Impact of single room contact precautions on hospital-acquisition and transmission of vancomycin-resistant enterococci in a high-risk setting: preliminary results from the CONTROL study

Lena Maria Biehl*4 5, Paul G Higgins5 6, Jannik Stemler4, Meyke Gillis6, Silke Peter13 14, Daniela Dörfel11 12, Wichard Vogel11, Winfried V. Kern10, Hanna Götz6, Hartmut Bertz2, Holger Rohde1 3, Eva-Maria Klupp1, Philippe Schafhausen2, Jon Salmantón-García4, Julia Ertel5 6, Janine Zweigner6 7, Harald Seifert5 6, Maria J.G.T. Vehreschild4 5

Background: The incidence of colonisation and infection by vancomycin-resistant enterococci (VRE) has increased worldwide. Recent studies report particularly high rates in hematology and oncology departments. The evidence for the effectiveness of contact precautions for patients colonised by these multidrug-resistant organisms is very limited.

Materials/methods: We performed a prospective cohort-study at four German hematology/oncology departments throughout 2016. All study sites screened patients for VRE on admission, weekly and before discharge. Two sites performed single room contact precautions for patients colonized or infected by VRE (SCP sites), the other two did not (NCP sites). Collected isolates from all VRE patients were subjected to whole genome sequencing and core-genome multi-locus sequence typing (cgMLST) to assess clonal relatedness. The latter was defined as a maximum difference of 10 alleles by cgMLST. Screening adherence, hand hygiene compliance and antibiotic exposure both at patient and ward level were assessed as potential confounders.

Results: In one year, 1,644 patients with 3,193 hospitalisations from SCP sites and 1,434 patients with 2,487 hospitalisations from NCP sites were included. Hospital-acquired colonization or infection was significantly less frequent at SCP sites (7.1%) as compared to NCP sites (12.6%; p<0.001). Bloodstream infections were rare events in both groups with 4 and 2 cases in SCP and NCP sites, respectively (p=0.692). cgMLST revealed a notably high rate of clonal relatedness in all study sites with clusters of up to 65 isolates. In SCP sites, we observed 167 potential transmission events involving 10.2% of all patients. At NCP sites, we observed 227 potential transmission events involving 15.8% of all patients (p<0.001). Of note, cgMLST also showed a high frequency of clonal relatedness among strains across different study sites. Determination of clinical relatedness to distinguish between
in-hospital transmissions and background clonal relatedness due to circulating clones in the community is pending.

**Conclusions:** In this multicenter cohort-study, applying single room contact precautions for patients colonised or infected with VRE was associated with a significantly lower rate of hospital-acquisitions and potential transmissions of VRE, but not with fewer invasive infections. Further investigations will elucidate reasons for closely related strains across study sites, as found in our study.