LABUPDATE no. 39

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ENTEROVIRUS LABORATORY TESTING

INTRODUCTION

Enteroviruses are common human pathogens, transmitted mainly through the faecal oral route or, less commonly, the respiratory route. Enteroviruses present with a wide spectrum of clinical manifestations, ranging from mild to severe (Table 1). Clinically, enteroviruses can be divided into polio and non-polio enteroviruses. Non-polio enteroviruses include coxsackie A viruses, coxsackie B viruses, echoviruses and other "newer" enteroviruses such as enterovirus A71 and enterovirus D68.

TABLE 1: CLINICAL SYNDROMES ASSOCIATED WITH ENTEROVIRUSES

Affected system or patient	Clinical syndromes and most common associated enteroviruses
Central nervous system	• Acute flaccid paralysis (AFP)* and brain stem encephalitis: Polio virus, EV71 and EVD68 • Aseptic meningitis or encephalitis: Coxsackie virus A9, B2, and B5; echovirus types 6 and 9
Ocular	• Acute haemorrhagic conjunctivitis: Coxsackie A24 and EV70
Exanthems or enanthems	• Herpangina: Coxsackie A • Hand, foot and mouth disease: Coxsackie A16 and EV71 • Maculopapular rash with fever
Heart	• Myopericarditis: Coxsackie B viruses
Respiratory	• Respiratory infection (URTI/LRTI): Various, including EV68 • Pleurodynia: Coxsackie B viruses
Neonates	• Myocarditis: Coxsackie B viruses • Fulminant hepatitis: Echoviruses
Immunocompromised	• Chronic meningitis • Disseminated infection

* ***AFP cases require two stool samples collected 24 to 48 hours apart within 14 days of onset of paralysis to be sent to the National Institute for Communicable Diseases (NICD). Serology assays are not useful for diagnosing polio or for an AFP workup.***

AVAILABLE TESTS TO DETECT ENTEROVIRUS INFECTIONS

The appropriate diagnostic test (Table 2) depends on where the patient is in the course of the disease (Figure 1).

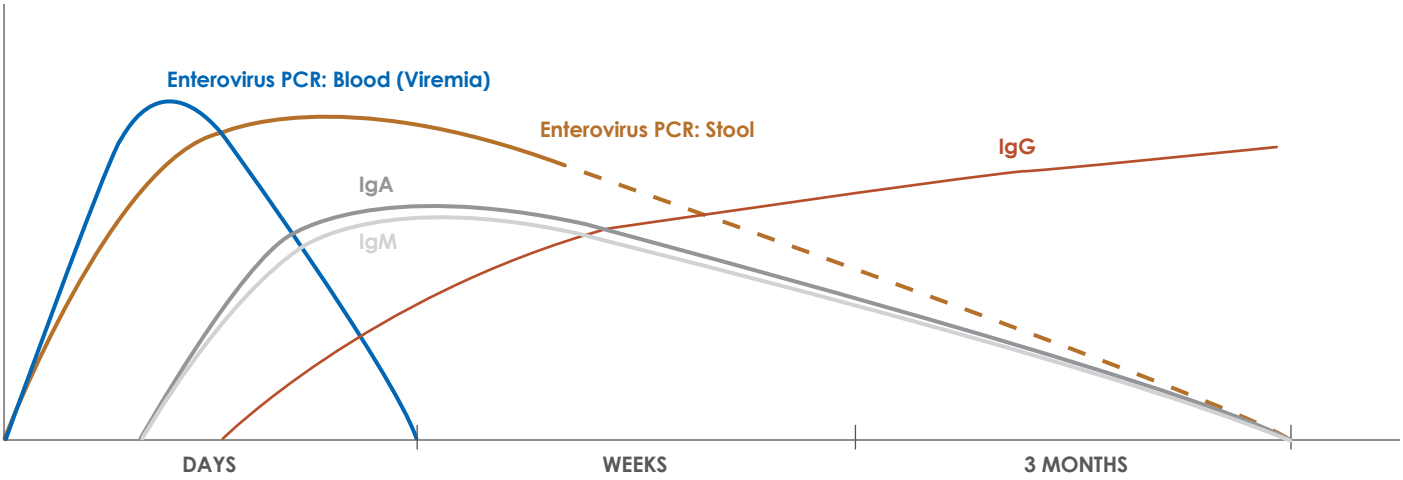

FIGURE 1: ENTEROVIRUS TEST WINDOW OF DETECTION

Molecular testing

- **Enterovirus PCR** can either be selected on its own, or as part of a multiplex PCR panel. The viremic period is short and infection may be missed, whereas shedding in stool is prolonged and detection may therefore indicate infection during the past three months.

Antibody testing

- **Enterovirus ELISA test** detects IgA, IgM and IgG antibodies to coxsackieviruses and echoviruses. This test is unable to differentiate between enterovirus types.
- **Coxsackie B immunofluorescence (IFA) test** detects IgM and IgG antibodies to coxsackie B1, B2, B3, B4, B5 and B6. This test will replace the existing coxsackie B antibody neutralisation test from April 2023. The test has improved sensitivity when compared to the neutralising antibody test, due to its detection of IgM antibodies and the fact that it is less prone to cross-reactivity.

TABLE 2: ENTEROVIRUS LABORATORY TESTS

PCR tests	Specimen type
Enterovirus PCR Mnemonic: ENTPCR	• Blood (serum/plasma): No clear site of infection • Eye swab: Haemorrhagic conjunctivitis • Vesicle swab (blister fluid): For a vesicular rash • Fluid: As an example, pleural fluid for pleurodynia • Tissue: As an example, endomyocardial biopsy for myocarditis • Stool
Viral meningitis PCR Mnemonic: VMPCR	• CSF
Comprehensive respiratory panel Mnemonic: RPCOMPCR	• Bronchoalveolar lavage, nasopharyngeal swab, nasopharyngeal aspirate, throat swab, sputum, tracheal aspirate, pleural fluid and tissue
Biofire respiratory panel Mnemonic: RESPMPCR	• Nasopharyngeal swab **Note:** Does not differentiate between rhino or enterovirus
Antibody tests	
Enterovirus ELISA Mnemonic: ENTERO Batched once weekly	• Serum (SST tube) • Acute infection: Positive IgM and/or IgA or a significant rise in IgG titre within a two-week period on a follow-up specimen
Coxsackie B (IFA) Mnemonic: COXB Batched twice weekly	• Serum (SST tube) • Acute infection: Positive IgM result or more than a twofold rise in IgG titre within a two-week period on a follow-up specimen

REFERENCES AVAILABLE ON REQUEST