

Identifying the Risk Factors and Characterizing the Survival of Super Trigger Finger (STF) Patients: Defining the "Super-Triggerers"

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INTRODUCTION: Trigger finger (TF) surgery involving A1 pulley release is commonly performed for patients suffering from trigger fingers who have recurrent symptoms despite conservative treatment. Several patient characteristics such as diabetes mellitus, carpal tunnel syndrome (CTS), increasing age, and female sex have been found to be associated with the diagnosis of trigger finger as well as recurrence after release. However, less is known about the subgroup of patients particularly affected by multiple trigger fingers, including those who appear to develop additional TFs in more rapid succession than the typical population—a group we defined as super trigger finger (STF) patients. Accordingly, the objective of this multi-cohort study was to analyze survival timelines to subsequent trigger finger release (TFR) and determine risk of subsequent TFR based on number of pre-existing TFRs, as well as identify independent risk factors associated with STF. We hypothesized that the number of pre-existing TFRs is a risk factor for subsequent TFR and that historically identified TFR comorbidities such as diabetes mellitus, carpal tunnel syndrome (CTS), hypothyroidism, and Dupuytren's disease are similarly risk factors for STF. We also hypothesized that other hormonal factors (e.g., testosterone replacement therapy) would increase the likelihood of STF.

METHODS: The TriNetX Global Network (comprising 151 Healthcare Organizations and over 145 million patient records) was queried for patients 18 years and older who underwent between 2 and 10 TFRs. The instance of a TFR was identified using the Current Procedural Terminology (CPT) code 26055 and the International Classification of Diseases 10th Revision Procedure Coding System (ICD-10-PCS) codes 0LN7/0LN8. Nine cohorts were defined based on the total number of TFRs each patient underwent (e.g., Cohort 1: 2 TFRs, Cohort 2: 3 TFRs, etc.). Kaplan-Meier (KM) survival analyses were performed for each cohort to determine the 1) risk of subsequent TFR within 1 year after previous TFR, 2) median survival (in days), and 3) hazard ratios (HR) of subsequent TFR (when compared to the 2 TFR cohort). Median survival times were assessed to identify which, if any, cohorts demonstrated a precipitous decline in survival to subsequent TFR (defined as <30 days after prior TFR). These cohorts were then pooled for a comparative multivariate analysis to determine independent risk factors for this outcome. Statistical analyses were conducted within the TriNetX analytics platform. Statistical significance of both KM analyses and Cox multivariate analyses was determined using HRs with 95% confidence intervals (95% CI).

RESULTS:

24,966 patients meeting inclusion and exclusion criteria were identified, ranging from 18,800 in the 2 TFR cohort to 71 in the 8 TFR cohort. Significant differences in 1-year survival were observed beginning with and continuing from the 5 TFR cohort. Except for the 3 TFR cohort, 1-year survival probability decreased, median survival time decreased, and HRs increased with each successive TFR. The 7 - 10 TFR cohorts all demonstrated median survivals between 1 and 7 days from prior TFR, defining patients with between 6 and 9 prior TFRs as STF patients (**Table 1, Figure 1**).

Multivariate analysis of the pooled STF cohorts compared with the pooled non-STF cohorts (between 1 and 5 prior TFRs) determined a significantly higher HR of subsequent TFR (HR 6.357, 95% CI 5.949 - 6.794). Independent risk factors associated with the STF cohorts included male sex (HR 1.072, 95% CI 1.042 - 1.103), HbA1c <5.7% (HR 1.188, 95% CI 1.143 - 1.234) or >10% (HR 1.09, 95% CI 1.022 - 1.163), hypothyroidism (HR 1.053, 95% CI 1.012 - 1.094), rheumatoid arthritis (HR 1.129, 95% CI 1.042 - 1.224), Dupuytren's disease (HR 1.1, 95% CI 1.025 - 1.18), CTS (HR 1.175, 95% CI 1.143 - 1.209), tobacco use (HR 1.249, 95% CI 1.159 - 1.348), and hormonal contraceptive use (HR 1.106, 95% CI 1.018 - 1.203). Hormone replacement therapy was also associated with STF (HR 1.42, 95% CI 1.289 - 1.564), with supraphysiologic (≥ 917 ng/dL) serum testosterone levels approaching statistical significance (HR 1.262, 95% CI 0.955 - 1.668).

DISCUSSION AND CONCLUSION: This study iteratively compared the survival time of patients with 2 or more TFRs to their next TFR. We identified an inflection point in the number of prior TFRs (6 TFRs), beyond which subsequent TFRs were found to occur in significantly more rapid succession. Patients crossing this threshold were defined as STF patients, with a median survival time of 1-7 days from the prior TFR. To our knowledge, this study herein provides the first characterization of STF patients alongside specific risk factors for development of this condition, including hypothyroidism, CTS, Dupuytren's disease, tobacco use, and hormone replacement therapy. These results suggest that when counseling STF patients, there should be a lower threshold for offering TFR on additional digits, even in the presence of mild symptoms. Subsequent research is warranted to further characterize the risk factors for development of STF and the potential for alternative treatment algorithms in these patients.

Figure 1: Kaplan-Meier Survival Curves of Successive TFR Cohorts.

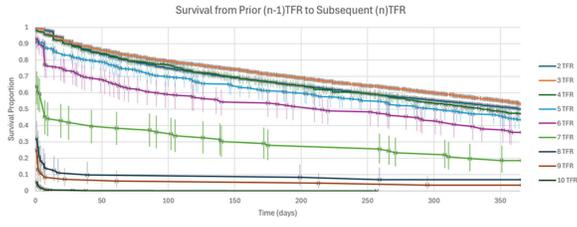


Table 1: Kaplan-Meier Survival Analyses of Successive TFR Cohorts

Cohort	Patients in Cohort	Patients with Outcome	Median Survival (days)	1 Year Survival Probability from Prior TFR	Hazard Ratio [†]	95% CI
2 TFR	18,800	9,443	364	49.77%	-	-
3 TFR	3,796	1,791	394	52.82%	0.898	(0.853, 0.944)
4 TFR	1,094	578	341	47.17%	1.056	(0.971, 1.148)
5 TFR	327	182	315	44.34%	1.176	(1.015, 1.362)
6 TFR	151	98	216	35.10%	1.615	(1.324, 1.971)
7 TFR	86	70	7	18.61%	3.526	(2.787, 4.461)
8 TFR	71	67	1	5.63%	15.298	(12.026, 19.46)
9 TFR	85	82	1	3.53%	19.335	(15.547, 24.046)
10 TFR	556	556	1	0%	130.616	(114.702, 148.737)

[†] Hazard ratios when compared to 2 TFR Survival Probability