Analyzing the Impact of Collagenase Clostridium Histolyticum on Treatment Patterns and Social Deprivation Trends in Dupuytren's Contracture

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INTRODUCTION:

Dupuytren's contracture is a progressive fibroproliferative disorder of the hand with various surgical and non-surgical treatment options. Since the introduction of Collagenase Clostridium histolyticum (CCH) injections in 2010, there have been several studies demonstrating an increase in its utilization compared to other options such as percutaneous needle aponeurotomy (PNA) and surgical fasciectomy within the subsequent 5-7 years. The purpose of this study was to investigate if CCH injections continued to predominate over PNA and surgical fasciectomy utilization, and to analyze if treatment patterns varied across surgeons according to the Social Deprivation Index (SDI) of their practice location.

METHODS:

Medicare Provider Utilization and Payment Data Public Use Files from years 2013-2021 were used to identify all claims data according to Current Procedural Terminology (CPT) codes for single cord surgical fasciectomy (26123), percutaneous needle aponeurotomy (26040) and CCH injection for Dupuytren's contracture (20527). We categorized claims data from each year into three year cohorts to compare the proportions of services for each procedure type across time. Provider zip codes were extracted from the data set and matched to standardized Zip Code Tabulation Areas (ZCTA) which were utilized to obtain the SDI, a validated county-level measure of socioeconomic status, for each provider's practice location. SDI levels ranged from 0-100, with higher levels signifying greater social deprivation measured by characteristics such as race/ethnicity, poverty, unemployment and education levels. We categorized SDI as high, medium, or low according to the upper and lower tertiles of the SDI ranges for each year. Pearson's chi-squared analysis was used to analyze proportions of each procedure across year and SDI levels and establish statistical significance at a p-value ≤ 0.05.

RESULTS:

According to Table 1, looking at overall utilization trends by year regardless of social deprivation status, single surgical fasciectomies were utilized less frequently than CCH closer to the CCH release in 2013-2015 (16% and 56% respectively) , however, utilization of fasciectomies increased in the years thereafter (22% in 2016-2018; 21% in 2019-2021). There was also a significant increase in PNA from 2013-2015 (28%) to 2016-2018 (54%), and a drop in utilization of CCH in 2016-2018 (56% in 2013-2015; 24% in 2016-2018). The utilization of CCH was similar across social deprivation status when looking at years 2013-2021 overall (38% H, 36% M, 35% L). Table 2 shows social deprivation status utilization stratified by year. Closer to the time of CCH release, there was high utilization in all three deprivation statuses (51% H, 57% M, 55% L), which all seemed to decrease with time ($p<0.0001$). Additionally, PNA increased over the years in all three deprivation statuses ($p<0.0001$).

DISCUSSION AND CONCLUSION:

Across different levels of social deprivation from 2013 to 2021, there was a notable variation in the utilization patterns of treatments for Dupuytren's contracture, particularly an increase in fasciectomy use in communities with low social deprivation. This difference in practice among surgeons likely depended on several factors, some may include the socioeconomic status of patients and the available resources within the practice's zip code area. Previous literature analyzing provider trends before 2015 speculated that CCH would surpass surgical fasciectomy in utilization (Thayer et al., 2018). This hypothesis was based on the less invasive nature of CCH injections, which were expected to become more popular. However, our data showed a decline in CCH utilization after 2015, irrespective of deprivation status. In conclusion, similar to previous studies, we observed an initial trend toward increasing use of CCH injections for managing Dupuytren's disease before 2015, driven by an increase in the number of providers offering the injections and a decrease in the number of needle aponeurotomies performed. However, the popularity of CCH declined in subsequent years (2016-2021), possibly due to various factors such as side effects, cost, or the narrative outcomes reported by surgeons performing these procedures, or initial excitement surrounding the drug subsided.

Table 1: Dupuytren's treatment across social deprivation indices and overall treatment pattern

Characteristic	CCH n=21981	Fasciectomy n=11,520	PNA n= 25,836	p-value
Social deprivation index: treatments over 2013-2021				<0.0001
High	6,854/18,075 (38%)	2,267/18,075 (13%)	8,954/18,075 (50%)	
Medium	6,956/19,415 (36%)	4,246/19,415 (22%)	8,213/19,415 (42%)	
Low	7,142/20,494 (35%)	4,808/20,494 (23%)	8,544/20,494 (42%)	
Years: overall treatments				
2013-2015	12,842/22,954 (56%)	3,787/22,954 (16%)	6,325/22,954 (28%)	<0.0001
2016-2018	4,251/17,584 (24%)	3,784/17,584 (22%)	9,549/17,584 (54%)	
2019-2021	4,888/18,799 (26%)	3,949/18,799 (21%)	9,962/18,799 (53%)	

Table 2: Dupuytren's treatment utilization stratified by social deprivation indices and years

Characteristic	CCH *n*=12,642	Fasciectomy *n*=3,787	PNA *n*=6,325	p-value
Social deprivation index				<0.0001
2013-2015				
High	3,267 (51%)	724 (11%)	2,394 (37%)	
Medium	3,901 (57%)	1,221 (18%)	1,750 (25%)	
Low	4,645 (55%)	1,643 (19%)	2,150 (25%)	
2016-2018				<0.0001
High	1,658 (30%)	709 (13%)	3,125 (57%	
Medium	1,531 (25%)	1,476 (24%)	3,111 (51%)	
Low	1,062 (18%)	1,599 (27%)	3,232 (55%)	
2019-2021				<0.0001
High	1929 (31%)	834 (13%)	3,435 (55%)	
Medium	1,524 (24%)	1,549 (24%)	3,352 (52%)	
Low	1,435 (23%)	1,566 (25%)	3,162 (51%)	