INTRODUCTION

- Central venous catheter (CVC) tip cultures (TCs) can be helpful in assessing patients with potential catheter-related bloodstream infections (CR-BSI)1.
- The practice of culturing CVC tips is recommended by the 2009 Infectious Diseases Society of America (IDSA) management guidelines2 to aid in diagnosing CR-BSI.
- However, contrary of the recommendation, reimbursement penalties for CR-BSI, as well as emerging evidence supporting watchful waiting, rather than removing and culturing CVC may have impacted sampling tendencies.
- Moreover, the validity of CVC TCs alone (without concomitant peripheral and central line blood cultures) has been questioned.
- The scale, trends, and impact of changing CVC tip sampling practices, as well as the results of CVC TCs vs. concomitant blood cultures, have not yet been studied.
- The objective of this study is to understand the trends of CVC tip sampling between 2009 and 2014, and the utility of CVC TC results.

METHODS

- Data source
  A retrospective cohort study was conducted in the Cerner™ Healthfacts Database: a large multicenter data repository with linked electronic records of patient encounter-level data, medication administrations and microbiology and susceptibility results.
  Hospitals are well distributed by bed size, geographic region, and teaching status.
- Definition
  All cultures referring to CVC and associated with the term “tip” were included. Urinary and abscess catheters were excluded.
  TC non-contaminant* taxa = S. aureus, Enterobacteriaceae, Pseudomonas sp., Enterococcus sp., Candida sp., A. baumannii
  TC Sampling APC: -17.0% [95%CI: -24.2% to –9.2%], p<0.01
  TC Sampling non-contaminant growth in 2009 to 5/10,000 patients in 2014 (Fig. 3)
- Annual percent change (APC) is calculated to assess significance of trends

RESULTS

Fig. 3. Catheter Tip Culture Sampling Trends – Trends by Year

![Graph showing catheter tip culture sampling trends](image)

- Between 2009 and 2014, 13,642 CVC TCs were drawn from 12,154 hospital encounters among 11,331 patients at 128 US hospitals.
- Over the 5-year period, TC sampling decreased from 18/10,000 patients in 2009 to 5/10,000 patients in 2014 (Fig. 3).
- TC Sampling APC: -17.0% [95%CI: -24.2% to –9.2%], p<0.01
- Compare to blood culture sampling  → APC: -2.5% [-5.0% to 0%], p=0.05 (Fig. 4)

Trends

- TCs were CoN
  - 51% of non-contaminant catheter tip cultures
  - 10% of non-contaminant catheter tip cultures
  - Compare to blood culture sampling
  - Taxa Distribution and Comparison to Concomitant Blood Cultures
    - 3,742 (27%) of all TC with blood culture sampled within +/- 2 days yield non-contaminants*
    - The most common non-contaminant taxa isolated among all positive TCs were CoN Staphylococci (31%), S. aureus (23%), Enterobacteriaceae (11%), Candida spp. and yeasts (10%), Enterococcus sp. (5%), Pseudomonas sp. (4%) (Fig. 5)
    - Of the 3,742 TC that displayed non-contaminant growth, 1,474 (39%) were not accompanied by growth in BCs.
    - Of the remaining 2,268 (61%) cultures that display positive growth in both TC and BC, 1,911 (84%) have matching taxa, while 16% do not.
    - Most frequently isolated TC + BC matching taxa combination are S. aureus, CoN Staphylococci, and Enterobacteriaceae.

CONCLUSIONS

- The practice of sampling CVC tips for culture is steadily declining at US hospitals.
- More than a third of pathogens cultured from CVC tips are unaccompanied by growth in the bloodstream.
- Barring the isolation of S. aureus or Candida sp. from CVC tips alone, which may represent potential opportunities to treat, there appears to be limited clinical utility to TC sampling for diagnosing CR-BSI.

REFERENCE


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