CASE REPORT

Double-positive with positive anti-glomerular basement membrane antibody and ANCA-positive disease in a patient with dermatomyositis

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SUMMARY

Approximately one in four patients (23.3%) with inflammatory myositis including dermatomyositis can require evaluation for acute kidney injury. The main cause of kidney injury is acute tubular necrosis from medications or myoglobinuria, though clinicians should be aware of a wide variety of possible aetiologies. We present the case of a 44-year-old woman with stable anti-Jo1 dermatomyositis, who presented with acute kidney injury. During her hospital course, she was diagnosed with double-positive disease characterised by circulating anti-glomerular basement membrane antibody and myeloperoxidase antineutrophil cytoplasmic antibody and renal biopsy revealing crescentic glomerulonephritis with linear staining of capillary wall for IgG.

with eating and lost 11 lb. She denied symptoms of fevers, chills, arthritis/arthralgia, shortness of breath or haemoptysis. She was admitted to a local hospital and empirically treated with norfloxacin for urinary tract infection and Solumedrol 1 g intravenously for a presumed autoimmune systemic illness. She was then transferred to Johns Hopkins Hospital for evaluation of acute renal failure with oliguria and a creatinine (Cr) of 12 on admission (normal 0.6–1.3 mg/dL with prior Cr 0.8, recently 1.2 one month prior). The patient denied history of smoking or drug usage. She had previously used low-dose non-steroidal anti-inflammatory for headaches approximately 8 months prior to admission. On physical examination, she had no synovitis and skin rash. Her strength was 5/5 in all muscle groups with no evidence of muscle atrophy.

BACKGROUND

We present the first case of a patient with dermatomyositis presenting with double-positive anti-glomerular basement membrane (GBM) antibody and antineutrophil cytoplasmic antibody (ANCA) disease. Treating physicians should be aware of this constellation of diseases and maintain a wide differential in treating patients with inflammatory myositis who present with acute kidney injury.¹

CASE PRESENTATION

A 44-year-old woman with a history of dermatomyositis was admitted for acute kidney injury. She has a diagnosis of dermatomyositis characterised by proximal weakness, elevated creatine kinase (CK; 2150 U/L, normal 24–170 U/L), irritable myopathy on electromyography, positive biopsy (perifascicular atrophy and degeneration with perivascular inflammation), positive Jo-1, and antinuclear antibodies (ANA; 1:640 speckled), early interstitial lung disease and Gottron papules. She was previously treated with methotrexate, but was doing well off medications for 6 years prior to presentation.

Four months prior to presentation, she was noted to have microscopic haematuria but did not undergo further evaluation. Two months later, she experienced dysuria and received antibiotics for urinary tract infection. She was otherwise in her usual state of health until 2 weeks prior to admission, when she developed symptoms of nausea, vomiting and lightheadedness. She had difficulty

INVESTIGATIONS

Labs were notable for admission: Cr 15.2 (peak 17.1), blood urea nitrogen 140 (peak 154, normal 7–18 mg/dL) and CO₂ 20 (normal 21–32 mmol/L). Additionally, erythrocyte sedimentation rate was 121 (normal 4–25 mm/hour), C-reactive protein 10.0 (normal <0.5 mg/dL), C3 166 (normal 75–152 mg/dL), C4 23 (normal 12–42 mg/dL), albumin 2.8 (normal 3.5–5.0 g/dL) and CK 70 (normal 24–170 U/L). Liver transaminases were within normal limits. Initial white cell count was 22.0×10⁹/L (normal 4.5–11.0×10⁹/L), though after receiving Solumedrol. She had positive ANA (>1/640, speckled, normal <40), rheumatoid factor 169 (normal 0–35), positive perinuclear (p)-ANCA (titre: 40, normal <20), positive anti-GBM (7.9, normal <1.0) and positive myeloperoxidase (MPO; 34.9, normal <20). HIV, hepatitis serologies and streptolysin O antibody were negative. Urinalysis showed yellow, hazy urine with a specific gravity of 1.010 (normal 1.003–1.030), pH 5.0 (normal 4.6–8.0) and 1+ protein sediment. Large haemoglobin pigment was seen with 435×10¹²/L red cells (normal 0–27×10¹²/L). Trace leucocyte esterase and negative nitrites were present in the urine with 7 white cells (normal 0–27/μL). CT revealed a 5 mm lung nodule. She underwent a renal biopsy that showed crescentic and necrotising glomerulonephritis, with linear staining in glomerular capillary walls for IgG, consistent with the diagnosis

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of anti-GBM glomerulonephritis. Moderate tubular injury and interstitial inflammation were present on biopsy.

OUTCOME AND FOLLOW-UP

The patient received daily plasmapheresis until anti-GBM antibodies were undetectable. She has not regained kidney function and received outpatient dialysis.

DISCUSSION

We present the case of a patient with a history of anti-Jo1 dermatomyositis doing well off medications who presented with acute renal failure secondary to double-positive anti-GBM antibody and p-ANCA disease.¹

Anti-GBM antibody disease, or Goodpasture's disease, is a small vessel vasculitis caused by autoantibodies against the alpha-3 chain of type IV collagen.² ANCA-associated vasculitis (AAV) also presents as a small vessel vasculitis including granulomatosis with polyangiitis, microscopic polyangiitis and eosinophilic granulomatosis. Both may present with crescentic glomerulonephritis, though AAV has a much greater rate of renal recovery with appropriate treatment.³ Approximately 20%–50% of patients with anti-GBM antibodies will have coexisting ANCA positivity,^{4 5} a condition known as 'double-positive' disease. Prognosis in these patients is not well known given low prevalence but renal outcomes appear to be similar to anti-GBM disease.^{6 7} In addition, these patients may share extrarenal manifestations similar to AAV, such as constitutional symptoms and involvement of the sinus, eyes, ears, lung, nerve and joints.³ In contrast to anti-GBM disease which is a monophasic illness, patients with double-positive disease can have a relapsing disease course. Our case presentation was notable for a lung nodule on CT, which may be an extrarenal manifestation.

Our presented patient was initiated on dialysis and daily plasmapheresis. She received 3 days of Solumedrol 1000 mg, then started prednisone 60 mg and cyclophosphamide 1.0 mg/kg daily.

She continued with plasmapheresis until anti-GBM antibodies were undetectable and established for outpatient dialysis. Patients with anti-GBM presenting with dialysis requirement are rarely able to recover renal function,⁸ and double-positive disease is believed to have a similar prognosis.⁷

This is the first report of a patient with dermatomyositis presenting with double-positive anti-GBM antibody and ANCA disease. Machado *et al*⁹ reported the only published case on anti-GBM antibody disease in a patient with dermatomyositis and psoriasis. Kawai *et al*¹⁰ reported a case on MPO-ANCA-related crescentic glomerulonephritis in amyopathic dermatomyositis, though anti-GBM antibodies were not present. Bauer and Brahn¹¹ also reported dermatomyositis coexisting with p-ANCA positivity on initial rheumatologic work-up. The patient had no manifestations of p-ANCA vasculitis until she developed renal failure months later, at which point renal biopsy was consistent with microscopic polyangiitis.

Learning points

- We report the first case of a patient with dermatomyositis presenting with double-positive disease characterised by presence of anti-glomerular basement membrane (GBM) antibody and myeloperoxidase antineutrophil cytoplasmic antibody (ANCA).
- Double-positive disease for anti-GBM and ANCA has renal outcomes similar to anti-GBM, though may have extrarenal manifestations and a relapsing disease course traditionally seen in ANCA-associated vasculitis.
- Plasmapheresis in combination with glucocorticoids and cyclophosphamide is the first-line treatment for anti-GBM antibody or double-positive disease and should be continued until anti-GBM antibodies are undetectable in serum. Maintenance immunosuppression may be needed given relapsing nature of double-positive disease.

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