Wound Irrigation Prior To Closure During Routine Upper-Extremity Surgery: Is There a Difference in Wound Complications?

Marco Foreman[1], Arman Tabarestani, Kevin A Hao, Isabella Amador, Jonathan Andres Benjamin, Jed Casauay[2], Oluwaferanmi Toluwanimi Dada, Persis Desai[2], Aaron Hunter Jennings, Adrienne Orriols, Reed Popp, Supreeya Ann Saengchote, Keegan Michael Hones, Anton Khlopas, Morad Chughtai[2], Jongmin Kim, Thomas W Wright[2]
[1]Department of Orthopaedic Surgery & Sports Medicine, University of Florida College of Medicine, [2]UF Orthopaedics

INTRODUCTION:
Presently there is no consensus within the field of orthopedics on whether irrigation prior to wound closure in routine upper-extremity surgery reduces wound complications. Therefore, forgoing pre-closure wound irrigation could provide time and cost savings in this context. The aim of this study was to evaluate the effectiveness of wound irrigation in routine upper-extremity procedures for this purpose.
METHODS:
We conducted a retrospective review of adult patients undergoing routine upper-extremity surgery at a single institution from 2013 to 2022. Patients were included if they underwent routine soft tissue upper extremity surgery (Table 1). Patients were excluded for having concomitant lacerations, penetrating injuries, open fractures, or unknown irrigation technique. For bivariable analysis, Fisher's Exact test and Welch's t-test were used. Multivariable logistic regression was used to determine whether irrigation prior to closure was associated with a lower incidence of postoperative wound complications.
RESULTS: We included 1,425 patients. The mean age was 55.2 ± 16 years and 65% were female. The incision was irrigated prior to closure in 65% of surgeries (Table 2). Wound complications occurred in 2.9% of patients (n=41). On bivariable analysis, irrigation prior to closure was not associated with a decreased incidence of wound complications (2.9% vs. 1.8%, *P*=.070). When adjusting for age, sex, BMI, operative time, history of prior surgery, diabetes, tobacco use, corticosteroid use, and immunosuppressant use, the employment of irrigation prior to wound closure was not associated with lower odds of wound complications in either bivariable (OR: 1.99, 95% CI [0.94, 4.19], *P*=.072) or multivariable (OR: 1.88, 95% CI [0.88,4.04], *P*=.087) analysis (Table 3).
DISCUSSION AND CONCLUSION:
Use of irrigation prior to wound closure was not associated with a reduction in the incidence or odds of postoperative wound complications. Surgeons should consider forgoing irrigation prior to closure to increase operating room efficiency and provide cost savings to the patients and payers.

Table I. Surgical procedures included.

Procedure	N	Proportion (%)
Tendon sheath incision of finger or wrist	318	22.3
Open carpal tunnel release	301	21.1
Endoscopic carpal tunnel release	281	19.7
Ganglion cyst excision	163	11.4
Cubital tunnel release	134	9.4
Tendon transfer	78	5.5
Tumor/vascular malformation excision	66	4.6
CMC arthroplasty	62	4.3
Tenolysis	14	1.0
Capsulotomy or capsulectomy	8	0.6

Table II. Demographics and surgical characteristics of included patients.

Characteristic	Overall (n=1,425)	Irrigation (n=920)	No irrigation (n=505)	*P*
Age at surgery (years)	55.2 ± 16.1	55.7 ± 16.1	54.2 ± 16.2	.094
Body mass index (kg/m^2)	30.4 ± 8.1	30.2 ± 7.7	30.8 ± 8.9	.212
Female sex	64.8% (923)	65.1% (599)	64.2% (324)	.728
Previous surgery	10.4% (148)	9.8% (90)	11.5% (58)	.319
Comorbidities				
Inflammatory arthritis	19.5% (278)	17.3% (159)	23.6% (119)	**.006**
Hypertension	40.6% (579)	41.3% (380)	39.4% (199)	.791
Heart disease	11.7% (167)	11.4% (105)	12.3% (62)	.667
Diabetes mellitus	16.4% (233)	16.2% (149)	16.6% (84)	.823
Tobacco use	32.9% (469)	32.5% (299)	33.7% (170)	.680
Chronic renal failure requiring dialysis	0.8% (12)	1.0% (9)	0.6% (3)	.556
Chronic liver failure	0.3% (4)	0.3% (3)	0.2% (1)	1.000
Corticosteroid use	24.9% (355)	26.5% (244)	22.0% (111)	.063
Immunosuppressant use	4.0% (57)	4.1% (38)	3.8% (19)	.779
Operating time (minutes)	39.3 ± 38.5	40.5 ± 35.7	37.2 ± 43.2	.155
Narcotics usage (MME)	19.7 ± 20	20 ± 21.9	19 ± 15.5	.329
Wound complications	2.9% (41)	3.5% (32)	1.8% (9)	.070
Reoperations	2.5% (36)	2.8% (26)	2.0% (10)	.381

Data are presented as mean ± standard deviation or % (N).
Bold values indicate statistical significance.

Table III. Multivariable logistic regression performed to determine whether irrigation prior to closure is associated with a reduced risk of wound complications after routine hand surgery procedures independent of covariates.

Preoperative predictor	Bivariable analysis		Multivariable analysis	
	OR [95% CI]	*P*	OR [95% CI]	*P*
Age at surgery (years)	1.0028 (0.9834,1.0224)	.782	1.0014 (0.9795,1.0238)	.901
Female sex	0.69 (0.37,1.29)	.241	0.68 (0.35,1.34)	.269
Body mass index (kg/m^2)	1.04 (1.01,1.07)	**.019**	1.04 (1,1.08)	**.048**
Operative time (minutes)	1.0059 (1.0002,1.0116)	**.042**	1.0063 (1.0002,1.0125)	.067
History of prior surgery	1.5 (0.62,3.63)	.369	1.28 (0.51,3.21)	.604
Inflammatory arthritis	0.57 (0.22,1.45)	.237	0.49 (0.18,1.33)	.133
Diabetes mellitus	1.92 (0.95,3.89)	.070	1.5 (0.7,3.21)	.309
Tobacco use	1.46 (0.78,2.75)	.240	1.4 (0.73,2.69)	.312
Corticosteroid use	2.69 (1.44,5.04)	**.002**	2.48 (1.3,4.76)	**.007**
Immunosuppressant use	0.59 (0.08,4.39)	.609	0.42 (0.06,3.21)	.343
Irrigation prior to closure	1.99 (0.94,4.19)	.072	1.88 (0.88,4.04)	.087

CI, confidence interval; OR, odds ratio.
Statistically significant comparisons are denoted in bold.