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[FP74] OUTCOME OF TWO STAGE SURGERY: "HONE YOUR WORK CAREFULLY; SPARE NO EFFORT".

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Aim: We wonder what the results of two stage procedures were in terms of morbidity (amputation, dead) and infection recurrence. We also seek to identify risk factors for failure and see if the results of a second two stage surgery were not even worse.

Material and Methods: We retrospectively reviewed 140 prosthetic joint infection (PJI) treated with a two stage procedure. Patient data has been reviewed to determine which factors would be predictive for failure.

Results: From the 140 two stages, 98 patients were infection free at two years. Four died in the following year. 38 patients presented a recurrence within the two years: 2 died and 1 was amputated within one year. Nine were further treated with a second two stage procedure and 26 with debridement and implant retention procedures and antibiotics (DAIR). Six of these last received long terms suppressive antibiotics. In total 27 from the 38 were again diseases free at two years follow up.

The dead and amputation rates are 4,3% and 0,8 % respectively. The rate of success after the first two stage was 80% and after a second two stage procedure 78%. The final rate of PJI cured is 89,3%.

The only difference observed between success and failure after a first two stage procedure was related to microbiology. Polymicrobial infection was 28.6% of the PJI which will fail and only 14,1% in those whose treatment will succeed ($p<0.05$). Looking to the patients that underwent a second two stage surgery, recurrence involved monomicrobial pattern with a microorganism that has developed a resistance to quinolones.

Conclusion: Mortality and amputation in PJI management should be mentioned to patients as significant potential complications. Infection control within a two stage procedure is not as high as reported, unless the final result is considered after secondary procedures. A second two stage procedure was not related with a worse outcome.

Our data confirms the poorer outcome of polymicrobial infection. Recurrence in those patients involves monomicrobial infections with resistant microorganisms. Nevertheless, a second two stage procedure appears acceptable when a DAIR procedure and suppressive antibiotherapy is difficult or impossible due to the microorganism resistance profile.

[FP75] ANTIBIOTIC-LOADED HYDROGEL OUTPERFORMS CLINICAL GOLD STANDARD TREATMENT IN A LARGE ANIMAL MODEL OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS IMPLANT ASSOCIATED OSTEOMYELITIS

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Aim: Implant-associated osteomyelitis is a devastating complication with poor outcomes following treatment, especially when caused by antibiotic-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA)[1]. A large animal model of a two-stage revision to treat MRSA implant-associated osteomyelitis has been developed to assess novel treatments[2]. A bioresorbable, thermo-responsive hyaluronan hydrogel (THH) loaded with antibiotics has been developed and our aim was to investigate it´s *in vivo* efficacy as a local antibiotic carrier compared to the current standard of care i.e. antibiotic-loaded polymethylmethacrylate (PMMA) bone cement.

Method: 12 female, 2 to 4 year old, Swiss Alpine Sheep were inoculated with MRSA at the time of intramedullary nail insertion in the tibia to develop chronic osteomyelitis. After 8 weeks sheep received a 2-stage revision protocol, with local and systemic antibiotics. Group 1 received the gold standard clinical treatment[3]: systemic vancomycin (2 weeks) followed by rifampicin plus trimethoprim/sulfamethoxazole (4 weeks), and local gentamicin/vancomycin via PMMA. Group 2 received local gentamicin/vancomycin delivered via THH at both revision surgeries and identical systemic therapy to group 1. Sheep were euthanized 2 weeks following completion of antibiotic therapy. At euthanasia, soft tissue, bone, and sonicate fluid from the hardware was collected for quantitative bacteriology.

Results: Sheep tolerated the surgeries and both local and systemic antibiotics well. Gold standard of care successfully treated 3/6 sheep with a total of 10/30 culture-positive samples. All 6 sheep receiving antibiotic-loaded THH were successfully treated with 0/30 culture-positive samples, p=0.0008 gold-standard vs. hydrogel (Fisher`s Exact).

Conclusions: The clinical gold standard treatment was successful in 50% of sheep, consistent with outcomes reported in the literature treating MRSA infection[1]. The antibiotic-loaded THH clearly outperformed the gold standard in this model. Superior efficacy of the THH is likely due to 1) the ability to administer local antibiotics at the both revision surgies due to the bioresorbable nature of the hydrogel, and 2) complete antibiotic release compared to bone cement, which is known to retain antibiotics[4]. Our results highlight the potential of local delivered, biodegradable systems for antibiotics for eradicating implant-related infection caused by antibiotic-resistant pathogens.

References:
[1]Parry 2014
[2]Moriarty 2017
[3]Pro Implant Foundation Guidelines
[4]Nelson 1994

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