

Case Report

Pyogenic flexor tenosynovitis: costly when missed

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ABSTRACT

ABSTRAK

Pyogenic flexor tenosynovitis is one of the most common cause of hand infections where it can lead to severely disabling complications if not promptly and adequately treated. Flexor tenosynovitis is diagnosed by the presence of 4 pathognomonic signs as described by Kanavel.

We present a case of a 44-year-old female patient with a chronic history of non-controlled diabetes mellitus complicated with chronic kidney disease, who present with a non-healing ulcer of the right middle finger. The patient was treated at a local diabetic clinic and was referred to our hospital because the wound did not show any improvement after treatment at the clinic. The wound was consulted as a diabetic ulcer, but further examination by the attending orthopaedic surgeon revealed a severely infected hand showing the classical signs of a pyogenic flexor tenosynovitis. Disability of the arm, shoulder and hand (DASH) score at the time of admission was 89.2 and an operation for debridement was scheduled. Intra-operative findings showed diffuse infection and the finger was unsalvageable, so a ray amputation was performed to the affected finger. The patient was discharged 2 days after the surgery and upon 2-month regular follow-up the wound healed with a DASH score of 28.2.

Flexor tenosynovitis is a disease that normally have a benign course if treated promptly and correctly. We present one of the worst outcomes that can happen to a normally benign course of flexor tenosynovitis if it is complicated by underlying diseases and a late onset of treatment.

Pyogenik fleksor tenosinovitis adalah salah satu penyebab paling umum dari infeksi tangan yang dapat menyebabkan komplikasi yang menyebabkan disabilitas jika tidak ditangani dengan cepat dan benar. Fleksor tenosinovitis dapat didiagnosis dengan adanya 4 tanda patognomonik seperti yang dijelaskan oleh Kanavel.

Kami mendeskripsikan kasus seorang pasien wanita berusia 44 tahun dengan riwayat diabetes melitus tak terkontrol dengan penyakit ginjal kronis yang datang dengan ulkus yang tidak sembuh pada jari tengah kanan. Pasien dirawat di klinik diabetes dan dirujuk ke rumah sakit kami karena lukanya tidak menunjukkan perbaikan setelah perawatan di klinik tersebut. Pasien dikonsultasikan dengan ulkus diabetes, tetapi pemeriksaan lebih lanjut oleh ahli bedah ortopedi menunjukkan tangan yang terinfeksi dan menunjukkan tanda-tanda klasik pyogenik fleksor tenosinovitis. Skor Disability of the Arm, Shoulder and Hand (DASH) pada saat masuk adalah 89,2. Operasi untuk debridemen dijadwalkan. Temuan intraoperatif menunjukkan infeksi difus dan jari dinilai tidak dapat diselamatkan, sehingga diputuskan untuk melakukan ray amputation ke jari yang terkena. Pasien dipulangkan 2 hari setelah operasi dan setelah follow up rutin 2 bulan, lukanya sembuh dengan skor DASH 28,2.

Fleksor tenosinovitis adalah penyakit yang pada umumnya jika diobati dengan segera dan benar dapat sembuh tanpa komplikasi. Kami memberi contoh salah satu kemungkinan terburuk yang dapat terjadi pada fleksor tenosinovitis yang dipersulit oleh penyakit komorbid dan penanganan yang terlambat.

Keywords: DASH, diabetes, flexor tenosynovitis, pyogenic, ray amputation, treatment delay
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INTRODUCTION

Flexor tenosynovitis is a term describing inflammation of the flexor tendon sheath. It can be a stand-alone inflammation from overuse or the result of a chronic process, but most of the time it is caused by an underlying infection. A flexor tenosynovitis with bacterial etiological source is also known as pyogenic flexor tenosynovitis. It is one of the most common cases of infections of the hand.^[1]

Infection of the tendon sheath is a common site for hand infection, as described by Glass and Fowler, the prevalence of pyogenic flexor tenosynovitis is 31% or almost one-third of all hand infections.^[2]

A diagnosis of flexor tenosynovitis can initially be made if these 4 pathognomonic signs as described by Kanavel are found: 1) tenderness over flexor sheath, 2) digit resting in a semi-flexed position, 3) tenderness with passive extension, and 4) uniform swelling of the entire digit.^[3]

Treatment of pyogenic flexor tenosynovitis consists of antibiotics followed by immediate debridement. If improperly treated with inadequate antibiotics and immediate debridement or lavage is delayed, this disease can lead to severe complications resulting in permanent tendon injury, decrease in range of motion, and ultimately, a non-viable finger. Concomitant diseases such as diabetes, also increase the morbidity rate significantly. And that is why it is of utmost important that a pyogenic tenosynovitis is recognized and treated without delay especially in the presence of a complementary disease.^[4,5]

In this report we are presenting a case of neglected pyogenic flexor tenosynovitis that was initially diagnosed and treated as a diabetic ulcer. Delayed diagnosis and treatment led to the digit being non-vital, which led to an unfortunate but necessary ray amputation of the finger.

Case Report

A 44-year-old female was consulted to the orthopaedic department for a non-healing ulcer of the third digit of the right hand. She was right-handed. The patient also had a history of insulin-dependent diabetes mellitus for more than 10 years, but was poorly compliant. The disease had already progressed to a chronic kidney disease. A month before admission, the patient had accidentally sliced the tip of her middle finger with a kitchen knife

while cooking and had the wound treated twice weekly at a local diabetic clinic. The routine wound dressing did not improve the overall wound condition and the patient was referred to our hospital for further treatment.

Laboratory findings, shortly after the patient was admitted, showed anemia, hyperglycemia, elevated ureum creatinine and hyperglycemia with signs of infection as shown by elevated white blood cells and inflammatory markers.

After the patient was stabilized, the wound of the hand was cleaned and dressed, and was consulted to the orthopaedic department as a diabetic ulcer.

The left hand was presented to us with very painful, edematous, reddish, fusiform swelling of the middle finger with apparent subcutaneous pus and necrotic tissues at the distal tip of the finger (Figure 1 and Figure 2). Radiological examination of the hand revealed soft tissue swelling with signs of osteomyelitis of the proximal, middle and distal phalanges of the middle finger (Figure 3). Laboratory results showed elevated blood sugar, leucocyte count and C-reactive protein levels.



Figure 1. Dorsal side of wound at presentation



Figure 2. Palmar side of wound at presentation



Figure 3. X-ray of wound

Pre-operative functional level according to the Disabilities of the Arm, Shoulder and Hand (DASH) score was 89.2.

Initially, a debridement and a closed irrigation as a salvage procedure was attempted, but intraoperative measurement showed that the digit was non-vital and the pus had spread to the midpalmar space and would risk further infection to the whole hand. Based on the intraoperative findings, we decided to perform a ray amputation of the middle finger. Post operative results are shown in figure 4 and figure 5.



Figure 4. Dorsal post-operative



Figure 5. Palmar post-operative

The patient was discharged 2 days after surgery, and the wound was cleaned and dressed routinely twice a week. Swab culture result revealed *Staphylococcus aureus* as the responsible pathogen, and antibiotic therapy was given according to the sensitivity test result. There was a slight wound dehiscence especially on the web space, and some slough formation on the first follow-up weeks. After 2 months of routine wound care visits, the wound healed nicely and the function was found to be 20.8 according to the DASH score, with the patient being able to do activities of daily living, including writing (Figure 6 - Figure 9).



Figure 6. 2 months Post-operative finger adduction



Figure 7. Palmar side 2 months post-operative



Figure 8. post-operative 2 months front view



Figure 9. Dorsal view 2 months post-operative

DISCUSSION

Pyogenic flexor tenosynovitis, as the name implies, is an inflammation of the flexor tendon sheath caused by a bacterial infection. It is one of the most common causes of patient presenting with hand infections.^[3]

Our patient presented in an advanced stage of lesion with marked subcutaneous pus formation and necrotic tissue in the distal part of the finger. The main problem was that the patient had already spent weeks being treated with a non-healing diabetic ulcer. Pyogenic flexor tenosynovitis as a diagnosis was only suspected after a consult to the orthopedic department. Examination showed fusiform swelling with finger in a semi-flexed position. All classic signs of flexor tenosynovitis were all present albeit somewhat masked by the extensive progression of the disease. Had the patient been consulted to a surgeon with the knowledge of this Kanavel signs, amputation could have been avoided.^[1,3]

According to a study by Hee-Nee Pang, *et al.* the prognosis of hand infections could be determined by: patient age, location of infection, treatment delay, presence of necrotic tissues, subcutaneous purulence, digital ischemia, and concomitant diseases such as diabetes mellitus.^[6] Where patient age 43 and above are associated with a 4.5 times higher risk of amputation, infection of closed structure and tendon sheaths are associated with delay in recovery; treatment delay of 2.5 days or more, along with subcutaneous purulence, and presence of necrotic tissues are all associated with delay in recovery and increasing the amputation risk. Concomitant diseases, particularly diabetes mellitus and peripheral arterial disease, also

increases the risk of amputation where patients presenting with flexor tenosynovitis with diabetes have a 39% chance of being amputated and 71% for peripheral arterial diseases.^[5]

We have found a few case reports of flexor tenosynovitis that have described the potentially devastating consequences of a pyogenic flexor tenosynovitis.^[7,8] These cases described necrosis and amputation as a result of extensive infection and disturbed perfusion leading to tissue destruction in patient with pyogenic flexor tenosynovitis. Flexor tenosynovitis by itself may have a predilection for infection advancement because flexor sheaths of tendons may interrupt with the body's healing mechanism.^[7]

A case report by Asif Jubair, MD, reported that flexor tenosynovitis complicated by digital ischemic necrosis leading to amputation^[7]. A case reported by Evgenios Evgeniou, Srinivasan Iyer also described a case of pyogenic flexor tenosynovitis leading to amputation because of delay in the treatment and complications in its management.^[8]

Our patient presented with some of the aforementioned conditions that point to an increased risk of amputation in a hand infection case, even before the decision to do the amputation was decided. First, the location itself (flexor tendon) is associated with higher chances of pus formation and necrosis.

The delay in treatment was estimated to be one month, which is far above the limit for treatment delay associated with poorer outcomes discussed above. Further, in our patient the presence of subcutaneous purulence, necrotic tissues, concomitant diabetes mellitus, along with lack of perfusion as shown by the lack of bleeding when tested by incision, all led to our decision to do an amputation of the digit. Fortunately, the amputation brought satisfying result to the patient as shown by the post-operative DASH score.

CONCLUSION

Flexor tenosynovitis by itself does not have high morbidity. Amputation and disabilities are prominent only when there are exacerbating factors such as age, concomitant diseases, advance disease progression, and delayed treatment.

While factors such as age and concomitant diseases cannot be modified, they, however, should raise the awareness of physicians for they may increase the chance of complications. All clinicians should be aware of the crucial modifiable factors of flexor tenosynovitis prognosis, which is the onset of treatment. Where early recognition and treatment could be the difference between total recuperation and restoration to full mobility and function or progressivity of the disease which may ultimately end up in an amputation.

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