

## CASE REPORT ON RARE BILATERAL PAROTITIS SECONDARY TO MUMPS AND MONONUCLEOSIS

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### ABSTRACT

Mumps, caused by rubulavirus, and mononucleosis, primarily resulting from Epstein-Barr virus (EBV) infection, represent distinct viral illnesses sharing overlapping clinical manifestations. This case report presents a 10-year-old male patient who exhibited symptoms suggestive of both conditions, including fever, vomiting, and bilateral parotid swelling. Despite vaccination efforts, breakthrough infections such as mumps persist, underscoring the complexity of achieving full immunity within the population. Concurrently, mononucleosis, characterized by pharyngitis, lymphadenopathy, and fatigue, presents diagnostic challenges due to its resemblance to mumps. This case report discusses a 10-year-old male presenting with fever, vomiting, and bilateral parotid swelling, ultimately diagnosed with concurrent mumps and mononucleosis from elevated inflammatory markers, prompting further diagnostic evaluation. Serological testing revealed mumps-specific immunoglobulin (IgM) and EBV IgM antibodies, confirming the coexistence of mumps and mononucleosis. Management strategies tailored to address symptoms and complications associated with both infections were implemented. The patient's clinical status improved following pharmacological interventions and supportive care. This case highlights the importance of meticulous diagnostic evaluation when encountering patients with overlapping symptoms suggestive of both mumps and mononucleosis. Moreover, it emphasizes the rarity and clinical significance of encountering both infections concurrently, as misdiagnoses can lead to inappropriate management strategies and potentially contribute to further spread. Comprehensive understanding and recognition of the distinct etiological origins and overlapping symptomatology of mumps and mononucleosis are essential for accurate diagnosis and optimal patient management.

**KEYWORDS:** Measles Mumps Rubella Vaccine, Epidemic Parotitis Virus, Mononucleosis, Infectious, Epstein Barr Virus.

### INTRODUCTION

Mumps, an acute contagious viral illness, is caused by the rubulavirus, a single-stranded RNA paramyxovirus belonging to the Paramyxoviridae family. Clinically, the

prodromal phase of mumps presents with non-specific symptoms such as low-grade fever, fatigue, headache, myalgia, and anorexia, occasionally accompanied by mild respiratory symptoms.<sup>[1,3]</sup>

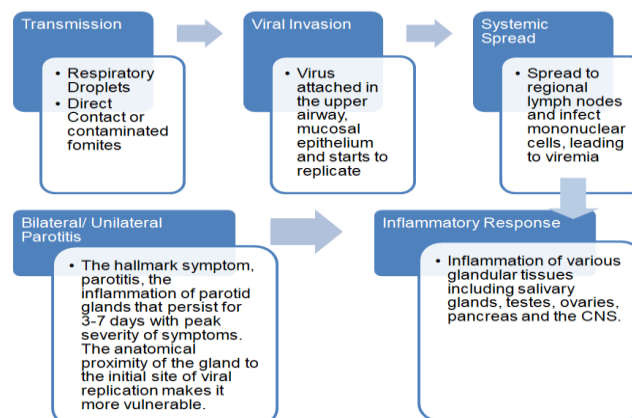


Figure 1: Schematic representation of mumps pathophysiology and transmission dynamics.

To prevent mumps, the administration of two doses of the MMR (measles, mumps, and rubella) or MMRV (measles, mumps, rubella, and varicella) vaccine is recommended. These vaccines are given subcutaneously to children at 12 through 15 months of age and at 4 through 6 years, with complete immunization being crucial before reaching puberty. Despite the significant reduction in mumps incidence attributed to the Mumps Measles Rubella (MMR) vaccine, breakthrough infections similar to this case continue to pose a challenge, underscoring the complexity of achieving full immunity within the population.<sup>[6-8]</sup>

Infectious mononucleosis, first termed by Sprunt and Evans in 1920, also known as glandular fever, predominantly results from primary Epstein-Barr virus (EBV) infection, characterized by pharyngitis, cervical lymphadenopathy, fatigue, and fever. The clinical resemblance of mononucleosis to mumps often leads to misdiagnosis, with mumps being erroneously identified as mononucleosis and vice versa, attributed to shared symptoms such as swollen lymph nodes and fever. Accurate differentiation is crucial for optimal patient management, necessitating serological testing for mumps-specific IgM antibodies or EBV-specific antibodies (including heterophile antibodies and EBV viral capsid antigen antibodies). Although coexisting mumps and mononucleosis cases are rare, their documented occurrence underscores the need for meticulous diagnostic evaluation when encountering overlapping symptoms, highlighting the clinical significance of precise differentiation.<sup>[9,11]</sup>

Despite their distinct etiological origins, the similarity in presentation frequently leads to misdiagnosis, with mumps being erroneously identified as mononucleosis and vice versa.<sup>[12]</sup> This diagnostic conundrum is further compounded by instances where both conditions coexist, presenting a formidable challenge for clinicians. Such misdiagnoses can lead to inappropriate management strategies, delaying appropriate treatment and potentially contributing to the spread of these infectious agents. Although the coexistence of mumps and mononucleosis is relatively rare, documented cases underscore its clinical significance. The rarity of this phenomenon emphasizes the need for heightened vigilance and comprehensive diagnostic evaluation when encountering patients with overlapping symptoms suggestive of both conditions.

## CASE DESCRIPTION

A previously healthy 10-year-old male patient with no known comorbidities was admitted to the hospital due to experiencing pain and swelling around his ears, along with fever, frequent vomiting (about 6-7 times), and abdominal discomfort. The fever came on suddenly, worsened gradually, occurred on and off, and was temporarily alleviated by medication. The child was unable to take orally due to episodes of vomiting. At the

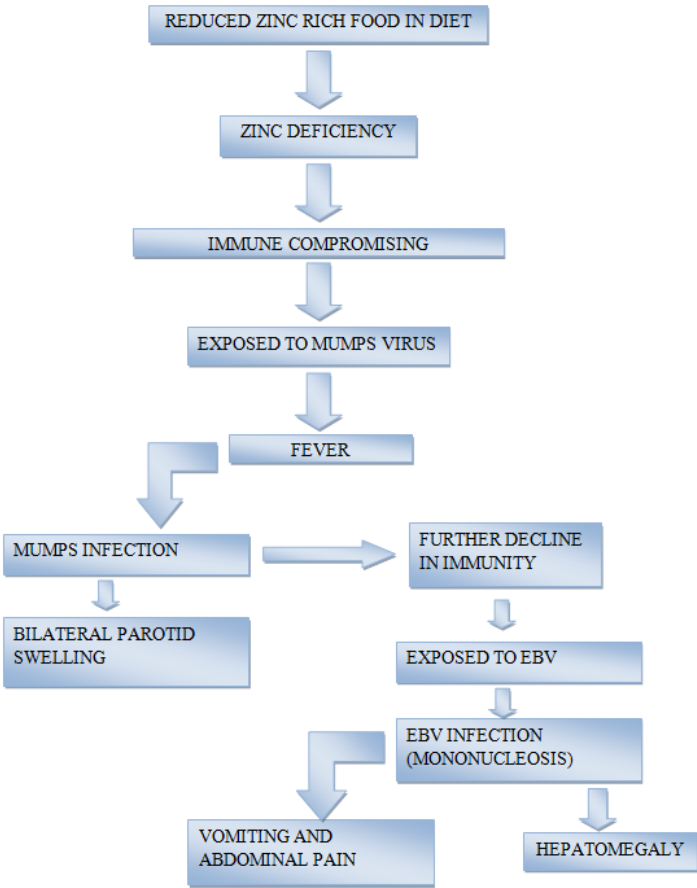
age of 2 months, he had a prior episode of viral meningoencephalitis with an unidentified cause. His vaccination is up to date.

Upon admission, the patient presented with a fever, registering at 101°F which kept on fluctuating (Figure 1), accompanied by tachycardia with a heart rate of 110 bpm and tachypnea with a respiratory rate of 32 cpm (Figure 2). He showed variation in his temperature, pulse rate, and respiratory rate in during the days of admission. Local examination revealed diffuse swelling measuring 3cm x 4 cm with a slightly firm consistency, indicative of bilateral parotid swelling in the pre-and post-auricular regions, suggestive of parotitis. Additionally, positive liver dullness was observed on examination at the right 5th intercostal space, confirming hepatomegaly. The pale skin, platynychia, peeling skin, and dry hands noted at the preliminary examination have shown possible zinc deficiency.

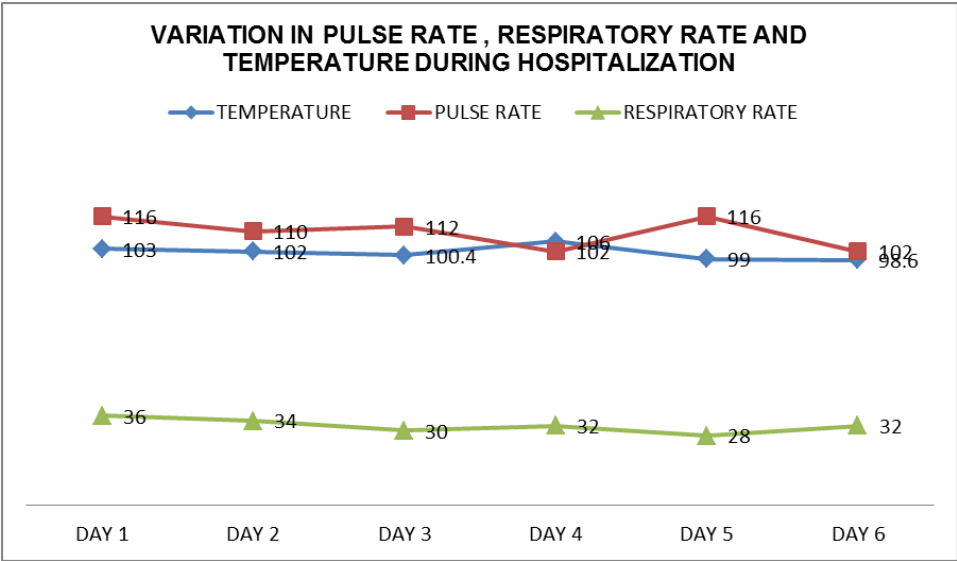
Laboratory analysis revealed lymphocytosis, with lymphocyte levels reaching 63%, as well as leukocytosis, with leukocyte levels at 89%. Furthermore, elevated liver enzymes including AST, ALT, and bilirubin were detected. Additionally, the patient exhibited an elevated CRP level of 32 mg/L. He underwent diagnostic interventions including ultrasound imaging of the parotid glands to assess for inflammation and enlargement. Serologic testing for mumps-specific immunoglobulin (IgM) and EBV IgM antibodies for mononucleosis came positive. The mono spot test detected heterophile antibodies that are produced in response to EBV infection. The patient has been diagnosed with bilateral parotid swelling secondary to the mumps virus complicated by mononucleosis from EBV.

The patient had undergone pharmacologic, supportive, and prophylactic interventions to manage the concurrent occurrence of mumps and mononucleosis (Table 1). Following the intervention, the patient exhibited a positive response, with swelling reduced to 1 cm x 1.5 cm. Oral intake improved, and no new complaints arose, leading to discharge after a seven-day hospitalization period, indicating successful management of concurrent mumps and mononucleosis.

Figures and figure legends



**Figure 2: Disease Progression.** This flowchart illustrates the cascade of events initiated by reduced zinc levels leading to immunodeficiency, culminating in the development of mumps characterized by fever and bilateral parotid swelling. Subsequent immune compromise exacerbates susceptibility to other infections, facilitating exposure to Epstein-Barr Virus (EBV) and resulting in the manifestation of infectious mononucleosis (mono) and its associated symptoms.



**Figure 3: Variations in Pulse Rate, Respiratory Rate, and Temperature During Hospitalization.**

This graph illustrates the fluctuations in pulse rate (PR), respiratory rate (RR), and temperature over the course of the patient's hospitalization period, providing insight into

the dynamic changes in vital signs associated with the management of concurrent mumps and mononucleosis.

### Tables and table legends

**Table 1: Supportive and Symptomatic Therapy** This table delineates the supportive and symptomatic therapies administered, specifying dosage frequency and indications.

DRUG	DOSE	FREQUENCY	INDICATION
IV PARACETAMOL	25 mL	1-1-1	Indicated for antipyretic and analgesic properties to manage fever and pain associated with parotitis.
IVF ½ DNS + 5 CC KCL			Indicated to maintain euvolemia, correct dehydration, and address electrolyte imbalance, ensuring optimal fluid and electrolyte status.
INJ. ONDEM	25 mL	1-0-1	To alleviate nausea and vomiting
INJ. PAN	25 mg	1-0-0	As a gastric acid suppressant and reduces gastric irritation from antibiotics and other potential gastric irritant drugs.
Syp. ZINCONIA	5 mL	1-0-1	Zinc sulfate is indicated for its immunomodulatory properties, potentially aiding in the modulation of the immune response against infections and promoting recovery.
TAB. CHYMORAL FORTE		½ - ½ - ½	Is indicated for its proteolytic and anti-inflammatory properties. It aids in reducing inflammation and swelling associated with parotid swelling.
IVF RINGER'S LACTATE	70 mL/hr		Ringer's lactate solution may be indicated for fluid resuscitation and electrolyte balance maintenance, especially if there are signs of dehydration or electrolyte disturbances due to vomiting and fever.
INJ. AMOXICLAV	600 mg	1-1-1	As a prophylaxis since the patient is susceptible to secondary bacterial infection.

### DISCUSSION

Mumps outbreaks persist despite vaccination, especially notable in pediatric populations as observed in the 1989-90 outbreaks, suggesting vaccination gaps. The unique aspect of this case lies in the concurrent manifestation of mononucleosis alongside mumps, adding layers of complexity to the diagnostic process. Mumps and mononucleosis, despite their distinct etiological origins, present as notorious mimics, sharing a multitude of clinical features that often confound medical professionals in their diagnosis and subsequent management. This diagnostic conundrum is further exacerbated by the overlapping symptomatology arising from the similar etiological pathways followed by both mumps and mononucleosis, involving lymph node enlargement and systemic manifestations. Despite the structural and familial disparities between the rubulavirus-causing mumps (single-stranded RNA) and the Epstein-Barr virus-causing mononucleosis (double-stranded DNA), their commonality to exploit the lymphatic system for systemic dissemination underscores the challenge in differentiation. The prodromal phase of mumps infection typically manifests with non-specific symptoms, succeeded by parotitis; however, mumps no longer exclusively dominates as the primary cause of parotid swelling, with other viral contenders such as cytomegalovirus and influenza A. Confirmatory diagnosis of mumps necessitates a comprehensive approach integrating local examination findings, RT-PCR, and serum IgM antibody assays. Moreover, the variable presentation of mumps, including instances lacking classical features like orchitis and parotitis, underscores the importance of relying on laboratory

confirmation techniques. In cases of recurrent parotid swelling or settings with low local incidence rates, comprehensive investigations extending to potential differential diagnoses like HIV and malignancy become imperative. Symptomatic mumps infections exhibit heightened severity in adults, with a higher propensity for complications such as meningitis, orchitis, and encephalitis. The observed demographic shift in mumps susceptibility from younger school-aged children to adolescents and young adults post-vaccination is attributed to factors including waning immunity and increased exposure intensity, contributing to the ongoing resurgence of mumps outbreaks despite vaccination efforts.

### CONCLUSION

There are case reports of pneumonia and mumps together among various other combinations but not on mononucleosis and mumps. Mumps is a benign illness that is self-resolving. The recent reports of outbreaks of mumps in vaccinated populations demand new strategies to mitigate the risk of future outbreaks and public mistrust of vaccines. There has to be an ongoing vigilance among the healthcare sector regarding possible breakthrough infections and their early recognition and management.

### Clinical significance

This case highlights the exceptionally rare co-occurrence of mumps and mononucleosis, emphasizing the diagnostic challenges posed by their overlapping symptoms and necessitating comprehensive evaluation

for accurate diagnosis and optimal management strategies.

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