Epidemiol. Infect. (2015), **143**, 754–756.

Correspondence

Epidemiol. Infect. (2015).
doi:10.1017/S0950268814001320
First published online 5 June 2014

Association between capsular serotype V and macrolide resistance in group B *Streptococcus*

To the Editor

Group B *Streptococcus* (GBS) expresses a polysaccharide antigen on its surface that is used for serotype identification (serotypes Ia, Ib, II–IX). Serotyping can be performed by use of a rapid latex agglutination test or by polymerase chain reaction (PCR) analysis [1]. The serotype distribution of both invasive and colonizing GBS isolates is continuously evolving and demonstrates not only regional, but also temporal variation. Thus, we read with interest the article by Morozumi *et al*. [2]. The authors investigated the serotypes, the genetic diversity by multilocus sequence typing, and the frequency of macrolide (ML) resistance of GBS isolates responsible for invasive infections in neonates in Japan from 2006 to 2011. Although their data add important information to epidemiological studies on GBS serotype distribution worldwide, we kindly request further exploration of their results on the frequency of serotype V.

Without intrapartum antimicrobial prophylaxis, peripartum transmission to the newborn is estimated to be 50–70% [3], resulting in a high frequency of early-onset GBS sepsis. In previous studies, about 20% of GBS isolates found in colonized Japanese women were designated as serotype V [4, 5]. However, in the study by Morozumi *et al*. [2], the frequency of serotype V isolates in 150 GBS isolates obtained from invasive infections in neonates was zero.

We recently found a highly significant association between serotype V and ML resistance in GBS-colonized Swiss women [6]. This is in line with previous findings in the Asia, Europe and the United States (Table 1 [6–19]). In the study by Morozumi *et al.* [2], 7/32 (21·9%) serotype Ia and 24/88 (27·3%) serotype III GBS isolates showed ML resistance. We wonder whether the lack of serotype V GBS isolates is an epidemiological variation in Japan, or alternatively, whether it can be attributed to the ability of GBS to switch capsular serotypes [20]. Recent studies using genome analysis confirmed capsular switching in serotype IV GBS isolates designated as clonal complex (CC)17 and its variant (i.e. ST291) [15, 21], even though CC17 GBS isolates are typically associated with serotype III. Such a phenomenon in serotype V would be, to the best of our knowledge, novel.

ACKNOWLEDGEMENTS

Our research mentioned in this letter received no specific grant from any funding agency, commercial or not-for-profit sectors.

DECLARATION OF INTEREST

None.

Table 1. *Association of macrolide resistance and serotype V*

Ref.	Study subjects	Study period	Method of serotyping	Total no. of isolates	Serotype V of all isolates, *n* (%)	Macrolide resistance in serotype V GBS isolates, *n* (%)
Asia						
Korea [7]	NR	1990–1998	AGGL	185	16/185 (8·6%)	11/16 (68·8%)
Korea [8]	NR	1990–2000	AGGL	308	45/308 (14·6%)	34/45 (75·6%)
Korea [9]	NR	1990–2002	AGGL	446	94/446 (21·1%)	80/94 (85·1%)
Korea [10]	PNW	2004–2007	AGGL	376	104/376 (27·7%)	85/104 (81·7%)
Europe						
France [11]	PNW	NR	AGGL, PCR	340	49/340 (14·4%)	11/49 (22·4%)
	NN			119	6/119 (5%)	6/6 (100%)
	AD			252	37/252 (14·7%)	15/37 (40·5%)
Germany [12]	NN	1993–1997	EEM	193	12/193 (6·2%)	5/12 (41·7%)
	AD			146	19/146 (13%)	5/19 (26·3%)
Italy [13]	NN, AD	2002–2005	ID, PCR	91	14/91 (15·4%)	9/14 (64·3%)
Italy [14]	PNW	2005–2006	AGGL	73	19/73 (26%)	2/19 (10·5%)
Ireland [15]	AD, PNW, NN, INF	2007–2011	AGGL	177	30/177 (16·9%)	13/30 (43·3%)
Poland [16]	AD, NN, INF	1996–2005	PCR–RFLP	114	20/114 (17·5%)	11/20 (55%)
Romania [17]	AD, PNW	2009–2010	AGGL, PCR	148	40/148 (27%)	23/40 (57·5%)
Spain [18]	NN	1992–2009	AGGL	212	14/212 (6·6%)	9/14 (64·3%)
Switzerland [6]	PNW	2009–2010	AGGL, PCR	364	93/364 (25·5%)	24/93 (25·8%)
America						
USA [19]	NN, INF	1997–1999	NR	122	11/122 (9%)	8/11 (72·7%)

AD, Adults; AGGL, agglutination test; EEM, enzymatic extraction method; ID, immunodiffusion, INF, infants; NR, not reported; NN, neonates; PCR, polymerase chain reaction; PNW, pregnant women; RFLP, restriction fragment length polymorphism.
Countries in Europe are presented in alphabetical order. The list is not exhaustive.

REFERENCES

1. **Kong F, *et al.*** Serotype identification of group B streptococci by PCR and sequencing. *Journal of Clinical Microbiology* 2002; **40**: 216–226.
2. **Morozumi M, *et al.*** Associations between capsular serotype, multilocus sequence type, and macrolide resistance in *Streptococcus agalactiae* isolates from Japanese infants with invasive infections. *Epidemiology and Infection* 2014; **142**: 812–819.
3. **Anthony BF.** Carriage of group B streptococci during pregnancy: a puzzler. *Journal of Infectious Diseases* 1982; **145**: 789–793.
4. **Kimura K, *et al.*** Active screening of group B streptococci with reduced penicillin susceptibility and altered serotype distribution isolated from pregnant women in Kobe, Japan. *Japanese Journal of Infectious Diseases* 2013; **66**: 158–160.
5. **Ueno H, *et al.*** Characterization of group B streptococcus isolated from women in Saitama city, Japan. *Japanese Journal of Infectious Diseases* 2012; **65**: 516–521.
6. **Fröhlicher S, *et al.*** Serotype distribution and antimicrobial susceptibility of group B streptococci in pregnant women: results from a Swiss tertiary centre. *Swiss Medical Weekly* 2014; **144**: w13935.
7. **Uh Y, *et al.*** Emerging erythromycin resistance among group B streptococci in Korea. *European Journal of Clinical Microbiology & Infectious Diseases* 2001; **20**: 52–54.
8. **Uh Y, *et al.*** Serotypes and genotypes of erythromycin-resistant group B streptococci in Korea. *Journal of Clinical Microbiology* 2004; **42**: 3306–3308.
9. **Uh Y, *et al.*** Correlation of serotypes and genotypes of macrolide-resistant *Streptococcus agalactiae*. *Yonsei Medical Journal* 2005; **46**: 480–483.
10. **Seo YS, *et al.*** Changing molecular epidemiology of group B streptococcus in Korea. *Journal of Korean Medical Science* 2010; **25**: 817–823.
11. **Domelier AS, *et al.*** Molecular characterization of erythromycin-resistant *Streptococcus agalactiae* strains. *Journal of Antimicrobial Chemotherapy* 2008; **62**: 1227–1233.
12. **von Both U, *et al.*** A serotype V clone is predominant among erythromycin-resistant *Streptococcus agalactiae* isolates in a southwestern region of Germany. *Journal of Clinical Microbiology* 2003; **41**: 2166–2169.
13. **Gherardi G, *et al.*** Molecular epidemiology and distribution of serotypes, surface proteins, and antibiotic resistance among group B streptococci in Italy. *Journal of Clinical Microbiology* 2007; **45**: 2909–2916.
14. **Savoia D, *et al.*** *Streptococcus agalactiae* in pregnant women: phenotypic and genotypic characters. *Journal of Infection* 2008; **56**: 120–125.
15. **Meehan M, Cunney R, Cafferkey M.** Molecular epidemiology of group B streptococci in Ireland reveals a diverse population with evidence of capsular switching. *European Journal of Clinical Microbiology & Infectious Diseases* (in press).

https://doi.org/10.1017/S0950268814001320 Published online by Cambridge University Press

16. **Sadowy E, Matynia B, Hryniewicz W.** Population structure, virulence factors and resistance determinants of invasive, non-invasive and colonizing *Streptococcus agalactiae* in Poland. *Journal of Antimicrobial Chemotherapy* 2010; **65**: 1907–1914.
17. **Usein CR, *et al.*** Molecular characterization of adult-colonizing *Streptococcus agalactiae* from an area-based surveillance study in Romania. *European Journal of Clinical Microbiology & Infectious Diseases* 2012; **31**: 2301–2310.
18. **Martins ER, *et al.*** Group B streptococci causing neonatal infections in Barcelona are a stable clonal population: 18-year surveillance. *Journal of Clinical Microbiology* 2011; **49**: 2911–2918.
19. **Andrews JI, *et al.*** Group B streptococci causing neonatal bloodstream infection: antimicrobial susceptibility and serotyping results from SENTRY centers in the Western Hemisphere. *American Journal of Obstetrics and Gynecology* 2000; **183**: 859–862.
20. **Luan SL, *et al.*** Multilocus sequence typing of Swedish invasive group B streptococcus isolates indicates a neonatally associated genetic lineage and capsule switching. *Journal of Clinical Microbiology* 2005; **43**: 3727–3733.
21. **Bellais S, *et al.*** Capsular switching in group B *Streptococcus* CC17 hypervirulent clone: a future challenge for polysaccharide vaccine development. *Journal of Infectious Diseases* 2012; **206**: 1745–1752.

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https://doi.org/10.1017/S0950268814001320 Published online by Cambridge University Press