

Impact of Antibiotic Stewardship on Flexor Tenosynovitis Length of Stay

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INTRODUCTION: Pyogenic flexor tenosynovitis (PFT) is an aggressive closed-space infection of the flexor tendon sheaths. While PFT can spread hematogenously, local inoculation is more common via laceration, puncture wound, or bite injuries.¹ Pressure buildup from tendon sheath infection can disrupt neighboring barriers allowing for rapid spread of the infection to adjacent structures and systemic circulation. Complications of PFT include long-term finger stiffness and pain, bone and tendon deformity, proximal spread of the infection, tendon necrosis, and eventual need for amputation. If detected within 48 hours of the initial injury or suspected time of infection, nonsurgical intervention including the use of broad-spectrum intravenous antibiotics with close monitoring may be appropriate.¹ Operative interventions include culturing of the infected site, closed or open sheath irrigation, and debridement, as necessary. Patients are then started on broad-spectrum antibiotics until culture results return and the patient can be started on a targeted antibiotic regimen.¹ As the medical field aims towards becoming a more cost-effective system, evaluating, and implementing perioperative protocols that allow for decreased time between surgery and discharge has the potential to reduce healthcare costs and improve outcomes. Length of Stay (LOS) has been a key metric for evaluating management protocols and developing strategies to increase high value care. This study aims to identify procedural and patient-specific factors that contribute to extended LOS in patients undergoing surgical intervention for PFT.

METHODS: Using the electronic medical record, a retrospective analysis was performed on patients who received surgical treatment for PFT at an urban, academic tertiary care center between 2018 and 2023. A patient pool was generated using the diagnosis of flexor tenosynovitis in the upper extremity, which yielded 63 subjects. Patients with the diagnosis of De Quervain tenosynovitis or flexor tenosynovitis of the flexor carpi radialis were excluded. Patients who did not receive surgical treatment were excluded. Excluding these individuals yielded a final sample of 33 patients. Data on patient demographics, comorbidities, total length of stay, operative details, wound culture results, and antibiotics used, were collected. Statistical analysis was performed to determine if any of these factors were associated with extended length of stay following surgical intervention for PFT. Extended length of stay was considered as patient stays averaging greater than 120 hours. Independent samples t-test and Chi-square test were conducted to determine significant differences between the extended stay group and control groups.

RESULTS SECTION: There was a total of 33 patients in the final analysis. 18 patients fit the criteria for extended length of stay (stay>120 hours), whereas 15 patients served as the control group. **Table 1** summarizes the following results. Patient demographics showed no significant differences between age and body mass index (BMI). Patient comorbidities assessing for presence of diabetes, cardiovascular disease, hypertension, chronic kidney disease, and immunocompromised status showed no significant differences between the control and extended stay groups. There was a significant difference in total Charlson Comorbidity Index (CCI) scores between the two groups, with the extended stay group having significantly greater CCI scores ($p=0.024$). Infection severity between the two groups also did not differ significantly. Kanavel signs between the two groups trended towards significance ($p=0.083$). However, other markers of infection severity including PFT scale, intra-operative purulence, re-operations, change in antibiotics, and presence of positive bacterial cultures did not differ significantly between the two groups.

DISCUSSION: The results in **Table 1** indicate that within this analysis, the 120-hour threshold was utilized since the average length of hospital stay for PFT is 4.7-5 days¹ which correlates to approximately 112-120 hours. In this initial analysis, we see that length of stay is significantly affected by the patient's pre-injury health status, as captured by the CCI. Additional areas of interest, such as indicators of infection severity like Kanavel signs and PFT scale were not significant, yet the number of Kanavel signs does trend toward significance. Certain limitations exist in this iteration of study, namely the limited sample size. Additionally, prescribed antibiotics and time to culture were obtained yet not analyzed. In the continuation of this study, additional patients will be assessed and antibiotic and bacterial culture data will be included in the analysis.

SIGNIFICANCE/CLINICAL RELEVANCE: PFT leads to unequal distribution in hospital lengths of stay, leading to a differential gradient in patient experiences, opportunities for iatrogenic infections, and varying costs of care. Our analysis is among the first to analyze the different factors that contribute to length of stay in patients with PFT.

REFERENCES: [1] Chapman T, Ilyas AM. Pyogenic Flexor Tenosynovitis: Evaluation and Treatment Strategies. *J Hand Microsurg.* 2019;11(3):121-126.

IMAGES AND TABLES:

Patient Factors	Control ¹ (n=15)	Extended Stay ¹ (n=18)	p-value ²
Demographics			
Age	45.49	51.52	0.294
BMI	29.96	31.47	0.564
Comorbidities			
Diabetes	5	11	0.112
Cardiovascular Disease	2	1	0.439
Hypertension	10	13	0.739
Chronic Kidney Disease	3	5	0.604
Immunocompromise	2	1	0.439
Total CCI Score	1.87	3.94	0.024
Infection Severity			
Kanavel Signs	3.87	3.39	0.083
PFT Scale	1.80	1.72	0.816
Intraoperative Purulence	13	14	0.510
Re-operation Required	2	5	0.312
Change in Antibiotics	10	15	0.266
Positive Cultures	9	15	0.134

Table 1. Difference in demographic, comorbidity, and infection severity data in patients undergoing operation for PFT.

¹Mean; n

²Independent t-tests; Chi-square tests.