



Infectious flexor hand tenosynovitis: State of knowledge. A study of 120 cases

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ABSTRACT

Introduction: Since Kanavel in 1905, knowledge of phlegmon of flexor tendon sheaths of the fingers have evolved over the twentieth century. This serious infection is 20% of infections of the hand and may have adverse consequences for the function of the finger and even beyond, of the hand. Amputation is always a risk. Frequently face this type of infection, we conducted a retrospective study and made an inventory of knowledge in order to consolidate and improve the overall care.

Materials & Methods: The study was retrospective and cross, focused on 120 patients operated on at Hand Surgery Unit, during 4 years. Inclusion criteria were primary or secondary infection of the sheath of the flexor tendons of the fingers. The evaluation focused on clinical and paraclinical perioperative parameters. At last follow, digital mobility (Total Active Motion), the functional score of QuickDASH and the socio-professional consequences were evaluated.

Results: The mean age was 40 years, with a male predominance. The hospital stay was 17 days on average (3 days to 80 days). From the classification of Michon, as amended by Sokolow, we found 60 Stage I, 48 stage II, 12 stage III. The Total Active Motion was respectively 240°, 140°, 40°. QuickDASH scores were respectively 20, 56 and 90 out of 100. The time for return to work was 1 month for stage I, 4 months for stage II and 12 months for stage III.

Discussion: The long-term functional outcome was generally poor, with stiffness or digital amputation. The poor prognostic factors were: the initial advanced stage of infection, infection beta-haemolytic Streptococcus group A, and delayed surgical management. Smoking was identified as a new risk factor in this disease, as well as diabetes or immunodeficiency. This study confirmed the predominance of Staphylococcus, and scalability of the infection depending on the mode of contamination, and / or type of germ that is to say, scalability schedule for β -hemolytic streptococci group A chronic and scalability for intracellular bacteria (mycobacteria).

Conclusion: Any suspicion of flexor hand tenosynovitis should lead to an emergency surgical exploration, not primary antibiotics prescription!

1. Introduction

Since the initial description by Kanavel in 1905 [1], data collection and modes of management for phlegmons of flexor tendon sheaths have continued to evolve following medical advancements and the advent of antibiotics. A phlegmon is a diffuse infection without a local collection, which is the opposite of an abscess. The word “phlegmon” has its origins in the Greek word *phlégō*, which means *I burn*.

A phlegmon of the flexor tendon sheaths refers to an infection of the

flexor tendons of the fingers, which is caused by infection of the synovial sheets. This severe infection represents 20% of hand infections and may result in complications that compromise the function of the finger, and even that of the hand, if it is not treated quickly. Furthermore, there is always a risk that amputation may be required.

The SOS Hand Unit frequently manages this type of infection. We hereby present a report, discussing the current state of knowledge on phlegmons of tendon sheaths, in order to codify and improve patient management, implement prevention strategies and add to the body of

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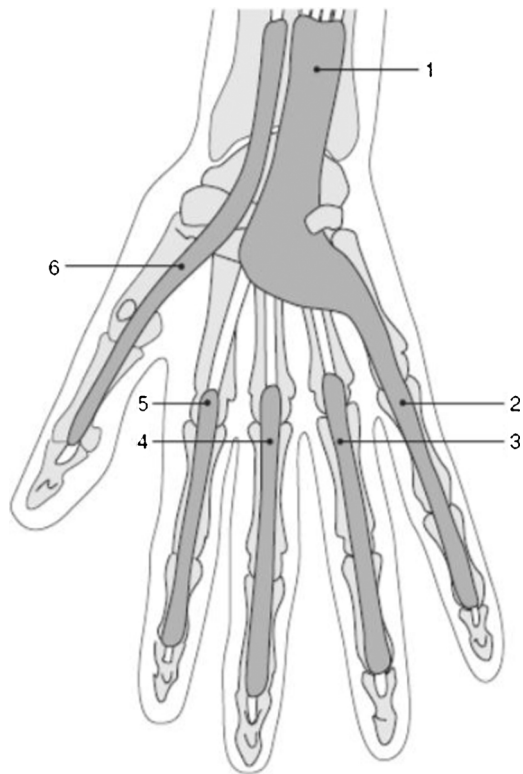


Fig. 1. Flexor tendon sheath.

medical knowledge in this area.

We make a distinction between the common synovial sheath of the flexor tendons, which runs from the carpal tunnel to the palm of the hand, the synovial sheet of the long flexor tendon of the little finger, and the digital synovial sheets of the four long fingers [2] (Fig. 1).

The synovial structure, which is also called the synovial sheath of the flexor tendons, is made up of two leaflets: a parietal leaflet and a visceral leaflet, which surround the tendon like a sleeve. The small space thus created between the two leaflets plays an important role in the mechanics of flexor tendon action.

A true communication may exist between these two digitocarpal sheaths at the level of the wrist. Gosselin found this in only 1.67% of cases, but other studies have reported a communication rate of 60%. This variation is the basis for the so-called “*per continuitatem*” phlegmon [3–5]. With respect to vascularisation, Zbrodowski and Guimberteau [6,7], describe the intrinsic vascularisation of the synovial sheaths and flexor tendons.

Three modes of contamination in phlegmon pathophysiology have been identified: direct inoculation, diffusion (a nearby focus of infection) and haematogenous spread.

During history-taking, the following should be elicited from patients: the circumstances of the accident, any predisposing condition (such as diabetes, immunodeficiency, chronic alcoholism, drug abuse), tobacco addiction, anti-tetanus vaccination status, and the usual functional signs (e.g. constant, acute and severe or slowly evolving pain along the length of the sheath of the flexor tendons of the fingers, and the flexed attitude of the finger).

During physical examination, the following should be looked out for: digital oedema, pain with passive extension, pain with palpation of the cul-de-sac of the sheath, epitrochlear or axillary lymphadenopathy, lymphangitis, and general signs (such as fever, chills, malaise). These general signs are not always present and point to severe disease.

No complementary examination is useful for making a diagnosis of a phlegmon of the flexor sheaths - the diagnosis is clinical. However, complementary examinations are useful in the context of diagnostic



Fig. 2. Sheath washing.

uncertainty, in the search for a lesion, for pre-operative evaluation, and to identify a microorganism.

Phlegmons evolve in three distinct phases, which form the basis for Sokolow's modification of Michon's classification [3,4]:

- **Stage I:** Exudative serositis, which distends the sheath; the fluid is clear or turbid and the synovium is simply hyperaemic.
- **Stage IIa:** The synovium is subnormal. There are some localized pathologic areas; there is no justification for a complete synovectomy, but a partial synovectomy (limited to the pathologic areas) may be performed.
- **Stage IIb:** The synovium is pathologic (oedematous, hypertrophic and granulomatous) throughout the length of the digital tunnel; there may also be infiltration of the subcutaneous tissue, which may have septic areas; a complete synovectomy is justified in this situation.
- **Stage III:** Necrosis, with greater or lesser tendon involvement (Fig. 2).

2. Materials and methods

2.1. Materials

This retrospective cross-sectional study was carried out at the orthopaedic and trauma surgery department of the SOS Hand Unit, involving patients who had an operation for treating a phlegmon of the flexor tendon sheaths of the fingers, between 2004 and 2008.

The exclusion criteria in our study were infections of the hand that did not involve the flexor tendon sheaths and non-infectious tenosynovitis. All of the patients were examined in person, except when this was not logistically possible (for example due to distant relocation). In these cases, patients were contacted by telephone.

The preoperative variables studied were: age, handedness, profession, leisure activities, consumption of tobacco or alcohol, past medical history, drug history, allergies, history of the illness (such as the type of wound), the circumstances, fingers affected, time interval before onset of symptoms, mode of management (use of initial antibiotic therapy, NSAIDs (non-steroidal anti-inflammatory drugs) etc.), functional signs (pain, flexion attitude of the finger), local physical signs (pain over the cul-de-sac, pain with extension, neurologic testing, vascularisation), regional physical signs (lymphadenopathy, lymphangitis), general signs (fever, chills, malaise), biological data, bacteriologic data and imaging.

For the purpose of follow-up research, the variables that were studied were: finger sensitivity and mobility (total active motion for the long fingers and Kapandji score [26] for the little finger), the Quick-Dash functional score [27], an abridged version of the DASH (*disability of the arm, shoulder and hand*), and the time interval before return to work or leisure activities.

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