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Frequency of Resistance of Community Isolates of Group B Streptococcus to Clindamycin and Erythromycin, and Impact of the D-test

C-001

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ABSTRACT

Background: Group B Streptococcus (GBS) is a significant cause of infection with increasing resistance to erythromycin (E) and clindamycin (CD) reported worldwide over the last decade. The D-test phenotypically distinguishes E-resistant strains that are resistant to CD from those that are susceptible, due to detection of inducible resistance. The objective of this community-based laboratory study was to assess the frequency of GBS resistance among community isolates and the impact of the D-test on resolving E/CD discordant susceptibilities in these strains. **Methods:** Over a 12 month period, a total of 358 clinically significant GBS isolates (genitourinary, anorectal, abscess and lesion isolates), were tested for their susceptibility to E and CD by disk diffusion without induction, and by the D-test, in accordance with CLSI guidelines. Frequency of resistance was analysed by age group, and the effect of the D-test on resolving discordant results was assessed. **Results:** Of the 358 isolates tested by disk diffusion, 119 (33%) were resistant to E, including 82 (23%) that were also resistant to CD. There were 37 (10%) isolates that were resistant to E but susceptible to CD. Of these 37 isolates, an additional 20 isolates were found to be resistant to CD using the D-test. Thus, of the 102 CD-resistant isolates, 20 (20%) isolates were detected only by the D-test. There were no statistically significant differences between frequencies of resistance to E or CD in isolates from patients in different age groups. **Conclusions**: These results indicate a high prevalence of resistance to E (33%) and CD (28%) among community isolates of GBS. The D-test had a significant impact on resolving E/CD discordant results by detecting 20% of isolates as resistant to CD that would not have been identified otherwise.

INTRODUCTION

Group B Streptococcus (GBS), also known as *Streptococcus agalactiae*, is a significant cause of infection in neonates as well as in pregnant women and in adults with comorbid medical conditions. Increasing resistance of GBS to erythromycin (E) and clindamycin (CD) has been reported worldwide over the last decade and is of concern when these antibiotics are indicated for use.

In macrolide-resistant GBS isolates, the presence of an *erm* gene encodes the methylation of the 23S rRNA that may confer inducible resistance to CD. This inducible resistance can be phenotypically detected by a disk approximation test, the D-test.

The purpose of this community-based laboratory study was to assess the frequency of resistance to E and CD in community isolates of GBS and the impact of the D-test on resolving E/CD discordant susceptibility test results in these strains.

METHODS

Strains

All clinically significant GBS strains isolated in 2006 were identified by standard methods, based on gram stain morphology, colonial growth characteristics, biochemical tests, and antibody-coated latex agglutination assay for GBS cell wall antigen. Duplicate isolates obtained from the same patient were excluded from the study.

Antimicrobial Susceptibility Testing

Isolates were tested by disk diffusion without induction for their susceptibility to E (15 µg) and CD (2 µg), in accordance with CLSI interpretive criteria.

D-test

The D-test was performed by placing the E and CD disks 12 mm apart (edge to edge) on the appropriate susceptibility plates, in accordance with CLSI guidelines. The D-test was interpreted as positive if a flattened clindamycin zone was demonstrated between the erythromycin and clindamycin disks. The absence of flattening indicated a negative test result (Figure 1).

RESULTS & DISCUSSION

Figure 1: Two E-Resistant GBS isolates with a positive (upper half) vs negative (lower half) D-test result.

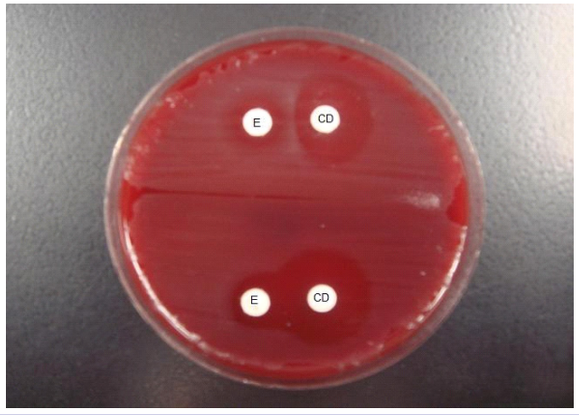

Figure 2: Impact of D-test on GBS Resistance to CD

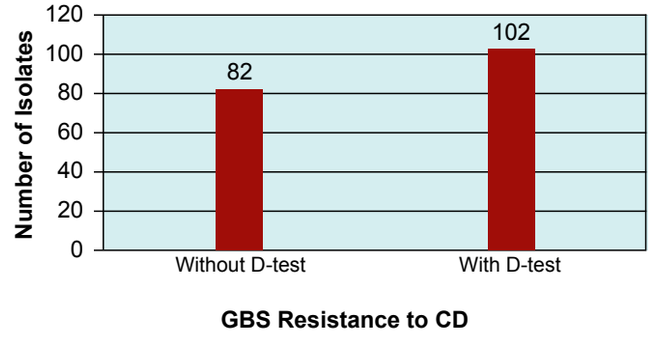

Table 1: Distribution of GBS Isolates by Site and Patient Age

Age Group (yr)	Urines	Vaginal	Anorectal	CVR*	Abscess/ Lesion	Total
≤ 13	3	0	0	0	0	3
14 – 49	139	5	4	72	5	225
≥ 50	126	0	0	0	4	130
Total	268	5	4	72	9	358

* CVR = combined vaginal-rectal

Table 2: GBS Susceptibility Data by Patient Age, with and without the D-test Effect*

Age Group (yr)	E			CD						Total
				Without D-test			With D-test			
	S	I	R	S	I	R	S	I	R	
≤ 13	3	0	0	3	0	0	3	0	0	3
14-49	143	6	76	165	6	54	153	6	66	225
≥ 50	82	5	43	97	5	28	89	5	36	130
Total	228	11	119	265	11	82	245	11	102	358

* E = Erythromycin; CD = Clindamycin; S = Susceptible; I = Intermediate; R = Resistant

All of the 358 GBS strains in this study were clinically significant isolates from various sites. Table 1 describes the distribution of isolates by site and patient age.

Of these 358 isolates, 119 (33%) were resistant to E, including 82 (23%) that were also resistant to CD. There were 37 (10%) isolates that were resistant to E but susceptible to CD by disk diffusion. Of these 37 isolates, an additional 20 isolates were found to be resistant to CD using the D-test.

Table 2 shows the susceptibility profiles of the isolates, grouped by patient age, with and without the D-test effect. Previous studies had described frequencies of GBS resistance that were highest among patients 18-49 years of age with invasive GBS disease. In our study, no attempt was made to distinguish colonising from invasive strains and there were no statistically significant differences between frequencies of resistance to E or CD associated with any of the age groups described.

As can be seen from Figure 2, the D-test detected more isolates as resistant to CD that would have otherwise been identified as susceptible.

CONCLUSIONS

- Our data indicate a high prevalence of resistance to E (33%) and CD (28%) among community isolates of GBS.
- The D-test had a significant impact on resolving E/CD discordant results, by identifying >50% (20 of 37) of E-resistant CD-susceptible isolates as truly resistant to CD, thus detecting 20% of the total 102 CD-resistant isolates that would not have been identified otherwise.

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