OSTEOSARCOMA TREATED AT THE RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH): 1995-2017

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Is High-Dose Methotrexate the Holy Grail for Osteosarcoma Outcomes?

BACKGROUND

We sought to review current practice at RCWMCH and to evaluate the outcomes of children and adolescents diagnosed with Osteosarcoma. The results will inform us on the justification to intensify treatment protocols with the addition of high-dose methotrexate (HDMTX) in the neoadjuvant setting.

METHODS

We performed a retrospective analysis of data from records of 44 patients, ≤13 years with biopsy-proven osteosarcoma diagnosed at RCWMCH between January 1995 and December 2017. Survival curves were plotted and probabilities estimated using the Kaplan-Meier method and groups were compared using the Log-rank test. A p-value of 0.05 defined statistical significance.

RESULTS

Patients with localised disease received a 2-drug neoadjuvant regimen (cisplatin, doxorubicin). Six with metastatic disease received an additional 3 drugs (ifosphamide, etoposide, carboplatin), 2 refused treatment and 3 died prior to chemotherapy. Good responders continued the same regimens. Nine (47%) of poor responders received HDMTX.

Patient Demographic and Clinical Characteristics (N=44)

Characteristic	Number / (%)
Male	23 (52%)
Female	21 (48%)
Mean age	9.9 years
Localised	32 (73%)
Metastatic	12 (27%)
Pleuropulmonary	8 (18%)
Skeletal	1 (2%)
Combined	3 (7%)
Surgery	37 (84%)
Limb-salvage	24 (65%)
Amputation	13 (35%)
Degree of Necrosis (%)	
<95 (poor responder)	19 (61%)
≥95 (good responder)	12 (39%)

Twenty-five (57%) were alive and disease free, 18 (41%) died of disease and 1 (2%) died of treatment-related toxicity. The Kaplan-Meier overall survival (OS) was 51%. The OS for localised disease was 66% and metastatic disease 17% (p=0.0006). Gender, age, tumour location, histologic subtype and necrosis were not significant predictors of survival. Considering localised disease, 17 poor responders had comparable survival to 10 good responders, OS 67% and 69% respectively (p=0.94). Eight poor responders who received HDMTX had an OS of 53% and the 9 who did not had an OS of 78% (*p*=0.67).

CONCLUSIONS

- Outcomes for Osteosarcoma at RCWMCH were reasonable for localised disease
- Metastatic disease remained a key predictor of poor outcome
- Outcomes for poor-responders with localised disease were not improved by the addition of HDMTX
- Toxic-related death was low, presenting scope to intensify treatment
- Results might be improved by employing HDMTX in the neoadjuvant setting