Catheter-related infections: does the spectrum of microbial causes change over time?

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Background:

Catheter-related bloodstream infections (CRBSI) are associated with increased morbidity, mortality, and healthcare costs. The incidence of CRBSI has rarely been investigated on a national scale in European countries, given the difficulty in obtaining clinical information.

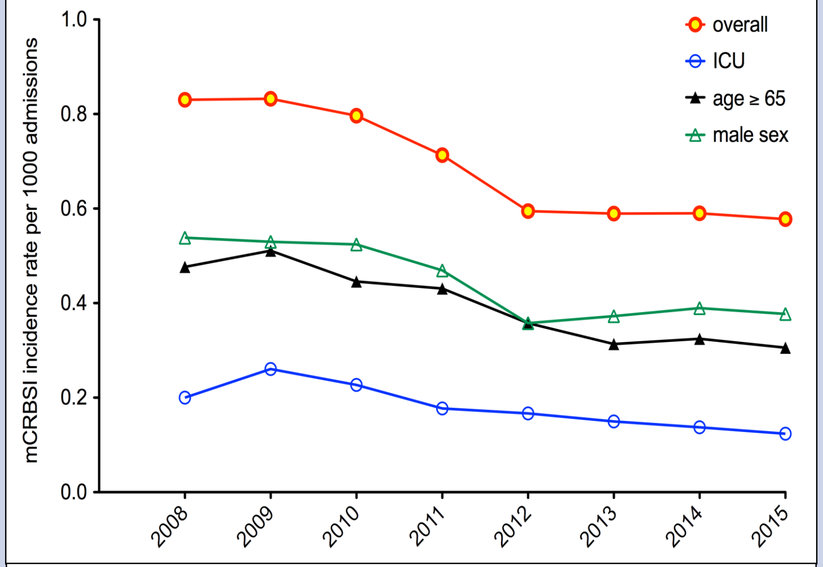
Materials/methods:

- We conducted a nationwide, observational study on CRBSI using date from the national surveillance database (ANRESIS) from 2008-2015.
- We used a modified CRBSI definition (mCRBSI) defined as isolating the same microorganism with identical antibiogram from blood cultures (performed ±7 days around the catheter removal) as the one recovered from the catheter tip.
- Incidence rates of mCRBSI were calculated per 1000 admissions using national data on hospital statistics.
- Trend analyses for specific factors and microorganism groups were performed using a Poisson regression model.

Results I: Overall Trends and Subgroups (Fig. 1):

- **2'741 mCRBSI** episodes were reported between **2008 and 2015**
- mean incidence rate: **342 episodes per year**
- mCRBSI incidence rate decreased from **0.83 to 0.58 episodes/1000 admissions** (-6% per year, p<0.001)
- The most notable trends were observed in:
  - individuals aged **≥65 years** (-3% per year, p=0.04)
  - **university hospitals** (-4% per year, p=0.009)
  - **ICU departments** (-4% per year, p=0.04)

Figure 1: Incidence of mCRBSI per 1000 hospital admissions: overall trends and subgroups

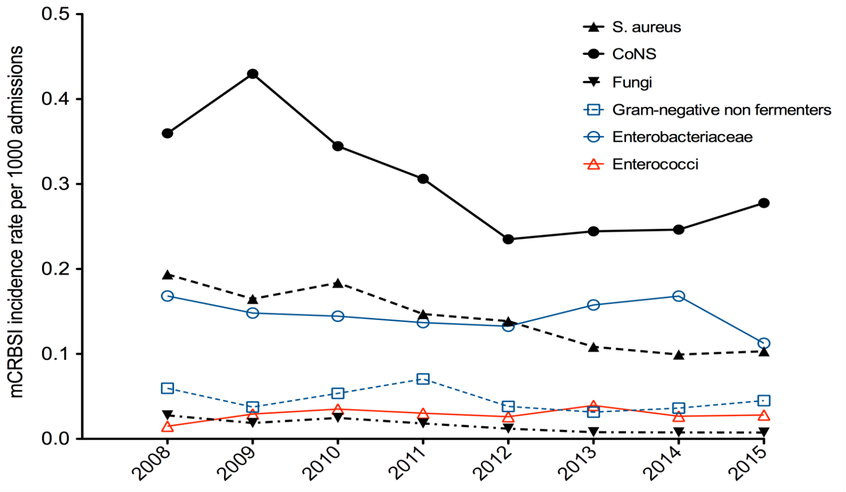


Note: ICU, intensive care unit. All trends were significant.

Results II: Causative Organisms (Fig. 2):

- Exhibited decreasing trends:
  - **Coagulase negative Staphylococci** (-7% per year, p<0.001)
  - ***S. aureus*** (-10%, p<0.001)
  - **Fungi** (-20%, p<0.001)
- Trends remained stable:
  - **Enterobacteriaceae** (-2%, p=0.25),
  - **Gram-negative non-fermenters** (-5%, p=0.1)
  - **Enterococci** (+3%, p=0.39)

Figure 2: Incidence of mCRBSI by causative organism



Note: CoNS, Coagulase-negative Staphylococci. CoNS, S. aureus and fungi showed a significant decrease (black line).

Conclusions:

The overall incidence of mCRBSI in Switzerland is decreasing. However, mCRBSI due to Enterococci and Gram-negative microorganisms did not change over time. These pathogens may grow in importance in catheter-related infections, which would have clinical implications for the choice of empiric treatment.

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