

Correspondence

Gram-Negative versus Gram-Positive Prosthetic Joint Infections

TO THE EDITOR—We read with great interest the report by Hsieh et al [1] in the 1 October 2009 issue of the journal on gram-negative prosthetic joint infections (GN PJIs). We congratulate the authors for their substantial contribution.

The authors revealed that treating GN PJI with debridement was associated with a lower 2-year cumulative probability of success than treating gram-positive (GP) PJI with debridement (27% vs 47% of episodes were successfully treated) [1]. This difference vanishes when 2-stage exchange is performed and stands in contrast to higher success rates of 40% [2] or 80% [2–4], even if the literature usually mixes up GP and GN organisms or concentrates only on GP organisms [4]. Hsieh et al [1] could not identify a statistically significant risk factor, probably because their study was underpowered. We think that the attribution of the 6 GN PJI cases with sinus tracts to the debridement-and-retention arm may have decreased the success rate. As shown in the authors' Table 5, no episode with a sinus tract has been cured with retention alone. This strong risk for treatment failure is congruent with expert opinion [5, 6].

Second, we were surprised to find that a sinus tract was already present in 6 (22%) of 27 episodes of PJI occurring among patients who underwent debridement and retention of the prosthesis, despite a maximal duration of clinical symptoms of 19 days. It is not clear how many episodes of GN PJI were hematogenous, but the median C-reactive protein level of 39 mg/L suggests that there was not a very impressive evolution of the disease in the majority of cases. Personally, we have had a different clinical experience with cases

of GN PJI in Geneva. We performed a prospective observational study during the period from 1996 through 2007. Of 144 episodes of PJI identified, 29 (20%) were episodes of GN PJI, of which 26 were nonpseudomonal infections and 3 were infections due to *Pseudomonas aeruginosa*. In the study by Hsieh et al [1], there were 21 (40%) of 53 episodes of GN PJI due to *P. aeruginosa*; in our study, there were 3 (10%) of 29 episodes of GN PJI due to *P. aeruginosa*. Also, in our study, a sinus tract was present in 10 (34%) of 29 episodes, but in these episodes, the sinus tract occurred after a much longer duration of symptoms (median duration, 33 days), compared with the duration of symptoms (range, 2–19 days) for all episodes of GN PJI in the study by Hsieh et al [1]. In our study, patients with GN PJI had the same age as those with GP PJI (median age, 77 years) and a similar overall cure rate: 23 (79%) of 29 patients with GN PJI were cured, and 89 (77%) of 115 patients with GP PJI were cured ($P = .82$, determined by use of the χ^2 test).

Third, in general, the GN PJI group is too heterogeneous to be mixed up, and should be separated between *P. aeruginosa* and other GN organisms stratified in further trials. Likewise, anaerobes should be kept apart from the GN PJI group (which had not been done in the study by Hsieh et al [1]). In larger trials, *P. aeruginosa* might yield a higher recurrence rate, as clinical experience often suggests. However, in our underpowered analysis, the overall cure rate for patients with *P. aeruginosa* infection was unchanged, compared with the overall cure rate for patients infected with other GN organisms: 2 (67%) of 3 patients with *P. aeruginosa* infection were cured, and 21 (81%) of 26 patients infected with other GN organisms were cured ($P = .52$, determined by use

of the Fisher exact test). For the subgroup of patients treated with implant retention alone, the findings were similar: 2 (100%) of 2 patients with *P. aeruginosa* infection were cured, and 10 (71%) of 14 patients infected with other GN organisms were cured ($P > .99$, determined by the Fisher exact test).

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