Abstract 6019

The effectiveness of two rapid identification technologies in Gram-negative bacteraemia without antimicrobial stewardship interventions

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Background: Rapid diagnostic technologies provides faster organism identification with subsequent antimicrobial susceptibilities, which would improve antimicrobial therapy selection or optimization. This quality improvement study consists of four parts: 1) no rapid diagnostic technologies (RDT) 2) implementation of Verigene (VG) 3) implementation of Accelerate Pheno (AP), 4) AP with antimicrobial stewardship (ASP) intervention. The study aim is to compare the first three phases prior to implementing the last phase utilizing RDT with ASP interventions.

Materials/methods: We evaluated the first 100 cases of gram-negative bacteremia (GNB) in the baseline period (2016) and intervention period (VG:2018, AP:2019) using quasi-experimental design. The subjects were divided into three groups based on the method of gram-negative organism identification: no RDT (nRDT), Verigene (VG), and Accelerate Pheno (AP). Vitek-2 was used for antimicrobial susceptibility testing. Inclusion criteria were patients with the first incidence of GNB and age ≥18-years-old. Patients with a hospital length of stay <2 days or those with GNB caused by organisms not detectible by either VG or AP were excluded. Study outcome measures include all-cause hospital mortality, length of hospitalization after positive blood culture (LOS), time to effective antibiotics, time to clinical stability, and incidence of VG/AP misidentification/detection failure. Electronic medical records were reviewed for patient specific factors and desired outcomes data.

Results: The study included 222 subjects (nRDT, n=67; VG, n=86; AP, n=69). All-cause mortality differed between groups, (nRDT, n=2(3%); VG, n=11(13%); AP, n=2(3%), p=0.02). LOS were similar between groups, (mean days±SD, nRDT, 6.1±6.9; VG, 6.5±5.8; AP, 7.6±10.9, p=0.64). Time to effective antibiotics was shortest in the AP group, (mean hours±SD nRDT, 5.5±8.8; VG, 5.2±13 ; AP, 3.6±9.3, p<0.001). Achievement of clinical stability were similar (nRDT, n=58(87%); VG, n=73(85%); AP, n=57(83%), p=0.81). A difference was detected in the time to clinical stability (mean days±SD nRDT, 1.9±2.8; VG,4.4±8; AP, 1.6±2.2, p=0.004). Incidence rates of misidentification/detection failure were similar, (VG, n=2(2%); AP, n=6(9%), p=0.14).

Conclusions: We found outcome differences including, mortality, time to effective antibiotics, and time to clinical stability between the groups. Further evaluations of RDT with ASP interventions is needed to determine if further optimization RDT can be achieved.

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