Group B streptococcal neonatal infections in Iceland : 1979 – 2014

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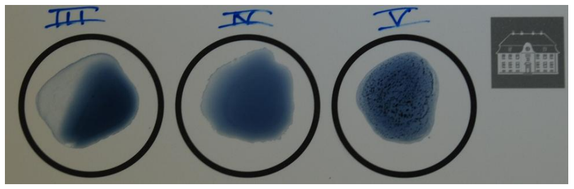
INTRODUCTION

Group B Streptococcus (GBS) is a leading cause of neonatal invasive infections in developed countries.
We analyzed all available GBS isolates recovered from all invasive infections in neonates in Iceland, between 1979 and 2014, with the aim of documenting the serotype distribution, molecular characteristics and antimicrobial resistance.

MATERIAL AND METHODS

A total of 115 invasive neonatal infections were found over the study period. All available isolates were serotyped with latex agglutination test (SSI) and multilocus sequence typing (MLST) was performed. Isolates were assigned to clonal complexes (CC) according to their sequence types (ST). Presence of surface proteins genes *bca*, *eps*, *alp2*, *alp3*, *alp4* and *rib* and of pilus islands PI-1, PI-2a and PI-2b were tested by PCR. Susceptibility to penicillin, erythromycin, clindamycin, streptomycin and tetracycline was tested by disc diffusion and macrolide and tetracycline resistance genes were detected by PCR.



RESULTS

Of the 115 infections 64 were from early-onset disease (EOD) and 51 from late-onset disease (LOD), for an average incidence of 0.7/1000 live births (0.4 and 0.3/1000 live births in EOD and LOD, respectively).
From these infections 95 isolates were available, 53 from EOD and 42 from LOD.
The most frequent serotype in the population was serotype III and Ia, together accounting for over 70% of the isolates.

	EOD		LOD	
serotype	count	%	count	%
Ia	14	26%	7	17%
Ib	7	13%	3	7%
II	5	9%	0	0%
III	19	36%	27	64%
IV	1	2%	2	5%
V	7	13%	3	7%
	53		42	

The isolates grouped into 7 CCs with 22 STs. In EOD serotype III was evenly distributed between CC17 and CC19 (42% and 58%, respectively), but in LOD, CC17 was much more frequent than CC19 (78% and 22%, respectively), reflecting an overrepresentation of CC17 in LOD cases (p=0.03).
Throughout the study period both serotypes III and Ia increased but the changes were not statistically supported. In contrast, the decrease in serotype Ib was significant (p=0.01)

CCs (EOD/LOD)	serotype EOD(53)	serotype LOD(42)	surface-protein	pili
CC1(6/5)				
ST1	V(3)	V(2)	*alp 3*	PI-1+PI-2a(4), PI-2a(1)
ST196	IV(1)	IV(2)	*eps*	PI-1+PI-2a
ST524	V(1)	V(1)	*alp 3*	PI-1+PI-2a
ST2	V(1)		*eps*	PI-1+PI-2a
CC7(3/3)				
ST7	Ia(2)	Ia(3)	*bca*	PI-1+PI-2b
	V(1)		ND	PI-1+PI-2a
CC10(10/3)				
ST8	Ib(4)	Ib(2)	*bca*	PI-1+PI-2a
ST12	Ib(2)		*bca*	PI-1+PI-2a
	II(2)		*bca*	PI-1+PI-2a
ST765	Ib(1)		*bca*	PI-1+PI-2a
ST10	II(1)		*bca*	PI-1+PI-2a
NEW		Ib(1)	*bca*	PI-1+PI-2a
CC17(8/21)				
ST17	III(8)	III(18)	*rib*	PI-1+PI-2b(24), PI-2b(2)
ST484		III(1)	*rib*	PI-1+PI-2b
ST743		III(1)	*rib*	PI-1+PI-2b
ST766		III(1)	*rib*	PI-1+PI-2b
CC19(13/6)				
ST19	III(9)	III(6)	*rib*	PI-1+PI-2a
ST28	II(1)		*rib*	PI-1+PI-2a
ST106	III(1)		*rib*	PI-1+PI-2a
ST110	V(1)		*rib*	PI-1+PI-2a
ST767	III(1)		*rib*	PI-1+PI-2a
CC22(1/0)				
ST764	II(1)		*bca*	PI-2a
CC23(12/4)				
ST23	Ia(11)	Ia(4)	*eps*	PI-2a
ST464	Ia(1)		*bca*	PI-2a

All isolates were susceptible to penicillin and only one was resistant to streptomycin. Erythromycin and clindamycin resistance rates were 7%, with most isolates displaying the $cMLS_B$ phenotype. Tetracycline resistance was 85%, mostly associated with the tetM gene.

CONCLUSION

Serotype distribution, antimicrobial susceptibility, and sequence type characterization in invasive neonates infections in Iceland is similar to what has been described elsewhere. The most common ST types and serotypes, ST17/III, ST19/III and ST23/Ia are responsible for about 70% of all infections and in LOD, CC17 was much more frequent than CC19.

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