Rapid Fire Papers 2

[O45] COST-TO-BENEFIT EVALUATION OF ANTIBIOFILM MICROBIOLOGICAL DIAGNOSTIC TECHNIQUES IN ORTHOPAEDICS

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Aim: Implant-related infections, including peri-prosthetic joint infection (PJI) and infected osteosynthesis, are biofilm-related. Intra-operative diagnosis and pathogen identification is currently considered the diagnostic benchmark, however the presence of bacterial biofilm(s) may have a detrimental effect on pathogen detection with traditional microbiological techniques. Sonication and chemical biofilm debonding have been proposed to overcome, at least partially, this issue, however little is known about their possible economical impact. Aim of this study was to examine direct and indirect hospital costs connected with the routine use of antibiofilm microbiological techniques applied to hip and knee PJIs.

Method: In a first part of the study, the "Turn Around Time (TAT)" and direct costs comparison between a system to find bacteria on removed prosthetic implants*, a closed system for intra-operative tissue and implant sampling, transport and antibiofilm processing, versus sonication has been performed. An additional analysis of the estimated indirect hospital costs, resulting from the diagnostic accuracy of traditional and antibiofilm microbiological processing has been conducted.

Results: Considering an average 5 samples per patient, processed separately with the sonication or pooled together, using the device*, the direct costs comparison shows a similar overall average estimated cost per patient when using sonication (€ 400.00) or the system to find bacteria on removed prosthetic implants* (€ 391.70). Indirect hospital costs of false positive or negative intra-operative pathogen identification can be estimated as, respectively, € 65,000 and € 90,000, including possible inadequate treatments and/or surgeries and/or need for further hospital stay, risk of infection recurrence/persistance, possible medico-legal claims, etc. Considering 1 out of ten cases of false identification as generating indirect hospital costs ("mitigation factor": 90%) and an accuracy of current intra-operative microbiological sampling and testing of approximately 80%, it is calculated that any antibiofilm procedure able to increase the microbiological diagnostic accuracy by 10%, at an average cost per patient of € 500.00, would induce an average hospital cost saving of appoximately € 100,000 per 100 treated cases.

Conclusions: To our knowledge, this is the first study specifically focused on the potential eonomical impact of the routine clinical use of microbiological antibiofilm processing techniques in orthopedics. The several limitations of this study notwithstanding, including the variable Country-based value of the different direct costs and the assumptions made concerning indirect costs calculations, this analysis points out how more accurate pathogen identification procedures can lead to an improvement of the management of implant-related infections in orthopaedics, with a substantial economical balance.
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