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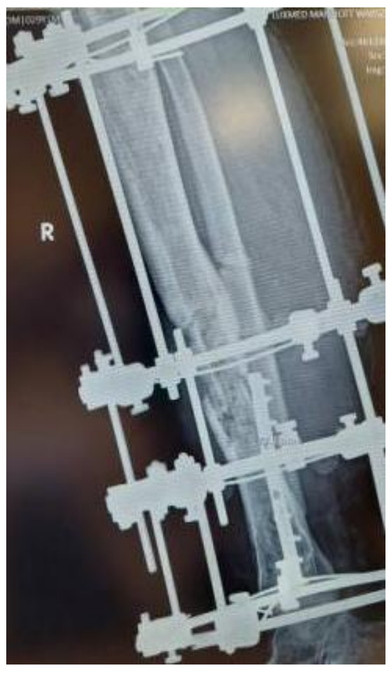
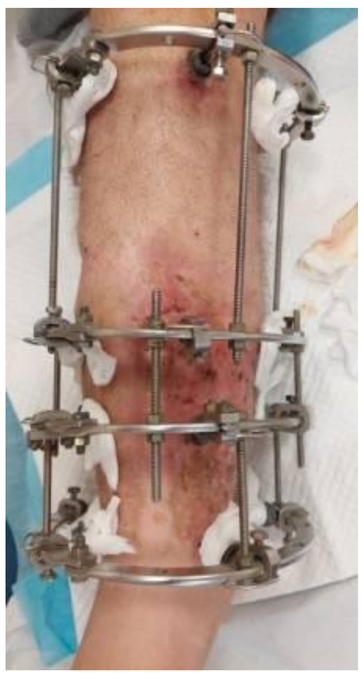
SOLARIO study idea in therapy of infected pseudoarthrosis of tibia with local antibiotics after six failed previous surgieries without local antibiotics

Aim: SOLARIO study idea i.e. focusing on local antimicrobial therapy and decreasing time of systemic antibiotics in infected pseudoarthrosis of the tibia after failed previous multiple surgeries without local antibiotics.

Methods and material: Male 29 years old. In 2021 open fracture of tibia diaphysis (GAIIIA), closed fracture of fibula and patella of right extremity. Primary therapy: fixation of tibia with Ilizariov external fixator, fibula with plate, patella with cerclage. Due to tibia delayed union, infection and poor skin condition over tibia next 6 surgeries with debridement, skin graft, fixation with nail and Ilizarov frame – all without local antibiotics. After 2 years clinical and radiological signs of infected pseudoarthrosis of the tibia diaphysis; loss of functionality of the extremity due to svelling and equinus position of the foot. Pathogen: Staph aureus MSSA susceptable for genta, wanco, clinda, RMPC. No treatment proposal in the previous hospital.

1 

2 

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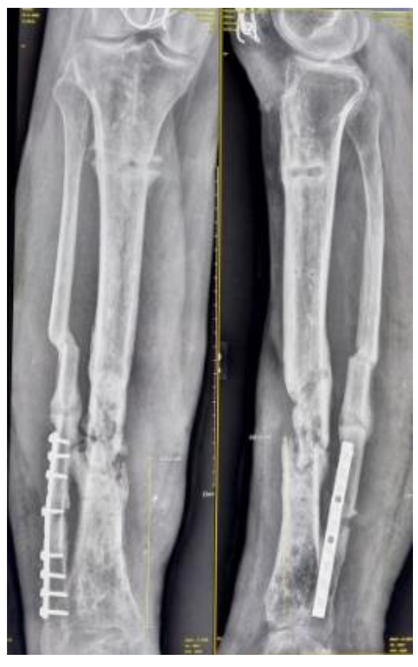
4 

Assesment and steps of treatment:

1. Radiography of tibia pseudoarthrosis during treatment with Ilizarov fixator.
2. Clinical appearance of extremity, skin condition, equinus foot position.
3. CT visualisation of tibia diaphysis nonunion.
4. Radiography of tibia after removal of Ilizarov fixator.

Therapy: in one-stage removal of plate from fibula, debridement of tibia with reaming without open resection of the pseudarthrosis, application to the medullary cavity of calcium sulfate bone substitute with antibiotics (gentamicin and wancomycin), stabilization of tibia with intramedullary nail coated with ALAC (antibiotic loaded acrylic cement) containing gentamicin with addition of 1 g vancomycin. Postoperative oral antibiotics: Clindamycin 2x600mg + Rifampicin 3x300 mg for 1 week. **Result**: FU 2,5 years; no signs of infection, diminishing of svelling, improvement of foot position and of global extremity function, possibility to full weight bearing. X-ray: stable construction of bone-IMN without osteolysis or loosening of osteosynthesis implants, healing of pseudoarthrosis.

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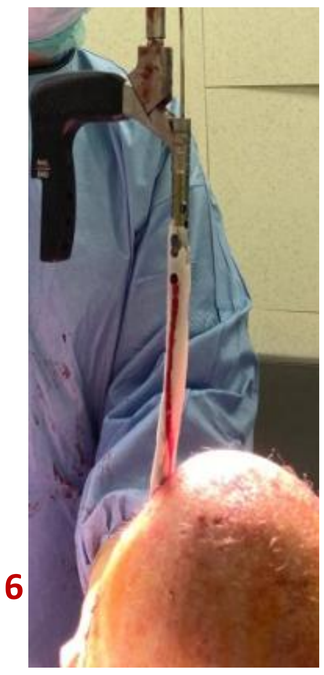
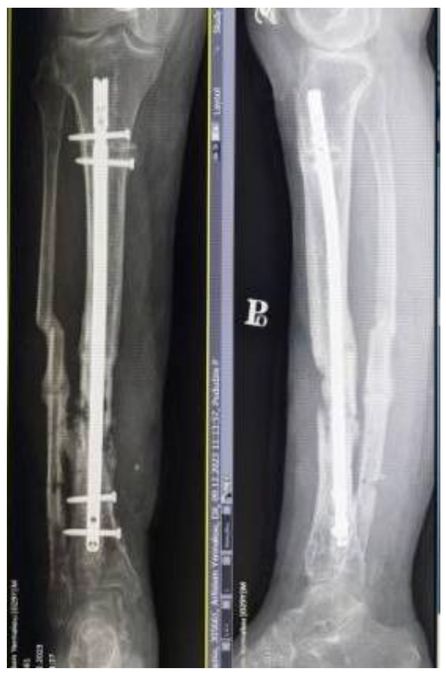
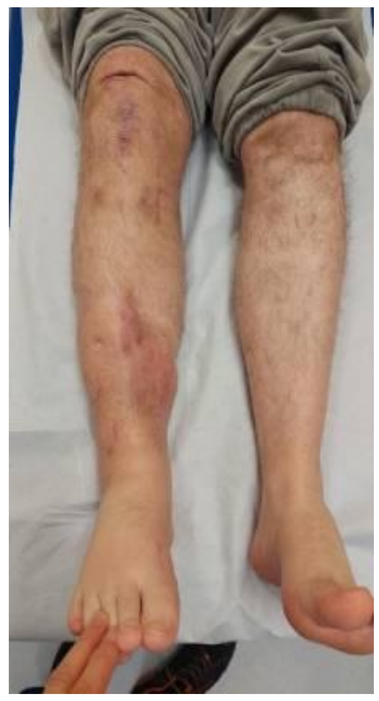
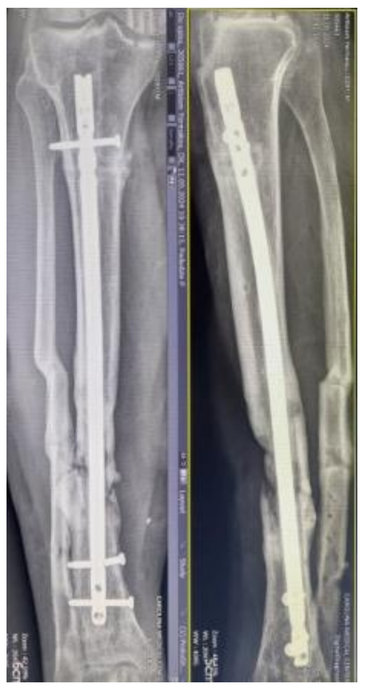
6 

7 

Treatment steps
5. Preparation of nail covered with ALAC
6. Implantation of nail covered with ALAC.
7. Tibia X-ray after implantation of nail. Visible ALAC layer on nail and local antibiotic pelets inside medullary cavity
8. No clinical signs of infection
9. Tibia X-ray after 6 months – progressing bone union of tibia pseudoarthrosis; no invasive osteolysis.

8 

9 

Conclusion. Local application of antimicrobials (calcium sulfate with gentamicin&vancomycin) together with stable fixation with intramedullary nail coated with acrylic cement containing gentamicin and vancomycin followed by 1 week oral antibiotics in therapy of infected pseudoarthrosis of tibia proved to be effective in contrary to previous 6 surgeries without local antimicrobials.