

# First presentation of a Nora-lesion of the talus in a paraossal fasciitis

Philipp Rottler,<sup>1</sup> Axel Wilke,<sup>1</sup>  
Hans Udo Kasper,<sup>2</sup> Felix Hütter<sup>1</sup>

<sup>1</sup>Department of Orthopedics and Orthopedic Rheumatology, Elisabeth-Klinik, Olsberg; <sup>2</sup>Institute of Pathology, Clemenshospital, Münster, Germany

## Abstract

Nora-Lesion is a proliferation that normally develops out of an intact corticalis. The entity of this fibroostotic pseudotumor, as discussed in literature, is triggered from repeating trauma or reactive periosteitis. In the literature, there are more than 200 cases defined as Nora lesion. In the daily routine of medical offices or ambulances, the Nora-Lesion should be established as a differential diagnosis for a swelling of the foot. Our case report of a 49-year-old patient is the worldwide first description of a Nora lesion of the talus, as well as secondary of the calcaneus. In the immense differential diagnosis discussion for bony pathologies of the hindfoot the Nora-lesion should be now added.

## Case Report

A 49-year-old patient shows up in our ambulance on the 22<sup>nd</sup> of February 2017 with a swelling of the right ankle that lasted for about ten weeks. A trauma in the former history was declined.

After 8 weeks, he was at an external hospital treated for arthritis of his ankle and tendovaginitis of the peroneal tendons with non-weight bearing in a cast and i.v. antibiotics. An aspiration of the joint at this time was not performed. In his blood count was seen a massive rise of CRP, which normalized under iv-antibiosis.

B-symptoms were not seen at any time. The patient had nicotine misuse. Rheumatoid arthritis and tuberculosis were not present. An electrophoresis could not show signs of plasmocytoma and also no Borrellia antibodies were seen in his blood count. Osteoporosis could be excluded by DXA. In his or his family history were not seen any disorders.

## Diagnostics

Preoperative we saw a massive swelling of his right ankle with tenderness medially

over the upper and lower ankle joint line. There was a mild overheat but no redness or systemic signs of infection. A weight-bearing of the ankle was because of pain not possible and the motion was limited.

In his general body examination nothing pathological was found. In his blood count the CRP results were elevated with 0.82 mg/dL (normal <0.5 mg/dL). The results for *Borrellia burgdorferi* IgG- and IgM-antibodies, CCP-antibodies, HLB-27 and serum-electrophoresis were at standard value.

Imaging results for standard X-ray and MRI showed over the period of 3 months very strong and progressive changes.

Standard X-ray showed progressive subchondral small spotted demineralization and osteolysis of talus and calcaneus (Figure 1).

In MRI there were seen edematous changes in talus and calcaneus at the upper ankle joint with progressive edematous changes of the surrounding tissue especially in cutis and subcutis and also an intraarticular effusion of upper and lower ankle joint (Figure 2A). For differential diagnosis we also performed a CT-scan. Images showed also diffuse small-spotted demineralization in all skeletal parts of the foot and lower limb with clear osteolysis in talus, calcaneus and the dorsal parts of the lower ankle joint. As described before there were edematous changes of the surrounding tissue (Figure 2B).

Because of these findings and a questionable dignity, we provided the indication for sampling. The histological examination should help for further treatment.

## Therapy and following regime

After typical preoperative treatment we performed an open sampling of the right medial talus and also of the peritalar soft tissue. Intraoperatively the tissue was edematous. The joint capsule showed a grey coloring. Microbiological smears were made from the paratendinous Achilles tissue and the synovial fluid of the upper ankle joint. A complete resection was not performed at this time of surgery.

After a non-complicated intra- and post-operative course, the patient was dismissed into ambulant treatment. Further treatment should be determined after receiving the histological results.

After receiving a positive result for Nora-Lesion we performed surgery 6 weeks later. The treatment of choice in this case is the complete resection. So, we performed a lateral arthrotomy of upper and lower ankle joint and sinus tarsi and did a complete resection. Again, we send these samples to pathology for histological examination.

Correspondence: Philipp Rottler, Orthopädie und Orthopädische Rheumatologie, Elisabeth-Klinik Bigge, Heinrich-Sommer-Str. 4, 59939 Olsberg, Germany.  
E-mail: mail@philipp-rottler.de

Key words: Nora-lesion, pseudotumor, bizarre paraostal osteochondromatous proliferation, fibroostotic pseudotumor.

Contributions: the authors contributed equally.

Conflict of interest: the authors declare no potential conflict of interest.

Funding: none.

Received for publication: 13 May 2018.

Accepted for publication: 24 January 2019.

This work is licensed under a Creative Commons Attribution NonCommercial 4.0 License (CC BY-NC 4.0).

©Copyright P. Rottler et al., 2019  
Licensee PAGEPress, Italy  
Orthopedic Reviews 2019;11:7628  
doi:10.4081/or.2019.7628

## Results

Microbiological examinations of the intraoperative smears showed no proof of germs. In histological examination of the preparations we saw a chronic fibrosing Synovitis (Figure 3). The bony sample of the talus showed a fragmented corticospongius bone with chronic-fibrosing reaction with minimal fibroblastic gigantocellular reaction, cartilage neoplasm as a chondral ossification with discrete chronic inflammation. Following these findings, we have a fibroostotic pseudotumor like it is seen in paraossal fasciitis. These lesions are defined as Nora lesions. A real real tumor cannot be diagnosed. Histological malignancy is not detectable. The typical findings of rheumatoid arthritis do not show up.

## Discussion

The Nora Lesion, named after his first describer,<sup>1</sup> is also called bizarre paraostal osteochondromatous proliferation (BPOP). It is a proliferation that normally proceeds from intact corticalis. The entity of this fibroostotic pseudotumor as discussed in literature is triggered from repeating trauma or reactive periosteitis.<sup>2</sup>

In literature there are more than 200 cases defined as Nora Lesion.<sup>3</sup> The lesion

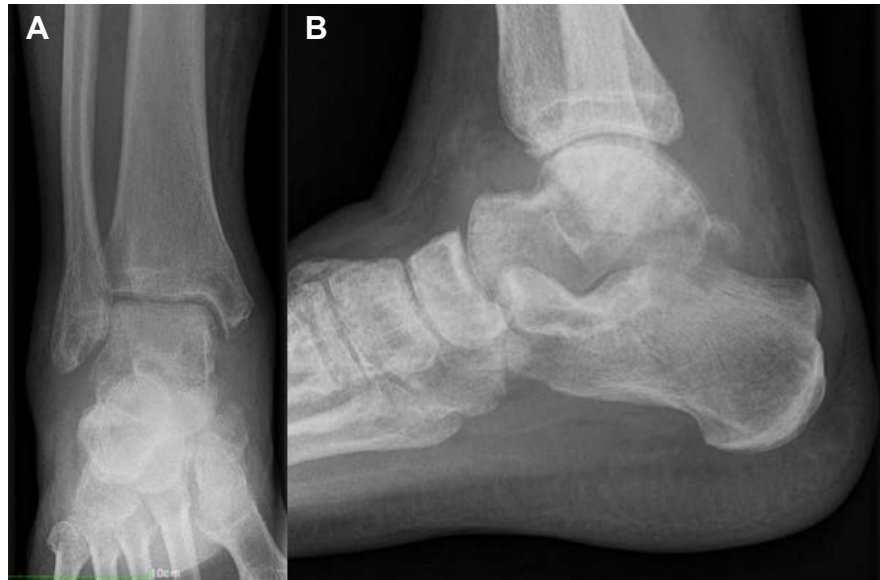
normally occurs in the 3<sup>rd</sup> and 4<sup>th</sup> decade of life, a gender preference does not exist.<sup>2,4,5</sup> Nora *et al.* described 1983 in 35 cases the localizations at small hand bones and less small foot bones. The BPOP concerns in most cases the metacarpal- and tarsal bones (76%), the long tubular bones (27%) and the hand (56%) more than the foot (20%).<sup>6</sup>

65 cases were analyzed by Meneses *et al.*,<sup>7</sup> in which 10 were seen in small tubular bones of the foot. Berber *et al.*<sup>8</sup> presented 22 cases of BPOP. Nine lesions were seen at the ossametacarpalia, 7 at the ossametatarsalia, 5 on long tubular bones and a single one at osesamoideum of the foot. Studies from Joseph *et al.*<sup>9</sup> present 13 cases of BPOP of which 9 were on the hand, a single case at tuberositas tibiae, 2 at phalanx proximalis of the second and third toe and another single one at osmetatarsale. In Germany, Hartog *et al.*<sup>10</sup> described 2 cases of proliferation of the metatarsal bones.

In one case, the Nora Lesion impresses clinically as plantar fasciitis of calcaneal origin.<sup>2</sup> A Turret-Exostosis (Revolver-Exostosis) of the dorsal talus described as free trabecular joint-body of the back-foot was first described by LeClere *et al.*<sup>11</sup> The Turret-Exostosis was described by Wissinger *et al.*,<sup>12</sup> as irregular bony extra-cortical proliferation and seems to be a result of trauma.

Similar changes are also described for the Nora Lesion. Indeed, here it seems to be a Traction-Exostosis, in which no traumatic context has ever been proved.<sup>6</sup>

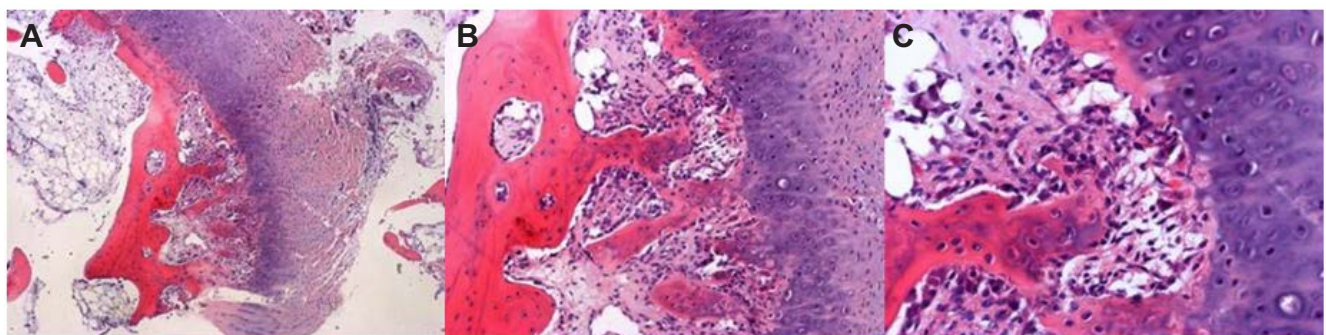
In differential diagnosis the Nora Lesion is discussed as benign pathology such as stress fractures, florid reactive periosteitis, osseocartilaginous exostosis, periosteochondrome, osteoidosteome, osteomyelitis or periosteal processes like sarcoidosis. Malignant pathologies for differential diagnosis are the osteosarcoma, chondrosarcoma or metastasis.<sup>2,3</sup>



**Figure 1.** Preoperative X-Ray of the upper right ankle: diffuse small-spotted subchondral demineralization with osteolysis of the talus and calcaneus.



**Figure 2.** A) Preoperative MRI-Diagnostics of the upper right ankle: Edematous changes in talus and calcaneus of the lower ankle joint with pronounced edematous surrounding tissue reaction of the cutis and subcutis and also effusion in the upper and lower ankle joint. B) CT-Diagnostics of the upper right ankle: Diffuse small-spotted demineralization in all skeletal parts of the foot and lower limb with clear osteolysis in talus, calcaneus and the dorsal parts of the lower ankle joint.



**Figure 3.** Histology, Hematoxylin & Eosin stain, A) Covering cartilage that matures into trabecular bone, x40; B) Enlargement with spindle-cells and greater blood vessels, x100, C) Matrix with dark-blue areas as an expression of mineralization, x200.

## Conclusions

In this case report we first describe a so-called Nora-Lesion of the talus as well as secondary a BPOP of the calcaneus.<sup>3</sup> The immense differential-diagnosis discussion for bony pathologies of the backfoot is now added by the Nora-lesion. Proof for this disease is histopathological examination.

## References

1. Nora FE, Dahlin DC, Beabout JW. Bizarre parostealosteochondromatous proliferations of the hands and feet. *Am J Surg Pathol* 1983;7:245-50.
2. Adler D, Aigner T, von Salis-Soglio G, et al. Nora's lesion. Discussion of a rare bone proliferation. *Orthopade* 2010;39:1065-70.
3. Rushing CJ, Rogers DE, Spinner SM, Gajzer DC. A case report of heel pain mimicking plantar fasciitis and osteosarcoma: a unique presentation of a Nora's lesion. *J Foot Ankle Surg* 2017;56:670-3.
4. Kraft D, Hailer NP. Nora's lesion at the second metacarpal bone of a twelve-year-old female. *Z Orthop Grenzgeb* 2006;144:228-31.
5. Rybak LD, Abramovici L, Kenan S, et al. Cortico-medullary continuity in bizarre parostealosteochondromatous proliferation mimicking osteochondroma on imaging. *Skeletal Radiol* 2007;36:829-34.
6. Murphey MD, Choi JJ, Kransdorf MJ, et al. Imaging of osteochondroma: variants and complications with radiologic-pathologic correlation. *Radiographics* 2000;20:1407-34.
7. Meneses MF, Unni KK, Swee RG. Bizarre parostealosteochondromatous proliferation of bone (Nora's lesion). *Am J Surg Pathol* 1993;17:691-7.
8. Berber O, Dawson-Bowling S, Jalgaonkar A, et al. Bizarre parostealosteochondromatous proliferation of bone: clinical management of a series of 22 cases. *J Bone Joint Surg Br* 2011;93:1118-21.
9. Joseph J, Ritchie D, MacDuff E, Mahendra A. Bizarre parostealosteochondromatous proliferation: a locally aggressive benign tumor. *Clin Orthop Relat Res* 2011;469:2019-27.
10. Hartog C, Centmaier-Molnar V, Patzwahl R, et al. Bizarre parostealosteochondromatous proliferation of the metatarsal bone. *Orthopade* 2016;45:901-5.
11. LeClere LE, Riccio AI, Helmers SW, Thompson KE. Turret exostosis of the talus. *Orthopedics* 2010;33:517.
12. Wissinger HA, McClain EJ, Boyes JH. Turret exostosis. Ossifying hematoma of the phalanges. *J Bone Joint Surg Am* 1966;48:105-10.