Management of Prosthetic Joint Infections: a survey of UK practice

Cordina, C.[1], Marek, A.[1] and Khanna, N.[2]

1. Microbiology Department, Glasgow Royal Infirmary, 2. Microbiology Department, Southern General Hospital, Glasgow.

Introduction

The morbidity and costs associated with infection of a prosthetic joint are substantial. The number of joint replacements is increasing and although only a small percentage of cases are complicated by infection **it is likely that increasing numbers will be seen [1].**

The management of these cases varies from centre to centre. Despite the recent publication of the Infectious Diseases Society of America guidelines [2] for the management of prosthetic joint infection (PJI) there is ongoing lack of consensus. In the UK there is no national treatment guideline and guidelines from other countries vary in the antibiotics commonly used, limiting their local applicability. Johannsson et al performed a survey of the treatment of PJI by infectious diseases practitioners in the US and concluded that there was substantial variability in practice [3] especially with regards duration of therapy. They also admit that practices are likely to vary between North America and Europe. In relation to this, we sought to perform a similar survey in the UK.

Methods

A telephone survey of consultant and senior trainee microbiologists in hospitals throughout Scotland and England was performed in June to August 2011. In order to contact the English laboratories the 'Directory of Microbiology Laboratories in England' available on the Department of Health website (DOH, 2009) was used [4]. The microbiology departments in Scotland were known locally. Respondents were either interviewed over the telephone or asked to complete and return the questionnaire via email. Non-responders were not re-contacted. The questions included in the survey are displayed below.

Results

186 centres were contacted and responses were received from 48 individuals (26%). The responses were a combination of local protocol recommendations and individual consultant preference.

Q1. What do you use empirically to treat PJI?

There was a wide variety of choices for the empiric antibiotic treatment of PJI, with no consensus amongst the different hospitals. Some of the more popular choices were vancomycin and gentamicin, vancomycin and rifampicin and vancomycin and piperacillin-tazobactam.

Q2. What is your first choice for treatment of MSSA PJI? Specify duration of IV and oral therapy.

Figure 1 shows that 20.83% of those asked would give IV flucloxacilin alone and 72.92% would give IV fluclox acillin with a second agent. The second agents used included rifampicin 43.75%, fusidin, clindamycin, gentamicin and ciprofloxacin.

Figure 1 - First choice therapy for MSSA PJI

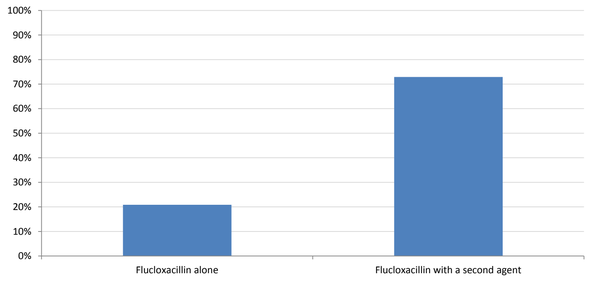


Figure 2 shows that 31.25% of respondents gave 2 weeks of IV antibiotics, 41.67% would give longer than 2 weeks IV with the longest duration suggested being 12 weeks

Figure 2 - Duration of IV therapy for MSSA PJI

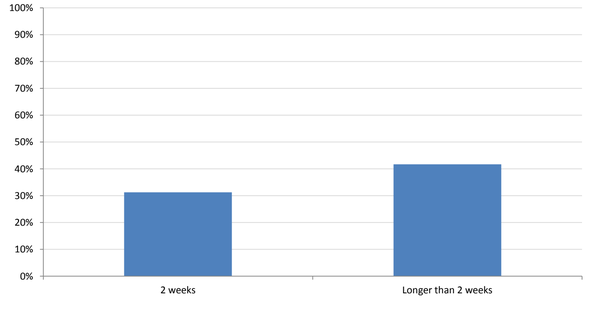
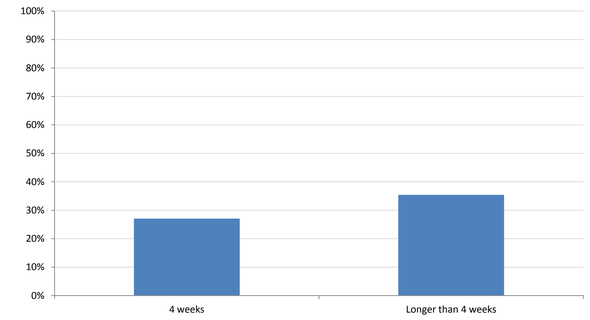


Figure 3 shows that 27.08% of respondents would give 4 weeks of oral therapy and 35.42% of respondents would give longer, with the longest suggestion being 12 weeks.

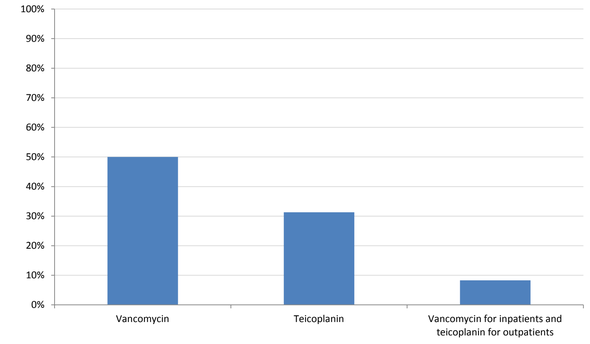
Figure 3 - Duration of oral therapy for MSSA PJI



Q3. What is your glycopeptide of choice for treatment of PJI?

Figure 4 showed that the majority of respondents named vancomycin as their glycopeptide of choice for treatment of PJI. This sometimes however depended on the treatment setting.

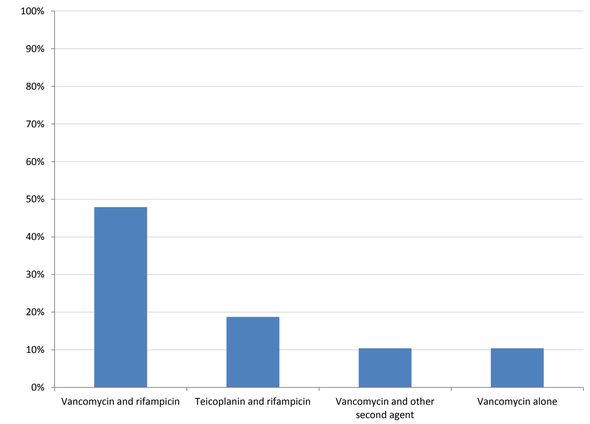
Figure 4 - Glycopeptide of choice for treatment of PJI



Q4 and 5. What is your preferred therapy for treatment of MRSA PJI, and what would be your second line?

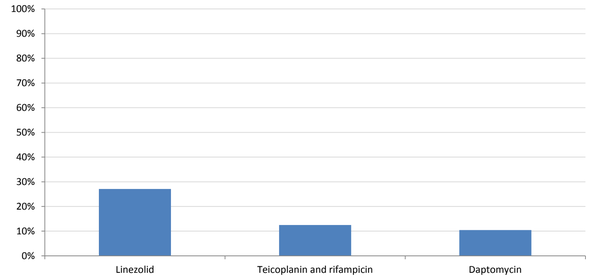
As can be seen in figure 5. Almost half of respondents (47.92%) said that a combination of vancomycin and rifampicin is their preferred choice for the treatment of MRSA PJI, with teicoplanin and rifampicin being the next most popular choice (18.75%).

Figure 5 - First line therapy for MRSA PJI



Many respondents used linezolid as a 2nd line choice for MRSA PJI. Figure 6 indicates some of the various regimens used.

Figure 6 - Second line therapy for PJI



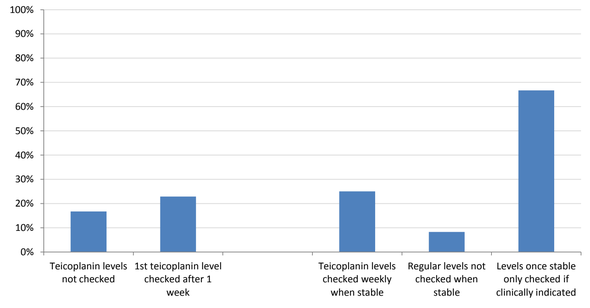
Q6. If you use teicoplanin, what loading and maintenance doses do you recommend for the treatment of PJI?

8 respondents (37.5%) gave a loading dose of teicoplanin 400mg twice daily for 3 doses. The range of loading doses recommended was from 400mg od to 800mg bd. 17 (35.42%) respondents gave 400mg once daily as the maintenance dose. The range of maintenance doses recommended varied from 400-800mg once daily or 8-10mg/kg/day.

Q7. What is your monitoring scheme for teicoplanin?

Figure 7 shows that 16.7% of respondents would not regularly check teicoplanin levels, 22.9% checked the first level after 1 week. The range of the remainder of the responses was from before the 4th dose to day 6. Once the teicoplanin levels are steady 8.3% would not regularly check levels, 25% would check a level weekly and the remainder would only do so if clinically indicated.

Figure 7 - Monitoring scheme for teicoplanin



60% of units surveyed sent their teicoplanin levels to the antimicrobial reference unit in Bristol.

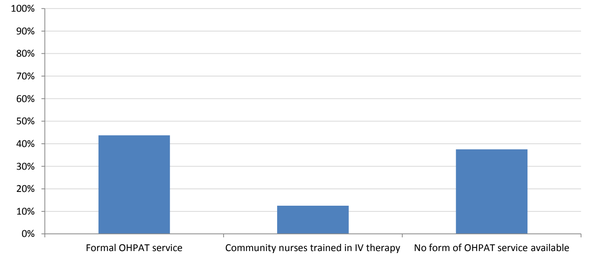
Q8. What is the maximum duration for which you would use linezolid?

The majority of respondents said that they would use linezolid for a maximum of 4 weeks. 9 (18.7%) respondents said that this was an individual patient decision, with close blood monitoring. **The range of maximum durations was from 2 weeks to 2 months.**

Q9. Do you have an OHPAT service available?

Figure 8 shows that 43.75% of respondents had a formal OHPAT service available and 12.5% did not have a formal service but had community nurses trained in giving IV therapy.

Figure 8 - OHPAT availability



Learning points

• Due to **a lack of well designed randomised controlled trials to guide the management of PJI,** there is great variability amongst different institutions in the UK and different countries worldwide. This variability in practice is reflected in our study. **Practice varies with respect to choice of antibiotic, and duration of IV and oral treatment.**

• **A review by Trampuz and Zimmerli [5] gave treatment recommendations** based on the organism cultured, time of prosthesis insertion prior to development of infection, and the surgical management of the infected prosthesis. **A number of our respondents mentioned that they follow the recommendations in this particular review** for the management of PJI. However there is currently no national guidance in the UK for the treatment of PJI.

• **There is conflicting evidence regarding the optimal glycopeptide of choice in bone and joint infection,** and this is reflected by the responses obtained in the questionnaire. One study found higher mean bone:serum concentration ratios for teicoplanin compared to vancomycin [6], however clinical studies have so far failed to elucidate the most appropriate glycopeptide in bone and joint infection.

• **Our study shows lack of consistency in the dosing schedules of teicoplanin for the treatment of PJI, and the optimal loading doses and trough concentrations of teicoplanin for PJI are still unclear.** Higher drug doses and serum levels of teicoplanin have been advocated for the successful treatment of bone and joint infections. [7] However this may be offset by an increased incidence of toxicity.

• **Monitoring of teicoplanin trough levels has been recommended for serious infections to ensure that therapeutic levels are achieved, with an aim for trough levels between 20 and 60 mg/l being advocated [8]. Practice amongst our respondents was highly variable,** with some microbiologists not recommending any drug level monitoring. Timing of the first trough level also varied amongst our respondents. Further studies are needed to provide more information on the optimal dosing and drug monitoring of teicoplanin in order to achieve the best clinical outcomes in PJI.

• Linezolid, has increasingly been used as a therapeutic option for PJI. It has a favourable pharmacokinetic profile, with oral bioavailability approaching 100% [9]. It also has good penetration into bone [10]. However its use is limited by the development of serious adverse events with prolonged use. Serious adverse events mostly occur in patients treated for longer than 28 days . **In our survey, the respondents recommended linezolid for a duration ranging from 2 weeks to 2 months.**

• **Bone and joint infections (BJI), including PJI, are the second most common infection treated by OHPAT teams. Successful outcomes have been reported for the management of BJI through OHPAT [11]. Advantages of treatment via OHPAT include reduction in healthcare-associated infections (HAI), reduction in healthcare costs and earlier return to work [11]. The availability of a formal OHPAT service was limited to just less than half of the centres interviewed in our study.**

• Limitations of the study include the lack of a tick box format resulting in a wide variability of responses and the low response rate. Additionally, in order to keep the questionnaire simple we did not include any sensitivity data. This may have contributed to the larger number of recipients giving the response 'individualised advice'.

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Disclosures

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