

Successfully treated osteomyelitis with 20 years of evolution, covering the whole humerus (case report)

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Abstract— Infections affecting the humerus are a serious therapeutic challenge, especially when they are spread along the entire length of the humerus and have a long evolution. Their origin can be both hematogenous and exogenous. Unsuccessfully treated osteomyelitis of the humerus can be the cause of severe disability, intoxication and even lead to amputation.

The aim: To pay attention to the difficulties associated with the treatment of a rare localization of osteomyelitis affecting the entire humerus.

Material and methods: One patient is presented, a 63-year-old man who underwent multiple operations for osteomyelitis of the humerus about 20 years ago.

Results: The early postoperative period went smoothly. The surgical wound healed primarily, the bone infection was completely repaired, and the right upper extremity is in good functional condition, with no evidence of circulatory or neurological problems.

Conclusion: The presented patient is a clear example that the key to the successful treatment of osteomyelitis is the correct choice of the main method, namely the method providing full revascularization of the bone or the replacement of the affected bone segment with autoosteoplastic material.

Keywords— humerus, longitudinal fenestration, osteomyelitis

1. Introduction

Infections affecting the humerus are rarer than those of the lower extremities, but at the same time they represent a serious therapeutic challenge, especially when they are spread throughout the humerus and have a long evolution. Their origin can be both hematogenous and exogenous, have a diverse localization, affect stable or unstable bone segments^{1,3,5}. In atypical courses of the disease, the differential diagnosis with bone tumors is mandatory². Unsuccessfully treated osteomyelitis of the humerus can be the cause of severe disability due to joint contractures, damage to the n. radialis, and also intoxication of the organism. With a more favorable prognosis are localized infections, in stable segments, distant from large joints, namely - types A1 and A2, according to the proposed own classification of osteomyelitis. More difficult to treat are the cases of type A3-1, in which the lesions can affect the entire diaphysis, but are distant from

the large joints and it is possible to apply a diaphysectomy, with subsequent autoosteoplasty⁴. The most difficult to treat lesions are type A3-2, where infection is spread over an extensive bone segment covering more than one-third of the length of the bone, but the lesions are in close proximity to a large joint, making excision of the affected segment impossible. The only favorable point in these cases is the preserved stability. This is the patient presented in the present report.

2. Patient and method

The presented patient is a 63-year-old man (IZ/4951), first admitted to the clinic in October 2021, with chronic osteomyelitis, with a 20-year evolution involving the entire right humerus - type A3-2. He has been operated on many times. There were old surgical cicatrixes along the lateral aspect of the right arm as well as two active fistulas. Movements in the shoulder joint were limited and painful, the elbow joint was in flexion contracture - 300 (Fig. 1 a, b). Laboratory tests showed moderately elevated values of leukocytes, CRP, ESR, mild anemia. The performed CT confirmed the diagnosis, revealed the presence of cloacae in the proximal and middle third of the humerus, as well as abscess collections in the adjacent soft tissues (Fig. 1 c, d).

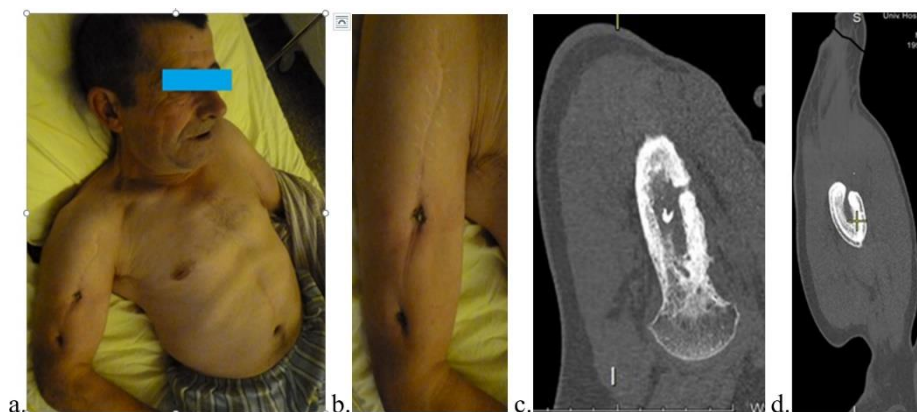


Fig.1 (a, b, c, d). (a, b) – diagnostic photographs - old operative cicatrix on the lateral side of the arm, as well as two active fistulas with purulent secretion; (c, d) – diagnostic CT - presence of cloacae in the proximal and middle third of the humerus and abscessing collections in the adjacent soft tissues.

From the fistulas, and later from the medullary canal, *St. aureus* was isolated. The operative intervention included – fistulectomy, evacuation of purulent collections around the bone, longitudinal fenestration of the humerus, along its entire length, during

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which a precise intramedullary debridement was performed, including the proximal and distal zones, in the area of the shoulder and elbow joints. A closed permanent flushing system was placed in the bone-brain canal (Fig. 2 a, b, c). Parenteral antimicrobial therapy administered in the postoperative period included Medaxon and Ciprofloxacin.

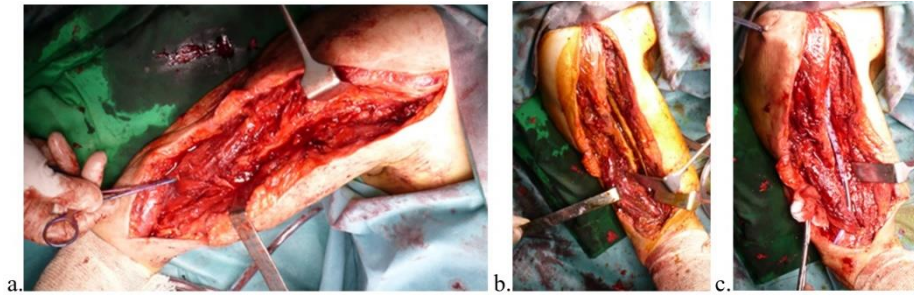


Fig.2 (a, b, c) – intraoperative finding and separate stages of the operative intervention. (a) – full exposure of the humerus; (b) antero-lateral longitudinal fenestration of the entire bone; (c) placement of an intramedullary, closed permanent irrigation system, after precise intramedullary debridement involving the joint areas.

3. Results

The early postoperative period proceeded smoothly (Fig. 3 a, b, c).

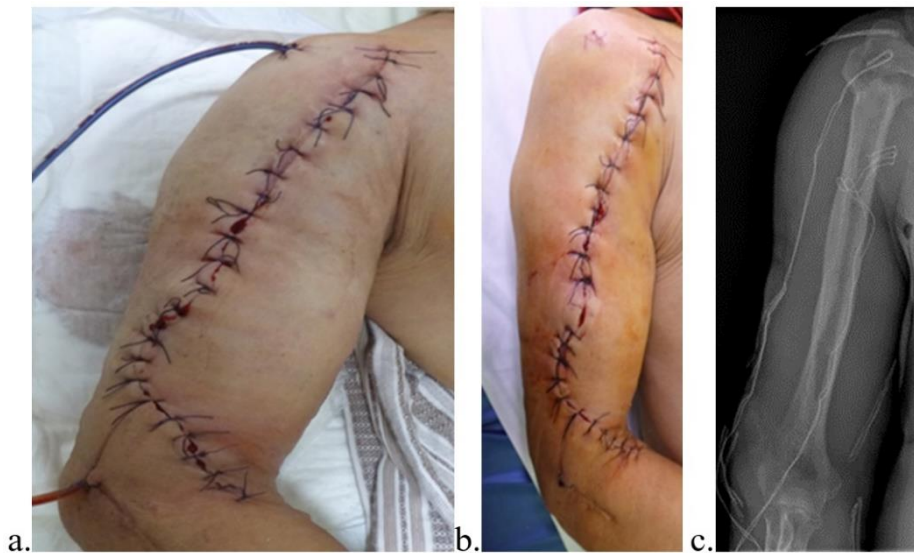


Fig. 3 (a, b, c) - early postoperative period. (a) - permanently closed - flushing system; (b) – state after removing the drains; (c) – postoperative X-ray - longitudinal fenestration along the entire bone.

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The surgical wound healed primarily, the bone infection was completely repaired, the right upper extremity was in good functional condition, with no evidence of circulatory or neurological problems (Fig. 4 a, b, c).



Fig. 4 (a, b, c) - 2 months after the operative intervention. (a) – the surgical wound healed primarily; (b, c) - functional result normal neurological status of the hand.

4. Discussion

Extensive fenestration of the bone is one of the four main methods for the treatment of osteomyelitis (according to the proposed own algorithm of surgical treatment), ensuring the necessary revascularization of the bone. It is the tool of choice in the treatment of extensive infections located in stable segments near large joints when total bone excision is impossible. In this case, through the described fenestration, extensive access was provided to the entire length of the medullary canal, the head and the distal part of the humerus, which is a prerequisite for performing precise intraosseous debridement and lavage, including in the joint areas, and also for the necessary revascularization of the bone through the adjacent soft tissues.

5. Conclusion

The presented patient is a vivid example that the key to the successful treatment of osteomyelitis is the correct choice of the main method, namely the method providing full revascularization of the bone or the replacement of the affected bone segment with autoosteoplastic material.

6. References

1. Pauli, S. Osteomyelitis - proximal humerus. Case study, Radiopaedia.org. (accessed on 04 Aug 2022) <https://doi.org/10.53347/rID-65484>;
2. Peter M Prodinger, Hakan Pilge, Ingo J Banke, Dominik Bürklein, Reiner Gradingner, Thomas Miethke, Boris M Holzapfel. Acute osteomyelitis of the humerus mimicking malignancy: Streptococcus pneumoniae exceptional pathogen in an immunocompetent adult. BMC Infectious Diseases volume 13, Article number: 266 (2013);
3. M. Chronic osteomyelitis of the distal humerus. Case study, Radiopaedia.org. (accessed on 04 Aug 2022) <https://doi.org/10.53347/rID-78351>;
4. Julio J. Contreras, Alonso Díaz, Manuel Beltrán, Extensive humeral defect secondary to humeral shaft nonunion and chronic osteomyelitis treated with induced membrane technique augmented with fibula autograft: a case report. Report| Volume 1, ISSUE 4, P446-456, November 01, 2021DOI:<https://doi.org/10.1016/j.xrrt.2021.08.004>;
5. Yechiel N Gellman, Madi El-Haj, Amal Khoury, Yoram A Weil. Closed Humeral Fracture Complicated with Acute Hematogenous Osteomyelitis: A Case Report. J Orthop Case Rep. 2018 Mar-Apr; 8(2): 61–64. doi: 10.13107/jocr.2250-0685.1052;

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