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Case Report

A Rare Case of Meningococcemia with Disseminated Intravascular Coagulation in an 11-Year-Old Boy

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ABSTRACT

Invasive Meningococcal Disease; a rare life-threatening bacterial infection caused by Neisseria meningitidis, can manifest itself as meningitis or meningococcemia or a combination of both. This case report details a case of fulminant meningococcemia with DIC in an 11 year old unvaccinated boy, presenting with high grade fever, palpable purpuric rash with inter spread petechiae and ecchymosis primarily over the extremities and signs of circulatory collapse that recovered after getting timely antibiotic therapy, aggressive fluid resuscitation, intensive care monitoring and multidisciplinary management, highlighting the critical role of rapid diagnosis and timely management of meningococcal disease by recognizing the characteristic rash in a febrile, ill looking child in shock. This case report also shows the importance of meningococcal vaccination and post exposure prophylaxis of close contacts.

Keywords: Invasive meningococcal disease; Neisseria meningitidis; Fulminant meningococcemia; Meningococcal vaccination

Case Presentation

An 11-year-old unvaccinated boy, previously healthy, presented to the emergency department on 12/12/24 5:21 am with one-day history of high-grade fever, multiple episodes of vomiting and loose stools, two episodes of generalized seizures, severe muscular pain especially in legs associated with rapidly progressing rash starting from face, trunk and extending to extremities. On arrival, patient was drowsy but arousable, toxic looking, irritable with the oral temperature of 102.7-degree Fahrenheit. He was tachycardiac (HR 138) with poor peripheral pulses, CRT (>4 seconds) and BP below 50th centiles (B.P 95/55). He was tachypneic and was maintaining oxygen Saturation level at 94% at room air. Physical examination revealed a palpable purpuric rash with inter spread petechiae and ecchymosis, primarily on the trunk and extremities associated with B/L small subconjunctival hemorrhages. Neurological examination revealed GCS of 9/15 with no focal neurological deficits but positive signs of meningismus. Motor examination showed power of 3/5 in all limbs.

Investigations

Investigations	Findings
Total Leucocyte Count (TLC) (/mm^3)	17000/mm^3
Platelets (/mm^3)	64000/mm^3
Urea (mg/dl)	58
Creatinine (mg/dl)	1.12

Serum Potassium (mEq/L)	2.5
Prothrombin Time (PT) (seconds)	17.3
International Normalized Ration (INR)	1.63
Activated Partial Thromboplastin time (APTT)	47.1
D Dimers (ng/ml)	>10,000
Arterial Blood Gases (ABGs)	Metabolic acidosis with elevated lactate
Blood for Culture and Sensitivity (Blood CS)	Neisseria Meningitidis (serogroup B)
Chest X ray (CXR)	B/L clear lung fields
CT Scan head	Unremarkable
2 D Echocardiography	Normal

Diagnosis

The clinical presentation of fever, hypotension, petechial rash, with positive blood cultures and positive associated lab findings confirmed the diagnosis of fulminant meningococcemia with DIC.

Management

Patient was admitted in intensive care unit. Ionotropic support with aggressive resuscitation with crystalloids and vasopressors was initiated with Injection dopamine started (12/12/24 - 16/12/24) and then tapered off gradually. Due to Disseminated Intravascular Coagulation (DIC), Lumber Puncture (LP) was withheld. Coagulopathy was corrected with Fresh Frozen Plasma (FFPs) and platelets. Patient was transfused 8 FFPs and 4 platelets in total. Empiric antibiotics; Inj. Ceftriaxone (Rocephin) and Inj. Vancomycin were commenced, later Inj. Meropenem and Inj. Linezolid (Nezkil) were added due to blood cultures revealing bacterial sensitivity to these antibiotics. Seizure prophylaxis was done with Syrup Levetiracetam (Lerase). Inj. Nalbuphine (Nalbin) was given in the early course of admission due to severe myalgias and arthralgias that patient had.

Strict vital monitoring was done throughout course of admission and patient was observed for development of complications. Patient developed grade 3 bed sores in sacrococcygeal region due to necrotic patch of rash and inactivity despite air mattress provided, surgical consultation was done and wound was regularly cleaned, debrided and dressed **(Figure 1)**.

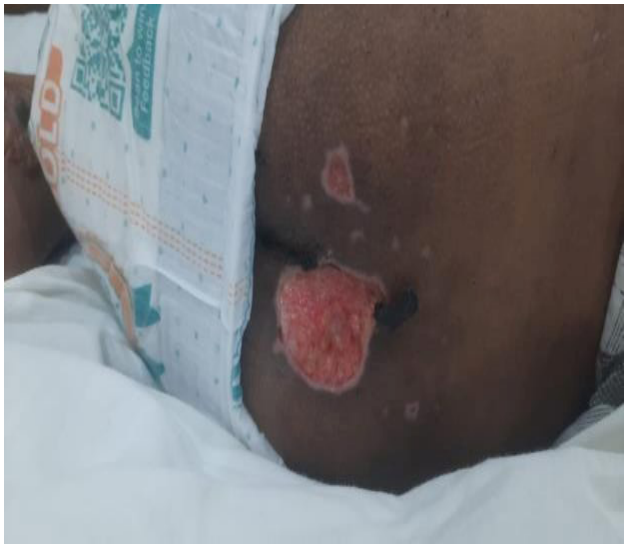

Figure 1: Grade three bed sores in the Sacrococcygeal region of the patient

Discussion

Invasive Meningococcal disease, manifesting itself as meningitis or meningococcemia or a combination of both[1] has an annual incidence in the Europe and United States of 1 case per 100,000 and 0.35 cases per 100,000 respectively with fluctuations in its incidence in some epidemic regions, like Sub-Saharan Africa, where case fatality rates are recorded as high as 70%[2]. Highest incidence rates are observed in infants and young children aged 1 to 4. It is even rarer (≤0.1)[3] for those aged 11-15 as in our case.

Twelve distinct serogroups of N. meningitidis, a human specific gram negative encapsulated diplococcus causing meningococcemia, transmitted via droplet aerosols or secretions from the nasopharynx of colonized contacts have been identified[1], with serogroups W (40.2%), B (31.7%) and C (10.4%)being the most common[4]. In our case serogroup B was isolated from blood cultures. Asymptomatic pharyngeal colonization is the initial step of infection and when the organism gains access to the systemic circulation, it causes meningococcemia with clinical features including fever, hemorrhagic rash (often petechial or purpuric) and signs of circulatory collapse (deranged capillary refill time, hypotension) often progressing rapidly to septic shock in an ill-looking child favoring suspicion of meningococcal disease similar to the case of meningococcemia reported in an 11 month old infant in kathmandu[5]. An observational study done on 233 children up to 15 years of age also showed that most children with meningococcal infection are ill looking, have a purpuric rash, fever and delayed capillary refill time[6]. Our case also presented with similar features along with positive signs of meningismus but confirmation of meningitis couldn't be made as LP was not performed due to DIC.

Diagnosis should be clinically made while awaiting organism identification via Cerebrospinal Fluid (CSF) analysis and blood cultures (meningococcemia) due to rapid progression and high fatality rates of the disease and immediate empirical antibiotic therapy should be commenced along with aggressive fluid resuscitation and vasopressor support for maintaining blood pressures and shock management[3]. Our case was also managed with intensive care monitoring, seizure prophylaxis, symptomatic management, empirical antibiotics, fluids, vasopressors and hemodynamic support like the case reported in kathmandu[5]. Recommended first line antibiotics are Cephalosporins or penicillin G[3] but due to high bacterial resistance rates of these antibiotics in our area, Vancomycin and Ceftriaxone were commenced as first line antibiotics while awaiting blood cultures. Blood cultures are positive in up to 3/4th cases of meningococcemia[5]. In our case also blood cultures came out to be positive. In rare cases, surgical intervention may be needed to manage complications due to tissue ischemia, which may require debridement or even amputation of necrotic tissued[3] as seen in a case report of a 5-month-old girl from Poland where hemorrhagic lesions of the extremities evolved to necrosis leading to hands and feet amputation[6,7]. In our case patient's rash on sacrococcygeal region got necrotic and was debrided.

The patient in our case report was not immunized with meningococcal vaccine similar to the case reported in Kathmadu[5], highlighting the importance of meningococcal vaccination. Post-exposure antibiotic prophylaxis (e.g., rifampin or ciprofloxacin) (PEP) of close contacts of individuals diagnosed with meningococcal disease should be done to reduce the risk of transmission[3] and was done in our case with Ciprofloxacin.

Conclusion

This case underscores the critical role of rapid diagnosis of meningococcal disease by recognizing the characteristic rash and maintaining a high index of suspicion in febrile patients with mentioned systemic symptoms as well as practicing emergent interventions including timely antibiotic therapy, aggressive fluid resuscitation, intensive care monitoring , vaccination programs, post exposure prophylaxis and multidisciplinary management for meningococcal disease to prevent further outbreaks and reduce the mortality associated with this rare but life threatening condition.

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