

Role of laboratory in rapid diagnosis of atypical mumps

ABSTRACT

Fairly large number of mumps virus infections present atypically without parotitis leading to delay in diagnosis and increased morbidity. Awareness of such presentations and inclusion of serological test for detecting IgM-specific antibodies could help in solving diagnostic dilemma, especially in unvaccinated individuals from developing countries.

Keywords: mumps, atypical presentations, IgM, indirect immunofluorescence assay.

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INTRODUCTION

Mumps is an acute viral illness characterized by unilateral or bilateral painful swelling of the parotid or other salivary glands. In unvaccinated populations, an estimated 30-70% of mumps infections are associated with typical acute parotitis.^{1,2} However, as many as 20% of infections are asymptomatic and nearly 50% are associated with non-specific or primarily respiratory symptoms, with or without parotitis.¹ Atypical mumps infection presentations include meningitis, epididymitis, orchitis, nephritis, pancreatitis, myocarditis, and others^{3,4} and in these cases laboratory confirmation is required. Mumps specific-laboratory assays include virus isolation from saliva or urine, anti-mumps IgM antibody detection in blood, four-fold rising in titers of anti-mumps IgG/neutralizing antibodies in blood and/or demonstration of viral RNA in cerebral spinal fluid (CSF).^{4,5} A rapid and reliable laboratory diagnosis of mumps virus infection is essential especially in cases with atypical presentations.⁶ Here we present a series of eight patients with atypical mumps infection in which anti-mumps IgM was detected by indirect immunofluorescence assay (IFA), proving to be very useful in disease confirmation and early settling diagnostic dilemma.

PATIENTS AND METHODS

Eight patients with laboratory confirmed mumps infection attended at Kasturba Hospital, a tertiary care teaching hospital in Manipal, South India,

during the year of 2005 were evaluated according to clinical and laboratorial data. All patients, including those with parotitis, underwent empirical therapy before serological and virology analysis. Briefly, blood and CSF samples were evaluated for the presence of anti-mumps IgM antibody by IFA (prepared and standardized in house). These specimens were also tested for specific IgM antibodies against herpes simplex viruses (HSV) and Japanese encephalitis virus (JEV). Polymerase chain reaction was carried out on CSF samples to rule out HSV-1 and HSV-2 infection. Saliva and urine samples were processed for mumps virus isolation on Vero cells line.

RESULTS

The characteristics of patients, clinical presentation at admission, and outcome diseases, as well as laboratorial data is presented in Table 1. Four cases (50%) were children between 5-13 years (three males and one female) and four adults (50%) (two males and two females, mean age of 17 years). Mumps was not the primary diagnosis at admission in six out of eight cases, as clinically evident parotitis was seen only in two cases. Even in these two cases, the admission was for meningitis or epididymo-orchitis. Five patients including three children and two adults had meningitis or meningo-encephalitis at the time of admission. One child had developed nephritis and renal failure, while one adult was presented with acute respiratory distress syndrome (ARDS). All eight

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Table 1. Clinical and laboratorial data from mumps-infected patients with atypical disease presentations

Pt No	Age/gender	Clinical features	Vaccination status	Mumps IgM antibody		Virus isolation saliva	Pleocytosis CSF	Other tests HSV-PCR JEV serology	Outcome
				blood	CSF				
1	7 yrs/female	Meningitis	-	+	+	-	Yes	-	Recovered
2	5 yrs/male	Meningitis	-	+	+	-	Yes	-	Recovered
3	7 yrs/male	Meningitis, Parotitis	-	+	+	-	Yes	-	Recovered
4	32 yrs/female	Meningitis	-	+	+	-	Yes	-	Recovered
5	23 yrs/female	Meningitis	-	+	+	-	Yes	-	Sensorineural hearing deficit
6	13 yrs/male	Nephritis	-	+	NA	-	NA	NA	Died
7	28 yrs/male	ARDS, Orchitis	-	+	NA	+	NA	NA	Recovered
8	26 yrs/male	Parotitis, Orchitis	-	+	NA	+	NA	NA	Recovered

NA: not applicable.

patients tested positive for anti-mumps IgM in blood and/or CSF. However, mumps virus isolation in saliva was successful only in two cases, one from the ARDS and the other from epididymoorchitis with parotitis. Six patients recovered completely, except one adult patient with meningitis, who developed sensorineural hearing deficit, while the child with nephritis later died due to renal failure.

DISCUSSION

The use of effective vaccine in developed countries successfully reduced mumps virus infection, though outbreaks are often reported.⁷ Due to absence of effective vaccination programs, mumps is still a major health problem in several developing countries. Mumps disease burden in India is still not completely understood. Few published reports indicate more occurrence of the disease in children of the age group 5-9 years.^{8,9} The clinical presentation of mumps is not necessarily typical. Clinical meningitis occurs in 1-10% of patients with mumps parotitis, but only 40-50% of patients with mumps meningitis, confirmed by serology or virus isolation, have parotitis.¹⁰ Large number of atypical presentations of mumps highlights the weakness of clinical diagnosis and the need of reliable rapid diagnostic tests. Virus isolation from saliva or urine is time consuming and labor intensive. RT-PCR for viral RNA detection is considered to be useful in diagnosing central nervous system (CNS) involvement by mumps virus, however, this technique is not available in most laboratories of developing countries. In unvaccinated subjects, mumps specific IgM is almost always detectable in serum as early as 11 days after exposure, and by the time of clinical illness. Cases of atypical and complicated mumps are often misdiagnosed or face delayed diagnosis, while extensive search for other etiologies are being conducted. This delays the institution of appropriate supportive therapy leading to increased morbidity and mortality as observed also in the present study. Moreover, early diagnosis could help to reduce virus spreading by patient isolation. High degree of clinical suspicion

and inclusion of simple and rapid tests, such as serology, for detecting mumps IgM antibodies during early investigative procedures could reduce diagnostic dilemma. IFA for detecting IgM antibodies is a very rapid and reliable method, which can be performed even by laboratories where virus isolation is unavailable. Together, these observations could help clinicians to suspect mumps viruses as another etiological agent, mainly in the CNS diseases, especially in countries where the virus is endemic and the vaccine coverage is still poor.

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