Operative trends and physician treatment costs associated with Dupuytren’s disease in Canada

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PURPOSE: To examine treatment trends and costs associated with Dupuytren’s disease (DD) in Canada.

METHODS: Data regarding fasciectomies, fasciotomies and digit amputations performed for DD from 2005 to 2010 were extracted from the Canadian Institute for Health Information database. The data were analyzed according to year, sex and five-year age groups. The estimated annual physician reimbursement costs for DD in Ontario were calculated using Ontario Health Insurance Plan billing information and the 2010 Physician Schedule of Benefits.

RESULTS: The number and rate of fasciectomies remained stable from 2005 to 2009 (mean of 4067 and 1.24 per 10,000, respectively), but increased in the 2009/2010 fiscal year (to 4458 and 1.32 per 10,000). The number of fasciotomies increased from 133 in 2005/2006 to 201 in 2008/2009, but dropped to 183 in 2009/2010. The mean number of amputations remained stable (12 procedures). The ratio of males to females undergoing fasciectomies remained stable (4:1). The highest rate of fasciotomies was performed for the age groups 65 to 69 years and 70 to 74 years. Estimated mean physician remuneration for DD in Ontario remained stable ($3.2 million per annum).

DISCUSSION: The results regarding patient demographics are comparable with results from previous literature. There was a trend toward an increasing number of fasciotomies and fasciectomies annually, with fasciotomies increasing faster than fasciectomies, which is reflective of the aging population and the recent attention to fasciotomies in the literature. The present study was the first to investigate treatment trends and physician reimbursement costs for the management of DD in Canada.

Key Words: Canada; Dupuytren’s disease; Fasciectomy; Fasciotomy; Physician remuneration; Treatment trends

Dupuytren’s disease (DD) is a fibroproliferative disease of the palmar fascia that, through the formation of palmar nodules and fibrous cords, can lead to disabling flexion contractures of the fingers (1,2). DD has been reported to have a global prevalence of 3% (3,4), with the highest prevalence in Northern Europe (3,6). Prevalence increases with age, and males are more commonly affected than females (7,8). Up to 40% of men ≥70 years of age in parts of northern Europe are affected by DD (7,9). Currently, the gold standard of treatment for DD is surgical or open fasciectomy, although closed fasciectomy (also known as percutaneous needle fasciectomy or needle aponeurotomy), and collagenase enzymatic digestion of disease cords are being advocated as nonsurgical alternatives (10,11). Because of the high cost differential in these treatment methods, we were interested in documenting the treatment trends and health care expenditures associated with DD in Canada.

The current study provides an analysis of both inpatient and day-surgery treatment for DD, and includes a description of treatment trends. Unlike other countries, such as France and England, Canada does not have a system of assigning health care expenditures to a specific diagnosis-related group. Instead, it has a system of global funding that roughly assigns funding based on population. Attempts to estimate the costs of treatment for a specific disease in Canada are, therefore, significantly more difficult. We were, however, able to estimate the physician reimbursement costs in Ontario for the management of DD.

METHODS
The data analyzed in the present study were extracted from three sources: the Canadian Institute for Health Information (CIHI); Statistics Canada; and the Ontario Medical Association (OMA). CIHI is a not-for-profit corporation established in 1994 and funded by federal, provincial and territorial governments (12). Presently, it maintains 27 pan-Canada health-related databases. For the purpose of the present study, day surgery and inpatient data were extracted from three CIHI databases: the National Ambulatory Care Reporting System; the Discharge Abstract Database; and the Hospital Morbidity Database. Quebec and Alberta day surgery data were not available because Quebec does not submit day surgery data to CIHI and Alberta did not start submitting day surgery data until April 2010.
Data extraction was limited to 2005 and beyond to avoid inconsistencies in data classification because the transition of data classification systems to the current International Classification of Diseases, 10th Revision (ICD)-10-CA/Canadian Classification of Health Interventions (CCI) was not completed until 2005.

In consultation with multiple CIHI analysts, data extraction was refined to only include encounters with the DD diagnosis codes, which were then subdivided according to procedure type (fasciectomy, fasciomy and digit amputation), sex and five-year age groups (from 45 to 85 years of age). The diagnosis codes used include M72.0 (palmar fascia fibromatosis [Dupuytren]), and M73.8 (DD associated with diabetes mellitus) from the ICD-10-CA. The procedure codes are based on the CCI and include 1.UY.72.W (fasciectomy), 1.UY.72.WK (fasciomy) and I.U.93.Â³ (amputation, phalanx of hand).

The data extraction was independently programmed by two CIHI analysts and these data sets were compared before the final data were released in spreadsheet (Excel, Microsoft Corporation, USA) format.

OMA

As mentioned above, the nature of the global funding formula for health care in Canada makes it exceedingly difficult to estimate hospitall costs for the treatment of DD; therefore, physician reimbursement costs were investigated instead. Because physician reimbursement mechanisms are different for each province, the analysis was limited to Ontario. It was believed that Ontario could provide an appropriate representation of trends in physician reimbursement costs because Ontario accounts for a significant proportion of the Canadian population. In the 2011 census of Canada, Ontario accounted for 36.3% of the population of the country, while in the 2006 census, it accounted for 40.7% of the total population (13).

Physician reimbursement costs for Ontario for 2005 to 2010 were calculated based on Ontario Health Insurance Plan (OHIP) physician billings associated with diagnosis code 728 for DD, obtained through the OMA Economics Department. Billings made by all physicians involved in the management of DD patients were included because the diagnosis of DD is often made in the primary care setting and managed conservatively without referral to a surgeon. The 2010 Ontario Ministry of Health and Long-Term Care Physician Schedule of Benefits (SOB) was used to apply the appropriate costs to the OHIP billing codes that were extracted. Because of fee schedule revisions, some codes used in earlier years were missing from the 2010 SOB. An Internet search revealed archived OHIP bulletins regarding changes to the SOB for some of the missing codes. The remuneration for other older billing codes could not be found and were excluded from further data analysis. Premium add-on codes that could be applied to multiple situations were also excluded from the analysis.

Results

The reported number of fasciectomy procedures performed appeared to remain relatively stable from 2005 to 2009, with 4062 procedures in the 2005/2006 fiscal year (April 1 to March 31) to 4979 procedures in 2008/2009. This increased to 4458 procedures in 2009/2010 (Figure 1). Similarly, the rate of fasciectomy remained relatively stable from 2005 to 2009, with a rate of 1.26 per 10,000 people in 2005/2006 to 1.23 in 2008/2009, and increased in 2009/2010 to 1.32 per 10,000 (Figure 2). The number of fasciectomy procedures increased from 133 in 2005/2006 to 201 in 2008/2009, dropping to 183 in 2009/2010. Digit amputations remained relatively stable during this time, with a mean of 12 procedures per fiscal year.

There were a significant number of unusual fee codes; therefore, an a priori decision was made to report only on the billing codes that were likely to be associated with DD. Every fee to be included in or excluded from the cost estimate was discussed with the senior author (BSG), an experienced plastic surgeon. Only 327 of the 1165 fee codes that initially extracted were included in the calculation for the estimate of the annual physician remuneration related to DD treatment.

Statistics Canada

Population demographics were obtained online through the Statistics Canada’s CANSIM database. Population tables were extracted according to province, five-year age groups (from 45 to 84 years) and sex in Canada from 2005 to 2010. The rate of fasciectomy procedures performed was determined by dividing the number of procedures (reported by CIHI) by the Canadian population for that year and reported as per 10,000. Procedure rates were also calculated for each five-year age group. The data analysis was performed using Excel.
and females at 70 years of age. Observations by Yost et al (17) in a large centre in Boston, Massachusetts, USA, showed that males had the highest incidence of DD at 66 years of age. In their study population, Yost et al (17) noted that patients first presented to a physician and when they actually underwent surgical treatment. In their study population, Yost et al (17) observed that males had the highest incidence of DD in their fifth decade, 10 years earlier than women. Our data reveal that the highest number of fasciectomies were performed in men 60 to 69 years of age and in women 65 to 69 years of age. We speculate that there may be a lag time between when patients first present to a physician and when they actually undergo surgical treatment. In their study population, Yost et al (17) observed that males had the highest incidence of DD at 66 years of age and females at 70 years of age.

Many of our results were comparable with results from previous literature on DD from other countries. The 4:1 ratio of males to females described in this study was similar to other reports. In his review of the epidemiology of DD, Ross (8) noted a 3:1 ratio of males to females diagnosed with DD receiving fasciectomies at a large hospital in Brooklyn, New York, USA. Yost et al (17) investigated patient demographics of individuals receiving surgery for DD in England from 2003 to 2008. Anthony et al (16) observed a 3:1 ratio of males to females in the study by Gerber et al (15), which investigated patient demographics of individuals undergoing surgery for DD in England from 2003 to 2008. Anthony et al (16) observed a 3:1 ratio of males to females diagnosed with DD receiving fasciotomies at two large centres in Boston (Massachusetts, USA) from January 1995 to July 2006. In 1955, Yost et al (17) surveyed patients at a large municipal hospital in Brooklyn (New York, USA) for DD, and also found the ratio of males to females diagnosed with DD to be 3:1.

The age-group and sex-related differences that we observed for the number of fasciectomy procedures performed were for the 60 to 64 and 65 to 69 years of age groups. The present study is the first to report the costs and trends associated with treatment of DD in Canada. To our knowledge, only two studies have been published worldwide investigating trends and operative costs associated with the treatment of DD (14, 15).

Many of our results were comparable with results from previous literature on DD from other countries. The 4:1 ratio of males to females undergoing fasciotomies and fasciectomy procedures was the same as the ratio of males and females in the study by Gerber et al (15), which investigated patient demographics of individuals receiving surgery for DD in England from 2003 to 2008. Anthony et al (16) observed a 3:1 ratio of males to females diagnosed with DD receiving fasciotomies at two large hospitals in the United States. Our results revealed an increasing number of fasciectomy procedures performed with the exception of the 80+ age group. The age-group and sex-related differences that we observed for the number of fasciectomy procedures performed were for the 60 to 64 and 65 to 69 years of age groups. The present study is the first to report the costs and trends associated with treatment of DD in Canada. To our knowledge, only two studies have been published worldwide investigating trends and operative costs associated with the treatment of DD (14, 15).

Physician remuneration in Ontario
Physician remuneration for the management of DD in Ontario appeared to remain relatively stable between 2005 and 2010 despite
the increase in fasciotomies performed nationwide. We speculate that this could be due to an increase in the cost effectiveness of the nonsurgical management of DD. The physician reimbursement expenditures we reported for the management of DD in Ontario are only a fraction of the actual health care expenditures for DD because our analysis does not include hospital costs of surgery or expenses from the utilization of allied health professional services such as physiotherapists.

In our calculation of the cost estimate for physician reimbursement expenditures, we applied the 2010 SOB to the billing codes from all five fiscal years (2005 to 2010). An alternative method would be to estimate physician reimbursement costs from billing codes for each year, using the corresponding SOB for that year, to account for changes in the value of each billing code and inflation. However, given that the estimate of physician reimbursement expenditures remained relatively stable from 2005 to 2010, we can extrapolate that the quantities of billings associated with the management of DD remained relatively stable overall and, thus, our method can give an appropriate approximation of costs.

Reliability of database information

CIHI data: In studies such as these, it is always unclear how reliable the particular databases are. Overall, the accuracy of CIHI data is considered to be high. First, it uses a rigorous protocol and monitors the quality of its databases through annual internal analyses. Second, the accuracy of the CIHI databases have been validated for surveillance data in other areas of medicine. Lee et al (20) found the CIHI data to be highly accurate for common cardiac procedures in Ontario when compared with the Cardiac Care Network clinical registry (gold standard). Similarly, Joseph and Fahey (21) compared perinatal data in CIHI with the Nova Scotia Atlee Perinatal Database and found CIHI databases to have a relatively high degree of accuracy.

Limitations in CIHI data include missing day surgery data from Alberta and Quebec. As well, some institutions did not submit data to CIHI due to staff shortages; therefore, the numbers of procedures we reported may be an underestimate of actual values.

OMA/OHIP data: With the significant number of discordant fee codes in the OHIP billing data provided by the OMA, we questioned the reliability of the data used to estimate physician reimbursement costs in Ontario. The unusual fee codes were likely a result of clerical errors in billing. We did our best to obtain a true estimate of physician reimbursement expenditures for the management of DD in Ontario by assessing the appropriateness of each billing code extracted. Only 327 of the 1165 original billing codes associated with the diagnosis for DD were included in the final cost estimates. A small percentage of the fee codes included may also have been errors in billing, but we cannot identify these erroneous codes unless we investigate the actual patient charts for which these fee codes were billed.

To further analyze the reliability of the data, we examined the number of R551 billings not associated with the diagnosis 728. As mentioned previously, R551 is the fee code for excision of fascia for DD and should be billed exclusively with 728; therefore, we expected to see few of these. Unexpectedly, there were >700 R551 billed without the DD diagnosis code annually from 2005 to 2010. In addition, we matched the number of fasciotomies, fasciostomies and digit amputations reported in CIHI for Ontario for 2005 to 2010 to the OMA/OHIP data and found discordance between the two datasets. In general, OMA/OHIP reported more fasciotomies, and less fasciostomies and digit amputations compared with CIHI. This may be a result of coding differences, or physicians billing fasciostomies as fasciotomies.

Although we concluded that the reliability of the OHIP data were questionable for our project, the OHIP database has been used extensively for other research, particularly for disease surveillance (for example, ischemic heart disease and nosocomial infections) as well as outcomes of drug therapy (particularly in older populations) (22-25). The OHIP database has also been validated. For example, Kwong and Manuel (26) compared OHIP physician claims for influenza vaccination against self-reported influenza immunization status by patients through responses to the Canadian Community Health Services Survey and found moderate agreement.

With any study involving database information, one needs to be cognizant of the reliability of the information and accept that some percentage of the data may be due to erroneous input. In particular, the unusual fee codes we encountered in our assessment of physician reimbursement expenditures for the management of DD stress the importance of careful input of billing and diagnosis codes at the level of the individual physician and his/her assistant.

CONCLUSION

At the time the present study was conducted, limited data regarding costs of treatment were available given the lack of national databases with this information, and the lack of a national schedule of tariffs such as in France and England. The present study, however, can act as a starting point for future research on this topic because it was first to describe the treatment trends for DD in Canada. Results from the present study can also provide Canadian medical practitioners involved in the care of patients with DD a better understanding of the characteristics of this patient population and DD treatment trends in this country.

REFERENCES
