

A Prospective Study Analysing Clinical Profile and Surgical Management of Patients with Dupuytren's Contracture

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Abstract:

Background: Dupuytren's contracture is a common condition that has the potential to be debilitating. It presents in a variety of manners and can be mild or more aggressive in its progression.

Aim: To study the clinical profile of patients with Dupuytren's disease and various surgical treatment modalities for it.

Methods: 58 patients with Dupuytren's contracture were included in this prospective observational study. On physical examination, severity of the contracture was noted and recorded using Goniometer, the degree of release after surgery was noted. Patients were followed up to 6 weeks, initially at 1 week, then at 3rd weeks followed by 6 weeks.

Results: Most common age group affected was 45-65 years with male predominance. Hypertension was the most common comorbid illness followed by diabetes and hypothyroidism. 51.7 % patients were smokers. Right side was commonly involved (67.2%), left side hand was involved (25.9%) with 6.9% bilateral involvement. Regional palmar fasciectomy was commonly done followed by Radical palmar fasciectomy and needle aponeurotomy. Majority of patients returned to normal work within 5-6 weeks.

Conclusion: In conclusion Regional fasciectomy is an effective technique to treat Dupuytren's contracture in our setting with excellent outcome and minimal complications.

Keywords: Dupuytren's contracture, Regional fasciectomy, Hand, Surgery.

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Introduction

Dupuytren's Disease is a benign disease of the palmar fascia, a fibromatosis that was mentioned in description by Platter, four hundred years ago and later named after the French surgeon, Baron Dupuytren Guillaume in 1830.[1] It is also referred to as palmar fibromatosis. Fibromatosis

emerge from fibrous proliferation and due to their interaction with surrounding tissue is to be found in an intermediate position between benign fibrous tumours and fibrosarcomas. They are characterised by an infiltrative growth, a tendency for

recurrence and the inability of metastasizing.[2]

Dupuytren's disease affecting the hands often results in limitations in dexterity and can have a significant impact on an individual's ability to engage in vocational and avocational activities. Patients also report safety concerns, specifically expressing fear that the fixed flexion of finger will make it more susceptible to injuries.[3] Surgical intervention is considered when the contracture affects hand function. This is usually where the MCP and PIP flexion contracture exceeds 30 degrees. Many surgeons use a simple assessment such as tabletop test to determine appropriateness for surgery. This tabletop test dictates that once affected hand can no longer be placed flat on the table, consideration should be given to surgical release.[4] There are number of surgical treatment modalities available to address finger contractures. Multiple options to expose the fascia has been described including longitudinal midline incision closed with Z plasty, Brunner type zigzag incisions and multiple transverse incisions.[5] A more extensive approach is regional or partial fasciectomy technique involving the removal of as much affected fascia as possible. Fasciotomy is a technique used to release contracture by dividing the diseased cord without the excision of the diseased tissue.[6]

The closed procedure often referred to a needle fasciotomy or needle aponeurotomy involves the placement of needle adjacent to the cord and slicing or piercing of the disease cord with a sharp beveled edge of the needle to release contracture.[7] For the management of aggressive or recurrent disease dermo fasciectomy has been recommended. Thus, extensive technique involves excision of the diseased fascia enbloc with the overlying skin and subsequent use of skin grafts to close the skin.[8] Recurrence rate following surgery remains high and recurrence rate increases with longer follow up periods.[9]

Material & Methods:

Type of study: Hospital based prospective observational study

Study setting: Postgraduate Department of Surgery and allied specialty of Plastic and Reconstructive surgery. Government Medical College Srinagar Jammu and Kashmir

Study Duration: This study was conducted over a period of 2 years.

Inclusion Criteria: All patients with clinical evidence of dupuytren's contracture who presented to our department, were included in the study after obtaining proper informed Consent

Exclusion Criteria

The patients presenting with the hand contractures other than dupuytren's contracture were excluded from the study like,

1. Post burn contracture
2. Post traumatic contracture
3. Rheumatoid arthritis

Tools used: Clinical examination and grading was done according to Tubiana staging [4] by using an instrument called as Goniometer. Tubiana staging system mainly focuses on the extension deficit. In this system the hand is subdivided in the digitopalmar segments. The sum of angles of the extension deficit in all the three joints [MCP, PIP, DIP] of one longitudinal segment represents the total contracture.

Stage 0: No lesions

Stage N: Palmar nodule without finger contracture

Stage 1: Total flexion deformity between 0 and 45 degrees

Stage 2: Total flexion deformity between 45 and 90 degrees

Stage 3: Total flexion deformity between 90 and 135 degrees

Stage 4: Total flexion deformity greater than 135

All patients within the included age group were assessed by thorough history taking and clinical examination. Various risk factors which include genetic susceptibility, alcohol intake, epilepsy, trauma, history of diabetes, hypothyroidism and occupation were recorded.

On physical examination, severity of the contracture was noted and recorded using Goniometer, the degree of release after surgery was noted.

Follow Up

Patients were followed up to 6 weeks, initially at 1 week, than at 3rd weeks followed by 6 weeks.

All the patients admitted in our department were assessed and subjected to treatment

after confirmation of the diagnosis depending upon their stage of clinical disease. The most common treatment plan for Dupuytren's contracture are surgical techniques such as limited Regional palmar fasciectomy and radical fasciectomy, and percutaneous needle aponeurotomy [PNA]. Surgical intervention is the gold standard in the treatment of progressive Dupuytren's disease and functionally impaired patients with contractures more than thirty degree in the MCP joint and an affected PIP joint.

Results:

The study included 58 patients, Male were predominant in our study with 47 (81%) males against 11 (19%) females. Most common age group affected was 46-65 years (74%).

Table 1: Demographic profile of the study population

Variables	Frequency	%
Male	47	81.0
Female	11	19.0
Age (years) ≤25	0	0.0
26-45	6	10.4
46-65	43	74.1
>65	9	15.5

Duration of disease was 6-10 months in 22 (37.9%) followed by 11-14 months in 20 (34.5%) patients, 15-18 months in 14 (24.2%) patients, 19-22 months in 2 (3.4%) patients [Table 2].

Table 2: Distribution of study participants according to Duration of Disease in months

Duration of Disease in months	Frequency	%
6-10	22	37.9
11-14	20	34.5
15-18	14	24.2
19-22	2	3.4

Majority of the study patients i.e. 25 (43.1%) had stage II followed by stage III in 13 (22.4%) patients, stage I in 12 (20.7%) patients. 4 (6.9%) patients each had stage N and stage IV [Table 3].

Table 3: Distribution of study participants according to Tubiana Classification

Tubiana Classification	Frequency	%
Stage 0	0	0.0
Stage N	4	6.9
Stage I	12	20.7
Stage II	25	43.1
Stage III	13	22.4
Stage IV	4	6.9

Single finger was involved in 28 (48.3%) patients, 2 fingers were involved in 23 (39.6%) patients and 3 fingers were involved in 7 (12.1%) patients [Table 4].

Table 4: Distribution of study participants according to Number of Fingers involved

Number of Fingers involved	Frequency	%
1	28	48.3
2	23	39.6
3	7	12.1

Mean of involvement of MCP joint was 40.09+16.13, mean of involvement of PIP joint was 22.16+22.50 and the mean of involvement of DIP joint was 12.59+7.51 [Fig 1].

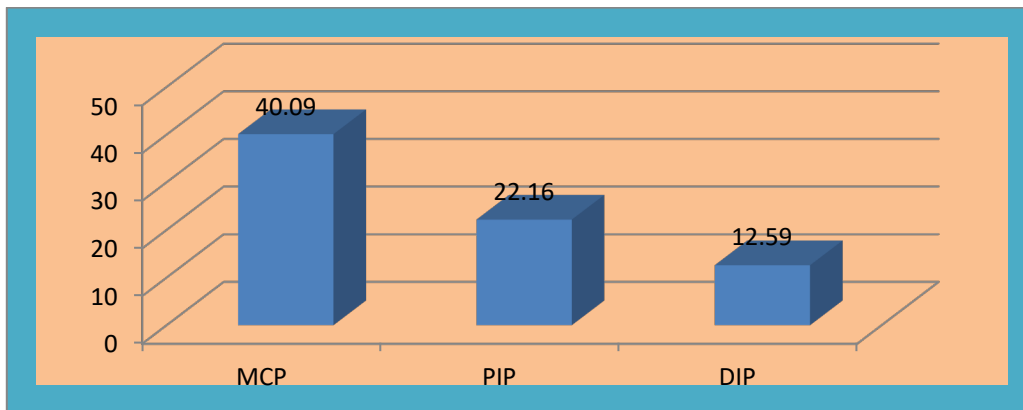


Figure 1: Degree of involvement of various joints (Flexion contracture)

Out of 58 study patients, 51 (87.9%) underwent regional palmar fasciectomy, 4 (6.9%) underwent needle aponeurotomy and 3 (5.2%) underwent radical palmar fasciectomy [Fig 2].

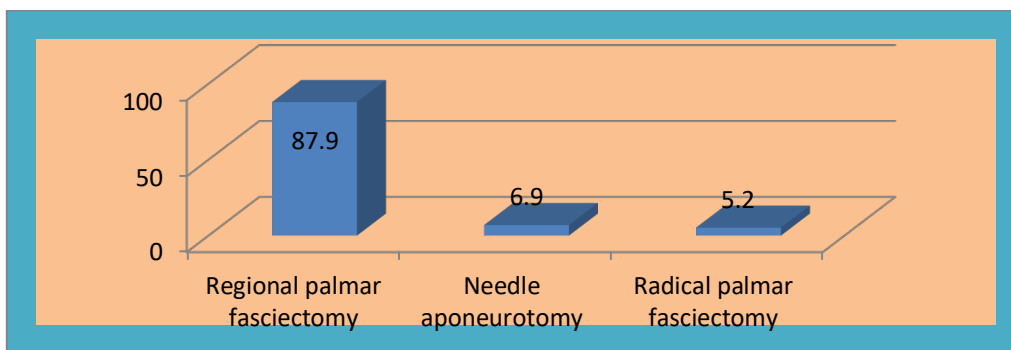


Figure 2: Distribution of study participants according to Type of Surgery

Hematoma was present in 8 patients who underwent regional palmar fasciectomy, partial skin flap necrosis and wound infection were present in 5 patients of regional palmar fasciectomy and 1 patient of radical palmar fasciectomy each, loss of

graft was seen in 5 patients in regional palmar fasciectomy, 4 patients of regional palmar fasciectomy had digital nerve injury, 1 patient had joint stiffness and recurrence in regional palmar fasciectomy [Fig 4].

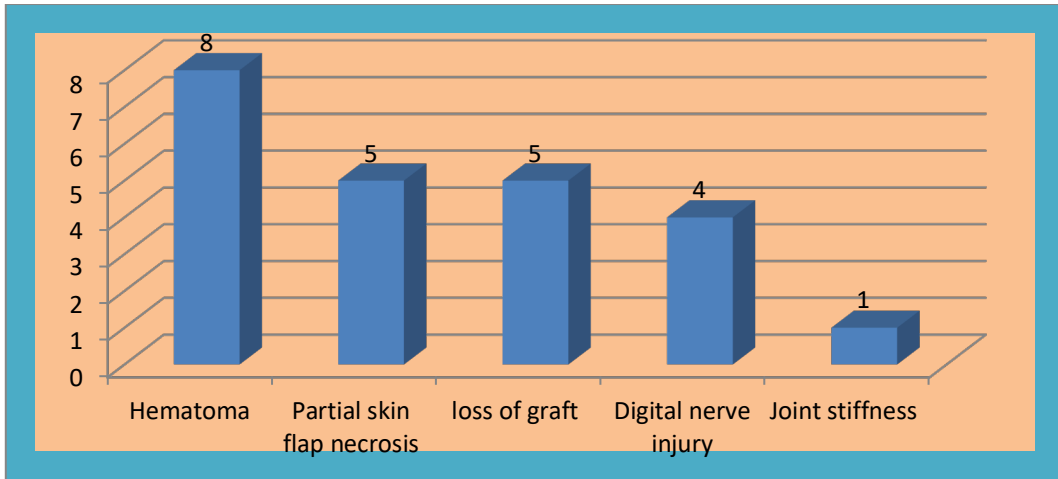


Figure 4: Comparison of different types of complications between 3 types of surgeries



Figure 5:

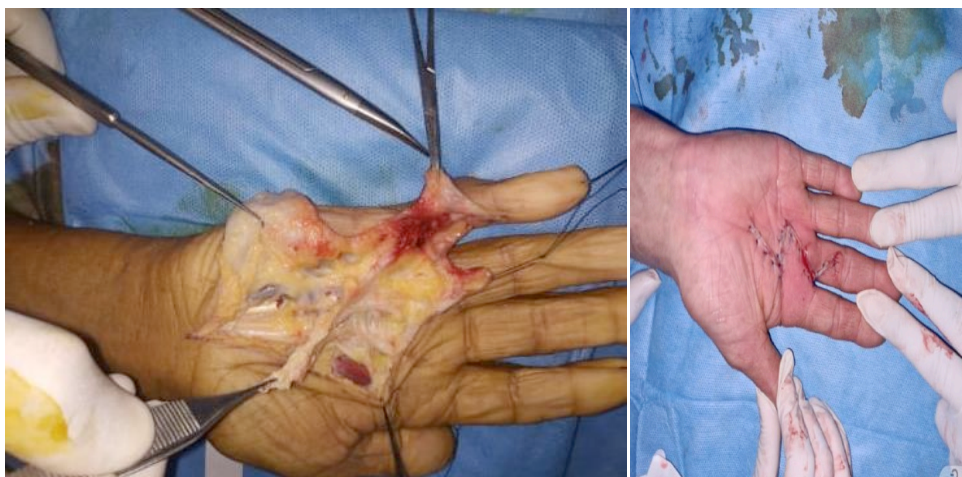


Figure 6: Immediate postoperative picture



Figure 7: Follow up at 6 weeks showing full extension of fingers.

Discussion

Dupuytren's contracture is the result of increased proliferation of myofibroblast and collagen matrix leading to the formation of nodules and cords ultimately flexion contracture of the thickened fascia. Scandinavians and people with north European ancestry were mainly responsible for spread of this disease hence it is known as vikings disease. Men are up to 15 times more likely to suffer from this disease. Some of the conditions associated with it are diabetes mellitus, alcohol, epilepsy and trauma.[10] The basic pathology involves fibroblast proliferation and collagen deposition leading to contracture of the palmar fascia.

In our study most common age group was 46-65 years with 43(74.1%) patients followed by >65 years 9 (15.5 %). 6 (10.4%) aged between 26-45 years. our study results were comparable with the findings of Gudmundsson KG et al; (2000).[11] In their study the prevalence of Dupuytren's disease and possible risk factors related to the disease were evaluated in a random sample of 1297 males and 868 females aged 46 to 74 years. Altogether 19.2 % of the males and 4.4 % of the female participants had

clinical signs of dupuytren's disease. The prevalence increased with age from 7.2 % among males in the age group 45 -49 years upto 39.5 % in those 70 -74 years old.

In our study majority population was Male 47 (81%) followed by female 11 (19%). Our studies were in concordance with Yeh CC et al (2015) [12] showed that both the incidence and prevalence rates are higher for men than women in Taiwan. The male;female incidence and prevalence rate ratios however are 1.72 and 1.55 which are lower than those for European and Australians,[13,14] but close to that for US Americans.[15] Overall male; female incidence rate ratios ranging from 1.7; 1 to 9.5; 1.[14,15]

In our study 30 (51.7%) patients were smokers and 28 (48.3%) were non-smokers. Our studies were in concordance with Burge P et al (1997) [16] where he reported association of dupuytren's contracture with smoking by a case control study in which 222 patients having an operation for this condition were matched for age, operation date and gender with control patients having other orthopaedic operations. Dupuytren's contracture needing operation was strongly associated with current cigarette smoking [adjusted

odds ratio 2.8 (95% confidence interval [CI]1.5 to 5.2). The mean lifetime cigarette consumption was 16.7 pack years for the cases compared with 12.0 pack years for the controls ($p=0.016$).

In our study, patients were graded according to Tubiana staging system which is classified into Stage 0 to stage 4. None of the patients in our study had stage 0, stage N had 4 (6.9 %) patients, stage 1 had 15 (25.8%) patients, stage 2 had 29 (50%) patients, stage 3 had 13 (22.4%) patients and stage 4 had 3 (5.2%). Similar results were observed by Bainbridge C et al, (2012).[17] In their study, 11% of patients were at Tubiana stage 1a (0-20 total flexion); 30% stage 1b (21-45); 34%, stage 2 (46 - 90); 17 %, stage 3 (91-135); and 5%, stage 4 >135.

In our study, most commonly involved finger was Ring finger with 27 (36 %) patients followed by little finger with 22 (31%) patients, middle finger 9 (17%). The contracture usually begins in the palm and then progresses distally, which results in finger flexion contracture. Nodules can present in both the palm and fingers, The ring finger is most affected and then, in order of frequency, the small finger, thumb, middle finger, and index finger Lanting R et al (2014).[18] In our study 52 patients underwent Regional palmar fasciectomy (89.7%), 4 (6.9 %) patients underwent needle aponeurotomy and 2 (3.4%) patients underwent Radical Palmar fasciectomy. Our study was comparable with Aykut S et al., (2017).[19] They explored regional variations in the surgical management of patients with Dupuytren's contracture in 12 European countries using a surgeon survey and patient chart. For the survey, a random sample of orthopaedic / plastic surgeons ($n=687$) with 3-30 year experience was asked about Dupuytren's contracture procedures performed during the previous 12 months. For the chart review ($n=3357$), information from up to five consecutive patients was extracted. Descriptive statistics are reported.

Ninety five percent of all surgeons used fasciectomy for Dupuytren's contracture, followed by fasciotomy (70%), dermofasciectomy (38%) and percutaneous needle fasciectomy (35 %). Most surgeons were satisfied with fasciectomy over other procedures. Recommended time away from work and duration of physical therapy increased with the invasiveness of the procedure. The intraoperative complication rate was 4.0%; the post-operative complication rate was 34%. Overall > 97% of the procedures was rated by surgeons as having a positive outcome. Across all regions, 54% of patients had no nodules or contractures after the procedures. Only 2% of patients required retreatment within the first year of surgery. Khan PS et al., (2010) [20] conducted a study on 30 (90 %) patients in which 27 patients underwent regional fasciectomy and 3 (10%) patients underwent extensive fasciectomy. Duthie RA, Chesney RB (1997) [21] performed percutaneous needle fasciectomy on 82 patients and followed them for 10 years. These authors observed a recurrence rate of 66 %. In their series 100 patients Tonkin MA et al (1984) [22] compared dermofasciectomy with selective fasciectomy and reported that the recurrence rate was lower in patients who had undergone dermofasciectomy.

Radical fasciectomy is another surgical modality which involves removal of the affected fascia to improve range of motion in the affected fingers. The advantages of radical fasciectomy include improved range of motion and function of the affected fingers, shown in our study this is in concordance with however some patients (1%) had wound infection, scarring, nerve injury, and stiffness, postoperative pain and swelling, longer recovery period compared to regional palmar fasciectomy, needle aponeurotomy. [23]

Needle aponeurotomy is a minimally invasive surgical procedure used to treat

early stage of Dupuytren's contracture. It's a minimal invasive procedure with a smaller incision and less tissue disruption compared to other surgical options with reduced risk of complications such as wound infection, scarring and faster recovery time multiple fingers can be treated in a single setting Pess GM et al (2012).[24] However there is a risk of recurrence of the condition, possible postoperative pain and swelling, risk of skin or nerve injury during the procedure.

In our study, 8 (13.8%) patients had stiffness of joints, 6 (10.5%) patients had hematoma, 6 (10.5%) patients had chronic complex regional pain, 5 (8.6%) patients had partial skin flap necrosis, 4 (6.9%) patients had wound infection, 4 (6.9%) patients had recurrence and 1 (1.7%) patient had digital nerve injury and 1 (1.7%) patient had graft loss. This is in unison with other studies like, Bainbridge C et al., (2012) [17] conducted a study in which the most common postoperative complications reported was haematoma (283; 8%), wound healing complications or delayed healing (207; 6%) and pain (213; 6%). In their study, postoperative complications occurred more frequently in patients undergoing more aggressive procedures. A wide range of recurrence rates is reported in the literature.[25-27]

In our study, functional postoperative outcome observed was good in 32 (55.13%) patients, satisfactory in 18 (31%) and poor in 8 (13.7%) patients. Various scales were used to measure the outcome such as DASH, ROM & PROM, The Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure and the Patient-Rated Wrist/Hand Evaluation (PROM) are commonly used scales to evaluate functional outcome in patients with Dupuytren's contracture. Honner R et al., (1971) [28] observed excellent results in 31%, good results in 35%, fair results in 25% and poor results in 9% of a total of 138 hands subjected to mostly wide and some limited fasciectomy. Aykut S et al.,

(2017) [19] conducted a study in which 14 (66.6%) hands had excellent results, five (23%) hands had good results and two (9.4%) had fair results.

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