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# Branch Retinal Artery Occlusion Following Moderna COVID-19 Vaccination

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## INTRODUCTION

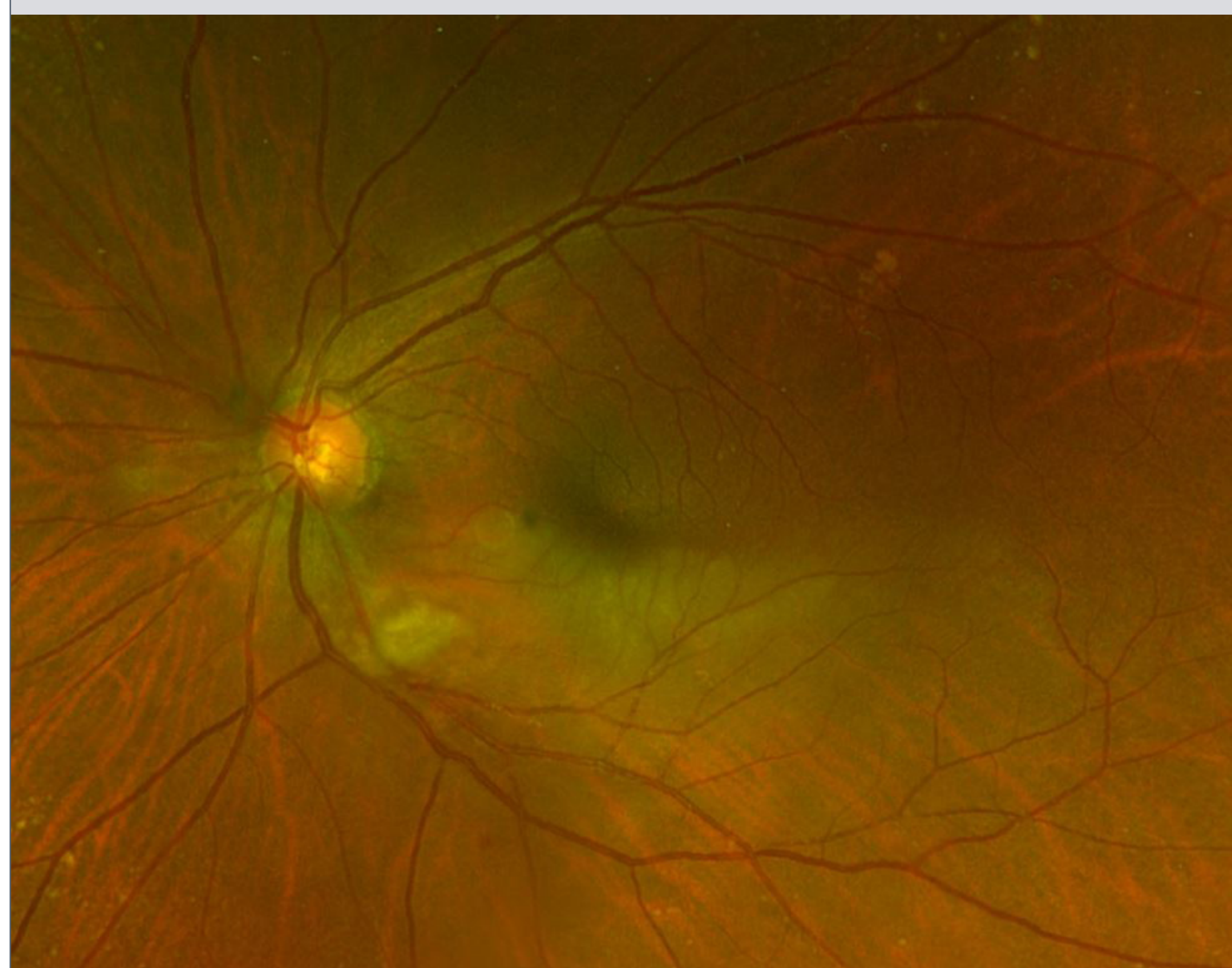
A branch retinal artery occlusion (BRAO) results from obstruction of one of the branches from the central retinal artery<sup>1</sup>. The most common cause of retinal artery occlusion is an embolism. Seventy four percent of retinal emboli are from carotid plaques which are derived from cholesterol (Hollenhorst Plaques). The heart is the second most common source of retinal emboli of which 10.5% are calcific and 15.5% platelet-fibrin<sup>3</sup>. Although extremely rare, BRAOs have previously been reported as a potential adverse effects of mRNA vaccines, specifically Pfizer-BioNTech COVID-19 vaccine. This case report highlights a patient diagnosed with a BRAO, after having received her second Moderna COVID-19 vaccine (also a mRNA vaccine), 12 hours prior.

## CASE HISTORY

A 68-year-old African American female presented with a left, painless, superior visual field loss, 12 hours after the administration of the second Moderna COVID-19 vaccine. She stated over time she regained some vision but reported an area of grayness in vision remaining. The patient's ocular history was remarkable for primary open angle glaucoma mild stage OU which was managed with Alphagan BID and a history of cataract extraction OU. The patient's medical history was remarkable for atrial fibrillation which was controlled with Eliquis. Best corrected acuity was 20/20 OD/OS. Confrontation fields revealed superior field loss OS. All other external testing and slit lamp examination were unremarkable IOP's were 9/11 mmHg OD/OS via Tonopen. Dilated fundus exam OD was unremarkable; OS findings included whitening of the left inferior retina and a yellow refractile deposit, within an artery, radiating inferiorly off the nerve. Subsequent visual field testing was significant for a superior field defect OS while OCT revealed inner retinal thickening OS.

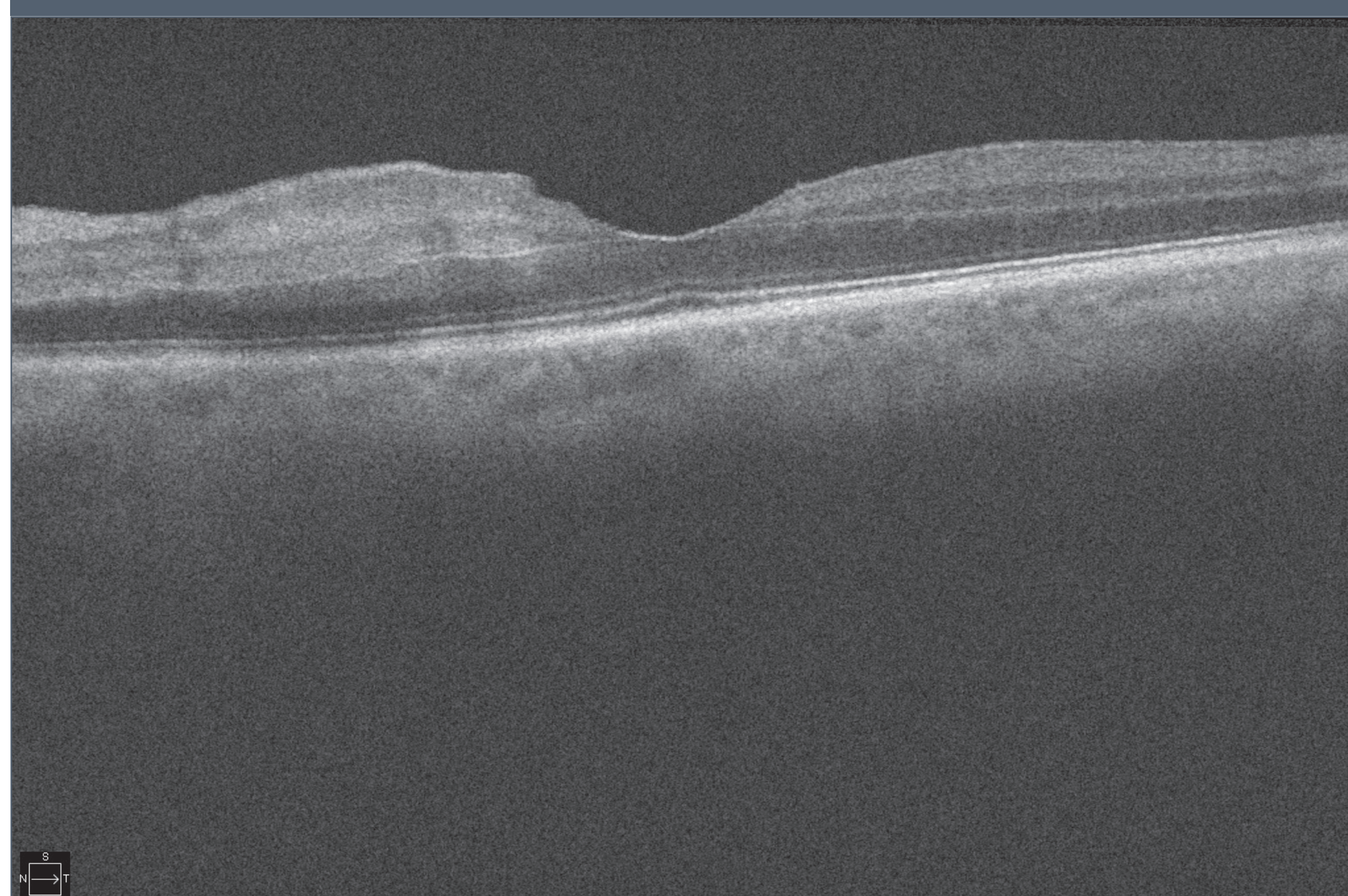
**FIGURE 1**

Optos photo OS showing whitening of the left inferior retina and a yellow refractile deposit, within a retinal artery, radiating inferiorly off the nerve



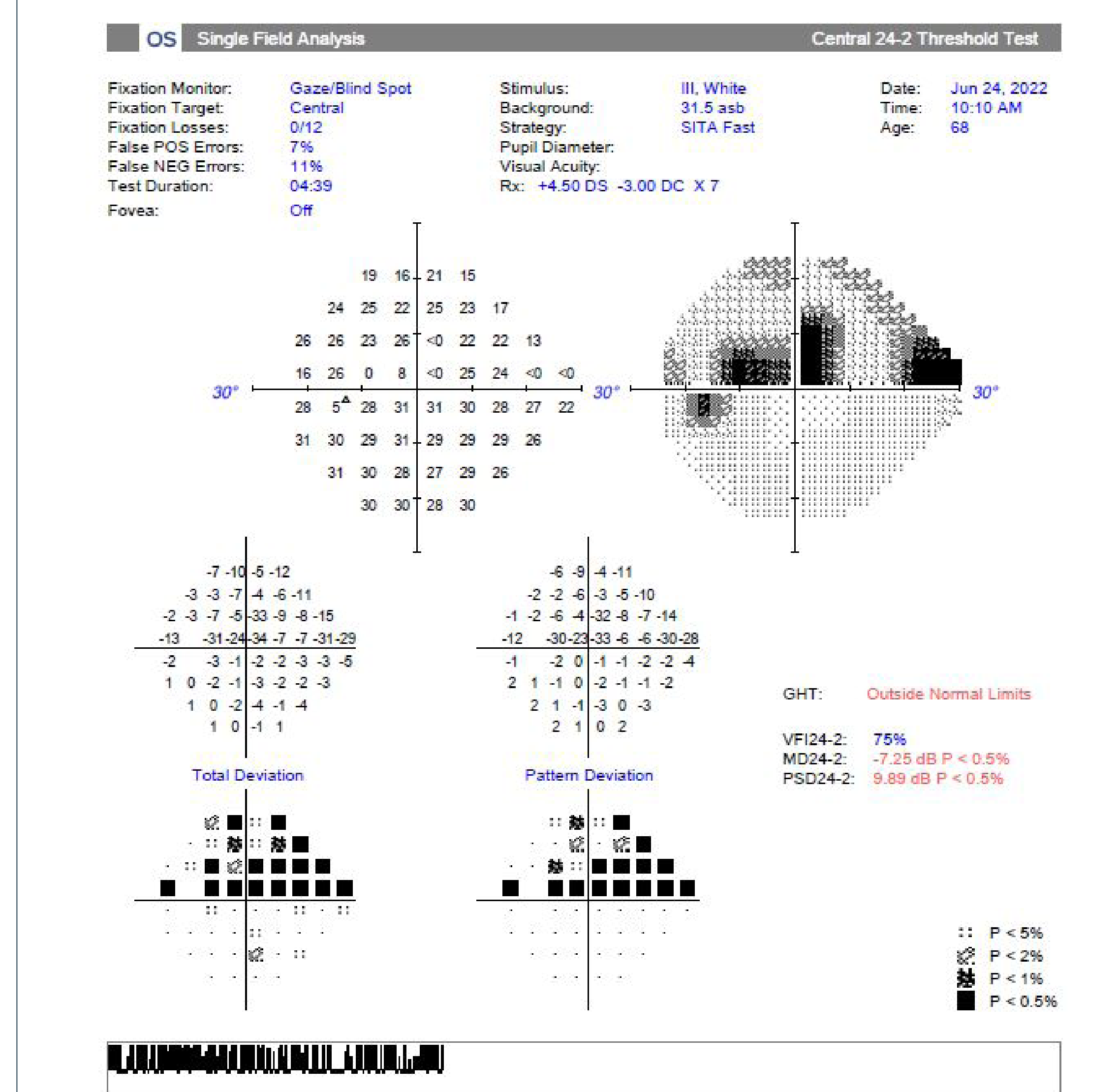
**FIGURE 3**

SD-OCT showing nasal inner retinal thickening OS.



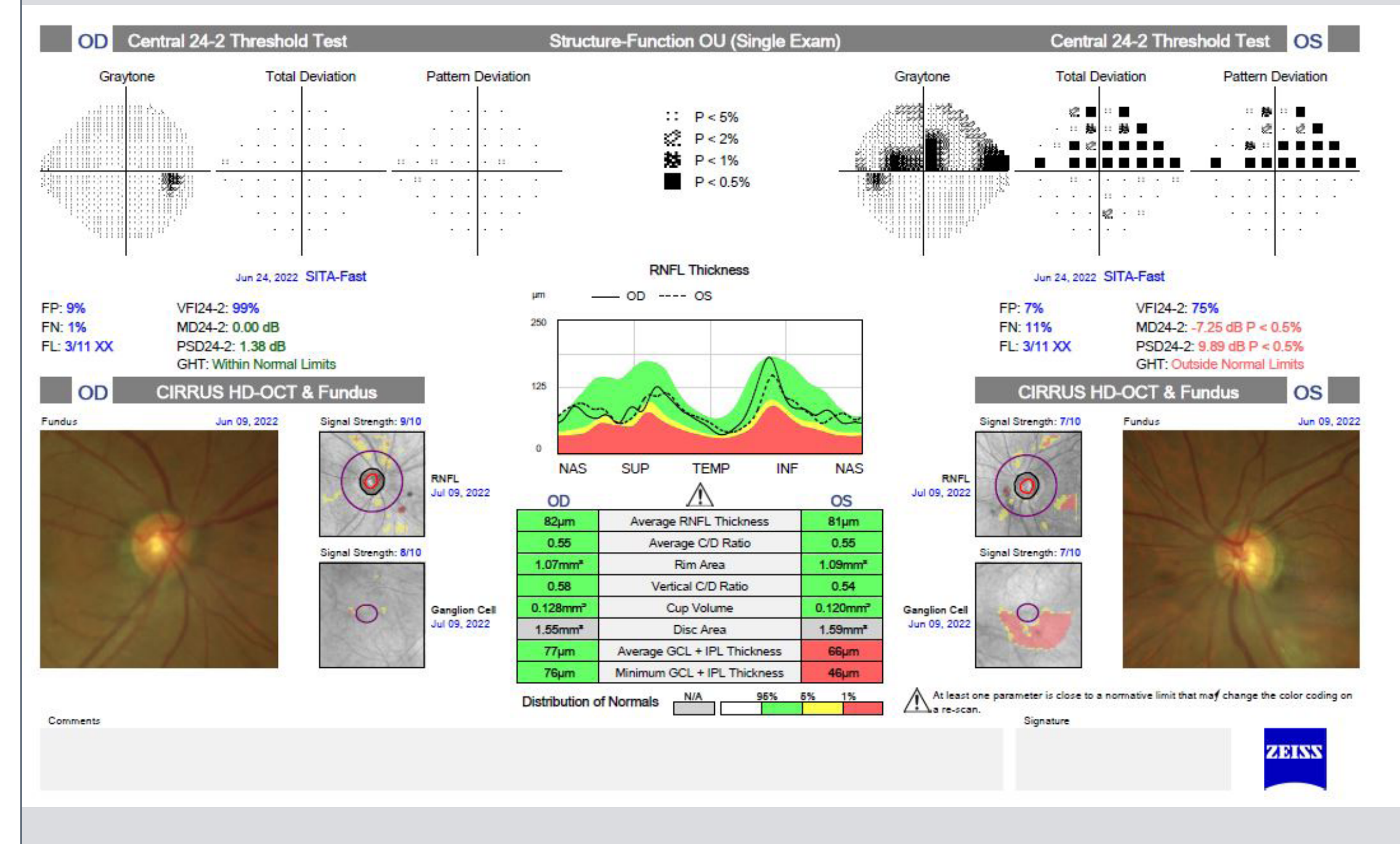
**FIGURE 2**

Visual field testing showing a left superior field defect.



**FIGURE 4**

Structure Function Correlation OD and OS



## CONCLUSION

Based on the patient's clinical presentation, the patient was diagnosed with a BRAO OS. The patient was referred to a stroke center where a transthoracic echocardiogram and carotid ultrasound were performed. The findings were unremarkable with no findings of additional emboli or plaques. The patient continues to be monitored.

## DISCUSSION

Although rare, retinal adverse events such as retinal artery occlusions may occur after the administration of mRNA COVID-19 vaccinations. There have been four documented cases of patient's suffering from a BRAOs/ischemic events post Pfizer-BioNTech COVID-19 vaccine.<sup>2</sup> The exact mechanism by which the COVID-19 vaccine causes a BRAO is still unclear. It has been proposed that COVID-19 infection can directly affect the endothelial cells, causing a pro-coagulatory and inflammatory state, which can lead to vascular thromboembolic complications<sup>2</sup>. However, vaccines do not contain live virus. Thus, the mechanism of action could be an immunologic response to the spike antigen, other viral antigens, or to components of human adenovirus<sup>4</sup>. Although the timing of vaccination in this case correlates to the patient's presentation with a BRAO, further studies should be conducted to establish a definite causal relationship between COVID-19 vaccinations and retinal artery occlusions.<sup>4</sup>

## REFERENCES

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## CONTACT

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