Blood culture diagnostics in Thuringia – data from the first 12-months report of the blood culture registry in AlertsNet

AlertsNet Thüringen

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Background

- Bloodstream infections (BSIs) are a leading cause of death worldwide (1,2).
- Population-based surveillance provides the best approach for
  - defining the burden of BSIs,
  - evaluating risk factors for acquiring infections, and
  - monitoring temporal trends in occurrence and resistance of pathogens (3).
- In 2013, the first German population-based surveillance study for BSIs has been established in Thuringia (AlertsNet).
- AlertsNet is based on an embedded blood culture registry for the federal state of Thuringia so that information on pathogens and resistance patterns can be obtained directly from participating institutions.

Objectives

- To report data on BSIs and underlying pathogens from the first 12 months of the population-based surveillance study AlertsNet To investigate if these data are plausible and consistent with population-based analyses from other sources

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, all blood cultures from 11 clinical institutions represented by four microbiological laboratories were included.

Methods

- Descriptive statistical measures were applied in order to determine overall and institution-specific blood culture positivity rates, pathogen distributions and clinical foci of the most common pathogens.

Results 1 – BC positivity and contamination

- In total 28,273 blood cultures were taken over the 12 months in the 11 institutions, of which 16% were positive and 7% showed a clinically relevant pathogen being associated with a bloodstream infection (Figure 1).

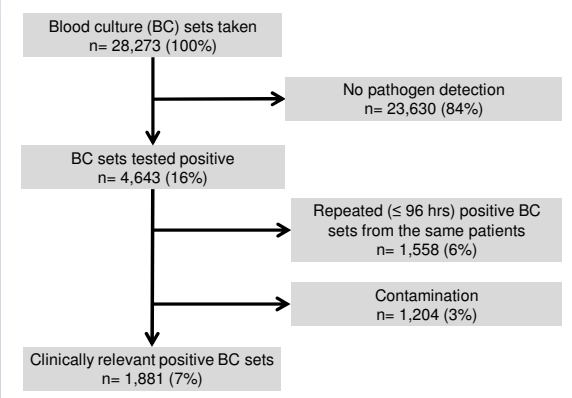

Figure 1: Flow chart showing how clinically relevant positive blood cultures were selected from all blood cultures taken

- Positivity rates were similar among participating centers (Figure 2) except for two institutions (7 and 8) which both use pre-incubation at a local stage so that only highly suspect blood cultures are forwarded to the microbiological laboratory

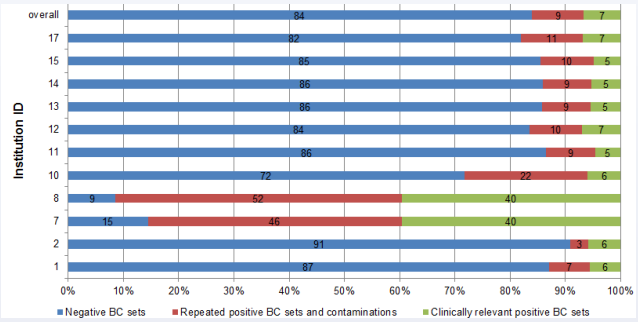

Figure 2: Positivity rates of blood cultures in the participating institutions. Blood cultures in institutions 7 and 8 were pre-incubated and only forwarded if visually positive

Results 2 – Distribution of pathogens

- *Escherichia coli*, *Staphylococcus aureus*, *S. epidermidis* and enterococci were responsible for more than 60% of all BSIs.
- The pathogen distribution resembled in general estimates from other population-based studies (1).

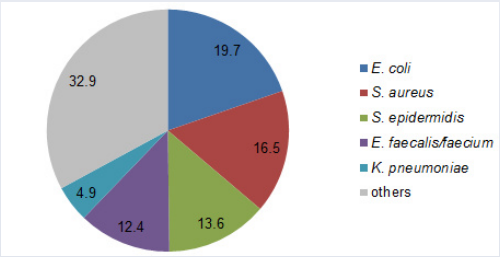

Figure 3: Distribution of underlying pathogens in all positive blood cultures deemed as clinically relevant (n=1,881)

Results 3 – Site of infection

- In about one third of all clinically relevant positive blood cultures no clear focus could be detected; the most common foci were pneumonia (18.6%), followed by urinary tract infections (UTI, 17.0%) and cholecystitis (5.8%; Figure 4).

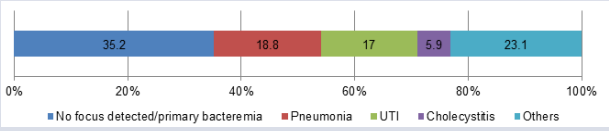

Figure 4: Distribution of foci in all positive blood cultures deemed as clinically relevant (n=1,881)

Conclusions and outlook

- Within the first 12 months of follow up, data collection within AlertsNet was shown to provide results which closely resemble the experience of previous population-based studies in other countries.
- The collected data will allow detailed pathogen-specific analyses using resistance profiles and clinical data and will thus be a unique resource for clinical and microbiological research on BSIs.

References

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