Cook, G. J., Pattison, J. M. Positron-emission tomography used to diagnose tuberculosis in a renal transplant patient. *Am. J. Transplant.* **2**, 105–107 (2002)
83. Gambhir, S. Imaging in extrapulmonary tuberculosis. *Int. J. Infect. Dis.* **56**, 237–247 (2017)
84. Bour, L. Multiparametric MRI features of granulomatous prostatitis and tubercular prostate abscess. *Diagn. Interv. Imaging* **94**, 84–90 (2013)
85. Merchant, S., Bharati, A., Merchant, N. Tuberculosis of the uro-genital system — urinary tract tuberculosis: renal tuberculosis. II. *Indian J. Radiol. Imaging* **23**, 64–77 (2013)
86. Kulchavanya, E. Best practice in the diagnosis and management of urogenital tuberculosis. *Ther. Adv. Urol.* **5**, 143–151 (2013)
87. Krishnamoorthy, S., Gopalakrishnan, G. Surgical management of renal tuberculosis. *Indian J. Urol.* **24**, 369–375 (2008)

88. Mcaler, S. J., Johnson, C. W., Johnson, W. D. in *Campbell-Walsh Urology* 9th edn (ed. Wein, A. J.) 436–470 (Saunders Elsevier, 2007)
89. Gow, J. G. Renal calcification in genitourinary tuberculosis. *Br. J. Surg.* **52**, 283–288 (1965)
90. Carl, P., Stark, L. Indications for surgical management of genitourinary tuberculosis. *World J. Surg.* **21**, 505–510 (1997)
91. Kim, H. H., Lee, K. S., Park, K. et al. Laparoscopic nephrectomy for nonfunctioning tuberculous kidney. *J. Endourol.* **14**, 433–437 (2000)
92. Gupta, R. Laparoscopic ablative and reconstructive surgeries in uro-genital tuberculosis. *JSL* **18**, e2014.00203 (2014)
93. Gupta, S. Acute renal failure in bilateral urinary tract tuberculosis. *Pediatr. Surg. Int.* **13**, 200–201 (1998)
94. Vasdev, N., Moon, A., Thorpe, A. C. Metabolic complications of urinary intestinal diversion. *Indian J. Urol.* **29**, 310–315 (2013)
95. Gupta, R., Singh, P., Kumar, R. Should men with idiopathic obstructive azoospermia be screened for genitourinary tuberculosis? *J. Hum. Reprod. Sci.* **8**, 43–47 (2015)
96. Nickel, J. C. Chronic epididymitis: a practical approach to understanding and managing a difficult urologic enigma. *Rev. Urol.* **5**, 209–215 (2003)
97. Cho, Y. S., Joo, K. J., Kwon, C. H. et al. Tuberculosis of testis and prostate that mimicked testicular cancer in young male soccer player. *J. Exerc. Rehabil.* **9**, 389–393 (2013)
98. Pryor, J. P., Hendry, W. F. Ejaculatory duct obstruction in subfertile males: analysis of 87 patients. *Fertil. Steril.* **65**, 725–730 (1991)
99. Gow JG, Barbosa S. Genitourinary tuberculosis. A study of 1117 cases over a period of 34 years. *Br J Urol.* 1984 Oct;56(5):449- 55
100. Chandra S, Chandra H, Chauhan N, et al. Male genitourinary tuberculosis – 13 years experience at a tertiary care center in India. *Southeast Asian J Trop Med Public Health.* 2012 Mar;43(2):364-9.
101. European Centre for Disease Prevention and Control Office Europe. Tuberculosis surveillance and monitoring in Europe 2017. Stockholm: European Centre for Disease Prevention and Control; 2017
102. D'Ambrosio L, Tadolini M, Dupasquier S, ERS/WHO tuberculosis consilium reporting of the initial 10 cases. *Eur Respir J.* 2014 Jan;43(1):286-9
103. World Health Organization. Global tuberculosis report 2017. Geneva: World Health Organization; 2017
104. Millard J, Ugarte-Gil C, Moore DA. Multidrug resistant tuberculosis. *BMJ.* 2015 Feb;350:h882
105. World Health Organization. Companion handbook to the WHO guidelines for the programmatic management of drug-resistant tuberculosis. Geneva: World Health Organization; 2014
106. Fox GJ, Mitnick CD, Benedetti A, et al. Surgery as an Adjunctive Treatment for Multidrug-Resistant Tuberculosis: An Individual Patient Data Metaanalysis. *Clin Infect Dis.* 2016 Apr;62(7):887-95
107. World Health Organization. WHO treatment guidelines for drug- resistant tuberculosis; 2016 update; October 2016 revision

108. Naftalin CM, Verma R, Gurumurthy M, et al. Coadministration of allopurinol to increase antimycobacterial efficacy of pyrazinamide as evaluated in a whole-blood bactericidal activity model. *Antimicrob Agents Chemother.* 2017 Oct;61
109. Hsu HL, Lai CC, Yu FL. Clinical and microbiological characteristics of urine culture confirmed genitourinary tuberculosis at medicine centers in Taiwan from 1995 to 2007. *Eur J Clin Microbiol Infect Dis.* 2011 Mar;30(3):319-26
110. Altiparmak MR, Trabulus S, Balkan II, et al. Urinary tuberculosis: a cohort of 79 adult cases. *Ren Fail.* 2015 Aug;37(7):1157-63
111. Figueiredo AA, Lucon AM. Urogenital tuberculosis update and review of 8961 cases from the world literature. *Rev Urol.* 2008;10(3):207-17
112. Gokce G, Kilicarslan H, Ayan S, et al. Genitourinary tuberculosis: a review of 174 cases. *Scand J Infect Dis.* 2002;34(5):338-40
113. Gow JG. Results of treatment in a large series of cases of genito- urinary tuberculosis and the changing pattern of the disease. *Br J Urol.* 1970 Dec;42(6):647-55
114. Psihramis KE, Donahoe PK. Primary Genitourinary Tuberculosis: Rapid Progression and Tissue Destruction During Treatment. *J Urol.* 1986 May;135(5):1033-6
115. Kulchayena E, Naber K, Bjerklund Johansen TE. Urogenital Tuberculosis: Classification, Diagnosis, and Treatment. *Eur Urol Suppl.* 2016 Jul;15(4):112-21
116. Shin KY, Park HJ, Lee JJ, et al. Role of early endourologic management of tuberculous ureteral strictures. *J Endourol.* 2002 Dec;16(10):755-8
117. Singh V, Sinha RJ, Sankhwar SN, et al. Reconstructive surgery for tuberculous contracted bladder: experience of a center in northern India. *Int Urol Nephrol.* 2011 Jun;43(2):423-30
118. Cek M, Lenk S, Naber KG, et al. management of genitourinary tuberculosis. *Eur Urol.* 2005 Sep;48(3):353-62
119. Critchley JA, Orton LC, Pearson F. Adjunctive steroid therapy for managing pulmonary tuberculosis. *Cochrane Database Syst Rev.* 2014 Nov 12;(11):CD011370