

## Human Amniotic Membrane plug to promote Recurrent Macular Hole closure

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### Abstract

**Importance:** Recurrent macular hole (RMH) treatment is a challenge for vitreoretinal surgeons. Despite many surgical options have been proposed, none of these guarantees 100% anatomical success and satisfactory visual recovery.

**Objective:** To investigate functional and structural outcomes of human Amniotic Membrane (hAM) plug implantation for the treatment of RMH.

**Design:** Prospective, consecutive, comparative, interventional study, between August 2017 and September 2019. Patients were examined at baseline and at 2 weeks, 1, 3, 6 months after surgery.

**Setting:** Eye Clinic of Azienda Ospedaliero-Universitaria of Careggi, Florence, Italy.

**Participants:** 36 eyes of 36 patients with RMH were included; 17 eyes had high myopia. We excluded patients with other associated retinal diseases.

**Exposure:** Pars plana vitrectomy (PPV) with hAM plug transplantation; 23 patients received 20% SF<sub>6</sub> and 13 patients received air as endotamponade. Face-down position for 5 days after surgery was requested. Follow ups were performed with a standard ophthalmological examination and SD-OCT; OCTA also in fellow eyes, Microperimetry and Adaptive Optics were performed at 6 months.

**Main outcomes and measures:** RMH closure as primary outcome; visual acuity recovery, structural changes assessment of parafoveal capillary plexuses, macular sensitivity evaluation, photoreceptor distribution.

**Results:** Mean age of the 36 patients included in the study was  $66.28 \pm 12.3$  years. 100% of RMH were closed at 3 months; in one case a reoperation was required. BCVA improved significantly ( $p < 0.05$ ). We found no statistically significant

difference between the data of patients tamponed with gas and those of patients tamponed with air. Morphological changes of parafoveal capillary plexuses and FAZ were evaluated. We found a shift of fixation to the edges of the hAM plug, where we assessed a partial recovery of the macular sensitivity. Adaptive Optics images revealed the presence of hyperreflective dots, correspondent to disrupted, but present photoreceptor mosaic in the area of the hAM plug.

**Conclusion and Relevance:** For the first time, air has been proposed as endotamponade for RMH surgery, with a 100% anatomical success rate, demonstrating the effectiveness of the hAM plug in treating these complex cases. Advanced multimodal diagnostic imaging allowed us to better understand the modifications induced by the hAM plug.

### Biography

Tomaso Caporossi has completed his Degree in Medicine and Surgery at the University of Siena and specialised in Ophthalmology at the Catholic University "Sacro Cuore" in Rome. He completed his PhD in Medical Biotechnology in University of Siena. He is an Ophthalmologist Physician attending Neuromusculoskeletal and sensory organ Department University Hospital Careggi, Firenze\_ Medical and scientific Director Dr Stanislao Rizzo. He has published more than 50 papers in reputed journals and has been serving as an editorial board member of repute.

15<sup>th</sup> International Conference on Ophthalmology and Vision Science, Webinar, August 24-25, 2020.