Increased incidence of invasive meningococcal disease in Switzerland due to serogroup Y strains: a molecular characterization

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Objectives: The invasive meningococcal diseases (IMD) remain one of the more severe infections due to Neisseria meningitidis of different serogroups. In Europe, the majority of strains belong to the serogroup B and C,strains; other serogroups are rarely isolated. Switzerland is a country with very low IMD endemicity and the incidence continues to decline since 2000s. However strains of serogroup Y have significantly emerged in the last two years. To improve the understanding of serogroup Y IMD in Switzerland, we conducted a systematic typing of isolates.
Methods: All strains submitted to the Swiss National Center for Meningococci in 2009 and 2101(n=98) were characterized by serological assays, antimicrobial susceptibility testing and molecular markers. The serogroup was defined both by agglutination and by specific PCR targets (siaD gene). The isolates were tested for antimicrobial susceptibility profile by the Minimal Inhibitory Concentration (MIC) method. Genotyping was performed by multilocus sequence typing (MLST), sequencing of the porA gene, and fetA allele determination.
Results: Among the ninety-three strains analyzed, 43 were of serogroup B (46%), 27 of serogroup C (28%) and 20 of serogroup Y (21.5%). Three additional strains were of serogroup W135 (n=2) or non determined serogroup (n=1). The majority of serogroup Y strains (90%) belong to the sequence type 23 (ST-23) clonal complex. One additional strain was ST-1627 and one of ST-174. Among the 20 Y isolates, more than half belonged the clone ST-23/P1.5-2,10-1 known to be commonly distributed across all continents and correlated with invasiveness. No specific resistance was detected for these strains. Sixty five percent of infected patients (n=13) were older than 40 years which is very rare for IMD due to other serogroups.
Conclusion: An increase of the serogroup Y strains has been already reported in the North America where one third of IMD cases are now caused by this serogroup. In Europe, the proportion of IMD cases caused by Y strains remains low (overall 5,8%). In the contrary, the percentage is clearly increasing in Switzerland compared to other neighboring country like in France (3% in 2009).The results of this study allow us to draw the profile of the invasive serogroup Y strains. The knowledge about these emerging endemic strains will be helpful to follow the epidemiology and pathology of IMD and can be an alarm for other European countries.