

Osteosynthesis Material Infection After A Mosquito Bite

ALTDORFER, Antoine*, GAVAGE, Pierre, MOERMAN, Filip

Université catholique de Louvain: Louvain-la-Neuve, Belgium

***Corresponding author:** Dr Antoine Altdorfer, Service d'infectiologie, CHR de la Citadelle, Bld du Douzième de Ligne, 1 4000 Liège, Belgium. Email: Antoine.Aldorfer@chrcitadelle.be

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Summary

We report here the case of a patient who presented an osteosynthesis material infection shortly after an adjacent skin infection, developed just after a mosquito bite. We will discuss the links between skin infections and orthopaedic implants infections; literature on this topic is scarce.

Background

We will discuss the links between skin infections and orthopaedic implant infections for which there is little data in the literature. A prospective study has shown that successfully treated surgical site infections do not increase the risk of developing an infection of the adjacent orthopaedic implant, even in the long term [1]. Data from a recent study suggest a risk of bacterial spread during a skin

infection to an adjacent orthopaedic implant. But these data are based on a small number of patients and need to be confirmed in prospective studies [2].

Case Presentation

We report the case of a 41-year-old patient whose only history was a non-complicated knee valgus osteotomy on the right side a few years ago. In March 2019, the patient consulted an orthopaedic surgeon for a left knee pain. The arthros scanner showed a cartilaginous lesion of the internal femorotibial compartment requiring surgical management. A tibial valgus osteotomy with the placement of a plate was performed on the left side in May 2019. The post-operative radiological check-up was reassuring (Figure 1) and the post-operative course had no particularity at the radio-clinic check-ups six weeks post-operatively.



Figure 1: Post-operative radiography.

In August 2019, 3 months after the procedure, the patient was able to walk without support. In addition, the surgical scar was perfectly closed and no inflammatory signs were to be detected. Mid-August, the patient contracted a mosquito bite on the external side of the left leg. In the days to follow, an erythematous skin lesion developed around the site of the bite that then began to spread to the anterior side of the entire left leg (Figure 2). The knee was not painful and there was no flexion deficit. The patient

presented to the emergency department. A laboratory workup showed an inflammatory syndrome with C-reactive protein at 18 mg/dl and white blood count at 12,000/mm³. The diagnosis of cellulitis following a mosquito bite was withheld. It was treated with amoxicillin-clavulanate during five days and the evolution was favourable since the leg quickly regained a normal aspect.



Figure 2: Clinical aspect: skin infection on the lateral side of the left leg.

However, despite the skin gradually returning to normal, the patient began to experience pain in his left knee. The support on the left leg had become painful and the palpation of the scar against the material had become painful as well. A blood analysis showed a mild inflammatory syndrome with CRP at 10mg/l. Given the persistence of the complaints, a white blood cell scintigraphy scan was performed, showing very clear accumulation of marked white blood cells on the left tibial plateau from the medial part to the medial side compatible with an orthopaedic implant infection.

The material was therefore fully extracted in October 2019 and microbiological results showed the presence of Methicillin-sensitive *Staphylococcus aureus* (MSSA) on deep specimens (5 positive out of 5 specimens). Blood cultures were negative and a cardiac ultrasound was normal. The patient was treated with Flucoxacillin but did not tolerate the treatment. He was subsequently treated with Ciprofloxacin for a month and then relayed to Minocycline for a total duration of three months. The evolution was favourable. Three months after the material removal procedure, consolidation continued quickly and the patient regained normal mobility without pain.

Discussion

In this case of a patient who has undergone a tibial valgus osteotomy with the placement of a plate, the postoperative evolution was initially quite favourable. Three months after the operation, a mosquito bite on the operated limb appears to have been the trigger for an infection of the skin in the immediate vicinity of the orthopaedic material. Cellulitis is a skin infection that affects the skin in the epidermal, dermal and hypo-dermal layers. It is caused by the passage of bacteria usually found on the skin to the subcutaneous layer as a result of a breach in the natural protection provided by the skin. Insect bites are one of the well-known triggers that can cause infection of the subcutaneous layer [3].

Microbiological documentation is rarely formally established, but the bacteria usually involved in cellulites are mostly β -haemolytic *Streptococci* and *Staphylococcus aureus* to a lesser extent. In the immunocompromised patient gram-negative bacilli may also be involved. In a recent large review, the proportion of cellulitis caused by *Staphylococcus aureus* ranged from 14 to 51% [4].

There is little literature on the pathophysiological link between skin infections and the occurrence of orthopaedic implants infections. It is generally accepted that a skin infection can spread into deep tissues and cause infection of the proximal prosthetic devices [5]. Even so, few robust prospective studies have addressed this issue. Guirro et al conducted a prospective single-center study on the occurrence of skin infections in 3000 total knee arthroplasties [1]. In the study, the authors showed that a superficial skin infection occurring in the first month post-operatively and properly treated does not affect the occurrence of a long-term periprosthetic joint infection (PJI). However, this study only partially explored the links between skin infections and prosthetic material infection. First of all, only surgical site infections meeting the Centers for Disease Control and Prevention (CDC) criteria were considered [6]. Thus, only skin infections occurring at the incision site and within the first 30 days postoperatively were included in the study, i.e. infections of the surgical site. Skin infections occurring after this period or at other locations were not included. Thereafter, only patients who developed a properly treated skin infection were included. Patients whom developed a deep infection within the first month post-surgery directly after a skin infection were excluded [1]. This study therefore shows that a skin infection is not a risk factor for developing a long-term prosthesis infection. But it does not explore the short-term (less than a month) link between skin infection and orthopaedic implant infection.

Another retrospective multicenter study looked into the links between skin infections and infection of prosthetic devices [2]. In this study, the authors identified 22 cases with joint prostheses who presented to the emergency department for a skin infection, then developed a prosthetic material infection within days. The mean time from skin infection to the onset of PJI was 3 days. The prosthetic implants had been in place for an average of 18 months and in 95% of the cases for less than 5 years. Interestingly, in 91% of the cases the skin infection occurred on the same limb as the joint prosthesis, suggesting a spread of bacteria by contiguity, as assumed in this case. Nevertheless, the results of this study have their limits since they concern only a small number of patients and only streptococcal infections, which was not the case in our patient.

To our knowledge, this is the first described case of an orthopaedic material infection in which the sequence of mosquito bite followed by skin infection and orthopaedic implant infection take place within a few days on the same anatomical site. It is generally accepted that skin infections

should be treated as soon as possible with antibiotics in patients with orthopaedic devices [5]. More generally, it is recommended to treat the risk factors for skin infections in such patients [2]. As such, it is probably advisable that patients living with orthopaedic implants protect themselves as much as possible from mosquito bites as they are a well-known trigger for skin infections [3]. Studies should be conducted to clarify whether the link between mosquito bites and the occurrence of orthopaedic device infection is indeed a concern for people living with such material.

Conclusion

There are few data in the literature on the links between skin infections and orthopaedic implant infections. The available data suggest a short-term link between skin infections and adjacent orthopaedic implants. Mosquito bites are a well-established trigger for skin infections. Further studies are needed to determine whether patients exposed to mosquito bites are actually at risk of developing orthopaedic implant infections.

References

1. Guirro P, Hinarejos P, Pelfort X, Leal-Blanquet J, Torres-Claramunt R, et al. (2015) Long Term Follow-Up of Successfully Treated Superficial Wound Infections Following TKA. *The Journal of Arthroplasty* 30: 101-103.
2. Wouthuyzen-Bakker M, Lora-Tamayo J, Senneville E, Scarbrough M, Ferry T, et al. (2018) Erysipelas or cellulitis with a prosthetic joint in situ. *Journal of Bone and Joint Infection* 3: 222-225.
3. Cranendonk D R, Lavrijsen APM, Prins JM, Wiersinga WJ (2017) Cellulitis: current insights into pathophysiology and clinical management. *Neth J Med* 75: 366-378.
4. Raff AB, Kroshinsky D (2016) Cellulitis: A Review. *JAMA* 316: 325-337.
5. Bravo T, Budhiparama N, Flynn S, Gaol I, Hidayat H, et al. (2019) Hip and Knee Section, Prevention, Postoperative Issues: Proceedings of International Consensus on Orthopedic Infections. *The Journal of Arthroplasty* 34: S321-S323.
6. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG (1992) CDC Definitions of Nosocomial Surgical Site Infections, 1992: A Modification of CDC Definitions of Surgical Wound Infections. *Infection Control & Hospital Epidemiology* 13: 606-608.