

Case report

Percutaneous treatment of chronic MRSA osteomyelitis with a novel plant-derived antisepticEugene Sherry^{*1}, Harry Boeck² and Patrick H Warnke³

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Abstract

Background: Antibiotic-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE), are an increasing problem world-wide, causing intractable wound infections. Complex phytochemical extracts such as tea tree oil and eucalypt-derived formulations have been shown to have strong bactericidal activity against MRSA *in vitro*. Polytoxinol (PT) antimicrobial, is the trade name of a range of antimicrobial preparations in solution, ointment and cream form.

Methods: We report the first use of this drug, administered percutaneously, via calcium sulphate pellets (OsteosetTM), into bone, to treat an intractable MRSA infection of the lower tibia in an adult male.

Results and Discussion: Over a three month period his symptoms resolved with a healing response on x-ray and with a reduced CRP.

Background

Antibiotic-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE), are an increasing problem world-wide, causing intractable wound infections [1,2]. Complex phytochemical extracts such as tea tree oil and eucalypt-derived formulations [3] have been shown to have strong bactericidal activity against MRSA *in vitro*. PolytoxinolTM (PT) antimicrobial, is the trade name of a range of antimicrobial preparations in solution, ointment and cream form. We report the first use of this drug, administered percutaneously, via calcium sulphate pellets (OsteosetTM), into bone, to treat an intractable MRSA infection of the lower tibia in an adult male.

Once antibiotics fail, treatment options are limited to debridement, removal of hardware, or amputation. The active ingredients are compounded Phytochemicals (Lemongrass, Eucalyptus, Melaleuca, Clove, Thyme as well as B.H.T. (Butylated Hydroxy Toluene), Triclosan (0.3%) and 95 undematured ethano (69.7%).

Methods

On 20/3/97, a 49 year-old man sustained an open fracture of his left tibia (Gustillo-Anderson Classification Grade 3 C) after falling and being run over by a golfcart. He underwent debridement and insertion of an intramedullary nail (IM). Two months later he required a free-flap to the lower tibia, re-positioning of the IM nail and a femoral-popliteal bypass graft. Eight months later, he required debridement of the flap and fifteen months



Figure 1
Pre-operative x-ray of lower tibia and ankle showing chronic osteomyelitis with cyst formation.



Figure 2
X-Ray at 3 months showing resolution of infective process with incorporation of bone graft.

later debridement of an infective focus of the lower tibia. The fracture and soft tissues later healed but he developed chronic osteomyelitis of the lower tibia (with MRSA) requiring long term antibiotic treatment with flucloxacillin (one gram orally six hourly) and dicloxacillin (one gram orally six hourly). (Fig 1). He had previously received four courses of intravenous flucloxacillin (one gram six hourly) and intravenous dicloxacillin (one gram six hourly) over the previous two years. His lower leg continued to swell and cause pain, especially at night with significant disability, making it impossible to return to employment as a chef. After repeated debridement and further intravenous antibiotics, as a last resort, amputation was considered. He then came under the care of Dr Eugene Sherry and requested application of PT to the infected bone area to save his limb. Antibiotics had been discontinued two months prior to surgery and have remained so. The ESR = 4 (normal <11 mm/hr), and the CRP = 21.9 (normal < 10 mg/l). Written permission was obtained. On December 8, 2000, on an emergency basis (as he was in severe pain with a flare-up), he was taken to the OR and via a 3 cm percutaneous incision medial to

the anterior tibial flap, the lower tibia was drilled (4.5 mm), curetted, washed-out with 4,000 ml normal saline and packed with Osteoset Pellets™ soaked in 3 ml of PT liquid. A funnel was used to insert the beads. A catheter was left in situ for further administration of the antiseptic over the following 48 hours (one ml per day). At three months, the wound has healed, symptoms have resolved, he feels better, his ESR = 14, CRP = 12, wound cultures were clear and a plain x-ray shows resolution of infective process with incorporation of the bone graft. (Fig. 2)

Discussion

Antibiotic-resistant Gram-positive cocci, especially MRSA, causing wound infections are of great concern as they cause increased mortality rates, hospitalisation and longer treatment to discharge times [4]. This is especially so in orthopaedic surgery with the use of internal fixation and prosthetic devices as bacteria compete with host cells to colonise these foreign surfaces [5]. Aggressive prophylaxis with antibiotics and optimised surgical strategies can reduce the frequency of MRSA infections [2,5], although increasing the cost of surgery.

PT is a complex chemical mixture and the biological activity of its major components, tea tree oil and eucalyptus, [6,7] have been described. A recent paper by Anderson and Fennessy reviewed and concluded that there was compelling in vitro evidence of the effectiveness of tea tree oil against MRSA; here we add a clinical case [3]. This case report describes a cheap, simple technique as a possible alternative to long-term systemic antibiotic therapy. Here it was administered percutaneously over calcium sulphate pellets and then topped-up via a catheter. It may also be used topically. The beads were used as a vehicle for PT and as a bone graft. More extensive case studies or a randomised controlled trial are now suggested.

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