

Enterovirus

Clinical Background

Enteroviral disease is a common, under-recognized childhood illness.

Epidemiology

- Prevalence – non-polio enteroviruses cause about 10-15,000,000 symptomatic cases annually in the U.S.
- Age – affects all ages; most severe disease in infants and older adults
- Occurrence
 - Infections occur throughout the year but peak during July-October
- Transmission – fecal-oral route
- Wild-type poliovirus 1-3 no longer in Western hemisphere due to effective vaccine strategies

Organism

- Enteroviruses are single-stranded RNA viruses in the Picornaviridae family
- >70 recognized serotypes
- Most-common non-polio enteroviruses
 - Coxsackieviruses A1-22 and 24
 - Coxsackieviruses B1-6
 - Echoviruses 1-9, 11-27 and 29-31
 - Enteroviruses 68-71

Clinical Presentation

- Nonspecific febrile illness with or without rash (coxsackieviruses A4, 5, 9, 10, 16, and B1-5)
- Acute hemorrhagic conjunctivitis (coxsackievirus A24, echovirus 70)
- Hand-foot-mouth disease (coxsackievirus A16, B1-5; echovirus 4-6)
- Sepsis syndrome in neonates (coxsackievirus B2-5)
- In the neonate, enterovirus may cause severe morbidity and mortality
 - Related to sepsis, meningoencephalitis, myocarditis or hepatitis
 - Complications associated with poor outcome generally occur 1-2 days after birth
 - Suggests prenatal origin of infection
 - Sudden onset of fever, irritability and poor feeding characterize infection
 - Diarrhea, vomiting and rash (macular or maculopapular) in 25% of patients
 - Meningeal involvement in febrile disease 70% of time
- Myocarditis (coxsackievirus B1-5 most common)
- Herpangina (coxsackievirus A1-10)
- Hepatitis
- Pneumonia, bronchiolitis (coxsackievirus A9, 16, B1-5)
- Central nervous system (CNS) infections
 - Aseptic meningitis (meningeal inflammation in absence of bacterial pathogen)
 - Enteroviruses are the most common cause (80-92% of all cases)
 - Serotype of enterovirus varies (commonly coxsackievirus A2, 4, 7, 9, 10, B1-5; echovirus 6, 7, 9, 10; enterovirus 70, 71)
 - Clinical manifestations depend upon host
 - Enteroviral encephalitis is less common but more severe than aseptic meningitis
 - Coxsackievirus A9, B1-5; enterovirus 71

- Global neurologic depression
- Evidence of focal encephalitis, similar to herpes simplex encephalitis (enterovirus found on brain biopsy)
- Immunocompromised adults and children with agammaglobulinemia are susceptible to chronic meningitis or meningoencephalitis
- Paralytic syndrome
 - Classically associated with poliovirus
 - Typically flaccid paralysis
 - Enterovirus 70, 71 and coxsackievirus A7 can cause similar syndrome
- Meningitis beyond neonatal period characterized by sudden onset of fever (38°-40°C)
 - Meningeal irritation (>6 weeks) occurs in >50% of patients
 - Headache and photophobia are almost universally reported
 - Neurologic abnormalities rare
 - Both short and long term outcomes generally good for immunocompetent hosts

Treatment

- Supportive

Diagnosis

- Indications for testing
 - Mild to moderate disease (eg, upper respiratory symptoms) – diagnostic testing usually not indicated
 - Disseminated or organ-specific syndromes – laboratory testing is indicated
- Laboratory testing
 - Nucleic acid amplification testing (eg, RT-PCR) recommended for CSF and blood specimens
 - Much more sensitive than culture
 - Rapid turnaround time aids in clinical management of patient
 - Culture – respiratory specimens, stool
 - Up to 1 week required for growth
 - Serologic antibody titers
 - Requires acute and convalescent titers
 - Typing testing – use for epidemiological studies

Lab Tests

Indications for Laboratory Testing

Tests generally appear in the order most useful for common clinical situations. For test-specific information, refer to the test number in the ARUP Laboratory Test Directory on the ARUP Web site at www.aruplab.com.

Test Name and Number	Recommended Use	Limitations	Follow Up
Enterovirus Detection by RT-PCR 0050249 Method: Reverse Transcription/Polymerase Chain Reaction	Rapid diagnostic test Use when enteroviral infection expected especially for CNS infections Standard of care for diagnosing viral infection from CSF specimen	Negative result does not rule out PCR inhibitors or enterovirus nucleic acid in concentrations below level assay can detect	

Viral Culture 0065008 Method: Cell Culture	Requires 5-7 days	Note: RT-PCR method is standard of care for diagnosing viral infection from CSF specimen	
Enterovirus Typing 0065058 Method: Immunofluorescence	Identify enterovirus type from culture <ul style="list-style-type: none"> • Echoviruses 4, 6, 9, 11, 30 • Coxsackievirus A9, A16, A24 • Coxsackievirus B1-B6 • Poliovirus 1-3 • Enterovirus 70, 71 		
Echovirus Antibodies 0060053 Method: Serum Neutralization Assay	When PCR or culture is not a viable option, order to confirm disease occurred Test includes echovirus 6, 7, 9, 11, 30		
Coxsackie B Virus Antibodies 0060055 Method: Serum Neutralization Assay	When PCR or culture is not a viable option, order to confirm disease occurred Test includes coxsackievirus B1-B6		
Coxsackie A9 Virus Antibodies by CF 0050503 Method: Complement Fixation	When PCR or culture is not a viable option, order to confirm disease occurred		
Poliovirus Antibodies 0060054 Method: Serum Neutralization Assay	When PCR or culture is not a viable option, order to confirm disease occurred Test includes poliovirus 1-3		

Additional Tests Available

Test Name and Number	Comments
Enterovirus Panel II 0098879 Method: Complement Fixation	

General References

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Related Content

Adenovirus

Herpes Simplex Virus - HSV

Measles Virus - Rubeola

Meningitis, Acute

Mycoplasma pneumoniae

Parainfluenza Virus 1, 2, 3

Parvovirus B19

Respiratory Syncytial Virus - RSV

Respiratory Viruses

Rubella Virus

Varicella-Zoster Virus - VZV

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