ANTI-NEUTROPHIL CYTOPLASMIC ANTIBODIES (ANCA)

Clinical Uses of C-ANCA and P-ANCA in Disease Diagnosis

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Tests for ANCA are useful in diagnosing various autoimmune diseases including glomerular diseases, rapidly progressive glomerulonephritis, vasculitis, and IBD.

What are ANCA?

Anti-neutrophil cytoplasmic antibodies (ANCA) are a family of autoantibodies that react with myeloid-specific proteins found in neutrophilic white blood cells. ANCA were first reported in 1982 in patients with the autoimmune kidney disorder glomerulonephritis. Early studies concluded that there were three specific types of ANCA: perinuclear or P-ANCA; cytoplasmic or C-ANCA; and X-ANCA, which showed an atypical staining pattern in test results and were reported in many diverse disorders including HIV infection.

Since 1989, it is generally recognized that there are only 2 subtypes of ANCA depending on the staining pattern seen in test results: P-ANCA and C-ANCA, although some types of P-ANCA are described as having an atypical staining pattern.

Diseases Associated with ANCA

ANCA are primarily associated and useful in diagnosing necrotizing granulomatosis and pauci-immune necrotizing vasculitis involving many tissues, including Wegener granulomatosis, microscopic necrotizing polyarteritis, systemic vasculitis, Churg-Strauss syndrome, drug-induced vasculitis, autoimmune hepatitis, and inflammatory bowel disease.

P-ANCA

Perinuclear or P-ANCA are seen in Churg-Strauss syndrome, Kawasaki syndrome, Giant-cell arteritis, glomerular membrane basement disease, rapidly progressive glomerulonephritis, polyarteritis nodosa, inflammatory bowel disease including Crohn’s disease, primary sclerosing cholangitis, rheumatoid arthritis, and drug-induced vasculitis. About 17 percent of patients with rheumatoid arthritis, especially juvenile arthritis, show the presence of P-ANCA.

Atypical P-ANCA

The P-ANCA seen in primary sclerosing cholangitis and autoimmune hepatitis have an atypical or incomplete staining pattern. In some laboratories, where atypical P-ANCA are reported, this information is useful in differentiating the autoantibody origin.
C-ANCA

Cytoplasmic or C-ANCA are seen in microscopic polyarteritis, Wegener granulomatosis, Henoch-Schonlein purpura, Churg-Strauss syndrome, Kawasaki syndrome, polyarteritis nodosa, and glomerular basement membrane disease. C-ANCA are seen in up to 85 percent of patients with Wegener granulomatosis and vasculitis, and levels or titers of C-ANCA tend to parallel disease activity.

PR-3 and MPO Reactivity

Some types of ANCA show reactivity with the proteins PR-3 and myeloperoxidase (MPO) and tests that demonstrate this reactivity should be used on all patients that test positive for C-ANCA or P-ANCA to help with disease diagnosis.

Glomerular Diseases

Glomerular diseases (glomerulonephritis) are kidney disorders that affect the blood supply of the renal tubules. This results in the loss of complete nephrons, which leads to increased levels of blood urea and the uremic syndrome. The most common type of glomerulonephritis is IgA nephropathy in which deposits of immunoglobulin A interfere with kidney function.

Rapidly Progressive Glomerulonephritis

Rapidly Progressive Glomerulonephritis (RPGN) is a heterogeneous group of disorders characterized by a rapidly progressive disease course that can lead to kidney failure in only a few weeks or few months. These syndromes are characterized by focal necrotizing glomerulonephritis and crescent formation within the kidney’s Bowman capsules. An abundance of epithelial cells and white blood cell macrophages compress the glomeruli of the kidneys and obstruct the proximal convoluted tubules, which compromises kidney function.

RPGN may be either autoimmune in nature or it may occur as a secondary condition related to infectious disease or as a disease secondary to other conditions, or as an adverse reaction to medications. Anti-glomerular basement membrane (GBM) antibodies may be present and up to 80 percent of patients show the presence of ANCA with or without an accompanying vasculitis.

Resources:

David Keren, Autoimmune Reactivity in Inflammatory Bowel Disease, Clinics in Laboratory Medicine, Progress and Controversies in Autoimmune Diseases Testing, 1997.

James Peter and Herminio Reyes, Use and Interpretation of Tests in Rheumatology, Los Angeles, Specialty Laboratories, 1996.