A Rare Case of a Full-Thickness Macular Hole after Air Puff Tonometry

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Introduction

- Tractional forces secondary to vitreous shrinkage cause idiopathic full-thickness macular holes.[1]
- Formation of full-thickness holes can be precipitated by other factors that exert force on the vitreofoveal interface, such as blunt trauma.

Case Description

- A 66-year-old male with bilateral pseudophakia presented to his optometrist with a visual acuity of 6/6 in both eyes.
- Following air puff tonometry, he immediately noticed reduced vision in his left eye; with a visual acuity of 6/24.
- A fundal examination of his left eye showed a full-thickness macular hole; with a deposit at the base of the hole and a small cup of fluid.
- Based on optical coherence tomography, a stage 2 full-thickness macular hole with vitreoretinal traction was confirmed.
- After a period of observation of 5 weeks, the patient's vision had deteriorated to 6/60 in the left eye.
- The patient was treated successfully with vitrectomy, internal limiting membrane peel, with cryo retinopexy and gas tamponade. The final visual acuity of the patient was 6/24.
- Interestingly the patient was found to have right eye vitreomacular traction when he was listed for surgery.
- This was not present at the time of his initial presentation and resolved spontaneously.

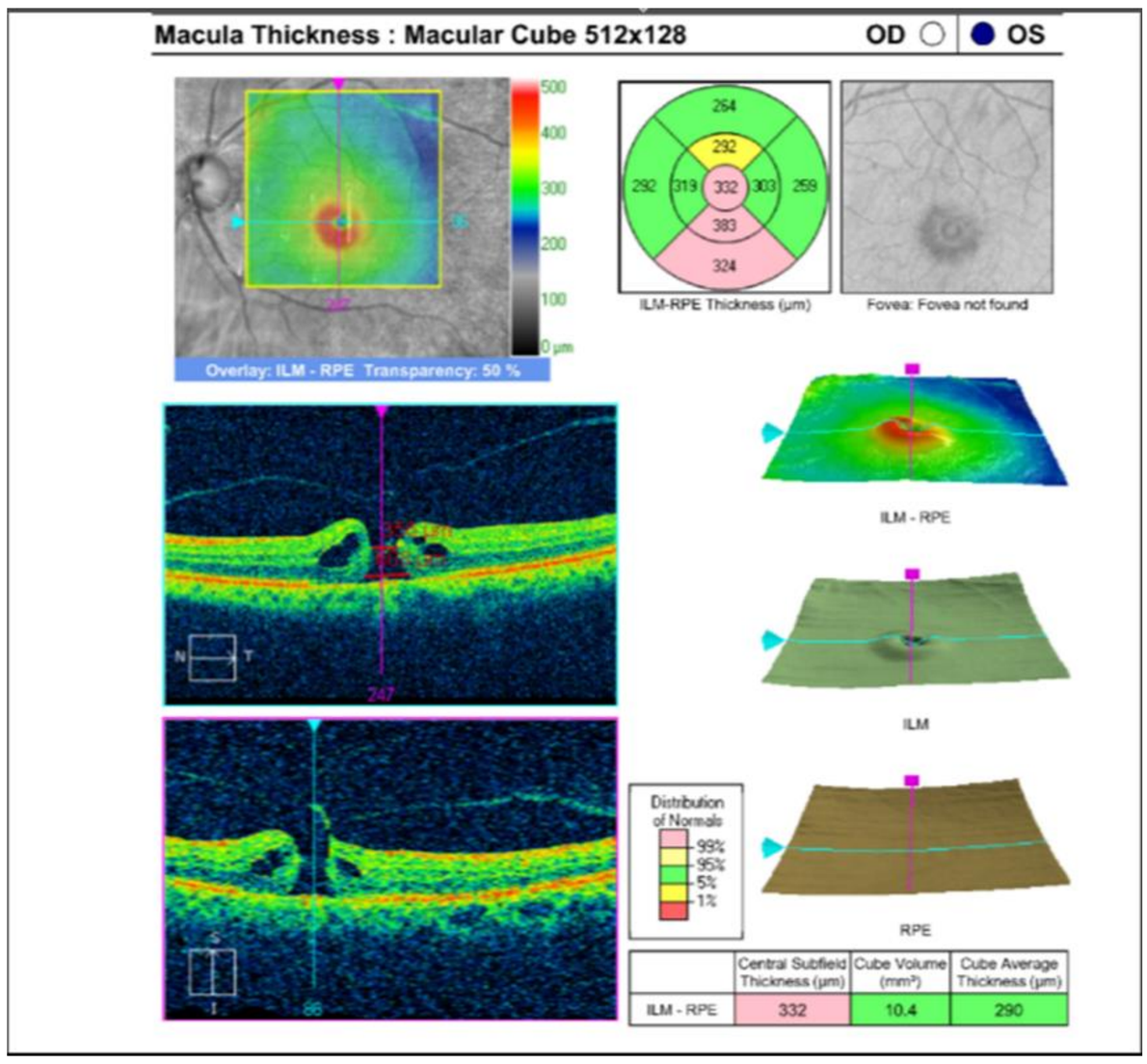

Figure 1: Left eye: Full-thickness macular hole (stage 2) at presentation

Discussion

- Air puff tonometry is a non-contact method that relies on a sudden high-pressure air pulse to flatten the cornea and measures corneal applanation through an electro-optical system.
- The rate of change of force per unit of time applied to the cornea is higher in air puff tonometry than in other forms of tonometry, owing to the short burst of air used.2
- It is well established that tractional forces at the vitreofoveal interface cause full-thickness macular holes.1 A sudden non-linear force applied to the cornea may result in a significant force that is transmitted through the ocular media.
- Given the immediate reduction in vision following the air puff tonometry in the affected eye, we hypothesise that air puff tonometry can induce a force that can cause vitreofoveal traction and lead to a full-thickness macular hole.

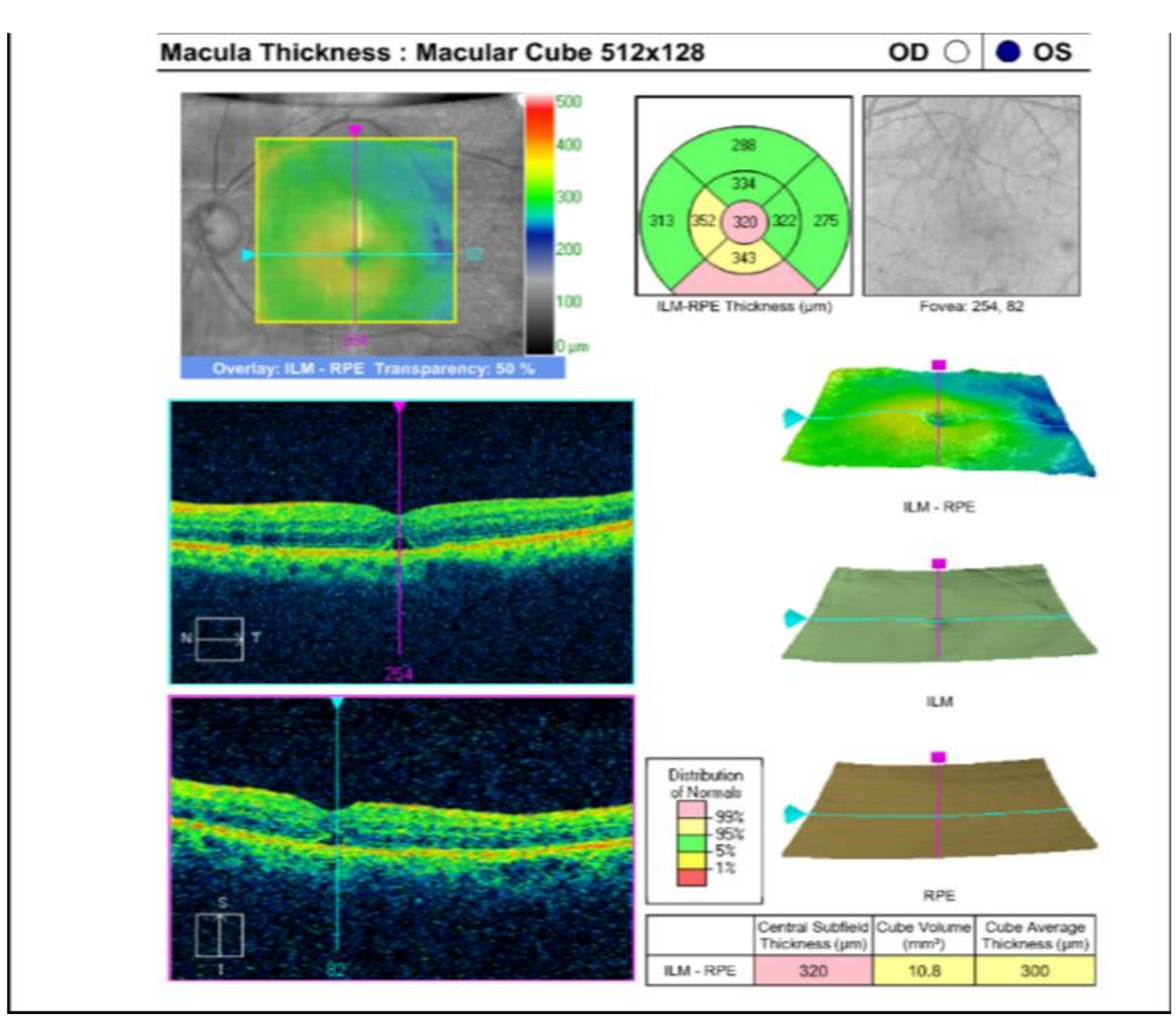

Figure 2: Left eye – closure of full-thickness macular hole 2 months after surgery

Conclusion

- This is the first case demonstrating the possible role of air puff tonometry in precipitating the formation of a full-thickness macular hole.
- It is imperative that machines using this method are regularly calibrated and serviced so that they use the lowest and safest air pressures necessary to determine intraocular pressure

References

1) Gass JD. Idiopathic senile macular hole. Its early stages and pathogenesis. Arch Ophthalmol. 1988;106:629–39

2) Rosentreter A, Neuburger M, Jordan J, Schild A, Dietlein T. [Factors influencing applanation tonometry – a practical approach]. Klin Monbl Augenheilkd. 2011;228(2):109–113. German.

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