Branch retinal vein occlusion and Valsalva manoeuvre in wind instrument players and singers

Christolyn Raj FRANZCO[1,2] Ian Gutteridge[3]

1. Vision Eye Institute Camberwell, Melbourne Australia 2. Faculty of Medicine & Health Sciences, University of Melbourne, Melbourne Australia
3. Optometry and Vision Sciences, University of Melbourne, Melbourne Australia

Purpose

There are many recognised risk factors for retinal vein occlusions including increasing age, altered clotting status and systemic hypertension.

Repeated Valsalva manoeuvres are commonly performed by musicians using high resistance wind instruments. This also true for singers. **It is plausible that musicians who play wind instruments or use their voice as their primary instrument may be at increased risk of branch retinal vein occlusions through repeated Valsalva manoeuvre** (VM).[1,2]

This case series illustrates a correlation between repeated Valsalva manoeuvres and retinal vein occlusion in three patients and explores the clinical and functional underlying mechanisms.

Case 1:

An 85-year-old pseudophakic male, French Horn player presented with a non-ischaemic branch retinal vein occlusion (BRVO) in the left eye. RVA: 6/6 LVA: 6/12 (Snellen)
Cardiovascular co-morbidities: non -smoker, no medications

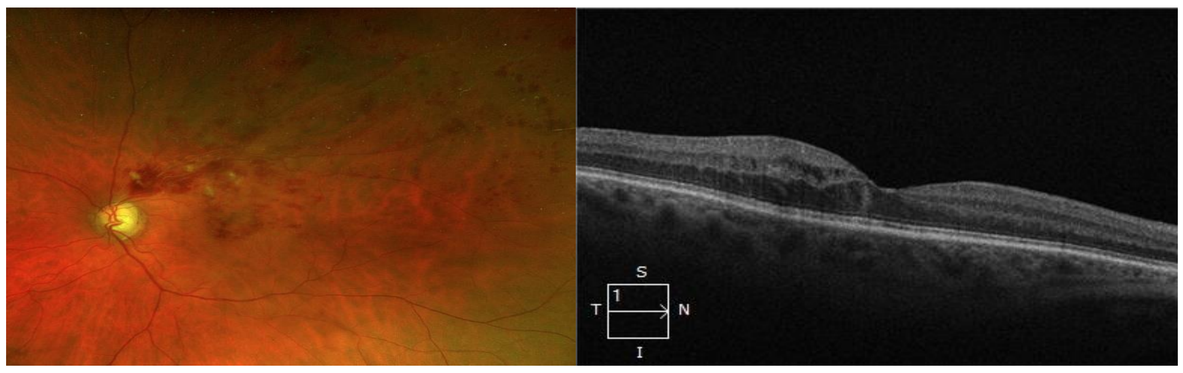


FIGURE 1: Colour fundus image showing a superior temporal BRVO and corresponding Ocular coherence tomography (OCT) showing macula oedema

Case 2:

A 77-year-old pseudophakic male Bass-Baritone singer presented with a non-ischemic BRVO in the left eye. RVA: 6/7 LVA: 6/12
Cardiovascular co-morbidities: non-smoker, hypertension.

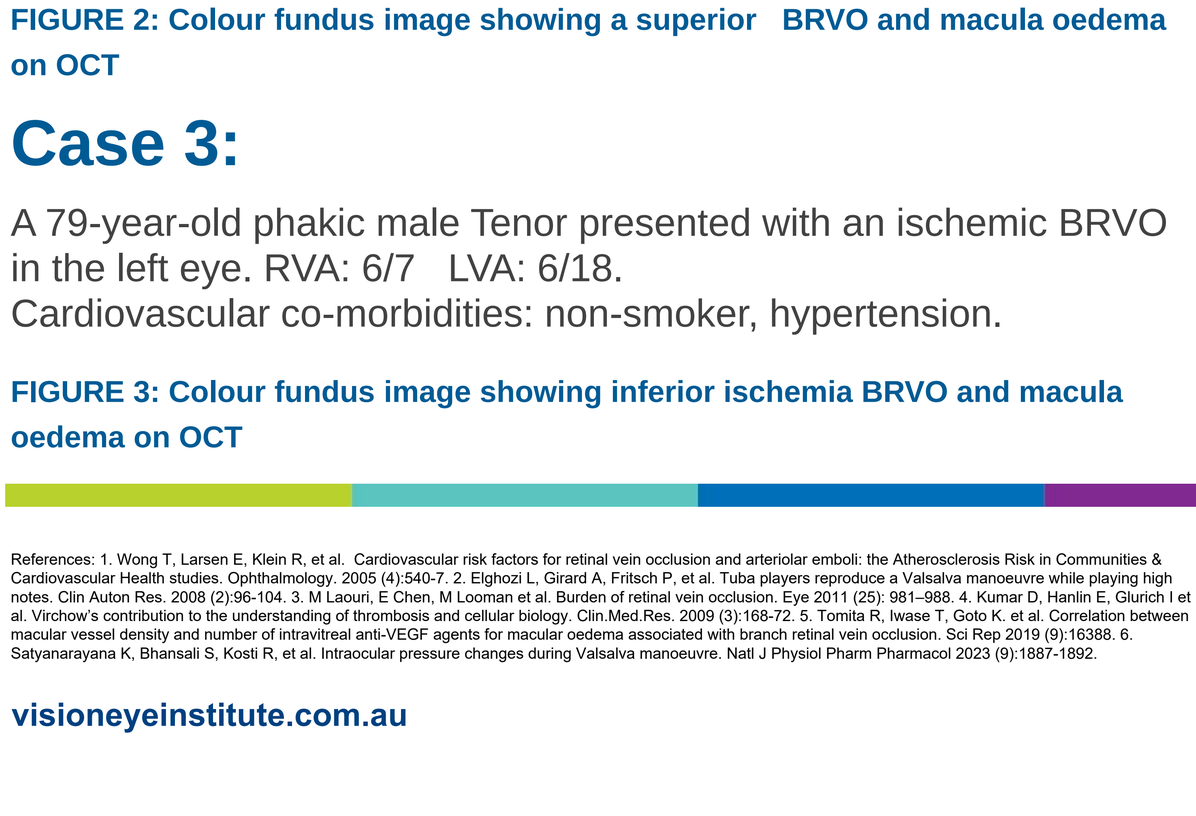
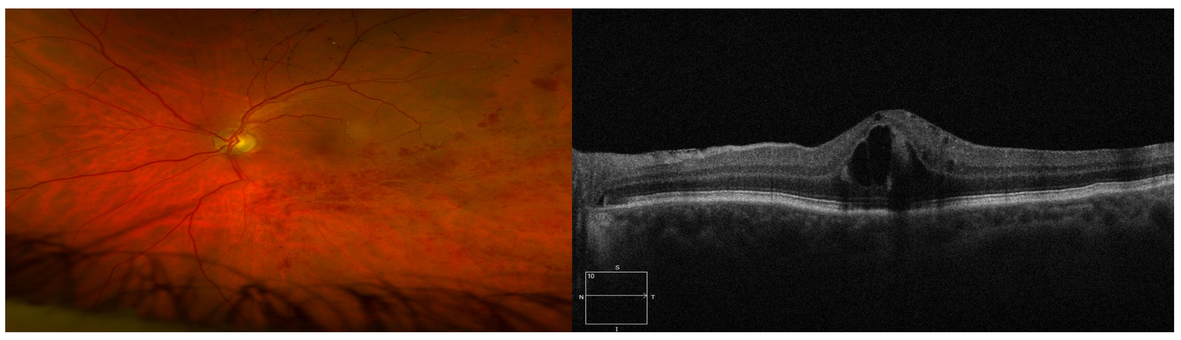


FIGURE 2: Colour fundus image showing a superior BRVO and macula oedema on OCT

Case 3:

A 79-year-old phakic male Tenor presented with an ischemic BRVO in the left eye. RVA: 6/7 LVA: 6/18.
Cardiovascular co-morbidities: non-smoker, hypertension.

FIGURE 3: Colour fundus image showing inferior ischemia BRVO and macula oedema on OCT



Treatment

All cases were initially treated with a monthly course of anti-VEGF intravitreal abjections (Ranibizumab or Aflibercept) and then placed on a treat-and-extend regimen. In Case 1 and 2, vision returned to pre-morbid levels however recurrence was seen at 8 to 12 weeks once musical activity was resumed. In case 3, there was modest improvement of vision which stabilised at 8 weeks.

Discussion

BRVO is the second most common retinal vascular disorder after diabetic retinopathy.[3] Pathogenesis is thought be to a function of ***Virchow's Triad***: venous stasis, endothelial cell injury and hypercoagulability.[4]

The mechanism believed to underlie BRVO in this sub-group is repeated VM contributing to venous stasis. [Figure 4.0] Currently, the mainstay of treatment of BRVO is intravitreal injections with anti-VEGF which target macula oedema. There are often cases in which macular oedema relapses even after intensive or varied drug treatment.[5]

There was a noticeable reduction in vision in our patients either subjectively or clinically after they had resumed their intensive music practice. Perhaps a suitable approach for these patients could involve a period of restraint from singing or wind-instrument playing after a course of anti-VEGF is initiated from 3 to 6 months.

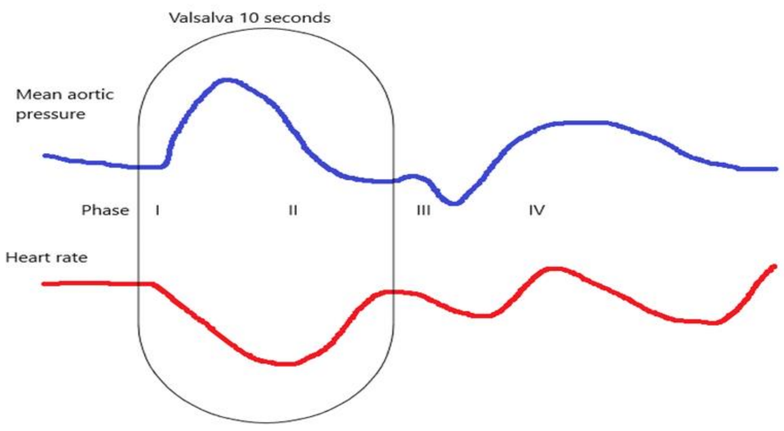


Figure 4 : Graph depicting the VM in four phases with relation to changes to systemic blood pressure and heart rate.

[I Transient rise in BP; **II** Fall in BP >> Tachycardia > increased cardiac output; **III** Transient fall in BP; **IV** Overshoot in BP >> return to normal **]**

Conclusion

Repeated VM as demonstrated in wind instrument musicians and singers may play a role in pathogenesis of branch retinal vein occlusions in susceptible individuals.

This is of valuable insight for clinicians to be aware of in diagnosis and management of patients who practise such activities.

References: 1. Wong T, Larsen E, Klein R, et al. Cardiovascular risk factors for retinal vein occlusion and arteriolar emboli: the Atherosclerosis Risk in Communities & Cardiovascular Health studies. Ophthalmology. 2005 (4):540-7. 2. Elghozi L, Girard A, Fritsch P, et al. Tuba players reproduce a Valsalva manoeuvre while playing high notes. Clin Auton Res. 2008 (2):96-104. 3. M Laouri, E Chen, M Looman et al. Burden of retinal vein occlusion. Eye 2011 (25): 981–988. 4. Kumar D, Hanlin E, Glurich I et al. Virchow's contribution to the understanding of thrombosis and cellular biology. Clin.Med.Res. 2009 (3):168-72. 5. Tomita R, Iwase T, Goto K. et al. Correlation between macular vessel density and number of intravitreal anti-VEGF agents for macular oedema associated with branch retinal vein occlusion. Sci Rep 2019 (9):16388. 6. Satyanarayana K, Bhansali S, Kosti R, et al. Intraocular pressure changes during Valsalva manoeuvre. Natl J Physiol Pharm Pharmacol 2023 (9):1887-1892.

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