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Hospitalization for Dupuytren's disease: A French national descriptive analysis, 2002 to 2009



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ABSTRACT

Objectives: The goal of this study is to describe hospitalization for treatment of Dupuytren's disease in France between 2002 and 2009.

Methods: A repeated, annual, cross-sectional national survey of public and private French hospitals was performed between 2002 and 2009, with planned selection criteria for data extraction. Outcomes were age, sex, number of hospitalizations, length of stays, and types of surgical procedure. Types of surgical procedure included aponeurectomy, aponeurotomy, transplantation (skin graft), arthrolysis, amputation, arthrodesis, combined procedures.

Results: The selected hospital stays represented 95% to 97% of all stays with Dupuytren's disease coded as the primary diagnosis. The hospitalizations involved mainly men in the 7th decade. The mean number of hospitalizations for Dupuytren's disease was 16,487, for between 7 and 8/10,000 total hospitalizations each year. Most of the hospitalizations for Dupuytren's disease were one-day stays in private settings. Over time, the mean length of hospital stay significantly shortened and the proportion of one-day stays significantly increased. Aponeurectomy was the most reported treatment. The distribution of aponeurectomy of 1 finger or ≥ 2 fingers was balanced. The performance of arthrolysis, transplantation, amputation and arthrodesis was low.

Conclusions: Despite of shortening of hospitals stays over time, hospitalization for surgery for Dupuytren's disease in France still represents a meaningful economic burden.

Level of evidence: Observational study II.

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1. Introduction

Dupuytren's disease is a world-wide musculoskeletal disorder [1]. It consists in progressive fibrosis of the palmar aponeurosis because of pathologic production and deposition of collagen [2]. The consequence is the formation of nodules and cords within the palmar aponeurosis that can induce flexion contracture of the metacarpophalangeal and interphalangeal joints. The prevalence of Dupuytren's disease varies by country, age, sex and other risk factors such as heredity, diabetes, tobacco and alcohol consumption, and heavy manual work [1]. Most of the prevalence studies have been conducted in northwestern Europe. Two of them, each a cross-sectional analysis of about 7000 people from the general population, indicated a prevalence of 3.5% and 11% in the United Kingdom and Denmark, respectively [3,4]. The incidence of

Dupuytren's disease has been estimated at about 34/100,000 males in England [5].

Treatment of Dupuytren's disease includes percutaneous and open surgical procedures [2,6]. Percutaneous options are needle aponeurotomy and collagenase injection that are non-surgical procedures. According to their advocates, these percutaneous methods would be applicable for early and advanced Dupuytren's disease and allow for immediate resumption of regular activities. Needle aponeurotomy is an ambulatory treatment developed in the 1970s [7]. Collagenase injection has more recently been proposed for Dupuytren's disease with flexion contracture between 20° and 100° [8–10]. Open surgery mainly includes aponeurectomy and dermo-aponeurectomy. It remains the most recommended treatment for Dupuytren's disease and probably the most used in clinical practice [11,12]. Open surgery for Dupuytren's disease may therefore represent a high economic burden. Because it is performed in a hospital setting, national hospital databases are suitable for assessing surgical practice for Dupuytren's disease. However, studies of the practice of Dupuytren's surgery are uncommon [13–15]. In a

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Table 1
Hospitalizations for Dupuytren's disease from 2002 to 2009 in France.

| Hospitalization characteristics | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Hospitalizations for Dupuytren's disease, no. | 15,846 | 16,725 | 15,096 | 16,427 | 16,824 | 16,207 | 17,079 | 17,696 |
| Hospitalizations for Dupuytren's disease/10,000 | 7.52 | 7.63 | 6.83 | 7.11 | 7.07 | 6.94 | 7.03 | 7.28 |
| Private hospitalizations for Dupuytren's disease, no. (%) | 12,491 (78.8) | 13,136 (78.5) | 11,699 (77.5) | 12,893 (78.5) | 13,068 (77.7) | 12,690 (78.3) | 13,021 (76.2) | 13,331 (75.3) |
| Length of stay, mean (SD) ^b | 2.3 (3.0) | 2.2 (2.0) | 2.1 (2.4) | 2.1 (2.6) | 2.0 (1.4) | 1.9 (1.5) | 1.8 (1.2) | 1.8 (1.3) |
| One-day stays, no. (%) ^b | 8260 (52.1) | 9056 (54.1) | 8399 (55.6) | 9406 (57.3) | 10,040 (59.7) | 10,269 (63.4) | 11,150 (65.3) | 12,095 (68.3) |
| <i>Patient characteristics from hospitalization data</i> | | | | | | | | |
| Men, no. (%) | 13,000 (82.0) | 13,762 (82.3) | 12,392 (82.1) | 13,275 (80.8) | 13,633 (81.0) | 13,201 (80.8) | 13,716 (80.3) | 14,228 (80.4) |
| Age, mean (SD) | 60.9 (11.4) | 61.1 (11.1) | 61.3 (11.2) | 61.6 (11.1) | 61.8 (11.1) | 61.8 (11.1) | 62.0 (11.1) | 66.8 (7.1) |
| <i>Treatment from hospitalization data</i> | | | | | | | | |
| Aponeurectomy, no. (%) ^a | 14,178 (87.7) | 14,803 (87.2) | 13,013 (85.2) | 14,416 (86.8) | 15,091 (88.8) | 14,707 (90.0) | 15,300 (88.8) | 15,719 (88.8) |

Data extracted from the French National Database by use of codes from the International Classification of Diseases - 10 and French common classification of medical procedures.

^a Number of procedures coded as aponeurectomy divided by all procedures related to the treatment of Dupuytren's disease.

^b Significant difference over time, $P < 0.0001$.

previous study, it was found that open surgery for Dupuytren's disease represented about 15,000 hospitalizations and 14 million Euros in France in 2001.

Because of the global trend in increased number of hospitalizations on one hand [16] and the development of percutaneous ambulatory treatments for Dupuytren's disease on the other [7–10], knowledge about the evolution of hospitalizations for the disease is of interest. Here, we aimed to analyze the evolution of hospitalizations for Dupuytren's disease from 2002 to 2009 in France.

2. Methods

The main objective of the study is therefore to describe and to analyze the evolution of hospitalizations for Dupuytren's disease from 2002 to 2009 in France.

3. Study design

This study was a repeated, annual, cross-sectional national survey from 2002 to 2009 with planned selection criteria for data extraction.

4. French National Hospital Database

The French National Hospital Database includes data on all hospitalizations for acute and rehabilitation care in public and private settings. These data comprise administrative information such as sex, age, and type of hospital, as well as medical information, including diagnosis and procedures encoded by the International Classification of Diseases – 10 (ICD-10) codes and the catalogue of medical devices (until 2004–2005) or the French common classification of medical procedures (since 2004–2005). According to the French law, hospitals must keep complete and accurate databases to receive funding.

5. Data extraction

We used the acute care data for 2002 to 2009 from the databases. The selection criteria for hospital stays were age ≥ 20 years, Dupuytren's disease as primary diagnosis, and procedure encoded as aponeurotomy or aponeurectomy.

6. Outcomes

For characteristics of hospitalizations, were reported total and private hospitalizations, length of hospital stay and one-day stays, using number, percentage, mean and standard deviation (SD) as appropriate. For characteristics of patients, we present age and male sex. Aponeurectomy data are presented as number and percentage for both aponeurectomy and aponeurotomy, from 2002 to 2009. From 2006 to 2009, the French common classification of medical procedures allowed for analyzing more procedures than aponeurectomy and aponeurotomy, including arthrolysis, transplantation (skin grafts), amputation and arthrodesis, which were expressed as a number. Number of hospitalization for surgery for Dupuytren's disease and number and percentage of hospitalizations for aponeurectomy were primary outcomes. Other criteria were secondary outcomes.

6.1. Statistical analysis

We performed descriptive statistical analysis of data for each year from 2002 to 2009. We analyzed evolution over time for length of hospital stay and one-day stays by Chi-square test and ANOVA and R v2.9.0 [2009–04–17] for Windows (Insightful Corp., Seattle, WA). A two-sided $P < 0.05$ was considered statistically significant.

7. Results

The selected data represent 95% to 97% of all hospital stays for Dupuytren's disease coded as the primary diagnosis from 2002 to 2009. The remaining 3 to 5% are due to hospital stays without aponeurectomy or aponeurotomy as procedure.

The characteristics of the hospitalizations for Dupuytren's disease from 2002 to 2009 are in Table 1. The hospitalizations involved mainly men (80–82%) in the 7th decade. The mean number of hospitalizations for Dupuytren's disease was 16,487, for 7 to 8/10,000 of total hospitalizations each year. Whatever the year, most of the hospitalizations for Dupuytren's disease were one-day stays in private settings. Over time, the lengths of stay significantly shortened and the proportion of one-day stays significantly increased (52–68%). Aponeurectomy was the most reported treatment (85–90%).

The details of the therapeutic management from 2006 to 2009 are in Table 2. Aponeurectomy of 1 finger (7035–7858 hospitalizations each year) or ≥ 2 fingers (7610–8070) was equally performed. The sum of both procedures gave slightly higher values

Table 2
Number of therapeutic procedures during hospitalization for Dupuytren's disease from 2006 to 2009 in France.

| | 2006 | 2007 | 2008 | 2009 |
|---------------------------------|--------|--------|--------|--------|
| Aponeurectomy | 15,091 | 14,707 | 15,300 | 15,719 |
| 1 finger | 7035 | 7113 | 7531 | 7858 |
| ≥ 2 fingers | 8070 | 7610 | 7777 | 7872 |
| Aponeurotomy | 1855 | 1592 | 1891 | 2087 |
| Percutaneous approach | 727 | 589 | 723 | 877 |
| Open approach | 1171 | 1047 | 1204 | 1264 |
| Arthrolysis | 617 | 699 | 767 | 874 |
| Transplantation | 429 | 406 | 462 | 502 |
| Amputation | 41 | 46 | 42 | 45 |
| Arthrodesis | 28 | 29 | 42 | 51 |
| Aponeurectomy + arthrolysis | 577 | 661 | 737 | 842 |
| Aponeurectomy + transplantation | 417 | 392 | 441 | 490 |
| Aponeurectomy + aponeurotomy | 122 | 91 | 112 | 110 |
| Other | 53 | 58 | 82 | 98 |

Data extracted from the French National Database with use of codes from the International Classification of Diseases and French common classification of medical procedures.

than the number of treatments recorded as aponeurectomy, which suggests that some patients received treatment for a bilateral condition during the same stay. Procedures other than aponeurectomy were exceptionally performed as unique treatment. Aponeurotomy ranked second (1592–2087). Arthrolysis (617–874) and transplantation (406–502) were performed more than were amputation (41–46) or arthrodesis (28–51). All these procedures were mainly combined with aponeurectomy. The number of combined procedures remained low as compared with aponeurectomy as a unique treatment.

8. Discussion

We provide original data on hospitalizations for Dupuytren's disease on a national basis in France between 2002 and 2009. Hospitalizations for Dupuytren's disease represented 15,000–18,000 stays of a mean of 2 days, with most in private hospitals. In accordance with epidemiological studies, most patients were male, and most were in their 60s and 70s [1]. These values are close to those obtained in 2001 [14]. This study reinforces that fact that aponeurectomy is the most frequently performed technique during hospitalization for Dupuytren's disease, with a balanced proportion of treatments of 1 finger and ≥ 2 fingers. Combinations including transplantation, arthrolysis, arthrodesis and amputation seemed uncommon. The characteristics of the hospitalizations for Dupuytren's disease appeared constant over the study period, with the exception of length of stay, which was significantly shortened over time.

The selection criteria we used for the extraction were planned and accounted for 95% to 97% of hospital stays with Dupuytren's disease as the primary diagnosis. Therefore, our data from the French National Hospital Database are representative of surgical practice for inpatients with Dupuytren's disease in France. A recent database analysis in England allows direct comparison [15]. This study analyzed 86% of admissions for Dupuytren's disease between 2003 and 2008. It reported around 13,000 admissions for Dupuytren's disease each year, increasing number of day cases on the study period and aponeurectomy as the main procedure, that is in accordance with our results. The rate of private admissions and the number of treated finger for each admission were not reported. High involvement of private hospitals we found may be due to the income generated. Data from national surveys of hospitalization have been reported for other rheumatic diseases in France in the last decade [17,18]. Interestingly, hip fracture considered to have high economic burden was responsible for about 15,000 hospital admissions each year from 2002 to 2008 for men and 50,000 for women [17]. Primary joint replacement for coxarthrosis and gonarthrosis represented about 70,000 and 40,000 hospital

admissions in 2001 in France [18]. The annual number of stays we found in the present study therefore suggests a meaningful economic burden of hospitalization and open surgery for Dupuytren's disease.

We chose aponeurotomy and aponeurectomy as criteria for selecting the hospital stays because both are considered open-surgery techniques [11]. Aponeurotomy can also be performed percutaneously with a needle in a medical outpatient setting [7]. Aponeurectomy is easily identifiable by a specific code in the catalogue of medical devices in effect up to 2004–2005 and in the French common classification of medical procedures after this period. Two types of aponeurotomy are defined in the French common classification of medical procedures. They are open and percutaneous techniques without any mention of a blade or a needle. Aponeurotomy recorded as an open approach in the classification is indisputably surgery. However, whether percutaneous aponeurotomy is surgery in our study remains unknown. Needle aponeurotomy is indeed a non-surgical approach developed by rheumatologists and suitable for an outpatient medical setting [7,19]. Aponeurotomy by surgeons with a blade has also been proposed. Unfortunately, we were unable to distinguish needle aponeurotomy from aponeurotomy with a blade in the French common classification of medical procedures. Furthermore, the catalogue of medical devices in effect until 2004–2005, mentions only percutaneous aponeurotomy and not open aponeurotomy. Whatever the technique, the performance of aponeurotomy remained marginal as compared with aponeurectomy, which represented more than 85% hospitalizations from 2002 to 2009. Considering aponeurectomy, open and percutaneous aponeurotomy from 2006 to 2009, aponeurotomy and open aponeurotomy that correspond to surgical management of Dupuytren's disease accounted for more than 95% treatments.

Our study has some limitations. The data recording was anonymous, so we could not check reliability by reviewing medical charts. However, each hospital performs a monthly internal control of coding for the French National Hospital Database, and physicians of the national medical insurance service perform a yearly external control. Our results, based on data from a French national survey, may not be representative of hospitalizations for Dupuytren's disease in other countries. Nonetheless, they are in accordance with a previous review of surgical practice for Dupuytren's disease in the United Kingdom [13] and with recommendations elaborated under the assistance of the American Society of Plastic Surgeons [12]. Characteristics of our population also agree with those from previous epidemiological reports [1]. So, our results may be reliable. The French National Hospital Database does not allow for describing ambulatory treatment of Dupuytren's disease. Therefore, our data are not suitable for estimating the total cost and implemented

means for the management of the disease. Describing and monitoring the total spectrum of care for Dupuytren's disease, including inpatient and outpatient settings, remain crucial for health economic decision makers. Finally, due to the characteristics of the database we used, our study did not include any effectiveness outcome of the procedures.

Half of the recorded aponeurectomies involved 1 finger only. The number of combined treatments suggesting complex forms of Dupuytren's disease was low. Indeed, transplantation is usually indicated with aponeurectomy in case of recurrence, arthrolysis if joint stiffness, and arthrodesis and amputation with severe or recurring Dupuytren's disease [12,13]. About half of the hospitalizations may have involved patients with non-complex form of Dupuytren's disease. The mean individual cost for hospital management of Dupuytren's disease has been reported to be 707 and 1795 Euros for private and public care settings, respectively, on the basis of the 2005 hospital tariff for France [14]. These data correspond to a 1-year cost of 14,179,988 Euros. The high cost of management of Dupuytren's contracture fully justifies, in addition to the decision criteria usually assessed (functional gene, anatomical lesions, benefit/risk relationship), taking into account the medico-economic impact in terms of cost of hospitalization (partly controlled by the one-day hospitalization) and especially duration of work stoppage which may extend over several months.

In conclusion, despite of shortening of hospital stays over time, Dupuytren's disease still represents a meaningful number of hospitalizations each year in France, and therefore a meaningful economic burden. Management during hospitalization is surgery, mainly aponeurectomy, involving early and advanced stages of Dupuytren's disease.

Disclosure of interest

I, Johann Beaudreuil, declare speaking fees less than 1000 euros from Pfizer and a previous scientific collaboration with the same organisation; no other financial relationships with any organisations that might have an interest in the submitted work; no support from any organisation for the submitted work; no other relationships or activities that could appear to have influenced the submitted work. Milka Maravic, Sandra Lasbleiz and Eric Roulot, my co-authors, declare no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work; no other

relationships or activities that could appear to have influenced the submitted work.

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