Epidemiology of haematogenous periprosthetic joint infections: an analysis of 96 consecutive episodes

Anastasia Rakow1, Carsten Perka1, Andrej Trampuz1, Nora Renz*

1Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery (CMSC), Berlin, Germany

Background: Haematogenous periprosthetic joint infections (PJI) are probably underreported. Unrecognized primary infectious foci may lead to continuous spread of microorganisms and treatment failure. We investigated the microbiological and clinical characteristics including the primary infectious focus of haematogenous PJI, in order to improve the diagnostic and therapeutic strategies of this clinical entity.

Materials/methods: All consecutive patients with haematogenous PJI treated at our institution from January 2010 until November 2017 were retrospectively analyzed. Diagnosis of PJI was established if ≥1 of the following criteria applied: (i) macroscopic purulence, (ii) presence of sinus tract, (iii) positive cytology of joint aspirate (>2000 leukocytes/μl or >70% granulocytes), (iv) significant microbial growth in synovial fluid, periprosthetic tissue or prosthesis sonication culture, (v) positive histopathology. PJI was classified as haematogenous if the onset of symptoms was >1 month after arthroplasty AND either same microorganism grew in blood cultures as at the prosthesis site or a distant infectious focus was diagnosed.

Results: A total of 96 patients were included. Median age was 75 years (32–89 years), 51 were women. Sites of PJI included 53 knees, 41 hips, one shoulder and one elbow joint. In 54/90 patients (60%) previous revision surgery was documented, median implant age was 50 months (range, 1-331 months). Median serum C-reactive protein value was 128mg/l (3-553mg/l). The pathogen was identified in 99% (n=95), the majority of episodes was monomicrobial (n=93, 97%). Blood cultures grew the pathogen in 37 of 61 patients (61%), in which they were collected. Isolated pathogens were Staphylococcus aureus (n=38), Streptococcus spp. (n=31) and Enterococcus faecalis (n=13), Enterobacteriaceae (n=7), coagulase-negative staphylococci (n=6), and Clostridium innocuum (n=1). Primary infectious focus was identified in 61 patients (64%), including intravascular device/heart valve (n=19), skin or soft tissue (n=12), dental (n=11), urogenital (n=10), gastrointestinal (n=6) or other (n=3) origin.

Conclusions: Haematogenous PJI were predominantly caused by high virulent microorganisms such as staphylococci, streptococci and gram-negative bacilli. The primary focus could not be identified in 35 cases primarily due to underuse of diagnostic workup. Meticulous diagnostic workup including collection of blood cultures is crucial in haematogenous PJI to improve treatment success and prevent relapses.