Introduction

Early and delayed prosthetic joint infections (PJI) are generally acquired during prosthesis implantation (Zimmerli, N Engl J Med 2004). Large studies on microorganism(s) isolated in these infections are rare (Schäfer, Clin Infect Dis 2008; Stefansdottir, Scan J Infect Dis 2008; Peel, AAC 2012).

Objectives

Our objective was to describe and compare the microorganisms isolated from early and delayed prosthetic hip (PHI) and knee infections (PKI) managed at our center.

Methods

The study center is a French regional referral center for complex bone and joint infections. All patients hospitalized with a PHI or a PKI deemed post-operative were included. Data was prospectively collected and entered into the study database from January 2004 to December 2010. Early infection was defined as surgical site pain, erythema, +/- drainage +/- fever, occurring within the first 30 days of a total arthroplasty (TA).

Delayed infection was defined as pain, joint dysfunction, +/- a fistula, occurring 1 month to 2 years post TA. Hematogenously infections were excluded. Microbiological diagnostics were performed by culturing with prolonged incubation (10 days) of preoperative joint fluid aspirates and/or intraoperative samples (Zeller, J Infect 2007). Microorganism(s) were considered to be responsible for the infection if they were isolated in EITHER 2 or more cultures from preoperative joint fluid aspirate and/or intraoperative samples at different sites OR a single preoperative joint fluid aspirate containing >1700 leukocytes/mm$^3$ and >65% neutrophils in the differential. A PJI was polymicrobial if 2 or more different microorganisms were isolated.

The Chi-square test was used to compared the microorganisms isolated in early versus delayed infections and monomicrobial versus polymicrobial PJI.

Results

Of 485 PJI treated during this period, 168 (34%) considered hematogenously acquired and 72 (15%) of undetermined origin, were excluded. The 245 remaining PJIs (51%) occurring within 2 years of TA were deemed post-operative: 100 early and 145 delayed. Median age was 71 years (IQR 61-77), with a 1.15 M/F sex ratio. Infection occurred in 168 (69%) hips, 77 (31%) knees. Of the PJIs managed elsewhere prior to admission to our center: 66 (27%) had been operated at least once and 89 (35%) had received antibiotic therapy.

Organisms identified from the 245 cases are shown in Table 1. S. aureus and polymicrobial infection (Peel, AAC 2012) were more frequently observed in early infections. Two third of these S. aureus isolates were methicillin-susceptible. Coagulase negative Staphylococci, especially S. epidermidis, and Propionibacterium sp were more frequently isolated in delayed infections. Among S. epidermidis isolates, 88% were methicillin-resistant and 35% glycopeptide-intermediate. Among polymicrobial infections, Enterobacteriaceae, P. aeruginosa and E. faecalis were more frequently observed than among monomicrobial infections (p<0.001).

Conclusion

In this large monocentric population of early and delayed PJI, where about one-third of the cases had been previously managed, the spectrum of microorganism(s) isolated was wide. Staphylococcal species were isolated in 61% of the cases with methicillin-resistant S. epidermidis being the most frequent pathogen (25%). Polymicrobial infections were more frequently observed in early infections with P. aeruginosa, E. faecalis and Enterobacteriaceae isolated in 26%, 34% and 39% of the cases, respectively (Peel, AAC 2012). Streptococcal infections were rarely observed. P. acnes were isolated in 14% of delayed infections. Very few patients had no microorganism isolated.

Table 1: Microorganisms isolated from 245 cases of early and delayed prosthetic joint infections managed at a Parisian Referral Center for bone and joint infections

Table 2: Microorganisms isolated from 58 cases of polymicrobial prosthetic joint infections