

## Review Article

### Enterovirus meningitis-a brief overview of the epidemiology and Diagnosis

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**Abstract:** Enteroviruses continue to be one of the most common viruses responsible for a large number of cases of viral meningitis/encephalitis. However, it is rare for clinicians to look for this pathogen in the work up of viral meningitis. This brief summary describes the epidemiology, serotypes and diagnosis of this common yet not often looked for cause of meningitis. Current review of the literature was done describing the current epidemiology and diagnosis Enteroviruses are the predominant virus responsible for a large number of cases of viral meningitis. There are several serotypes responsible for illnesses in the adult and pediatric population. Diagnosis should be based on the use of DNA PCR of the virus. Treatment is supportive.

**Keywords:** Enteroviruses, pathogen, meningitis.

## INTRODUCTION

### Epidemiology of Enterovirus Meningitis

Non-polio enter viruses are the most common cause of viral meningitis accounting for 46% of all cases of viral meningitis [1]. Approximately 25,000 to 50,000 cases of viral meningitis are reported annually [1, 6]. With the majority of cases occurring in the summer and early fall months [8]. Viral meningitis tends to occur more often in children, can occur at any age and often goes undiagnosed [8].

### Serotypes

Enterovirus belongs to the family “picornavirus” and has over different 50 subtypes that cause meningitis [8]. The two main subtypes of enteroviruses that cause meningitis are Coxsackie viruses (group A and B) and echoviruses. Each serotype has a different pattern of circulation and shows a different clinical manifestation

[1]. The surveillance summary from 1970-2005 has found that the five most common serotype of enterovirus (echoviruses 9, 11, 30, and 6, and coxsackie virus B5) cause the majority of cases of meningitis. According to the CDC[2]: Echovirus 9 is the most common type of enterovirus that causes aseptic meningitis. Echovirus 11 tends to cause more serious and fatal infection in neonates. Echovirus 30 causes aseptic meningitis and presents with meningoencephalitis and milder illnesses such as respiratory illness. Echovirus 6 is another Enterovirus that causes aseptic meningitis and affects neonates and gastrointestinal illnesses. In addition, Coxsackie virus B5 is another enterovirus that causes neonatal systemic illnesses such as (encephalo myocarditis syndrome), aseptic meningitis, acute flaccid paralysis, myocarditis and meningoencephalitis.

**Table-1: Shows the different serotypes of viral meningitis reported from the CDC from 1970-2005. The serotypes are listed from high to low occurrence[2].**

Serotype	Overall rank	Reports with known serotype (N = 49,637)		Rank				Highest rank	No. of years the serotype was		
		No.	%	1970-1979	1980-1989	1990-1999	2000-2005		Reported	Among the 15 most common	
										Among the five most common	
Echovirus 9	1	5,868	11.8	1	2	4	1	36	35	22	
Echovirus 11	2	5,638	11.4	2	1	2	10	36	35	22	
Echovirus 30	3	5,021	10.1	12	3	1	2	36	30	18	
Coxsackievirus B5	4	4,313	8.7	3	4	9	5	36	28	12	
Echovirus 6	5	3,023	6.1	5	5	4	6	36	34	7	
Coxsackievirus B2	6	2,596	5.2	6	6	5	12	36	35	14	

### Clinical Features

Viral meningitis is defined as meningitis with a negative bacterial CSF culture [3]. These are seen in a younger population in the fall season and may or may not be without encephalitis. In a study conducted by Ihekwaba, Kudeia and McKendrick (2008), a progression from polymorphs to lymphocytes was noted in patients with enterovirus infections. Most WBC's in CSF are lymphocytes. In infants, meningeal signs rarely occur but irritability and fever are the presenting feature [4, 5]. The elderly less often presents with headache and neck stiffness but can present with altered mental status and focal neurologic deficits.

### Diagnosis

Viral meningitis is diagnosed based on the CSF findings including cell count and differential, glucose, protein, Gram stain, culture. In viral meningitis the majority of white cell in the CSF may be lymphocytes with neutrophils (<20%). In addition, classic viral CSF characteristics include: elevated WBC count with a mononuclear predominance, a CSF to serum concentration ratio of greater than 0.5 (>40 mg/dL), elevated CSF protein concentration, and negative Gram stain. In addition to the lumbar puncture tests discussed above, DNA polymerase chain reactions (PCR) for detection of enteroviruses should be performed. PCR testing is helpful in detecting viral meningitis and can detect most viruses included Enteroviruses [7].

### Treatment

Treatment of Enteroviral meningitis is symptomatic and includes supportive measures such as hydration, control of fever, and occasionally steroids. Specific antiviral therapy is not available at this time.

### CONCLUSION

Enteroviruses remain one of the most common causes of viral meningitis. It has several different serotypes that are responsible for a variety of illnesses. The diagnosis is based on DNA PCR of the CSF for the virus. Treatments remain supportive

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