Molecular typing of enterovirus positive samples in 2022 confirms Echovirus 9 as most prevalent genotype in Belgium

Cuypers Lize[1], Bloemen Mandy[2], Beuselinck Kurt[1], Van Ranst Marc[1,2], Wollants Elke[2]

[1] University Hospitals Leuven, Department of Laboratory Medicine, National Reference Centre for Enteroviruses, Leuven, Belgium
[2] KU Leuven, Department of Microbiology, Immunology and Transplantation, Rega Institute for Medical Research, Laboratory of Clinical and Epidemiological Virology, Leuven, Belgium

BACKGROUND

- Enteroviruses (EV) = large genus including fifteen species: Enterovirus species A-L and Rhinovirus A-C
- Human enteroviruses infect millions of people worldwide every year: most often asymptomatic infections
- Also associated with a wide spectrum of both common and uncommon illnesses
- Aseptic meningitis = most commonly encounters illness associated with enterovirus infections – mainly affects very young children
- Since 2014, EVD68 is emerging worldwide – high attention of public health authorities because of its magnitude and clinical presentation
- Acute flaccid paralyse (AFP) in children under 15 years is the golden standard for polio detection.

MATERIALS

- Epidemiological surveillance of Enteroviruses in Belgium: genotyping of enterovirus positive samples at NRC UZ/KU Leuven
- Respiratory samples: broad respiratory panel including entero/rhinovirus
- Molecular typing by RT-PCR using different primer sets
  - EV species A & B: sequencing part of VP1
  - EV species C & D: sequencing VP4/VP2, VP1 and non-coding region

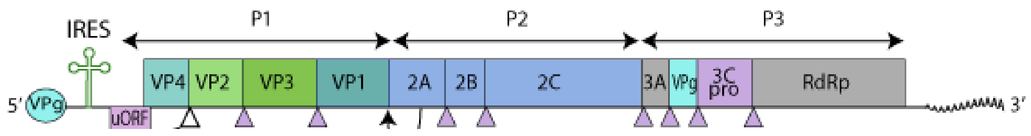

Figure 1: Linear ssRNA(+) genome of enterovirus (source: ViralZone)

RESULTS

- Overall number of samples for detection of Enterovirus in 2022:
  - 4794 samples (3491 individuals) from 44 Belgian laboratories
  - EV-positive: 712 samples (14.9%) – from 596 individuals
    - Respiratory samples = 84.0%
    - Cerebrospinal fluid (CSF) = 13.5%
    - Faeces = 2.3%
    - Other (e.g. lesions) = 0.2%

- Genotyping for 428 out of 615 EV-positive cases 2022
  - **Respiratory samples:** (n = 392 or 91.6%)
  - Rhinovirus A (38.5%), RVC (27.6%) and RVB (3.1%)
  - EVB (12.2%), EVA (1.0%) and EVD68 (1.8%)

  - **Cerebrospinal fluid** (n = 83)
  - EVB (91.6%): Echoviruses account for 56.7% with mainly Echovirus 9 (43.4%) and Coxsackievirus B (22.2%)
  - EVA (8.4%): majority typed as Coxsackievirus A

  - **Faeces** (n = 20: originating from 14 cases)
  - Two AFP cases and one polio request
    => all negative for poliovirus
    => one case positive for Coxsackievirus A4
  - EVB (71.4%): Coxsackievirus B (35.7%, mainly COXB4/B5) and Echoviruses (28.6% including Echo 9 and Echo 11)
  - EVA (28.6%): all Coxsackievirus A4

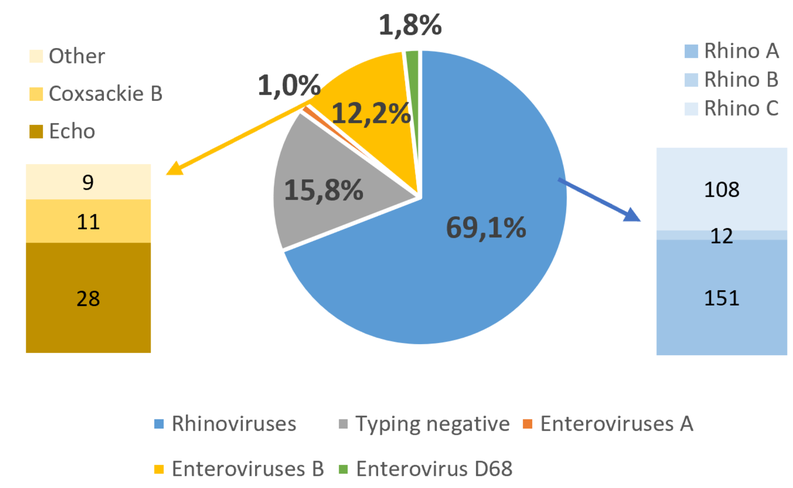

Figure 1: Genotyping of enterovirus-positive respiratory samples for 2022

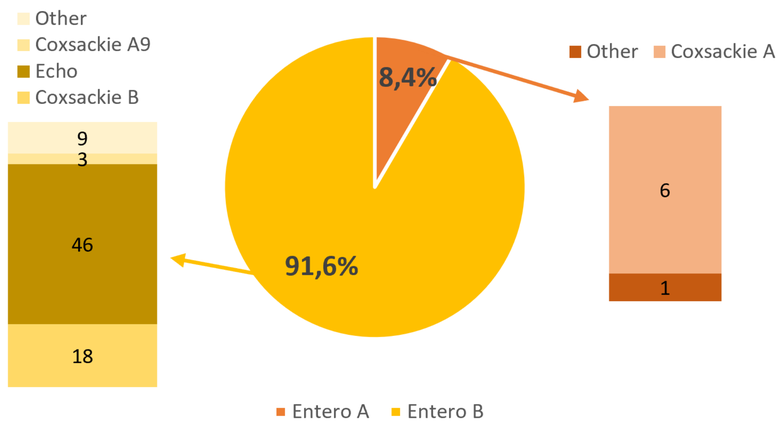

Figure 2: Genotyping of enterovirus-positive CSF samples for 2022

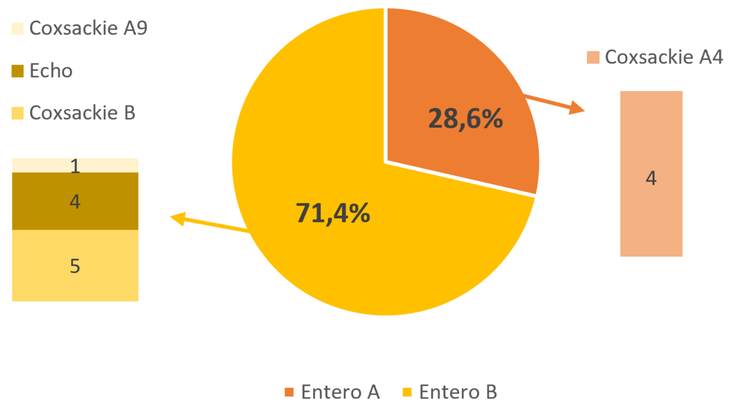

Figure 3: Genotyping of enterovirus-positive fecal samples for 2022

CONCLUSION

Echovirus 9 was the most abundant genotype in cerebrospinal fluid in the year 2022. In respiratory samples, Rhinovirus A was the most prevalent enterovirus. Acute Flaccid Paralysis was reported in three cases this year. The stool samples from one AFP case were positive for Coxsackievirus A4. No poliovirus was detected in Belgium this year.