Cases of Early Infectious Flexor Tenosynovitis Treated Non-Surgically With Antibiotics, Immobilization, and Elevation

Des cas de ténosynovites infectieuses précoces des fléchisseurs traitées sans intervention chirurgicale par des antibiotiques, une immobilisation et une élévation

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Abstract

Background: Early infectious flexor tenosynovitis has been treated with urgent surgery by most surgeons since Bunnell wrote the first textbook of hand surgery in 1945. Some surgeons have good experience with non-surgical management of early presenting disease in some cases. **Methods:** This retrospective chart review included 12 inpatients with early infectious flexor synovitis who received conservative treatment with antibiotics, immobilization, and elevation without surgical drainage. **Results:** The mean time to resolution of infective symptoms for the 12 patients was 5 days (range: 2-11 days) for those receiving conservative management. Half of them required hand therapy. Eight of the 12 patients had good documentation of a full return of hand function. **Conclusions:** In some patients with early infectious flexor synovitis, urgent surgery may not be required. We present a brief synopsis of 12 such cases.

Résumé

Historique : La plupart des chirurgiens opèrent d'urgence les ténosynovites infectieuses précoces des fléchisseurs depuis que Bunnell a rédigé le premier manuel sur les chirurgies de la main en 1945. Certains chirurgiens possèdent une bonne expérience de la prise en charge non chirurgicale de certains cas à présentation précoce. **Méthodologie :** La présente analyse rétrospective des dossiers médicaux portait sur 12 patients hospitalisés à cause d'une synovite infectieuse précoce des fléchisseurs qui avaient reçu un traitement prudent au moyen d'antibiotiques, d'une immobilisation et d'une élévation, sans drainage chirurgical. **Résultats :** La période moyenne jusqu'à la résolution des symptômes des 12 patients ainsi traités était de cinq jours (plage de deux à 11 jours). La moitié d'entre eux ont dû subir une chirurgie de la main. Huit des 12 patients présentaient une reprise complète de la fonction de la main bien étayée. **Conclusions :** Chez certains patients atteints d'une synovite infectieuse précoce des fléchisseurs, la chirurgie d'urgence n'est pas nécessaire. Les auteurs présentent un synopsis de ces 12 cas.

Keywords

antibiotic therapy, infectious flexor tenosynovitis, conservative management

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Introduction

In 1912, Dr Allen Kanavel described infectious flexor synovitis in his influential book *"Infections of the Hand."*¹ In 1937, Dr Robert Grinnell stressed the importance of surgical intervention in this condition by illustrating a time-dependent relationship between delay to surgical debridement and patient outcome.² Sterling Bunnell's first text of hand surgery in 1945³ established surgery as the first-line treatment of flexor synovitis. This belief was appropriate at that time as these infections routinely ruined hand function and actually killed some patients because there were no effective antibiotics.

Since 1945, many surgeons have found that they can frequently abort infection in early infectious flexor synovitis with antibiotics, elevation, and immobilization, without the need for surgical drainage and its inherent morbidity. Surgical treatment of early infectious flexor synovitis creates a secondary injury to the soft tissues surrounding the flexor tendon. Scars created by surgical dissection can add additional morbidity to the infection insult to the tissues.⁴⁻⁷

The treatment of early infectious flexor synovitis without surgical intervention has not been well-documented in the literature.⁸ We present 12 successful cases of such conservative management.

Materials and Methods

This study was a retrospective chart review of 12 consecutive patients admitted to hospital with early infectious flexor synovitis, under our group of staff plastic surgeons at the Saint John Regional Hospital. We made the diagnosis of flexor synovitis with Kanavel's 4 signs: fusiform finger inflammation and swelling, finger held in a flexed position, acute tenderness on attempted extension, and pain on palpation of the flexor tendon sheath. Careful physical examination was performed to evaluate for obvious purulence in the sheath. More recently, we have added bedside ultrasound examination to look for pus collections in the soft tissues. If either purulent drainage from puncture wounds or presence of a white area beneath or through the skin (pointing pus) were identified, surgery was undertaken, and these patients were not included in this article. If the patients had no obvious pus in the sheath or hand on physical examination but did have the presence of Kanavel's signs, and they were early in the course of the disease (less than 3-7 days since the onset of symptoms), conservative management was attempted as described below.

A Trial of Conservative Treatment

After diagnosis of early infectious flexor synovitis, the patients were hospitalized for a trial of inpatient conservative management in the dedicated plastic surgery unit with specialized nursing care familiar with hand injuries and infections. A trial of conservative management included intravenous antibiotics, elevation, and immobilization without surgical intervention. Patients received one or a combination of intravenous

cefazolin, clindamycin, or vancomycin. Antibiotic treatment was altered by culture reports and infection response. Patients were assessed daily by the attendings or the residents. If their condition had deteriorated to the point where pus in the hand seemed obvious by clinical examination, they would have been taken to the operating room for drainage and irrigation. This did not happen in this group of 12 patients. Once the hands were clearly getting better as determined by a marked decrease in inflammation, pain, and swelling, the patients were switched to oral antibiotics and discharged home to be followed in the clinic. We encouraged them to get off all pain medicine as soon as the pain was gone while they were immobilized. We encouraged them to listen to their body's message of pain and gradually increase their hand movement and activity as guided by their pain. All patients were given hand therapy exercises in follow-up in the outpatient clinic by a certified hand therapist.

Results

In this group of 12 patients, there were 8 men and 4 women. Their ages ranged from 21 to 65 years at the time of diagnosis, with a mean age of 45 years. The mechanism of inciting event of the infection was unknown in 3 patients, foreign body in 2 patients, laceration in 3 patients, and puncture wound in the remaining 4 patients. The infection completely resolved without surgery in all 12 patients. They were discharged from hospital in an average of 5 days, with a range of 2 to 11 days in hospital. We have included a video of one of the cases, which is a typical representation of our experience with conservative management of flexor tenosynovitis (Supplemental Video 1).

There was documented full return of hand function in 8 of the 12 patients by our hand therapists. This was assessed by return of the patient to work, hobby, or sport without the patient indicating any sequelae. The other 4 patients were lost to follow-up as they did not return for hand therapy. In our system, hand therapy is covered by medicare for this problem and patients don't have to pay for it. Patients frequently stop coming back when they are satisfied with their hand function.

Discussion

Since the influential writings of Kanavel, Grinnell, and Bunnell in the first half of the 1900s, infectious flexor synovitis has remained treated as a surgical emergency as the first line of treatment in most centres. A recent systematic review found that there was not enough literature to determine the efficacy of early infectious flexor synovitis treatment with antibiotics alone.⁹ We present 12 cases in which a first-line treatment of a trial of non-operative treatment of early infectious flexor tenosynovitis was effective in clearing infection without surgical intervention.

Murray also described isolated case reports of patients diagnosed with early infectious flexor synovitis who showed rapid resolution of infective symptoms and full functional recovery when treated with antibiotics alone.¹⁰

We define early infectious flexor synovitis as the clinical scenario, where there is still no obvious pus collection in the finger or

hand to palpation, aspiration of pus with a needle, visualization of pointing pus below or through the skin, or visualization of a pus collection with ultrasound. We treat late-presenting infections with evident pus with surgical drainage in an operating room.

It is important to note that any signs of worsening infection while undergoing a trial of conservative management give us a low threshold to progress to surgical drainage. We are fortunate in our centre to have a relatively low incidence of drug-resistant organisms. We are also fortunate to have many patients present with early infections that have not progressed to frank evident pus as health-care coverage is truly universally covered by government health insurance.

Before the time of the writing of Bunnell's first textbook in hand surgery, "simple" infections of the hand were frequently deadly because penicillin was not available to the masses until 1945. Surgical drainage at that time in history was not just the only way to save hand function, it saved lives. When penicillin became available to the masses, surgical drainage dogma had already become entrenched as essential first-line treatment, even in early infections that may have responded to a trial of penicillin, elevation, and immobilization.

One limitation of this case series is that in conservatively managed patients, no visual confirmation of purulent fluid within the flexor sheath was obtained as all patients were managed conservatively. Some of our patients may have had soft tissue infection not involving the flexor sheath and still have the presence of Kanavel's signs. Only recently have we begun using bedside ultrasound in the hand, which is helping us in the diagnoses of finger infections and true suppurative flexor tenosynovitis.

In our experience, when we have used surgical drainage as the first option, we have sometimes found that we have taken our patients to the operating room for flexor tenosynovitis only to find that they do not have pus in the soft tissues or sheath and that the flexor sheath is preserved from infection. Our successes in a trial of early conservative therapy in early infections without obvious pus formation suggest that sometimes a trial of conservative management and antibiotics is warranted rather than a trial of operative intervention.

We feel that immobilization is important in the treatment of this problem to prevent mechanical pumping and spreading of bacteria along avascular planes of the hand and flexor tendon sheaths. Elevation helps decrease swelling to improve blood flow to get the antibiotics, white cells, and antibodies to the zones of invasion by bacteria. We also get the patients off all pain killers as soon as if their pain is gone when the hand is immobilized and elevated. We tell them: "We did not spend 2 billion years evolving pain because it is bad for us! It is your body's only way of telling you it is trying to fight the infection and heal and that it is not ready to do the things you are trying

to do." Most reasonable patients understand this common sense approach. We tell them they can increase their activity and allowing their hand down only if it does not hurt to do so when they are off all pain medication. This is pain-guided hand therapy that has worked well in our patients.

In summary, we have presented 12 patient examples of early infectious flexor synovitis with classic Kanavel's signs in which urgent surgical drainage was not required. Some patients will respond to elevation, immobilization, and intravenous antibiotics.

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Supplemental Material

Supplementary material for this article is available online.

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