

## Research Article

## Open Access

## Septic acute Tenosynovitis of the Flexor Hallucis Longus Tendon Complicating a Lower Limb Erysipelas

Hatim Abid<sup>1\*</sup>, Mohammed El Idrissi<sup>1</sup>, Abdelhalim El Ibrahimi<sup>1</sup>, Abdelmajid Elmrimi<sup>1</sup>, Nissrine Amraoui<sup>2</sup>, Meriem Meziane<sup>2</sup> and Fatima Zahra Mernissi<sup>2</sup>

<sup>1</sup>Department of osteoarticular surgery (B4), HASSAN II teaching hospital, Fes, Morocco

<sup>2</sup>Department of dermatology (E4), HASSAN II teaching hospital, Fes, Morocco

### ABSTRACT

Erysipelas is the most common bacterial dermal-hypodermal acute not necrotizing infection [1,2]. Its evolution is usually mild but can be complicated mainly by local abscess or necrosis [3-7]. In this context osteo-articular complications and septic acute tenosynovitis are rarely described in the literature with a rate of 1.2% [3]. We report in the light of a literature review a case of recurrent erysipelas of the leg in a young patient of 29 years complicated by septic acute tenosynovitis of the flexor hallucis longus (FHL), to remind this complication mainly observed in severe forms of erysipelas which is not the case of our patient.

### \*Corresponding author

Hatim Abid, Department of osteoarticular surgery (B4), HASSAN II teaching hospital, Fes, Morocco. E-mail : hatim.abid1@gmail.com

**Received:** May 22, 2021; **Accepted:** May 26, 2021; **Published:** May 30, 2021

**Keywords:** Erysipelas, Complications, Septic Acute Tenosynovitis, Flexor Hallucis Longus.

### Introduction

The lower limb is the most common location for erysipelas [3]. In its classic form, the disease appears as a bright-red, spreading, superficial, edematous lesion with sharply demarcated edges [7]. Its evolution is usually favorable to antibacterial therapy in primary care. However, local complications remain possible particularly in the presence of risk factors as obesity, diabetes mellitus, age greater than 50 years, female gender, smoking, cardiovascular history, lymphedema and nonsteroidal anti-inflammatory drugs taking [8].

We share through this article in the light of a literature review, the case of a septic acute tenosynovitis of the FHL which is rarely described in healthy patients as a locally complication of erysipelas [9].

### Observation

We report the case of a young sportive male of 29 years, with an antecedent of erysipelas of the right leg 10 years ago following which he kept a slight lymphedema. The patient presented abruptly a second episode of erysipelas (Figure 1).



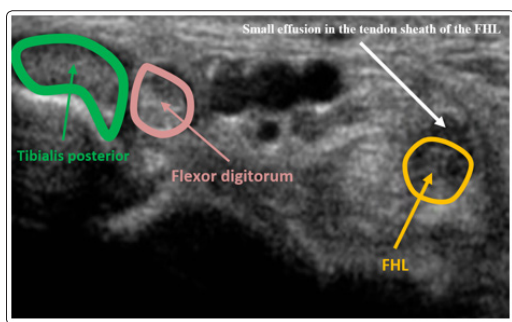
**Figure 1:** Clinical presentation of erysipelas of the right leg and foot

The general examination revealed a feverish patient in 39°. Skin examination found painful erythematous edematous and hot right leg extending to the right foot without gravity signs, associated with slight lymphedema and an intertoe intertrigo. At this stage, the rest of the physical examination was normal.

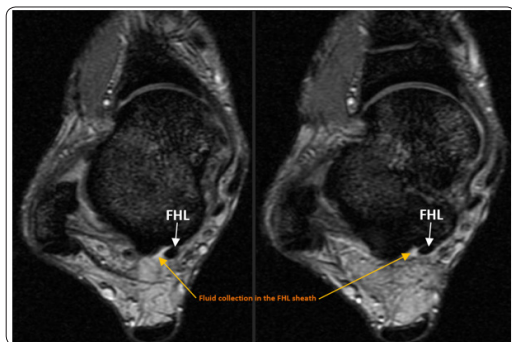
Laboratory test showed hyperleukocytosis with neutrophils predominance at 18800 cells/mm<sup>3</sup>, an increased C-reactive protein (CRP) at 322 mg/L, a procalcitonin (PCT) at 0.66 ng/ml, a negative hemocultures with a normal value of glycemia. Plain radiographs of the foot and ankle showed no abnormality.

The patient was put under penicillin G. An initial clinical and laboratory improvement was noted, hence the switch to the oral pathway after the sixth day of treatment. The evolution was marked a day later by the onset of inflammatory tumefaction of the medial malleolar associated with palpation pain of the FHL tendon throughout its course from the posteromedial ankle region to the base of the last phalanx of the great toe particularly when the ankle and hallux are maximally dorsiflexed.

The joint ultrasound and MRI revealed a small effusion of the tendon sheath of the FHL evoking in the context a septic tenosynovitis of the FHL (Figure 2 and 3). Therefore, the patient was put first under injectable antibiotics based on quinolones and gentamicin and operated by limited catheter irrigation technique. The Antibiotics were continued orally until CRP negativation obtained around 6 weeks. To prevent erysipelas recurrence, the patient was put under Benzylpenicilline Benzathine (2.4 MU/3week). Stockings and rehabilitation were prescribed for the management of the lymphedema.



**Figure 2:** Joint ultrasound revealing a small effusion (white arrow) of the tendon sheath of the FHL (orange arrow).



**Figure 3:** T2-weighted MRI of the ankle demonstrating high signal fluid (orange arrow) surrounding the low-signal of the FHL (white arrow)

## Discussion

Local and systemic complications are possible during erysipelas. They are the cause of prolonged hospitalization, death and are mainly observed in severe infection forms which is not the case of our patient who presented an associated slight lymphedema as a recurrence risk factor [10].

Local complications are seen in 5% to 10% of cases, they occur in the context of disease evolution in the absence of treatment or appear after incomplete improvement under treatment as seen in our patient [10]. Next to abscess, necrosis or deep phlebitis, osteo-articular complications such as osteomyelitis, synovitis and bursitis are rarer and whose rate is estimated at 1,2% [3,4,11]. In the same frame, septic acute tenosynovitis is even less reported in the literature.

Septic acute FHL tenosynovitis manifests clinically by pain that traces the path of the tendon sheath ranging from the posterior leg to the plantar foot and the hallux and can be awakened by local pressure and tensioning of the tendon. Often it is associated with edema, fever and chills [12]. Untreated septic acute tenosynovitis exposes to infection dissemination to adjacent tendons, joints and subcutaneous tissue, which implies a risk of cellulitis, arthritis or sepsis. Locally, the affected tendon may be the subject of a rupture. [12].

From a bacteriological point of view, the most implicated germ is the staphylococcus aureus with a percentage of 80% [13]. Then follow each other in decreasing order of frequency the  $\beta$ -hemolytic streptococcus in 30% of the cases, the staphylococcus epidermidis and the Gram negative bacilli with the same percentage around 20% [14]. In practice, germ detection is usually difficult. Indeed, cultures are often sterile and samples of the front door are inconclusive [15]. About that, studies have shown that in 20 to 68% of the time, no bacteria are ever isolated [16,17].

Complementary imaging studies are important to confirm the diagnosis [18,19] with the exception of standard radiography which is usually normal especially if it is prematurely realized but makes note of the arguments against a bone or joint disease of neighborhood [20].

Osteo-articular ultrasound which is an inexpensive, repeatable and non-invasive tool, represents the key to detect first a collection in the sheath tendon and in the second place to study the tendons and joints neighborhood [21]. The magnetic resonance imaging (MRI) permits the visualization of edema and inflammation. It specifies the anatomic extent of the infection and displays an associated abscess [22,23].

Prompt diagnosis of septic acute tenosynovitis can be challenging, but early recognition and initiation of treatment is essential to avoid complications and preserve extremities function [24]. In this context, the literature review highlights the importance and the benefits of systemic antibiotics alongside surgery in the treatment of this rarer local erysipelas complication [24].

Regardless of the pathogen, management of septic acute tenosynovitis includes prompt administration of empiric intravenous antibiotics. Prior to obtaining culture results, antibiotic selection should cover gram-positive organisms, including Staphylococcus and Streptococcus species. Empiric antibiotics should also cover gram-negative rods and anaerobes especially in immunocompromised patients. Once the precise organism is isolated, the antibiotic regimen should be narrowed to target the specific bacteria identified [25,26]. Some reported the use of intravenous (IV) antibiotic postoperatively after surgical debridement [27] whereas others suggested that antibiotic therapy should be initiated as soon as the diagnosis is made [28-30]. About that, Giladi et al could not differentiate in their systematic review the outcomes between these approaches [24].

Recently, there has been work trying to elucidate the role of local antibiotics and corticosteroids in the treatment of septic tenosynovitis [31]. In a cadaveric model, the authors found that bacterial load by direct colony counting decreased by 18.5% with saline irrigation alone, 42.6% with irrigation and local steroids, 54.4% with irrigation and local antibiotics and 77.3% with irrigation and both local antibiotics and steroids [31]. Thereby, adjunction of local antibiotics and corticosteroids to better eradicate the infection could be considered in the current

treatment of septic tenosynovitis [25,31].

Concerning surgical procedure, it contains theoretically at first the excision of the front door with a systematic wash of the synovial sheath. According to the local observation, the intervention can be completed by a synovectomy and much wider excision [12]. Technically, in the literature, the opinions are divided between two main attitudes that are aggressive open surgical debridement and limited catheter irrigation technique. The results from smaller comparative technique studies [32-35] support that aggressive open surgical debridement exposed to a high risk of joint stiffness and tendon adhesions. However, limited entry into the flexor sheath utilizing catheter irrigation results in better overall range of motion outcomes without increased risk of infectious complications.

Lui T H described in the context of minimally invasive approach, the combined arthroscopic and tendoscopic procedure to manage FHL septic tenosynovitis and first metatarsophalangeal (MTP-1) synovitis after prick injury [36]. According to the author, the advantages of this technique include small incisions which provides better cosmetic results, less chance of painful scar formation and thorough exploration and debridement of the FHL tendon and the MTP-1 joint [36].

The prevention of the occurrence of septic tenosynovitis passes above all by the prevention of erysipelas and the control of its risk factors. It is based first on the identification and effective treatment of the front door. In this context, Long-term prophylactic antibiotics therapy with oral or intramuscular penicillin or macrolides is aimed at eradicating and preventing the growth of bacteria [37-41]. Several learned societies advise initiating treatment after the second erysipelas episode [42-44]. The International Society of Lymphology [45], the Infectious Diseases Society of America [46] and the French Society of Dermatology indicate that repeated, frequent or several episodes of prophylactic antibiotics therapy are necessary [47]. In addition, maintaining the integrity of the skin barrier is essential in this preventive approach. All documents call for Avoiding dry and cracked skin, treating macerated skin and fungal foot infections [48-50]. Chronic lymphedema foster the growth of bacteria and fungi and impair the body's ability to produce an appropriate local immune response [51,52]. Different methods have been described to treat this accumulation of fluid in the tissues most of which are non-operative and act principally by mechanical compression and increasing of blood and lymphatic flow thanks to compressive bandages, elastic stockings, physical therapy and exercise. Diuretic treatment generally works through the production of urine and shifting of the body's fluids from the swollen tissues into the blood vessels, and weight loss works by reducing limb volume and the facilitation of vascular flow and lymphatic drainage [53,54]. Surgical techniques to treat lymphedema have slowly been introduced, aiming to reconstruct a lymphatic drainage system and to remove overgrowing tissue, including the removal of fat tissue (liposuction) [54,55].

In our context, the patient was operated through a medial approach by limited catheter irrigation technique. Parenteral antibiotics were started immediately following tissue sampling addressed to bacteriological and histological analysis. Methicillin-sensitive *Staphylococcus aureus* was isolated on culture. The IV antibiotics were continued until edema, pain and inflammatory markers improvement. The patient was then switched to an oral regime for a duration of 6 weeks. Six months after surgery, the patient had resumed sports activities and inflammatory markers remained within normal limits.

## Conclusion

This case report underlines one of the rare but potential complication of the leg erysipelas namely septic acute tenosynovitis of the FHL tendon. Benign in appearance, this complication can have serious consequences, particularly in a young athlete by bringing into play the functional prognosis of the ankle. Consequently, an early diagnosis of this affection is essential for establishing the appropriate treatment. The prevention of septic acute tenosynovitis of the FHL tendon passes above all by the prevention of leg and foot erysipelas recurrence and the control of its risk factors.

## References

1. Vinh DC, Embil JM (2005) Rapidly progressive soft tissue infections. *Lancet Infect Dis*. 5:501-513.
2. Baddour LM (2005) Epidemiology, clinical features and diagnosis of cellulitis. In: Rose BD, editor. Wellesley (MA): Up-to-Date; 2005.
3. Jorup-Ronstrom C (1986) Epidemiological, bacteriological and complicating features of erysipelas. *Scand J Infect Dis*. 18:519-524.
4. Eriksson B, Jorup-Ronstrom C, Karkkonen K, Sjöblom AC, Holm SE et al. (1996) Erysipelas: clinical and bacteriologic spectrum and serologic aspects. *Clin Infect Dis*. 23:1091-1098.
5. Ginsberg MB (1981) Cellulitis: analysis of 101 cases and review of the literature. *South Med J*. 74:530-533.
6. Lanoux P, Penalba C, Legin C, Kivade M, Reveil JC. L'érysipèle: a propos de 118 observations. *Med Mal Infect*. 1993;23:908-12.
7. Chartier C, Grosshans E (1990) Erysipelas. *Int J Dermatol*. 29:459-467.
8. Titou H, Ebongo C, Bouati E, Boui M (2017) Risk factors associated with local complications of erysipelas: a retrospective study of 152 cases. *Pan Afr Med J*. 26: 66.
9. Millerioux S, Rousset M, Canavese F (2013) Pyogenic tenosynovitis of the flexor hallucis longus in a healthy 11-year-old boy: a case report and review of the literature. *Eur J Orthop Surg Traumatol*. 23:311-315.
10. Crickx B (2000) Erysipèle: evolution medicale sous traitement. Complications. *Med Mal Infect*. 30: 359-364.
11. Mahe E, Toussaint P, Lamarque D, Boutchneis S, Guiguen Y et al. (1999) Erysipèles dans la population jeune d'un hôpital militaire. *Ann Dermatol Venerol*. 126:593-599.
12. Dernis E, Puéchal X (2006) Bursites et tenosynovites septiques: diagnostic et traitement. *Rev du Rhum*. 73:345-350.
13. Hutton C, Maddison PJ, Isenberg D, Woo P, Glass D, et al. (1993) Regional problems of the arm and leg in adults: tendinitis and enthesitis. *Oxford textbook of rheumatology*. New York: Oxford University Press Inc: 70-79.
14. Smith J, Piercy EA, Mandell GL, Bennett JE, Dolin R, et al. (1995) Mandell, Douglas and Bennett's principles and practice of infectious diseases. New York: Churchill Livingstone Bone and joint infections.2: 1032-1039.
15. Polo FJ, Solera J, Espinosa A, Martinez-Alfaro E (2000) Abscessed tenosynovitis caused by *Nocardia* sp. in a patient with human immunodeficiency virus infection. *Enferm Infect Microbiol Clin*. 18: 298-299.
16. Neviasser RJ (1978) Closed tendon sheath irrigation for pyogenic flexor tenosynovitis. *J Hand Surg Am*. 3: 462-466.
17. Juliano PJ, Eglseder WA (1991) Limited open-tendon-sheath irrigation in the treatment of pyogenic flexor tenosynovitis. *Orthop Rev*. 20:1065-1069.
18. Chartash EK, Good PK, Gould ES, Furie RA (1992) Septic subdeltoid bursitis. *Semin Arthritis Rheum*. 22: 25-29.
19. Floemer F, Morrison WB, Bongartz G, Ledermann HP (2004)



- MRI characteristics of olecranon bursitis. *Am J Roentgenol* 183:29-34.
20. Jimenez-Palop M, Corteguera M, Ibanez R, Serrano-Heranz R (2002) Olecranon bursitis due to *Candida parapsilosis* in an immunocompetent adult. *Ann Rheum Dis* 61:279-281.
  21. Chau CL, Griffith JF (2005) Musculoskeletal infections: ultrasound appearances. *Clin Radiol* 60:149-159.
  22. Beltran J, Shankman S (2001) MR imaging of bone lesions of the ankle and foot. *Magn Reson Imaging Clin N Am* 9:553-566.
  23. Rawool NM, Nazarian LN (2000) Ultrasound of the ankle and foot. *Semin Ultrasound CT MR* 21:275-284.
  24. Giladi A M, Malay S, Chung K C (2015) Management of acute pyogenic flexor tenosynovitis: Literature review and current trends. *J Hand Surg Eur* 40: 720-728.
  25. Chapman T, Ilyas A M (2019) Pyogenic Flexor Tenosynovitis: Evaluation and Treatment Strategies. *J Hand Microsurg* 11:121-126.
  26. Boles SD, Schmidt CC (1998) Pyogenic flexor tenosynovitis. *Hand Clin* 14: 567-578.
  27. Bauman JT, Millon SJ, Tanner SL (2005) The outpatient treatment of pyogenic flexor tenosynovitis. *J Surg Orthop Adv* 14: 92-95.
  28. Clark DC (2003) Common acute hand infections. *Am Fam Physician* 68: 2167-2176.
  29. Dailiana ZH, Rigopoulos N, Varitimidis S, M Hantes, K Bargiotas, et al. (2008) Purulent flexor tenosynovitis: factors influencing the functional outcome. *J Hand Surg Eur* 33: 280-285.
  30. Henry M (2011) Septic flexor tenosynovitis. *J Hand Surg Am* 36: 322-323.
  31. Ketonis C, Hickock NJ, Ilyas AM (2017) Rethinking pyogenic flexor tenosynovitis: biofilm formation treated in a cadaveric model. *J Hand Microsurg* 9:131-138.
  32. Delsignore JL, Ritland D, Becker DR, (1986) Continuous catheter irrigation for the treatment of suppurative flexor tenosynovitis. *Conn Med* 50: 503-506.
  33. Monstrey SJ, van der Werken C, Kauer JM (1985) Tendon sheath infections of the hand. *Neth J Surg* 37:174-178.
  34. Murray AR (1951) The management of the infected hand: based on a clinical investigation of 513 cases. *Med J Aust* 1: 619-22.
  35. Sokolow C, Dabos N, Lemerle JP, R Vilain (1987) Bacterial flexor tenosynovitis in the hand. A series of 68 cases. *Ann Chir Main* 6:181-188.
  36. Lui T H (2017) Flexor Hallucis Longus Tenosynovitis and First Metatarsophalangeal Synovitis After Penetrating Nail Prick Injury: Treated by Zone 3 Flexor Hallucis Longus Tendoscopy and Metatarsosesamoid Arthroscopy. *Arthrosc Tech* 6: 427-433.
  37. Babb RR, Spittell JA Jr, Martin WJ, Schirger A (1966) Prophylaxis of recurrent lymphangitis complicating lymphedema. *JAMA* 195: 871-873.
  38. Bitnun S (1985) Prophylactic antibiotics in recurrent erysipelas. *Lancet* 1: 345.
  39. Duvanel T, Merot Y, Harms M, Saurat JH (1985) Prophylactic antibiotics in erysipelas. *Lancet* 1: 1401.
  40. Ferrieri P, Dajani AS, Wannamaker LW (1973) Benzathine penicillin in the prophylaxis of streptococcal skin infections: a pilot study. *J Pediatr* 83: 572-577.
  41. Thind P (1985) Prophylactic antibiotics in recurrent erysipelas. *Lancet* 1: 986.
  42. British Lymphology Society (BLS) (2017) Consensus Document on the Management of Cellulitis in Lymphoedema. Revised Cellulitis Guidelines 2016. [www.lymphoedema.org/images/pdf/CellulitisConsensus.pdf](http://www.lymphoedema.org/images/pdf/CellulitisConsensus.pdf).
  43. International Lymphoedema Framework (ILF) (2017) Best Practice for the Management of Lymphoedema. International consensus 2006. <http://www.lympho.org/portfolio/best-practice-for-the-management-of-lymphoedema:1-60>.
  44. Draijer LW, Koning S, Wielink G, Boukes FS, Goudswaard AN et al. (2008) Summary of the practice guideline 'Bacterial skin infections' (first revision) from the Dutch College of General Practitioners [Samenvatting van de standaard 'Bacteriële huidinfecties' (eerste herziening) van het Nederlands Huisartsen Genootschap]. *Ned Tijdschr Geneesk* 152: 1619-1625.
  45. International Society of Lymphology (ISL) (2013) The diagnosis and treatment of peripheral lymphedema: Consensus document. *Lymphology* 46: 1-11.
  46. Stevens DL, Bisno AL, Chambers HF, Everett ED, Dellinger P, et al. (2005) Practice guidelines for the diagnosis and management of skin and soft-tissue infections. *Clin Infect Dis* 41: 1373-1406.
  47. French Society of Dermatology [Société Française de Dermatologie] (2000) Management of erysipelas and necrotizing fasciitis [Erysipèle et fasciite nécrosante: prise en charge]. *Ann Dermatol Venereol* 127: 1118-1137.
  48. Baddour LM (2000) Cellulitis syndromes: an update. *Int J Antimicrob Agents* 14: 113-116.
  49. Stalbow J (2004) Preventing cellulitis in older people with persistent lower limb oedema. *Br J Nurs* 13: 725-732.
  50. Swartz MN (2004) Clinical practice. Cellulitis. *N Engl J Med* 350: 904-912.
  51. Mallon E, Powell S, Mortimer P, Ryan TJ (1997) Evidence for altered cell-mediated immunity in postmastectomy lymphoedema. *Br J Dermatol* 137: 928-933.
  52. Mortimer PS, Rockson SG (2014) New developments in clinical aspects of lymphatic disease. *J Clin Investig* 124: 915-921.
  53. Arsenault K, Rielly L, Wise H (2011) Effects of complete decongestive therapy on the incidence rate of hospitalization for the management of recurrent cellulitis in adults with lymphedema. *Rehabil Oncol* 29: 14-20.
  54. Szolnoky G, Dobozy A, Kemény L (2014) Towards an effective management of chronic lymphedema. *Clin Dermatol* 32: 685-691.
  55. Campisi CC, Ryan M, Boccardo F, Campisi C (2016) A single-site technique of multiple lymphatic-venous anastomoses for the treatment of peripheral lymphedema: long-term clinical outcome. *J Reconstr Microsurg* 32: 42-49.

**Copyright:** ©2021 Hatim Abid, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.