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Paper Poster Session
Bone and prosthetic joint infection

Clonal relationship of Propionibacterium acnes isolates recovered from bone and joint infections: multi-locus sequence typing of multiple intraoperative isolates

Faten El Sayed[1], Anne-Laure Roux[1], Jean-Pierre Rabes[2], Philippe De Mazancourt[3], Jean-Louis Herrmann[4], Jean-Louis Gaillard[5], Thomas Bauer[6], Martin Rottman*[7]

[1]*Hospital Ambroise Pare, Microbiology, Boulogne Billancourt, France*

[2]*Hôpital Ambroise Paré , Biochemistry-Molecular Biology, Boulogne-Billancourt , France*

[3]*Hôpital Ambroise Paré, Biochemistry-Molecular Biology, Boulogne-Billancourt, France*

[4]*Hôpital Raymond Poincaré , Microbiology, Garches, France*

[5]*Ambroise Paré University Hospital, Microbiology, Boulogne-Billancourt, France*

[6]*Hospital Ambroise Paré, Orthopedic Surgery , Boulogne Billancourt, France*

[7]*Hospital Raymond Poincaré, Microbiology, Garches, France*

Background: *Propionibacterium acnes* is a slow growing Gram-positive anaerobic bacillus requiring five to fifteen days to grow on solid or liquid media. *P. acnes* is a skin commensal colonizing the deeper structures of the pilous bulb. It is responsible for 5-10% of lower limb prosthetic joint infections (PJI) but accounts for as many as 50% of shoulder arthroplasty infections. *P.* acnes PJIs characteristically feature limited systemic inflammation, limited polymorphonuclear infiltration and clinical signs compatible with aseptic loosening. All current microbiological definitions of PJI require two or more identical commensal isolates to be recovered from the same procedure to diagnose PJI to increase specificity and rule out contamination. Whereas the antimicrobial susceptibility patterns of coagulase negative staphylococci are highly polymorphic and commonly allow the ready distinction of unrelated strains, *P. acnes* shows a highly stereotypical susceptibility profile and it is impossible to phenotypically assess the clonal relationship of isolates. In order to determine the clonal relationship of multiple *P. acnes* isolates recovered from arthroplasty revisions, we analyzed by multi-locus sequence typing (MLST) *P. acnes* isolates grown from PJI in a reference center for bone and joint infection.

Material/methods: We retrospectively selected all cases of microbiologically documented monomicrobial PJI caused by *P. acnes* diagnosed in our center from January 2009 to January 2014. Microorganisms were identified by MALDI-TOF mass spectrometry (Bruker Daltonics). All corresponding *P.acnes* isolates biobanked in cryovials frozen at -80°C were subcultured on anaerobic blood agar, DNA extracted by freeze-thawing and bead-milling, and typed according to the 9 gene MLST scheme proposed by Lomholt HB. and *al*.

Results: Over the 5-year period, 39 cases of PJI positive with *P. acnes* were diagnosed in our center. Three to ten intraoperative samples were sent for microbiological analysis per surgery. Overall, 148 *P. acnes* isolates were grown from 210 samples. On average, four samples were positive out of six. In 34/39 cases, all isolates belonged to the same ST. In 5 cases, multiples STs were found among the *P. acnes* isolates. In 3/39 cases (7.7%), a single ST was found to be microbiologically significant, with a single isolate of the alternate ST. In 2/39 cases (5.1%), we found that each isolate belonged to a different ST.

Conclusions: *P. acnes* PJI were found to be polyclonal by MLST in 12.8% of cases in our experience, with more than 5% of cases not fulfilling the requirements for microbiological significance. The criteria for microbiological significance do not necessarily apply to commensal agents with no antimicrobial susceptibility pattern variation such as *P. acnes.*