Case report

Chronic mild eosinophilia and severe cardiomyopathy

S.W. DUBREY1, G. ROSSER1, M.T. DAHDAL1, K. PATEL2, J. WONG3 and R. GROCOTT-MASON1

From the 1Department of Cardiology, 2Department of Haematology, Hillingdon Hospital, Pield Heath Road, Uxbridge, Middlesex, UB8 3NN and 3Department of Radiology, Harefield Hospital, Hill End Road, Harefield, Middlesex, UB9 6JH, UK

Address correspondence to Dr S.W. Dubrey, Department of Cardiology, Hillingdon Hospital, Pield Heath Road, Uxbridge, Middlesex, UB8 3NN, UK. email: simon.dubrey@thh.nhs.uk

Case report

A 62-year-old male presented with a 10-day history of dyspnoea and ankle swelling. Investigations revealed a haemoglobin of 13.0 g/l, white cell count of 5.7 × 10^9/l and platelet count of 279 × 10^9/l. Eosinophils were mildly elevated at 3.9 × 10^9/l (normal range 0–0.5) and C-reactive protein (CRP) increased at 49 mg/l. Renal, liver, thyroid function tests, serum calcium, rheumatoid factor, complement levels (C3 and C4) and immunoglobulins A, G and M were normal. Smooth muscle antibodies were weakly positive. The patient had suffered asthma for the past 30 years and had recent onset seronegative arthritis. Medication comprised beclomethasone and salbutamol inhalers and aminophylline at 200 mg daily. No recent travel had occurred and only temperate climate regions had been visited. Parasitic infection or underlying malignancy was not evident.

The pulse was 110 bpm with a ‘gallop’ rhythm. There was marked pitting oedema to the thighs, an elevated JVP and coarse crackles at both lung bases. Chest radiography showed a small right and larger left effusion with an isolated patch of consolidation at the left apex. Echocardiography revealed a dilated heart with a left ventricular end diastolic dimension of 64 mm and severely impaired bi-ventricular function (left ventricular ejection fraction 20%). Treatment was commenced for acute heart failure.

Cardiac catheterization revealed normal coronaries. Cardiac magnetic resonance imaging (cMRI) confirmed a dilated, poorly functioning left ventricle (LV) with almost global late uptake of gadolinium, in keeping with widespread infiltrative disease (Figure 1). Concentric thrombus was observed within the LV cavity, a potential nidus of future embolic phenomena, for which anticoagulation was commenced. On review of this patient’s eosinophilia, it had been noted since August 2007 with a count fluctuating between 0.7 and 3.9 × 10^9/l. Anti-neutrophil cytoplasmic antibody (ANCA) was positive with perinuclear ANCA weakly positive and myeloperoxidase IgG also positive. Bone marrow biopsy showed a mild increase in eosinophils (7%). Fluorescence in situ hybridization analysis was negative for both BCR-ABL (breakpoint cluster region of ABL gene) and FIL1LI (Fip1-like1-platelet-derived growth factor receptor alpha) fusion gene abnormalities.

The most likely diagnosis in this case eosinophilia was secondary to probable Churg–Strauss syndrome with eosinophil induced endomyocardial fibrosis was made.

Since initial presentation (5 years ago), the eosinophilia has been consistently elevated at around 1 × 10^9/l. No immunosuppressive or steroid therapy has been employed. Repeat echocardiograms and cMRIs show progressive improvement to a complete resolution of the left ventricular function (ejection fraction 65%) with no apical thrombus. The patient remains well on lisinopril (20 mg daily), digoxin (125 mcg daily), frusemide at 40 mg twice weekly and oral anticoagulation with warfarin.

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Discussion

Eosinophilia usually occurs in response to infection (predominantly parasitic or fungal), autoimmune conditions (i.e. Churg–Strauss syndrome), atopic conditions or malignancy. Eosinophilia may be a response to myeloproliferative disease resulting from increased levels of interleukin 5. Less frequently (<1% of cases) eosinophilia presents without obvious cause (idiopathic eosinophilia); a condition predominantly affecting males.1

In hyper-eosinophilic conditions, the eosinophils infiltrate organs, commonly including the heart (33–75% of cases) and bone marrow.2,3 First described by Loeffler, Cardiac involvement is a major cause of mortality.2 Eosinophils infiltrate the myocardium causing inflammation and necrosis,4,5 indicated by late gadolinium enhancement on cMRI. Thrombus frequently forms over fibrosed endocardium, providing a reservoir for embolic phenomena, making anti-coagulation desirable. With time, myocardium is replaced with scar tissue leading to a restrictive cardiomyopathy. Valvular abnormalities may occur as the chordae become less mobile with resultant valve incompetence.

Our case was pathognomonic of eosinophilic endomyocarditis, both on echocardiography and cMRI imaging. An endomyocardial biopsy was not performed initially and is now difficult to justify in the context of clinical recovery. The mild positive perinuclear ANCA, a marker (although not obligatory)6 for Churg–Strauss syndrome, suggests an autoimmune cause. Anti-neutrophil cytoplasmic antibodies and specifically anti-myeloperoxidase antibodies are associated with such autoimmune vasculitic lesions. It seems likely that our patient has the Churg–Strauss variant,7 within the spectrum of hyper-eosinophilic syndromes.8 The negative BCR-ABL and FIL1LI gene results indicate a low likelihood of a myeloproliferative disorder being responsible.

A recent eosinophil count remains elevated at $1.7 \times 10^9$. Any surge of the latter, and or cardiac deterioration, may necessitate suppressive therapy.

Figure 1. Early gadolinium enhancement imaging (A) demonstrates a large apical thrombus (arrows) lining the anterior wall and apex of the left ventricle. Delayed enhancement (B) imaging shows subendocardial fibrosis of the anterior and inferior walls (arrows), underlying the thrombus. Two years later, serial early (C) and delayed enhancement imaging (D) demonstrates almost complete resolution of the left ventricular thrombus (arrows) after anticoagulation, together with persisting subendocardial fibrosis (arrows).
with high-dose steroids or combination therapy with steroids and cyclophosphamide. Recommendations for non-life threatening disease include methotrexate and, for maintenance therapy, low dose steroids and azathioprine, leflunomide or methotrexate.9

**Conclusion**

We report an unusual condition in the UK, of likely eosinophil induced endomyocardial cardiomyopathy. The condition was caused by a low-level eosinophilia and the patient achieved recovery of heart function without immuno-suppressive therapy.

*Conflict of interest:* None declared.

**References**