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Case illustrated

Fulminant meningococcemia

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A 23 year old Caucasian woman was admitted to a local emergency room after awakening with “bruises” and “red spots” scattered over her body associated with fever and rigors and dizziness. Upon arrival, she had no measurable blood pressure and a temperature of 40.2 °C. Petechiae and purpurae were noted primarily over her trunk and extremities. A CBC revealed WBC 2700/mm^3 with a manual differential showing 52% band forms, hemoglobin 10.4 and platelet count 7200/mm^3. A Wright stain of the peripheral blood is shown below. She was given intravenous ceftriaxone immediately after presentation but died 6 h later never having a measurable blood pressure.

Meningococcemia is caused by *Neisseria meningitidis* (*N. meningitidis*), a gram negative diplococcus that frequently colonizes the human nasopharynx and oropharynx. Humans are the only natural reservoir for *N. meningitidis* and transmission from person to person is via respiratory droplets [1,2].

The bacterium has genetic variability in its capsular polysaccharide, outer membrane proteins and lipo-oligosaccharide allowing it to have 13 serogroups with the most prevalent in the United States being serotypes B and C. Adhesins allow for the colonization of the bacterium. The strains that cause disease are virtually always encapsulated by a polysaccharide capsule to protect them from antibodies, complement pathways, and phagocytosis. The lipopolysaccharide acts as an endotoxin that induces the release of chemokines, reactive oxygen species, and nitric oxide.

Meningococcemia is a life threatening medical emergency that requires immediate recognition and treatment with antimicrobials. The first 4–6 h of disease tend to mimic viral upper respiratory infections that can progress quickly to disseminated intravascular coagulation and multi-organ failure. Meningitis may or may not co-exist. Meningococcemia usually presents with a petechial or purpuric rash including mucous membranes and is especially notable on extremities [2]. If adrenal hemorrhage occurs with the rash, the process is called Waterhouse-Friderichsen syndrome. A more indolent variety of infection called chronic meningococcemia rarely occurs [3].

The Wright-stained peripheral blood smear shows kidney shaped diploccoci that stain blue. A Gram stain of the specimen showed the Gram-negative nature of the organism but even with the Wright stain, the morphology suggested the meningococcus rather than the pneumococcus (Fig. 1).

Treatment with penicillin G, third generation cephalosporins (such as ceftriaxone), and chloramphenicol are recommended for treatment by the WHO with the latter used primarily in the developing world. Individuals who have been in prolonged and close proximity with the patient or who have had direct exposure to oral secretions should be treated with chemoprophylaxis as recommended by the CDC. Currently 2 quadrivalent conjugate vaccines are available for the prevention of meningococcal infection and protect against serogroups A, C, Y, and W-135 and are recommended for those living in college dorms, military recruits, asplenics, patients with terminal complement deficiency, and travelers to endemic regions. A newer, non-capsule based vaccine for serogroup B is also now available [4].

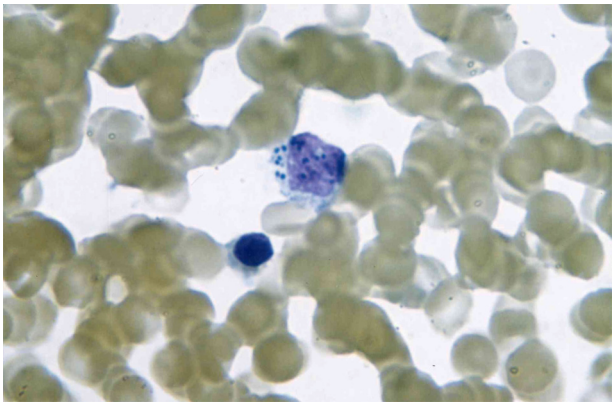

Fig. 1. Wright stain of the Peripheral Blood.

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