



First report of a TKA - periprosthetic infection with *Bacillus cereus* Successful treatment with debridement and implant retention

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Introduction:

According to current guidelines early prosthetic joint infections can be successfully treated with debridement and retention of the prosthesis in a number of carefully selected patients using long-term oral antibiotics¹. Experienced multidisciplinary teams achieve success rates of over 80 % in patients with staphylococcal or streptococcal infections. However, management of early total knee arthroplasty (TKA) - infections caused by rare pathogens is often unclear due to the scarcity of published reports. Case reports on the individual management and outcome of such infections can guide the clinician in difficult treatment decisions. We therefore discuss management and outcome in a patient with an early TKA-infection caused by *B. cereus*. To our knowledge this is the first report of a clearly documented prosthetic joint infection caused by this pathogen.

Patient and Methods:

A 69-year old otherwise healthy male patient with left sided gonarthrosis was treated with an Innex® - TKA using standard techniques, laminar airflow environment and perioperative prophylaxis with cefuroxime (Zinacef®). For the tibial component Palacos® bone cement was used, while the femoral component was implanted without cement. On the second postoperative day a haematoma was evacuated and on day 7 open revision due to purulent haematoma with radical debridement and lavage was performed. The patient was febrile (38.4 °C) and a rise of CRP to 290 mg/l (<5 mg/l) was noticed.



Fig. 1: Innex® - TKA in ap and lateral view 12 months postop

B. cereus was isolated from a preoperative joint aspirate and in 3 of 4 intraoperative tissue specimens plated on Columbia sheep blood agar and chocolate agar. Identification was achieved by standard methods using cellular and colonial morphological criteria as well as biochemical tests according to Logan and Turnbull².

Literature:

1. Zimmerli W, Trampuz A, Ochsner PE. Prosthetic-Joint Infections. *N. Engl. J Med* 2004; 351: 1645-54
2. Logan NA, Turnbull PCB. Bacillus and other aerobic endospore-forming bacteria. In: Murray PM et al. (eds.). *Manual of Clinical Microbiology*, 8th ed., 2003; 445-460. ASM Press, Washington D.C.
3. Turnbull PCB et al. MICs of selected antibiotics for *B. anthracis*, *B. cereus*, *B. thuringiensis* and *B. mycoides* from a range of Clinical and Environmental sources as determined by the Etest. *J Clin Microbiol* 2004; 42: 3626-3634

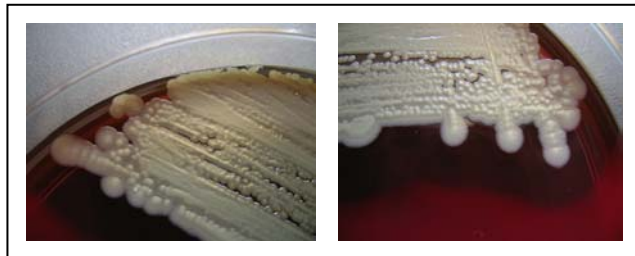


Fig. 2: Colonies of *B. cereus* on Columbia sheep blood agar

Results:

There exist no standardized methods for susceptibility testing according to CLSI or the Société Française de Microbiologie. In a preliminary agar diffusion test, the *B. cereus* isolate was resistant against rifampin and all betalactam antibiotics except imipenem; it was susceptible to aminoglycosides, ciprofloxacin, levofloxacin, clindamycin, erythromycin, sulfamethoxazole + trimethoprim, teicoplanin and vancomycin. Due to the lack of standardized methods for minimal inhibitory concentrations (MIC) testing of Bacillus sp. other than *B. anthracis*, MICs were determined by the Etest method as described by Turnbull et al.³: From freshly grown colonies, a suspension in saline with a turbidity equivalent to a 0.5 McFarland standard was prepared. This suspension was streaked onto Mueller-Hinton agar plates with a diameter of 90 mm. One Etest strip (AB Biodisk, Solna, Sweden) was applied per plate. After 16 to 18 hours incubation at 35° C, the MICs were read according to the manufacturer's instructions. MICs (mg/l) and their interpretation as susceptible according to CLSI criteria used for staphylococci and/or gramnegative bacteria were as follows:

antibiotic	ciprofloxacin	imipenem	cotrimoxazol	teicoplanin
MIC (mg/l)	0.125	0.094	2,5	3

On the 1. and 2. postoperative day intravenous flucloxacillin and oral rifampin were given empirically followed by intravenous imipenem (Tienam®) 500 mg every 6 hours for 2 weeks. At that time local and systemic symptoms improved (CRP 8.9 mg/l) and oral ciprofloxacin (Ciproxin®) 750 mg every 12 h was given for 6 months. At the end of treatment and 6 months later clinical and radiographic assessment and values for CRP and sedimentation rate were all normal.

Discussion:

According to the treatment algorithm for periprosthetic infections of Zimmerli et al.¹, debridement with retention of the implant is a reasonable option for early infections (development is less than 3 months after surgery). An extensive debridement is the base of a successful treatment followed by intravenous antibiotic therapy for at least 2 weeks and then oral therapy for 6 months in cases with knee prostheses.

Conclusion:

We have demonstrated that *Bacillus cereus* can cause prosthetic joint infections and a successful treatment with debridement and retention of the implant is possible. In this case the follow up is currently over 12 months and still ongoing.