



Clinical outcomes and prognostic factors of pediatric osteosarcoma: A single-center retrospective cohort study

มหาวิทยาลัยมหิดล
คณะแพทยศาสตร์ศิริราชพยาบาล

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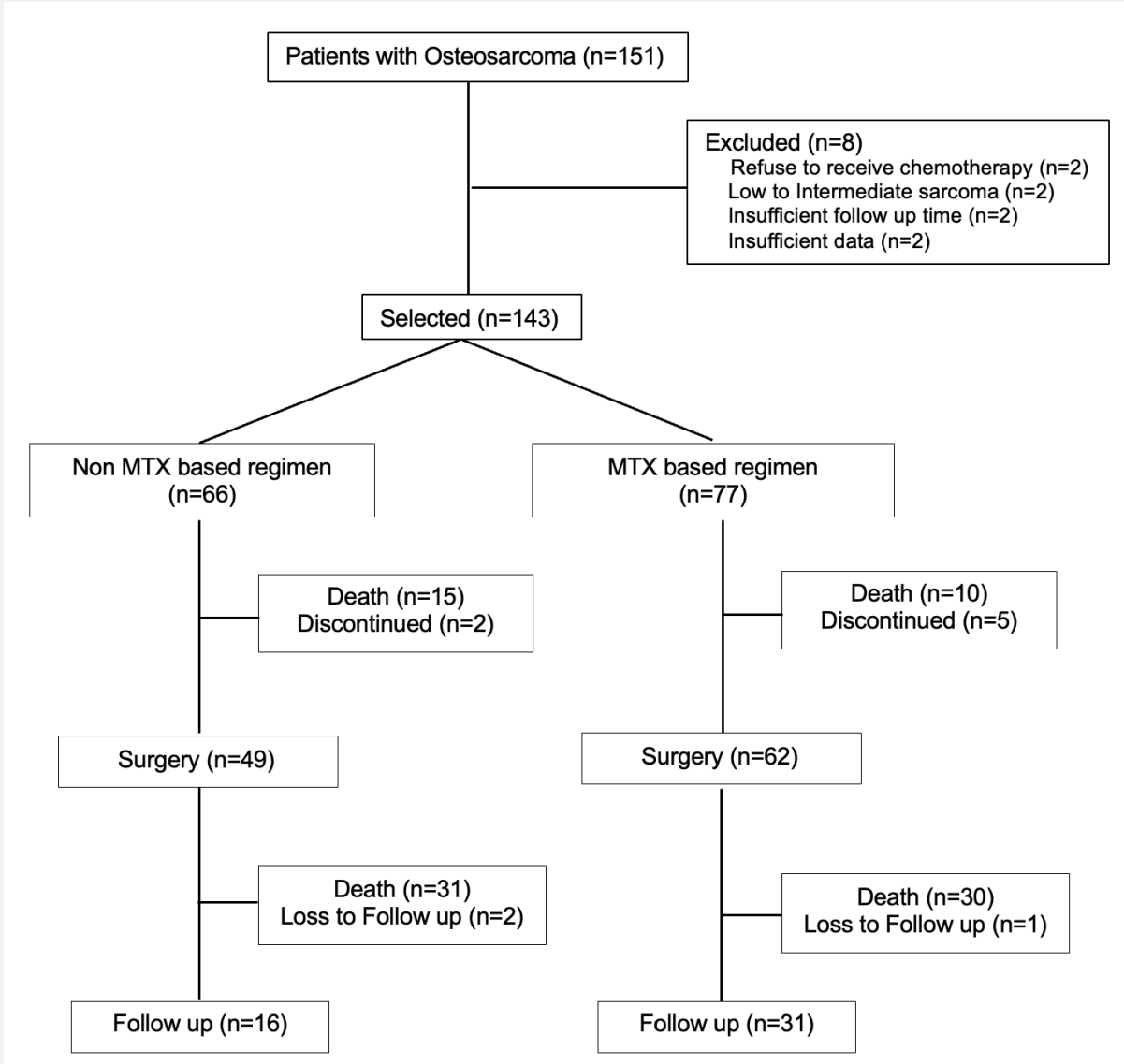
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Background

Osteosarcoma is the most common primary malignant bone tumor in children, with pulmonary metastases remains a major challenge. Debate persists over the impact of high-dose methotrexate (HDMTX) versus non-HDMTX chemotherapy protocols on survival outcomes. This study aimed to evaluated survival outcomes and prognostic factors in pediatric osteosarcoma.

Methods

A retrospective cohort study was conducted, including patients aged 1–18 years diagnosed with osteosarcoma between 2006 and 2024 at the Department of Pediatrics, Siriraj Hospital.



Results

The study included 143 patients ,with a median age at diagnosis of 11.6 years. Femur was the most common primary site (55.9%). Primary pulmonary metastases were present in 46.8% of patients. The 5-year OS and EFS rates were 36.4% and 31.7%, respectively. No statistical differences were observed between HDMTX and non-HDMTX regimens, with 5-year OS rates of 48.0% versus 33.4% (p = 0.957) and EFS rates of 37.2% versus 26.3% (p = 0.944). Multivariable Cox regression identified humerus tumors, metastases as significant predictors of worse outcomes. For 5-year OS, adjusted HRs of were 2.475 (95%CI 1.329-4.609); p=0.004) ,6.252 (95%CI 2.139-18.273; p = 0.001), respectively. For 5-year EFS, adjusted HRs were 1.816 (95% CI: 0.902–3.656; p = 0.095) ,8.598 (95% CI: 3.241–22.808; p < 0.001), respectively.

Conclusion

Survival outcomes for pediatric osteosarcoma at our center remain suboptimal compared to developed countries, particularly among patients with pulmonary metastases. Developing effective therapies for metastatic disease is critical to improving survival outcomes. Patients who received HDMTX containing regimen appeared to have better survival outcomes but experienced more significant side effects. The choice between these regimens depends on multiple factors, including patient-specific considerations, toxicity profiles, and institutional protocols, highlighting the need for further studies to optimize treatment strategies and improve survival rates in pediatric osteosarcoma.

Results

Table 1. Demographic and Clinical Characteristics of Pediatric Osteosarcoma Patients

Factors	All Patients (n=143)	Non-HDMTX based regimen (n=66)	HDMTX based regimen (n=77)	p-value
Male gender, n(%)	78(54.5)	35(53.0)	43(55.8)	0.866
Age at diagnosis (years), median(SD)	11.6(2.9)	11.4(2.6)	11.9(3.2)	0.351
Locations				
Femur, n(%)	80(55.9)	34(51.5)	46(59.7)	0.413
Humerus, n(%)	15(10.5)	5(7.6)	10(13.0)	0.436
Fibula, n(%)	5(3.5)	3(4.5)	2(2.6)	0.662
Tibia, n(%)	33(23.1)	22(33.3)	11(14.3)	0.013
Left Side, n(%)	75(52.4)	32(48.5)	43(55.8)	0.477
Metastasis status				
Metastasis at diagnosis, n(%)	77(53.8)	36(54.5)	41(53.2)	1.000
Metastasis overall, n(%)	110(76.9)	52(78.8)	58(75.3)	0.771
Surgical				
Surgery, n(%)	111(77.6)	49(74.2)	62(80.5)	0.486
Amputate	52(36.4)	29(43.9)	23(29.2)	
Limb salvage	59(41.3)	20(30.3)	39(50.6)	

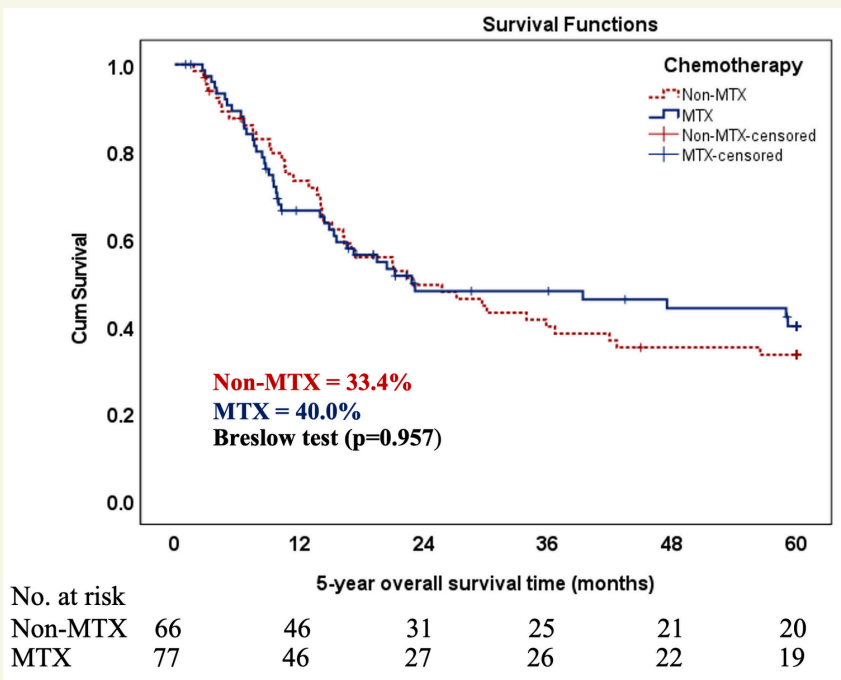


Figure2. Kaplan-Meier Survival Analysis for Pediatric Osteosarcoma estimated 5-year overall survival according to chemotherapy regimens

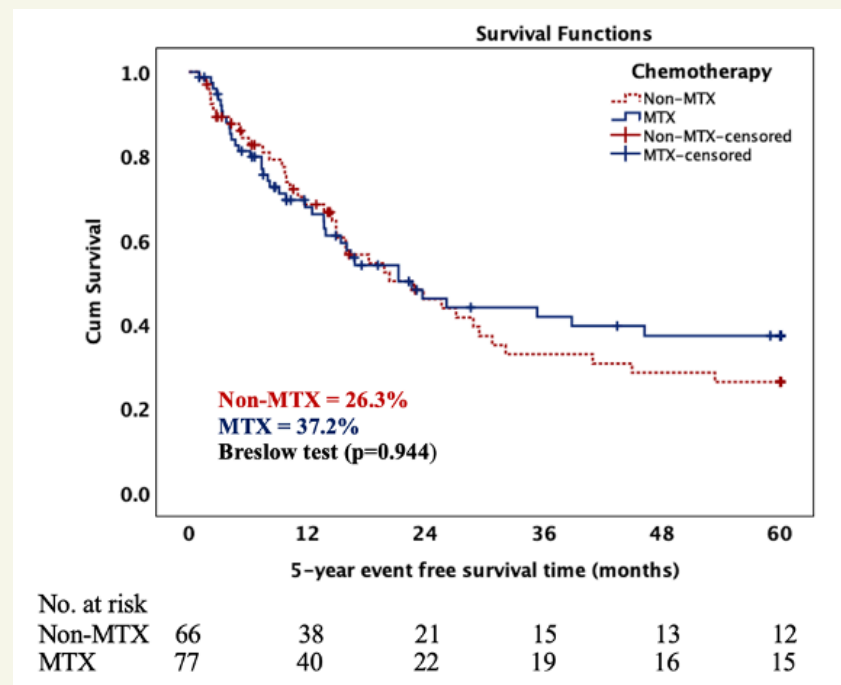


Figure3. Kaplan-Meier Survival Analysis for Pediatric Osteosarcoma estimated 5-year event-free survival according to chemotherapy regimens

