

DUPUYTREN'S DISEASE FOLLOWING ACUTE INJURY IN JAPANESE PATIENTS: DUPUYTREN'S DISEASE OR NOT?

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This paper reports the development of Dupuytren's disease following acute injury in 16 hands in 14 Japanese patients. The patients included six women and eight men. Five patients developed disease following trauma, one following infection and eight following elective surgery. In the present series, the patient age and sex are irrelevant. The disease was unilateral, confined to a single digital ray, and without ectopic lesions in most cases. Disease presented predominantly in the ring or middle finger rays. There were only three patients who underwent surgery for definite flexion contracture. Diabetes mellitus was the most frequently associated risk factor. Our results suggest that Dupuytren's disease following acute injury could be considered a separate entity from typical Dupuytren's disease. At present, we believe that this condition should be considered a subtype of Dupuytren's disease.

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Dupuytren's disease is currently called the "Vikings Disease" on the assumption that the disease spread to Europe and the British Isles during the 9th to the 13th centuries (Elliot, 1988; Hueston, 1988; McFarlane, 2002). However, Elliot (1988) cast doubt on whether this could be true, largely because of the lack of recorded evidence of the disease in the extensive surgical literature of the mediaeval period in Europe and because of failure to identify the disease in the literature of North Europe in Viking times (Elliot, 1999; Whaley and Elliot, 1993).

Dupuytren's disease is now present world wide with few, if any, populations being free of disease, although the typical features of Dupuytren's disease may differ among ethnic groups. Genetic inheritance, trauma and associated diseases such as diabetes, epilepsy and alcoholism, have been implicated as significant aetiological factors, with little doubt about these relationships to this disease. However, the role of trauma remains uncertain after discussion for a long time (Anderson, 1891; Clarkson, 1961; Elliot and Ragaoowansi, 2004; Fisk, 1974; Goyrand, 1835; Hueston, 1968; James and Tubiana, 1952; Kelly et al., 1992; McFarlane and Shum, 1990; McFarlane, 1991; Rayan and Moore, 2005). In particular, little information is available on Dupuytren's disease following trauma, infection or surgery to the ipsilateral hand, wrist or forearm in a Japanese population.

The purpose of this study was to determine if Dupuytren's disease following acute injury runs a similar, or different, course from typical Dupuytren's disease of spontaneous onset in Japanese patients.

PATIENTS AND METHODS

From 1994 to 2004, 133 patients were diagnosed with Dupuytren's disease in the authors' institutes. Of these,

in accordance with Elliot and Ragaoowansi's (2004) criteria for recognition of Dupuytren's disease following acute injury (Table 1), 14 patients were called for review. History of trauma, infection or surgery preceding the development of the disease, as well as the presence of associated risk factors, including alcohol consumption, liver disease, epilepsy, diabetes mellitus, gout and cardiovascular disease and occupation were all evaluated. The patients were also evaluated for association with the other risk factors related to Dupuytren's diathesis, viz. early onset of disease (younger than 45), bilateral involvement, a positive family history and ectopic lesions (Hueston, 1963). Physical examination included determining the presence of a nodule, pit and/or cord and its location, and measuring the extension loss in the diseased finger ray. Finally, the length of time between injury and onset of disease was recorded.

RESULTS

The patients included six women and eight men with an average age at the onset of disease of 56 (range 24–72) years. All patients were of Japanese descent. Seven right and nine left hands were involved; two patients developed the disease bilaterally following trigger finger release in both hands.

Five patients developed Dupuytren's disease following various kinds of trauma, viz. a finger tip injury, a burn on the volar aspect of the hand, a sharp laceration on the palm, a blunt injury on the palm and a distal radius fracture. One developed the disease following infection, due to a thorn embedded in the palm. Ten hands in eight patients developed disease following uncomplicated elective hand surgery, viz. seven hands after trigger finger release, one after carpal tunnel

Table 1—Elliot and Ragaoowansi's criteria for recognition of Dupuytren's contracture after acute injury

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- (1) There is objective evidence of injury with no evidence of Dupuytren's disease prior to surgery.
 - (2) The injury was within the same hand wrist or forearm as the first hand to develop disease.
 - (3) The patient may be of any age and may or may not exhibit conditions predisposing to Dupuytren's disease or indicative of a diathesis.
 - (4) Disease appears within 1 year of injury.
 - (5) A single nodule or band appears first in the palm of the injured hand.
 - (6) Disease commonly remains limited to part of the hand initially involved but may progress within the same hand or to the other hand and may occasionally become significant in degree.
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Elliot and Ragaoowansi (2004).

decompression, one after open reduction and internal fixation of a distal radius fracture and another after flexor tendon repair.

No correlation between disease and the occupations of the patients was found. Six patients were diabetics and two had hypertension. None suffered from epilepsy, liver disease or alcoholism. Three patients had early onset of disease. Two patients had bilateral hand involvement. Two patients had ectopic lesions (knuckle pads). No patients had a positive family history of disease.

The length of time between injury and onset of disease varied between 1 month and 11 months, with a mean of 3.6 months. Clinical data for each of the study patients are listed in Table 2.

The diseased digital rays were as follows: little in three cases, ring in nine cases, middle in six cases, index in two cases and first web in one case. Three hands of two patients had multiple digital ray involvement. In nine of 16 hands, the disease presented in the form of a nodule, or a pit, causing no significant morbidity. However, three of these patients underwent elective surgery for palmar discomfort or tenderness. In the remaining seven hands, the disease presented in the form of a cord. Of these, four patients developed a definite flexion contracture. The diseased digital rays were as follows: index in one, middle in one, ring in one and little in one case. All four patients had at least one risk factor related to Dupuytren's diathesis: these included bilateral involvement, early onset of disease or knuckle pad lesions. Three of these four hands underwent fasciectomy for a definite flexion contracture. No recurrence or extension was observed in these three patients over a follow-up of 12, 3 and 2 years, respectively.

DISCUSSION

The relationship of injury to the onset, progress or pattern of Dupuytren's disease has been under discussion since Goyrand (1835). The first attempt to establish criteria for recognition of Dupuytren's contracture after acute trauma was performed by Anderson (1891). He appeared to have considered Dupuytren's disease after acute trauma to be a different entity and called it "False

Dupuytren's contraction-traumatic form". McFarlane and Shum (1990) suggested seven guidelines for recognition of Dupuytren's disease after acute injury, which were later modified from seven items to six by McFarlane (1991). Elliot and Ragaoowansi (2004), suggested new criteria for recognition of Dupuytren's disease after acute injury. More recently, Rayan and Moore (2005) proposed a new entity "non-Dupuytren's palmar fascial disease" (Table 3). They described the "typical Dupuytren's disease" patient as being of Northern European descent with bilateral progressive multiple digital contractures, a family history of disease and a genetic predisposition for Dupuytren's disease, while cases in non-Caucasians populations often lack family history, exhibit mild symptoms with disease, confined to the hand, usually unilateral and when treated surgically, have no recurrence. Our previous reports, however, have suggested that this is only partially true in Japanese patients. Although Japanese patients with a family history are rare, with only two cases being reported, certain Japanese patients with Dupuytren's diathesis have developed an aggressive course of Dupuytren's disease (Abe et al., 2004a, b). Of the four sets of criteria for diagnosis of Dupuytren's disease after acute injury (Anderson, 1891; Elliot and Ragaoowansi, 2004; McFarlane, 1991; Rayan and Moore, 2005), the Elliot and Ragaoowansi criteria seem to be more practical and universal while the Rayan and Moore criteria seem to be exclusively for non-Caucasians.

In the present series, the age and sex of patients were not relevant. The disease was unilateral, confined to a single digital ray, and without ectopic lesions in most cases. Diabetes mellitus was the most frequently associated risk factor, being present in six of the 14 patients. The disease presented predominantly in the ring or middle finger rays. There were only three patients who underwent surgery for definite flexion contracture. These results would suggest that Dupuytren's disease following acute injury runs a different course, which is less progressive and less extensive, rarely requiring surgery, and with a radial shift of presentation of the disease, from typical Dupuytren's disease in the Japanese patient. Our previous studies revealed that Dupuytren's disease occurs predominantly in the little and ring finger, sometimes leading to severe digital contracture requiring surgery and recurrence and

Table 2—Patients data in the present series

Sex/hand	Age at onset (years)	Injury	Occupation	Risk factors	Digital ray/presentation	Joint contracture	Treatment	Injury to disease (month)
Female/right	36	Trigger finger release	Housewife	IDDM, early onset knuckle pads	Middle/cord	MCP: 35°	Observation	2
Male/left	45	ORIF of distal radius fracture	Office worker	None	Middle/nodule	None	Observation	8
Male/bilateral	Rt. 67 Lt. 67	Trigger finger release (bilateral)	Retired	NIDDM knuckle pads bilateral involvement	Rt. ring, little/cord Lt, middle, ring, little/nodule	None	Observation	Rt. 3 Lt. 4
Male/right	56	Middle finger tip injury	Car mechanic	None	Middle/nodule	None	Observation	2
Female/left	66	Carpal tunnel decompression	Housewife	NIDDM hypertension	Index/nodule	None	Observation	3
Male/left	41	Burn on the volar aspect of the hand	Farmer	early onset	Little/cord	MCP: 30° PIP: 50°	Subtotal fasciectomy	11
Male/right	66	Infection (thorn)	Retired	None	Ring/nodule	None	Subtotal fasciectomy	1
Female/right	54	Trigger finger release	Housewife	None	Ring/nodule	None	Subtotal fasciectomy	1
Female/left	64	Palmar laceration	Housewife	NIDDM	Ring/pit	None	Observation	3
Female/bilateral	Rt. 57 Lt. 57	Trigger finger release (bilateral)	Housewife	NIDDM bilateral involvement	Rt. middle, ring/cord Lt. ring/cord	Rt. MCP: 25° (ring) Lt. none	Subtotal fasciectomy	Rt. 4 Lt. 5
Male/left	72	Distal radius fracture	Retired	None	First web/cord	None	Observation	3
Male/left	63	Blunt injury on the hypothenar	Office worker	NIDDM hypertension	Ring/pit	None	Observation	3
Male/left	24	Flexor tendon injury and repair	Druggist	Early onset	Index/cord ¹	MCP: 15° PIP: 55°	Subtotal	
Female/right	55	fasciectomy + tenolysis Trigger finger release	2 Housewife	None	Ring, middle/nodule	None	Observation	2

ORIF, open reduction and internal fixation; IDDM, insulin dependent diabetes mellitus; NIDDM, non-insulin dependent diabetes mellitus; MP, metacarpophalangeal joint; PIP, proximal interphalangeal joint.
¹with histological proof of Dupuytren's tissue.

Table 3—Criteria for recognition of “non-Dupuytren’s palmar fascial disease”

- (1) The patients have no family history, there is ethnic diversity, with blacks being affected, and there is no gender predilection.
- (2) The condition is unilateral, confined to the hand and without ectopic manifestations.
- (3) It involves the palm and may be in line with a single digit, without digital involvement. Although fascial disease is present, joint contracture, especially at the proximal interphalangeal joint, does not occur.
- (4) Factors other than genetic ones play a role in its pathogenesis, such as trauma, previous surgery and diabetes.
- (5) Palmar fascial disease without digital contracture has been observed following hand trauma.

Rayan and Moore (2005).

extension frequently, with an incidence of 14% and 16%, respectively, in Japanese patients (Abe et al., 2004a, b).

Rayan and Moore (2005) stress the importance of trauma, surgery and diabetes in the pathogenesis of “non-Dupuytren palmar fascial disease”. Predominantly, involvement of the ring and middle finger rays and benign prognosis were addressed in their study. This atypical pattern, the radial shift of presentation of the disease and benign prognosis were also observed in other post traumatic series of Dupuytren’s disease cases (Elliot and Ragaoowansi, 2004; Kelly et al., 1992).

In the present series, Dupuytren disease after acute injury was relatively rare, occurring in 14 of 133 (10.5%) of a Japanese population. This is compatible with the figures reported by McFarlane et al. (1990) of a prevalence of Dupuytren’s disease after acute injury of 15% in Japanese patients who underwent surgery. In this study, this prevalence was the same as for patients in Northern and Southern Europe. This would suggest that genetic inheritance is not a significant factor in the aetiology of Dupuytren’s disease following acute injury.

In conclusion, this study suggests that Dupuytren’s disease following acute injury could be considered a separate entity from typical Dupuytren’s disease. However, the affected tissues of typical Dupuytren’s disease and Dupuytren’s disease following acute injury show no histological difference. Thus, it is not appropriate to name this condition “False Dupuytren’s contraction-traumatic form” (Anderson, 1891) or “non-Dupuytren’s palmar fascial disease” (Rayan and Moore, 2005). We think Dupuytren’s disease following acute injury should be considered as a subtype of Dupuytren’s disease at the present time. Further genetic and epidemiological studies are necessary to differentiate these two clinical entities.

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