

A review of Dupuytren's contracture in 43 hands: assessment of the nature and result after fasciectomy

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Abstract

Background: Dupuytren's disease is a fibroproliferative disorder of the palmar fascia that can result in disabling contractures of the digits. When function is impeded or deformity is disabling, surgical intervention can be considered, wherein a major problem is recurrence (reported up to 74%). Although, the disease occurs predominantly in men of northern European, there are very few reports from African and Asian populations, especially from our country which may follow from the low prevalence in these areas. The purpose of this study was to examine the nature of the Dupuytren's disease and the recurrence rate after fasciectomy.

Methods: A hospital-based and cohort study design was used to recruit patients. Data were gathered from the medical records and follow-up interviews with average 3 years (ranges from 1 to 8 years), from all patients who underwent fasciectomy in our hospital from 1370 to 1388.

Results: 29 patients (with 43 involved hands) have been admitted for surgical correction of Dupuytren's disease. Disease is more common (90% of cases) and appears significantly earlier in men. Right hand involves in 28% of the patients, left hand in 24% and both hands in 48%. The ring and the little fingers are involved most frequently. Association of Dupuytren's disease with the following factors was found: Manual labor in 68.97%, smoke in 31.03%, diabetes in 24.14%, alcohol in 17.24%, and epilepsy in 13.79%. The most common grade was found to be the grade II by using Tubiana's grade. Two patients with ectopic sites of the disease were found. The recurrence rate after fasciectomy in our patients is 9.38% (3 of 32 operated hands). From the recurrence risk factors, only bilateral disease involvement revealed to be significant in our patients.

Conclusion: Manifestations, pattern and severity of the disease were nearly comparable to those observed in the published studies, except for a lower prevalence rate and lower recurrence rate in our findings which are higher in the most studies. It seems that, the reason for this difference include genetics, pathogenesis and other factors which may cause the disease and are still unclear.

Keywords: Dupuytren's disease, contracture, prevalence, recurrence, fasciectomy.

Introduction

Dupuytren's contracture which is generally attributed to the French surgeon Baron Guillaume Dupuytren because of his description of the treatment of the disease in 1834 [1], is a benign fibroproliferative disorder of the palmar

fascia and progresses slowly [2]. However, this disease can result in disabling contractures of the digits [3]. Some features of this disease like age at presentation and severity of disease may be related to genetic etiologies. Furthermore, the association of this disease with alcoholism, smoking, diabetes, liver failure, seizure disorder

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ders, and trauma supports an environmental etiology [4].

Dupuytren's disease typically affects elderly men of northern European descent [5]. Except the extremely rare reports of this contracture in isolated African (eight cases), Indian (ten cases) and Vietnamese (one case), the disease had not been seen in non-Europeans until the recent reports in Japanese [6-8]. The Middle East and the Orient are considered areas in which the condition is virtually unknown [9]. Dupuytren's disease is more common in men and usually presents after forty years of age [10], [11]. Although the incidence of Dupuytren's disease is higher in men and ratio has been reported to be as high as 9:1, the disease is less severe in women; therefore, it may go unnoticed until later in life [11-12].

Many conditions or factors have been associated with Dupuytren disease. The following have shown the strongest associations [13], [14]: Local trauma or injury, alcoholic liver disease, diabetes, smoking, manual work, epilepsy and use of epileptic medications.

A recurrence has been defined as nodules and contractures reappearing in the area of the previous operation. Recurrence is common after surgery (up to 74%) [15]. However, the overall rate of recurrence and/or extension of Dupuytren's disease was found to be 34% in [16]. In an study

performed among the 10 Indian patients, no instance of true recurrence was found [17]. Recurrence can be difficult to treat and is seen more commonly in patients with early disease onset (younger than 40 years), a positive family history, rapid disease progression, distal disease, radial side of hand involvement, bilateral disease, and ectopic lesions [15].

As mentioned above, there are very few reports from Asian populations [6-7], which suggests the low prevalence of Dupuytren's disease in these areas. In fact, we could not find any report of Dupuytren's disease published in our country. This motivates us to study and analyze the factors influenced the prevalence of this disease. Moreover, due to high recurrence rates after fasciectomy, reported in other studies, we investigated and determined the recurrence rate after fasciectomy treatment.

The purpose of this study was investigate the Dupuytren's diseases in order to analyze and determine the followings (for Dupuytren's disease): Age and sex distributions, associated factors, recurrence rate after fasciectomy treatment, severity classification and grading, ectopic sites, and pathologic reports.

Methods

A hospital-based, retrospective, cohort study design is used to recruit patients with a diagno-

Table 1. Patients parameters and factors involved in study.

| Parameters | Factors |
|-------------------------|--|
| Age | Age at operation |
| Sex | male/female |
| Affected hand | right/left/both |
| Affected fingure | digit 1-5 |
| Staging | Tubiana classification |
| Lifestyle | Condition alcohol, nicotin |
| Other diseases | diabetes mellitus, epilepsy |
| Manual Labour | yes/no |
| Recurrence | yes/no |
| Recurrence risk factors | Bilateral involvement, ectopic lesions, early onset (younger than 45), radial side of hand involvement |

sis of Dupuytren's disease. All available data from the medical records from each patient documented for operative treatment of Dupuytren's disease in Shafa Yahyaieian Hospital, Hand Surgery Department, from 1370 to 1388, were analyzed. Moreover, these patients who underwent surgery were called for review for surgical outcome evaluation. Our follow-up duration had an average of 3 years (ranges from 1 to 8 years). A total of 33 patients who were admitted for surgical correction of Dupuytren's disease selected as samples. There were 29 men and four women. The subtotal fasciectomy was the surgical technique used on the patients. We used four different incision methods to expose the pathological tissue in our patients; 1) Zigzag incision in 18 hands, 2) Z-plasty in 6 hands, 3) Transverse incision in 6 hands, and 4) V-Y plasty in 2 hands. Data collected from all patients included our investigated variables which are shown in Table 1.

Of all patients, 29 had completed case records and attended for review. However, four patients were excluded because they were inaccessible. Thus, 29 patients and 43 hands were identified for examining nature of Dupuytren's disease and recurrence follow-up analysis with average of 3 years (ranges from 1 to 8 years). 74 digits were involved. 32 hands, from 43 involved hands, were operated in 29 patients (Table 2).

Table 2. Details of information gathered from patients.

| Gathered data | | Percentage |
|------------------|---------|------------|
| Patients | 29 | |
| Involved hands | 43 | |
| Involved fingers | 74 | |
| Average age | 57.55 y | |
| Male | 26 | 89.66% |
| Female | 3 | 10.34% |
| Smoker | 9 | 31.03% |
| Epilepsy | 4 | 13.79% |
| Manual Labor | 20 | 68.97% |
| Alcohol | 5 | 17.24% |
| Diabetes | 7 | 24.14% |

Recurrence of Dupuytren's disease was assessed according to the following definition [18]: recurrence is the reappearance of Dupuytren's tissue in a zone previously operated on. We used Tubiana classification to characterize the stage of the Dupuytren's disease in patients. This method, utilized the amount of the total passive extension deficit (TPED) to examine the grade of this disease. For this purpose, the amount of the passive extension deficit of the metacarpophalangeal (MCP), proximal interphalangeal (PIP), and distal interphalangeal (DIP) joints must be quantified in degrees during the examination, and be translated into TPED (grade I: 0° to 45°, grade II: 46° to 90°, grade III: 91° to 135°, grade IV: 136° to 180°) [19].

Statistical analyses were conducted using the Microsoft Excel software package. The characteristics of the hands and digits were analyzed with cross tables. Means and standard deviations (STD) were also derived to compare the measured data in an ordinary way. The statistical methodology was based on the two-sample student T-test, which can be unequal or equal variance and 1-tail or 2-tail based on the data analyzed. P-values were calculated using these tests.

Results

Although, Shafa Yahyaieian University Hospital is a referral center for hand surgery in our country, only 33 patients were admitted for surgical correction of Dupuytren's disease within a period of 18 years (from 1370 to 1388). Thus, we concluded that, Dupuytren's disease was not very common in this area.

Of the 29 patients examined, 26 (89.66%) were men and 3 (10.34%) women. Most patients were between 50 and 75 years old. The youngest man was 36 and the oldest 80. In women, the youngest age was 60 year and 65 as the oldest one. The mean age for all patients was 57.55, for men 57.08 (STD 12.59) and for women 61.67 (STD 2.89) years. $p < 0.14$ indi-

cated that there was no significant difference between the groups. These results were in agreement with those published by other authors [20-21]. Our results confirm that the disease was not only much more common in men (90% of cases) but also appeared significantly earlier and that in men who were operated upon earlier. McFarlane et al [21], in their multicentric review of 1150 operated patients report a high predominance of men although that percentage varies with the geographical area studied: 84% for the whole group, 78% in north America, 95% in Japan, 89% in Germany and France, 84% in Great Britain and 76% in Australia. In addition to possible racial or genetic factors, the type of recruitment of patients probably played a role in these observed differences.

Generally the disease starts in the right hand in 28% and in the left hand in 24% of the patients, with both hands being affected simultaneously in 48% of the cases. This agrees with the results, wherein very large population have been investigated by Loos et al [22].

Fig.1 shows involved hands versus operated hands. It is concluded that, in most cases, when both hands involved the right hand needs operation more often than left hand.

A total of 74 digits were involved, in 43 hands from 29 patients. The percentage of involvement of each finger is shown in Fig. 2. The most common finger involved was the ring (47.3%). The involvement was not equally distributed among the five rays, the ring and little fingers, by far, was the most common sites of the disease. This is congruent with the results in literature; where the most common finger was the ring finger. [23], and 53.8% of the involved digits have been the ring finger in [24]. The presence of Dupuytren tissue in the first two rays (the radial rays) was usually interpreted as a sign of severe disease [8]. It is seen in 2.7% of the fingers (Fig. 2).

The mean number of involved digits in each patient was 2.59 (STD 1.5). In 65.52% of the cases, only one or two digits only were in-

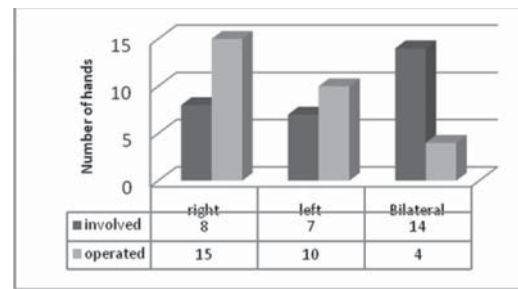


Fig. 1. The involved hands versus operated hands

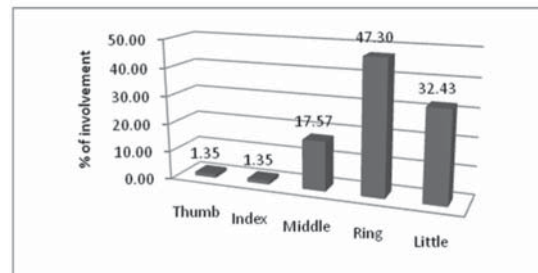


Fig. 2. The involved digits in various fingers.

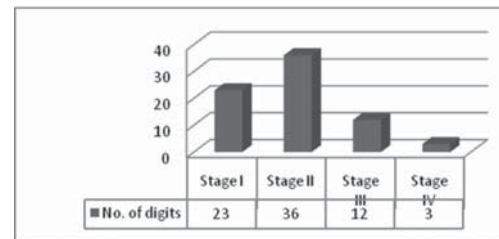


Fig. 3. The Tubiana's grade for number of digit.

involved. In Northern European patients, McFarlane et al. found this percentage to be 67% [21]. In our findings, the means of involved digits in each patient were 2.77 (STD 1.5) in men, and 1.33 (STD 0.58) in women. Therefore, men had significantly more rays involved than women ($p < 0.0006$). Wilbrand et. al. have obtained a similar result in [11], where they have concluded that, the disease was less severe in women; therefore, it may go unnoticed until later in life.

The association of Dupuytren's contracture with factors such as alcoholism, diabetes, smoking, manual labor and epilepsy, has been recognized for many years [13]. We find the association of Dupuytren's contracture with the

Table 3. Tubiana's grade and associated factors

| factors | diabetes | alcohol | smoke | epilepsy | total |
|---|----------|---------|-------|----------|-------|
| Stage I (No. of digits) | 8 | 5 | 9 | 5 | 23 |
| Stage II (No. of digits) | 6 | 10 | 16 | 8 | 36 |
| Stage III (No. of digits) | 1 | 1 | 4 | 1 | 12 |
| Stage IV (No. of digits) | 0 | 2 | 1 | 0 | 3 |
| Mean (of stages) | 1.53 | 2.00 | 1.90 | 1.71 | 1.93 |
| STD (of stages) | 1.42 | 1.69 | 1.64 | 1.99 | 1.41 |
| Significance (p-value) (difference with total) | 0.05 | 0.07 | 0.10 | 0.05 | |

following factors: Manual labor in 68.97% of the patients, smoke in 31.03% of the patients, diabetes in 24.14% of the patients, alcohol in 17.24% of the patients and epilepsy in 13.79 % of the patients. Thus, the most effective associated factor was the manual labor. In the literature, as many studies have established a relation between Dupuytren's disease and manual labour as have refuted it [25].

The condition is often associated with involvement of other areas of the body, so called ectopic disease such as plantar fibromatosis (Ledderhose disease, 6-31%), and penile fibromatosis (Peyronie's disease, 2-8%) [24]. Of 29 patients, we found two patients with ectopic sites of the disease, one with plantar fibromatosis and the other one with penile fibromatosis.

The mean Tubiana's grade was 1.93 (STD 1.41). The distribution of the number of digits (total=74) by Tubiana's grade is shown in Fig. 3. It can be seen that grade II was the most common one, which has been concluded in previous studies as well [19].

The results of Tubiana's grade distribution among different associated factors are summarized in Table 3. Number of digits (total=74) in each stage was obtained for associated factors. Then, mean and standard deviation (STD) for the stage of each factor were calculated. Moreover, differences in the Tubiana's grade between each factor group and total patients were analyzed. Table 3 illustrated that diabetic patients had tendency to have a milder form of the disease, i.e. significantly lower Tubiana's grade ($p<0.05$). This was in agreement with the re-

sults obtained by Townly et. al. and published in clinical review [14]. Patients with epilepsy, also, had a lower grade ($p<0.05$), but higher than diabetic patients. Alcoholics and smokers had a higher mean Tubiana's grade but the difference was not significantly noticeable ($p<0.1$ and $p<0.08$).

32 hands, from 43 involved hands, were operated by fasciectomy in 29 patients. In post-operative follow-ups, four patients had minor complications including local hematoma and painful scars. There were no vascular injury, infection, skin necrosis, and nerve damage.

Of these 32 operated hands, 3 hands developed recurrence, and only two recurrent hands needed reoperation due to severity of disease. Recurrence was observed in the first patient 4 months after the first operation and in the second and third patients 5 months and 6 years after the first operation, respectively. Contrary to the most studies which found that the recurrence is common after fasciectomy (up to 74% in some works [15]), our recurrence rate was 9.38%. Although, in some rare studies lower recurrence rate has been reported, e.g. an study performed among the 10 Indian patients, no recurrence have been found [17]. Although, early disease onset, radial side of hand involvement, bilateral disease involvement and ectopic lesions are common risk factors for recurrence, in our 3 recurrent hands, early disease onset, radial side of hand involvement, and ectopic lesions played no role. However, bilateral disease involvement revealed to be a significant recurrence risk factor (66.67%).

Fibroblast proliferation is a key feature of early Dupuytren's disease and manifests clinically as a nodule. In these early stages, Dupuytren's disease shares certain properties with malignant tumors and histologically often resembles fibrosarcoma. As the disease progresses, proliferation fizzles out and connective tissue assembles, manifesting clinically as the cord [26]. We investigated the pathological reports of all operated patients. The results were similar to the defined pathology of the Dupuytren's disease which observed in published studies and no unusual pattern was found.

Conclusion

We examined the nature of Dupuytren's disease based on the findings of 29 patients and 43 involved hands (74 digits), admitted for surgical correction of Dupuytren's disease. Manifestations and pattern of the disease including age and sex distribution, common involved finger, number of involved digits, severity and stage of the disease using Tubiana's grade and pathological reports were nearly comparable to those observed in the published studies. However, there were two distinct differences in our findings compared with most studies, a lower prevalence rate and a lower recurrence rate. Due to few numbers of patients which refer to our hospital for Dupuytren's disease in duration of 18 years, we concluded a lower prevalence rate for Dupuytren's disease in this area. Yet, more studies are needed to determine the precise prevalence rate in our country. We found the recurrence rate after fasciectomy in our patients equal to 9.38%. This result opposes most studies, wherein the recurrence rate has been found to be very common. However, in some rare studies lower recurrence rate has been reported. It seems that, underlying caused of this difference might be genetics, pathogenesis of disorder and other unexplained factors which may lead to the disease. Hence further investigations are needed to assess the potential role of

these factors in the Dupuytren's disease.

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