Adult Primary Bone Sarcoma (High-Grade)[1]

Note: Consider Clinical Trials as treatment options for eligible patients.

The chemotherapy regimens recommended are intensified by both dose and schedule, which often requires the specialized monitoring and management provided at a comprehensive cancer center.

INITIAL EVALUATION

- History and physical (H&P)
- CBC with differential, total protein, albumin, calcium, total bilirubin, alkaline phosphatase, LDH, ALT, sodium, potassium, chloride, carbon dioxide, PT, and PTT
- Plain films of primary to include whole bone
- MRI with contrast of the primary site
- Bone scan
- Baseline chest x-ray **and** CT chest with contrast
- Consider CT of the primary site[2]
- Consider FDG PET/CT for osteosarcomas and small cell[3] sarcomas
- Screening MRI spine for small cell
- Core needle biopsy if not done outside
- Histology review by bone tumor pathologist
- EKG and cardiac scan (MUGA or echocardiogram)
- Sarcoma Multidisciplinary Planning Conference
- Discuss fertility options and sperm banking for patients of child bearing potential (refer to Fertility Preservation Prior to Cancer Treatment algorithm)
- Lifestyle risk assessment[4]

TREATMENT

Metastasis?
- Yes → See Page 3
- No → Discuss Goal Concordant Care (GCC) with patient or if clinically indicated, with Patient Representative[5]

Small cell[3]?
- Yes → Doxorubicin, ifosfamide and vincristine for up to 6 cycles
- No → Doxorubicin and cisplatin for 4 cycles

Resectable?
- Yes → Surgery
- No → Radiation therapy

Viable tumor?
- Yes → Ifosfamide and etoposide (total duration of therapy approximately 12 months)
- No → High dose ifosfamide for 2-4 cycles

Resectable?
- Yes → Surgery
- No → See Page 3 for management based on metastatic disease

Surgery
- Good response: ≥ 95% necrosis → Doxorubicin and ifosfamide for 4 cycles
- < 95% necrosis → Ifosfamide for 6 cycles then high dose methotrexate for 6 cycles followed by ADIC as tolerated

Ifosfamide and etoposide (total duration of therapy approximately 12 months)

See Page 2 for surveillance after treatment of non-metastatic disease

ADIC = doxorubicin and dacarbazine

[1] Excluding chondrosarcoma not otherwise specified, and osteosarcoma of head and neck

[2] CT of the primary site is not routinely done; it is optional based on clinical scenario and is particularly helpful with pelvis and shoulder girdle

[3] Small cell includes the following: rhabdomyosarcoma, Ewing's Sarcoma/Primitive, neuroectodermal tumor, mesenchymal chondrosarcoma, and unclassified small cell sarcoma

[4] See Physical Activity, Nutrition, and Tobacco Cessation Treatment algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

[5] GCC should be initiated by the Primary Oncologist. If Primary Oncologist is unavailable, Primary Team/Attending Physician to initiate GCC discussion and notify Primary Oncologist. Patients, or if clinically indicated, the Patient Representative should be informed of therapeutic and/or palliative options. GCC discussion should be consistent, timely, and re-evaluated as clinically indicated. The Advance Care Planning (ACP) note should be used to document GCC discussion. Refer to GCC home page (for internal use only).

Department of Clinical Effectiveness V11
Approved by The Executive Committee of Medical Staff 06/18/2024

Adult Primary Bone Sarcoma (High-Grade)

Note: Consider Clinical Trials as treatment options for eligible patients.

SURVEILLANCE: Non-Metastatic Disease

- H&P:
  - Every 3 months for 2 years, then
  - Every 4 months for 2 years, then
  - Every 6 months for 1 year, then
  - Annually
- CBC with differential, total protein, albumin, calcium, glucose, creatinine, total bilirubin, alkaline phosphatase, LDH, and ALT every visit
- Plain films of primary at each visit
- For pelvic primaries: MRI with contrast and x-ray each visit with H&P above
- X-ray to symptomatic bone metastases
- Bone scan for symptomatic patients with history of bone metastases
- Chest x-ray each visit with H&P above
- CT chest with contrast if chest x-ray equivocal or for surgical planning
- Sarcoma Multidisciplinary Planning Conference if further multidisciplinary decisions required

Department of Clinical Effectiveness V11
Approved by The Executive Committee of Medical Staff 06/18/2024

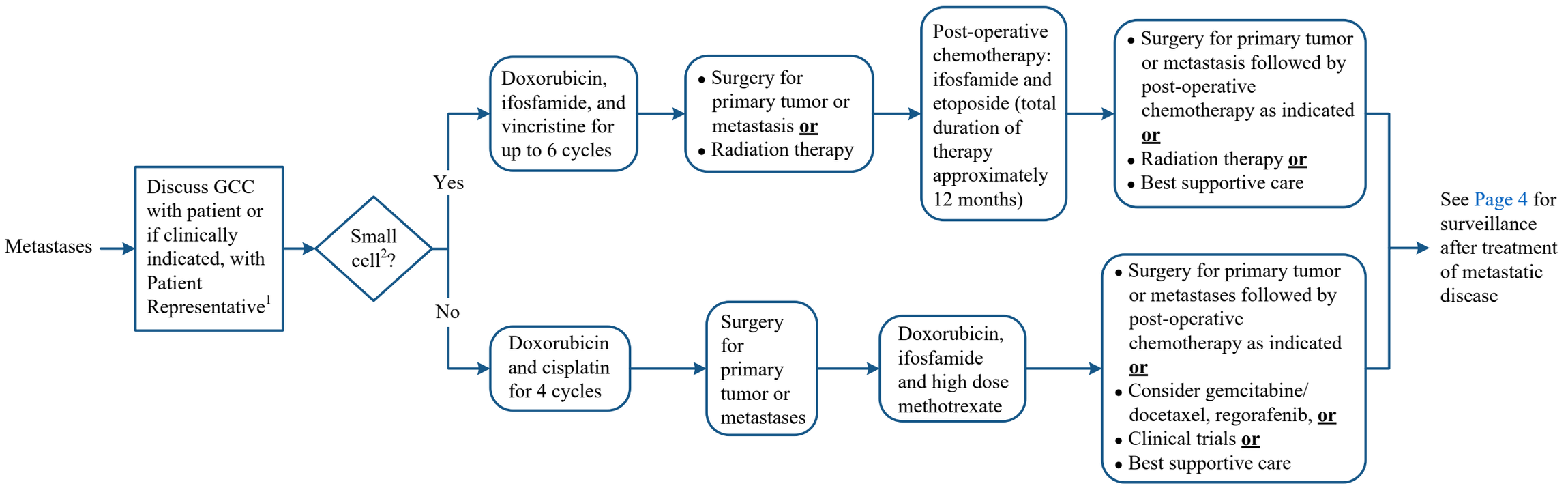
Adult Primary Bone Sarcoma (High-Grade)

Note: Consider Clinical Trials as treatment options for eligible patients.

The chemotherapy regimens recommended are intensified by both dose and schedule, which often requires the specialized monitoring and management provided at a comprehensive cancer center.

INITIAL PRESENTATION

TREATMENTS



[1] GCC should be initiated by the Primary Oncologist. If Primary Oncologist is unavailable, Primary Team/Attending Physician to initiate GCC discussion and notify Primary Oncologist. Patients, or if clinically indicated, the Patient Representative should be informed of therapeutic and/or palliative options. GCC discussion should be consistent, timely, and re-evaluated as clinically indicated. The Advance Care Planning (ACP) note should be used to document GCC discussion. Refer to GCC home page (for internal use only).

[2] Small cell includes the following: rhabdomyosarcoma, Ewing's Sarcoma/Primitive, neuroectodermal tumor, mesenchymal chondrosarcoma, and unclassified small cell sarcoma

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Adult Primary Bone Sarcoma (High-Grade)

Note: Consider Clinical Trials as treatment options for eligible patients.

SURVEILLANCE: Metastatic Disease

- H&P
  - Every 3 months for 2 years, then
  - Every 4 months for 2 years, then
  - Every 6 months for 1 year, then
  - Annually
- CBC with differential annually
- Total protein, albumin, calcium, glucose, creatinine, total bilirubin, alkaline phosphatase, LDH, and ALT every other visit for 5 years, then annually
- Plain films of primary at each visit
- X-ray to symptomatic bone metastases
- MRI with contrast at end of treatment for pelvic primaries
- Bone scan for symptomatic patients with history of bone metastases
- Chest x-ray each visit with H&P above
- CT scan chest with contrast if chest x-ray equivocal or for surgical planning
- Sarcoma Multidisciplinary Planning Conference if further multidisciplinary decisions required

SUGGESTED READINGS

General Overview

MD Anderson Institutional Policy #CLN1202 - Advance Care Planning Policy. Advance Care Planning (ACP) Conversation Workflow (ATT1925)

National Comprehensive Cancer Network. (2024). *Soft Tissue Sarcoma.* (NCCN Guideline Version 1.2024). Retrieved from https://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf

Doxorubicin/cisplatin for osteosarcoma:

Benjamin, R. S., Chawla, S. P., Carrasco, C. H., Raymond, A. K., Murray J. A., Armen, T., … Martin, R. G. (1992). Preoperative chemotherapy for osteosarcoma with intravenous adriamycin and intra-arterial cis-platinum. *Annals of Oncology, 3* (Suppl. 2), S3-S6. doi:10.1093/annonc/3.suppl_2.S3

Jaffe, N., Patel, S. R., & Benjamin, R. S. (1995). Chemotherapy in Osteosarcoma: Basis for Application and Antagonism to Implementation; Early Controversies Surrounding its Implementation. *Hematology/Oncology Clinics of North America, 9*(4), 825-840. doi:10.1016/S0889-8588(18)30074-1

Doxorubicin/ifosfamide for osteosarcoma and soft-tissue sarcomas:

Patel S. R., Vadhan-Raj S., Burgess M. A., Plager C., Papadopoulos N., Jenkins J., & Benjamin R. S. (1998). Results of two consecutive trials of dose-intensive chemotherapy with doxorubicin and ifosfamide is highly active in patients with soft-tissue sarcomas. *American Journal of Clinical Oncology, 21*(3), 317-321. Retrieved from: https://journals.lww.com/amjclinicaloncology/fulltext/1998/06000/results_of_two_consecutive_trials_of.25.aspx

Gemcitabine/docetaxel for osteosarcoma:

Navid, F., Willert, J. R., McCarville, M. B., Furman, W., Watkins, A., Roberts, W., & Daw, N. C. (2008). Combination of gemcitabine and docetaxel in the treatment of children and young adults with refractory bone sarcoma. *Cancer, 113*(2), 419-425. doi:10.1002/cncr.23586

High-dose ifosfamide for osteosarcoma and soft-tissue sarcoma:

Patel S. R., Vadhan-Raj S., Papadopoulos N., Plager C., Burgess M. A., Hays C., & Benjamin R. S. (1997). High-dose ifosfamide in bone and soft-tissue sarcomas - Results of phase II and pilot studies - Dose response and schedule dependence. *Journal of Clinical Oncology, 15*(6), 2378-2384. doi:10.1200/JCO.1997.15.6.2378

Regorafenib for osteosarcoma:

Davis, L. E., Bolejack, V., Ryan, C. W., Ganjoo, K. N., Loggers, E. T., Chawla, S., … Maki, R. G. (2019). Randomized Double-Blind Phase II Study of Regorafenib in Patients With Metastatic Osteosarcoma. *Journal of Clinical Oncology, 37*(16), 1424-1431. doi:10.1200/JCO.18.02374

DEVELOPMENT CREDITS

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