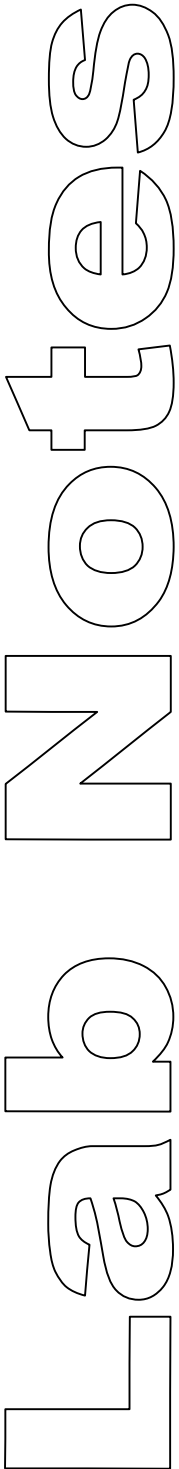


Erythrocyte Sedimentation Rate and C-Reactive Protein Assay



Because the early diagnosis and treatment of infections markedly improves the outcome, the use of nonspecific screening tests for the assessment of the potentially infected patient are often employed. The leukocyte indices remain the most common screening test. Also available as additional/alternate tests in most clinical laboratories are the erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).

The ESR is a simple, inexpensive laboratory test that measures the distance in millimeters that erythrocytes fall during one hour. Needless to say, the ESR is highly dependent on erythrocyte aggregation. It is thought that the rate of erythrocyte aggregation/sedimentation is determined by the plasma concentration of certain proteins such as fibrinogen, acute-phase alpha-globulins, and immunoglobulins. Many of these proteins require days to weeks to become elevated while all have half-lives ranging from days to weeks. This time factor makes the ESR less useful for the assessment of acute infection or for the early assessment of the patient's response to antimicrobial therapy. The scientific explanation of why the ESR is increased with infection has not progressed significantly since the Greeks first observed the relation between the sedimentation of red blood cells and "phlegma" (bad bodily humors). Nonetheless, clinicians have used the ESR to confirm a suspicion of infection and for decision-making for over 50 years. The ESR has been criticized because the concept seems scientifically unsound as well as because the test lacks specificity.

The CRP is a plasma protein molecule consisting of a pentamer of nonglycosylated polypeptide subunits that is produced by hepatocytes. This plasma protein normally is found in the plasma of healthy persons in trace amounts (<1 mg/dl). Within hours of an acute injury as well as the onset of most types of inflammation or infection, the rate of production of CRP increases markedly with up to a 3,000-fold increase in plasma concentration. For this reason, CRP is considered an "acute-phase" protein. As the acute process resolves, the plasma level of CRP rapidly decrease toward the normal range. The CRP response is non-specific, and consequently, results must be interpreted in the light of full clinical information. Under these circumstances, the plasma CRP value is a sensitive screening test, which can be useful for the early diagnosis of an occult infectious process.

In summary, the ability to screen for infection has been evolving over time with a marked improvement in sensitivity although, as to be expected, these screening tests remain less specific. Newer screening test such as CRP have proven quite useful in differentiation bacterial from viral infections. In fact, the value of the CRP in the potentially infected patient today exceeds that of leukocyte indices.

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