Comparison of LIM Broth with PNA FISH to Carrot Broth with PNA FISH for Identification of Group B Streptococcus in Prenatal Vaginal/Rectal Specimens

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Abstract

Background: Screening of pregnant women for Group B Streptococcus (GBS) colonization with antibiotic administration for colonized women has significantly reduced the incidence of early-onset neonatal sepsis. The most common method for identification of colonized women is vaginal/rectal culture in LIM broth with subculture onto blood agar and phenotypic identification of GBS colonies. This process can be time consuming and require two or more days to complete. Another broth option is Carrot Broth (Hardy Diagnostics Santa Maria, CA), which can identify hemolytic GBS in 24 hours or less. This broth still requires subculture of negative samples for the possibility of non-hemolytic strains of GBS. With either broth, non-hemolytic strains may be difficult to identify and isolate in cultures of mixed vaginal/rectal flora. GBS PNA FISH (AdvantDx, Inc. Woburn, MA) has been FDA cleared for use with LIM broth. This protocol requires that PNA FISH be performed on all samples. The purpose of this study was to validate the use of GBS PNA FISH with Carrot broth. This protocol would require performance of PNA FISH only on Carrot broth negative samples and provide a one day turn around time to sample result.

Methods

Random prenatal vaginal/rectal samples collected in dual swab collection containers (Becton, Dickinson and Company, Sparks, MD)

One swab was placed in LIM Broth (Becton, Dickinson and Company, Sparks, MD) and the other into Carrot Broth. All samples were both sub-cultured to blood agar and tested for GBS using PNA FISH. All GBS culture positive plates had the GBS identified using BBL Streptocord (Becton, Dickinson and Company, Sparks, MD).

Results: Of the 99 samples tested, 18 were found to be positive by either LIM or Carrot broth (CB) methods and 81 were negative by both methods (Fig 1). 2 of the positives were only identified by Carrot broth, and not LIM broth. 17 GBS isolates were hemolytic strains (HGBS) and one isolate was a non-hemolytic GBS (NHGBS) strain (Fig 2) recovered by PNA FISH and subculture from both broth methods but as expected was Carrot broth negative. 18/18 culture positive samples were PNA FISH positive from both LIM and Carrot broth. 1 was positive by Carrot/PNA FISH and negative with both LIM subculture and PNA FISH; 1 sample was positive with Carrot/PNA FISH and LIM/PNA FISH but was not recovered from LIM or Carrot broth subculture (Fig 4). 15/18 of the samples were positive by both the LIM/PNA FISH and Carrot/PNA FISH methods (Fig 3).

Conclusions:

Carrot broth compares favorably with LIM broth for isolation of Group B Streptococcus in conjunction with PNA FISH. PNA FISH in conjunction with either LIM or Carrot broth identified more Group B Streptococci than broth culture alone.

Discussion: In this study, all samples that were subculture positive were GBS PNA FISH positive indicating that PNA FISH can be successfully performed from Carrot broth cultures. One sample was a non-hemolytic strain that would be difficult to discern on a blood agar plate subculture and would not be Carrot broth positive. This isolate was PNA FISH positive and so identified without lengthy subculture. One GBS was only recovered from Carrot broth, indicating that this broth may be a better medium for GBS recovery than LIM broth. All but three culture positive samples were Carrot broth positive, requiring PNA FISH testing only on broth negative cultures. The combination of Carrot broth and PNA FISH minimizes labor and maximizes recovery of within a 24 hour time frame from prenatal vaginal/rectal culture screen samples.

References