

BONE CANCER TREATMENT REGIMENS (Part 1 of 2)

The selection, dosing, and administration of anticancer agents and the management of associated toxicities are complex. Drug dose modifications and schedule and initiation of supportive care interventions are often necessary because of expected toxicities and because of individual patient variability, prior treatment, and comorbidities. Thus, the optimal delivery of anticancer agents requires a healthcare delivery team experienced in the use of such agents and the management of associated toxicities in patients with cancer. The cancer treatment regimens below may include both FDA-approved and unapproved uses/regimens and are provided as references only to the latest treatment strategies. Clinicians must choose and verify treatment options based on the individual patient.

NOTE: GREY SHADED BOXES CONTAIN UPDATED REGIMENS.

General treatment notes:¹

- Chemotherapy for Ewing's sarcoma and osteosarcoma should include growth factor support.
- Conventional chondrosarcoma has no known standard chemotherapy options.
- Mesenchymal chondrosarcoma: follow Ewing's sarcoma regimens.
- Malignant fibrous histiocytoma (MFH) of bone: follow osteosarcoma regimens.

REGIMEN

DOISING

Ewing's Sarcoma and Mesenchymal Chondrosarcoma

First-Line Therapy (Primary/Neoadjuvant/Adjuvant)

VAC/IE (vincristine [Oncovin] + doxorubicin [Adriamycin] + cyclophosphamide [Cytoxan] <u>alternating with</u> ifosfamide [Ifex] + etoposide [Toposar, VePesid, Etopophos VP-16]) ^{1,2}	Alternating VAC and IE cycles. Repeat each cycle every 3 weeks for 17 cycles. VAC cycles Day 1: Vincristine 2mg/m ² (max 2mg) IV + doxorubicin 75mg/m ² IV bolus + cyclophosphamide 1,200mg/m ² IV. Dactinomycin can be substituted for doxorubicin if there are concerns regarding cardiotoxicity ² ; dactinomycin 1.25mg/m ² IV can be substituted for doxorubicin when a total doxorubicin dose of 375mg/m ² is reached. IE cycles Days 1-5: Ifosfamide 1,800mg/m ² IV + mesna + etoposide 100mg/m ² IV.
VAI (vincristine + ifosfamide + dactinomycin [actinomycin D; Cosmegen] + doxorubicin) ^{1,3}	Day 1: Vincristine 1.5mg/m ² IV, plus Days 1-3: Ifosfamide 2,000mg/m ² IV + mesna, plus Days 1, 3 and 5: Dactinomycin 0.5mg/m ² IV, plus Days 2, 4: Doxorubicin 30mg/m ² IV. Repeat cycle every 3 weeks.
VIDE (vincristine + ifosfamide + doxorubicin + etoposide) ^{1,4}	Day 1: Vincristine 1.4mg/m ² (max 2mg), plus Days 1-3: Doxorubicin 20mg/m ² IV + ifosfamide 3mg/m ² IV + mesna 3g/m ² continuous IV infusion + etoposide 150mg/m ² IV. Repeat cycle every 3 weeks for up to 6 cycles.
<h3>Primary Therapy for Metastatic Disease at Initial Presentation</h3>	
VAC/IE (vincristine [Oncovin] + doxorubicin [Adriamycin] + cyclophosphamide [Cytoxan] <u>alternating with</u> ifosfamide [Ifex] + etoposide [Toposar, VePesid, Etopophos VP-16]) ^{1,2}	Alternating VAC and IE cycles. Repeat each cycle every 3 weeks for 17 cycles. VAC cycles Day 1: Vincristine 2mg/m ² (max 2mg) IV + doxorubicin 75mg/m ² IV bolus + cyclophosphamide 1,200mg/m ² IV. Dactinomycin can be substituted for doxorubicin if there are concerns regarding cardiotoxicity ² ; dactinomycin 1.25mg/m ² IV can be substituted for doxorubicin when a total doxorubicin dose of 375mg/m ² is reached. IE cycles Days 1-5: Ifosfamide 1,800mg/m ² IV + mesna + etoposide 100mg/m ² IV.
VAI (vincristine + ifosfamide + dactinomycin [actinomycin D; Cosmegen] + doxorubicin) ^{1,3}	Day 1: Vincristine 1.5mg/m ² IV, plus Days 1-3: Ifosfamide 2,000mg/m ² IV + mesna, plus Days 1, 3 and 5: Dactinomycin 0.5mg/m ² IV, plus Days 2, 4: Doxorubicin 30mg/m ² IV. Repeat cycle every 3 weeks.
VIDE (vincristine + ifosfamide + doxorubicin + etoposide) ^{1,4}	Day 1: Vincristine 1.4mg/m ² (max 2mg), plus Days 1-3: Doxorubicin 20mg/m ² IV + ifosfamide 3mg/m ² IV + mesna 3g/m ² continuous IV infusion + etoposide 150mg/m ² IV. Repeat cycle every 3 weeks for up to 6 cycles.
CVD (cyclophosphamide [Cytoxan] + vincristine + doxorubicin OR dactinomycin) ^{1,5}	Day 1: Vincristine 2mg/m ² IV + cyclophosphamide 1,200mg/m ² + doxorubicin 75mg/m ² (the first 5 cycles) OR dactinomycin 1.25mg/m ² IV (subsequent cycles). Repeat cycle every 3 weeks for 17 cycles.

continued

BONE CANCER TREATMENT REGIMENS (Part 2 of 2)

REGIMEN	DOSING
Second-Line Therapy (Relapsed or Refractory Disease)	
Cyclophosphamide + topotecan (Hycamtin) ^{1,6}	Days 1-5: Cyclophosphamide 250mg/m ² /day IV + topotecan 0.75mg/m ² /day IV. Repeat cycle every 3 weeks for 12-14 cycles.
Irinotecan (CPT-11; Camptosar) + temozolomide (Temodar) ^{1,7}	Days 1-5: Temozolomide 100mg/m ² /day orally, plus Days 1-5 and 8-12: Irinotecan 10-20mg/m ² /day IV at least one hour after temozolomide. Repeat cycle every 3 or 4 weeks.
Carboplatin (Paraplatin) + ifosfamide + etoposide ^{1,8}	Days 1 and 2: Carboplatin 400mg/m ² /day IV, plus Days 1-5: Ifosfamide 1,800mg/m ² /day IV + mesna + etoposide 100mg/m ² /day IV. Repeat cycle every 3 weeks for up to 12 cycles (median 1 cycle).
Gemcitabine (Gemzar) + docetaxel (Taxotere) ^{1,9}	Days 1 and 8: Gemcitabine 675mg/m ² IV, plus Day 8: Docetaxel 75-100 mg/m ² IV. Repeat cycle every 3 weeks for up to 13 cycles (median 4 cycles).
Ifosfamide + etoposide ^{1,10}	Days 1-5: Ifosfamide 1,800mg/m ² /day IV + mesna. Days 1-5: Etoposide 100mg/m ² /day IV. Repeat every 3 weeks for 12 cycles.
Osteosarcoma	
First-Line (Primary/Neoadjuvant/Adjuvant) or Primary Therapy for Metastatic Disease at Initial Presentation¹	
Cisplatin (CDDP; Platinol) + doxorubicin (Adriamycin) ^{1,11}	Days 1-3: Doxorubicin 25mg/m ² /day IV, plus Day 1: Cisplatin 100mg/m ² IV continuous IV infusion. Repeat cycle every 3 weeks for 6 cycles.
MAP (high-dose methotrexate [MTX] + cisplatin + doxorubicin) ^{1,12}	Day 1: Methotrexate 8g/m ² IV (with leucovorin rescue 15mg every 6 hrs for 11 doses, starting 24 hrs after beginning methotrexate), followed by Days 7-9: Cisplatin 120mg/m ² /day intra-arterially, followed by Day 9: Doxorubicin 60mg/m ² IV (48 hrs after start of cisplatin infusion). Repeat cycle once after 4 weeks.
Second-Line Therapy (Relapsed or Refractory Disease)	
Carboplatin + ifosfamide + etoposide ^{1,8}	Days 1 and 2: Carboplatin 400mg/m ² /day IV, plus Days 1-5: Ifosfamide 1,800mg/m ² /day IV + mesna + etoposide 100mg/m ² /day IV. Repeat cycle every 3 weeks for up to 12 cycles (median 1 cycle).
Gemcitabine (Gemzar) + docetaxel (Taxotere) ^{1,9}	Days 1 and 8: Gemcitabine 675mg/m ² IV, plus Day 8: Docetaxel 75-100mg/m ² IV. Repeat cycle every 3 weeks for up to 13 cycles (median 4 cycles).
References	
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