A 46 year old Nigerian man presented with a four week history of progressive bilateral visual loss. He had been unwell, with weight loss, fever, and night sweats for six months. Dilated fundoscopy revealed macular haemorrhages and diffuse Roth’s spots. The patient was found to be severely anaemic and a bone marrow aspirate revealed a T cell lymphoma with a decreased CD4+ T cell count. The patient consented for testing for HIV which proved positive.

Cases of Roth’s spots in the macula are rare, and usually seen in association with subacute bacterial endocarditis or other systemic diseases, such as myeloproliferative disorders. The patient’s anaemia was severe, with a haemoglobin of 52 g/l, and his white cell and platelet counts were normal. Erythrocyte sedimentation rate and C-reactive protein were grossly raised at 120 mm/hour and 148 mg/l respectively. A presumptive diagnosis of subacute bacterial endocarditis was made, although routine and transoesophageal echocardiography were negative. Blood cultures were negative. The possibility of a myeloproliferative disorder was considered. The patient was started on empirical intravenous antibiotic therapy and underwent immediate transfusion of four units of whole blood. A bone marrow aspirate showed a T cell lymphoma with anaplastic T cells.

His coagulation profile revealed an international normalised ratio of 1.23. Haematinics were normal with the exception of a grossly raised serum ferritin of 3668 µg/l. Screening for opportunistic pathogens was negative.

On review one week later, the Roth’s spots had decreased in number and the macular haemorrhages had begun to resolve (fig 2). A CD4+ T cell count revealed a lymphopenia of 70 cells/mm³. A liver biopsy specimen revealed the presence of Kupfer cells. Retrospectively, these were indicators of the presence of Mycobacterium avium intracellulare complex. The patient consented to testing for HIV and this proved positive.

On review two months later, the macular haemorrhages had completely resolved, with no macular hole formation (see later). Unfortunately the patient was too ill for further fundus photography as he was undergoing treatment for his refractile anaemia and the Mycobacterium avium intracellulare complex. His CD4+ T cell count had fallen to 4 cells/mm³.

**DISCUSSION**

Histologically, Roth’s spots consist of haemorrhage, presumably from a ruptured capillary network, and fibrin thrombus with platelet aggregates. Although initially thought of as a manifestation of subacute bacterial endocarditis, Roth’s spots are a non-specific sign seen in patients with blood dyscrasias and anaemia. They should not be confused with haemorrhages associated with cotton wool spots. The latter are sentinels of retinal ischaemia seen as result of obstruction of axoplasmic flow in the nerve fibre layer. There are many
conditions which can give rise to retinal haemorrhages and cotton wool spots (see box 1) including HIV retinopathy. Roth’s spots resolve with treatment of the underlying infective or coagulative disorder. Visually they are asymptomatic unless the macula is involved. The presenting symptom in this patient was visual loss from macular haemorrhage. The multiple diffuse Roth’s spots were secondary to AIDS related anaemia. Macular lesions are rare. Patients may be asymptomatic in the presence of extensive retinopathy unless the macula is involved. Even extensive macular lesions usually recover with correction of haematological indices and eradication of infection. Few may develop macular holes. The chance of an individual with AIDS developing an ocular complication is high.

Authors’ affiliations
M J Vose, S J Charles, Manchester Royal Eye Hospital, Manchester

Correspondence to: Dr M J Vose, Manchester Royal Eye Hospital, Oxford Road, Manchester M13 9WL, UK; Markjovose@hotmail.com

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Box 1: Conditions in which retinal haemorrhages occur with cotton wool spots
- Diabetic retinopathy.
- Hypertensive retinopathy.
- Retinal vein occlusion.
- Vasculitides.
- Pre-eclampsia (including HELLP syndrome).
- Asphyxia (including prolonged intubation).
- Ocular ischaemic syndrome.

Box 2: Learning points for Roth’s spots
- They are a non-specific sign.
- They usually occur in severe anaemia/blood dyscrasias or subacute bacterial endocarditis.
- Histologically they consist of platelet and fibrin thrombus in the centre of a ruptured capillary network, and represent an active retinal reparative pathology.
- They can be seen in shaken baby syndrome.
- They may be mistaken for cotton wool spots and associated retinal haemorrhage.
- They are visually asymptomatic unless the macula is (rarely) involved.
- Visual prognosis is good with the treatment of the underlying disorder.

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M J Vose and S J Charles

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