

Anti-infective therapy for bloodstream infections in Thuringia - data from the first 12-month report of the Thuringian blood culture registry AlertsNet

Karch A¹, Schmitz RPH², Reißner F³, Kortegast M², Jakob M², Mikolajczyk RT¹, Brunkhorst FM^{2,3}

¹Department of Epidemiology, Helmholtz Center for Infection Research (HZI), Braunschweig

²Center for Sepsis Control and Care (CSCC), Jena University Hospital

³Center for Clinical Studies, Jena University Hospital



Universitätsklinikum
Jena



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Control & Care

Background

- Bloodstream infections are a leading cause of death worldwide (1,2).
- Population-based surveillance provides the best approach for
 - defining the burden of bloodstream infections,
 - evaluating risk factors for acquiring infections,
 - monitoring temporal trends in occurrence/resistance of pathogens,
 - monitoring usage and trends in the application of anti-infective treatment (3).
- In 2013, the first German population-based surveillance study for bloodstream infections has been established in Thuringia (AlertsNet).

Objectives

- To report data on anti-infective therapy of bloodstream infections from the first 12 months of the population-based surveillance study AlertsNet
- To investigate how initial empirical therapy was adapted according to blood culture results

Study design and study population

- AlertsNet is a population-based study including data on three levels
 - microbiological data on pathogens and resistance profiles for each blood culture taken in the participating institutions,
 - clinical data (including daily updated information on antibiotic treatment) for all patients with clinically relevant positive blood cultures,
 - institutional data (e.g. case mix index) in order to allow comparisons between institutions adjusted for institution-specific criteria.
- Analyses are based on the first 12-months report of AlertsNet (01 May 2014 to 30 April 2015).
- In this time period, patients from 7 clinical institutions represented by four microbiological laboratories were assessed for inclusion in this analysis.
- All patients with a clinically relevant positive blood culture (according to a pre-defined algorithm) and a completed case report form were enrolled.

Methods

- Demographic and clinical data of all enrolled patients were obtained from participating hospitals and linked to blood culture results collected via the automated electronic blood culture registry of AlertsNet.
- Daily information on antibiotic treatment of the individual patients was linked to clinical and microbiological data.
- Standard measures of descriptive statistics were applied in order to describe the distribution of anti-infective drugs used and on how anti-infective therapy was adapted over time.

Results 1 - empirical anti-infective therapy

- In total, 812 patients with one to six positive blood cultures were included.
- In 29% of bloodstream infections, anti-infective treatment (with one to six different drugs) was already administered when the first blood culture set was taken.
- Piperacillin/Tazobactam was used in 29% of the regimens when treatment was started before blood culture sampling; it is thereby the most frequently used anti-infective drug (Figure 1A).

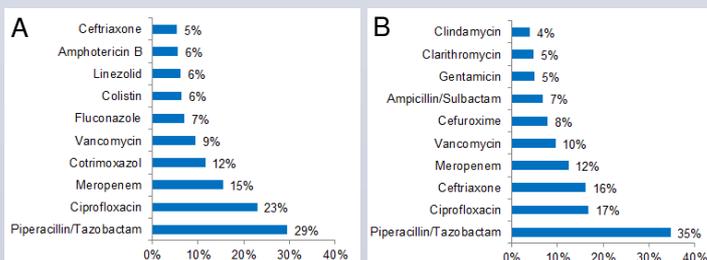


Figure 1: Ten most common anti-infective drugs being part of the initial regimen under which the first blood culture set was taken (A); ten most common anti-infective drugs being part of the initial empirical regimen when therapy was started after the first blood culture was taken (B).

- In patients, where anti-infective treatment was initiated after the first blood culture set was taken, empirical therapy was more likely to include third generation cephalosporins like ceftriaxone (16%) and cefuroxime (8%; Figure 1B).
- Patients already under therapy when the first blood culture was taken were more likely to have a defined focus (36% vs. 28%) and they were more likely on ICU (31% vs. 9%).

Results 2 - changes in anti-infective therapy over time

- Adaptation of anti-infective therapy was necessary at least once in 44.3% of bloodstream infections when treatment was initiated after blood culture sampling, but in 64.8% of episodes when treatment had already been initiated before BC sampling ($p < 0.001$).
- The number of adaptations during bloodstream infection episodes ranged from one to ten.
- In 33.7% of cases, anti-infective therapy was adapted between first blood culture sampling and report of BC results (median time to report (IQR): 119 (68-141) hours)
- While report of results to clinicians led to changes in anti-infective treatment within the following 6 hours in 10% of patients only, more than 30% of all regimens were adapted within 48 hours of reporting (Figure 2).

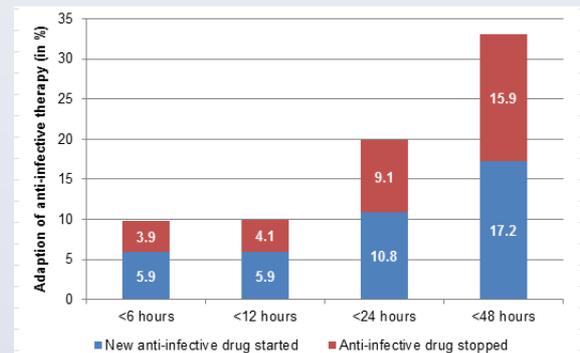


Figure 2: Proportion of bloodstream infections in which anti-infective therapy was adapted after reporting of blood culture results (by time between report and therapy adaption)

Conclusions and outlook

- The first 12 months of data collection in AlertsNet showed the project's potential for monitoring and evaluating treatment decisions in the context of increasing levels of antimicrobial resistance.
- Future analyses will allow pathogen- and resistance-specific information on initial therapy and treatment algorithms in a population-based setting which will be used for developing interventions in order to improve treatment of patients with bloodstream infections.

References

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Acknowledgements



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