

BÖLÜM 9

SPİNAL VASKÜLER TÜMÖRLER

Mehmet TURMAK ¹

GİRİŞ

Kanser hastalığı geçmişte olduğu gibi günümüzde de dünya için büyük bir sorun teşkil etmektedir. Bu nedenle kanser hatalığını engellemeye yönelik veya ortaya çıktıktan sonra tedavi etmeye yönelik çalışmalar ve yeni yaklaşımalar her geçen gün artarak devam etmektedir. Tabi spinal tümörler bu hastalığın içerisinde önemli bir yere sahiptir. Her ne kadar primer spinal tümörler tüm iskelet sistemi tümörleri içerisinde %10'dan az bir oranla oldukça nadir olsa da tüm kanserlerin seyri boyunca spinal bölgeye metastazî yaklaşıklık %5 ile %10 arasında oldukça yüksek bir orana sahiptir. Dolayısı ile spinal tümörlerin büyük çoğunluğu yani yaklaşık %90'nından fazlası metastatik lezyonlardır (1-3). Primer ve metastatik omurga tümörleri genellikle mekanik instabilite, ilerleyici ve geçmeyen ağrı ile radikülopati veya kompresyon myelopatisi sonucunda oluşan; parezi, parestezi, mesane ve barsak disfonksiyonu ve cinsel işlev bozukluğu gibi komplikasyonlar ile kendini göstererek fonksiyon kaybına ve hastanın yaşam kalitesinde belirgin düşmeye sebep olmak-

tadır (4-5). Bu nedenle gerek primer tümörlerin gerekse metastatik tümörlerin erken tanısı ve doğru bir yaklaşım ile tedavi edilmesi hastanın yaşam kalitesi açısından çok önemlidir. Spinal tümörlerin tedavisinde kemoterapinin yeri pek yoktur. Genellikle radyoterapi ve/veya cerrahi uygulanmaktadır. Bu iki yöntemin içerisinde birinci basamak olarak radyoterapi uygulanmakla birlikte, radyorezistan tümörlerde veya omurga instabilitesi olanlarda genellikle cerrahi kullanılır. Ancak tümör progresyonu, omirilik kompresyon bulguları veya ilerleyici nörolojik semptomları olan hastalarda her iki tedavi yöntemi birlikte uygulanabilmektedir (5). Spinal vasküler tümörler konu başlığının seçilme sebebi bu tümörlerin tedavi disiplini içerisinde girişimsel yaklaşımların ortaya çıkmasıdır. Cerrahi komplikasyonları azaltmak, daha iyi bir eksizyon zonu oluşturmak, kitle etkisini azaltmak, rezeke edilemez durumda olan tümörü rezeke edilebilir hale getirmek vs. gibi nedenlerle cerrahi öncesi hipervasküler olan tümörlerde intraarteriyel embolizasyon endikasyonu oluşmuştur. Spinal vasküler tümörler hem vasküler

¹ Dr. Öğr. Üyesi, Dicle Üniversitesi Tip Fakültesi Radyoloji AD., turmaklar@hotmail.com

SONUÇ

Spinal tümörler genellikle mekanik instabilité, ilerleyici ve geçmeyen ağrı ile radikülopati veya kompresyon myelopatisi sonucunda oluşan; parези,parestezi,mesane ve barsak disfonksiyonu ve cinsel işlev bozukluğu gibi komplikasyonlar ile kendini göstererek fonksiyon kaybına ve hastanın yaşam kalitesinde belirgin düşmeye sebep oldukları için gerek primer tümörlerin gerekse metastatik tümörlerin erken tanısı ve doğru bir yaklaşım ile tedavi edilmesi hastanın yaşam kalitesi açısından çok önemlidir. Özellikle hiper-vasküler spinal tümörlerin tedavisinde pre-op embolizasyon ameliyata bağlı komplikasyonları azaltmakta ve tedavi başarısını artırmaktadır.

KAYNAKLAR

1. Lewandrowski KU, Bell GR, McLain RF. Cancer of the spine. How big is the problem? In *Cancer in the spine. Comprehensive care*. Edited by McLain RF. Humana Press. Totowa, New Jersey, 2006: 11-15.
2. Walsh GL, Gokaslan ZL, McCutcheon IE, et al: Anterior approaches to the thoracic spine in patients with cancer: Indications and results. *Ann Thorac Sur*. 1997; 64:1611-1618,
3. Simmons ED, Zheng Y. Vertebral tumors: surgical versus nonsurgical treatment. *Clin Orthop Relat Res*. 2006; 443: 233-47.
4. Bilsky MH, Lis E, Raizer J, et al: The diagnosis and treatment of metastatic spinal tumor. *Oncologist*. 1999; 4:459-469.
5. E. Ozkan, S. Gupta. Embolization of Spinal Tumors: Vascular Anatomy, Indications, and Technique. *Tech Vasc Interventional Rad*. 2001; 14:129-140
6. Tanrıvermiş S. Neoplaziler. Aslan H, Özmen E (ed). *Diagnostik İmaging: OMURGA*. Ankara:Güneş Tip Kitabevleri. 2016; Kısım V, Bölüm 1. p. 1-134.
7. Resnick D, Nemcek AA, Haghghi F: *Spinal enostosis radiology*. 1983; 147:373-376,
8. Kulshrestha M, Byrne P: Multiple primary haemangiomas of bone mimicking vertebral metastases. *R Soc Med*. 1997; 90: 632-634.
9. Osborne AG: *Diagnostic Neuroradiology*. St. Louis: Mosby-Year Book Inc, 1994: 877-879.
10. Dorward RH,Lamasters DL, Watanbe TJ: Tumors. In Newton TH, Potts DG, editors, *computed tomography of the spine and spinal cord*. San Anselmo, Clavadel press. 1983; pp.115-147.
11. Golwyn DH, Cardenes CA, murtagh FR, et al: MRI of a cervical extradural cavernous hemangioma. *Neuro-radiol*. 1992; 34:68-69
12. Fox MW, Onofrio BM. The natural history and management of symptomatic and asymptomatic vertebral hemangiomas. *J Neurosury*. 1993; 78:36-45.
13. Laredo JD, Reizine D, Bard M, Merland JJ. Vertebral hemangiomas: radiologic evaluation. *Radiology*. 1986; 161: 183-89.
14. Hwang PM: Vertebral abnormality in a patient with suspected malignancy. *BUMC Proceeding*. 2002; 15:325-326.
15. Schrock WB, Wetzel RJ, Tanner SC, et al. Aggressive hemangioma of the thoracic spine. *J Radiol Case Rep*. 2011; 5: 7-13.
16. Cohen JE, Lylyk P, Ceratto R, et al. Percutaneous vertebroplasty: Technique and results in 192 procedures. *Neurol Res*. 2004; 26:41-49.
17. Vinay S, Khan SK, Braybrooke JR: Lumbar vertebral haemangioma causing pathological fracture, epidural haemorrhage, and cord compression: A case report and review of literature. *J Spinal Cord Med*. 2011; 34:335-339.
18. Sögüncü Y. Benign Primer Omurga Tümörleri. Aydinli U, Kahraman S, Yalnız E (ed). *Omurga ve Spinal Kord Tümörlerinin Tanı ve Tedavisi*. Ankara: İris Yayınları. 2016; p. 155-185.
19. Leggon RE, Zlotecki R, Reith J, et al. Giant cell tumor of the pelvis and sacrum: 17 cases and analysis of the literature. *Clin Orthop Relat Res*. 2004; 423: 196-207.
20. Redekop GJ, Del Maestro RF. Vertebral hemangiomas causing spinal cord compression during pregnancy. *Surg Neurol*. 1992; 38:210.
21. Roelvink NCA, Kamphorst W, August H, et al. Literature statistics do not support a growth stimulating role for female sex steroid hormones in haemangiomas and meningiomas. *J Neurooncol*. 1991; 11:243-53.
22. Moles A, Hamel O, Perret C, et al. Symptomatic vertebral hemangiomas during pregnancy. *J Neurosurg Spine*. 2014; 20:585-591.
23. Rawat S, Nangia S, Ezhilalan RB, et al. Variance in the treatment of vertebral haemangiomas. *J Indian Med Assoc*. 2007; 105(1):42, 44-5.
24. Hekster RE, Endtz LJ. Spinalcord compression caused by vertebral haemangioma relieved by percutaneous catheter embolisation: 15 years later. *Neuroradiology*. 1987; 29(1):101.
25. Hurley MC, Gross BA, Surdell D, et al. Preoperative Onyx embolization of aggressive vertebral hemangiomas. *AJNR Am J Neuroradiol*. 2008; 29(6):1095-7.
26. Benati A, Dalle Ore G, Da Pian R, et al: Transfemoral selective embolisation in the treatment of some cranial and vertebro-spinal vascular malformations and tumours. Preliminary results. *J Neurosurg Sci*. 1974; 18: 233-238.
27. Doppman JL, Oldfield EH, Heiss JD. Symptomatic vertebral hemangiomas: treatment by means of direct intralesional injection of ethanol. *Radiology*. 2000; 214(2):341-8.
28. Goyal M, Mishra NK, Sharma A, et al. Alcohol ablation of symptomatic vertebral hemangiomas. *AJNR Am J Neuroradiol*. 1999; 20(6):1091-6.

29. Browne TR, Adams RD, Roberson G: Hemangioblastoma of the spinal cord. Review and report of five cases. *Arch Neurol.* 1976; 33: 435– 44.
30. Chu BC, Terae S, Hida K, et al. MR findings in spinal hemangioblastoma: correlation with symptoms and with angiographic and surgical findings. *AJNR Am J Neuroradiol.* 2001;22:206-217
31. Barone BM, Elridge AR: Ependymoma, a clinical survey. *J neurosurg.* 1970; 33: 428–438.
32. Osborne AG: Cysts, tumors and tumor like Lesions of the Spine and Spinal Cord Part 5 – Chapter 21 In: *Diagnostik Neuroradiology. Mosby.* 1994; 876–915.
33. Huisman TAGM. Pediatric tumors of the spine. *Cancer Imaging.* 2009; 9: 45-8.
34. Takai K, Taniguchi M, Takahashi H, et al. Comparative analysis of spinal hemangioblastomas in sporadic disease and Von Hippel-Lindau syndrome. *Neurol Med Chir (Tokyo).* 2010;50:560-567.
35. Kopelson G, Lingood RM, Kleinman GM: Management of intramedullary spinal cord tumors. *Radiology.* 1980;135: 473–479.
36. Couch V, Lindor NM, Karnes PS, et al. von Hippel-Lindau disease. *Mayo Clin Proc.* 2000;75:265-272.
37. Neumann HP, Eggert HR, Scheremet R, et al. Central nervous system lesions in von Hippel-Lindau syndrome. *J Neurol Neurosurg Psychiatry.* 1992;55:898-901.
38. Neumann HP. Basic criteria for clinical diagnosis and genetic counselling in von Hippel-Lindau syndrome. *Vasa.* 1987;16:220-226.
39. Boström A, Hans FJ, Reinacher PC. Intramedullary hemangioblastomas: timing of surgery, microsurgical technique and follow-up in 23 patients. *Eur Spine J.* 2008;17(6):882-6.
40. Liu JK, Brockmeyer DL, Dailey AT, et al. Surgical management of aneurysmal bone cysts of the spine. *Neurosurg Focus.* 2003;15:E4.
41. Liu JK, Brockmeyer DL, Schmidt MH. Aneurysmal bone cyst of the spine. *Contemp Neurosurg.* 2004;26:1–8.
42. Jaffe H, Lichtenstein L. Solitary unicameral bone cyst with emphasis on the roentgen picture, the pathologic appearance and the pathogenesis. *Arch Surg.* 1942;44:1004–25.
43. Kransdorf MJ, Sweet DE. Aneurysmal bone cyst: concept, controversy, clinical presentation, and imaging. *AJR Am J Roentgenol.* 1995; 164: 573–80.
44. Dahlin DC, McLeod RA. Aneurysmal bone cyst and other nonneoplastic conditions. *Skeletal Radiol.* 1982;8:243–50.
45. Ameli NO, Abbassioun K, Saleh H, et al. Aneurysmal bone cysts of the spine: report of 17 cases. *J Neurosurg.* 1985;63:685–90.
46. Hay MC, Paterson D, Taylor TK. Aneurysmal bone cysts of the spine. *J Bone Joint Surg Br.* 1978;60-B:406–11.
47. Tillman BP, Dahlin DC, Lipscomb PR, et al. Aneurysmal bone cyst: an analysis of ninety-five cases. *Mayo Clin Proc.* 1968;43:478–95.
48. Turker RJ, Mardjetko S, Lubicky J. Aneurysmal bone cysts of the spine: excision and stabilization. *J Pediatr Orthop.* 1998; 18: 209–13.
49. Murphey MD, Andrews CL, Flemming DJ, et al. From the archives of the AFIP. Primary tumors of the spine: radiologic pathologic correlation. *Radiographics.* 1996; 16: 1131–58.
50. Dahlin DC, Cupps RE, Johnson EW Jr. Giant-cell tumor: a study of 195 cases. *Cancer.* 1970; 25: 1061–70.
51. Jaffe H. Osteoid osteoma: a benign osteoblastic tumor composed of osteoid and atypical bone. *Arch Surg.* 1935; 709–715.
52. Saifuddin A, White J, Sherazi Z. Osteoid osteoma and osteoblastoma of the spine: Factors associated with the presence of scoliosis. *Spine.* 1998; 23:47-53.
53. Poey C, Clement JL, Baunin C. Percutaneous extraction of an osteoid osteoma of the lumbar spine under CT guidance. *J Comput Assist Tomogr.* 1991; 15: 1056-1058.
54. Rosenthal DI, Springfield NS, Gebhardt MC, et al. Osteoid osteoma: percutaneous radio-frequency ablation. *Radiology.* 1995; 197: 451-4.
55. Boriani S, Capanna R, Donati D. Osteoblastoma of the spine. *Clin Orthop.* 1992; 278:37-45.
56. Kroon HM, Schurmans J: Osteoblastoma: Clinical and radiologic findings in 98 new cases. *Radiology.* 1990; 175:783-90.
57. Schajowicz F, Lemos C. Osteoid osteoma and osteoblastoma: closely related entities of osteoblastic derivation. *Acta Orthop Scan.* 1970; 41: 271-291.
58. Mayer L. Malign degeneration of socalled benign osteoblastoma. *Bull Hosp Jt Dis.* 1967; 28: 4-13.
59. Zileli M, Cagli S, Basdemir G, et al. Osteoid osteomas and osteoblastomas of the spine. *Neurosurg Focus.* 2003;15:E5.
60. Flemming DJ, Murphey MD, Carmichael BB, et al. Primary tumors of the spine. *Semin Musculoskeletal Radiol.* 2000; 4:299–320.
61. Fiorini F, Lavrador JP, Vergani F, et al. Primary lumbar paraganglioma: clinical, radiological, surgical and histopathological characteristics from a case series of 13 patients. *World Neurosurg.* 2020; 23.
62. Tuleasca C, Al-Risi AS, David P, et al. Paragangliomas of the spine: a retrospective case series in a national reference French center. *Acta Neurochir.* 2020; 162:831–837.
63. Aghakhani N, George B, Parker F. Paraganglioma of the cauda equina region-report of two cases and review of the literature. *Acta Neurochir.* 1999; 141:81–87
64. Dillard-Cannon E, Atsina KB, Ghobrial G, et al. Lumbar paraganglioma. *J Clin Neurosci.* 2016; 30:149–151.
65. Djindjian M, Ayache P, Brugieres P, et al. Giant gangliocytic paraganglioma of the filum terminale. *Case Rep J Neurosurg.* 1990; 73:459–461
66. Landi A, Tarantino R, Marotta N, et al. Paraganglioma of the filum terminale: case report. *World J Surg Oncol.* 2009; 7:95.
67. Lenders JW, Pacak K, Walther MM, et al. Biochemical diagnosis of pheochromocytoma: which test is best? *JAMA.* 2002; 287:1427–1434.
68. Gelabert-Gonzalez M. Paragangliomas of the lumbar region. Report of two cases and review of the literatu-

- re. *J Neurosurg Spine*. 2005; 2:354–365.
69. Dahlin DC. Osteochondroma (Osteocartilaginous Exostosis). Bone Tumors. 3rd ed. Springfield, IL: Charles C. Thomas Publisher. 1978;17–27.
 70. Albrecht S, Crutchfield JS, SeGall GK. On spinal osteochondromas. *J Neurosurgery*. 1992; 77:247–52.
 71. Yıldırım T. Spinal Tümörler ve Tümör Benzeri Lezyonlar. Sancak İ.T (ed). *Temel Radyoloji*. Ankara: Güneş Tip Kitabevi; 2015. P. 454–480.
 72. Fidler MW. Surgical treatment of giant cell tumours of the thoracic and lumbar spine: report of nine patients. *Eur Spine J*. 2001; 10: 69–77
 73. Murphey MD, Andrews CL, Flemming DJ, et al. From the archives of the AFIP. Primary tumors of the spine: radiologic pathologic correlation. *Radiographics* 1996; 16: 1131–58.
 74. Hulen CA, Temple HT, Fox WP, et al. Oncologic and functional outcome following sacrectomy for sacral chordoma. *J Bone Joint Surg Am*. Jul 2006;88(7):1532–9.
 75. Çağatay Ö, Gökçen B. Malign Primer Omurga Tümörleri. Aydınlı U, Kahraman S, Yalnız E (ed). *Omurga ve Spinal Kord Tümörlerinin Tanı ve Tedavisi*. Ankara: İris Yayınları. 2016; p. 185–194.
 76. Sundaresan N, Borianı S, Rothman A, et al. Tumors of the osseous spine. *J Neurooncol*. 2004 Aug–Sep;69 1–3:273–90
 77. Scuibba DM, Chi JH, Rhines LD, et al. Chordoma of the spinal column. *Neurosurg Clin N Am*. 2008; Jan;19 1:5–15.
 78. Sundaresan N. Primary malignant tumors of the spine. *Orthop. Clin North Am.* 2009;40 1: 21–36. 21.v; 36.v.
 79. McKenna RJ, Schwinn CP, Soong KY, et al. Sarcomata of the osteogenic series (osteosarcoma, fibrosarcoma, chondrosarcoma, parosteal osteogenic sarcoma and sarcomata arising in abnormal bone). An analysis of 552 cases. *J Bone Joint Surg*. 1966; 48(1):1–26.
 80. Sissons HA. The WHO classification of bone tumors. *Recent Results Cancer Res*. 1976; 54:104–8.
 81. Huvos AG. Bone Tumors: Diagnosis, Treatment, and Prognosis. Saunders; 1991.
 82. Barwick KW, Huvos AG, Smith J. Primary osteogenic sarcoma of the vertebral column: a clinicopathologic correlation of ten patients. *Cancer*. 1980; 46(3):595–604.
 83. Dreghorn CR, Newman RJ, Hardy GJ, et al. Primary tumors of the axial skeleton. Experience of the Leeds Regional Bone Tumor Registry. *Spine (Phila Pa 1976)* 1990;15(2):137–40.
 84. Kelley SP, Ashford RU, Rao AS, et al. Primary bone tumours of the spine: a 42-year survey from the Leeds Regional Bone Tumour Registry. *Eur Spine J*. 2007;16(3):405–9.
 85. Fischgrund J. Orthopaedic Knowledge Update. Jeffrey, editors. 9. *Amer Academy of Orthopaedic*; 2008.
 86. Mirabello L, Troisi RJ, Savage SA. Osteosarcoma incidence and survival rates from 1973 to 2004: data from the Surveillance, Epidemiology, and End Results Program. *Cancer*. 2009;115(7):1531–43.
 87. Flemming DJ, Murphey MD, Carmichael BB, et al. Primary tumors of the spine. *Semin Musculoskeletal Radiol*. 2000; 4:299–320.
 88. Shives TC, McLeod RA, Unni KK, et al. Chondrosarcoma of the spine. *J Bone Joint Surg Am* 1989; 8:1158–65.
 89. L. F. Hirsh, A. Thanki, and H. B. Spector, "Primary spinal chondrosarcoma with eighteen-year follow-up: case report and literature review," *Neurosurgery*, vol. 14, no. 6, pp. 747–749, 1984.
 90. World Health Organization, "Cartilage tumours," in *World Health Organization Classification of Tumours. Pathology and Genetics. Tumours of Soft Tissue and Bone*, C. D. M. Fletcher, K. K. Unni, and F. Mertens, Eds. IARC Press, Lyon, France, 2002; pp. 234–257.
 91. S. Boriani, F. De Lure, S. Bandiera et al., "Chondrosarcoma of the mobile spine: report on 22 cases," *Spine*, 2000; vol. 25, no. 7, pp. 804–812.
 92. S. Gitelis, F. Bertoni, P. Picci, et al. "Chondrosarcoma of bone. The experience at the Istituto Ortopedico Rizzoli," *Journal of Bone and Joint Surgery*. 1981; *Series A*, vol. 63, no. 8, pp. 1248–1257.
 93. M. Quiriny and M. Gebhart, "Chondrosarcoma of the spine: a report of three cases and literature review," *Acta Orthopaedica Belgica*, 2008; vol. 74, no. 6, pp. 885–890.
 94. Shives TC, McLeod RA, Unni KK, Schray MF. Chondrosarcoma of the spine. *J Bone Joint Surg Am*. 1989; 8:1158–65.
 95. D. G. Mohler, R. Chiu, D. A. McCall, et al. "Curettage and cryosurgery for low-grade cartilage tumors is associated with low recurrence and high function," *Clinical Orthopaedics and Related Research*, 2010; vol. 468, no. 10, pp. 2765–2773.
 96. I. C. M. Van Der Geest, M. H. De Valk, J. W. J. De Rooy, et al. "Oncological and functional results of cryosurgical therapy of enchondromas and chondrosarcomas grade," *Journal of Surgical Oncology*, 2008; vol. 98, no. 6, pp. 421–426.
 97. N. Toyota, A. Naito, H. Kakizawa et al. "Radiofrequency ablation therapy combined with cementoplasty for painful bone metastases: initial experience," *CardioVascular and Interventional Radiology*, 2005; vol. 28, no. 5, pp. 578–583.
 98. H. Kojima, N. Tanigawa, S. Kariya, A. Et al. "Clinical assessment of percutaneous radiofrequency ablation for painful metastatic bone tumors," *CardioVascular and Interventional Radiology*, 2006; vol. 29, no. 6, pp. 1022–1026.
 99. Ewing J. Diffuse endothelioma of bone. *Proc NY Pathol Soc*. 1921; 21:17
 100. Horowitz MC, Malawer MM, Woo SY, et al. Ewing's sarcoma family of tumors: Ewing's sarcoma of bone and soft tissue and peripheral primitive neuroectodermal tumors. In: *Principles and practice of pediatric oncology*, 3rd edn. Pizzo PA, Poplack DG, eds. Philadelphia: Lippincott-Raven. 1997; 831–857
 101. Barbieri E, Chiaulon G, Bunkeila F, et al. Radiotherapy in vertebral tumors. Indications and limits: a re-

- port on 28 cases of Ewing's sarcoma of the spine. *Chir Organi Mov.* 1998; 83:105–111
102. Villas C, San Julian M. Ewing's tumor of the spine: report on seven cases including one with a 10-year follow-up. *Eur Spine J.* 1996; 5:412–417
 103. Unni KK. Ewing's tumor. In: *Dahlin's Bone Tumors: General Aspects & Data on 11,087 Cases*, 5th ed. K. Krishnan Unni, (ed). Philadelphia: LippincottRaven 1996; 249–261
 104. Saito Y, Matsuzaki A, Suminoe A, et al. Congenital Ewing sarcoma in retroperitoneum with multiple metastases. *Pediatr Blood Cancer.* Jul 11 2008.
 105. Cowan AJ, Allen C, Barac A, et al. Global burden of multiple myeloma: a systematic analysis for the global burden of disease study 2016. *JAMA Oncol.* 2018;4(9):1221–1227.
 106. Dudeney S, Lieberman IH, Reinhardt MK, Hussein M : Kyphoplasty in the treatment of osteolytic vertebral compression fractures as a result of multiple myeloma. *J Clin Oncol* 20 : 2002; 2382-2397.
 107. Kyle RA, Gertz MA, Witzig TE, et al. Review of 1027 patients with newly diagnosed multiple myeloma. *Mayo Clin Proc.* 2003;78(1):21–33.
 108. Lecouvet FE, Vande Berg BC, Maldaque BE, et al. Vertebral compression fractures in multiple myeloma. Part I. Distribution and appearance at MR imaging. *Radiology.* 1997;204(1): 195–199.
 109. Moulopoulos LA, Varma D, Dimopoulos MA, et al : Multiple myeloma : spinal MR imaging in patients with untreated newly diagnosed disease. *Radiology.* 1992; 185 : 833-840.
 110. Formica C, Gavino D, Giudive V : Tumors of the spine. Indication for surgical treatment. *Chir Organi Mov.* 1998; 83 : 23-33.
 111. Jonsson B, Sjostrom L, Jonsson H, et al. Surgery for multiple myeloma of the spine. a retrospective analysis of 12 patients. *Acta Orthop Scand.* 1992; 63 : 192-194.
 112. Kim DY, Jung SK, Jo GT, et al. A survival analysis of surgically treated metastatic spine tumor. *J Korean Neurosurg Soc.* 2003; 33 : 247-251.
 113. Soutar R, Lucraft H, Jackson G, et al. Guidelines on the diagnosis and management of solitary plasmacytoma of bone and solitary extramedullary plasmacytoma. *Clin Oncol (R Coll Radiol).* 2004;16(6):405–413.
 114. Hatlaş H, Külli S, Ramadan SS, et al. Memede plazmositom (olgu sunumu). *EAJM.* 2007; 39:224–226.
 115. Hussein MA: New treatment strategies for multiple myeloma. *Semin Hematol.* 2004; 41(4 Suppl 7):2-8,
 116. Tosi P. Diagnosis and treatment of bone disease in multiple myeloma: spotlight on spinal involvement. *Scientifica (Cairo).* 2013; 2013:104546.
 117. Cervoni L, Celli P, Salvati M, et al. Solitary plasma-cytoma of the spine: Relationship of IgM to tumor progression and recurrence. *Acta Neurochir (Wien).* 1995; 135:122- 125.
 118. Di Micco P, Di Micco B. Up-date on solitary plasma-cytoma and its main differences with multiple myeloma. *Exp Oncol.* 2005; 27(1):7-12.
 119. Berkow R: The Merck Manual of Diagnosis and Therapy. 16th ed. *Merck and Co (N.J.),* 1992
 120. Braunwald E, Fauci AS, Kasper D, et al. Harrison's Principles of Internal Medicine. 15th ed. *McGraw Hill,* 2001.
 121. İliçin G, Biberoğlu K, Süleymanlar G, et al. İç Hastalıkları. İkinci Baskı. Ankara: Güneş Kitabevi, 2003.
 122. Stout AP, Murray MR. Hemangiopericytoma: a vascular tumor featuring Zimmerman's pericytes. *Ann Surg.* 1942; 116(1):26–33.
 123. Espat NJ, Lewis JJ, Leung D, et al. Conventional hemangiopericytoma: modern analysis of outcome. *Cancer.* 2002; 95(8):1746–1751
 124. Kibar Y, Uzar AI, Erdemir F, et al. Hemangiopericytoma arising from the wall of the urinary bladder. *International Urology and Nephrology.* 2006; 38:243-245.
 125. Kumar M, Tripathi K, Khanna R, et al. Hemangiopericytoma of the spleen: Unusual presentation as multiple abscess. *World Journal of Surgical Oncology.* 2005; 3:77.
 126. Herzog CE, Leeds NE, Bruner JM. Intracranial hemangiopericytomas in children. *Pediatr Neurosurg.* 1995; 22:274–279.
 127. Nanda A, Mohan H, Handa U, et al. Cytomorphological diagnosis of hemangiopericytoma. *Diagnostic Cytopathology.* 2006; 34:715-717.
 128. Berenstein A, Lasjaunias P, TerBrugge KG. Tumors of the spinal column and spinal cord, in Berenstein A, Lasjaunias P, TerBrugge KG (eds): *Surgical Neuroangiography, vol 2. Clinical and Endovascular Treatment Aspects in Adults.* Berlin, Springer, 2004; pp 874-877.
 129. Schiarioti M, Goetz P, El-Maghraby H, et al. Hemangiopericytoma: long-term outcome revisited. *J Neurosurg.* 2011; 114:747–755
 130. Vanneuville B, Janssens A, Lemmerling M, et al. Non-Hodgkin's lymphoma presenting with spinal involvement. *Ann Rheum Dis.* 2000; 59: 12-4.
 131. Boukoba M, Mazel C, Touboul E. Primary vertebral and spinal epidural non-Hodgkin's lymphoma with spinal cord compression. *Neuroradiology.* 1996;38(4):333-337.
 132. Shu Y, Wang A, Yi L, et al. Primary spinal epidural diffuselarge B-cell lymphoma with paraplegia as the first manifestation: a case report. *Oncotargets Ther.* 2019; 12: 6497-501.
 133. Mally R, Sharma M, Khan S, et al. Primary lumbo-sacral spinal epidural non Hodgkin's Lymphoma: A case report and review of literature. *Asian Spine J.* 2011; 5: 192-5.
 134. Jagtap SA, Patil AS, Kesavadas C, et al. Primary spinal epidural diffuse large B-celllymphoma. *Neurol India.* 2013; 61: 532-4.
 135. Xiong L, Liao LM, Ding JW, et al. Clinicopathologic characteristics and prognostic factors for primary spinal epidural lymphoma: report on 36 Chinese patients and review of the literature. *BMC Cancer.* 2017;17(1):131.
 136. Moussaly E, Nazha B, Zaarour M, et al. Primary non-Hodgkin's lymphoma of the spine: A case report and literature review. *World J Oncol.* 2015; 6: 459-63.
 137. Monnard V, Sun A, Epelbaum R, et al. Primary spi-

- nal epidural lymphoma: patients' profile, outcome, and prognostic factors: a multicenter Rare Cancer Network study. *Int J Radiat Oncol Biol Phys.* 2006; 65(3):817-823.
138. Özdemir N. G., Baran Ö., Şahin Ö. F. et al. Primary Spinal Epidural Lymphoma: A Case Report. *İstanbul Med J* 2020; 21(Suppl 1): 32-35
139. Hong B, Hermann EJ, Reuter C, et al. Outcome of surgical decompression of spinal mass lesions in non-Hodgkin's lymphoma and plasmacytoma. *Clin Neurol Neurosurg.* 2013;115(12):2476-2481.
140. Córdoba-Mosqueda ME, Guerra-Mora JR, Sánchez-Silva MC, et al. Primary spinal epidural lymphoma as a cause of spontaneous spinal anterior syndrome: A case report and literature review. *J Neurol Surg Rep.* 2017; 78: e1-4.
141. Monnard V, Sun A, Epelbaum R, et al. Primary spinal epidural lymphoma: patients' profile, outcome, and prognostic factors: a multicenter Rare Cancer Network study. *Int J Radiat Oncol Biol Phys.* 2006; 65: 817-23.
142. Mkandawire N. Primary spinal cord epidural non-Hodgkin's lymphoma as cause of paraplegia: report of 2 cases. *Malawi Med J.* 2003; 15: 72-5.
143. N. Hosono, K. Yonenobu, T. Fuji, et al. "Orthopaedic management of spinal metastases," *Clinical Orthopaedics and Related Research*, no. 312, pp. 148– 159, 1995.
144. Harel R, Angelov L: Spine metastases: current treatments and future directions. *Eur J Cancer.* 2010; 46:2696–2707.
145. Molina CA, Gokaslan ZL, Sciubba DM: Diagnosis and management of metastatic cervical spine tumors. *Orthop Clin N Am.* 2012; 43:75
146. In N, E. Vol. Edited by Newey M.: *Surg Oncol*; 2012.
147. H. Yasuda, N. Shima, N. Nakagawa et al., "Osteoclast differentiation factor is a ligand for osteoprotegerin/osteoclastogenesis-inhibitory factor and is identical to TRANCE/RANKL," *Proceedings of the National Academy of Sciences of the United States of America.* 1998; vol. 95, no. 7, pp. 3597–3602.
148. A. Piccioli and R. Capanna, Il Trattamento delle Metastasi Ossee, Linee Guida SIOT, 2008.
149. Perrin RG, Laxton AW: Metastatic spine disease: epidemiology, pathophysiology, and evaluation of patients. *Neurosurg Clin N Am.* 2004; 15:365.
150. Sciubba DM, et al: Diagnosis and management of metastatic spine disease A review. *J Neurosurg Spine.* 2010; 13:94–108.
151. Cabanillas ME, Waguespack S.G, Bronsteinet Y, et al. Treatment with tyrosine kinase inhibitors for patients with differentiated thyroid cancer: the M. D. Anderson experience. *J Clin Endocrinol Metab.* 2010; 95:2588–2595.
152. De Vries MM, C.M. Persoon A, L. Jager P, et al: Embolization therapy of bone metastases from epithelial thyroid carcinoma: effect on symptoms and serum thyroglobulin. *Thyroid.* 2008; 18:1277–1284.
153. Kloos RT, D Ringel M, V Knopp M, et al: Phase II trial of sorafenib in metastatic thyroid cancer. *J Clin Oncol* 2009, 27:1675–1684.
154. Orita Y, Sugitani I, Matsuuraet M, et al. Prognostic factors and the therapeutic strategy for patients with bone metastasis from differentiated thyroid carcinoma. *Surgery.* 2010; 147:424–431.
155. Petrich T, Widjaja A, Musholt T J, et al. Outcome after radioiodine therapy in 107 patients with differentiated thyroid carcinoma and initial bone metastases: side-effects and influence of age. *Eur J Nucl Med.* 2001; 28:203–208.
156. Quan GM, Pointillart V, Palussière J, et al. Multidisciplinary treatment and survival of patients with vertebral metastases from thyroid carcinoma. *Thyroid.* 2012; 22:125–130.
157. Qiu ZL, Song HJ, Xu YH, et al. Efficacy and survival analysis of 131I therapy for bone metastases from differentiated thyroid cancer. *J Clin Endocrinol Metab.* 2011; 96:3078–3086.
158. Costachescu B, Popescu CE. Modern management in vertebral metastasis. *Romanian Neurosurgery.* 2010; 27(4):432–437.
159. Harrington KD. Metastatic disease of the spine. *Journal of Bone and Joint Surgery-American.* 1986; 68A:1110–1115.
160. D. Ptashnikov, N. Zaborovskii, D. Mikhaylov, et al. Preoperative embolization versus local hemostatic agents in surgery of hypervascular spinal tumors. *Int J Spine Surg.* 2014; Dec 1;8:33.