Therapy Of Chronic Recurrent Osteomyelitis With Multi-Resistant *Pseudomonas aeruginosa* Using Local Antibiotic Release By A Custom Made Tibia Nail

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1. Introduction and Objectives

Treatment of a patient with recurrent osteomyelitis after a 3rd grade open tibia fracture at our hospital failed several times due to recurrent infection with *Pseudomonas aeruginosa* even after adequate antibiotic treatment. However, *P. aeruginosa* became multi-resistant and suitable antibiotic treatment was limited to colistin. The objective of this case report was to establish an intramedullary rod construct with PMMA to locally administer colistin.

2. Materials and Methods

Colistin was mixed with 40g Copal® G+C (Heraeus Medical GmbH) (Fig.1) and added to an Ender nail which was placed in a silicon sleeve (Fig.2). The silicon sleeve was removed after 5 minutes when bone cement was cured. The nail-cement construct was temporarily implanted into the tibia after intramedullary reaming and rigorous lavage (Fig. 3). Patient received additional i.v. antibiotics for 12 weeks and was monitored in an outpatient clinic setting.

3. Results

Colistin was eluted from Copal® G+C over a period of 2 weeks whereas mechanic stability was also reached based on ISO 5833. The patient recovered on time and lab test showed that leucocytes and CRP declined in a continuous fashion and received normal levels after 3 weeks. The tibia nail was explanted after 2 weeks and radiographs showed sufficient bone regeneration. The patient is pain free since 2 years without any signs of infection and controls always showed normal blood tests.

Figure 1: Colistin is available in Switzerland only in vials of 1x10⁶ IE which correspond to 33.3mg colistin. Thus, 60 vials of 1x10⁶ IE colistin had to be used to provide required amount of 2g colistin.

Figure 2: The mix of Copal® G+C and colistin (Copal® G+C plus) was infused in to the plastic sleeve holding the ender nail in order to provide a stable coating of the nail in an evenly fashion.

Figure 3: The ender nail covered with Copal® G+C plus was placed into the intramedullary space for 2 weeks. Radiographs shows intramedullary ender nail in an a/p (a) and lateral (b) view.

4. Conclusions

We provide evidence that colistin can be locally applied with PMMA matrix providing appropriate concentration due to elution over a period of at least 2 weeks. This technique demonstrates a custom-made solution for patient with multi-resistant osteomyelitis for *P. aeruginosa* when conventional treatment fails.

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