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Case Report

Paediatrics Section

Methicillin-resistant *Staphylococcus aureus* Bacteraemia in a Young Boy following Mumps Infection: A Case Report

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ABSTRACT

Mumps infection is regarded as one of the main vaccine-preventable diseases in the world. Although mumps is considered one of the most innocuous infections, it can also cause serious complications such as meningoencephalitis, pancreatitis, myocarditis, and long-term issues like deafness and multiple cranial nerve palsies. Due to its predominantly benign nature, it has long been a neglected infection. The Government of India includes the administration of the Measles and Rubella (MR) vaccine only (without the mumps vaccine) at 9 and 15 months of age for all children in the National Immunisation Schedule. In the present case, a nine-year-old boy was brought in with complaints of fever and bilateral swelling in the parotid region for three days, accompanied by pain during chewing. Clinically, patient was diagnosed with a mumps infection. The parotid swelling gradually decreased over the course of one week. However, the boy continued to experience persistent high-grade fever even after the parotitis improved. Complications of mumps, such as orchitis, pancreatitis, and meningoencephalitis, were ruled out. Laboratory investigations revealed the growth of Methicillin-resistant *Staphylococcus aureus* (MRSA) in the blood, which was sensitive to the antibiotics doxycycline, ciprofloxacin and clindamycin. The boy was started on doxycycline, and the fever abated within 24 hours, leading to constitutional improvement. This unusual presentation of MRSA bacteraemia following a mumps infection underscores the importance of considering all possible differential diagnosis when a child does not follow the expected clinical course and continues to exhibit symptoms without improvement.

Keywords: Doxycycline, Measles mumps rubella vaccine, Myocarditis, Parotitis

CASE REPORT

A nine-year-old boy presented to the Paediatric Department with complaints of swelling on both sides of his neck and cheeks, along with pain while chewing food and fever for the past three days. The fever was high-grade and intermittent, relieved with antipyretics. There was a history of loss of appetite and lethargy since the onset of the fever. There was no history of vomiting, abdominal pain, difficulty swallowing, headache, or decreased urine output. A clinical diagnosis of mumps was made. The child was treated for mumps with paracetamol at a dose of 15 mg/kg every 4-6 hours and was advised to maintain adequate fluid intake and consume a soft diet. The child had been vaccinated according to the National Immunisation Schedule, having received only the MR vaccine, and had never been immunised against mumps infection. The child returned after about one week with persistent fever spikes; however, the parotid swelling had reduced, and he had no other complaints regarding complications such as painful swelling of the scrotum, vomiting, headache, altered sensorium, or cough.

On examination, the child was febrile (temperature of 100°F), had a pulse rate of 90 beats per minute, a respiratory rate of 24 breaths per minute, and a blood pressure of 100/70 mm Hg. The child was haemodynamically stable upon admission. A head-to-toe examination and examination of other systems for signs of complications from mumps were unremarkable.

Laboratory investigations were conducted, revealing leucocytosis with elevated Erythrocyte Sedimentation Rate (ESR) and C-reactive Protein (CRP). Blood cultures were sent, and differential diagnosis of scrub typhus, leptospirosis, enteric fever and malaria were considered, with appropriate investigations also sent [Table/Fig-1].

The fever spikes continued to persist throughout the course of admission, with the child experiencing atleast two high-grade fever episodes per day. The child was empirically started on broad-spectrum intravenous ceftriaxone at a dose of 100 mg/kg/day while awaiting the blood culture report. However, the child continued to have fever spikes for 48 hours despite ceftriaxone treatment.

Parameters	Patient's value	Normal range
Haemoglobin	13.1 g/dL	12-15 g/dL
TLC	30,200 cells/microliter	5000-15,000 cells/microliter
Neutrophils	93%	25-57%
Lymphocytes	7%	35-65%
Eosinophils	0%	1-6%
Basophils	0%	<1%
Platelet count	4.15 lakhs/cumm	2 lacs - 4.9 lakhs/cumm
ESR	83 mm/hour	1-15 mm/hour
CRP	40 mg/dL	<6 mg/dL

[Table/Fig-1]: Comparison of patient's parameters with the normal value.
TLC: Total leucocyte count

Immunoglobulin M (IgM) for scrub typhus, Widal test, rapid malarial card test, peripheral smear for malarial parasites and IgM for leptospirosis were all negative. Meanwhile, the blood culture report revealed the growth of MRSA species after 48 hours of incubation, which was sensitive to doxycycline, ciprofloxacin and clindamycin. All other investigations were negative.

The boy was then started on doxycycline at a dose of 2.2 mg/kg for seven days after discontinuing ceftriaxone. The frequency of fever episodes reduced, and the child became afebrile with overall clinical improvement by the third day of initiating oral doxycycline. The child was discharged on the seventh day and was doing well on follow-up after a week.

DISCUSSION

Mumps is an acute infection caused by a paramyxovirus that is self-limiting. It was once quite common but is now uncommon in many countries due to the easy availability of the Measles, Mumps

and Rubella (MMR) vaccine [1]. Mumps is usually characterised by fever, bilateral or unilateral parotitis, and can sometimes lead to orchitis and meningoencephalitis [2]. Although not very common in countries with extensive vaccination programs, mumps continues to be endemic in the rest of the world where vaccination against mumps is not routinely administered [3]. While complications are rare, some children do develop orchitis and meningoencephalitis. Other uncommon complications include conjunctivitis, optic neuritis, pneumonia, nephritis, pancreatitis, mastitis and thrombocytopenia [4,5].

Neurological manifestations can include meningitis, encephalitis, transverse myelitis, Guillain-Barré syndrome, cerebellar ataxia, facial palsy and hydrocephalus. Neurological complications are typically self-resolving, with a low incidence of morbidity and mortality [4]. Although western countries have good vaccination coverage against mumps through the routine administration of the MMR vaccine to all children, there has been a resurgence in mumps cases among fully vaccinated children. This may be due to the suboptimal efficacy of the mumps component of the MMR vaccine, high intensity of exposure, delays in reporting, and a lack of availability of appropriate laboratory tests {such as reverse transcription-Polymerase Chain Reaction (PCR)} in low- and middle-income countries [6]. There are many reports of the emergence of mumps infection among predominantly unvaccinated children around the world [7,8].

In a study conducted by Bashar A et al., there was a rising number of mumps cases among children in Maharashtra, Uttar Pradesh, Odisha, and Rajasthan over a span of 4-5 years. Additionally, in October and November 2023, there was a mumps outbreak in Idukki and Palakkad in Kerala, Sivagangai in Tamil Nadu, Udupi in Karnataka, and Rajnandgaon in Chhattisgarh [7].

In the case of this unimmunised child, the authors would first suspect complications of mumps as one of the differential diagnosis for the prolonged fever following the mumps episode. However, MRSA bacteraemia in a young boy causing prolonged fever is a rare entity. There have been reports of mumps and enteroviral co-infection in three children suffering from viral meningitis. A case report by Mao M and Doyle A documents co-infection of mumps with coxsackie A virus [9].

Despite an extensive review of the literature, the authors found no instances of MRSA infection following or occurring alongside mumps infection. In general, there is truly sparse literature on mumps infection leading to or co-existing with MRSA infection. This case report is the first of its kind to document MRSA infection following mumps infection. Physicians are typically trained to consider a single virus as the cause of a clinical syndrome. The present case report illustrates the need for more studies to enhance our understanding of how often co-infections occur and how they influence the disease course.

Another important issue to mention is the significance of routine Immunisation against mumps. Studies of mumps outbreaks in Western countries show that the rates of complications are far lower than those reported in the prevaccine era. Additionally, a large-scale study conducted in Israel found statistically significant lower rates of hospitalisation and complications among those vaccinated for mumps compared to those who were not [10]. This highlights the urgent need to incorporate the MMR vaccine in place of the MR vaccine in the national Immunisation schedule in India.

CONCLUSION(S)

The mumps vaccination has not yet been included in the National Immunisation Schedule, and the alarming outbreak of mumps in scattered regions of India validates the urgent necessity of incorporating the mumps vaccine into the national Immunisation schedule of India. If a known disease follows an unpredictable course, in addition to the common complications associated with that disease, certain uncommon etiologies should also be considered. This underscores the importance of thorough clinical examination and history-taking.

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