High failure rate in streptococcal periprosthetic joint infection: results from a 7-year retrospective cohort study

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Background: Streptococci account for about 10% of periprosthetic joint infection (PJI). Because of high susceptibility to penicillin, the outcome of streptococcal PJI is expected to be better than infections caused by other pathogens, however conflicting data exist. Rifampin plays the key role in the treatment of staphylococcal PJI, but its significance in streptococcal PJI is unclear.

Material/methods: We retrospectively evaluated the treatment and outcome of patients with streptococcal PJI in our institution from 2009 to 2015. Cases were identified by review of the hospital-based PJI register. Diagnosis of PJI was established when at least one of following criteria applied: macroscopic purulence, presence of sinus tract, positive cytology of joint aspirate (>2000 leukocytes/µl or >70% granulocytes), histological proof of acute inflammation in periprosthetic tissue, isolation of streptococcus species in synovial fluid, periprosthetic tissue or sonication fluid culture. Treatment success was considered when all of the following criteria were fulfilled: 1. infection eradication, characterized by a healed wound without fistula, drainage and no recurrence of the infection caused by the same organism; 2. no subsequent surgical intervention for infection after reimplantation surgery; 3. no occurrence of PJI related mortality and 4. no long-term antimicrobial suppression therapy.

Results: 30 mono-streptococcal PJIs were included (12 hips and 18 knees). The median patient age was 70 years (range, 47-90 years). The route of infection was considered haematogenous in 16 cases and perioperative in 14 cases. The predominant microorganism was Streptococcus agalactiae (n = 12), followed by streptococci of the viridans group (n=13) (including S. mitis/oralis, S. gordonii, S.
parasanguinis). 22 cases were treated with a two-stage revision, 6 cases with débridement and retention of the prosthesis and 2 cases with one-stage revision. In all patients penicillin derivatives were administered, rifampin was added in 53% (n=16) of the cases. The median follow-up time for episodes without treatment failure was 39 months (range, 12-75 months), whereas treatment failures occurred all within the first year after joint revision surgery. Treatment failure was observed in 12 cases (40%). Treatments failed in 10 of 22 (45%) with two-stage revision, 2 of 6 (33%) with débridement and retention and none of 2 with one-stage revision. The comparison of survival times by using the Log-rank test didn’t showed statistically significant differences between the groups with and without adequate rifampin therapy (p=0,175).

Conclusions: Contrary to literature reports, a high failure rate of 40% in streptococcal PJI was observed in our cohort after 3 years of follow up. Rifampin showed no beneficial effect on treatment success. New therapeutic strategies against streptococcal biofilms are needed.