Introduction & Methods

Blood cultures are a mainstay of diagnosis for patients presenting with signs and symptoms of systemic infections. However, defining which patients should have blood culture performed is subjective and overutilization of blood cultures could result in delayed diagnosis, inappropriate treatment of contaminants, excessive costs, and unnecessary needle sticks. Therefore, in April 2014, the ED at UF Health Shands Hospital implemented an Epic alert to reduce unnecessary blood cultures based on criteria from Shapiro et al, 2008. The number of blood cultures received by the microbiology laboratory decreased ≈ 20% hospital wide (>35% from the Emergency Department (ED)) between 2014 and 2016. We aimed to determine if this change impacted patient outcomes including time to antibiotics, length of stay, and mortality in septic vs. non-septic patients.

Figure 1: Epic alert based on Shapiro Criteria. The alert functioned as a reminder to consider the criteria; providers were not required to input responses.

Results

1. When the Shapiro Decision rule was implemented, the number of blood cultures sent from the ED decreased by about 35%. This decrease correlated in time with an increase in the LOS for non-septic patients, but not for septic patients (Figure 3).

2. After the Shapiro Decision rule was implemented, there was an immediate increase of about 1.3 hours in the time to get the 1st blood culture, but no effect on time to start IV antibiotics (Figure 4). Delay in the start of antibiotics was associated with longer LOS and higher mortality for both septic and non-septic patients (Figures 5 and 6).

3. Delay in getting a blood culture was associated with longer LOS and mortality for non-septic but not for septic patients, even when the timing of IV antibiotics was controlled for (Figure 5).

4. When blood cultures were delayed relative to the start of IV antibiotics, there was a statistically significant increase in both LOS and mortality (Figure 6).

Discussion

1. When the Shapiro Decision rule was implemented, the number of blood cultures sent from the ED decreased by about 35%. This decrease correlated in time with an increase in the LOS for non-septic patients, but not for septic patients (Figure 3).

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4. When blood cultures were delayed relative to the start of IV antibiotics, there was a statistically significant increase in both LOS and mortality (Figure 6).

Conclusions

1. After the Shapiro Decision rule was implemented in Epic, there was a temporarily related increase in hospital LOS for Non-septic patients but not for Septic patients.

2. When getting blood cultures was delayed relative to the time of starting IV antibiotics, hospital LOS and even mortality increased.

3. Further data (such as whether blood cultures were positive) and study are needed to understand why a delay in getting blood cultures affects LOS. Until then, this is the Blood Culture Conundrum.