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Author: T. Bauer A.-L. Roux A. Dinh

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Editorial

What's new in periprosthetic joint infection: diagnosis and bacteria

T. BAUER, A.-L. ROUX, A. DINH

Centre de Références en Infections Ostéo-Articulaires, Hôpital Ambroise Paré, Assistance
Publique – Hôpitaux de Paris, Université Paris Ile-de-France Ouest
9 avenue Charles de Gaulle
92100 BOULOGNE
France

thomas.bauer@aphp.fr

Periprosthetic joint infection (PJI) remains one of the most challenging situations for both patients and surgeons, because of the difficulty of eradicating the infection, high surgical risks, antibiotic therapy toxicity, social and functional consequences for the patient, and public health costs [1]. Despite considerable improvements in treatment, both surgical and medical, in recent decades, diagnosis of PJI remains paradoxically difficult.

Joint aspiration is the gold-standard to diagnose PJI, and should be performed almost systematically in prosthesis revision, except in obvious early acute PJI and most cases of mechanical failure such as periprosthetic fracture or implant breakage. Preoperative aspiration before implant revision avoids the most dangerous and difficult situation: positive intraoperative microbiological findings in what was presumed to be “aseptic” revision with standard antibiotic prophylaxis. Routine microbiological culture of preoperative aspiration and intraoperative deep samples is the key to, identifying the bacteria responsible for the PJI and determining antibiotic sensitivity. Delivery of deep joint samples to the microbiology lab needs to be meticulously organized, and it is the responsibility of the surgeon or the physician who performs the aspiration to make sure that the aspiration fluid is analyzed as quickly as possible. Microbiological assessment requires specific culture media and techniques, as bacteria implicated in PJI have a specific metabolisms featuring slow growth, varying from colony to colony [2]. Moreover, when PJI is suspected, the microbiology lab needs to have experience with joint aspiration and intraoperative samples, as bacteria such as *Cutibacterium acnes* and some coagulase-negative staphylococci and anaerobic bacteria are difficult to identify and require prolonged culture and specific techniques [3,4].

Cutibacterium acnes is now better known as a pathogen causing chronic late PJI (especially involving shoulder prostheses) due to its various degrees of virulence and biofilm formation capacity [5,6]. Physicians and surgeons suspecting PJI should alert the microbiology lab to use specific techniques and prolonged culture to identify this increasingly implicated bacterium.

Nevertheless, even in expert labs, microbiological cultures match between preoperative aspiration and intraoperative samples in only 75-90% of cases [7,8], with 10-25% of PJIs remaining difficult to diagnose on conventional microbiology. Alternative biological techniques are therefore very helpful for these difficult cases, providing supplementary evidence for or against infection when standard microbiological culture proves inconclusive. Molecular biology techniques with identification of bacterial 16S rRNA are interesting as they provide information quickly, with simple standardized procedures; however, they do not determine the antibiotic sensitivity of suspected strains [9].

Serological tests (BJI Inoplex Diaxonhit, Paris, France) provide additional information by antibody detection for *Staphylococcus spp*, *Streptococcus spp* and *Cutibacterium acnes*.

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