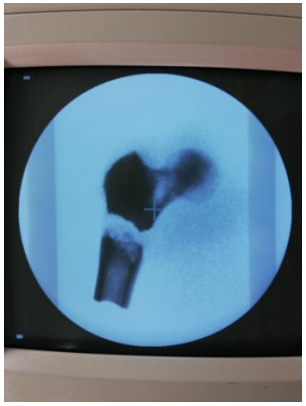


Malign Tümörlerde Gelişen Patolojik Kırıklarda Tedavi

Doç. Dr. Seyit Ali Gümüştaş

Sunum Akışı

- Giriş
- Ekstremite Patolojik Fraktür
  - Primer Sarkom
  - Myelom/Lenfoma
  - Metastatik karsinom
  - Adjuvan tedavi
- Vertebra Patolojik Fraktür

Malign

- Belirsiz sınır, kortikal destrüksiyon, düzensiz kontrast tutulumu ve kemik iliği boyunca tümörün uzanımı, yumuşak doku kitlesinin varlığı

- Myers SP. *MRI of bone and soft tissue tumors and tumorlike lesions*. New York: Thieme, 2008
- Bui KL, Ilaslan H, Bauer TW, Lietman SA, Joyce MJ, Sundaram M. Cortical scalloping and cortical penetration by small eccentric chondroid lesions in the long tubular bones: not a sign of malignancy? *Skeletal Radiol* 2009;38: 791-796

Primer sarkom

- %5-12 sıklıkla

✓ Chandrasekar CR, Grimer RJ, Carter SR, Tillman RM, Abudu A, Jeys LM, et al. Pathological fracture of the proximal femur in osteosarcoma: need for early radical surgery? ISRN Oncol. 2012;2012:512389.

- Spontan, mikrotravma, biyopsi yada kemoterapiye bağlı tümör nekrozu sonrası.

✓ Fuchs B, Valenzuela RG, Sim FH. Pathologic fracture as a complication in the treatment of Ewing's sarcoma. *Clin Orthop Relat Res* 2003;415:25–30.

✓ Friedlaender GE, Tross RB, Doganis AC, et al. Effects of chemotherapeutic agents on bone. Short-term methotrexate and doxorubicin (adriamycin) treatment in a rat model. J Bone Joint Surg Am 1984;66:602—7.

✓ Rosenstock JG, Jones PM, Pearson D, et al. Ewing's sarcoma, adjuvant chemotherapy and pathologic fracture. Eur J Cancer 1978;14:799—803.

Primer sarkom

- Hematomun ve mikrosirkülasyon bozukluğunun tetiklediği istenmeyen mikrometastaz

✓ Simon MA. Limb salvage for osteosarcoma. J Bone Joint Surg Am. 1988;70:307–10.

✓ Frassica FJ, Chao E, Sim F. Special problems in limb-salvage surgery. Semin Surg Oncol 1997;13:55—63.

- Azalmış yaşam süresi

✓ Scully SP, Ghert MA, Zurakowski D, Thompson RC, Gebhardt MC. Pathologic fracture in osteosarcoma : prognostic importance and treatment implications. J Bone Joint Surg Am. 2002;84-A:49–57. 12.

✓ Vermesan D, Vermesan H, Dragulescu SI, Bera I, Di Giovanni A, Sabatini R, et al. Secondary pathologic fractures in osteosarcoma: prognosis and evolution. Eur Rev Med Pharmacol Sci. 2009;13:71–6.

- Artmış lokal nüks

✓ Ferguson PC, McLaughlin CE, Griffin AM, Bell RS, Deheshi BM, Wunder JS. Clinical and functional outcomes of patients with a pathologic fracture in high-grade osteosarcoma. J Surg Oncol. 2010;102:120–4.

Primer sarkom

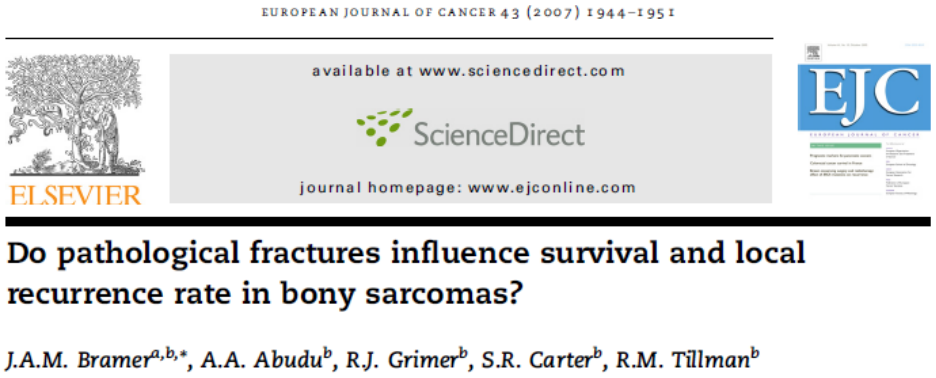
- Metaanaliz, 1677 vaka
- Osteosarkomda yaşam süresini olumsuz etkileyebilir

Original Article

Prognostic role of pathologic fracture in osteosarcoma: Evidence based on 1,677 subjects

Primer Sarkom

- 770 primer sarkom (484 OS, 130 KS, 156 ES)
- Patolojik kırık: 56 (OS), 33 (KS), 16 (ES)
- Ekstremite koruyucu cerrahi: ↓ (%79/84)
- Yaşam süresi: ↓ (OS: %34/58)
- Lokal nüks: ⟷



EUROPEAN JOURNAL OF CANCER 43 (2007) 1944–1951

available at www.sciencedirect.com

ScienceDirect

journal homepage: www.ejconline.com

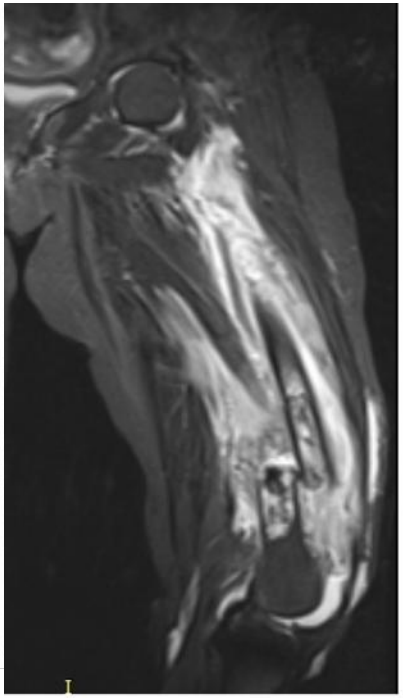
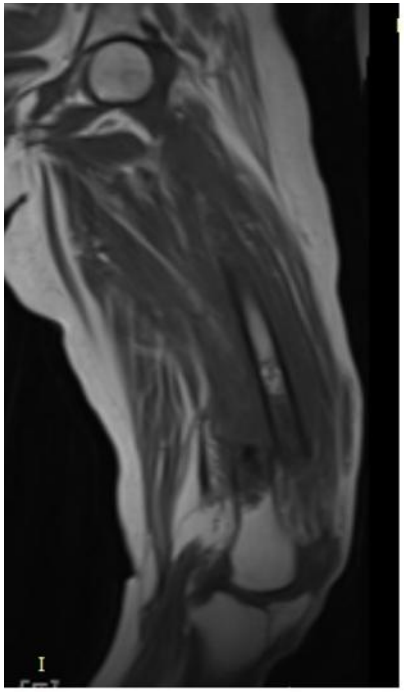
ELSEVIER

EJC

Do pathological fractures influence survival and local recurrence rate in bony sarcomas?

J.A.M. Bramer[a,b,*], A.A. Abudu[b], R.J. Grimer[b], S.R. Carter[b], R.M. Tillman[b]

63 yaş, KS


Primer Sarkom

- OS: Yaşam süresi ↓ Lokal nüks ↑
- ES: Yaşam süresi ve lokal nüks ↔

Oncology

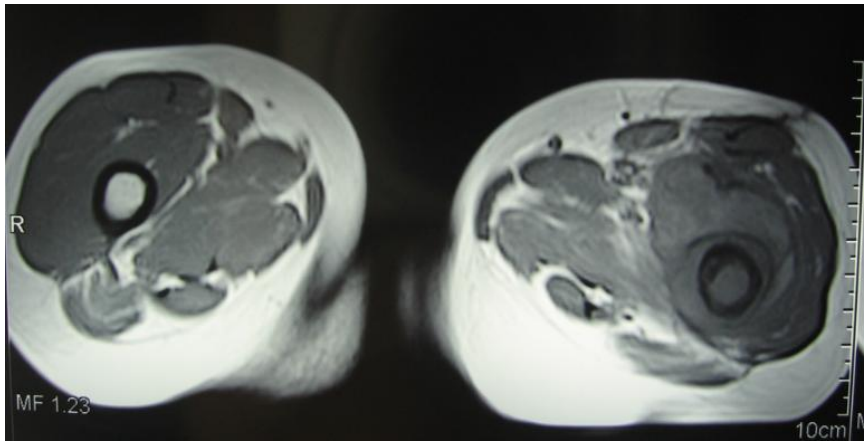
Oncology
DOI: 10.1159/000487142

Received: January 15, 2017
Accepted after revision: January 23, 2018
Published online: April 13, 2018

Impact of Pathological Fractures on the Prognosis of Primary Malignant Bone Sarcoma in Children and Adults: A Single-Center Retrospective Study of 205 Patients

Miriam Schlegel[a] Martina Zeumer[a] Peter Michael Prodinger[b]
Klaus Woertler[c] Marc Steinborn[d] Rüdiger von Eisenhart-Rothe[b]
Stefan Burdach[a] Hans Rechl[b] Irene von Luettichau[a]

9 yaş, ES



Primer sarkom

- Benzer yaşam süresi ve lokal nüks oranı

- ✓ Abudu A, Sferopoulos NK, Tillman RM, Carter SR, Grimer RJ. The surgical treatment and outcome of pathological fractures in localised osteosarcoma. J Bone Joint Surg (Br). 1996;78:694–8.
- ✓ Bacci G, Ferrari S, Longhi A, Donati D, Manfrini M, Giacomini S, et al. Nonmetastatic osteosarcoma of the extremity with pathologic fracture at presentation: local and systemic control by amputation or limb salvage after preoperative chemotherapy. Acta Orthop Scand. 2003;74:449–54
- ✓ **Moradi B, Zahlten-Hinguranage A, Lehner B, Zeifang F.** The impact of pathological fractures on therapy outcome in patients with primary malignant bone tumours. *Int Orthop* 2010;34:1017–1023.
- ✓ **Scully SP, Ghert MA, Zurakowski D, Thompson RC, Gebhardt MC.** Pathologic fracture in osteosarcoma: prognostic importance and treatment implications. *J Bone Joint Surg [Am]* 2002;84-A:49–57
- **Bramer JA, Abudu AA, Grimer RJ, Carter SR, Tillman RM.** Do pathological fractures influence survival and local recurrence rate in bony sarcomas? *Eur J Cancer* 2007;43:1944–1951.

Osteosarkom

- 268 hasta.
- %12 patolojik kırık. (Tanı ya da KT esnasında)
- Hastalıklı ve hastalıksız yaşam süresi açısından anlamlı fark yok.

Chung et al. BMC Musculoskeletal Disorders (2016) 17:503
DOI 10.1186/s12891-016-1351-x

BMC Musculoskeletal Disorders

RESEARCH ARTICLE Open Access

Pathological fractures in predicting clinical outcomes for patients with osteosarcoma

Lien-Hsiang Chung[1,4,6], Po-Kuei Wu[1,3,5,6], Cheng-Fong Chen[1,3], Hung-Kai Weng[1,7,8], Tain-Hsiung Chen[1,3] and Wei-Ming Chen[1,2,3,6*]

Osteosarkom

- Ekstremite koruyucu cerrahiye engel olmadığı ortaya konulmuştur.
- Amputasyon güvenli sınırın elde edilemediği yada fonksiyonsuz ekstremite durumunda uygulanabilir.
- Stabilizasyon için; alçı, traksiyon ya da EF uygulanabilir
- Ekstremite koruyucu tedaviye uygun olarak neoadjuvan KT sonrası rezeksiyonun planlanması.

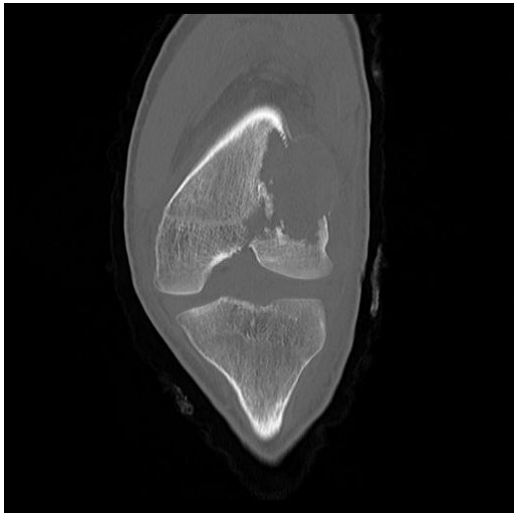
- ✓ Wu PK, Chen WM, Lee OK, Chen CF, Huang CK, Chen TH. The prognosis for patients with osteosarcoma who have received prior manipulative therapy. J Bone Joint Surg (Br). 2010;92:1580–5.
- ✓ Abudu A, Sferopoulos NK, Tillman RM, Carter SR, Grimer RJ. The surgical treat-ment and outcome of pathological fractures in localised osteosarcoma. J BoneJoint Surg Br 1996;78:694–8.[10] Scully SP, Temple HT, O'Keefe RJ, Mankin HJ, Gebhardt M. The surgical treatmentof patients with osteosarcoma who sustain a pathologic fracture. Clin OrthopRel Res 1996;324:227–32.
- ✓ Scully SP, Temple HT, O'Keefe RJ, Mankin HJ, Gebhardt M. The surgical treatmentof patients with osteosarcoma who sustain a pathologic fracture. Clin OrthopRel Res 1996;324:227–32.
- ✓ Ferguson PC, McLaughlin CE, Griffin AM, et al. Clinical and functional outcomes of patients with a pathologic fracture in high-grade osteosarcoma. J Surg Oncol. 2010; 102:120--124
- ✓ Chandrasekar CR, Grimer RJ, Carter SR, et al. Pathological fracture of the proximal femur in osteosarcoma: need for early radical surgery? *ISRN Oncol* 2012;2012:512389.
- ✓ Hosalkar HS, Dormans JP. Limb sparing surgery for pediatric musculoskeletal tumors. *Pediatr Blood Cancer* 2004;42:295–310.

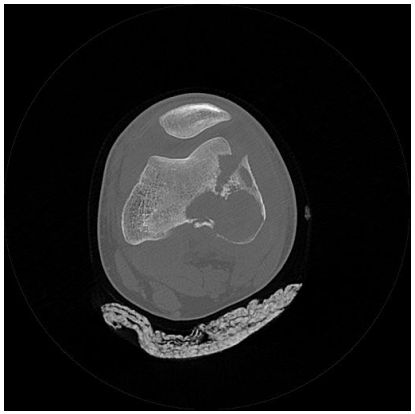
Primer Sarkom

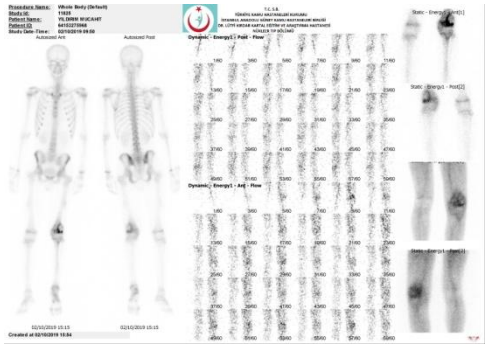
- Kemoterapi sürecinde kırıkta iyileşme görülebilir.

- ✓ Jaffe N, Spears R, Eftekhari F, et al. Pathologic fracture in osteosarcoma. Impact of chemotherapy on primary tumor and survival. *Cancer* 1987;59:701–709.
- ✓ Scully SP, Ghert MA, Zurakowski D, Thompson RC, Gebhardt MC. Pathologic fracture in osteosarcoma: prognostic importance and treatment implications. *J BoneJoint Surg [Am]* 2002;84-A:49–57.

19 YAŞ, OS





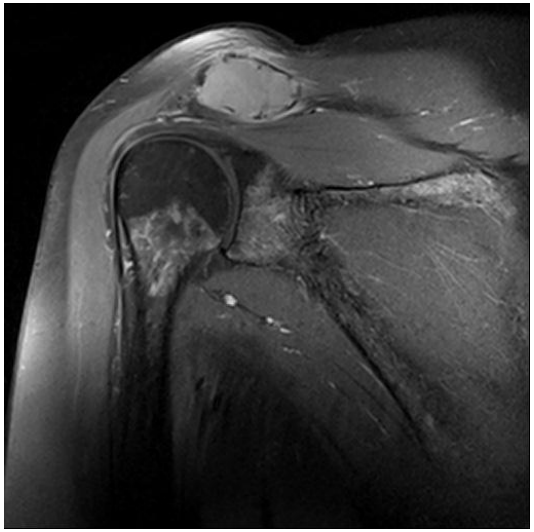


Multıpl myelom

- %40 varan oran
- En sık torakal vertebra
- %67'e varan kaynama oranı

- ✓ Berenson JR, Lichtenstein A, Porter L, *et al.*: Long-term pamidronate treatment of advanced multiple myeloma patients reduces skeletal events. *J Clin Oncol* 1998, 16(2):593-602.
- ✓ Melton LJ 3rd, Kyle RA, Achenbach SJ, Oberg AL, Rajkumar SV: Fracture risk with multiple myeloma: a population-based study. *J Bone Miner Res* 2005, 20:487-493.
- ✓ Surgeon's Committee of the Chinese Myeloma Working Group of the International Myeloma Foundation. Consensus on Surgical Management of Myeloma Bone Disease. Orthop Surg. 2016 Aug;8(3):263-9.
- ✓ Gainor BJ, Buchert P. Fracture healing in metastatic bone disease. Clin Orthop Relat Res 1983(178):297–302.

66 yaş, MM



Multıpl myelom

- 49 hasta
- 3 yıllık takip
- Yaşam süresi ⬇
- Patolojik kırık var: 17 ay
- Patolojik kırık yok: 57 ay

Research

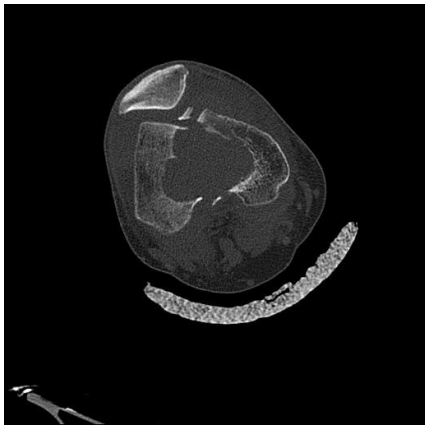
Open Access

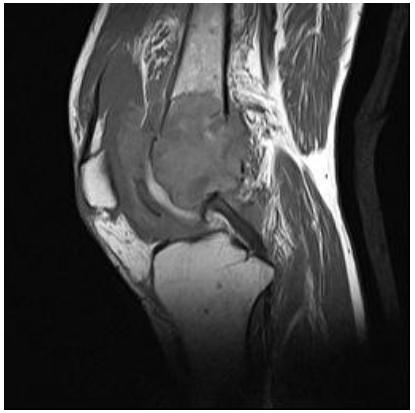
Effect of pathologic fractures on survival in multiple myeloma patients: a case control study

Mehmet Sonmez*[1], Tulin Akagun[2], Murat Topbas[3], Umit Cobanoglu[4], Bircan Sonmez[5], Mustafa Yilmaz[1], Ercument Ovali[1] and Serdar Bedii Omay[1]

51 YAŞ, MM





Multıpl myelom

- 96 hasta
- Tüm kemiği içeren intramedüller fiksasyonda yeniden ameliyat oranı daha düşük

Clin Orthop Relat Res (2013) 471:706–714
DOI 10.1007/s11999-012-2656-1

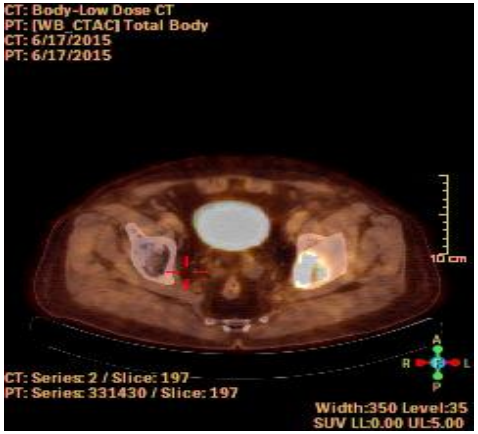
Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

CLINICAL RESEARCH

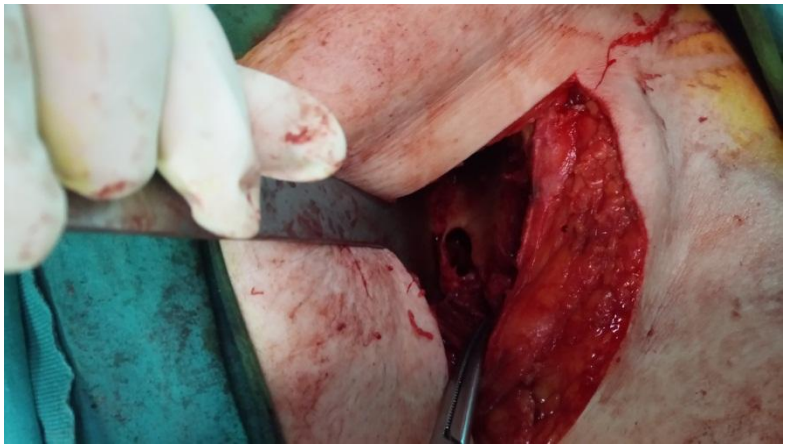
Prophylactic Stabilization for Bone Metastases, Myeloma, or Lymphoma: Do We Need to Protect the Entire Bone?

Hasham M. Alvi MD, Timothy A. Damron MD

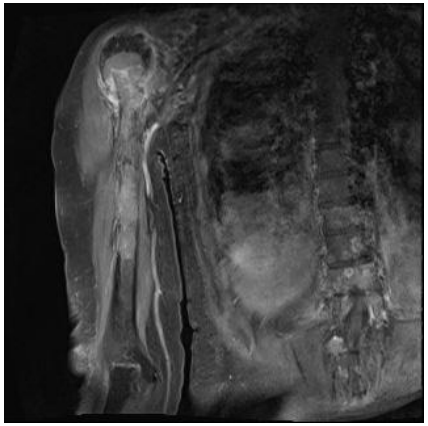
Multıpl Myelom (78 yaş)



Proksimal Humerus ve Asetabulum Fraktürü



Multıpl Myelom
Patolojik Humerus ve Vertebra Fraktürü



Multıpl myelom

- Destrüktif proksimal femur tutulumunda protez ön planda

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 341, pp 192–205

Prosthetic Hip Replacement for Pathologic or Impending Pathologic Fractures in Myeloma

Panayiotis J. Papagelopoulos, MD; Evanthia C. Galanis, MD**; Philip R. Greipp, MD†; and Franklin H. Sim, MD**

Lenfoma

- Çok çok nadir
- Proksimal femur ve humerus
- Litik destrüktif
- Ewing ve osteomiyelit ayırıcı tanı

Case Report

Surgical Management of Primary Bone Lymphoma of the Hip: A Case Report and Review of the Literature

Grace Kennedy, Phil Weir, Kevin Johnston, and Patrick Elder

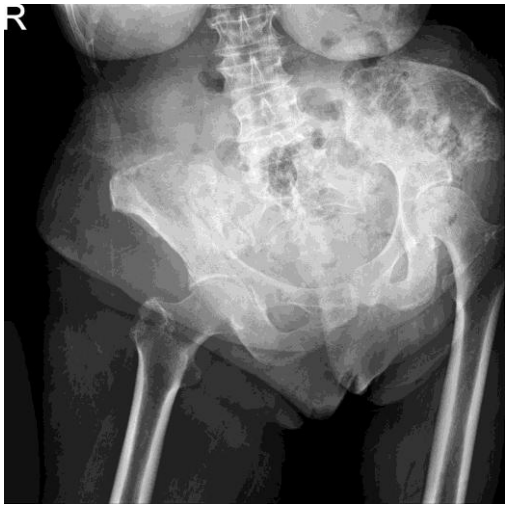
DOI: 10.7860/JCDR/2013/3948.2809

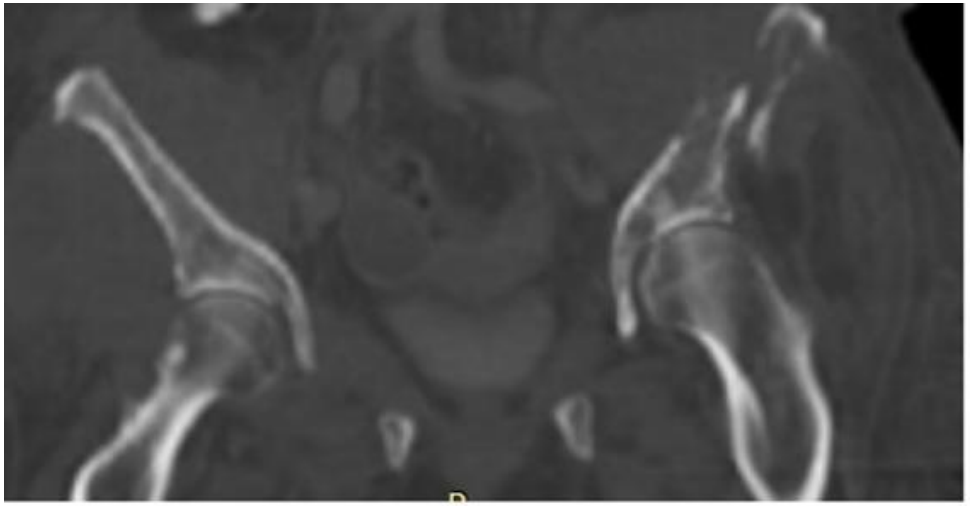
Case Report

Orthopaedic Section

Pathological Fractures in Primary Non-Hodgkin's Lymphoma of the Bone: A Case Series with Review of the Literature

Lenfoma (74 yaş. B hücreli)





Metastaz

- 16 primer, 53 metastaza bağlı patolojik kırık
- Litik korteks, minerilizasyon, yumuşak doku kitlesi ve periosteal düzensizlik.

European Journal of Radiology 82 (2013) e36–e42

Contents lists available at SciVerse ScienceDirect

European Journal of Radiology

journal homepage: www.elsevier.com/locate/ejrad

Imaging differentiation of pathologic fractures caused by primary and secondary bone tumors

Theodoros Soldatos[a,1], Majid Chalian[a,1], Samer Attar[b,1], Edward F. McCarthy[c,1], John A. Carrino[a,1], Laura M. Fayad[a,*]

Metastaz

- Metastaz hastalarının %10-30'unda patolojik kırık gelişir ve mortalite artışına neden olur.

- Chow S, McDonald R, Yee A, et al. A multidisciplinary bone metastases clinic at Sunnybrook Odette Cancer Centre: A review of the experience from 2009-2014. *Journal of Pain Management* 2015;8:117–121.
- Selvaggi G, Scagliotti GV: Management of bone metastases in cancer: A review. Crit Rev Oncol Hematol 56:365-378, 2005
- Behnke NK, Baker DK, Xu S, et al: Risk factors for same-admission mortality after pathologic fracture secondary to metastatic cancer. Support Care Cancer 25: 513-521, 2017
- Saad F, Lipton A, Cook R, et al: Pathologic fractures correlate with reduced survival in patients with malignant bone disease. Cancer 110:1860-1867, 2007

Metastaza bağlı patolojik Kırık

- %10-29
- En sık Femur>Humerus>Tibia
- %35 kaynama

- Saad F, Lipton A, Cook R, et al. Pathologic fractures correlate with reduced survival in patients with malignant bone disease. *Cancer* 2007;110:1860-7.

Biyopsi

- Patolojik kırıkla başvuran kanser hikayesi olmayan hastalarda primer sarkom dışlanmalı.

- Anract P. Surgical management of primary bone cancer. Bull Acad Natl Med2009;193(1):107–26.

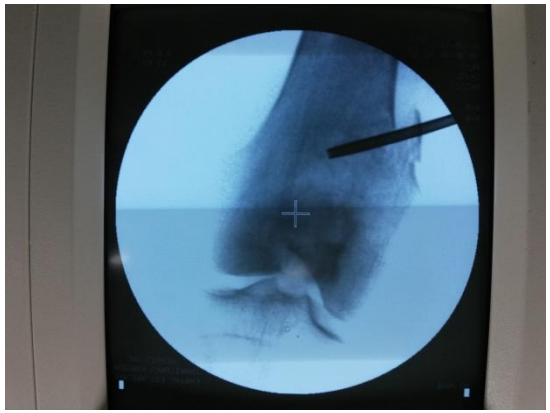
Biyopsi

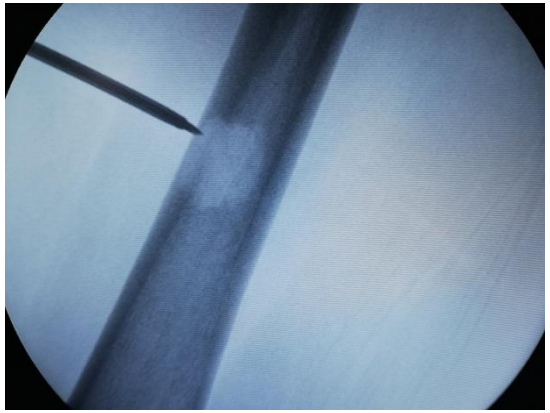
- Görüntüleme eşliğinde iğne biyopsisi ile tanı konulabilir.
- Ekstraosseos tümör dokusunun olmadığı ve yaygın hemorajinin mevcut olduğu vakalarda kapalı biyopsi ile tanısal sonuç elde edilemeyebilir.

- Core-needle/Jamshidi

- Datir A, Pechon P, Saifuddin A. Imaging-guided percutaneous biopsy of pathologic fractures: a retrospective analysis of 129 cases. American Journal of Roentgenology 2009;193:504–8.

Biyopsi






2040
65kVp
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DAP 3.358uGym2
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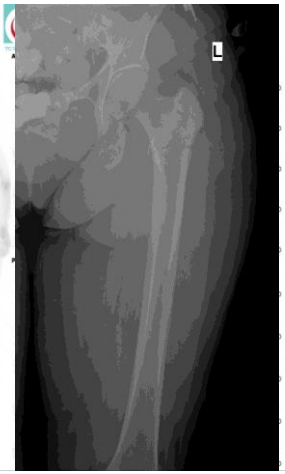
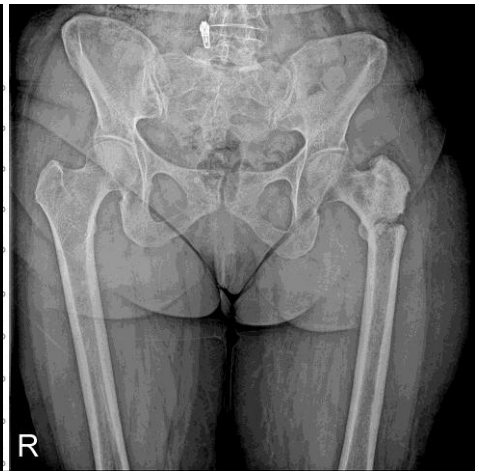
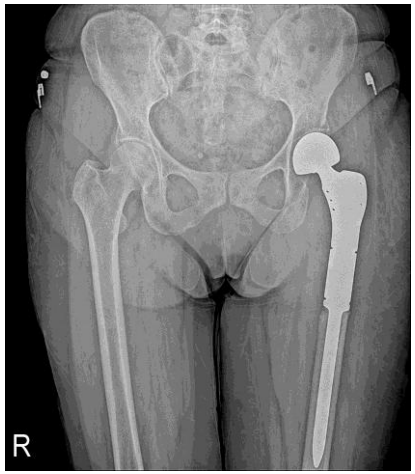
2019/09/16-15:38:55

Biyopsi sonrası fraktür
(59 yaş, Ac Adenokarsinom)



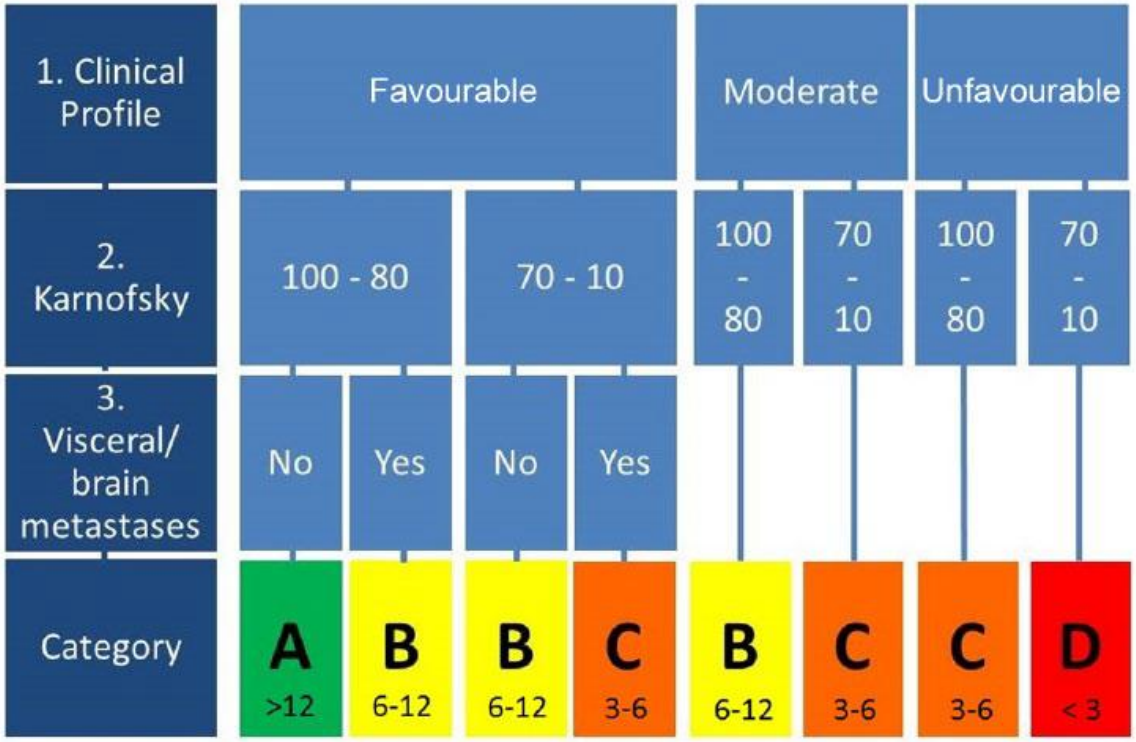




Tedavi

- Karar vermede hastanın genel durumu, beklenen yaşam süresi ve tümörün adjuvan tedaviye yanıtı önemlidir.

Prognoz



- Bollen L, van der Linden YM, Pondaag W, et al. Prognostic factors associated with survival in patients with symptomatic spinal bone metastases: a retrospective cohort study of 1043 patients. *Neuro-Oncology* 2014;16:991-98.

58 yaş, Ac Ca Metastazı

Tedavi

- En uygun tedavi patolojik kırık gelişimini engellemektir.

İmpending fraktür
Profilaktik fiksasyon

- Mirels ≥9 ise %33 kırık riski

Mirel's criteria score > 8 suggests prophylactic fixation			
Score	**1**	**2**	**3**
Site	upper limb	lower limb	peritrochanteric
Pain	mild	moderate	functional
Lesion	blastic	mixed	lytic
Size	< 1/3	1/3 to 2/3	> 2/3

- Mirels H: Metastatic disease in long bones. A proposed scoring system for diagnosing impending pathologic fractures. Clin Orthop Relat Res 1989:256-264, 1989

İmpending fraktür
Profilaktik fiksasyon

- Harrington's kriterlerinden herhangi bir tanesinin mevcut olması kırık riski varlığını gösteririr.

Harrington's criteria for predicting risk of fracture.
Cortical bone destruction > 50%
A lesion > 2.5 cm in the proximal femur
Destruction of subtrochanteric femoral region
Persistent pain despite irradiation

- Harrington KD. Impending pathological fractures from metastatic malignancy: evaluation and management. Instr Course Lect 1986;**35**:357-381.

İmpending fraktür
Profilaktik fiksasyon

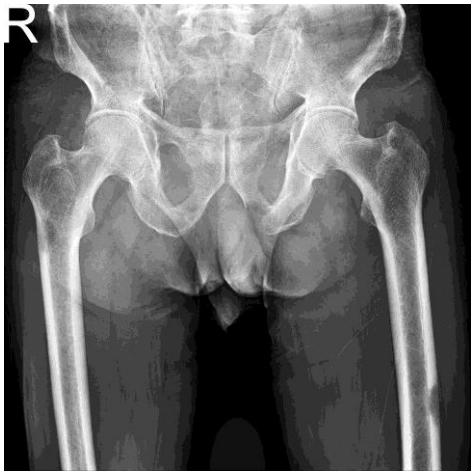
- 43,920 hasta. 14,318 profilaktik, 28,602 kırık sonrası akut fiksasyon
- İntra-postop komplikasyon oranı, hastane yatış süresi ile masraf düşer

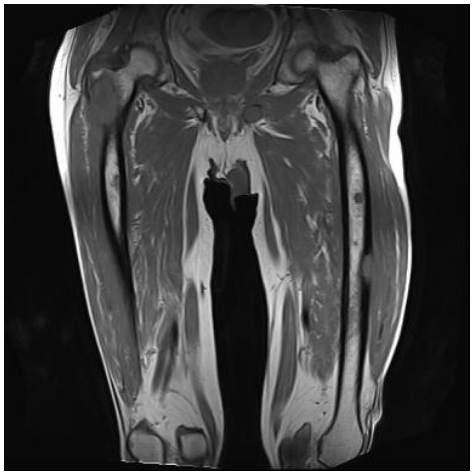
CARE DELIVERY

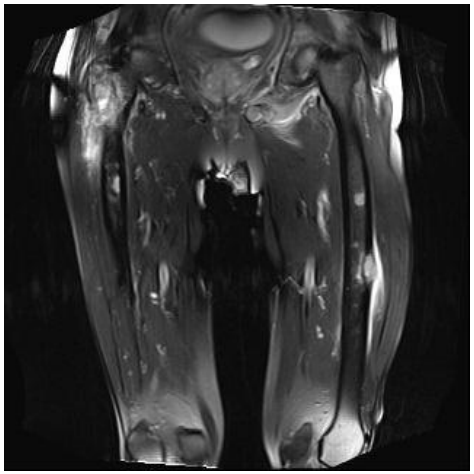
Early Clinical and Economic Outcomes of Prophylactic and Acute Pathologic Fracture Treatment

Zachary A. Mosher, MD[1]; Harshadkumar Patel, MD[1]; Michael A. Ewing, MD[1]; Thomas E. Niemeier, MD[1]; Matthew C. Hess, MD[1]; Eric B. Wilkinson, MD[1]; Gerald McGwin Jr, PhD[1]; Brent A. Ponce, MD[1]; and Joshua C. Patt, MD, MPH[2]

67 yaş, Ac Ca Met

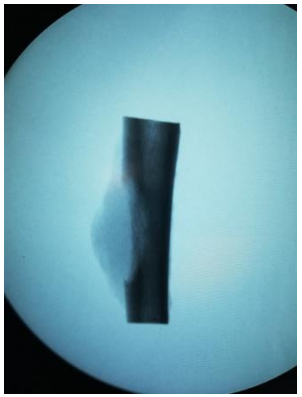






İmpending Fraktür
(62 yaş, Endometrium Adenokarsinom)



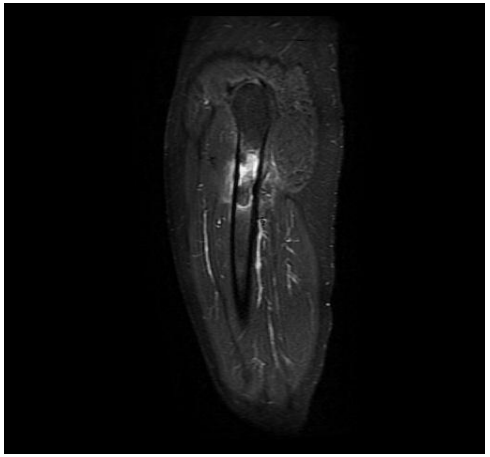




İmpending fraktür
Profilaktik fiksasyon

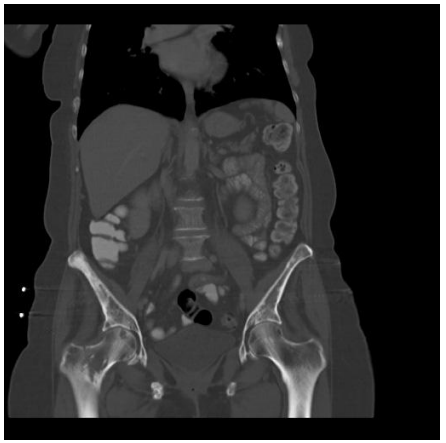
- Mortalite oranı düşerken postop yaşam süresi uzar.
- Ayrıca erken mobilizasyon, yaşam kalitesinin artışı, düşük postop ağrı skoru, ek cerrahi gereksinimin azalması avantajları vardır.

- Arvinius C, Parra JLC, Mateo LS, et al: Benefits of early intramedullary nailing in femoral metastases. Int Orthop 38:129-132, 2014

Meme Ca Proksimal Femur Patolojik Fraktür



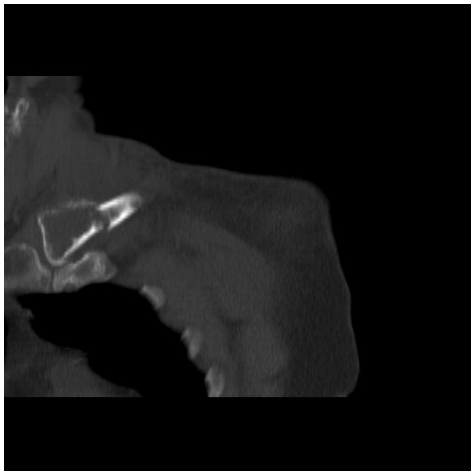
İnkomplet kırık (63 yaş, Meme)

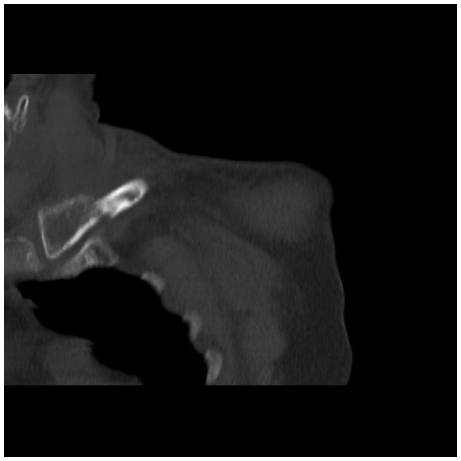




Metastatik Kemik Tümörleri-Tedavi

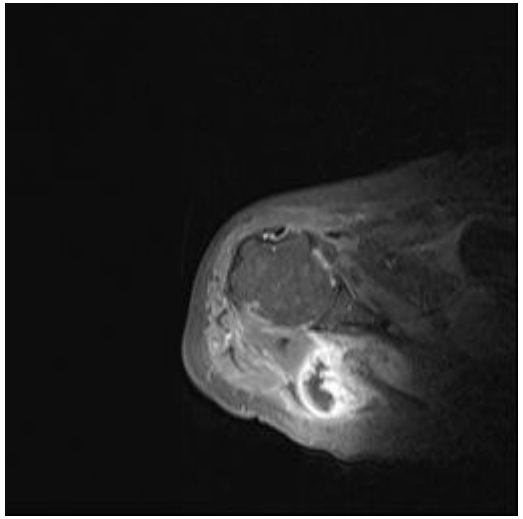
- **Epifiz**: Protez
- **Metafiz**: İntralezyonel küretaj+ Sementaj+ Fiksasyon (Plak/Çivi), Protez
- **Diafiz**: İm çivi/İnterkalar Protez

Klavikula Patolojik Fraktür (Ac Ca Metastazı)





Konservatif
(60 yaş, Rektum Adenokarsinom)



Fiksasyon

- Masif proteze göre daha düşük komplikasyon ve daha uzun sağ kalım

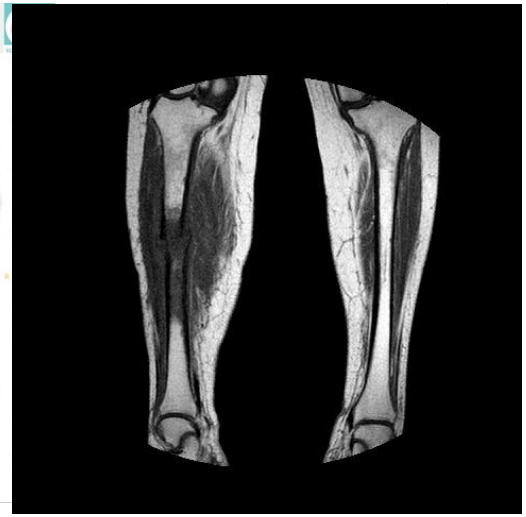
CLINICS 2006;61(4):313-20

ORIGINAL RESEARCH

PROGNOSTIC FACTORS IN PATHOLOGIC FRACTURES SECONDARY TO METASTATIC TUMORS

Douglas Kenji Narazaki, Carlos Coelho de Alverga Neto, André Mathias Baptista, Marcelo Tadeu Caiero Olavo Pires de Camargo

67 yaş, Ac Adeno Ca

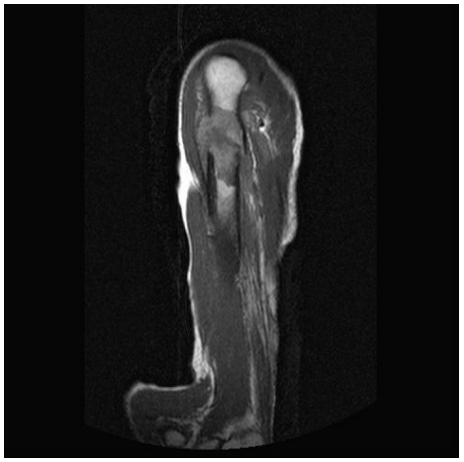


IMN

- Diafiz kırıklarında ilk seçenek.
- Düşük komplikasyon, erken mobilizasyon, ağrı da anlamlı azalma ile yaşam kalitesinde artışa neden olur.
- Küretaj ve sement uygulanımı ile kombine edilebilir.
- Tüm kemiğin fikse edilmesi sonradan gelişebilecek metastazlar açısından avantajlıdır.

- Swanson KC, Pritchard DJ, Sim FH. Surgical treatment of metastatic disease of the femur. J Am Acad Orthop Surg 2000;8:56–65.
- Capanna R, Campanacci DA. The treatment of metastases in the appendicular skeleton. J Bone Joint Surg Br 2001;83:471–81.
- Ward WG, Holsenbeck S, Dorey FJ, Spang J, Howe D. Metastatic disease of the femur: surgical treatment. Clin Orthop Relat Res 2003;415:230–44.
- Piccioli A, Rossi B, Scaramuzzo L, Spinelli MS, Yang Z, Maccauro G.Intramedullary nailing for treatment of pathologic femoral fracturesdue to metastases. Injury 2014;45(2):412–7,
- Ofluoglu O, Erol B, Ozgen Z, Yildiz M. Minimally invasive treatment of pathological fractures of the humeral shaft. Int Orthop. 2009 Jun;33(3):707-12.

63 yaş, HCC Metastazı



IMN

- %3-13 arasında değişen oranlarda implant yetmezliği bildirilmiştir.

- Sarahrudi K, Greitbauer M, Platzer P, Hausmann JT, Heinz T, Ve´ csei V. Surgical treatment of metastatic fractures of the femur: a retrospective analysis of 142 patients. J Trauma 2009;66:1158–63.
- Wedin R, Bauer HC. Surgical treatment of skeletal metastatic lesions of the proximal femur: endoprosthesis or reconstruction nail? J Bone Joint Surg Br 2005;87:1653–7.

- Oymalı çivide daha kalın implant kullanma avantajına karşı tümörün yayılımı ve emboli riski açısından endişelendirse de oymasız çivi arasında sonuçlar açısından fark yoktur.

- Cole AS, Hill GA, Theologis TN, Gibbons CL, Willett K. Femoral nailing for metastatic disease of the femur: a comparison of reamed and unreamed femoral nailing. Injury 2000;31:25–31.

Sefalomedüller?

- Standart tercih edilen yöntem.
- Eklem penetrasyonu, artmış cerrahi süre ve radyasyon alanı dezavantaj
- Avantaj?

- Arvinius C, Parra JL, Mateo LS, Maroto RG, Borrego AF, Stern LL. Benefits of earlyintramedullary nailing in femoral metastases. Int Orthop 2014;38(1):129–32.
- Sarahrudi K, Greitbauer M, Platzer P, Hausmann JT, Heinz T, Vecsei V. Surgical treatment of metastatic fractures of the femur: a retrospective analysis of 142 patients. J Trauma. 2009;66:1158– 1163.
- Swanson KC, Pritchard DJ, Sim FH. Surgical treatment of metastatic disease of the femur. J Am Acad Orthop Surg. 2000;8:56– 65.
- Van der Hulst RR, van den Wildenberg FA, Vroemen JP, Greve JW. Intramedullary nailing of (impending) pathologic fractures. J Trauma. 1994;36:211–215.
- Ward WG, Holsenbeck S, Dorey FJ, Spang J, Howe D. Metastatic disease of the femur: surgical treatment. Clin Orthop Relat Res. 2003;415(suppl):S230–244.
- Weber KL, O'Connor MI. Operative treatment of long bone metastases: focus on the femur. Clin Orthop Relat Res. 2003: 415(suppl)S276–278.

Sefalomedüller?

- 145 hastaya femur IMN. (Metastaz, Myelom, Lenfoma)
- Hiçbir hastada post-op femur boyun metastazı saptanmamış.

Clin Orthop Relat Res
DOI 10.1007/s11999-014-4064-1

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

CLINICAL RESEARCH

Intramedullary Nailing of Femoral Diaphyseal Metastases: Is it Necessary to Protect the Femoral Neck?

Bryan Moon MD, Patrick Lin MD, Robert Satcher MD, PhD, Justin Bird MD, Valerae Lewis MD

İmpending Fraktür (78 yaş, Akc Met)

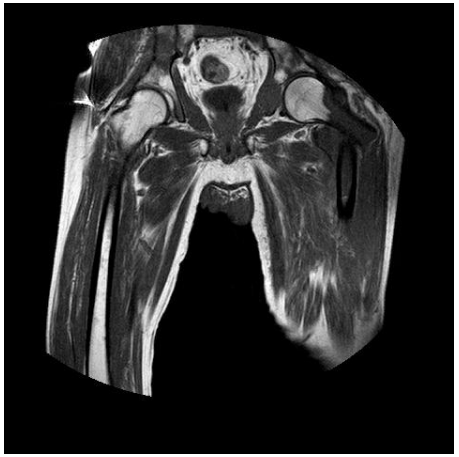
IMN
Perkutan çimento enjeksiyonu

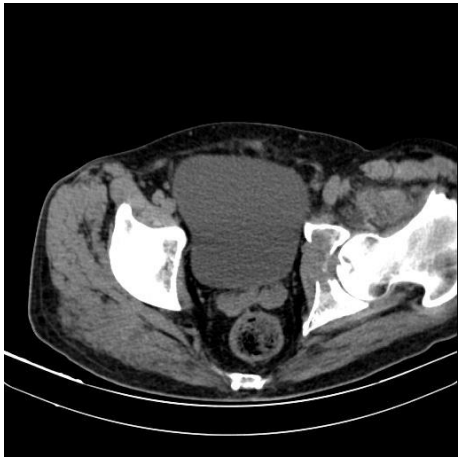
- 43 hastaya IMN+perkutan çimento enjeksiyou,27 hastaya sadece IMN
- VAS skor ve PET tutulumunda anlamlı fark
- Ağrı palyasyonu ve tümör progresyonunun yavaşlatılması açısından avantajlı

■ ONCOLOGY

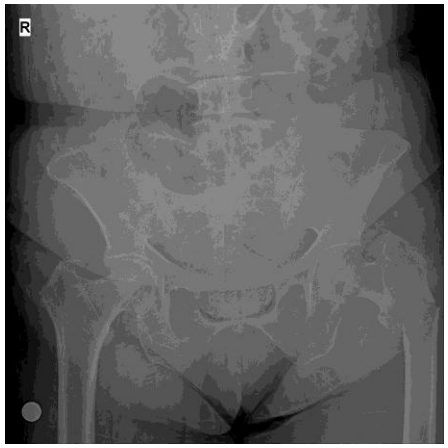
Closed intramedullary nailing with percutaneous cement augmentation for long bone metastases

63 yaş, HCC Met





58 yaş, Meme Ca



Çimento uygulanımı

- Özellikle omurga ve pelvis ve uzun kemik metafiz tutulumunda tercih edilir.

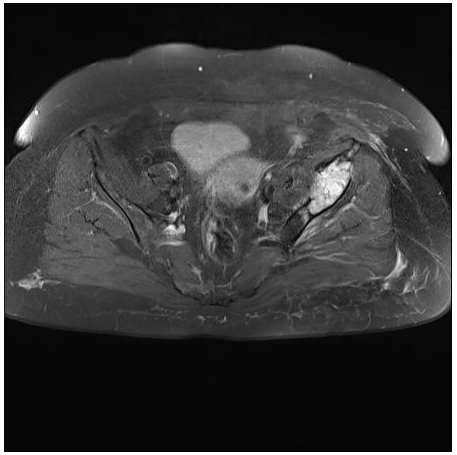
➢ Anselmetti GC. Osteoplasty: percutaneous bone cement injection beyond the spine. *Semin Intervent Radiol* 2010;27:199–208.

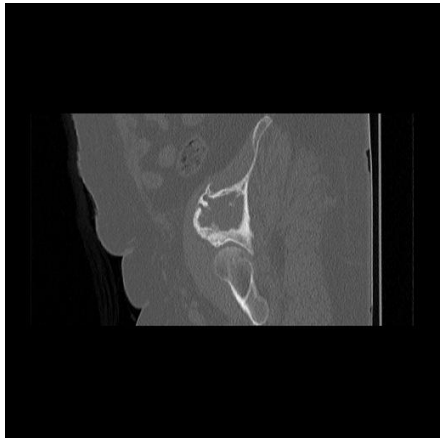
- Methotrexate (100-150 mg) ve cisplatinum (200 mg) ile kombine edilebilir.

- Capanna R, Piccioli A, Di Martino A, Daolio PA, Ippolito V, Maccauro G, et al.Management of long bone metastases: recommendations from the ItalianOrthopaedic Society bone metastasis study group. Expert Rev AnticancerTher 2014;14(10):1127–34,

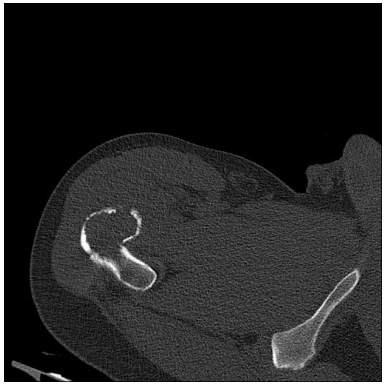
Meme Ca İliak Kanat Metastazı

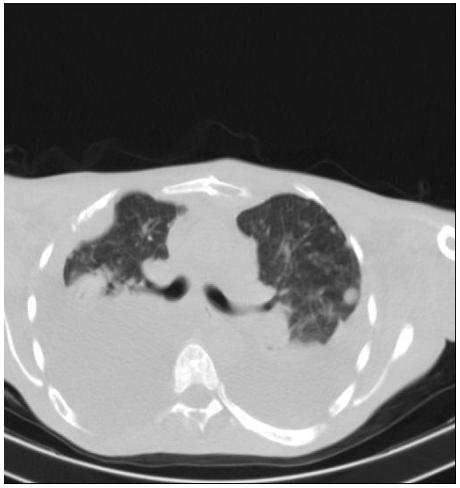







Malign Melanom Metastazı Proksimal Femur Patolojik Fraktür



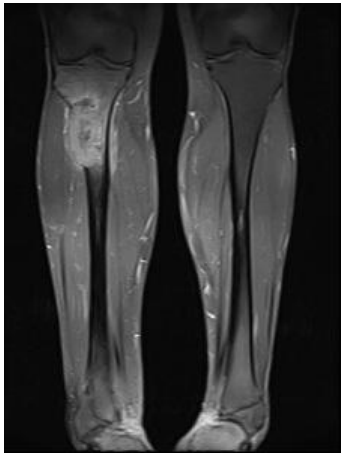


Plak

- Metafiz tutulumlarında tercih edilebilir.
- Defekt durumuna göre küretaj ve çimento ile kombine uygulanabilir.
- Üst ekstremitede kullanım ön planda ve IMN ile benzer sonuçlar
- Proksimal femurda başarısızlık oranı yüksek
- Yara problemi en sık komplikasyon

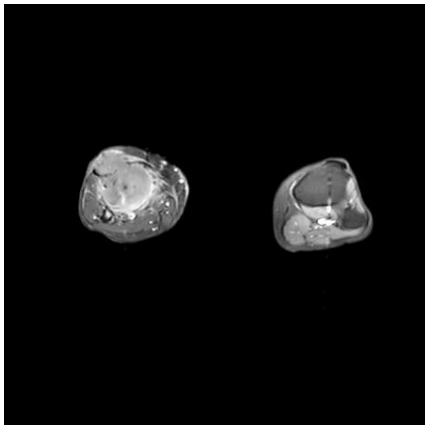
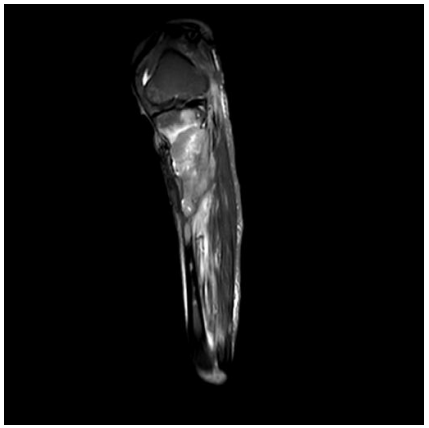
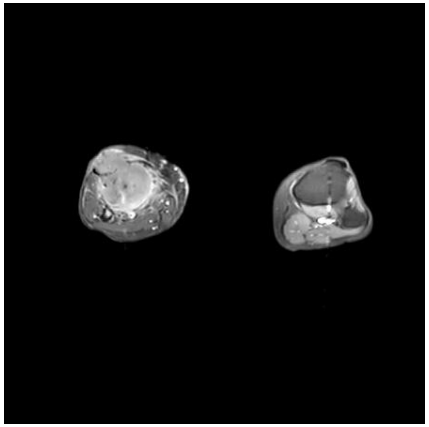
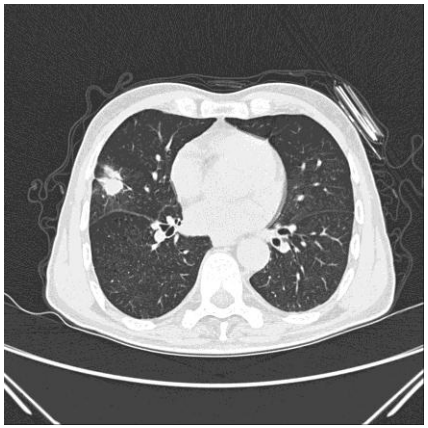
- Jacofsky DJ, Haidukewych GJ. Management of pathologic fractures of the proximal femur: state of the art. J Orthop Trauma 2004;18:459–69.
- Capanna R, Campanacci DA. The treatment of metastases in the appendicular skeleton. J Bone Joint Surg Br 2001;83:471–81.
- Ward WG, Holsenbeck S, Dorey FJ, et al. Metastatic disease of the femur: surgical treatment. Clin Orthop. 2003;415:S230-44.
- Bickels J, Kollender Y, Wittig JC, et al. Function aft er resection of humeral metastases: analysis of 59 consecutive patients. Clin Orthop. 2005;437:201-8.
- Dijkstra PDS, Wiggers T, van Geel AN, Boxma H (1994) Impending and actual pathological fractures in patients with bone metastases of the long bones. A retrospective study of 233 surgically treated fractures. Eur J Surg 160:535–542
- Yazawa Y, Frassica FJ, Chao EYS, Pritchard DJ, Sim FH, Shives TC (1990) Metastatic bone disease. A study of the surgical treatment of 166 pathologic humeral and femoral fractures. Clin Orthop Relat Res 251:213–219

57 yaş, Özefagus Adenokarsinom Metastazı



71 yaş
Squamoz hücreli karsinom met



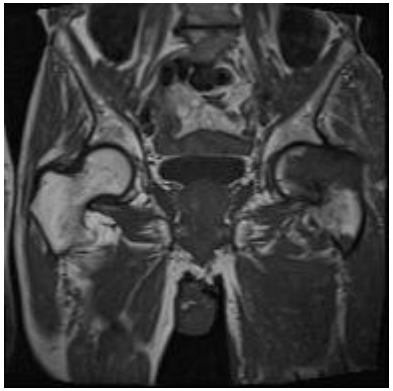






Protez

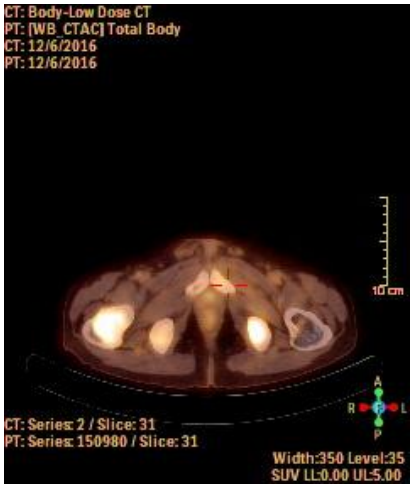
- Femur baş-boyun tutulumunda bipolar protez sıklıkla tercih edilir.
- Uzun yaşam beklentisi ya da öncesinde radyoterapi öyküsü var ise total kalça protezi uygun seçenek.
- Astabulumda destrüksiyon var ise Harrington prosedürü uygulanabilir.
- Bu yöntemde dislokasyon riski yüksek olduğundan dual-mobil cup tercih edilebilir.

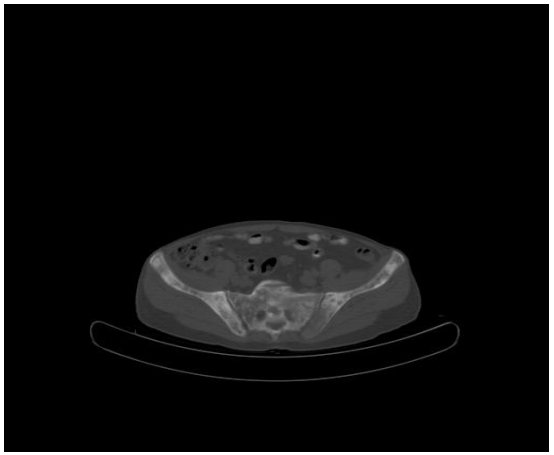
- Felden A, Vaz G, Kreps S, Anract P, Hamadouche M, Biau DJ. A cemented acetab-ular component with a reinforcement cross provides excellent medium-termfixation in total hip arthroplasty after pelvic irradiation. Bone Joint J 2015;97-B(2):177–84.
- Harrington KD. The management of acetabular insufficiency secondary tometastatic malignant disease. J Bone Joint Surg Am 1981;63(4):653–64.

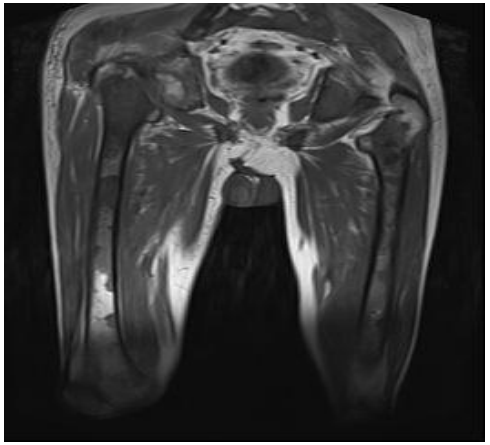
Femur Boyun (58 yaş, Akc met)



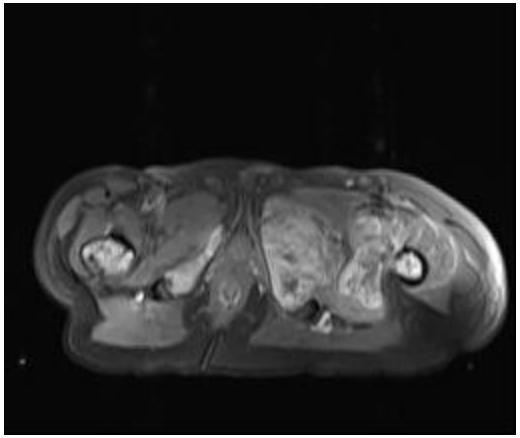
Prosta Ca Metastazı
Patolojik Femur Boyun Fraktürü

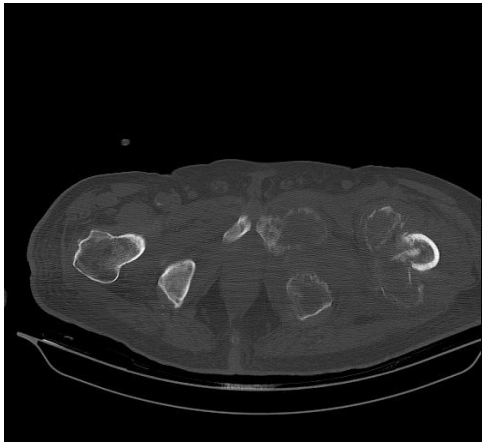




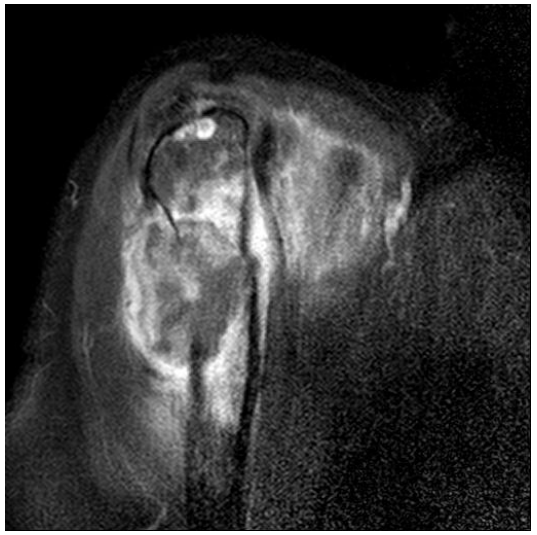


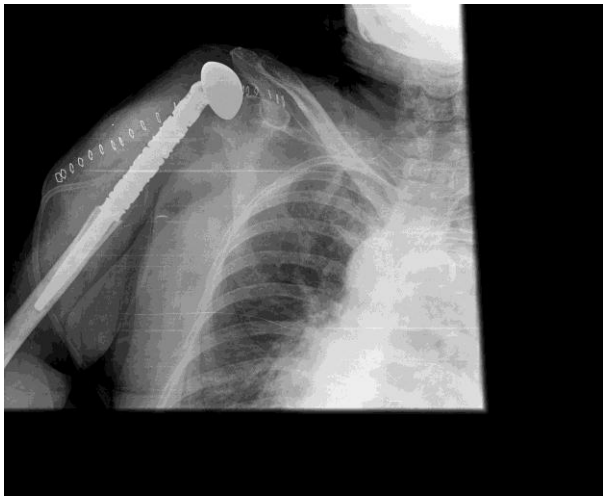
Mesane (Ürotelyal Karsinom) Metastazı Patolojik Proksimal Femur Fraktürü





57 yaş, Ac Adenokarsinom



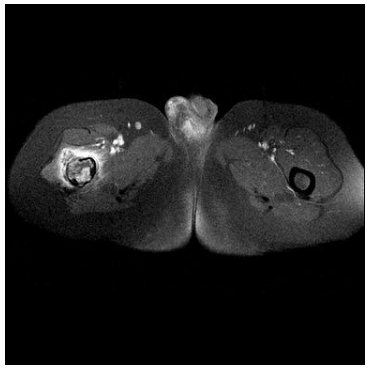


Protez

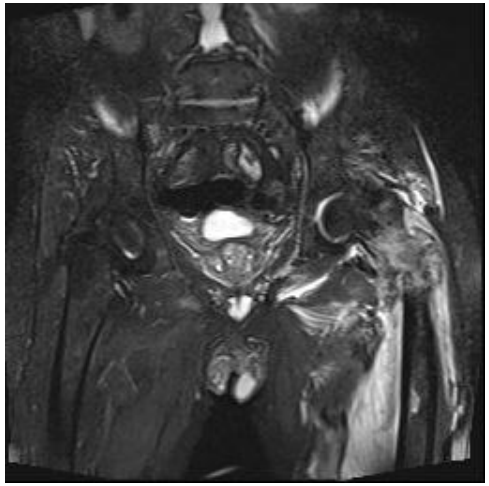
- Özellikle proksimal femurun tutulduğu ve destrüksiyonun eşlik ettiği olgularda masif protez uygulanabilir.
- Genel durumu iyi olan ve adjuvan tedaviye yanıtı kötü olan metastaz olgularında ön planda tercih edilir.
- Büyük trokanterin tutulmadığı durumlarda proteze fikse edilmesi çıkık riskini düşürür.

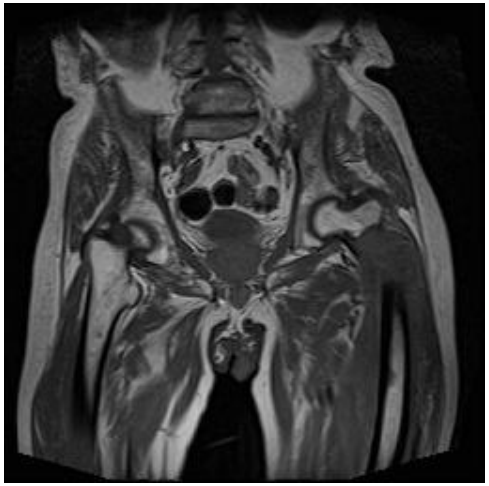
- Park DH, Jaiswal PK, Al-Hakim W, Aston WJS, Pollock RC, Skinner JA, et al. TheUse of massive endoprostheses for the treatment of bone metastases. Sarcoma 2007

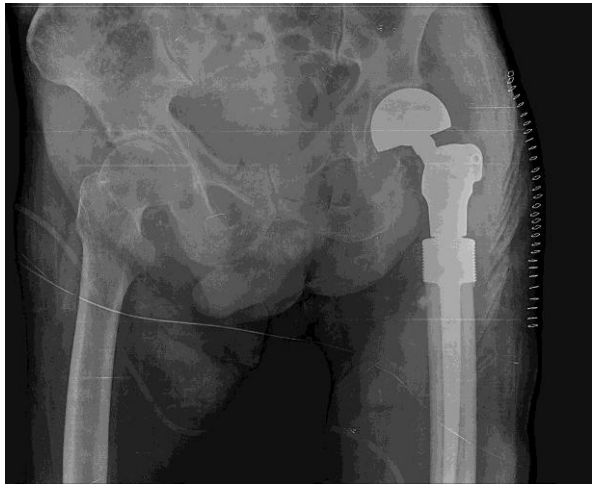
62 yaş, Ac Ca Metastazı



83 Yaş, Üroepitelyal Karsinom Metastazı



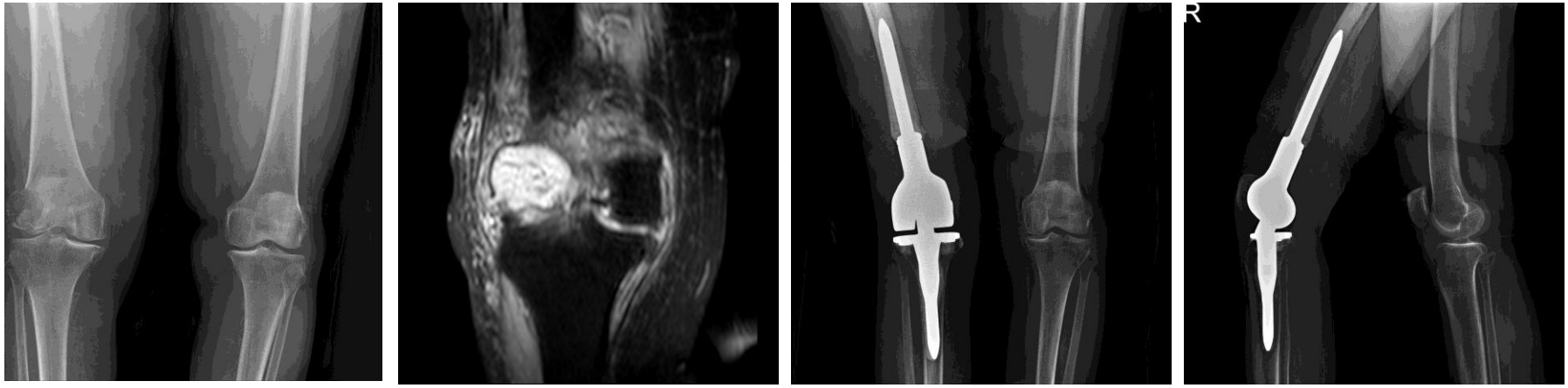




67 yaş, Meme Ca Metastaz




77 yaş, RCC Metastazı

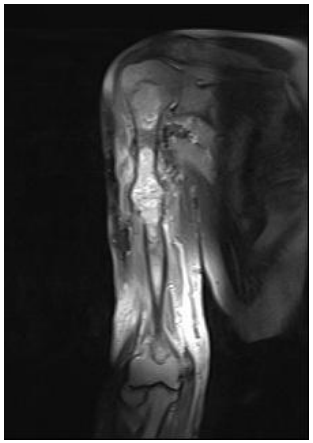
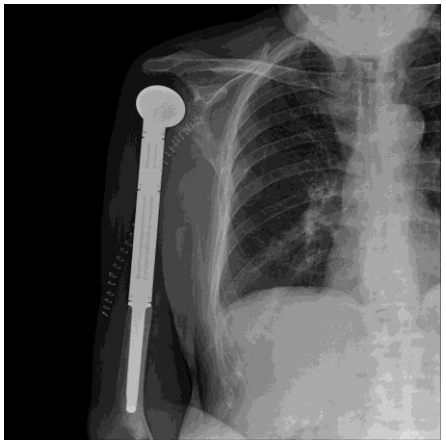
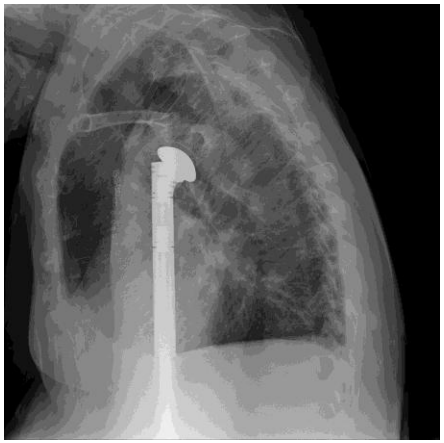


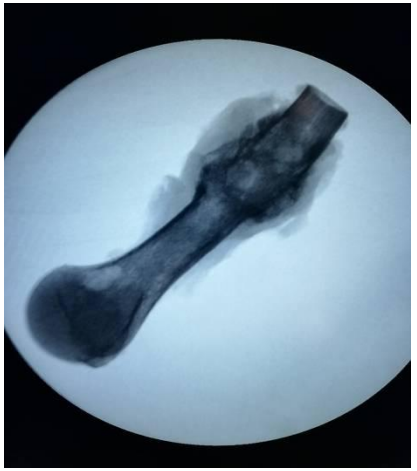
Protez

- Humerus baş ve trokanterik tutulumda tercih edilir.
- Diafize uzanım varlığında ters omuz protezi uygun seçenektir.

- Kassab M, Dumaine V, Babinet A, Ouaknine M, Tomeno B, Anract P. Twentynine shoulder reconstructions after resection of the proximal humerus for neo-plasm with mean 7-year follow-up. Rev Chir Orthop Reparatrice Appar Mot2005;91(1):15–23.

67 yaş, RCC Metastazı

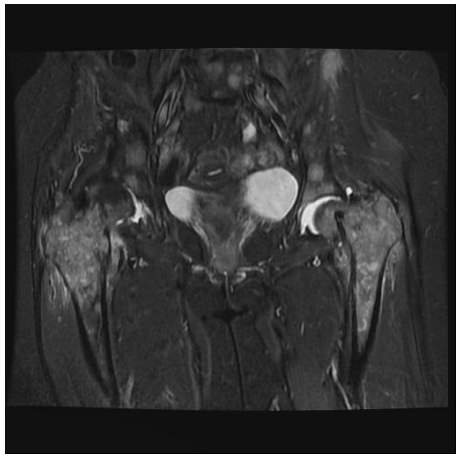
Protez/Fiksasyon

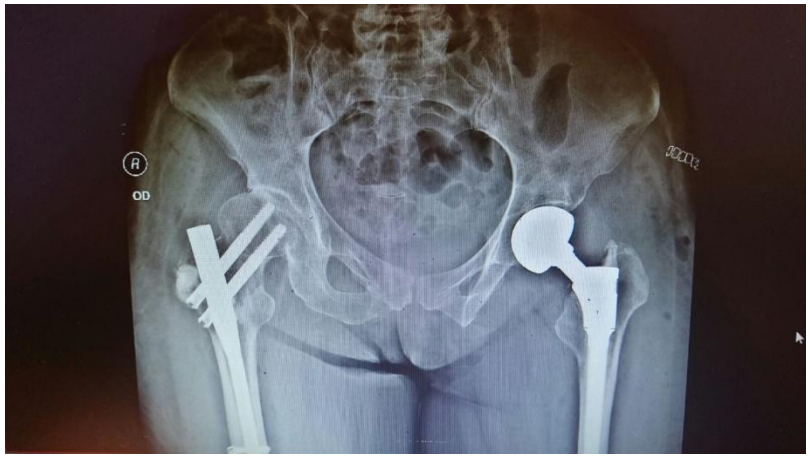
- 88 proksimal femur metastazı
- 57 Masif protez, 31 IMN
- Masif protez: Daha iyi fonksiyonel sonuç ve yaşam süresi
- IMN: Çok kısıtlı yaşam beklentisi olan hastalarda önerilmekte

Surgical management of metastatic lesions of the proximal femur with pathological fractures using intramedullary nailing or endoprosthetic replacement

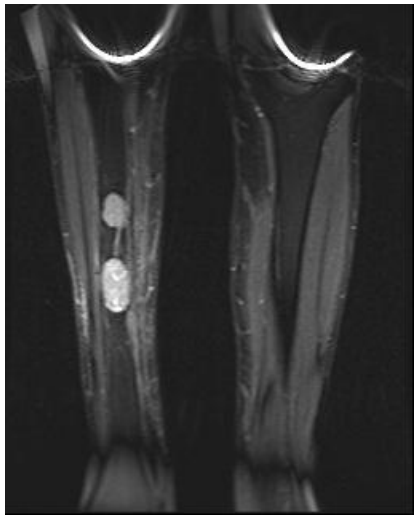
ZEPING YU*, YAN XIONG*, RUI SHI, LI MIN, WENLI ZHANG, HONGYUAN LIU, XIANG FANG, CHONGQI TU and HONG DUAN

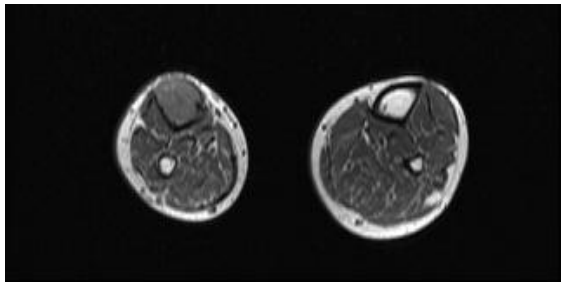
57 yaş, Meme Ca Metastazı





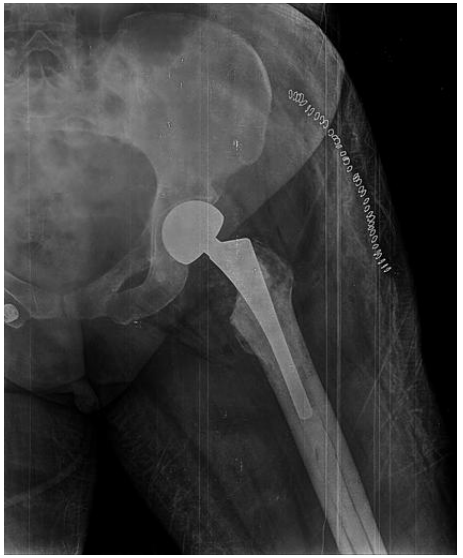
66 yaş, Tiroid Ca Met



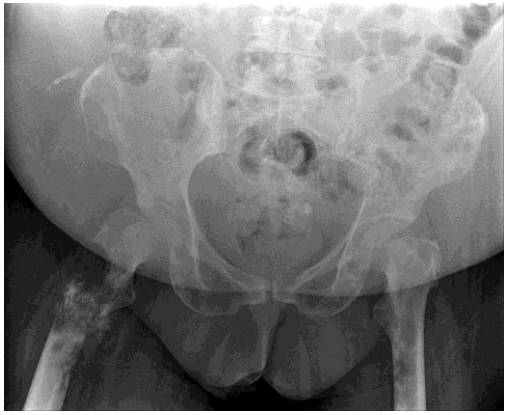


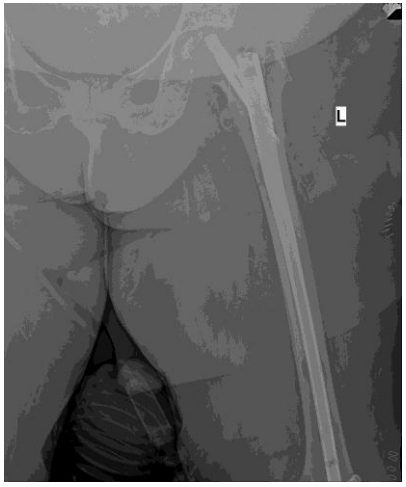
62 yaş, Meme Ca Multıpl Met



57 yaş, Meme Ca Multıpl Met





Malign Hemanjioperiosteoma Metastazı Patella Patolojik Fraktür

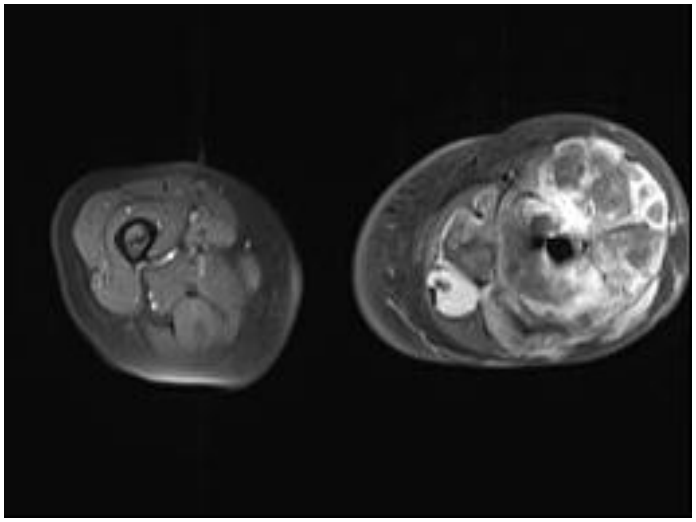


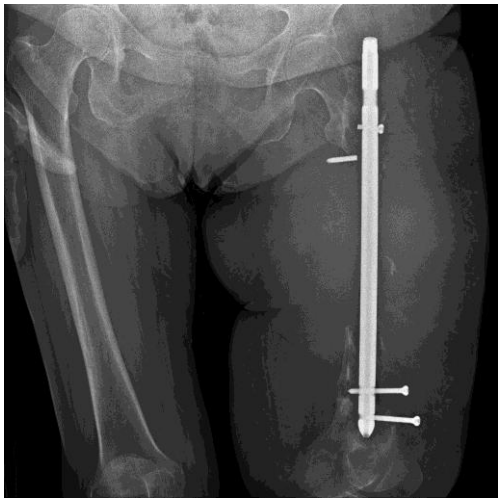




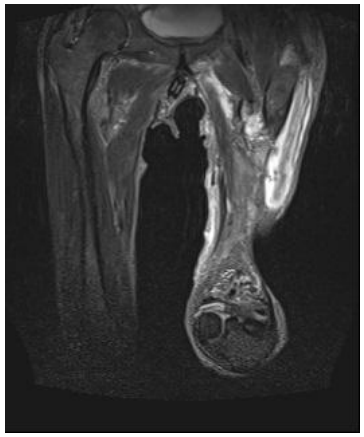


İndferansiye Pleomorfik Sarkom Kalça Dezartikülasyonu





Akc (Adenokarsinom) Metastazı
Patolojik Distal Femur+ Proksimal Tibia Fraktürü



Radyoterapi

- Metastaza bağlı patolojik kırıklar adjuvan radyoterapi ile kombine edilmelidir.
- Yalnız başına cerrahi ile tümörün ilerlemesine bağlı fiksasyon başarısızlık oranı yüksek. (%15-20)
- Sıklıkla 5-10 fraksiyonda 20-30 Gy

- Frassica DA (2003) General principles of external beam radiation therapy for skeletal metastases. Clin Orthop Relat Res 415:S158–S164
- Frassica FJ, Frassica DA (2003) Evaluation and treatment of metastases to the humerus. Clin Orthop Relat Res 415:S212–S218
- Townsend PW, Smalley SR, Cozad SC, Rosenthal HG, Hassanein RE. Role of postoperative radiation therapy after stabilization of fractures caused by metastatic disease. *Int J Radiat Oncol Biol Phys* 1995;31:43-9.

Radyoterapi

- Tümör kontrolü
- Ağrı kontrolü
- Kırık hattının tekrar kalsifiye olması

- Koswig S, Budach V. Remineralization and pain relief in bone metastases after after different radiotherapy fractions (10 times 3 Gy vs. 1 time 8 Gy). A prospective study. Strahlenther Onkol. 1999; 175:500-8 [Article in German]
- Feyer PC, Steingraeber M. Radiotherapy of Bone Metastasis in Breast Cancer Patients - Current Approaches. Breast Care (Basel). 2012;7(2):108-112.

Ac Ca Metastaz

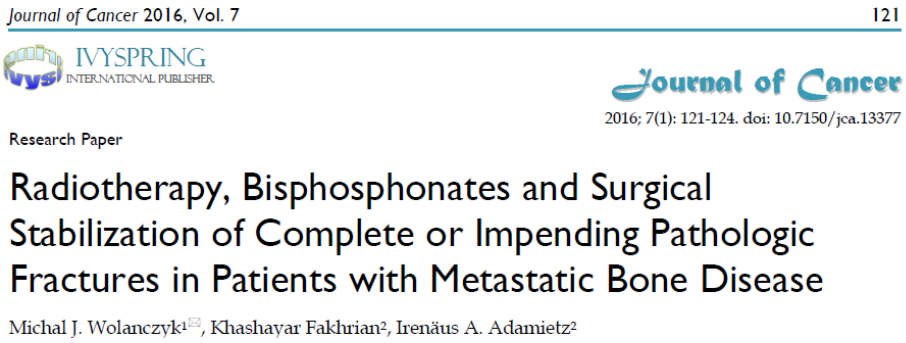
Bifosfanat

- Zolendronik asit metastaza bağlı iskelet patolojisi gelişimini anlamlı derecede düşürür.

- Saad F, Gleason DM, Murray R, et al. A randomized, placebo- controlled trial of zoledronic acid in patients with hormone- refractory metastatic prostate carcinoma. *J Natl Cancer Inst*. 2002;94:1458–1468.
- Rosen LS, Gordon D, Tchekmedyian S, et al. Zoledronic acid versus placebo in the treatment of skeletal metastases in patients with lung cancer and other solid tumors: a phase III, double-blind, randomized trial—the Zoledronic Acid Lung Cancer and Other Solid Tumors Study Group. *J Clin Oncol*. 2003;21:3150–3157.
- Tanvetyanon T, Hines E Jr. Long-term efficacy and safety of zoledronic acid in the treatment of skeletal metastases in patients with nonsmall cell lung carcinoma and other solid tumors. Cancer. 2005 Apr 15;103(8):1756-7
- Kohno N, Aogi K, Minami H, Nakamura S, Asaga T, Iino Y, Watanabe T, Goessl C, Ohashi Y, Takashima S. Zoledronic acid significantly reduces skeletal complications compared with placebo in Japanese women with bone metastases from breast cancer: a randomized, placebo-controlled trial. J Clin Oncol. 2005 May 20;23(15):3314-21.

Adjuvan tedavi

- 72 hasta
- Grup 1: RT, 2: RT+Bifosfanat, 3: Bifosfanat
- Tümör progresyonu, ağrı progresyonu, ek cerrahi girişim gereksinimi
- Kombine tedavi ile daha iyi sonuçlar



Journal of Cancer 2016, Vol. 7 121

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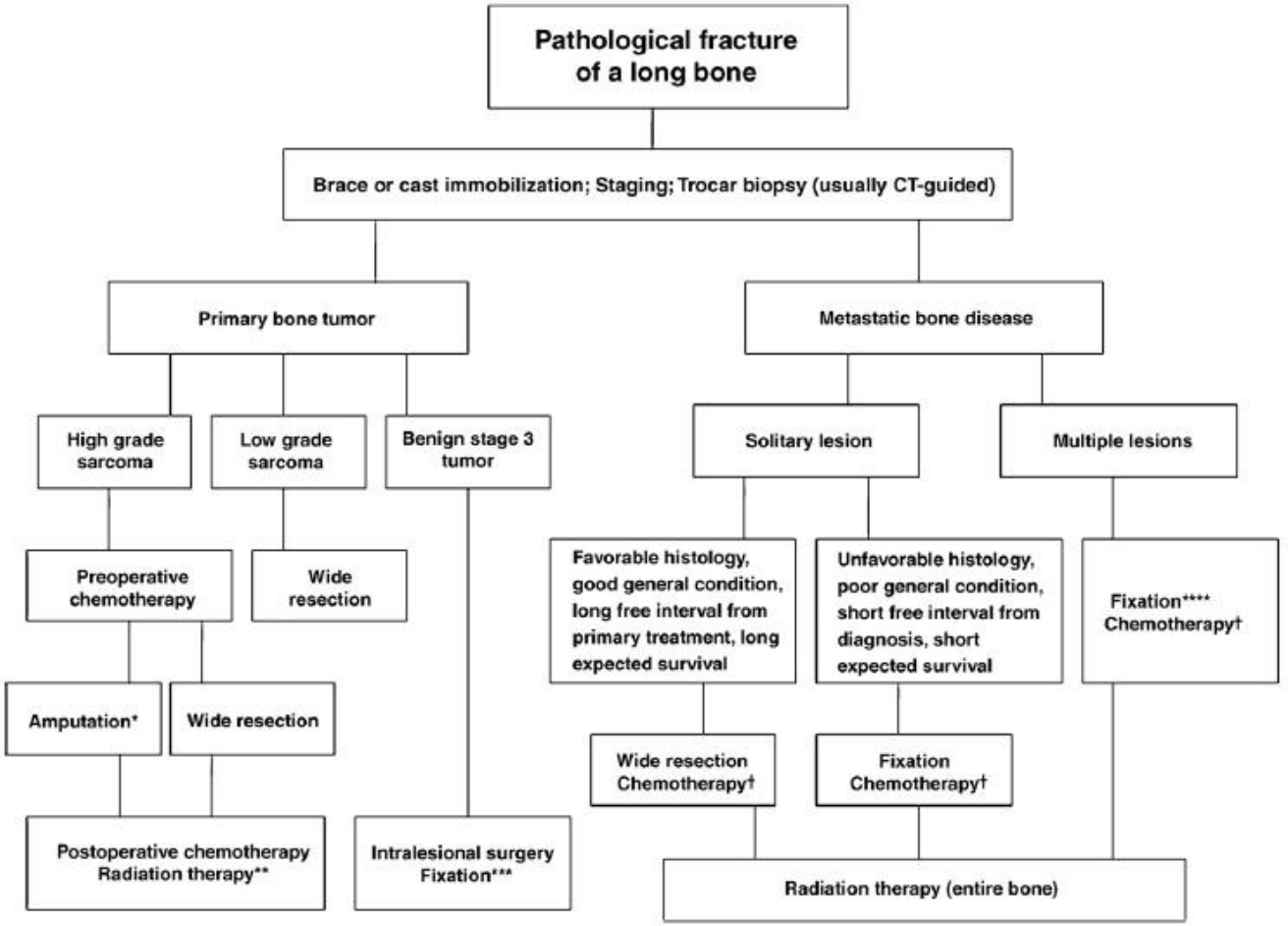
2016; 7(1): 121-124. doi: 10.7150/jca.13377

Research Paper

Radiotherapy, Bisphosphonates and Surgical Stabilization of Complete or Impending Pathologic Fractures in Patients with Metastatic Bone Disease

Michal J. Wolanczyk[1], Khashayar Fakhrian[2], Irenäus A. Adamietz[2]



g. 3. Treatment algorithm for patients with pathological fractures in primary bone tumours and skeletal metastases. *When limb salvage is not feasible due to extent of ion, neurovascular involvement, and/or massive contamination. **Radiation therapy rarely given; only if margins are not wide, or contaminated. ***Wide resection if ation is not feasible. ****Wide resection only if fixation is not feasible due to extent of the lesion or meta-epiphyseal involvement. †Chemotherapy in patients with skeletal etastases only if feasible depending on age, general condition and expected survival.

- Ruggieri P, Mavrogenis AF, Casadei R, Errani C, Angelini A, Calabrò T, Pala E, Mercuri M. Protocol of surgical treatment of long bone pathological fractures. Injury. 2010 Nov;41(11):1161-7.

Omurga Patolojik Kırık

- Hastanın **genel durumu** ve **beklenen yaşam süresi** cerrahi tedavi tipine karar vermede belirleyicidir

- Yüksek komplikasyon oranına (%30-40) sahiptir

Omurga Patolojik Kırık

- Decision framework

Neurologic

Oncologic

Mechanical

Systematic

The Oncologist

The NOMS Framework: Approach to the Treatment of Spinal Metastatic Tumors

The Oncologist 2013;18:744–751 www.TheOncologist.com

Omurga Patolojik Kırık

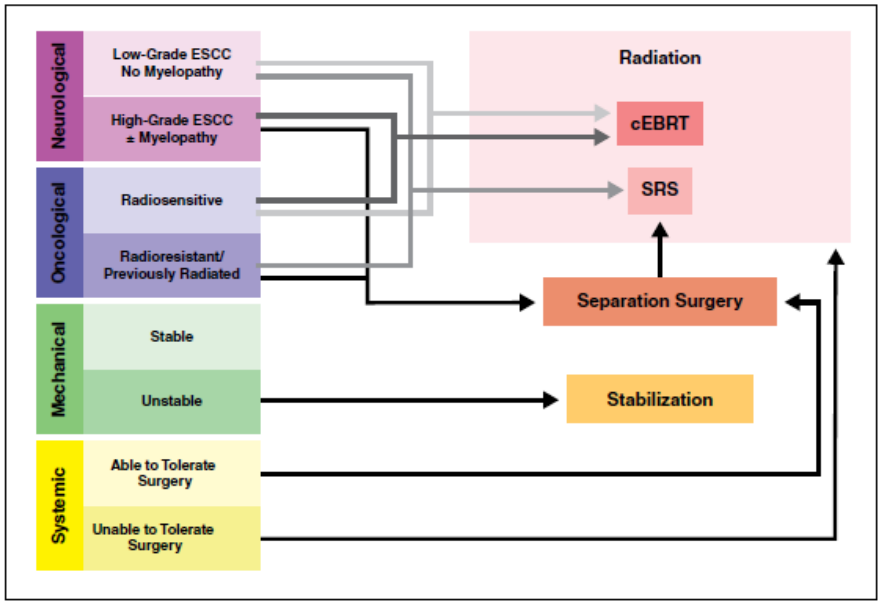


Fig 2. — The NOMS (neurological, oncological, mechanical, and systemic) algorithm for the treatment of spinal metastases. Radiosensitive malignancies are referred to conventional radiotherapy regardless of degree of cord compression. Radioresistant disease requires IMRT either upfront (in the absence of high-grade cord compression) or following decompressive separation surgery. Generally, IMRT is the chosen modality of adjuvant radiation for previously radiated tumors. Mechanical instability provides an independent surgical indication. cEBRT = conventional external-beam radiation, ESCC = epidural spinal cord compression, IMRT = intensity-modulated radiation therapy, SRS = stereotactic radiosurgery. Republished with permission of AlphaMed Press, from Laufer I, Rubin DG, Lis E, et al. The NOMS framework: approach to the treatment of spinal metastatic tumors. *Oncologist*. 2013;18(6):744-751; permission conveyed through Copyright Clearance Center, Inc.

Separation Surgery for Spinal Metastases: Effect of Spinal Radiosurgery on Surgical Treatment Goals

Nelson Moussazadeh, MD, Ilya Laufer, MD, Yoshiya Yamada, MD, and Mark H. Bilsky, MD

Nörolojik

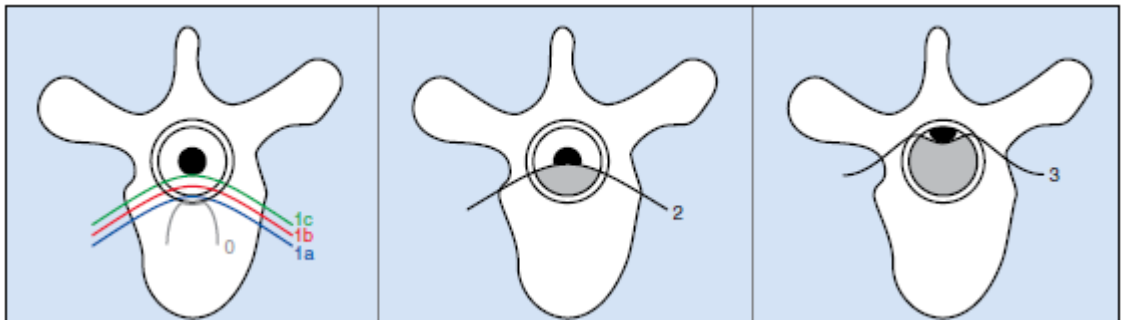


Table 1: Epidural Spinal Cord Compression Scale[3]

Grade 0	Bone-only Disease	"Low-Grade ESCC"
Grade 1a	Epidural Disease without Thecal Sac Compression	
Grade 1b	Deformation of Thecal Sac	
Grade 1c	Deformation of Thecal Sac and Spinal Cord Abutment	"High-Grade ESCC"
Grade 2	Spinal Cord Compression with CSF visible	
Grade 3	Spinal Cord Compression without CSF visible	

Separation Surgery for Spinal Metastases: A Review on Surgical Treatment Goals

Gabriel A. Smith[1], Arunit J. Chugh[1], Michael Steinmetz[2]

Onkolojik

Table 3. Classification of Radiosensitive and Radioresistant Histologies

Study	Lymphoma, Seminoma, Myeloma	Breast	Prostate	Sarcoma	Melanoma	Gastrointestinal	NSCLC	Renal
Gilbert *et al*[103]	F	U	U	U	U	U	U	U
Maranzano *et al*[79]	F	F	F	U	U	U	U	U
Rades *et al*[20,43]	F	I	I	I	U	I	U	I
Rades *et al*[58]	F	F	F	U	U	U	U	U
Katagiri *et al*[49]	F	F	F	U	U	U	U	U
Maranzano *et al*[22]	F	F	F	U	U	U	U	U
Rades *et al*[23]	F	I	I	I	U	I	U	I

F indicates favorable; I, intermediate; U, unfavorable.

Radiotherapy and Radiosurgery for Metastatic Spine Disease

What Are the Options, Indications, and Outcomes?

Peter C. Gerszten, MD, MPH,*† Ehud Mendel, MD,‡ and Yoshiya Yamada, MD§

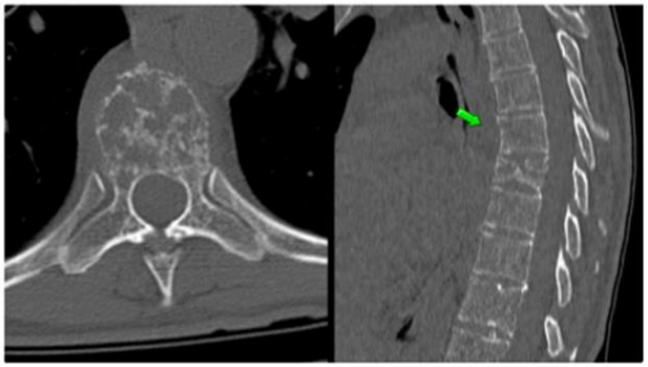
Mekanik

	SINS
Location within the spine	
Junctional (occiput–C2, C7–T2, T11–L1, L5–S1)	3
Mobile spine (C3–C6, L2–L4)	2
Semi-rigid (T3–T10)	1
Rigid (S2–S5)	0
Pain relief with recumbence and pain with movement or loading of the spine	
Yes	3
No (occasional pain but not mechanical)	1
Pain-free lesion	0
Bone lesion quality	
Lytic	2
Mixed lytic or blastic	1
Blastic	0
Radiographic spinal alignment	
Subluxation or translation present	4
De-novo deformity (kyphosis or scoliosis)	2
Normal alignment	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement of spinal elements (facet, pedicle, or costovertebral joint fracture or replacement with tumour)	
Bilateral	3
Unilateral	1
None of the above	0

The SINS score is generated by adding all of the scores from the six individual components. A score of 0–6 is classified as a stable spine, and no action is needed. A score of 7–12 receives a classification of indeterminate, and indicates potential instability, which warrants surgical consultation. A score of 13–18 indicates spinal instability that warrants surgical consultation. Adapted from Fisher et al,[12] with permission from Wolter Kluwer Health. SINS=Spine Instability Neoplastic Score.

Table 1: Classification system for SINS

MIS Case



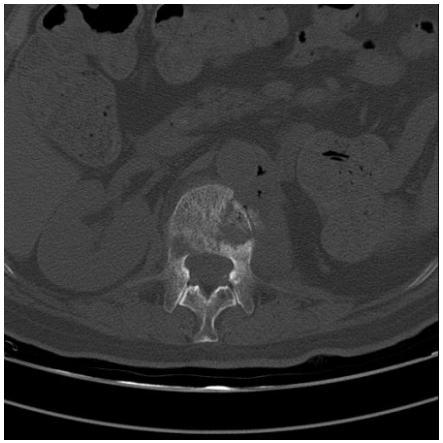
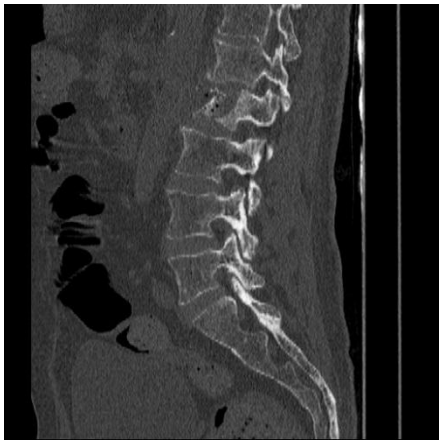
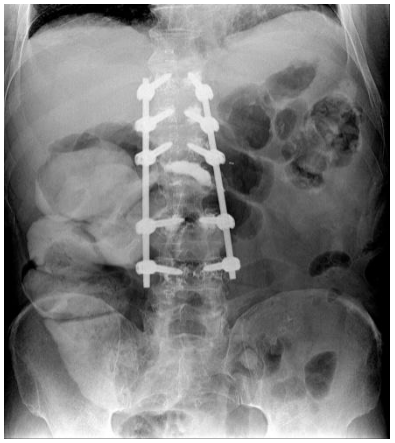
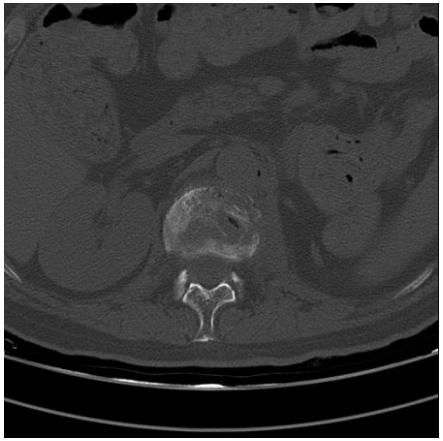
SINS score **10**

	Score
Location	
Junctional (Occiput-C2,C7-T2, T11-L1, L5-S1)	3
Mobile spine (C3-C6,L2-L4)	2
Simirigid (T3-T10)	1
Rigid (S2-S5)	0
Pain	
Yes	3
Occasional pain but not mechanical	1
Pain-free lesion	0
Bone Lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
De novo deformity (kyphosis/scoliosis)	2
Normal alignment	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involvement	1
None of the above	0
Posteriolateral involvement of spinal elements	
Bilateral	3
Unilateral	1
None of the above	0

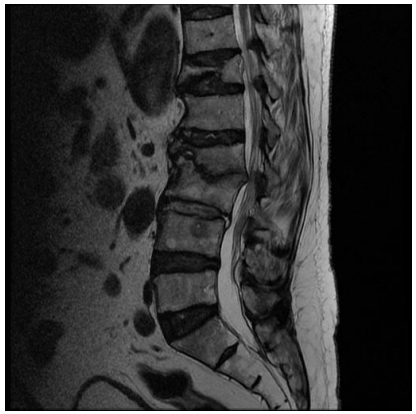
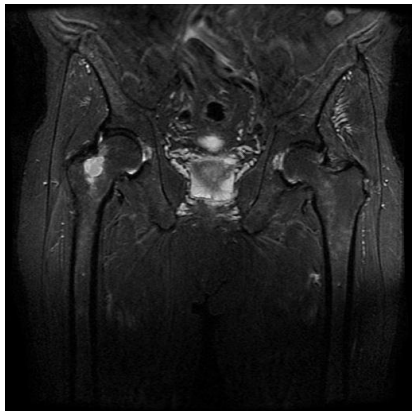
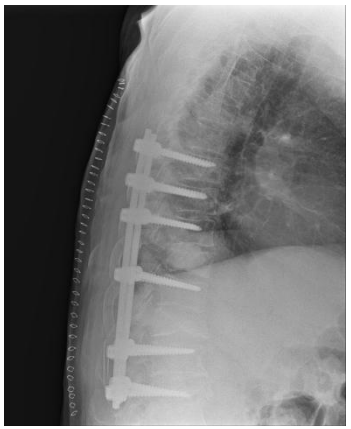
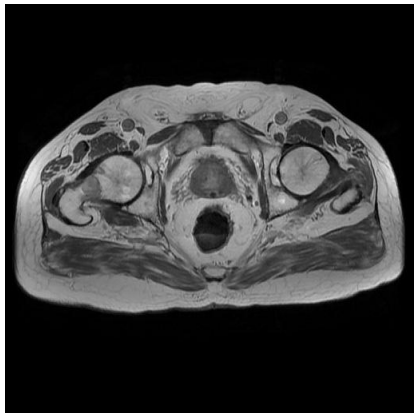
Sistemik

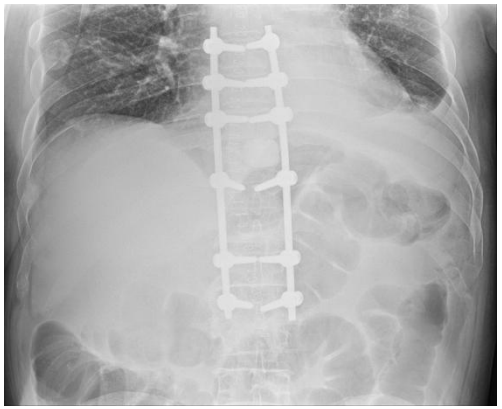
ECOG PERFORMANCE STATUS*	
Grade	ECOG
0	Fully active, able to carry on all pre-disease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work
2	Ambulatory and capable of all selfcare but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited selfcare, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any selfcare. Totally confined to bed or chair
5	Dead

RCC L1 VERTEBRA METASTAZI

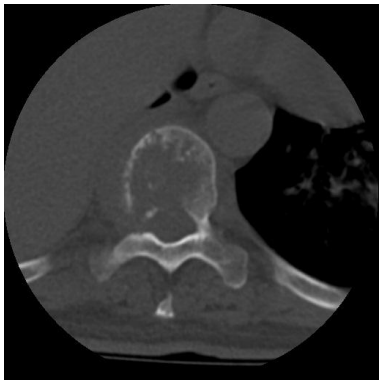
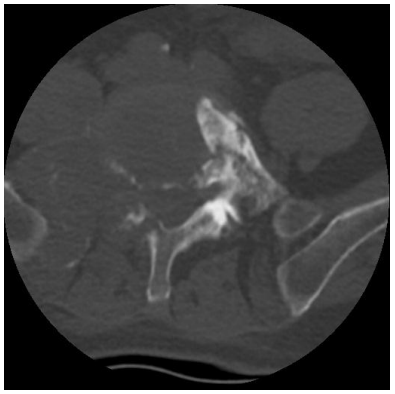
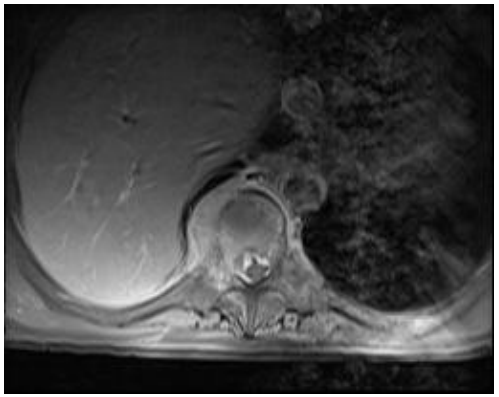
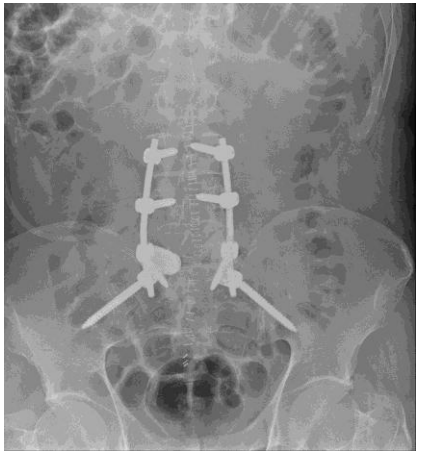





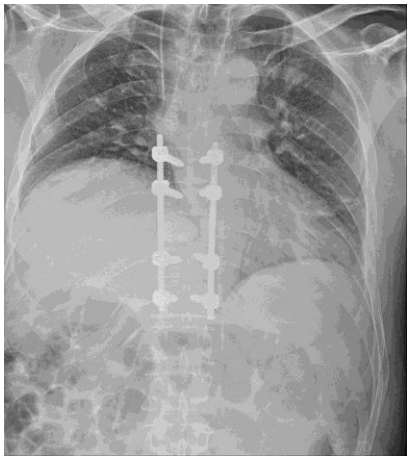
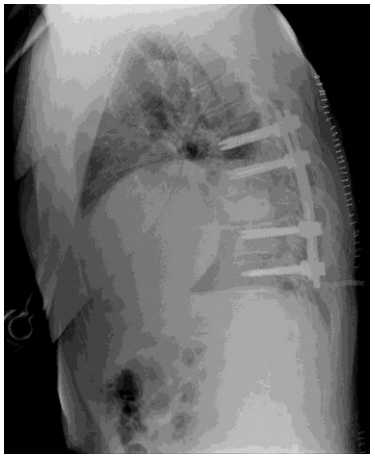
67 yaş, Ac Ca Multıpl Metastaz

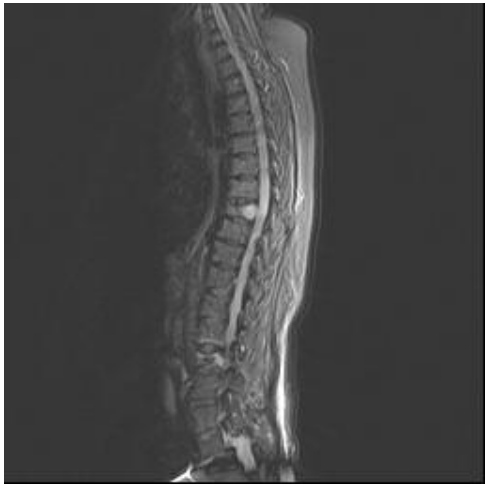
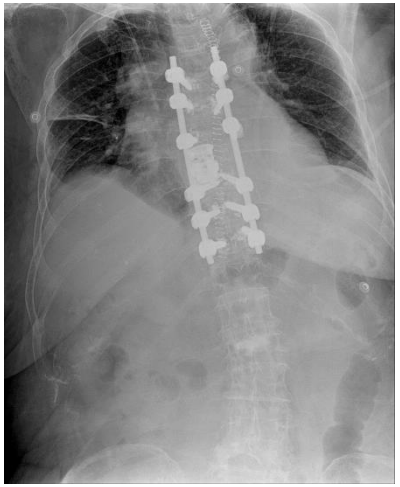
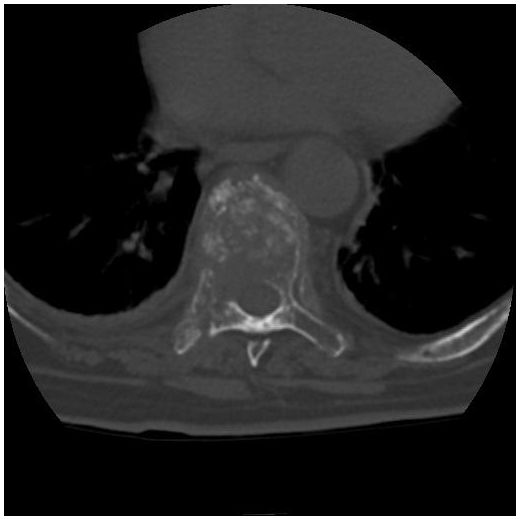


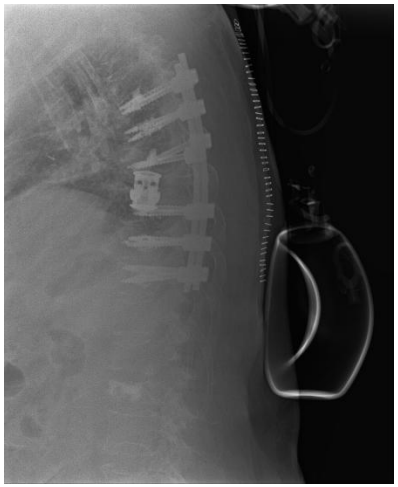
58 yaş
Ac Adenokarsinom Metastaz

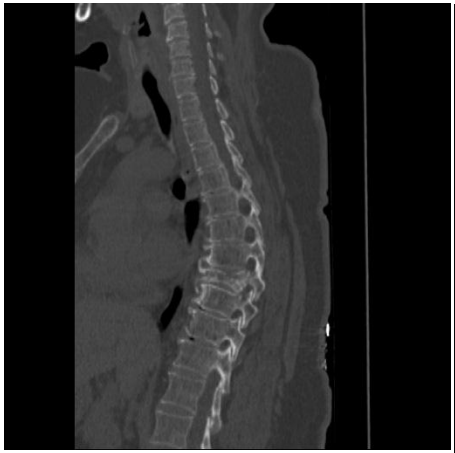



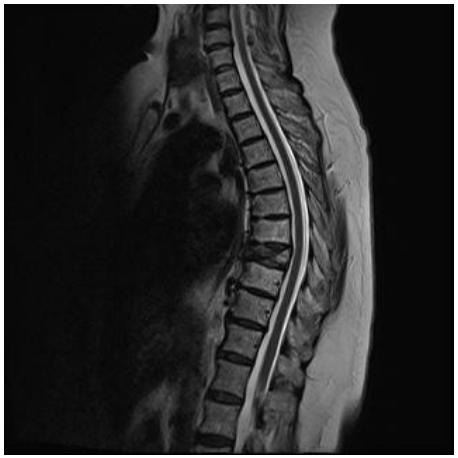
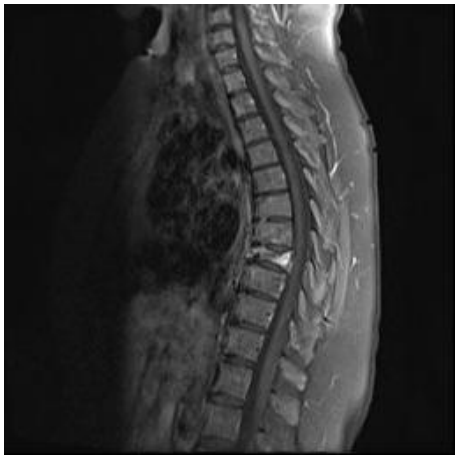
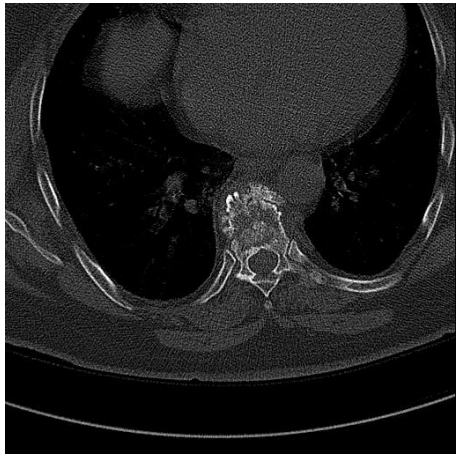
64 yaş
Multıpl Myelom T8 Patolojik Fraktür



56 yaş,
Rektum Adenokarsinom Metastazı

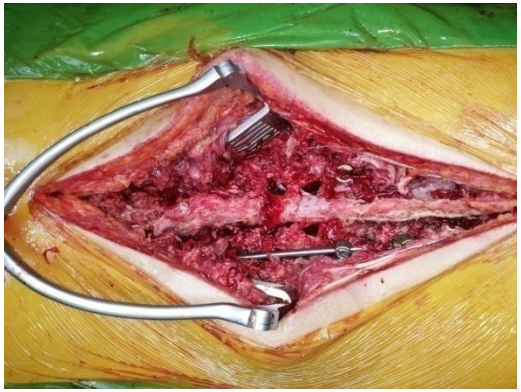



57 yaş
Üroepitelyal Karsinom Metastazı








54 yaş, Meme Ca T8-9 Metastaz

Teşekkürler