

True Infection Is Rare Despite Extensive Workup for Postoperative Fever After Pediatric Extremity Sarcoma Surgery

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Topic: Bone Sarcomas

Scientific Abstract

Significance and Hypothesis

Postoperative fever following extremity sarcoma resection in children is common and has been associated with increased diagnostic testing, longer hospitalization, and parental distress. Standard postoperative protocols mandate comprehensive infectious evaluation given the presence of central venous lines (CVLs) and prior exposure to neoadjuvant chemotherapy (NACT). However, it remains unclear whether these fevers represent true bloodstream infections, as non-infectious postoperative inflammatory fevers are common and often self-limiting. This study aimed to determine the incidence of true infection with positive blood cultures, identify risk factors for postoperative fever, and quantify the associated costs of postoperative fever workup following extremity sarcoma resection in pediatric patients.

Innovation

This first-of-its-kind study combines perioperative risk modeling and real-world cost data to define the risk, yield, and cost of postoperative fever workup in pediatric extremity sarcoma surgery.

Approach

A retrospective single-institution review of pediatric patients undergoing extremity sarcoma resection between 2011 and 2026 was performed. Patients were categorized based on the presence of postoperative fever ($\geq 38.0^{\circ}\text{C}$) occurring between postoperative days 0 and 7. Collected variables included demographics; preoperative factors (NACT, CVL, NACT to surgery interval, and absolute neutrophil count); disease characteristics (sarcoma type and anatomic site); intraoperative factors (reconstruction type, operative duration, blood loss, transfusion requirement, and urinary catheterization); and postoperative variables (analgesic modality and transfusions).

Predictors of postoperative fever were evaluated using univariate analysis and multivariable Firth-penalized logistic regression. Costs associated with postoperative fever workup were derived from federally mandated hospital price transparency files. Median costs for each

diagnostic investigation were calculated separately for Medicaid and commercially insured patients using contracted payer rates.

Results

Eighty-nine patients met the inclusion criteria, of whom 44 (49.4%) developed postoperative fever, and 45 (50.6%) remained afebrile. Baseline characteristics were similar between groups, except that patients with diagnoses other than osteosarcoma or Ewing sarcoma were less likely to develop postoperative fever ($p = 0.03$).

On univariate analysis, postoperative fever was significantly associated with NACT ($p = 0.004$), greater intraoperative blood loss ($p = 0.03$), presence of a CVL ($p = 0.004$), and intraoperative Foley catheterization ($p < 0.001$). In the Firth penalized multivariable analysis, only intraoperative Foley catheterization independently predicted postoperative fever (OR = 4.07, $p = 0.02$), whereas neoadjuvant chemotherapy showed a strong, non-significant trend (OR = 5.20, $p = 0.08$).

Only 2 of 44 febrile patients (4.5%) had positive blood cultures, and both exhibited hemodynamic instability. The median cost of fever workup was \$188.79 for Medicaid patients and \$1,471.69 for patients with commercial insurance. Fevers most commonly occurred on postoperative days 2 and 3. The median length of hospital stay was 7 days in febrile patients, compared with 3 days in afebrile patients.

Discussion and Impact

Postoperative fever following pediatric extremity sarcoma resection is common, while true bloodstream infection is rare. Routine infectious workup in clinically stable patients incurs substantial cost and prolongs hospitalization with limited diagnostic yield. Future efforts should focus on risk-stratified evaluation strategies to reduce unnecessary testing and resource utilization following pediatric extremity sarcoma surgery.

Table 1: Baseline comparison of febrile and afebrile patients undergoing extremity sarcoma resection surgery					
		Total (89)	Afebrile (45)	Febrile (44)	p
Age, years (95 % CI)			14 (11.39-16)	13 (12-15)	0.88
Weight, KG (95 % CI)			55.5 (44.98-66.72)	52 (45.9-62.9)	0.96
Sex (n, %)	Female	41 (46.07)	21	20	0.91
	Male	49 (53.93)	24	24	
Race (n, %)	White	69 (77.53)	37	32	0.56
	Black	8 (8.9)	3	5	
	Other	12 (13.48)	5	7	
Ethnicity (n, %)	Hispanic	4 (4.49)	42	43	0.32
	Not hispanic	85 (95.51)	3	1	
Insurance (n, %)	Government	43 (48.31)	23	20	0.37
	Private	46 (51.69)	22	24	
Diagnosis (n, %)	Osteosarcoma	62 (69.66)	29	33	0.03
	Ewing Sarcoma	17 (19.1)	7	10	
	Other	10 (11.24)	9	1	
KG= Kilgogram, CI= Confidence Interval					

Table 2: Firth penalized multivariable logistic regression evaluating the association of risk factors to post operative fever					
Fever	afebrile (45)	febrile (44)	Odds ratio	<i>p</i>	95% confidence interval
Neoadjuvant chemotherapy (n, %)	34 (75.56)	43 (97.72)	5.20	0.08	0.82-32.81
Intraoperative blood loss (ml, 95 % CI)	200 (150, 248.70)	250 (200, 300)	1.00	0.87	1.00-1.00
Duration of surgery(minutes, 95%CI)	152.5 (135.02, 173.94)	176 (155.10, 194.87)	1.00	0.87	1.00-1.00
Foley's catheterization (n, %)	16 (35.55)	34 (77.27)	4.07	0.02	1.22-13.53
Use of epidural anesthesia (n, %)	15 (33.33)	23 (532.28)	0.80	0.71	0.25-2.59
ml= milileters, CI= Confidence Interval					

Table 3: Median costs of fever workup among patients with medicaid/public and private/commercial insurance

Insurance type	<i>n</i>	Median cost in US dollars	95% confidence interval
Medicaid/Public	21	188.79	93.63, 247.52
Private/Commercial	23	1471.69	877.03, 2444.86