

Risk factors associated with acute hip prosthetic joint infections and outcome of treatment with a rifampin-based regimen

Sir—In the management of orthopedic device-associated infections, adherence to a treatment algorithm is crucial for a good prognosis (Giulieri et al. 2004, Zimmerli et al. 2004). In their recent publication, Choong et al. (2007) reported the outcome of a treatment protocol for total hip arthroplasty-associated infections (THIs), including debridement with retention and prolonged rifampin-based therapy. Since the authors refer to our treatment concepts, we would like to call attention to the fact that their retrospective study (Choong et al. 2007) clearly used different criteria to select patients for retention of the implant than were described in our algorithm (Zimmerli et al. 2004). Moreover, the duration of antimicrobial treatment reveals fundamental divergences from our approach. We are concerned that the reader of the Choong article may get the impression that their treatment policy is in agreement with our previously published algorithm (Zimmerli et al. 2004).

An important basis of our algorithm in defining the treatment duration is the differentiation between ‘curative’ and ‘suppressive’ antimicrobial therapy. In our concept, this is performed in analogy to anticancer treatment. In patients with THI qualifying for debridement with retention, we suggest a treatment duration of 3 months. In contrast, in patients with purely suppressive therapy, the duration is usually 1–2 years, or even up to life-long. The latter treatment option should be limited to patients in a bad general condition who are unable to undergo further surgery. Since Choong et al. (2007) reported that 11 of 14 patients were treated with antibiotics for a median duration of 20 months (range 12 to indefinite), they obviously used a concept of suppression and not one of cure. Therefore, the characteristics of their patients should be analyzed.

Important predictors of success for debridement with retention include (i) a short duration of clinical signs and symptoms, (ii) a stable implant, (iii) good condition of the soft tissue, and (iv) antimicrobial susceptibility of the microorganism (Zim-

merli et al. 2004). Compliance with these criteria is important, because it significantly improves the chance of cure (Giulieri et al. 2004, Betsch et al. 2008).

The duration of symptoms is important, since several studies have shown a high success rate (82–100%) with debridement and retention, if the duration is 3 weeks (Burger et al. 1991, Widmer et al. 1992, Zimmerli et al. 1998, Tattevin et al. 1999, Meehan et al. 2003, Barberan 2006, Laffer et al. 2006). The time to diagnosis of infection, described by Choong et al. (2007) ranged from 5 to 105 days. Moreover, the treatment protocol was also applied in patients with wound discharge (i.e. sinus tract), which is associated with a high risk of treatment failure (Marculescu et al. 2006). Finally, the authors present 7 of 14 patients who were infected with methicillin-resistant *Staphylococcus aureus* (MRSA) which should be considered as a difficult-to-treat microorganism (Zimmerli et al. 2004). Indeed, in only 4 of the 7 patients with single or mixed MRSA infection could the prosthesis be successfully retained. Taken together, the statement of Choong et al. (2007) that debridement with retention “may be suitable for patients who are not fit for major revision surgery (and) for those who decline further major surgery” is not based on our treatment concepts. Because Choong et al. (2007) highlight the influence of our work on their treatment concept, we would like to emphasize the mentioned differences. Our curative concept for device retention in patients with THI takes into strict consideration all the above-mentioned predictors of success, thorough debridement and 3-month therapy with an antibiotic that contains activity against surface-adhering microorganisms.

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Sir—Thank you for the opportunity to respond to the letter by Sendi et al. As in our paper, we acknowledge their role in developing the considered use of Rifampicin based treatment for resistant organisms. Indeed, it was their work that first inspired us to review our approach to the management of acute orthopedic joint infections and we felt that it was appropriate to acknowledge the primary source of our current endeavours.

As with the myriads of treatments for different conditions, it would be naive for us to consider that our work is a direct reproduction of Send et al's, and that definitions and criteria are always going to differ between treating institutions. There can be no question that each centre worldwide will be influenced by local philosophy and practice. The most important message that would link treating institutions, however, is the reliance on good and aggressive debridement and the considered use of specific and appropriately indicated antibiotic therapy.

We agree with Sendi et al., that 3 of our 14 cases have ongoing therapy and in these cases we agree that infection may be being suppressed rather than cured. However, without a recurrence of infection it is difficult for us to know if it is suppression or cure that is keeping the patients infection free. Perhaps, this is a moot point as from a patient perspective and functional point, they are behaving normally, not withstanding the encumbrance of ongoing medical review. For the other patients, our data demonstrate cessation of treatment and the follow-up dates are post-cessation of treatment. We prefer to let the reader decide for themselves whether the results would constitute cure or not.

We are not in a position to argue the primacy of Sendi et al.'s treatment, nor would it be a fruitful exercise. We can say, however, that from our practice, strong collaborations and inclusion of infectious diseases physicians in a multidisciplinary approach to treating acutely infected joint replacements is likely to deliver better and less complicated care for the patient.

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Sir—We read with great interest the article “Risk factors associated with acute hip prosthetic joint infections and outcome of treatment with a rifampin based regimen” (Choong et al. 2007). Antibiotic pressure is known to select mutants that can survive the adverse conditions. In a hospital, constant use of antibiotics results in survival and spread of MRSA, extended spectrum beta lactamase producers and multidrug resistant enterococci (Srinivasan et al. 2006).

As quoted by the authors combination therapy with rifampin emergence of resistance may be prevented. However, literature is having quite a number of reports reporting primary MRSA resistance to rifampin as well as following combination therapy (Yourassowsky et al. 1981, Gottlieb et al. 1998, Aucken et al. 2002, Norazah et al. 2002, Srinivasan et al. 2006). A study has shown emergence of rifampin resistance to MRSA in tuberculosis wards. And hence the question arises why it cannot happen the reverse way round (Sekiguchi et al. 2006).

With approximately 9 million people developing active tuberculosis (TB) every year and 1.7 million deaths annually, TB is far from under control and is a major public health problem in Asian and African countries (WHO 2006). The increasing spread of multidrug resistant TB (MDR-TB) and the recalcitrant nature of persistent infections pose additional challenges to treatment with currently available anti-TB drugs (WHO 2006).

The number of prosthetic joint infections in developing countries is also rising and so in the number with infection due to MRSA. However, in these countries the message that rifampin may be a panacea to MRSA prosthetic joint and other infections may actually topple the public health programme of TB control which is a greater public health concern and which presently relies heavily on it.

Effective prevention and control of infections due to MRSA depends on practice of infection control measures such as hand washing. Minimizing risk factors and attention to alternate cost effective combination therapy may ease the problem of management of infections with MRSA (Srinivasan et al. 2006) and at the same time not add to the emergence of MDR-TB.

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Sir—Thank you for the opportunity to respond to the letter from Neogi et al. Their concerns with regard to the emergence of rifampicin resistance in mycobacteria is a genuine one. We agree with their sentiments that appropriate precautions should be taken to minimize joint infection rather than relying on specific antibiotics to treat the complication of infection after it occurs. Whether resistance is to mycobacteria or staphylococcal species or any other organism, the results can be devastating to patients and depleting on valuable resources. As Neogi et al. emphasize, the use of rifampicin should not be regarded as a panacea.

As we have stated in our paper the use of combination therapy provides some barrier to the development of resistance. Further, the use of rifampicin and fusidic acid is considerably less in our community than in Neogi et al.'s, so the risk of developing resistant mycobacterial organisms while real is much less in this environment. Nonetheless, sensible use of chemotherapeutic agents require a considered and evidence based approach, hence our protocol and follow-up of outcomes. Perhaps the most important lesson from our work is the fundamental need to include an infectious diseases physician in the multidisciplinary team to provide guidance for the appropriate use of critical treatments such as this.

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