Outcomes of Perioperative Use of Inflammatory Anti-Interleukin and Anti-Tumor Necrosis Factor-α Biologics in Orthopaedic Surgery

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INTRODUCTION: Given the reported increased infection risk associated with biologic interleukin (IL) and tumor necrosis factor-α (TNF-α) inhibitors, the current recommendation is to hold biologics prior to elective orthopaedic procedures. This study characterized the complication rate associated with perioperative use of these agents in selected semi-elective and urgent orthopaedic surgical procedures.

METHODS: A retrospective chart review was performed at our tertiary referral center; patients underwent a total knee or hip arthroplasty or reverse total shoulder arthroplasty from 2009 to 2024. Perioperative IL and TNF-α inhibitor use, preoperative and postoperative whole blood laboratory data, comorbidities, surgical data, and complications were collected. A t-test comparing complication rates between biologic-treated and naive groups was conducted. Confounder analysis between outcome and demographic variables of interest was performed.

RESULTS SECTION: Included in this study were 150 patients (30 study, 120 control). An overall complication rate of 20% was observed, characterized primarily by reoperations due to prosthetic joint infection or prosthetic loosening, which was significantly greater than the control cohort rate of 5% (p=0.0151). No significant difference in body mass index, age, comorbidities, or time on biologic therapy was observed between groups found to have complications and those that did not. The group with complications had greater relative levels of monocytes which were associated with increased complication rates.

DISCUSSION: Biologic therapy and elevated perioperative monocyte count appear to be associated with complications for orthopaedic surgical outcomes. Future studies should include more subjects as well as multiple treatment sites.

SIGNIFICANCE/CLINICAL RELEVANCE: Patients with autoimmune diseases who are actively being treated with biologic medication may experience disease flares during the perioperative period when undergoing orthopaedic arthroplasty. Due to this risk, the benefit of discontinuation must be weighed against disease control.

IMAGES AND TABLES:

Table 1. Demographics and Descriptive Statistics of Biologic Treated and Biologic Naïve Groups

	Biologic Treated Group			Biologic Naïve Group		
	No Complications	Complications	All	No Complications	Complications	All
Total Number of Patients (%)	24 (80)	6 (20)	30 (100)	114 (95)	6 (5)	120 (100)
Male (%)	7 (23.3)	3 (10)	10 (33.3)	36 (30)	4 (3.3)	40 (33.3)
Female (%)	17 (56.6)	3 (10)	20 (66.6)	78 (65)	2 (1.6)	80 (66.6)
Mean Age (Years)	66.9	67.1	66.9	64.9	62.9	64.9
Max (Years)	85.1	87.3	87.3	86.8	75	86.8
Min (Years)	48.8	53.1	48.8	46.1	49.8	46.1
SD (Years)	8.9	13.4	9.7	9.5	8.9	9.5
Mean BMI (kg/m²)	31.3	31.3	31.2	31.9	34	32
Max (kg/m²)	43.0	46.3	46.3	48.7	40.5	48.7
Min (kg/m²)	20.0	24.1	20.0	19.4	22.4	19.4
SD (kg/m²)	6.6	8.9	6.9	7.2	7.1	7.2
Number of Patients by Biologic						
Adalimumab	11	4	15			
Etanercept	4	1	5			
Secukinumab	3		3			
Infliximab	2		2			
Golimumab	1	1	2			
Risankizumab-rzaa	2		2			
Ustekinumab		1	1			
Brodalumab	1		1			
Indication for Biologic Therapy						
Crohn Disease	1	1	1			
Ankylosing Spondylitis	1					
Rheumatoid Arthritis	12	4	16			
Psoriatic Arthritis	4		4			
Psoriasis	3		3			
Ulcerative Colitis		1	1			
Procedure Type						
Total Number of THA	8	3	11	42	2	44
Total Number of TKA	14	2	16	60	4	64
Total Number of RTSA	2	1	3	12		12
Comorbidities						
Hypertension	17	3	20	106	6	112
Diabetes	10		10	53	2	55
CKD	2		2	18		18
Other Metabolic/Endocrine	5		5	31	1	32
Complications						
Superficial Skin Infection		1	1		5	
Reoperation		5	5		1	
Sepsis					1	
Abscess					1	

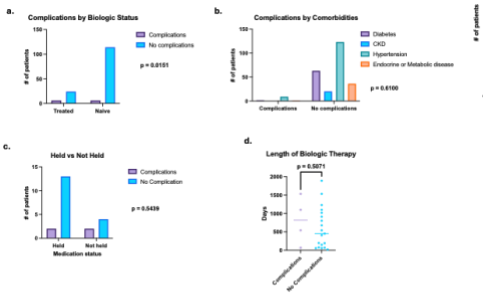

Figure 1. (a) Of the 30 biologic treated patients, 6 patients experienced complications representing a 20% complication rate, predominantly reoperation. The control group (n = 120) demonstrated a significantly lower complication rate of 5% (n = 6), predominantly superficial skin infections. (b) Outcomes were stratified by comorbidities and Fisher's exact test was used to compare groups, showing no significant difference. No significant difference in outcome was found between (c) patients who had their biologic held (held, n = 15; not held, n = 5) or (d) the length of biologic therapy prior to surgery.

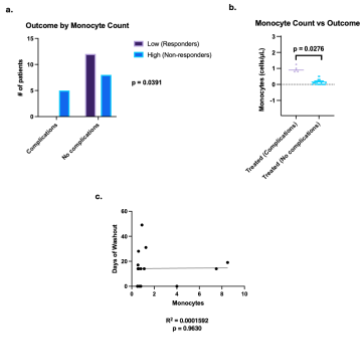

Figure 2. (a) In the biologic treated cohort, peri-operative (within 8 weeks pre-operatively and post-operatively) monocyte levels were divided into high and low levels, divided by the median value of the cohort (0.8 cells/μL). Fisher's exact test showed significantly higher complication rates in patients with high monocyte levels. (b) Within the biologic treated group, higher monocyte counts were associated with complications (p = 0.0276). (c) Simple linear regression comparing monocytes and days of washout prior to surgery did not reveal statistical significance (n = 16).