

O625

2-hour Oral Session

Infections of the brain and meningitis

### Epidemiology of *Listeria monocytogenes* meningitis in the Netherlands, 1985-2014

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**Background** *Listeria monocytogenes* is the third most common cause of bacterial meningitis and primarily affects elderly and immunocompromised individuals. A recent study showed unfavourable outcome due to *L. monocytogenes* meningitis has increased in the past decade from 27% to 61%, which could partially be explained by a shift in listeria genotype in listeria meningitis. We analysed national surveillance data to describe the epidemiology of *L. monocytogenes* meningitis including variation in serotype and genotype over the past 30 years.

**Methods** We examined national surveillance data from the Netherlands Reference Laboratory of Bacterial Meningitis (NRLBM) for cases of *L. monocytogenes* meningitis proven by cerebrospinal fluid culture (CSF) from January 1, 1985, to December 31, 2014. Strains were serotyped by agglutination with the use of O- and H-sera of an Listeria Antisera Set. Multi locus sequence typing (MLST) was used to identify changes in genetic lineage based on variation in seven housekeeping genes. We obtained demographic data on the age and sex distribution of the Dutch population during the observation period from Statistics Netherlands. Listeria meningitis patients were divided into three age-groups: neonates (0-4 weeks old), children and adults younger than 50 years old (4 weeks – 49 years old), and elderly ( $\geq 50$  years old). We tested differences between proportions with the Pearson  $\chi^2$  test or Fisher's exact test, and differences in frequencies between time periods with the Mann-Whitney U test.

**Results** Between 1985-2014 a total of 1077 *L. monocytogenes* isolates have been collected by the NRLBM of which 375 (35%) were isolates from cerebrospinal fluid samples. The incidence of listeria meningitis fluctuates over the years. Incidence was highest in neonates (0.61 per 100.000 live births) and elderly patients (peak at 82 years of age; 0.52 per 100.000 same-age population). A total of 374 (99%) isolates were serotyped. Main groups were serotype 4b (213 [57%]), 1/2a (95 [25%]) and 1/2b (44 [11%]). All these samples were sequence typed with MLST. In the past 30 years the dynamic of occurrence of sequence type has changed. The proportion of sequence type 1, 2 and 3 are decreasing [figure 1] and the proportion of sequence type 6 increased significantly (2,5% in 1985-1989 to 36% in 2010-2014,  $p < 0.001$ ).

**Conclusions** There has been a shift in the past 30 years of *L. monocytogenes* sequence types that cause listeria meningitis. Sequence type 6 has emerged as the dominant sequence type. Since a recent study showed an association between sequence type 6 and unfavourable outcome further studies of virulence factors of *L. monocytogenes* sequence types are needed.

Figure 1. Proportion of sequence types causing Listeria meningitis 1985-2014

