

## Haemorrhagic retinal arterial macroaneurysm: a case report

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### ABSTRACT

Retinal Arterial Macroaneurysms (RAMs) are acquired saccular or fusiform dilatations of the large branches of retinal arteries, usually within the first three orders of bifurcation. RAMs are rare conditions and usually affect hypertensive elderly women. In clinical practice, RAMs are frequently misdiagnosed as they masquerade other retinal conditions. We present a case of haemorrhagic RAM which was initially misdiagnosed as vitreous haemorrhages secondary to retinal vein occlusion or posterior vitreous detachment.

**Key words:** Retinal arterial macroaneurysms, RAMs, Retinal vascular diseases, Vitreous haemorrhage

### INTRODUCTION

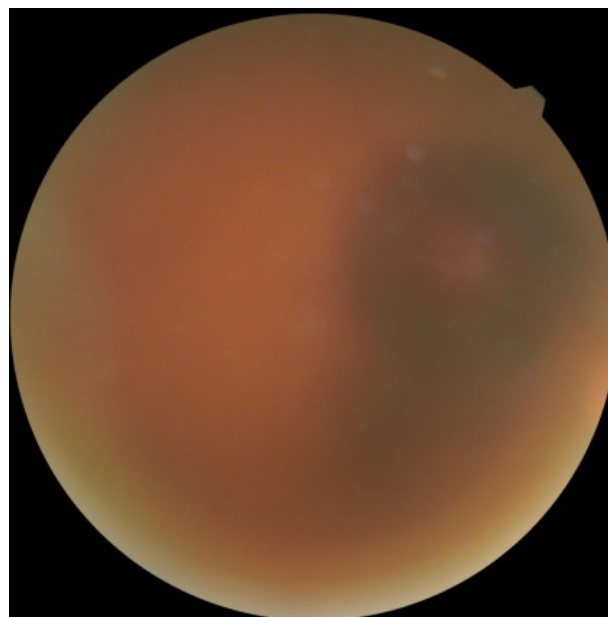
Retinal Arterial Macroaneurysms (RAMs) are acquired saccular or fusiform dilatations of the large branches of retinal arteries, usually within the first three orders of bifurcation<sup>1</sup>. Isolated cases of the condition have been described in literature since the nineteenth century<sup>1</sup>. However, Robertson was the first to describe the lesions as retinal arterial macroaneurysms in 1973<sup>2</sup>.

RAMs are rare conditions. A population-based cross sectional study done in central India found 0.07% prevalence of RAMs<sup>3</sup>. RAMs masquerade other retinal conditions and consequently, they are often misdiagnosed in clinical practice<sup>1,4</sup>. We present a case of haemorrhagic RAM. The case was initially misdiagnosed as vitreous haemorrhages secondary to retinal vein occlusion or posterior vitreous detachment. The case provides clinical information that may aid in diagnosis of RAMs in patients presenting with vitreous haemorrhage. In addition, a review of literature on the current investigation and treatment of patients with RAMs is provided in order to give an update on management of RAMs.

### CASE REPORT

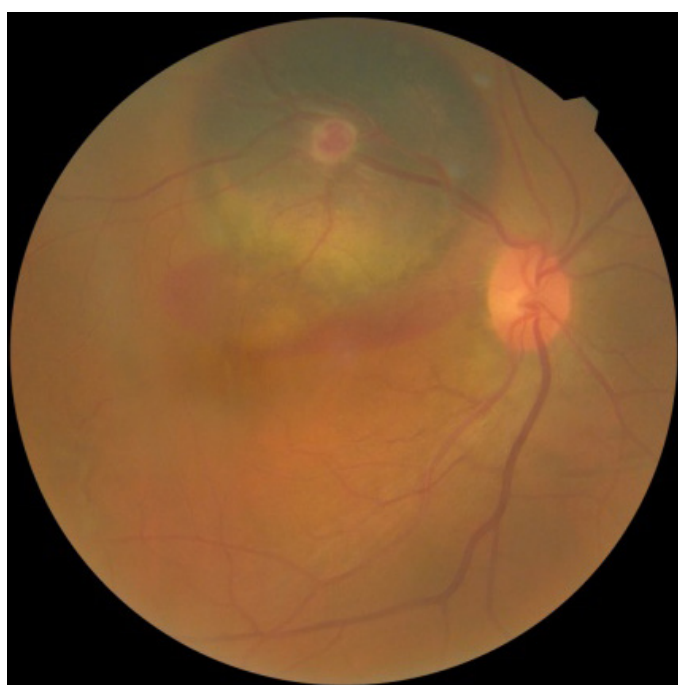
A 58 year old woman presented in April 2017 at Lions Sight First eye unit in Blantyre, Malawi with one week history of sudden loss of vision in her right eye. She had history of systemic hypertension and was on treatment for the hypertension (enapril, hydrochlorothiazide and low dose aspirin). She denied history of trauma, any previous eye surgery or diabetes.

On examination, visual acuity was reduced in the right eye at 2/60 and normal in the left eye at 6/6. Intra-ocular pressures and anterior segments were normal in both eyes. Fundal view in the right eye was hazy with vitreous haemorrhage (Figure 1). Posterior segment examination in the left eye was normal. Ultra-sound B scan assessment of the right eye confirmed vitreous haemorrhage and showed no retinal detachment. The diagnosis was vitreous haemorrhage probably secondary to Posterior Vitreous Detachment (PVD) or retinal venous occlusion. She was on observation and was advised to come for follow up review 3 weeks later.

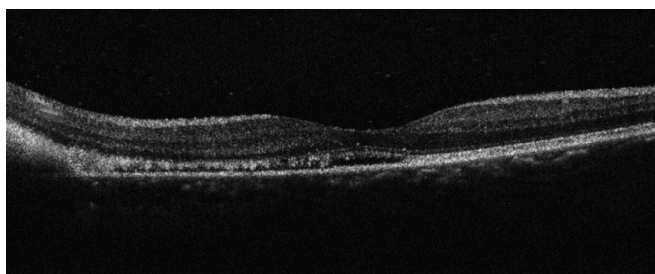


**Figure 1:** Retinal image of the right eye during the first visit. There is reduced visibility of the retinal arterial macroaneurysm due to associated vitreous haemorrhage

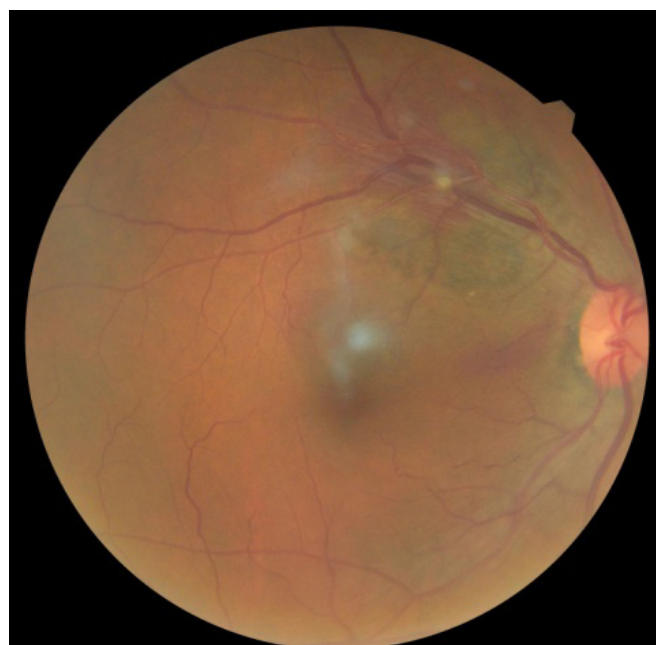
On her second appointment, her vision had greatly improved in her right eye. The visual acuity was 6/15 in the right eye and 6/6 in the left eye. Fundoscopy of the right eye (Figure 2) showed a large subretinal haemorrhage along supero-temporal retinal arteriole at arteriovenous crossing. In addition, there was a relatively small intra-retinal haemorrhage. There were no hard exudates or cotton wool spots. The fundus examination in the left eye was normal. Spectral Domain Optical Coherence Tomography (SD-OCT) showed sub-retinal fluid collection and sub-retinal haemorrhage (Figure 3). The diagnosis Retinal Arterial Macroaneurysm (RAM) in the right eye was made. The patient was still on observation and was told to come 4 weeks later.



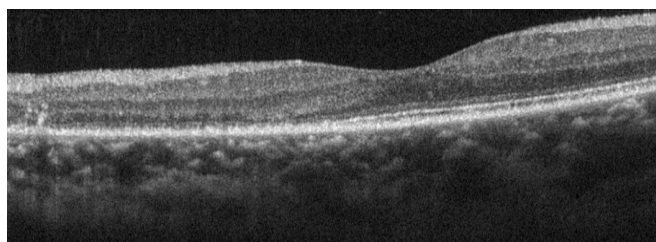
**Figure 2:** Retinal image of right eye during second visit showing haemorrhagic retinal arterial macroaneurysms along supero-temporal arcade with sub-retinal and intra-retinal haemorrhages. The vitreous haemorrhage has cleared completely



**Figure 3:** OCT vertical scan image of the right eye on second visit showing sub-retinal fluid collection and temporal sub-retinal haemorrhage



**Figure 4:** Retinal image on right eye on third visit showing marked resolution of retinal arterial macroaneurysm. There are also artifacts around the fovea



**Figure 5:** OCT vertical scan image of the right eye taken on third visit. The image is almost normal

On her third hospital appointment, her vision had returned to normal. The visual acuity was 6/6 in both eyes. The retinal lesion in the right eye had almost completely resolved (Figures 4 and 5).

## DISCUSSION

Our patient presented with haemorrhagic RAM. RAMs can be classified as haemorrhagic, exudative or quiescent based on the predominant clinical finding<sup>5</sup>. RAM is one of the few retinal conditions where haemorrhage can present at multiple levels; sub-retinal, intra-retinal, pre-retinal and vitreous<sup>1</sup>. This was characteristic of our patient. In exudative RAMs, the RAM is predominantly associated with signs of retinal oedema<sup>5</sup>.

The systemic risk factors associated with RAMs are systemic hypertension, old age and female gender<sup>5,6</sup>. Sclerotic arterial wall changes associated with systemic hypertensive and aging are believed to make the retinal arterioles susceptible to RAMs<sup>1</sup>. It is not known why women are more prone to develop RAMs than men. Interestingly, women are also at higher risk of developing cerebral aneurysms than men. Cerebral arteries and retinal

arterioles share similar anatomical and physiological characteristics<sup>1,4</sup>. Genetic and hormonal factors may probably account for the increased risk of the aneurysms in women<sup>1,4,7</sup>.

RAMs commonly occur as solitary unilateral lesions along temporal vascular arcades. They are frequently located on the arteriovenous crossing or arterial bifurcations<sup>5,8</sup>. The aneurysmal lesion in our patient was solitary and was located at an arteriovenous crossing along the supero-temporal vascular arcade. Some cases of RAMs may be associated with retinal vein occlusions<sup>1,4-6</sup>.

There are variations in clinical presentation of patients with RAMs. Patients with exudative RAMs may present with gradual loss of vision secondary to macular oedema and may be misdiagnosed as diabetic macular oedema, age related macular degeneration, and retinal vein occlusions. Patients with haemorrhagic RAMs may present with sudden onset of generalized visual loss from vitreous haemorrhages. Patients with haemorrhagic RAMs may also present with central visual loss from pre-macular or sub-foveal haemorrhage<sup>1,5</sup>. Haemorrhagic RAMs with secondary vitreous haemorrhage may be misdiagnosed especially in early stages as vitreous haemorrhage secondary to posterior vitreous detachment or retinal vein occlusion<sup>1</sup>. RAMs with large sub-macular haemorrhage may mimic retinal tumours such as melanoma and cavernous hemangioma<sup>1</sup>. Our patient presented with sudden visual loss from vitreous haemorrhage with either retinal vein occlusion or posterior vitreous detachment as possible underlying causes. Some cases of RAMs may be asymptomatic and may be diagnosed as incidental findings during examinations<sup>1,7</sup>.

Fundus fluorescein angiography is the most important test in investigation of RAMs and it is particularly used in cases where the diagnosis of RAM is not clear clinically<sup>1,4,5</sup>. It was not available at our hospital. Spectral domain Optical Coherence Tomography (OCT) is increasingly becoming an important imaging test in the management of patients with RAMs. It can be used to determine and monitor extent of macular oedema and sub-retinal fluid or haemorrhage<sup>7,9</sup>.

Many cases of RAMs resolve spontaneously with good prognosis. Therefore, observation is warranted in most cases<sup>1,6</sup>. Our patient was on observation and the RAM resolved rapidly with a good visual outcome. Interventions in selected cases include laser treatment, Anti-Vascular Endothelial Growth Factor (Anti-VEGF) therapy and pars plana vitrectomy. Laser therapy has been used for treatment of RAMs for many years and is indicated for symptomatic cases with macular oedema<sup>1,4,5,7,8</sup>. The laser is either applied directly at the macroaneurysms or indirectly around the macroaneurysms. There is no clear evidence to demonstrate whether applying laser burns within the macroaneurysm or around the macroaneurysm is superior<sup>1,7</sup>. Anti-VEGF therapy is a new treatment and is an alternative to laser treatment<sup>10-13</sup>. Pars plana vitrectomy is reserved for cases of non-clearing vitreous haemorrhage<sup>1</sup>. Our case was visually symptomatic and had macular oedema. However, we initially observed our case and we did not perform any intervention such as laser

treatment or Anti-VEGF because our patient experienced rapid recovery of vision.

In conclusion, RAMs have varied clinical presentations and may be misdiagnosed as the clinical presentation can mimic other retinal diseases. Careful assessment and low threshold for diagnosis is needed especially when patients present with retinal exudation, vitreous haemorrhages or retinal haemorrhages.

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