Diagnostic Utility of Dedicated Fungal Blood Cultures for Diagnosis of Candidemia

Bryant Yang, MD; Richard Ou, MD; Nicholas Stanzione, MD; Omai Garner, PhD
Department of Infectious Diseases
David Geffen School of Medicine at UCLA

Background

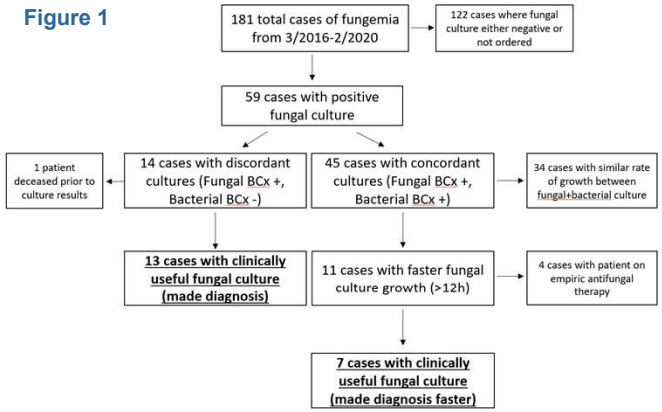
- Bloodstream infection, especially candidemia, causes substantial morbidity and mortality worldwide[1, 2].
- Traditional bacterial blood culture techniques have improved to the point where they are considered sensitive for the detection of *Candida* species. However, expert guidelines clarifying the utility for dedicated fungal isolator cultures are lacking, and the literature has shown mixed results[3, 4].
- As such, there is heterogeneity in how fungal cultures are utilized at the individual clinician level and even at the level of the microbiology lab, with some labs choosing not offering them due to unclear benefit.
- Our goal was to detail the experience at one academic medical center with fungal blood cultures to determine whether they change clinical management.

Methods

- We started with a dataset with blood cultures positive for *Candida* ordered on adult inpatients between March 2016 and February 2020.
- Charts were manually reviewed to record time to positivity, timing of initiation of antifungal therapy, and whether contemporaneous blood cultures were sent.
- Only cultures sent before initiation of antifungal therapy were examined, to focus on *de novo* diagnoses of candidemia.
- "Clinically useful" fungal blood cultures were defined as those that either exhibited faster growth than its contemporaneous (sent within 6 hours of each other) bacterial blood culture or those that grew discordantly (bacterial blood culture negative), prompting initiation of antifungal therapy .

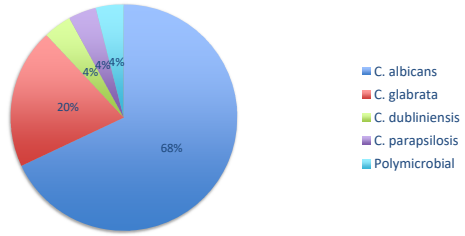
Results

Figure 1



- Figure 1 (above) displays the breakdown of fungal cultures that definitively changed clinical management of the patient
- In the 11 cases where fungal cultures grew more rapidly than their contemporaneously sent bacterial counterpart, the fungal culture grew faster by a median of 29.28 hours (IQR 44.4 hours, range 12.96 to 88.32).
- A breakdown by species for those 25 cultures that grew either discordantly or more rapidly is shown in Figure 2 (right).

Figure 2: Candida Species from Clinically Useful Specimens



Conclusions

- Ordering a fungal blood culture yielded clinically useful results in 20 out of 181 cases (11%), either by making the diagnosis faster than traditional bacterial blood cultures or by making the diagnosis outright.
- While this short analysis does not examine the cost involved with a separate fungal isolator bottle, any interventions that decrease time to diagnosis of candidemia are important given the increased mortality associated with delays in initiating therapy beyond 12 hours from cultures being drawn (OR 2.09)[5]. Dedicated fungal cultures may aid in this.
- We cannot exclude the possibility of the volume of blood sampled, rather than intrinsic differences between culture media, contributing to discordance between bacterial and fungal culture growth.
- Additional analysis is ongoing on a larger data set to further answer the question of fungal blood culture utility.

References

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bryant_yang