Antimicrobial Resistant Gram-positive Cocci in Pregnant Mothers with Aerobic Vaginitis

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Introduction

The vaginal microbiota of a healthy asymptomatic woman consists of an extensive diversity of anaerobic and aerobic bacterial genera and species dominated by the microaerophilic genus *Lactobacillus* (Donati *et al.,* 2010), known to inhibit the growth of potentially pathogenic non-acid tolerant microorganisms (Mijac *et al.,* 2006; Li *et al*., 2011; Stojanovic *et al.,* 2012). An imbalance of species within this biofilm may result in endogenous opportunistic infections such as aerobic vaginitis (AV). *Streptococcus agalactiae (S. agalactiae)* and *Enterococcus faecalis (E. faecalis)* were found to be the predominant Gram-positive cocci in AV and have been implicated in neonatal and obstetric sepsis. The prevalence and antibiotic profiles of bacteria appear to differ in different geographical locations thus complicating the standardisation of infection control.

Objective

The aim of the study was to determine the prevalence and antimicrobial susceptibility of *E. faecalis* and *S. agalactiae* in pregnant women with AV in the Western Cape, South Africa.

Methodology

Ano-vaginal swab samples were collected from 301 women at 28-37 weeks of gestation. Patient demography was obtained by completion of a questionnaire. The "AV" score was microscopically graded as absent, slight, moderate or severe by comparing the proportion of lactobacilli with leukocytes, other vaginal microflora and parabasal epithelial cells. Swabs were cultured by routine methods and antibiotic susceptibility profiles were determined using the Sensititre TREK system. Isolation and identification of Gram-positive cocci were achieved by conventional methods. The study complied with the Declaration of Helsinki (2013).

Results

AV was detected in 52 of the 199 (26.13%) pregnant women, with *S. agalactiae* and *E. faecalis* isolated from 32 and 20 mothers respectively. Using EUCAST/CLSI breakpoints, *S. agalactiae* and *E. faecalis* showed resistance to 12 of the 17 antibiotics tested, including those recommended for prophylaxis according to the CDC guidelines, namely penicillin, erythromycin, cefazolin, clindamycin, tetracycline and vancomycin. Fig. 1 represents the number of women with *S. agalactiae* and *E. faecalis* expressed as a percentage of the total number of women with AV (N=79). The sensititre trek system results of the antimicrobial susceptibility analysis for both *S. agalactiae* and *E. faecalis* are shown in Table 1.

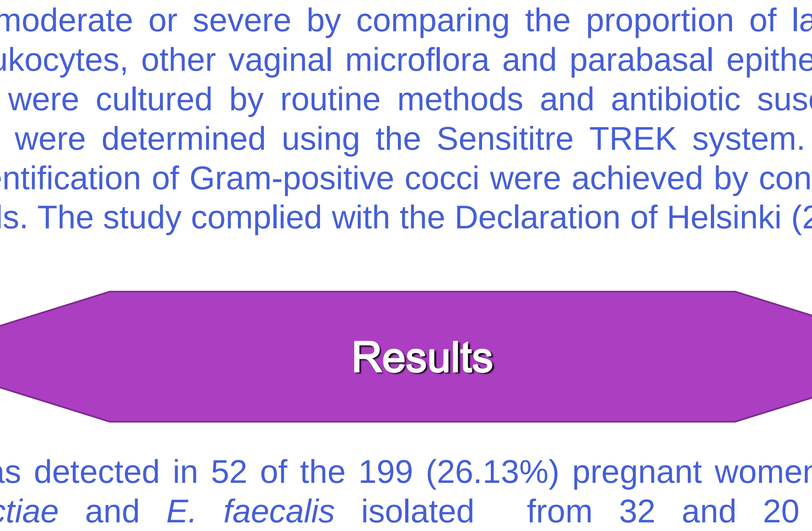

Figure 1. Frequency of *S. agalactiae* and *E. faecalis* in women with AV.

Table 1: Prevalence and susceptibility of *E. faecalis* and *S. agalactiae isolates* in pregnant mothers with AV.

ANTIMICROBIAL		Current pregnancy outcomes: Frequency (%) *E. faecalis* isolates (n = 20)	Current pregnancy outcomes: Frequency (%) *S. agalactiae* isolates (n = 32)
AZITHROMYCIN [a]	Susceptible	4 (20.0%)	16 (50.0%)
	Intermediate	1 (5.0%)	-
	Resistant	15 (75.0%)	16 (50.0%)
CEFOTAXIME [a]	Susceptible	-	18 (56.25%)
	Intermediate	-	
	Resistant	20 (100.0%)	14 (43.75%)
CEFTRIAXONE [a]	Susceptible	-	18 (56.25%)
	Intermediate	-	
	Resistant	20 (100.0%)	14 (43.75%)
CHLORAMPHENICOL [a]	Susceptible	17 (85.0%)	23 (71.9%)
	Intermediate	-	
	Resistant	3 (15.0%)	9 (28.1%)
CLINDAMYCIN [a]	Susceptible	2 (10.0%)	18 (56.25%)
	Intermediate	5 (25.0%)	
	Resistant	13 (65.0%)	14 (43.75%)
DAPTOMYCIN [a]	Susceptible	3 (15.0%)	20 (62.5%)
	Intermediate	-	-
	Resistant	17 (85.0%)	12 (37.5%)
ERTAPENEM [b]	Susceptible	-	19 (40.6%)
	Intermediate	-	-
	Resistant	20 (100.0%)	13 (40.6%)
ERYTHROMYCIN [a]	Susceptible	2 (10.0%)	16 (50.0%)
	Intermediate	1 (5.0%)	-
	Resistant	17 (85.0%)	16 (50.0%)
LEVOFLOXACIN [a]	Susceptible	12 (60.0%)	24 (75.0%)
	Intermediate	2 (10.0%)	8 (25.0%)
	Resistant	6 (30.0%)	-
LINEZOLID [a]	Susceptible	17 (85.0%)	32 (100.0%)
	Intermediate	2 (10.0%)	-
	Resistant	1 (5.0%)	
MEROPENEM [a]	Susceptible	1 (5.0%)	19 (59.4%)
	Intermediate	-	-
	Resistant	19 (95.0%)	13 (40.6%)
MOXIFLOXACIN [b]	Susceptible	17 (85.0%)	30 (93.8%)
	Intermediate	-	1 (3.1%)
	Resistant	3 (15.0%)	1 (3.1%)
TETRACYCLINE [a]	Susceptible	3 (15.0%)	3 (9.4%)
	Intermediate	-	-
	Resistant	17 (85.0%)	29 (90.6%)
TIGECYCLINE [a]	Susceptible	18 (90.0%)	32 (100.0%)
	Intermediate	1 (5.0%)	-
	Resistant	1(5.0%)	-
PENICILLIN [a]	Susceptible	1 (5.0%)	15 (46.9%)
	Intermediate	-	-
	Resistant	19 (95.0%)	17 (53.1%)
TRIMETHOPRIM/ SULPHAMETHOXAZOLE [a]	Susceptible	17 (85.0%)	31 (96.9%)
	Intermediate	-	-
	Resistant	3 (15.0%)	1 (3.1%)
VANCOMYCIN [a]	Susceptible	15 (75.0%)	21 (65.6%)
	Intermediate	-	-
	Resistant	5 (25.0%)	11 (34.4%)

[a] CLSI breakpoint values were used.
[b] EUCAST breakpoint values were used.

Conclusion

This study demonstrated the increasing resistance of *S. agalactiae* and *E. faecalis* to the antimicrobials commonly administered for their eradication and highlights the need for alternative treatment regimens for AV during pregnancy to reduce the risk of (AV-associated) negative pregnancy outcomes.

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