CORRESPONDENCE

Microbial Load in Septic and Aseptic Procedure Rooms

Results From a Prospective, Comparative Observational Study

by Dr. med. Julian-Camill Harnoss, Prof. Dr. med. Ojan Assadian, Prof. Dr. med. Markus Karl Diener, Dr. med. Thomas Müller, Dr. rer. med. Romy Baguhl, Prof. Dr. med. Markus Dettenkofer, cand. med. Lukas Scheerer, Prof. Dr. phil. Thomas Kohlmann, Prof. Dr. med. Claus-Dieter Heidecke, Dr. med. Stephan Gessner, Prof. Dr. med. Dr. h.c. mult. Markus Wolfgang Büchler, and Prof. Dr. med. Axel Kramer
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Separate Septic and Aseptic Operating Areas

The authors deserve thanks for discussing the controversial topic of microbial load in operating rooms (1), as sustainable measures to reduce microbial load in this setting are essential.

Tables 1 and 2 in the article compare septic and aseptic surgical procedures and find mostly higher average values of microorganisms in the air of operating rooms for septic procedures, especially of aerobic spore forming bacteria (1). The authors emphasize that “the fact that the differences between the 2 procedure types were statistically insignificant cannot [...] be interpreted as direct evidence of equal microbial load”. However, in their conclusion, the authors recommend not to separate operating rooms.

Operating areas have a key role. According to a prospective study at Geneva University Hospital, which included 6101 joint prostheses (mean follow-up 70 months), 90% of infections originated during surgery, and 31% presented with initial symptoms after >2 years (2).

A prospective randomized study shows the risk posed by microorganisms in the air of operating rooms (3): „Analysis of the relationship between the number of bacteria washed from the wound at the end of operation to both the number of bacteria in the air of the operating room and those on the patient’s skin at the wound site, clearly showed that the most important and consistent route of contamination was airborne.”

A multicenter study of 8052 joint prostheses indicates that in operating rooms the rate of infection rises with increasing contamination of the air, with Laminar Air Flow offering better protection than turbulent mixing ventilation (4). However, infections develop in spite of ventilation technology.

On the basis of the study reported by Harnoss et al. (1) and in view of the study results mentioned above, no recommendation can be given to abolish the separation between septic and aseptic operating rooms for surgical procedures that entail a high risk of surgical site infection.

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Prof. Dr. med. Karin Büttner-Janz

Extraordinary Professor at Charité—Universitätsmedizin Berlin
IWE Ärzte Management AG, Berlin
buettn-janz@iwe-berlin.de

Conflict of interest statement

Prof. Büttner-Janz provided the primary deposit for IWE Ärzte Management AG.

In Reply:

We thank Prof. Büttner-Janz for her contribution. As she rightly says, microbial load in partial results in our study was tendentially higher after septic procedures than after aseptic ones (1). Because of the wide spread and the very small deviations, we considered these differences to be irrelevant. Furthermore, the significantly larger proportion of aerobic spore forming bacteria affected the mean values of the microbial load in the procedure rooms. Etiologically, however, these pathogens are out of the question in terms of causing postoperative wound infections. For visceral surgical procedures, individual findings of *E faecalis* and *E coli* do not translate into a risk of infection, because these findings are far below any infectious dose. As the results were obtained in an operating room without a room ventilating system (RVS) and the recovery time in a setting of mixed air flow is a maximum of 20 minutes, with an RVS, pathogens still present in the room air will be eliminated by the start of the procedure. Even without an RVS and with a changeover time of 30 minutes, it is not necessary to separate operating areas.

The comment that „the fact that the differences between the 2 procedure types were statistically insignificant cannot [...] be interpreted as direct evidence of equal microbial load“ was quoted in an abbreviated form. It relates only to the study design, which was originally not intended to be that of an equivalence or non-inferiority study.

The Geneva study, according to which 90% of infections after implantation of a joint endoprosthesis developed during the procedure, does not permit the conclusion that the pathogens came from the environmental air. Such infections are almost exclusively caused by Gram-positive pathogens in the skin microflora. In order to minimize this risk of infection, low-turbulence laminar flow is recommended (2), which serves to keep the operating field free from pathogens over the duration of the procedure (3).

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Prof. Dr. med. Axel Kramer

Institute for Hygiene and Environmental Medicine, University Medicine Greifswald,

Dr. med. Julian-Camill Harnoss

Department of General, Visceral and Transplantation Surgery and Study Center of the German Surgical Society
University of Heidelberg
julian-camill.harnoss@med.uni-heidelberg.de

Prof. Dr. phil. Thomas Kohlmann

Institute for Community Medicine, University Medicine Greifswald

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The authors declare that no conflict of interest exists.

CLINICAL SNAPSHOT

Multiple Pulmonary Emboli of Bone Cement after Kyphoplasty

Figure

a) Local leakage of bone cement into the prevertebral venous plexus (red arrow), retrograde flow via the transpedicular drilled canal (green arrow). b) Cement embolus into a pulmonary artery, diameter 1 mm.

We report the autopsy findings of a 75-year-old woman who died of an acute pulmonary arterial embolism secondary to deep venous thrombosis of the lower limbs. Computerized tomography had shown local leakage of cement from a kyphoplasty (T11, T12) performed three years earlier. Gross pathological examination of the lungs revealed needle-shaped cement emboli (Figure), and histopathological examination revealed multiple microemboli of bone cement, some of which were integrated into vessel walls. These findings demonstrate a rarely reported complication of this commonly performed surgical procedure. The clinical significance of pulmonary microemboli of bone cement may be

underestimated; its full extent should be determined in future morphological studies. Already at present, kyphoplasty should only be performed when strictly indicated, and preventive measures against cement embolism must be taken. These include using cement of suitable viscosity, avoiding excessive pressure, and paying due consideration to the local vascular anatomy in the light of the patient's underlying disease.

Dr. med. Sebastian Butscheidt, Institut für Osteologie und Biomechanik, Universitätsklinikum Hamburg-Eppendorf, Hamburg, s.butscheidt@uke.de

Jacob Ritter, Prof. Dr. med. Klaus Püschel, Institut für Rechtsmedizin, Universitätsklinikum Hamburg-Eppendorf

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