

Changes in Provider Treatment Patterns for Dupuytren's Contracture: Analysis of Trends in Medicare Beneficiaries

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Background: Collagenase Clostridium histolyticum (CCH) injection has been shown to be a safe and effective treatment option for Dupuytren's contracture. We hypothesize that the gaining popularity of CCH has resulted in a change in treatment patterns among providers, with increased utilization of CCH injections in the management of Dupuytren's contracture from 2012 to 2014.

Methods: The Medicare Provider Utilization and Payment Data Public Use Files were used to identify all surgeons who submitted claims for surgical fasciectomy, needle aponeurotomy (NA), and CCH injection. The data were analyzed for number of providers performing the procedures, number of procedures per provider, and location of practice.

Results: From 2012 to 2014, the number of providers performing more than 10 open fasciectomies decreased from 141 to 131. In the same time, the number of providers performing more than 10 NAs increased from 63 to 70 with mean procedures per provider decreasing from 35 to 21. In contrast, the number of providers performing more than 10 CCH injections increased from 72 to 112, with mean injections per provider going from 24 to 20. The total number of injections performed increased from 1,734 to 2,220 from 2012 to 2014. The largest increase in number of injections and number of providers performing injections occurred in the South.

Conclusions: The introduction of collagenase has changed treatment patterns with more providers treating Dupuytren's contractures with CCH injections and a statistically significant decline in the number of NA procedures per provider. (*Plast Reconstr Surg Glob Open* 2018;6:e1932; doi: 10.1097/GOX.0000000000001932; Published online 3 October 2018.)

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This study did not require approval from the University of Washington Institutional Review Board, as the research utilized a de-identified data set and does not meet the federal regulatory definition of human subjects research.

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INTRODUCTION

Dupuytren's disease is a fibroproliferative disorder of the hand. Thickening of the palmar fascia results in rope-like cords, which can progress to debilitating contractures of the hand. This is estimated to affect approximately 1% of the United States population.¹ Treatments for Dupuytren's disease are aimed at releasing contractures of the hand by removing or breaking up the cords in the palmar fascia. Current treatment options include open fasciectomy, percutaneous needle aponeurotomy (NA), and collagenase clostridium histolyticum (CCH) injection. In February 2010, CCH was approved for clinical use in Dupuytren's disease by the United States Federal Drug Administration (FDA).² Since then, several studies have demonstrated CCH injections to be a safe and effective nonsurgical option in the treatment of Dupuytren's contracture.³⁻⁸

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We hypothesize that the relatively noninvasive nature of CCH injections has resulted in greater popularity of CCH and ultimately increased utilization in the treatment of Dupuytren's contracture between 2012 and 2014.

METHODS

Patient data were obtained from the Medicare Provider Utilization and Payment Data Public Use Files for calendar years 2012 and 2014. This database has previously been used to investigate treatment trends in orthopedic surgery.⁹ The database includes claims submitted to Traditional Medicare for providers who submitted more than 10 claims to Medicare for the procedure within a calendar year. Providers submitting less than 10 claims per procedure were excluded from this database due to privacy concerns. The database was searched to identify all surgeons who submitted claims for surgical fasciectomy (CPT 26123), NA (CPT 26040), and CCH injection (CPT 20527) for treatment of Dupuytren's contracture.

The data were analyzed for number of providers performing each of the procedures, number of each procedure per provider, and location of practice. CCH injection patterns were then also analyzed by provider's practice

location region based on divisions of the United States Census Bureau (West, Midwest, South, and North East).¹⁰ The number of procedures per provider in each category and year were compared using a 2-tailed nonparametric Wilcoxon rank sum test. Statistical significance was established at $P \leq 0.05$.

RESULTS

In 2012, a total of 141 providers performed more than 10 open fasciectomies, with a mean of 16 procedures per provider (range, 11–36). In the same year, 63 providers performed more than 10 needle aponeurotomies (NAs) with a mean of 35 procedures each (range, 11–237), whereas 72 providers performed more than 10 CCH injections, with a mean of 24 injections each (range, 11–147).

In 2014, 131 providers performed more than 10 open fasciectomies with a mean of 15 procedures per provider (range, 11–39). In the same year, 70 providers performed more than 10 NA's with a mean of 21 procedures each (range, 11–72), whereas 112 providers performed more than 10 CCH injections, with a mean of 19.8 injections each (range, 11–101) as shown in Figure 1.

Trends in Provider Practices for Dupuytren's Contractures Between 2012 and 2014

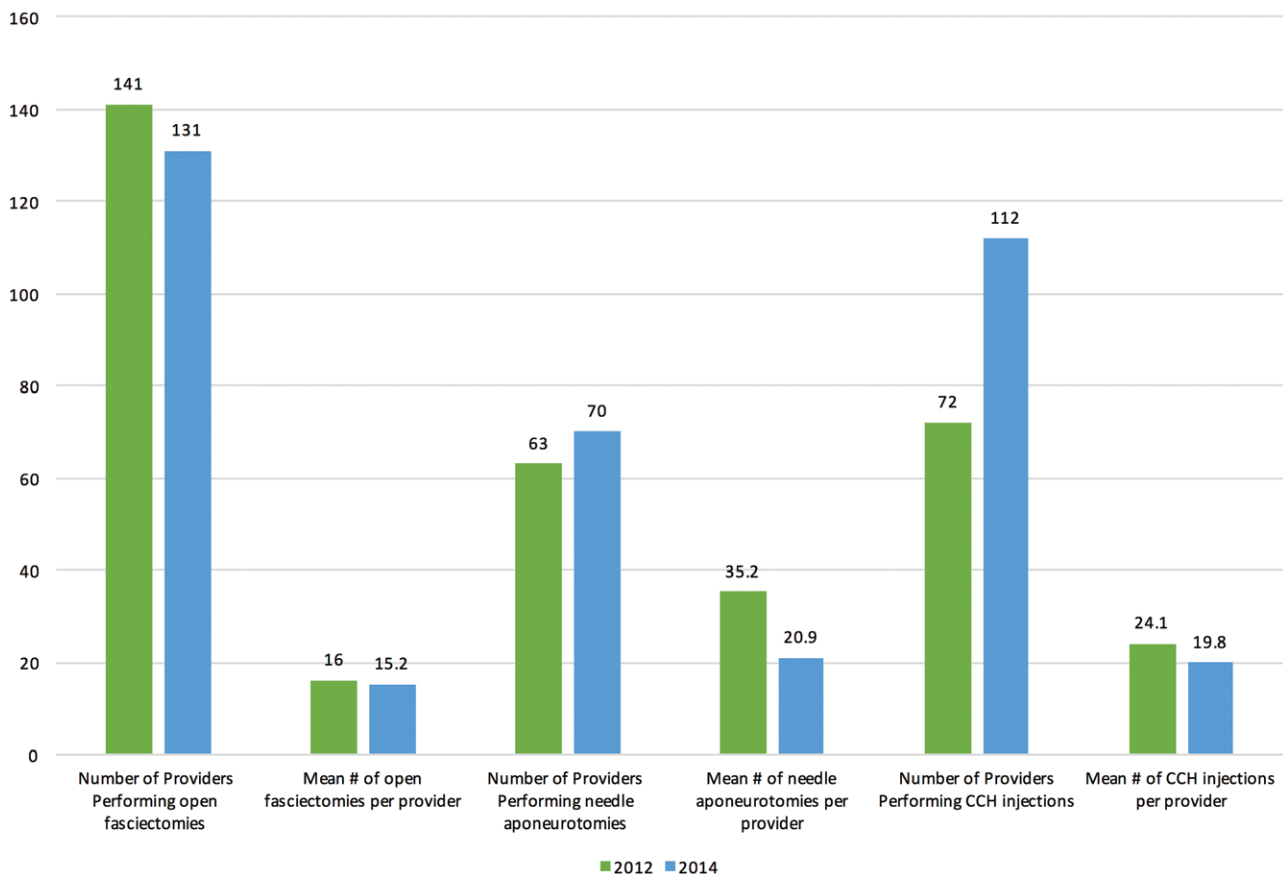


Fig. 1. Comparison of number of providers and mean number of procedures in each treatment category for Dupuytren's Contractures between 2012 and 2014.

Comparing the 2014 data to the 2012 data, the volume of open fasciectomy per provider ($P=0.4792$) and CCH injections per provider ($P=0.1909$) were not statistically significantly different. However, the number of NA procedure claims per provider showed a statistically significant decline ($P=0.001$) from 2012 to 2014.

The mean number of injections per patient for providers performing more than 10 injections per year remained steady at 1.4 injections per patient in 2012 to 1.2 injections per patient in 2014 despite a large increase in the total number of injections (1,734–2,220) and number of patients receiving the injections (1,272–1,830). Comparing 2012 and 2014, the number of health care providers performing more than 20 NAs decreased from 34 to 20, and those performing more than 50 NAs decreased from 9 to 4. There was very little difference in the number of surgeons who continue to perform surgical fasciectomy or the mean number of fasciectomy procedures performed per provider.

We noted regional trend differences in number of CCH injections performed. In the Northeast, the number of injections by physicians performing more than 10 injections decreased from 357 to 204. In contrast, in the

South, the number of injections increased from 755 to 1,276. Smaller differences were noted in the West with a slight decrease in injections from 452 to 442, and the Midwest with a modest increase from 170 to 198 as shown in Figure 2.

In the West, the number of injections per provider decreased from 32 to 20, with a corresponding increase in number of providers performing per injection from 14 to 22. In the South, where the number of total injections increased the most among the high-volume injectors, the mean number of injections per provider increased slightly from 20 to 23, while the number of providers performing more than 10 injections doubled from 32 to 62. In the Northeast and in the Midwest, the trend changes in number of providers performing more than 10 injections and the number of injections per provider were more modest as shown in Figures 3, 4.

DISCUSSION

Dupuytren’s disease is a fibroproliferative condition that can lead to disabling contractures of the palmar hand. Since its FDA approval in 2010, CCH has become a widely

Total Number of Injections by Region from 2012 to 2014

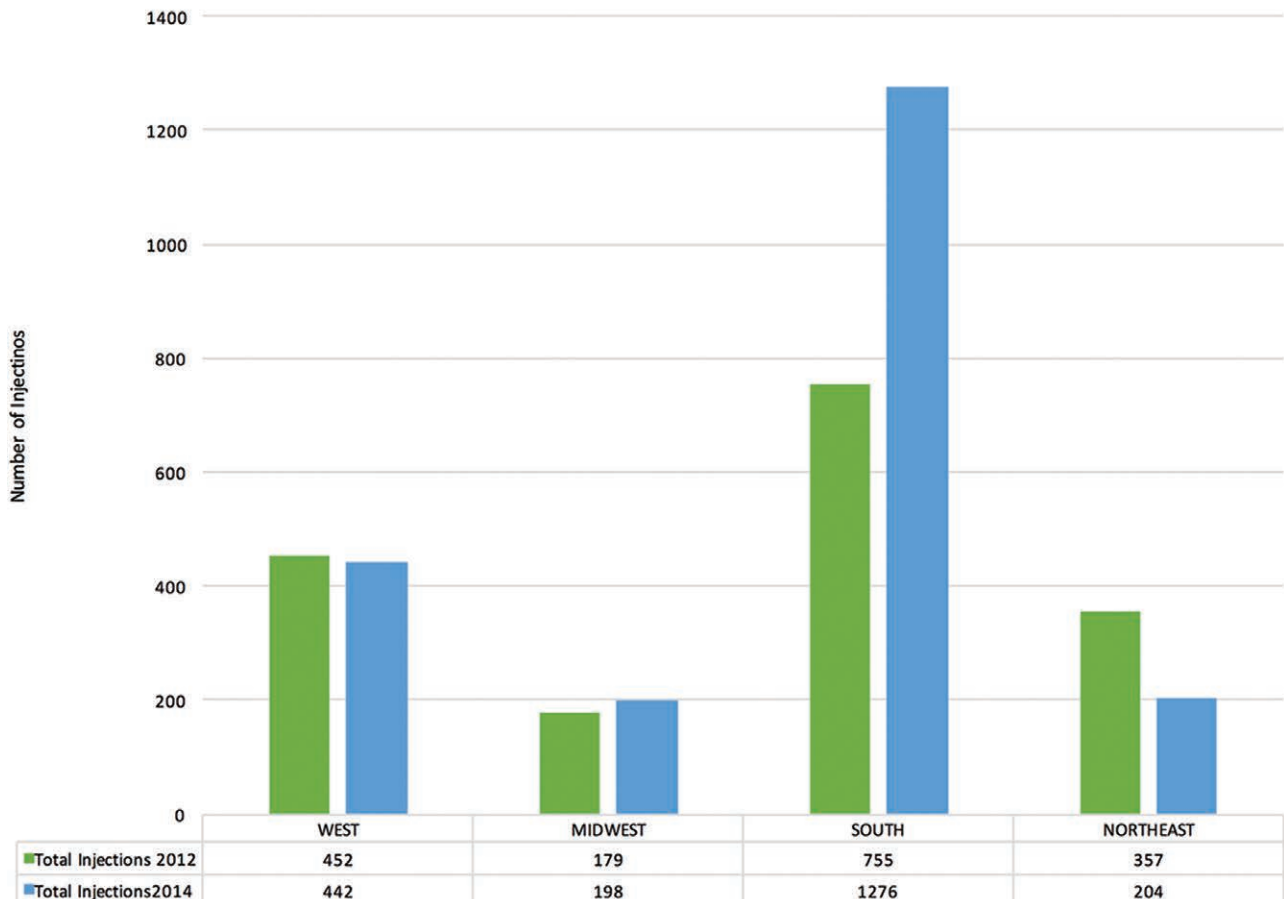


Fig. 2. Changes in total number of CCH injections by region by providers performing more than 10 injections per year.

Number of Providers Performing >10 CCH Injections by Region from 2012 - 2014

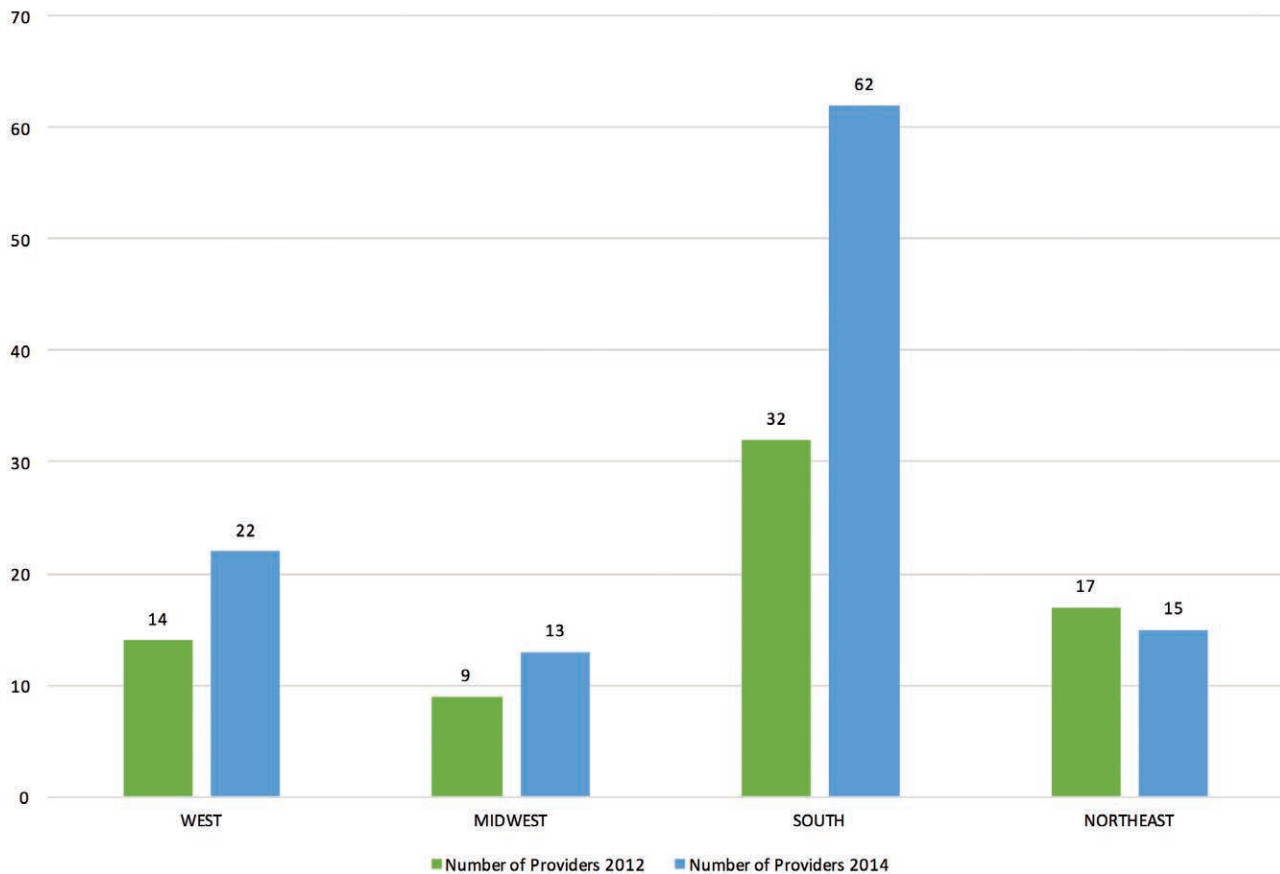


Fig. 3. Number of providers performing more than 10 CCH injections per year divided by region.

accepted safe and effective nonoperative treatment option for this debilitating disease. The injections have been compared with surgical fasciectomy, the historical gold standard of care, in terms of cost and have been found to cost less and require fewer outpatient and therapy visits for the patient,¹¹ which may account for surgeons' and patients' preferences toward this treatment. We hypothesized that over time, as the collagenase injection became more widely accepted, practitioners have changed their individual trends for treatment of Dupuytren's contracture.

We found that in the Medicare population, from 2012 to 2014, there was a large increase in the total number of injections performed and number of patients receiving the injections when evaluating providers performing more than 10 injections per year. In addition, we found that the number of providers performing more than 10 CCH injections increased while the mean injections per provider decreased. Interestingly, there were only small changes in the number of surgeons performing more than 10 fasciectomies per year and the number of fasciectomies performed per surgeon. The biggest decrease was seen in the number of needle aponeurotomies performed

by surgeons. Overall, this would point toward a trend of increasing number of providers being trained and becoming comfortable in performing collagenase injections as an effective, alternative treatment option for Dupuytren's contracture. Although the overall number of CCH injections increased, each provider is performing fewer injections, indicating that the increased total number of injections seen is coming from additional providers rather than additional patients per provider.

It is important to understand the treatment options available when interpreting the changes in provider practices that we have noted. Treatment options include open surgical fasciectomy, percutaneous NA, and now CCH injections. Each of these strategies comes with its own set of benefits and risks. Although the most invasive option, surgical fasciectomy has been the historic mainstay of treatment, especially for severe contractures.¹² NA is a less invasive option with acceptable outcomes. Studies note higher recurrence rates of contractures with NA than surgical fasciectomy; however, this was often found to be acceptable due to the lower risk profile of the treatment.¹³ CCH injections have also been found to have a low risk of complications but approximately 47% recurrence rates.⁷

Average Number of Injections per Provider by Region from 2012 - 2014

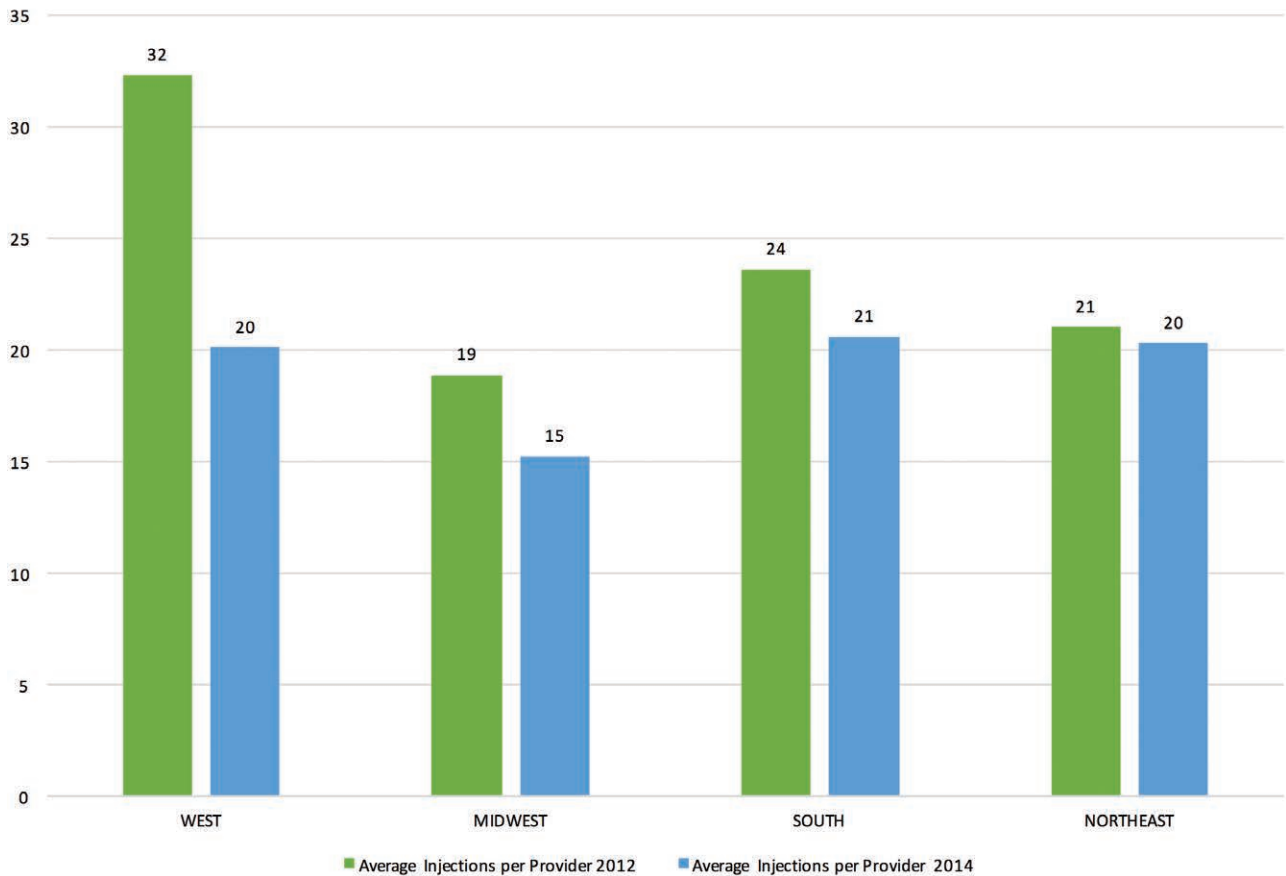


Fig. 4. Average number of injections per provider by region for those performing more than 10 injections per year from 2012 to 2014.

One must weigh the risks of recurrence in these lower risk procedures against the surgical risk and complications associated with open fasciectomy and longer postoperative recovery when choosing the right procedure for the patient.

In a recent article by Lipman et al.,¹⁴ trends in Dupuytren's treatment in the United States between 2007 and 2014 were evaluated using the PearlDriver Patient Records Database. They found an increasing percentage of treatment consisted of CCH injection (from 0% before FDA approval to 11% by end of study period). In the same time period, they noticed decreasing percentage of fasciotomies and fasciectomy. Interestingly, they found no change in the percentage of percutaneous needle aponeurotomies performed over the same time period. Overall, this was felt to represent a generalized trend away from open invasive procedures and toward less invasive management strategies. Their study did not comment on trends of individual practitioners.

Zhao et al.¹⁵ also evaluated trends in treatment of Dupuytren's after the FDA approval of CCH. They used the Intercontinental Marketing Services Health Office-Based Medical Claims Database and found a decreasing trend

of surgical management of Dupuytren's with an increased incidence of CCH injections from 2010 to 2013.¹⁵ Like the results of Lipman et al.,¹⁴ Zhao noted that despite the changes in injections and surgical procedures being performed, there was no significant change in the amount of NA's being performed. They also noticed an increase in surgical fasciectomy in the winter, but no seasonal variability in CCH or NA. Another interesting observation made in both Zhao and Lipman's work is an increased number of encounters per year for Dupuytren's.^{14,15} Zhou especially noted that the rate at which these encounters increased was higher after the approval of CCH than before approval. This suggests that many patients who were previously reluctant to undergo surgical fasciectomy for their Dupuytren's contracture were willing to undergo a less invasive, nonoperative treatment option.

Similar to Zhao and Lipman, we sought to evaluate trends in treatment of Dupuytren's disease in the United States as impacted by the approval of CCH. We also found an increasing number of CCH injections being performed. However, while both studies found a decrease in the number of surgical fasciectomy but no change in number of needle aponeurotomies, our current study

demonstrated similar incidence of open fasciectomy when comparing 2012 and 2014 but less needle aponeurotomies as the number of CCH injections increased. Our data were unique in the fact that we evaluated trends of specific providers rather than just the population as a whole. This allowed us to view changes in the mean number of each of the procedures performed per provider and number of providers performing greater than 10 procedures each year. We also found regional differences in treatment trends. In the South, there was a substantial increase in total number of injections as well as number of providers performing CCH injections. In contrast, in the West, the total number of CCH injections remained steady with more providers performing the injections, but each performing fewer injections.

As we compare trend differences in number of surgical fasciectomy, needle aponeurotomies, and CCH injections, one interesting finding was that the number of providers performing more than 10 needle aponeurotomies was steady, but the mean number of needle aponeurotomies per provider decreased significantly from 35 to 21. This would suggest that providers who perform needle aponeurotomies continue to offer this procedure. However, many of the patients who previously would have undergone needle aponeurotomies ended up having CCH injections for their Dupuytren's disease instead, either with the same or a different provider.

Major limitations in our study are directly related to the nature of the database. Information stored in the database relies on accurate coding of diagnoses and procedures by individuals. This introduces the possibility of error, as we are not able to verify the diagnosis nor the procedure in the patient's record ourselves. Additionally, the Medicare Provider Utilization and Payment Data Public Use Files only include practitioners performing more than 10 procedures in a calendar year. This does not allow us to capture data on providers performing fewer than 10 procedures per year. It is possible that as the new treatment was introduced, more providers were performing smaller numbers of injections as they became comfortable with the treatment method. Therefore, the total number of CCH injections, needle aponeurotomies, and surgical fasciectomy are all likely underestimations.

Strengths of this study include the evaluation of individual practitioner trends and geographical variation, which, to our knowledge, have not yet been reported. This allowed us to not just identify trends in total number of each procedure, but also to assess the changing treatment algorithm for physicians treating Dupuytren's contracture. Previous studies focused on total numbers of each procedure and changes over time. They were not able to analyze for number of providers performing the procedures or any changes in the mean number of procedures per physician.

In conclusion, similar to previous studies, we found a trend toward increasing use of CCH injections in the management of Dupuytren's disease, which was largely

accounted for by an increased number of providers performing the injections and a decrease in the number of needle aponeurotomies performed. Additionally, we found regional differences in treatment, with the largest increase in the Southern region of the United States.

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