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Contact: yonatano@hadassah.org.il

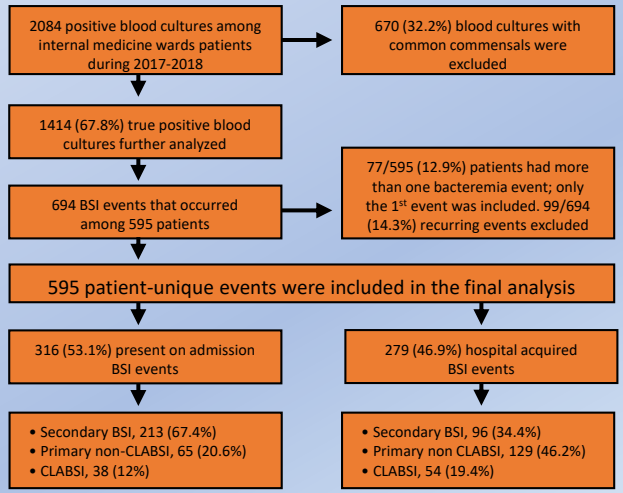
# Sources of Primary Bloodstream Infections in Internal Medicine Patients – a Cohort Study

**Yonatan Oster, MD[1] , Yonatan Ben-Yosef, MD[1] , Matan J Cohen, MD, PhD[2], Carmela Schwartz, RN, MPH[1] and Shmuel Benenson, MD, MSc[1 #]**

[1] Faculty of Medicine, Hebrew University of Jerusalem; Department of Clinical Microbiology and Infectious Diseases, Hadassah Hebrew University Medical Center, Jerusalem, Israel. [2] Clalit Health Services, Jerusalem district, affiliated with the Hebrew University, Jerusalem, Israel
# current affiliation: Faculty of Medicine, Hebrew University of Jerusalem, Israel; Unit for Infection Prevention and Control, Shaare-Zedek Medical Center, Jerusalem, Israel

**Background:** The sources of bloodstream infections (BSIs) in internal-medicine patients, on admission and during hospitalization, are not well-defined. We evaluated these infections to determine the proportion of BSIs in which no secondary cause could be defined (i.e. primary-BSI).

**Methods:** We analyzed all BSIs at all six internal-medicine wards of the two campuses of the Hadassah Hebrew-University Medical Center, in Jerusalem, Israel, during 2017-2018. We defined the source of each BSI event (secondary, Central-line associated BSI (CLABSI) or primary non-CLABSI) per NHSN criteria, and compared BSIs present on admission (POA) to hospital acquired (HA).




**Patients characteristics and clinical outcomes according to the source of bloodstream infection (N=595)**

| Source of bloodstream infection | CLABSI N=92 | Primary non-CLABSI N=194 | Secondary BSI N=309 | P-value |
|---|---|---|---|---|
| | N (%) / mean ± SD | | | |
| Female gender | 33 (35.9%) | 82 (42.3%) | 119 (38.5%) | 0.7 |
| Age (years) | 63.5 (18.5) | 71.4 (15.6) | 68.9 (18.3) | 0.002 |
| Nursing-home residence | 23 (25%) | 46 (23.7%) | 54 (17.5%) | 0.2 |
| **Medical conditions** | | | | |
| Hypertension | 59 (64.1%) | 122 (62.3%) | 177 (57.3%) | 0.34 |
| COPD | 8 (8.7%) | 24 (12.4%) | 29 (9.4%) | 0.51 |
| Cirrhosis | 6 (6.5%) | 14 (7.2%) | 17 (5.5%) | 0.63 |
| Diabetes mellitus | 52 (56.5%) | 103 (53.1%) | 161 (52.1%) | 0.58 |
| Chronic renal failure | 61 (66.3%) | 74 (38.1%) | 85 (27.5%) | 0.001 |
| Dialysis | 41 (44.6%) | 24 (12.4%) | 28 (9.1%) | 0.001 |
| Needs assistance in ADL | 75 (81.5%) | 163 (84%) | 240 (77.7%) | 0.5 |
| **Clinical outcome** | | | | |
| LOS from culture to discharge | 17 (18.3) | 15.2 (18.2) | 15.3 (16.6) | 0.84 |
| In hospital death | 40 (43.5%) | 77 (39.7%) | 79 (25.6%) | 0.001 |
| LOS from culture to death (days) | 10 (17.1) | 10.8 (19.1) | 11.3 (20.2) | 0.94 |

CLABSI, central-line associated bloodstream infection; BSI, bloodstream infection; COPD, chronic obstructive pulmonary disease; ADL, activity of daily living; LOS, length of stay

**Results**: We analyzed 595 patient-unique BSI events, 316 (53.1%) POA-BSI and 279 (46.9%) HA-BSI. Overall, 309 (51.9%) were secondary, 194 (32.6%) primary non-CLABSI and 92 (15.5%) CLABSI. Primary non-CLABSI in the POA-BSI group was 20.6% vs. 46.2% in the HA-BSI group (p=0.001). Length of hospital stay was longer in the HA-BSI group compared to the POA-BSI group (mean 19 days vs. 13.6 days, p=0.01) and the in-hospital mortality rate was higher (48.7% vs. 19%, p=0.001). *Staphylococcus aureus* BSI was more common in primary non-CLABSI than in CLABSI and secondary BSI (29.5%, 12.8% and 16.2%, respectively).

**Conclusions**: The proportion of primary non-CLABSI among HA-BSI events is very high (46.2%). **The absence of any plausible source for these BSIs, and the fact that most patients in Internal-medicine wards have peripheral lines, suggests that the peripheral catheter is a probable source for primary non-CLABSIs.** Measures to prevent peripheral line associated BSI, similar to those implemented successfully for the prevention of CLABSI, should be considered.

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