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Laboratory Testing in Rheumatologic Disease

Series Editor:

Janet F. Burkholder, MD

Assistant Professor of Medicine, Temple University Hospital, Philadelphia, PA

Authors:

Seth Mark Berney, MD

Associate Professor of Medicine, Division of Rheumatology, Center of Excellence for Arthritis and Rheumatology, Louisiana State University, Health Sciences Center, Shreveport, LA

Steven N. Berney, MD

Professor of Medicine, Chief, Section of Rheumatology, Temple University School of Medicine, Philadelphia, PA

Donald L. Kimpel, MD

Associate Professor of Medicine, Division of Rheumatology, Center of Excellence for Arthritis and Rheumatology, Louisiana State University, Health Sciences Center, Shreveport, LA

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Laboratory Testing in Rheumatologic Disease

INTRODUCTION

Laboratory tests and their correct interpretation are important components in evaluating patients both for and with rheumatologic diseases. However, it is important to remember that laboratory test results must be interpreted in the context of the patient's history and physical examination. Unless the appropriate disease manifestations are present, laboratory abnormalities may only mean that the values have fallen outside 2 standard deviations of the mean. The more tests that are ordered, the more likely some clinically irrelevant laboratory abnormalities may be found. In the appropriate clinical context, laboratory tests help diagnose or support the diagnosis of disease, help predict the patient's prognosis, aid in monitoring disease activity, and warn of toxicity of the treatment. This manual addresses the role and significance of laboratory testing in rheumatologic disease.

RHEUMATOID ARTHRITIS

CASE PRESENTATION

A 35-year-old white woman with a 3-year history of bilateral metacarpophalangeal (MCP), proximal interphalangeal (PIP), wrist, knee, ankle, and metatarsophalangeal (MTP) swelling presents to a rheumatologist. The patient reports that she experiences joint stiffness lasting 6 hours after arising from bed ("morning stiffness"), difficulty performing her activities of daily living, and significant fatigue.

On physical examination, she has significant bilateral synovitis of the MCP, PIP, wrist, knee, ankle, and MTP joints and a pea-size nodule on the extensor surface of her right forearm.

- What laboratory tests should be requested at the initial visit?

DISCUSSION

This patient has a chronic symmetric polyarthritis with constitutional symptoms. The differential diagnosis includes rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), chronic hepatitis, sarcoidosis, and psoriatic arthritis.

Laboratory testing should consist of specific tests that will help determine a diagnosis, assess the degree of systemic disease activity (the extent of the inflammation), and determine which organs may be involved. In addition, testing should provide information regarding the patient's general medical condition, thus allowing the physician to begin a reasonable treatment regimen.

Complete Blood Count

In autoimmune and chronic inflammatory diseases, the hemoglobin or hematocrit, platelet count, and leukocyte count are important initial laboratory measurements because they can reflect systemic inflammation or disease activity and its chronicity. They are also important tests with which to follow the response to treatment and side effects of the medications.

Patients with chronic inflammatory diseases can become anemic for several reasons. The most common is the anemia of chronic disease (AOCDD). Although its etiology is multifactorial, AOCDD is most likely due to the effects of circulating inflammatory cytokines such as interleukin (IL)-1, IL-6, and tumor necrosis factor α (TNF- α) on bone marrow. In this anemia, the hematocrit is approximately 28% to 35%, hemoglobin is between 9 and 11 g/dL, the red blood cells are borderline normocytic with a mean corpuscular volume (MCV) of approximately 76 to 83 μm^3 , and the reticulocyte count is inappropriately low. Iron supply studies will reveal a low serum iron level, a low to normal total iron-binding capacity (TIBC), and a normal or elevated ferritin level. Furthermore, the patient will have normal bone marrow iron stores. The chronic systemic inflammation possibly impairs the ability of erythropoietic precursors to transport and utilize iron from the marrow iron stores, resulting in the anemia. As the inflammation abates, the hematocrit should increase toward normal. The most common rheumatologic cause of AOCDD is RA, but this anemia can be seen in any chronic inflammatory process (although infrequently in SLE).

Other types of anemia seen in autoimmune disease are hemolytic anemia (both intravascular and extravascular) and, more rarely, pure red cell aplasia. If the hematocrit is lower than 28% or the MCV is either less than 75 μm^3 or greater than 83 μm^3 in patients with anemia, other causes must be considered; these include gastrointestinal blood loss (causing microcytosis), folate/ B_{12} deficiency, or reticulocytosis (which can