

C-101 Evaluation of GBS Detect and ChromID Strepto B agars for the detection of Group B streptococcus from GBS Screening Broth Medium (GBS)

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REVISED ABSTRACT

Background:

Streptococcus agalactiae (GBS) causes significant morbidity and mortality in the newborn child; In fact babies borne to mothers carrying GBS strep are 25 times more likely to become ill with early onset disease than those whose mothers are not colonized. Due to their insensitivity, rapid direct tests have not been recommended for screening for GBS in vaginal/ rectal samples. The latest guidelines from The Centers for Disease Control (CDC) for the detection of carriers include the following recommendations: using a broth culture based system with subculture to routine culture media or using a PCR based method following broth enhanced culture. Approximately 5% of all GBS causing disease fail to produce beta hemolysis on routine culture media. The purpose of the study is to compare the efficiency of GBS Detect media (Hardy Diagnostics) and ChromID Strepto B (BioMérieux) for the detection

Methods:

Evaluations were conducted at Carolinas Medical Center (CMC) a 900 bed tertiary care hospital. Samples were collected from pregnant women at 35-37 weeks gestation for the detection of GBS. Routine procedures were performed according to CDC recommendations with an over all positivity rate of 28-38%. This method includes subculture of positive or negative GBS Broth (NorthEast Laboratories) following overnight incubation to CNA or Blood agar. A total of 228 plated media comparisons were evaluated in two separate data sets. One hundred sixteen samples were compared using routine culture and GBS Detect media (Hardy Diagnostics) and 112 samples were used to compare BioMérieux ChromID StreptoB agar. A PCR method was used to evaluate discrepant results. An additional 300 samples were run including a PCR method and a consensus of 2 tests positive was used as the gold standard.

Results:

Both GBS Detect and ChromID Strepto B performed well with initial sensitivities and specificities being 100%, 86% and 100%, 91% respectively. In addition, of 61 GBS positive samples detected by either GBS Detect or ChromID Strepto B, only 52 (85%) were found using GBS broth visual inspection. In a head-to-head comparison of GBS Detect, ChromID Strepto B, and PCR. GBS Detect detected 19/19 isolates, ChromID Strepto B detected 17/19 and our routine media detected 16/19; sensitivities were 100%, 89.5% and 82.4% respectively. GBS Detect performed superior using the expanded gold standard. In the additional trial the GBS Detect media found 55/57 positives and ChromID Strepto B agar detected 27/57 positive samples.

Conclusions:

GBS Detect performed the best detecting all PCR positive samples. Both GBS Detect and ChromID Strepto B aid in detecting non-hemolytic GBS in clinical samples not routinely detected using standard media and protocols.

MATERIALS AND METHODS

Culture methods were performed according to CDC guidelines for the detection of GBS (*Streptococcus agalactiae*). Routine cultures were performed according to Carolinas Medical Center standard operating procedure for this culture type. Swabs were inoculated in to a GBS Broth (NorthEast Laboratories, Winslow, Maine) incubated according to the manufactures recommendation, and then used for subculture to various media and for the molecular assays. Additionally, GBS Broth was also read for the presence of GBS. Both chromID Strepto B (BioMérieux) and GBS Detect (Hardy Diagnostics) were inoculated and incubated at 35.5° C and interpreted based on manufacturer's guidelines following 24 and 48 hrs incubation. The ChromID Strepto B and GBS Detect media were examined for the presence of mauve-colored colonies and beta-hemolytic colonies, respectively, which indicated the presence of GBS. The organism was confirmed by using streptococcal grouping sera.

Samples found to be discordant were refereed using the PCR assay.

REFERENCES

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4. EVALUATION OF THE ILLUMIGENE GBS METHOD, HARDY DETECT AND GBS CHROME AGARS FOR THE DETECTION OF GROUP B *STREPTOCOCCUS* FROM GBS BROTH Jessica D. Dolloff¹, Zarna A. Shah¹, and R. L. Sautter²
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ACKNOWLEDGEMENTS

We would like to thank the Microbiology Departments at Carolinas Medical Center. We would also like to thank Meridian Bioscience®, Inc for their support of this project.

RESULTS

Table 1.
GBS Detect vs. routine

GBS Detect	Routine Culture		Totals
	Absent	Present	
Test Positive	10	45	55
Test Negative	61	0	61
Totals	71	45	116

	Estimated Value	95% Confidence Interval	
		Lower Limit	Upper Limit
Prevalence	0.387931	0.300211	0.483179
Sensitivity	1	0.902035	1
Specificity	0.859155	0.751609	0.926787
For any particular test result, the probability that it will be:			
Positive	0.474138	0.381434	0.568577
Negative	0.525862	0.431423	0.618566
For any particular positive test result, the probability that it is:			
True Positive	0.818182	0.686485	0.904827
False Positive	0.181818	0.095173	0.313515
For any particular negative test result, the probability that it is:			
True Negative	1	0.92619	1
False Negative	0	0	0.07381
likelihood Ratios: [C] = conventional [W] = weighted by prevalence			
Positive [C]	7.1	3.99724	12.611201
Negative [C]	0	0	NaN
Positive [W]	4.5	2.533944	7.991494
Negative [W]	0	0	NaN

Table 2.
ChromID Strepto B vs. routine

ChromID Strepto B	Routine		Totals
	Absent	Present	
Test Positive	7	27	34
Test Negative	78	0	78
Totals	85	27	112

	Estimated Value	95% Confidence Interval	
		Lower Limit	Upper Limit
Prevalence	0.241071	0.167457	0.332805
Sensitivity	1	0.844958	1
Specificity	0.917647	0.832352	0.963432
For any particular test result, the probability that it will be:			
Positive	0.303571	0.222125	0.398715
Negative	0.696429	0.601285	0.777875
For any particular positive test result, the probability that it is:			
True Positive	0.794118	0.615926	0.906624
False Positive	0.205882	0.093376	0.384074
For any particular negative test result, the probability that it is:			
True Negative	1	0.941513	1
False Negative	0	0	0.058487
likelihood Ratios: [C] = conventional [W] = weighted by prevalence			
Positive [C]	12.142857	5.972135	24.689492
Negative [C]	0	0	NaN
Positive [W]	3.857143	1.950244	7.628558
Negative [W]	0	0	NaN

Table 3. Additional Evaluation

GBS Detect Media vs. Consensus
(different gold standard)
(2 methods positive-including PCR)

GBS Detect media	Absent	Present	Totals
Test Positive	0	55	55
Test Negative	243	2	245
Totals	243	57	300
	Estimated Value	95% Confidence Interval Lower Limit Upper Limit	
Prevalence	0.19	0.148136 0.239994	
Sensitivity	0.964912	0.868372 0.993899	
Specificity	1	0.980601 1	

Table 4. Additional Evaluation

ChromID Strepto B Media vs. Consensus
(different gold standard)
(2 methods positive-including PCR)

ChromID Strepto B	Absent	Present	Totals
Test Positive	0	27	55
Test Negative	243	30	245
Totals	243	57	300
	Estimated Value	95% Confidence Interval Lower Limit Upper Limit	
Prevalence	0.19	0.148136 0.239994	
Sensitivity	0.473684*	0.341781 0.609128	
Specificity	1	0.980601 1	

* Additional evaluations will be performed

CONCLUSIONS

In conclusion, Hardy Diagnostics GBS Detect media is the most reliable selective media for the detection of GBS when using the CDC culture algorithm. In addition, it is apparent that negative GBS Broth cultures MUST be subcultured to detect non-hemolytic strains of GBS.