Retrospective patient-reported assessment of quality of life after surgical release for de Quervain tenosynovitis

Analyse der Lebensqualität nach chirurgischer Spaltung des ersten Strecksehnenfachs bei Tendovaginitis stenosans de Quervain

Abstract

Background: Evaluation of the quality of life following surgical release of the first extensor compartment in adult patients with de Quervain disease.

Patients and methods: This retrospective study included hospital chart review and patient-reported outcome assessment using the German version of the Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure and the validated German Michigan Hand Outcomes Questionnaire (MHQ).

Results: A total of 46 patients underwent a surgical release of the first extensor compartment for de Quervain disease. Postoperative German MHQ was 78±4. Postoperative DASH score was 19±5. Satisfaction with surgery was rated positive in 85%, and 89% would undergo the procedure again. Patients with a transversal incision line had a DASH result of 11±6 and a German MHQ score of 83±7, patients with a longitudinal incision had a DASH score of 22±9 and a German MHQ score of 80±6. The patients pain level after transversal incision was markedly lower (resting pain=0.4±0.3; stress pain=1.0±0.6) than in patients operated with a longitudinal incision (resting pain=2.4±0.9; stress pain=3.1±1.1).

Conclusion: The surgical approach for the treatment of de Quervain disease is associated with a high postoperative quality of life, a low postoperative morbidity and a low level of postoperative pain. A transversal incision is associated with better postoperative results than the longitudinal approach.

Keywords: open release, DASH, German MHQ, incision line

Zusammenfassung


Patienten und Methoden: Retrospektiv wurden Patientendaten sowie die Patienten-orientierten Fragebögen Michigan Hand Outcomes Questionnaire (MHQ) und Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure ausgewertet und analysiert. Primäre Endpunkte: DASH-Ergebnis (0=keine Einschränkung, 100=maximale Einschränkung) und MHQ-Ergebnis (0=maximale Einschränkung, 100=keine Einschränkung), sekundäre Endpunkte: Schmerzen (Numerische Rating Skala (NRS) 0–10), Zufriedenheit, Narkoseform, Schnittführung, Komplikationen.

Ergebnisse: Wir führten bei insgesamt 46 Patienten eine offen chirurgische Spaltung des ersten Strecksehnenfaches durch. Der postoperative MHQ-Score war 78±4 Punkte und der postoperative DASH-Score 19±5 Punkte. Die Zufriedenheit der Patienten mit dem chirurgischen
Vorgehen lag bei 85%, wobei sich 89% dieser Prozedur erneut unterziehen würden. Patienten mit einer quer zum Handgelenk verlaufenden Hautschnittführung hatten einen MHQ-Score von 83±7 Punkten und einen DASH-Score von 11±6 Punkten, während Patienten mit einer Längsinzision einen MHQ-Score von 80±6 Punkten und einen DASH-Score von 22±9 Punkten aufwiesen (n.s.). Das Schmerzniveau nach querer Schnittführung (Ruheschmerz=0,4±0,3; Belastungsschmerz=1,0±0,6) war deutlich geringer als bei Patienten mit longitudinaler Inzision (Ruheschmerz=2,4±0,9; Belastungsschmerz=3,1±1,1, n.s.).


Schlüsselwörter: offen chirurgische Spaltung, DASH, MHQ, Inzisionslinie

Introduction

Stenosing tenosynovitis of the first dorsal compartment of the wrist, also known as de Quervain disease, is a common disorder. It is characterized by radial wrist pain resulting from a thickening of the tendon sheaths of the abductor pollicis longus and extensor pollicis brevis muscles. Typical symptoms include grip difficulties, pain and swelling over the thumb side of the wrist. Most cases are associated with a preceding overuse of the thumb musculature, recently also described as a side effect of cellular phone text messaging [1]. Women are affected more often than men. There is some controversy related to the pathology of this disease. On the one hand, it is considered an inflammation of the tendon sheaths of the first dorsal compartment [2]. Gundes et al. summarize the inflammatory pathology by the inflammation as “caused by anything that inflames, narrows, swells or thickens” [3]. On the other hand, histological assessment of the tendon sheath and synovia revealed no inflammation; it was, however, characterized by tendon sheath thickening and by the accumulation of mucopolysaccharides [4]. Recently, significant neovascularisation of the extensor retinaculum could also be found as a reason for de Quervain tenosynovitis [5]. Finkelstein’s test, a sharp ulnar deviation of the hand with the thumb grasped by the physician, is predominantly used to diagnose de Quervain disease.

Two principal treatment options for de Quervain tenosynovitis can be delineated. The nonsurgical treatment consists mainly of supportive casting or corticosteroid injections. For the latter, a large body of mostly descriptive and retrospective literature can be found, but only one small controlled trial reported on significant success of this conservative treatment option. The study, however, was limited to pregnant and lactating women only [6]. The surgical release of the first dorsal compartment was originally described by Fritz de Quervain more than 110 years ago [7], [8], [9]. Randomized controlled trials assessing the outcome of patients after surgical release of de Quervain disease are rare, and a reliable compari-

son is difficult as most studies do not use commonly available questionnaires for hand and arm patients [10], [11], [12].

The purpose of this study was thus to assess the quality of life of patients who underwent surgical treatment of de Quervain disease, using two validated and prevalent self-report tools, the German Michigan Hand Outcomes Questionnaire (MHQ) and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire.

Patients and methods

This study was designed as a retrospective hospital chart review and a subsequent patient-reported outcome assessment using the validated German Michigan Hand Outcomes Questionnaire (MHQ) [13] and the Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure [14], [15], [16]. The scoring results of the DASH and German MHQ questionnaires were the primary endpoints of this study.

Chart review

Subjects were identified through a computerized search by ICD-10 code (M65.4) for all patients undergoing surgery for de Quervain tenosynovitis at our department between January 1, 2006, and December 31, 2010. Data collected included age, gender, status of surgeon (resident/attending), method of anesthesia, and postoperative symptoms or complications. Two out of the following three case definitions had to be met for a subject to be included in the study:

1. a documented history of pain over the radial aspect of the wrist,
2. a documented physician’s diagnosis of de Quervain’s tenosynovitis, or
3. a documented Finkelstein’s test in the patient’s medical record.
Outcome measure tools – DASH and German MHQ

The Disabilities of the Arm, Shoulder, and Hand (DASH) Outcome Measure is a data collection instrument composed of 30 questions that ascertain the condition of the upper extremity. On a five-point Likert scale, patients rate their ability to perform different daily physical activities using the arm, shoulder, or hand (21 items), the severity of rest pain and activity-related pain, tingling, weakness, and stiffness (5 items), and the impact on social activities, work, sleep, and self-image (4 items). The raw score is then transformed to a score from 0 (no disability) to 100 (most severe disability). The German version of the DASH questionnaire has previously been standardized and validated [14], [15], [16].

The Michigan Hand Outcomes Questionnaire (MHQ) has also been developed as a hand specific outcomes tool, applying psychometric principles to create an instrument measuring the health status of patients with hand or wrist disorders. The questionnaire consists of 37 core questions with 5-point scales evaluating the overall hand function, activities of daily living, pain, work performance, aesthetics, and patient’s satisfaction with the overall hand function. The raw scale score is the sum of responses to each scale item, which is then converted to a score ranging from 0 (worst hand performance) to 100 (best hand performance). The German version of the MHQ has been standardized and validated by our own group [17].

The DASH Outcome Measure and the German MHQ have been accompanied by further questions about postoperative satisfaction, numeric rating scale (NRS) for pain evaluation, or, if applicable, corticosteroid therapy before surgery. The primary endpoints of this study have been defined as the scoring values of the DASH and German MHQ questionnaires.

Surgical procedure

Under general, regional or local anesthesia, the patient was placed in a supine position with the affected arm supported by a hand table. All operations were performed under Esmarch ischemia with tourniquet control. First, the radial styloid process and the first extensor compartment on the radial side of the wrist were palpated and marked. Then, a transverse or longitudinal incision was made just distal to the radial styloid over the first extensor compartment. The radial sensory nerve branches and veins were identified and protected. The extensor ligation was longitudinally opened at the dorsoulnar corner from the distal edge of the retinaculum and partially resected. Separate subcompartments of the abductor pollicis longus and the extensor pollicis brevis tendon were also released completely if identified in situ, and tenosynovectomy was performed in cases with apparent tenosynovitis. The tourniquet was then deflated and haemostasis established. The skin was closed with a running 4.0 non-absorbable monofilament suture. The surgical procedure was finished by application of bulky soft dressing.

Results

Demographic data

All demographic data and characteristics of the participants and the nonparticipants are presented in Table 1. A total of 46 patients were operated between 2006 and 2010 and were invited to participate. The study sample comprised 39 women and 7 men. The mean age was 52±2 years (range, 17–75 years). The chart review data presented were obtained from this entire cohort. A total of 27 patients responded to our invitation and filled out the German MHQ and DASH questionnaires. The mean follow-up after surgical release was 33±3 months. At the time of the follow-up examination, 25 patients (93%) had resumed the same occupation and 2 patients (7%) had changed their job or became unemployed.

Patient characteristics

Four patients (15%) received preoperative steroid treatment, which only lasted for a month or less. Preoperative splinting was performed in 44% of patients which led to an improvement in only 20% of the patients. Longitudinal or transversal incisions were almost equally distributed. Most of the patients were operated in local anesthesia (61%), 30% in general anesthesia, 7% were operated in local anesthesia with anesthesia stand-by, and 2% in regional anesthesia (brachial plexus block). Over two thirds of all surgeries was performed in an outpatient setting. Mean operating time was 27±2 min and a consultant has operated 72% of the patients. Patient satisfaction with the operative procedure was rated positive in 85% of all patients and 89% would undergo the procedure again; 7% of the patients had further surgery at the respective hand. Four out of 27 patients reported complications after surgery, such as scarring (n=1), reduced sensibility (n=1), pain in the wound area (n=3), hematoma (n=1) and problems with hand/finger function (n=2).

Postoperative German MHQ and DASH scores

Postoperative German MHQ score: Mean German MHQ score was 78±4 (95% CI 75–81). German MHQ subscores were MHQ work with 74±6 (94% CI 77–70) and MHQ pain 70±6 (95% CI 66–74) (Figure 1).

Postoperative DASH score: Mean DASH score was 19±5 (95% CI 16–23), subscores of DASH were DASH work with 24±6 (95% CI 21–28) and DASH sport was 17±7 (95% CI 14–20) (Figure 2).
Table 1: Presentation of different German MHQ as well as DASH results divided by subgroups

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>No. of patients (%)</th>
<th>German MHQ</th>
<th>DASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1 (2%)</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>21–30</td>
<td>3 (7%)</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>31–40</td>
<td>5 (11%)</td>
<td>89±6</td>
<td>25±11</td>
</tr>
<tr>
<td>41–50</td>
<td>9 (20%)</td>
<td>91±5</td>
<td>13±11</td>
</tr>
<tr>
<td>51–60</td>
<td>14 (30%)</td>
<td>82±8</td>
<td>19±9</td>
</tr>
<tr>
<td>60+</td>
<td>14 (30%)</td>
<td>82±6</td>
<td>23±9</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>39 (85%)</td>
<td>84±4</td>
<td>18.8±5.5</td>
</tr>
<tr>
<td>male</td>
<td>7 (15%)</td>
<td>80±11</td>
<td>22.5±13.0</td>
</tr>
<tr>
<td>Prior steroid treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y</td>
<td>4 (15%)</td>
<td>9±3</td>
<td>91±2</td>
</tr>
<tr>
<td>n</td>
<td>24 (85%)</td>
<td>21±5</td>
<td>83±4</td>
</tr>
<tr>
<td>Finkelstein’s sign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y</td>
<td>26 (93%)</td>
<td>90±2</td>
<td>10±3</td>
</tr>
<tr>
<td>n</td>
<td>2 (7%)</td>
<td>79</td>
<td>31</td>
</tr>
</tbody>
</table>

n.d., no data available

Interestingly, the questionnaire results differed according to the chosen incision line, especially in the DASH results. While patients with a transversal incision line had a DASH result of 11±6 and a German MHQ score of 83±7, patients with a longitudinal incision had a DASH score of 22±9 and a German MHQ score of 80±6. The overall pain level has been 1.44±0.5 in resting and 2.41±0.63 during stress of the hand or wrist. The patients pain level after transversal incision was markedly lower (resting pain=0.4±0.3; stress pain=1.0±0.6) than in patients operated with a longitudinal incision (resting pain=2.4±0.9; stress pain=3.1±1.1). Furthermore, regression analysis shows that both questionnaires present nearly the same outcomes and can therefore be used equally (Figure 3).
Table 2: Overview of the studies using the disabilities of the arm, shoulder and hand (DASH) questionnaire for the assessment of the function of de Quervain patients and respective treatment alternatives

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Age</th>
<th>Intervention</th>
<th>DASH score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niekel et al. [20]</td>
<td>53</td>
<td>58±13 yrs</td>
<td>open release</td>
<td>29; QuickDASH: 35</td>
</tr>
<tr>
<td>Ring et al. [19]</td>
<td>44</td>
<td>44±12 yrs</td>
<td>open release</td>
<td>33</td>
</tr>
<tr>
<td>Kang et al. [23]</td>
<td>25</td>
<td>52 yrs</td>
<td>open release</td>
<td>preoperative: 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>postoperative: 7 (20-month follow-up)</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>51 yrs</td>
<td>endoscopic release</td>
<td>preoperative: 64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>postoperative: 2 (18-month follow-up)</td>
</tr>
<tr>
<td>Pagonis et al. [34]</td>
<td>A: 24</td>
<td>A: 44 yrs</td>
<td>corticosteroid injection</td>
<td>A: pre-injection: 94</td>
</tr>
<tr>
<td></td>
<td>B: 24</td>
<td>B: 43 yrs</td>
<td>(A: 4-point technique; B: 2-point technique)</td>
<td>2 weeks: 36; 4 weeks: 19; 8 weeks: 5; 52 weeks: 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B: pre-injection: 93</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 weeks: 65; 4 weeks: 60; 8 weeks: 23; 52 weeks: 8</td>
</tr>
<tr>
<td>Knobloch et al. [5]</td>
<td>3 females</td>
<td>mean 57 yrs</td>
<td>polidocanol sclerosing and eccentric forearm training</td>
<td>female 1: 61 (before) to 21 (after)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>female 2: 71 to 34</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>female 3: got surgery</td>
</tr>
</tbody>
</table>

Discussion

The overall aim of this study was to assess the quality of life following surgical release of the first dorsal compartment in adult patients. To the best of our knowledge, this is the first quantitative and standardized evaluation of postoperative outcome measures using two validated questionnaires for hand disorders. The results of this study confirm outcomes of previous studies, some facts, however, are new [18]. We were able to identify the ideal patient – a female patient with a diagnosed de Quervain disease, between 41 and 50 years of age, having a positive Finkelstein’s sign, no corticosteroid pre-treatment and a transversal incision for the surgical release, will most likely profit from surgery [18]. In other groups, mean postoperative DASH scores range from 2 to 33 points (Table 2). However, the follow-up times differ markedly, with better results shortly after surgery and a tendency to worse results in the long-term. In contrast, our study shows the best mean postoperative DASH scores of adults after a mean follow-up time of 33 months. Furthermore, in comparison to other hand related diseases, such as carpal tunnel syndrome, trigger finger, lateral epicondylitis, wrist or distal radius fracture, or wrist arthrosis, the DASH results in our study represent the highest quality of life after an open release and are in the top one third of reported outcomes [19, 20].

The fact that patients with a positive initial Finkelstein’s sign have a better overall outcome might be explained by the earlier onset of symptoms of hand or lower arm pain, leading to an earlier diagnosis and treatment of the disorder. Patients who do not seek treatment for an extended period of time, sometimes in spite of severe symptoms, are at risk of developing severe nerve injury, which does not regenerate or cannot be ameliorated by surgery. The short term results after corticosteroid injection [21] as well as the results of a recent Cochrane analysis [6] recommend the injection of corticosteroids in patients with de Quervain disease. Furthermore, no side effects or local complications of steroid injection were reported. These results, however, have been shown only in small controlled clinical trials with a limited amount of participants [22]. In our study, the postoperative results of patients with preoperative corticosteroid treatment were considerably worse than in the group without steroid injection, suggesting that an early operation without previous steroid injection might represent the best treatment option.

Postoperative pain after the release of the first dorsal compartment can be caused by incomplete release of the extensor compartment, subluxation of the tendon, superficial radial nerve injury, or painful scarring. The overall pain level in our patient cohort has been only slightly higher than reported by Kanget al. [23]. However, even the incision line might have an effect on the outcome, as pain levels after transversal incision were markedly lower than after a longitudinal incision. Furthermore, it seems that the transversal incision, even if not statistically significant, might be associated with increased patient satisfaction. The use of the longitudinal versus the transversal approach has led to some controversies in recent literature. Mellor and Ferris described poor cosmetic results, superficial radial nerve injuries, wound infections, and reflex sympathetic dystrophy by the use of the longitudinal approach [1]. This is in contrast to most of the recently published articles, which mostly recommend the longitudinal incision due to better exposure and protection of the respective vital structures, prevention of possible tendon subluxation in the postoperative period, and reduced scarring [3], [24], [25], [26].

The assessment of outcomes after hand surgery by the use of questionnaires is a common instrument. A large variety of specific, e.g. for carpal tunnel syndrome [27], and unspecific [28], [29] hand disease questionnaires have been proposed. In 1996, the DASH score has been developed to evaluate specific hand functions, symptoms or handicaps [28]. The DASH Outcome Measure has been validated as a reliable method to assess the pre-operative hand function as well as the outcome after intervention.
of different hand diseases [5], [13], [19], [20], [28], [30]. The MHQ, originally described by Chung in 1998 [29], is divided in six domains and additionally assesses the aesthetics and patient satisfaction with the hand function. Both hands can be assessed individually. As a further finding of this survey, we can expand the use of the DASH and German MHQ questionnaires to include the evaluation of patients with de Quervain disease. Both questionnaires can be used equivalently to evaluate the operative results, as good DASH scores are correlated to a good outcome in the German MHQ and vice versa.

To summarize, this is, to the best of our knowledge, the first time that the MHQ questionnaire has been used to evaluate the outcome of surgical de Quervain therapy. We consider the open release of the first extensor compartment an effective and low-risk surgical procedure, associated with a high postoperative quality of life, a low rate of complications and a low level of postoperative pain. Eighty-five percent of our patients were highly satisfied with the treatment, and 9 out of 10 would choose surgery again. Surprisingly, in spite of the fact that conservative treatment options with splinting and corticosteroid injection seem to have lower success rates [31], [32], the open surgical release is not recommended as a first line treatment by the literature [2], [12], [22], [33], [23], [24].

A controversy about the best incision line also still exists, and a clear and evidence based strategy has not been developed as of yet. Prospective, controlled long-term studies will therefore be needed in order to develop evidence-based recommendations for the therapy of de Quervain tenosynovitis.

Notes

Competing interests

The authors declare that they have no competing interests.

Authorship

Heiko Sorg and Robert Krämer contributed equally.

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