### Frequency of C-ANCA, P-ANCA, MPO & PR3 Abs in Vasculitis

<table>
<thead>
<tr>
<th>Disease Category</th>
<th>C-ANCA</th>
<th>P-ANCA</th>
<th>Anti-MPO</th>
<th>Anti-PR3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granulomatosis with polyangiitis (Wegener’s) (GPA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Active – generalized</td>
<td>4+</td>
<td>1+</td>
<td>1+</td>
<td>4+</td>
</tr>
<tr>
<td>• Active – limited</td>
<td>3+</td>
<td>&lt;1%</td>
<td>&lt;1+</td>
<td>3+</td>
</tr>
<tr>
<td>Idiopathic Necrotizing and Crescentic Glomerulonephritis without Immune deposits</td>
<td>1-2+</td>
<td>3-4+</td>
<td>3-4+</td>
<td>1-2+</td>
</tr>
<tr>
<td>Microscopic Polyangiitis (MPA)</td>
<td>1-2+</td>
<td>3+</td>
<td>3+</td>
<td>1-2+</td>
</tr>
<tr>
<td>Churg-Strauss Syndrome</td>
<td>2+</td>
<td>2+</td>
<td>2+</td>
<td>2+</td>
</tr>
<tr>
<td>Classic Polyarteritis Nodosa</td>
<td>Rare</td>
<td>Rare</td>
<td>Rare</td>
<td>Rare</td>
</tr>
<tr>
<td>Polyangiitis Overlap Syndrome</td>
<td>1+</td>
<td>1+</td>
<td>1+</td>
<td>1+</td>
</tr>
</tbody>
</table>

Grading System: **1+** (15-25%)  **2+** (26-50%)  **3+** (51-75%)  **4+** (76-100%)

Combining ANCA IFA testing with ELISA for Anti-PR3 and Anti-MPO are the preferred assays in evaluating these disorders.

### Guide to Interpretation for ANCA

C-ANCA are present in 90% of patients with active generalized GPA. Sensitivity decreases to 60% with inactive or limited GPA. A negative C-ANCA, therefore, does not exclude a diagnosis of GPA.

C-ANCA in GPA are primarily due to anti-Proteinase 3 antibodies (anti-PR3). The presence of both C-ANCA and anti-PR3 yields a sensitivity of 73% and a specificity of 99% for GPA.

90% of anti-PR3 positive sera are also C-ANCA positive.

Serial ANCA titers can be useful in monitoring disease activity in a modest proportion of patients, but therapeutic decisions based solely on changes in ANCA titers are not generally recommended in the majority of patients.

C-ANCA are seen in only a minority of patients with Microscopic Polyangiitis and Idiopathic Necrotizing and Crescentic Glomerulonephritis (without immune deposits).

Although the majority of GPA patients have C-ANCA and most patients with ANCA-associated Glomerulonephritis without systemic manifestations have P-ANCA, there is some overlap.

P-ANCA are a useful marker for MPA, Vasculitis-Associated Pauciimmune Crescentic Glomerulonephritis and Idiopathic Pauciimmune Crescentic Glomerulonephritis.

In patients with ANCA-associated Glomerulonephritis and Systemic Necrotizing Vasculitis about 90% of P-ANCA are secondary to anti-MPO abs.

The presence of both P-ANCA and MPO yields a sensitivity of 67% and a specificity of 99% for MPA.

Positive predictive value of ANCA positivity in Rapid Progressive Glomerulonephritis approaches 98%.

(continued on back)
P-ANCA are occasionally present in a minority of patients with GPA.

P-ANCA are present in 10% of Systemic Lupus Erythematosus patients.

False positive P-ANCA can be caused by ANA’s; hence, concurrent ANA testing is performed on P-ANCA positive sera.

Atypical P-ANCA are commonly seen in Ulcerative Colitis, Sclerosing Cholangitis and Type I Autoimmune Hepatitis, but are unrelated to anti-MPO antibodies.

About 30% of patients with antiglomerular basement membrane disease have ANCA positivity (mainly anti-MPO). A small percentage of GPA and MPA patients will have antiglomerular basement membrane antibodies.

P-ANCA can be seen in many CTD, including SLE, RA, DM/PM, MCTD, Sjogren’s Syndrome, Reactive Arthritis, Ankylosing spondylitis and others, directed against a variety of intracellular neutrophil cytoplasmic antigens.

Additional ANCA antigens recognized in other autoimmune diseases include catalase, alpha-enolase, actin, defensin, elastase, HMG1/2, cathepsin G, lactoferrin and lysozyme; all of these antigen cause a P-ANCA pattern. Atypical C-ANCA can be produced by bactericidal/permeability-increasing protein (BPI) (commonly seen in Cystic Fibrosis). Most of these antigens lack clinical utility, although they are being investigated in disease states such as SLE.

**Drug Induced ANCA Associated Vasculitis**

Several drugs have been implicated in ANCA-associated Vasculitis including PTU, Methimazole, Minocycline, Hydralazine, Carbimazole, Allopurinol, Cocaine, Phenytoin, Levamisole and are directed against various cytoplasmic neutrophil antigens.

**Infections Associated with ANCA**

- SBE (Subacute endocarditis)
- Invasive Amoebiasis
- Cystic Fibrosis (Pseudomonas)
- HIV/AIDS
- Some Respiratory Infections
- Chromomycosis
- Acute Malaria
- Hepatitis C
- Tuberculosis
- Parvovirus B19
- Aspergillosis
- Histoplasmosis
- Leprosy

**References**


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