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Original article

Modified percutaneous trigger finger release

Technique modifiée de traitement percutané du doigt à ressaut

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Abstract

Stenosing tenosynovitis or trigger finger is one of the most common disorders that affect the flexor tendon apparatus of the hand. Percutaneous release has been previously reported to be easier, quicker, less invasive and less costly than open surgery. The purpose of this study was to report the outcome of an alternative percutaneous trigger finger release technique. From March 2008 to January 2014, 92 patients (128 fingers) who underwent the alternative percutaneous trigger finger release, with a minimum of 6 months follow-up were included. Outcomes included size of skin incision, pain, residual symptoms, satisfaction and complications. Percutaneous release was achieved in all fingers, except 1 for which an opening of the skin was necessary to complete the release of the pulley. Eight fingers (6%) required revision open surgery because of persistence of their symptoms. At 1 week after the procedure, no finger swelling was reported, however 4 fingers (3%) were painful and 45 (35%) were stiff and required physiotherapy. Percutaneous release was successful in 120 fingers (94%). At the final follow-up, all the patients were satisfied by the procedure (95 rated their result as much better and 32 as better). This study shows that our alternative percutaneous trigger finger release is a reliable and safe procedure with high patient satisfaction.

Level of evidence. – Level IV, clinical study, therapeutic study.

Keywords: Trigger finger; Percutaneous

Résumé

Le doigt à ressaut est une des pathologies les plus fréquentes de l'appareil fléchisseur des doigts. Des études précédentes ont montré que la ténolyse percutanée était plus simple, plus rapide, moins invasive et moins coûteuse qu'à ciel ouvert. Le but de cette étude était de rapporter les résultats d'une nouvelle technique de ténolyse percutanée dans le traitement du doigt à ressaut. Entre mars 2008 et janvier 2014, 92 patients (128 doigts) traités par cette nouvelle technique de ténolyse percutanée et avec un recul minimum de 6 mois furent inclus. Les critères d'évaluation comprenaient la taille de l'incision cutanée, la douleur, les symptômes résiduels, la satisfaction et les complications. La ténolyse percutanée était complète dans tous les doigts sauf 1 pour lequel une incision fut nécessaire afin de compléter le geste à ciel ouvert. Huit doigts (6 %) furent repris pour persistance des symptômes. À une semaine de l'intervention, aucun doigt n'avait d'œdème, cependant 4 doigts (3 %) étaient douloureux et 45 (35 %) étaient raides et furent traités par la rééducation. La ténolyse percutanée fut efficace dans 120 doigts (94 %). Au dernier recul, tous les patients étaient satisfaits de l'intervention (95 qualifiaient leur résultat de « bien meilleur » et 32 de « meilleur »). Cette étude montre que notre technique de ténolyse percutanée est fiable et sûre dans le traitement des doigts à ressaut et permet d'obtenir un taux de satisfaction élevé.

Niveau de preuve. – Niveau IV, étude clinique, étude thérapeutique.

Mots clés : Doigt à ressaut ; Percutané

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1. Introduction

Stenosing tenosynovitis or trigger finger is one of the most common disorders that affect the flexor tendon apparatus of the hand [1]. Most patients can be managed conservatively with medication, physical therapy and steroid injection especially early in the course of the disease [2]. However, when conservative management fails to improve the symptomatic trigger finger, then release of the A1 pulley is recommended and has been shown to lead to good outcome [3]. The A1 pulley release is performed through a standard open approach or percutaneous approach with good outcome reported in both [1,4–8]. Percutaneous release has been reported using needle [6,7,9–20], angiocatheter [21–23], scalpel blade [8,24–26] or other percutaneous custom made instruments [27–30] and it has been reported to be an easier, quicker, less invasive and less costly alternative, which could be performed in a clinic setting.

The authors of this manuscript have developed an alternative technique of percutaneous trigger finger release that to our knowledge has not been published previously in the literature. The purpose of this study was to report the surgical steps and outcome of this percutaneous trigger finger release technique.

2. Materials and methods

2.1. Patients

From March 2008 to January 2014, 171 consecutive patients (213 fingers) who had failed to respond to non-operative treatment for trigger finger involving any finger except for the thumb were included. They all underwent an alternative percutaneous trigger finger release by the same surgeon (MC). Ninety-two patients (128 fingers) had a minimum 6 months follow-up and were included in the analysis. There were 67 females and 25 males with an average age at the time of surgery of 64 years old (range: 38–85). Triggering of the middle finger was the most common (58), followed by the ring finger (42), the index (20) and the little finger (8). The modified Green classification [1] was used to grade triggering (Table 1): 3 fingers were grade 0; 90 graded 1; 29 graded 2; and 6 were graded 3. Concomitant hand disorders were found in 2 patients (2 carpal tunnel syndromes which were treated simultaneously).

2.2. Surgical technique

After appropriate preparation of the hand with antiseptic solution, the proximal aspect of the A1 pulley of the involved finger is identified according to the landmarks described by Wilhelmi et al. [31] (Fig. 1). Three cc of lidocaine 1% without epinephrine are injected at this level in the flexor tendon sheath. The patient is then asked to flex the involved finger beyond the triggering or locking position. The tip of an n° 11 blade is inserted percutaneously through the skin and the flexor tendon just proximal to the A1 pulley and the appropriate position of the knife is confirmed by asking the patient to attempt gently wiggle his finger that results in motion of the knife (Fig. 2).

Table 1
Classification of triggering finger severity [1].

Grade	Clinical finding
0	Pretriggering: pain, tenderness over A1, no locking of the finger
1	Locking of the finger, but active extension is possible
2	Locking of the finger, passive extension is possible
3	Flexion contracture

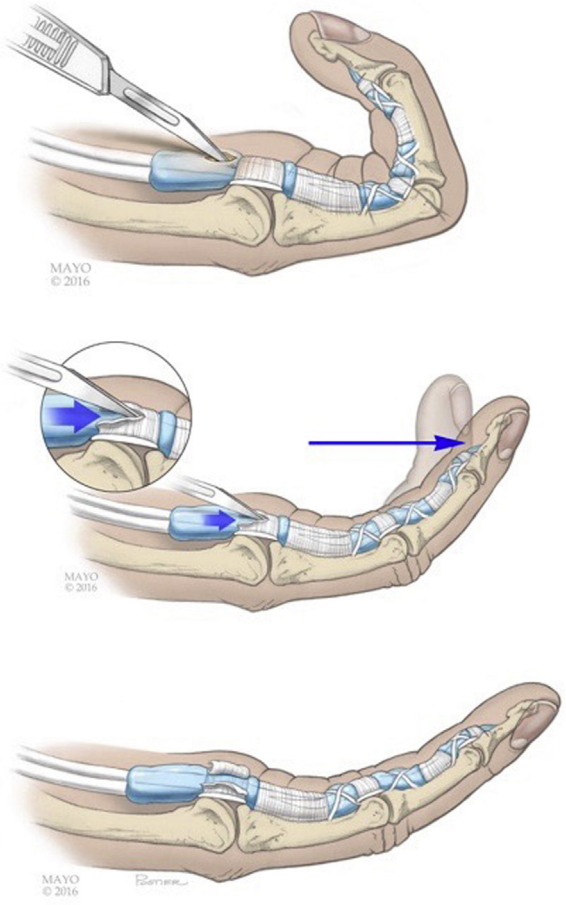

Fig. 1. Surgical steps of the percutaneous trigger finger release. The tip of the blade of the knife needs to be aimed towards the center of the finger to prevent neurovascular injuries.

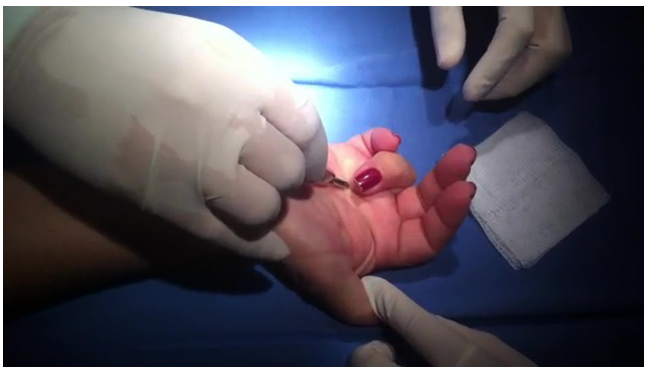

Fig. 2. The tip of an n° 11 blade is inserted percutaneously through the skin and the flexor tendon just proximal to the A1 pulley.

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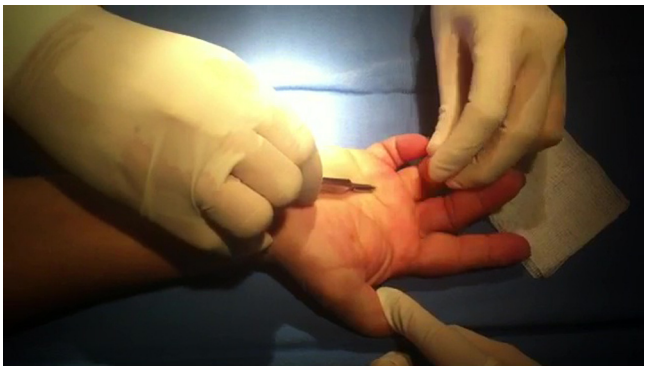

Fig. 3. The handle of the knife is lowered to a level parallel and close to the palm of the hand with the tip of the knife kept aimed towards the center of the finger.

Once this is confirmed then the handle of the knife is lowered to a level parallel and close to the palm of the hand with the tip of the knife kept aimed towards the center of the finger (Fig. 3). The patient is then asked to extend the finger and as he/she is extending the finger, the surgeon pushes gently passively on the tip of the finger to help in smooth full extension of the finger. The tip of the blade which is placed in the flexor tendon proximal to the A1 pulley is pulled distally during finger extension, thus, resulting in complete release of the A1 pulley (Fig. 4). The knife is then pulled away and a successful release of the A1 pulley is confirmed by observing the patient ability to perform smooth full active range of motion of the finger with no triggering or catching. Then a band-aid is applied to the small wound and the patient is allowed progressive activity using his hand as tolerated.

2.3. Postoperative evaluation

At the end of surgery, the number of attempts was recorded, the size of the skin opening was measured in centimetres with a ruler and the necessity of a skin suture was noted. The patient was asked if pain had been felt during the procedure.

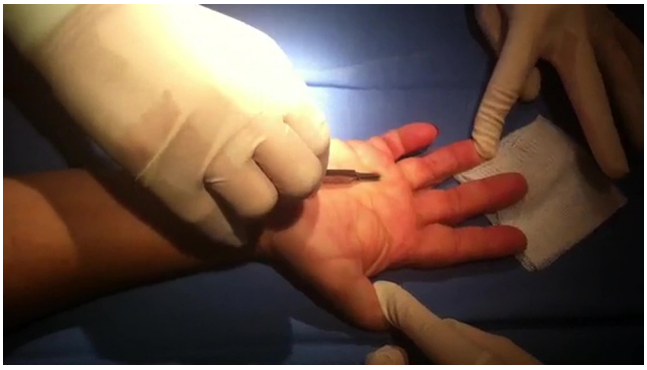

Fig. 4. The patient is then asked to extend the finger and as he/she is extending the finger, the surgeon pushes gently passively on the tip of the finger to help in smooth full extension of the finger. The tip of the blade which is placed in the flexor tendon proximal to the A1 pulley is pulled distally during finger extension, thus, resulting in complete release of the A1 pulley.

All patients were examined at 1 week postoperatively to assess whether the surgical procedure had been successful. Finger swelling, stiffness and pain were also reported. If the patient's fingers were found to be stiff at that time, physiotherapy was prescribed. Final follow-up data was collected by examination at a minimum 6 months postoperatively. Overall mean length of follow-up was 43 months (range: 6–77). Residual symptoms were evaluated. Complications such as infection, digital nerve injury, painful scar and bowstringing of the flexor tendon were reported. Subjective satisfaction was assessed by asking the patients at follow-up how they felt compared with before surgery and was graded using a 4-point scale: 1: much better; 2: better; 3: same; 4: worse.

3. Results

Percutaneous release was achieved in all fingers, except one for which an opening of the skin was necessary to complete the release of the pulley.

The mean size of the skin incision was 0.45 cm (range: 0.1–1 cm.), and sutures were needed for wound closure in only 3 fingers. The mean number of attempts was 1.29 (range: 1–3). Pain was not felt during the procedure by any of the patients.

Percutaneous release was successful in 120 fingers (94%). Eight fingers (6%) were not completely relieved of their symptoms by the percutaneous procedure and required open surgery. Similar findings were observed for these patients during open surgery: partial opening of the proximal part of the A1 pulley and no neurovascular or tendon injuries.

At 1 week after the procedure, no finger swelling was reported, however 4 fingers (3%) were painful and 45 (35%) were stiff in both flexion and extension and required physiotherapy (Table 2).

At the time of last follow-up, no complications such as digital nerve injury, painful scar, residual stiffness, infection or bowstringing of the flexor tendon had been reported. At the final follow-up, all the patients were satisfied by the procedure (95 rated their result as much better and 32 as better).

4. Discussion

Open release of the A1 pulley for symptomatic trigger fingers who failed to respond to non-operative treatment is currently the gold standard for surgical management. Its results are generally excellent with 97% to 100% of complete resolutions [5,6,8]. To reduce costs, surgical time and risks, several surgeons since Lorthioir [27] in 1958 have attempted to develop different percutaneous techniques. These techniques

Table 2
Incidence of postoperative complications.

Grade	$n = 128$	Pain ($n = 4$)	Stiffness ($n = 45$)	Failure ($n = 8$)
0	3	0 (0%)	2 (67%)	0 (0%)
1	90	3 (3%)	34 (38%)	5 (6%)
2	29	0 (0%)	5 (17%)	3 (10%)
3	6	1 (17%)	4 (67%)	0 (0%)

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have been reported with variable outcomes ranging from 38% to 100% of resolution of symptoms [6–11,13–15,18–21,23–27,29,30,32]. Though uncommon, complications can be observed from trigger finger release including A2 pulley injury leading to flexor tendon bowstringing, infection and nerve injury (neurapraxia, nerve laceration). Risks of neurovascular injuries have been more frequently described in the thumb [4] as well as risks of lacerations of the index finger radial palmar digital nerve. Flexor tendon injuries have been previously described in the literature. These injuries are very frequent when using needles (88% [21], 81% [28]), but they have not been proven to have deleterious functional consequences in clinical studies. Three prospective randomized studies [6–8] have proved the superiority of percutaneous release in terms of operative time and cost with similar functional results using needles [6,7] and scalpel blades [8].

As this was a pilot study, all surgeries were performed in an operative room and therefore no cost analysis was done. However, our technique described in this study is an alternative to other techniques that have been described previously in the literature. It differs by the fact that the tip of the narrow blade is advanced through the skin and inside the surface of the flexor tendon that in turns allows for a more reliable release of the A1 pulley as the finger is passively extended. The ease of the steps and its reliability and reproducibility makes it a more attractive technique that is easy to teach and perform in the clinic setting with high patient satisfaction and potentially lower cost.

In summary, this study shows good to excellent outcome of our alternative percutaneous trigger finger release in managing refractory symptomatic trigger finger symptoms.

Ethical statement

Each author certifies that his or her institution approved the human protocol for this investigation and that all investigations were conducted in conformity with ethical principles of research.

Disclosure of interest

The authors declare that they have no competing interest.

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