



Hemepath Case 38: 2-Year-Old Girl

HISTORY

A 2-year-old girl is brought in by her father. Two weeks ago, the child had a runny nose and an unproductive cough, along with a low-grade fever. They visited the local clinic and were diagnosed with a cold. The father bought some over-the-counter cold medications but these did not seem to improve the girl's symptoms.

Approximately a week ago, the girl began experiencing 15-20 intense bouts of coughing per day, with each episode lasting a few minutes. The father remarks that the child's face turns bright red from coughing so hard.

CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	High

DESCRIPTION OF SLIDE

Peripheral Blood Smear

There are examples of RBC echinocytosis (consistent with dehydration; see circles) as well as increased platelets (see arrows). There is also severe mature lymphocytosis (see rectangles). Lymphocytic morphology is unremarkable. Blast cells are not seen.

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MORPHOLOGICAL DIAGNOSIS

Secondary lymphocytosis, consistent with infection such as pertussis

DISCUSSION

Pertussis (whooping cough) refers to an acute infection of the upper respiratory tract caused by the Gram-negative bacterium *Bordetella pertussis*. The organism attaches to the ciliated epithelium of the nasopharynx, multiplies locally, and produces toxins that damage the mucosa and impair the immune response. The pertussis toxins also inhibit lymphocytic migration from the bloodstream into body tissues, resulting in

lymphocytosis. Classically, the lymphocytes in the peripheral smear are mature and do not appear reactive (in the way they would in a patient infected with EBV, for example).

Patients with pertussis normally undergo three phases. The initial catarrhal stage resembles a typical viral respiratory tract infection, and patients commonly complain of a low-grade fever with cough, sneezing, and a runny nose. This is followed by the paroxysmal stage, in which patients experience severe fits of coughing followed by an inspiratory whoop. In the convalescent stage, the paroxysms gradually reduce in severity and frequency.