

INTRODUCTION

- Bacterial endocarditis causes significant morbidity and mortality. ¹ Prospective studies shows a mortality rate as high as 22 percent. ^{2,3}
- Viridans streptococci* is a significant causative agent of native valve endocarditis in non IV drug using populations.
- Viridans streptococci* produce a glycocalyx that leads to adherence to cardiac heart valves which may retard the penetrance of antimicrobials. ⁴
- Species of *Viridans streptococci* that form a glycocalyx are known to incite infections more frequently and result in higher morbidity than bacteria that do not.
- Glycocalyx production has been quantified using the tryptophan assay developed by Shetlar et al. ⁵
- Previous work has shown an association between glycocalyx production and endocarditis. ^{6,7}

OBJECTIVE

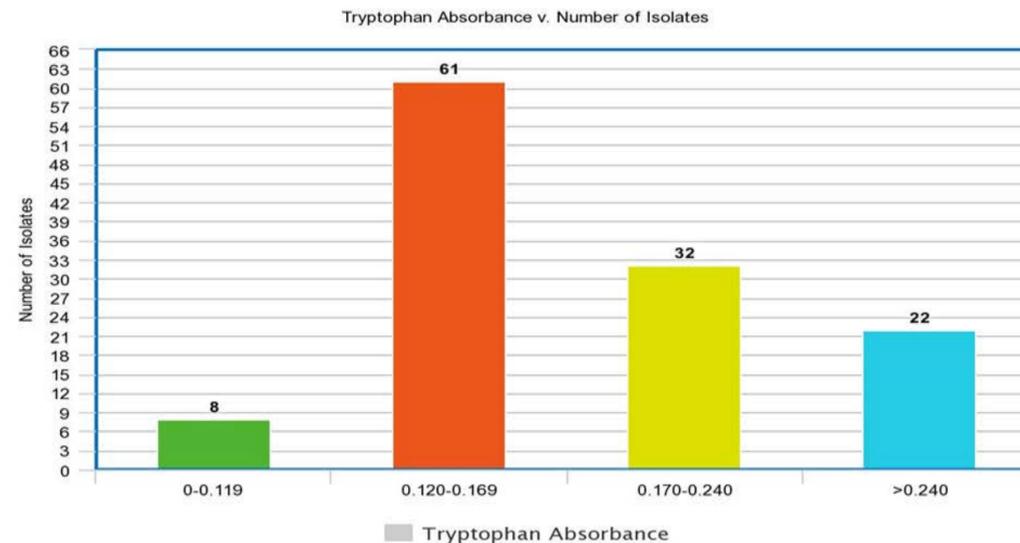
- To determine if the in vitro tryptophan assay of glycocalyx production by viridans group streptococci has potential value as a predictor of clinical pathogenicity.

METHODS

- Over a five year period, one hundred and twenty-three *Viridans streptococci* isolates were collected from patients with endocarditis from 40 hospitals to assess their spectrophotometric absorbance using the tryptophan assay.
- One investigator blinded to the cases reviewed the records and evaluated them for the presence of bacterial endocarditis according to the Von Reyn criteria. ⁸
- Glycocalyx production measurements by tryptophan spectrophotometric assay were evaluated to determine if there is a consistent and statistically significant correlation of particular spectrophotometric measurements and bacterial endocarditis.

RESULTS

- The tryptophan assay was used to assess the Absorbance values for the 123 isolates from patients with confirmed endocarditis.
- The largest group of isolates (N= 61) was included within the 0.120 to 0.169 absorbance value range.
- Significantly, a total of 115 isolates had absorbance values greater than 0.119.
- Analyzing the data revealed a mean absorbance value of 0.180 with a standard deviation of 0.055. A 95% confidence interval for the data set was calculated to be $0.17017 \leq \text{Absorbance Value } (A_{500}) \leq 0.18983$.



Number of Isolates (N=123)	Absorbance Values Range (A_{500})
N=8	(0-0.119)
N=61	(0.120-0.169)
N=32	(0.170-0.240)
N=22	(>0.240)

SUMMARY

- An association between *Viridans streptococci* cultures producing glycocalyx measuring a spectrophotometric absorbance of >0.120 on tryptophan assay and endocarditis was found ($p < 0.001$).
- Only 6.5% of the cultures fell below that break point (N=8).
- Study of 123 isolates demonstrated a statistically significant correlation between absorbance values above 0.120 with a mean spectrophotometric value of 0.180 for all patients with criteria confirmed endocarditis.

CONCLUSION

- The tryptophan assay measuring the glycocalyx spectrophotometric absorbance may be helpful to clinicians in predicting the pathogenicity of *Viridans streptococci* in positive blood cultures.
- Our work suggests the association of glycocalyx production, measured by the tryptophan assay, and bacterial endocarditis may be used as a marker to predict disease.
- Further experience with this assay will allow us to a prospective evaluation of blood culture isolates to further understand the sensitivity and specificity of this assay.

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