

Surgical complications associated with oncologic rotationplasty procedures

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INTRODUCTION:

Rotationplasty procedures provide a durable option for lower extremity reconstruction following sarcoma resection, allowing for continued limb growth without the burden of multiple revisions associated with endoprosthetic limb salvage in skeletally immature patients. Despite attractive function and durability, rotationplasty invites its own array of complications. In order to appropriately counsel prospective patients and their families, we intend to determine the most common complications of this procedure and describe them further.

METHODS:

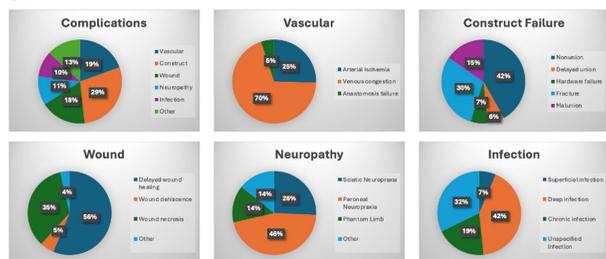
We performed a literature review through the PubMed database for rotationplasty procedures for oncologic resection in skeletally immature patients, which yielded 293 articles. Following a series of exclusions of publications with inappropriate surgical indications, insufficient surgical technique descriptions, and inadequate clinical follow up data, 27 articles were ultimately included in the final cohort. Chi-square testing was performed for data analysis where appropriate.

RESULTS:

There were 767 patients and 312 reported complications in the final 27 articles. Of the total cohort, 64% of patients were men and 36% were women. However, we found 52% of complications occurred in men and 48% occurred in women (P value <0.01). The most common complications involved osseus construct (28.8%), vascular (19.6%), and wound related (17.6%). Other less commonly reported complications were neuropathy (11.2%) and infection (9.9%). Thirteen percent of patients had a complication that did not fall into any of the aforementioned categories. Of the patients with construct related complications, 67.9% occurred within one year of surgery. Seventy percent required surgical correction. Nonunion and fracture were the most frequently reported construct related complications at 41.7% and 29.7%, respectively. For vascular complications, 94% occurred in the peri-operative period (defined as within 14 days of surgery), with 77% occurring in the first 24 hours following surgery. All patients with vascular complications required surgical intervention. Venous congestion was the cause in 69.5% of patients. Vascular complications were significantly more likely to occur in patients with vascular anastomosis compared to the vascular coil (80.0% vs 20.0%, p value <0.01). In patients who sustained wound related complications, 97% occurred within one year of surgery, but only 38.1% of these patients required an additional procedure. The two most common wound complications were delayed wound healing at 56.4% and wound necrosis at 34.5%. Details of surgical complications were not adequately reported in many series, limiting statistical evaluation.

DISCUSSION AND CONCLUSION:

This is the first rotationplasty review to provide a detailed assessment of surgical complications. Sixty-six percent of complications involved osseus construct, vascular, or wound problems. Seventy percent of patients with osseus constructed related complications and 100% of patients with vascular complications required repeat surgical intervention. The details of each complication, such as timing, age, and gender, were not uniformly reported in the studies used in our final cohort. A prospective review of multi-institutional perioperative data would allow for a more comprehensive summary



these

procedures.

Variables	Total	Vascular	Construct	Wound	Neuropathy	Infection	Other
Number of Studies	27	21	18	16	10	14	10
Number of Patients	767	57	86	58	32	31	20
Avg Age (years)	15.04	13.88	15.17	13.74	9.47	17.38	17.75
Gender (%)							
Male	326 (64.1)	10 (52.6)	16 (51.6)	7 (53.8)	3 (50)	3 (75)	1 (25)
Female	183 (35.9)	9 (47.4)	15 (48.4)	6 (46.2)	3 (50)	1 (25)	3 (75)
Tumor Type (%)							
Osteosarcoma	543 (79.5)	15 (55.6)	24 (68.6)	9 (81.8)	5 (83.3)	7 (87.5)	3 (75)
Ewings	63 (9.2)	3 (11.1)	4 (11.4)	1 (9.1)	0	0	1 (25)
UPS	25 (3.7)	0	2 (5.7)	0	0	0	0
Other	42 (6.1)	1 (3.7)	4 (11.4)	1 (9.1)	1 (16.7)	0	0
Nonmalignancy	10 (1.6)	8 (29.6)	1 (2.9)	0	0	1 (12.5)	0
Location (%)							
DF	436 (79.3)	8 (10.5)	23 (71.9)	7 (70)	4 (66.7)	2 (100)	2 (100)
PT	61 (11.1)	3 (18.75)	2 (6.3)	1 (10)	0	0	0
PF	23 (4.2)	4 (25.0)	3 (9.4)	2 (20)	0	0	0
EF	8 (1.5)	1 (6.25)	3 (9.4)	0	1 (16.6)	0	0
Other	22 (4.0)	0	1 (3.1)	0	1 (16.6)	0	0
Vascular Management (%)							
Loop	167 (35.1)	5 (19.2)	5 (33.3)	5 (35.7)	3 (100)	3 (37.5)	0
Anastomosis	309 (64.9)	21 (80.8)	10 (66.7)	9 (64.3)	0	5 (62.5)	1 (100)
Osteosynthesis (%)							
Plate	268 (91.8)	20 (87.0)	26 (96.3)	21 (87.5)	5 (100)	10 (90.9)	2 (66.7)
Nail	10 (3.4)	1 (4.3)	1 (2.6)	2 (8.3)	0	0	0
Other	14 (4.8)	2 (8.7)	2 (5.1)	1 (4.2)	0	1 (9.1)	1 (33.3)