Dupuytren's Contracture: A Chart Review to Determine Benefits of Wound Irrigation

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Hematoma is one of the most serious postoperative complications of surgical treatment for Dupuytren's contracture. This article examines the use of continuous irrigation as part of palmar fasciectomy to prevent hematoma and other postsurgical complications. A polyethylene tube is placed into the surgical wound before closure. A continuous drip irrigates the wound with Ringer's solution for 24—36 h postoperatively. This retrospective study involves 131 patients with 196 procedures dating from 1975 to 1998. The incidence of hematoma in patients who did not have irrigation was 8.1%. The incidence of hematoma in patients who underwent irrigation was 0.0%. No adverse side effects were noted with the irrigation. Irrigation was also associated with fewer postoperative complications and less postoperative pain.

The purpose of this study was to determine whether continuous irrigation is a benefit for patients with Dupuytren's contracture.

HISTORICAL PERSPECTIVE

The proper treatment of Dupuytren's contracture has been debated through the years with arguments concerning both the indications and the techniques of surgery. In the 1950s, Mason and Mclndoe and Beare stated that the presence of a nodule was an indication for surgery. They believed that resection at the early stages reduced complications. At present, surgery is usually delayed until there is a definite cord and presence of a flexion contracture of at least 30° (2,4—7,14,16,17,19,21,22,26-28,30,32,36,39).

Limited fasciectomy has been advocated, with the increased risk of recurrence accepted in exchange for the reduction in postsurgical complications. Despite this preference for limited fasciectomy, some authors have still advised radical palmar resection for individuals with a strong diathesis. In these cases, the increased risk of complications was deemed less important than the need to halt a rapidly progressing disease that could result in an impaired hand (2,5,7,13,14,27,30,31,37).

Skoog, Davis, and Hueston each advocated a particular type of limited fasciectomy that could reduce postoperative complications. Skoog recommended a selective aponeurectomy in which the nonpathologic transverse palmar ligament and the peritendinous septa were retained. He claimed that this technique offered fewer complications, quicker recovery, and a postoperative palm with protected feeling and normal appearance. Davis advocated the removal of only the diseased fascia, as indicated by his ulnar nerve test. (In this test, the ulnar nerve is blocked at the elbow, and the diseased area is detected by the absence of sweat.) Hueston advocated removal of fascia only distal to the distal flexion crease to avoid the palmar hollow and, thus, palmar hematoma. He noted that a recurrence in the palm alone rarely results in a contracture (5,13,33).
In addition to limited resection, many techniques have been devised as remedies specifically for postoperative hematoma. One of the first methods used was the insertion of drains in the wound and the application of a compression dressing in the palm. To eliminate the palmar hollow, Mason advocated tying the dressing to the palm with long silk sutures placed at the outside of the palm. Tanzer suggested that sutures be placed around the dressing and through the hand (34). Skoog preferred that the skin be sutured to the transverse palmar ligament, which is retained in his selective aponeurectomy. In 1959, McFarlane reported on the use of suction tubes inserted into the wound through the web spaces to reduce hematoma. Despite an equivocal review of the technique by some authors, others have adopted its use. Grant called it a useless technique, noting that he usually found the tube plugged when it was removed. Halliday et al. advised against the practice, saying the tubes macerate the skin (9,10,19,23,33,35,37,38).

Tubiana (36), McIndoe and Bear (26), Dickie and Hughes (6), and Halliday et al. (10) used drugs to lower the patients' blood pressure before closure to reduce incidence of hematoma. Using the same principle, Larsen and Posche reduced the local tissue pressure by elevating the patient's hand before closure.

One of the most successful methods for reduction of hematoma has been the McCash open-palm technique in which the transverse incision in the palm is allowed to heal by secondary intention. This technique virtually assures that no hematoma will develop in the palm, and it has been associated with less postoperative pain. However, the potential for infection, the limitation in exposure of the distal palm, and the prolonged healing period have made this practice unattractive to some (8,12,20-22).

Throughout the literature, emphasis has been placed on the importance of complete hemostasis and the proper application of the dressing and splint in preventing hematoma. Davis, in particular, noted that complete hemostasis was imperative and that the wound should be perfectly dry before closure. Tubiana et al. stressed the importance of the skill of the surgeon in preventing hematoma. In a series of 195 patients they reviewed, the incidence of hematoma after surgery performed by faculty was one-half that when the resident staff performed surgery. They and Peacock also suggested that undermining large areas of the palm contributes to hematoma and should be avoided (1,3,5,11,13,16,17,19,22,24,29,35-38).

McFarlane et al. (24) and McFarlane and McGrouther (25) noted an overall complication rate of 17%. Complications were specifically associated with bilateral disease and skin grafting, but no differences were found in age or sex with regard to the development of postoperative complications. Infections comprised 1.3% of the complications; hematoma, 2.2%; nerve injury, 1.5%; loss of flexion, 4.6%; and sympathetic dystrophy, 4.2%. Although hematoma comprised 2.2% of reported postoperative complications, the authors concluded that hematoma was unlikely with skin grafting. Finally, most patients regained full range of motion within a year (24,25).

Our study in 1987 included a review of 101 patients who underwent 124 procedures. It showed a 6.3% incidence of hematoma in patients who did not have irrigation after surgery and a 0.0% incidence of hematoma in patients who underwent irrigation. We concluded that postoperative irrigation of the palmar wound with Ringer’s solution reduced the risk of hematoma. In general, we also noted that patients tended to have less postoperative pain and edema and a reduced recovery period (15).

## INDICATIONS

Surgery is indicated if a patient finds that the contracture interferes with function and that the affected hand can no longer be laid flat. It is not considered for patients with Dupuytren’s nodules who do not have contracture, and we do not operate solely to relieve pain. We have found irrigation is most helpful in patients with a history of bleeding or bruising tendencies, who have sustained traumatic palmar degloving injuries.

## TECHNIQUE

Excision of the diseased tissue is carried out with sharp dissection. Hemostasis is obtained by using electric cautery and fine absorbable ligatures (Fig. 1). The tourniquet is released before wound closure, and hyperemia is allowed to subside for a minimum of 10 min. A 14-gauge (or larger) polyethylene tube is connected to a bag of cold Ringer’s solution (Fig. 2). The temperature of the solution will gradually increase to room temperature (below body temperature). The outlet end of the tube extends into the distal portion of the wound. Irrigation is started before the incision is sutured. The wound is closed with loosely placed 5-0 or 6-0 monofilament nylon sutures. A soft Dacron bulky dressing is applied with a posterior splint to keep the wrist in a neutral position (Fig. 3).

We previously hospitalized all patients 24–36 h postoperatively to ensure that the hand was elevated and that irrigation proceeded without difficulty. However, for the past 5 years, patients have been allowed to go home with the irrigation running. Before surgery, the patient and a family member or live-in friend are instructed in the technique. The irrigation solution runs by gravity at approximately 75 cc/h for 24–36 h postoperatively and is allowed to drain out of the loosely closed wound into a disposable bed chuck under the dressing, which the patient then throws away (the extremity is not wrapped in plas-
tic because this would impede the evaporation). The irri-
gation tube is removed at the first dressing change at
24–36 h. A smaller bulky dressing with a wrist splint is
left in place for 7–10 days, and active finger motion is
couraged.

### REHABILITATION

We have used a certified hand therapist for the postoper-
ative care of many of these patients (145 of 196 proce-
dures). We find that early intervention by the hand thera-

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**FIG. 1.** Excision with sharp dissection and
hemostasis by electric cautery.

**FIG. 2.** A 14-gauge polyethylene tube is
anchored to skin with 5-0 nylon. The end
of tube fish-mouth is split to prevent
blockage.
Derminirig the Benefits of Wound Irrigation

FIG. 3. Bulky Dacron dressing with continuous gravity irrigation. The dressing has been helpful in returning patients to preoperative activities of daily living.

RESULTS

Our study group consisted of 131 patients and 196 surgical procedures. Nineteen patients (14.6%) were female, and 112 (85.4%) were male. The mean age at onset of disease was 55.6 years; the mean age at the time of surgery was 61.1 years. Males had a mean onset age of 56.3 years and a mean surgery age of 61.7 years. Females had a mean onset age of 54.5 years and a mean surgery age of 60.3 years. Retired patients comprised 38.5% of the population; manual laborers accounted for 16.9%. Thirteen patients (10.0%) had diabetes; four (3.1%) had epilepsy. Forty-four (33.5%) of all patients had more than one surgery, with an average of 1.45 surgeries per patient. Thirty-seven (28.2%) patients had procedures performed bilaterally. Surgery was performed on the dominant hand 51.5% of the time. Surgery was performed on the right hand 52.7% of the time.

Of the four patients with epilepsy, none had bilateral surgeries. Of the 127 patients who did not have epilepsy, 37 (28.2%) had bilateral surgeries. The mean age of onset of disease in epileptic patients was 56.5 years; the mean age at the time of surgery was 61.3 years. Patients without epilepsy had a mean age of 55.6 years at onset and 61.1 years at surgery.

Nine of 37 patients who had bilateral surgeries had complications after at least one of their procedures, with an average of one complication per procedure. Among the 95 patients who had surgery on one hand only, 13 (13.7%) had complications, with a mean of 1.23 complications per procedure.

Table 1 presents how many patients had postoperative complications, hematoma, or pain. The types of postoperative complications are listed in Table 2. Table 3 compares how patients fared with and without continuous irrigation with cold Ringer's solution. The differences in outcome among procedures performed with and without skin grafting is presented in Table 4.

One hundred sixty-six procedures (87.4%) resulted in full range of motion after surgery, with a mean of 9.32 weeks. Full range of motion was not obtained after 25 (12.7%) procedures.

SUMMARY

In accordance with the previous literature, our study had a greater percentage of males (85.4%) than females presenting with Dupuytren's disease. However, contrary to McFarlane et al., we found no significant difference between the mean ages at onset and at surgery between males and females (24). Also contrary to previous research, we did not find a preponderance of surgeries on the right hand when the condition was unilateral. Rather, there was approximately the same number of surgeries on left hands as on right hands. McFarlane et al. reported that approximately 26% of patients require bilateral surgery; our study supports this finding, with a 28.2% rate of patients who had surgery on both hands. Our study also supports their assertion that the disease shows no relation to hand dominance: 51.5% of our procedures were on dominant hands and 48.5% were on nondominant hands. We found bilateral surgeries to be associated with a higher percentage of postoperative complications, in agreement with McFarlane.

<table>
<thead>
<tr>
<th>TABLE 1. Percentages of total procedures with postoperative complications, hematoma, and postoperative pain</th>
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<tbody>
<tr>
<td>%With postoperative complications</td>
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<td>-----------------------------------</td>
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<tr>
<td>Total procedures (N = 196)</td>
</tr>
</tbody>
</table>
and McGrouther. With regard to occupation, the largest percentage of our patients were retired (18).

Approximately 3% of our patients had epilepsy, supporting previous research. However, the extent of the disease was not more severe and the course of the disease was no more aggressive in this population. None of our epileptic patients had bilateral surgeries. Also, the mean onset age and mean surgery age of the patients with epilepsy was within 6 months of the other patients, suggesting that epileptic patients are similar to the general population with respect to Dupuytren’s disease.

In conflict with previous research, our study showed that procedures with skin grafting involved fewer postoperative complications than procedures without skin grafting.

When analyzing our total data, we found that our patients demonstrated a lower overall complication rate (11.6%) than that reported in the previous literature (17%). However, we noted approximately the same number of hematomas. When continuous irrigation was used, there were fewer overall complications, no hematomas, and fewer patients complaining of postoperative pain. These data support and quantify the results from our previous study in 1987.

### TABLE 2. Complications and the number of procedures in which they occurred

<table>
<thead>
<tr>
<th>Type of complication</th>
<th>Number of procedures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edema</td>
<td>6 (3.06)</td>
</tr>
<tr>
<td>Postoperative sympathetic pain</td>
<td>3 (1.53)</td>
</tr>
<tr>
<td>Hematoma</td>
<td>3 (1.53)</td>
</tr>
<tr>
<td>Necrosis</td>
<td>2 (1.02)</td>
</tr>
<tr>
<td>Numbness</td>
<td>2 (1.02)</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>1 (0.51)</td>
</tr>
<tr>
<td>Contracture of graft</td>
<td>1 (0.51)</td>
</tr>
<tr>
<td>Dermatitis</td>
<td>1 (0.51)</td>
</tr>
<tr>
<td>Seroma</td>
<td>1 (0.51)</td>
</tr>
<tr>
<td>Tenderness</td>
<td>1 (0.51)</td>
</tr>
</tbody>
</table>

### TABLE 3. The differences in percentage of postoperative complications, hematoma, and postoperative pain between procedures using irrigation and procedures not using irrigation

<table>
<thead>
<tr>
<th></th>
<th>%With postoperative complications (mean number/patient)</th>
<th>%With hematoma</th>
<th>%With postoperative pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures with irrigation (n = 159)</td>
<td>10.5 (1.06)</td>
<td>0.0</td>
<td>13.7</td>
</tr>
<tr>
<td>Procedures without irrigation (n = 37)</td>
<td>16.2 (1.33)</td>
<td>8.1</td>
<td>21.6</td>
</tr>
</tbody>
</table>

### TABLE 4. The differences in percentages of postoperative complications, hematoma, and postoperative pain between procedures with skin grafts and procedures without skin grafts

<table>
<thead>
<tr>
<th></th>
<th>%With postoperative complications (mean number/patient)</th>
<th>%With hematoma</th>
<th>%With postoperative pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures with skin grafts (n = 88)</td>
<td>8.4 (1.00)</td>
<td>2.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Procedures without skin grafts (n = 108)</td>
<td>14.0 (1.20)</td>
<td>0.9</td>
<td>9.4</td>
</tr>
</tbody>
</table>

*None used irrigation.*

### REFERENCES

Determining the Benefits of Wound Irrigation


