Investigating Clinical Trial Patterns in Orthopaedic Oncology: An In-Depth Analysis

Affiliations

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Introduction: In the United States, the annual incidence of primary orthopaedic cancers is approximately 3,920 new cases with a five-year overall survival rate of 67.9%[1]. However, persistent challenges of trial discontinuation and nonpublication hinder progress[2–4]. In response, this study aims to provide a systematic, quantitative assessment of the prevalence of trial discontinuation and nonpublication within the orthopaedic oncology domain. Additionally, it seeks to discern the underlying factors influencing these outcomes.

Methods: Employing a robust cross-sectional approach, this study analyzes data obtained from ClinicalTrials.gov, focusing on phase 3 and 4 clinical trials within the realm of orthopaedic oncology. This comprehensive analysis encompasses an examination of critical parameters, including trial completion, the spectrum of intervention modalities, diverse funding sources, and the current publication status of these trials. Furthermore, logistic regression models are employed to scrutinize the intricate associations between these variables and the intrinsic likelihood of trial discontinuation or nonpublication.

Results: Within the cohort of 130 trials investigated, a notable 19.2% were discontinued prematurely. These discontinuation trends were further illuminated through a granular analysis of the diverse intervention types, with pharmaceutical interventions boasting significantly higher completion rates (83.8%) compared to their non-pharmaceutical counterparts (8.0%). Stepping into the realm of publication, the overall rate stands at an encouraging 85.4%, and once again, pharmaceutical interventions exhibit a remarkable publication rate (83.9%). The intricate landscape of funding sources and enrollment figures yielded intriguing insights. These factors exhibited limited impact on the probabilities of trial discontinuation or nonpublication. Remarkably, larger-scale trials emerged as a protective factor against both discontinuation (AOR: 0.85, 95% CI: 0.4–0.95), and nonpublication (AOR: 0.19, 95% CI: 0.57–1.93).

Discussion: The findings of this study cast a spotlight on a compelling issue within orthopaedic oncology – the challenge of trial discontinuation and nonpublication. These trends manifest significant implications for both specialist practitioners and non-specialist stakeholders, underscoring the need for a collective, comprehensive approach. With a specific focus on non-pharmaceutical interventions and trials with limited enrollment, this study drives home the significance of targeted strategies to overcome challenges. The implications of funding and enrollment, though limited, emphasize the nuanced interplay between these factors.

Significance/Clinical Relevance: This study's significance resonates with the interdisciplinary nature of oncology. It offers critical insights into the formidable challenges posed by trial discontinuation and nonpublication within the realm of orthopaedic oncology. The identified trends open avenues for strategizing and optimizing trial outcomes, resource allocation, and patient care. This interdisciplinary

approach caters to a diverse audience, from specialized clinicians to broader financial stakeholders, aligning with the multifaceted nature of clinical advancement.

Table 1: Characteristics of completed versus discontinued trials and published versus unpublished trials (n = 130)

Rates of discontinuation and non-publication of Orthopaedic Oncology Clinical Trials

Characteristic	Total	Trial status			Publication status		
		Discontinued (25)	Completed (105)	$\chi 2$, P	Published (112)	Unpublished (18)	$\chi 2$, P
Intervention							
Pharmaceutical	111 (85.4%)	23 (92.0%)	88 (83.8%)	**Pearson χ2 = 5.98, P < .001**	103 (91.96%)	8 (44%)	Pearson χ2 = .99, P = .008
Behavioral/dietary	7 (5.4%)	0 (0%)	7 (5.38%)		3 (2.68%)	4 (22%)	
Device	2 (1.5%)	1 (4.0%)	1 (1.0%)		0 (0%)	2 (11.1%)	
Procedure	10 (7.7%)	1 (4.0%)	9 (8.6%)		6 (5.35%)	4 (22%)	
Funding							
NIH	50 (38.5%)	10 (40.0%)	40 (38.5%)	Pearson χ2 = .8286, P = .17	46 (41.1%)	4 (19.05%)	Pearson χ2 = 0.3318, P = .67
Industry	72 (55.4%)	13 (52.0%)	59 (56.19%)		64 (54.46%)	8 (52.38%)	
Mixed	2 (1.5%)	0 (0%)	2 (1.9%)		0 (0%)	2 (9.52%)	
Other	6 (4.6%)	2 (8.0%)	4 (3.8%)		2 (1.8%)	4 (19.05%)	
Published							
No	18 (13.8%)	4 (16%)	14 (13.3%)	**Pearson χ2 = 23.64, P < .001**	0 (0%)	18 (100%)	--
Yes	112 (86.2%)	21 (84%)	91 (86.7%)		112 (100%)	0 (0%)	
Completed							
No	25 (19.2%)	25 (100%)	0 (0%)	--	19 (16.96%)	6 (33.3%)	**Pearson χ2 = 9.05 P < .001**
Yes	105 (80.8%)	0 (0%)	105 (100%)		93 (83.03%)	12 (66.7%)	
Enrollment: Median: 261 (IQR: 72–615)							
< 261	59 (45.4%)	17 (68.0%)	42 (40.0%)	**Pearson χ2 = 8.72, P < .001**	51 (45.5%)	8 (44.4%)	**Pearson χ2 = 7.69, P < .001**
≥ 261	71 (54.6%)	8 (32.0%)	63 (60.0%)		61 (54.5%)	10 (55.6%)	

Table 2: Logistic regression of trial discontinuation and nonpublication

Rates of discontinuation and non-publication of Orthopaedic Oncology Clinical Trials

Characteristic	Discontinued trials (n = 25)		Unpublished trials (n = 18)	
	No. (%)	AOR (95%CI)	No. (%)	AOR (95%CI)
Intervention				
Pharmaceutical	23 (92.0%)	1 [Ref]	8 (44%)	1 [Ref]
Behavioral/dietary	0 (0%)	--	4 (22%)	1.6 (0.64–4.18)
Device	1 (4.0%)	1.08 (0.78–2.35)	2 (11.1%)	1.03 (.65-4.57)
Procedure	1 (4.0%)	1.12 (0.63–1.26)	4 (22%)	.85 (.57-1.93)
Funding				
NIH	10 (40.0%)	1 [Ref]	4 (19.05%)	1 [Ref]
Industry	13 (52.0%)	0.45 (0.29–1.24)	8 (52.38%)	0.49 (0.36–1.94)
Mixed	0 (0%)	--	2 (9.52%)	0.62 (0.27–1.87)
Other	2 (8.0%)	0.48 (0.4–1.21)	4 (19.05%)	0.74 (0.46–2.78)
Enrollment				
< 261	17 (68.0%)	1 [Ref]	8 (44.4%)	1 [Ref]
≥ 261	8 (32.0%)	**0.85 (0.42–0.95)**	10 (55.6%)	**0.19 (0.13–0.47)**

Literature Cited

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