



# A Rare Association: Neovascular Glaucoma Accompanying Anterior Chamber Synchysis Scintillans

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## Abstract

Synchysis scintillans, also known as cholesterolosis bulbi, is a degenerative eye pathology characterized by the accumulation of cholesterol crystals in the vitreous. It is typically observed bilaterally but can rarely be unilateral. It can be triggered by severe trauma, chronic inflammation, chronic retinal detachment, hyphema, vitreous hemorrhage, Coats' disease, and retinoblastoma. In this report, we present a case with an uncommon association of anterior chamber synchysis scintillans and neovascular glaucoma.

**Keywords:** Anterior chamber, cholesterolosis bulbi, neovascular glaucoma, retinal detachment, synchysis scintillans

## Introduction

Synchysis scintillans is an uncommon degenerative ocular condition.<sup>1,2,3,4</sup> This entity is also known as cholesterolosis bulbi due to the presence of cholesterol crystal accumulations in the vitreous humor, resulting in the appearance of small, reflective opacities in the posterior segment of the eye.<sup>2,3,4</sup> The crystals observed in synchysis scintillans have been confirmed via chromatography to be pure cholesterol,<sup>5</sup> and they move freely in a gravity-dependent manner, creating a snow globe-like effect.<sup>6</sup> The condition can be caused by severe trauma, chronic inflammation, chronic retinal detachment, hyphema, vitreous hemorrhage, Coats' disease, and retinoblastoma.<sup>2,3,4,6,7,8</sup> Although synchysis scintillans is typically observed in eyes with severe disease, it is often discovered incidentally as an asymptomatic finding.

Limited epidemiological studies have been conducted on synchysis scintillans, but the available literature suggests that it is a relatively rare condition.<sup>4</sup> It usually presents in the third decade of life, although cases have been reported in individuals of all ages.<sup>4</sup> Bilateral presentation is typical, while unilateral occurrence is extremely rare.<sup>2,4</sup>

Although synchysis scintillans is typically observed in the vitreous cavity, there have been rare reports of anterior chamber cholesterolosis.<sup>3,4,7,8,9</sup> The underlying causes of synchysis scintillans in the anterior chamber are not well-established, but some theories suggest that cholesterol crystals may either form in the anterior chamber following hyphema or more commonly pass from the posterior segment to the anterior segment.<sup>4,8,9</sup> Additionally, synchysis scintillans can arise in the anterior chamber due to long-term synchysis.<sup>4</sup>

Herein, we report an extremely unusual presentation in the form of anterior chamber synchysis scintillans in a patient with neovascular glaucoma secondary to chronic diabetic tractional retinal detachment.

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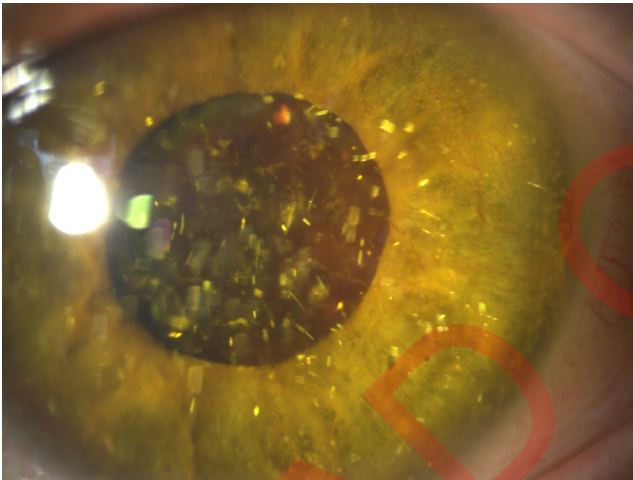
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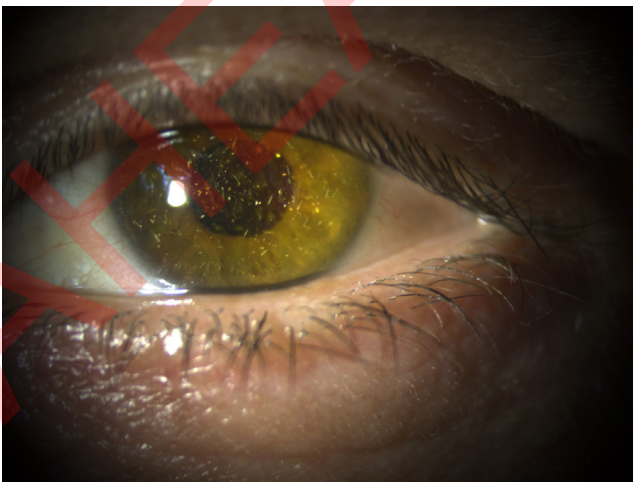


## Case Report

A 45-year-old man presented with a 5-year history of vision loss and a 1-week history of pain in his left eye. His medical history revealed type 1 diabetes mellitus, and his ophthalmological history revealed panretinal photocoagulation in the right eye for proliferative diabetic retinopathy and phacoemulsification surgery combined with pars plana vitrectomy in the left eye for tractional retinal detachment 5 years ago. His best corrected visual acuity was 20/25 on the right and no light perception in the left eye. Anterior segment examination was unremarkable in the right eye. Slit-lamp examination of the left eye revealed posterior chamber intraocular lens, rubeosis iridis, and anterior chamber synchysis scintillans presenting as multiple free, mobile, polychromatic, shiny cholesterol crystals (Figures 1, 2). Intraocular pressure was 13 mmHg in the right and 43 mmHg in the left eye. Dilated fundus examination revealed panretinal photocoagulation scars along with regressed neovascularization in the right (Figure 3) and tractional retinal

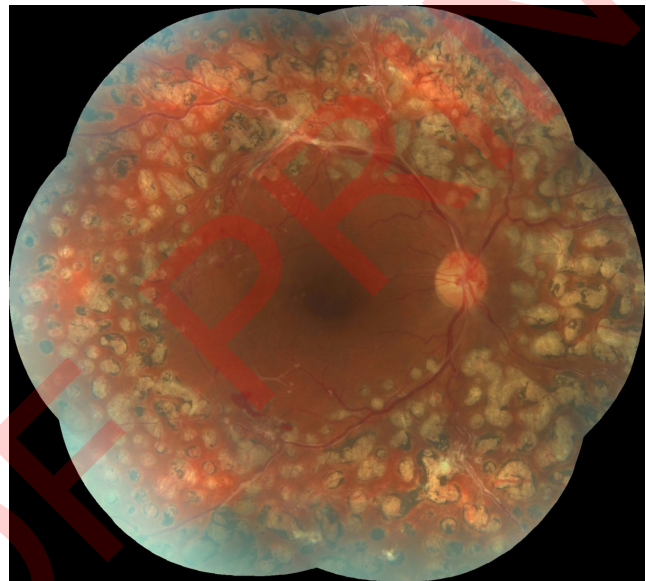


**Figure 1.** Anterior segment photograph of the left eye revealed anterior chamber synchysis scintillans, rubeosis iridis, and posterior chamber intraocular lens



**Figure 2.** Anterior segment photograph of the left eye

detachment in the left eye. Anterior chamber injection of 1.25 mg bevacizumab (Altuzan, Roche, Germany) was performed and topical dorzolamide-timolol fixed combination (Oftomix, Bilim Ilac, Istanbul, Türkiye) and brimonidine (Alphagan P, AbbVie, Istanbul, Türkiye) were initiated twice daily. His clinical follow-up was stable for both eyes with no pain in the left eye for 3 years, and no additional bevacizumab injection was needed.



**Figure 3.** Fundus photograph of the right eye showing panretinal photocoagulation scars along with regressed neovascularization

## Discussion

Synchysis scintillans, also known as cholesterolosis bulbi, is an uncommon condition.<sup>1,2,3,4</sup> Parfait-Landrau first reported the presence of sparkling crystals in the human ocular vitreous body in 1828, and three years later Schmidt determined these crystals were made of cholesterol.<sup>8</sup> Synchysis scintillans is thought to be caused by a variety of factors, including hemorrhage, trauma, and chronic inflammation.<sup>2,3,4,7,8</sup> Although the pathogenesis of anterior chamber synchysis scintillans is not well understood, it is believed to occur either due to the formation of cholesterol crystals following hyphema, or the migration of cholesterol crystals from the posterior segment to the anterior chamber.<sup>4,7</sup> The anterior passage of posterior crystals is facilitated by factors such as pre-existing trauma, aphakia, pseudophakia, and subluxation of the lens.<sup>4</sup> The major source of intraocular cholesterol crystals is probably degrading extravascular blood.<sup>4</sup> Postprandial or familial hyperlipemia may play a role in the formation of cholesterol crystals following vitreous hemorrhage or hyphema.<sup>4,8</sup> However, some authors argue that there is no correlation between cholesterolosis bulbi and blood cholesterol levels.<sup>9,10</sup> Additionally, neovascularization and repeated hemorrhages in a diabetic eye prone to bleeding may create a hyperlipemic environment that facilitates synchysis

scintillans, which is probably the underlying cause in our presented patient.

In the vitreous cavity, synchysis scintillans should be differentially diagnosed from asteroid hyalosis, a degenerative condition of the vitreous.<sup>10,11</sup> Unlike synchysis scintillans, which is composed of cholesterol crystals, asteroid hyalosis is composed of hydroxyapatite and phospholipids. In the anterior chamber, both phenomena may appear similarly as pseudohypopyon.<sup>10,11</sup> A definite diagnosis of cholesterol crystals can be confirmed through histopathological examination, which reveals the characteristic birefringence of cholesterol crystals under polarized light and positive staining with lipid stains such as oil red O.<sup>10,11</sup> Nevertheless, clinical diagnosis of cholesterol crystals is also relatively easy due to their typical characteristics and limited differential diagnosis, which includes calcium oxalate crystals, proteinaceous crystals, and aqueous cells. Cholesterol crystals are easily distinguishable due to their polychromatic appearance and larger size compared to these other substances.<sup>10,11</sup>

Although we could not confirm the differential diagnosis from asteroid hyalosis by histopathological examination, the clinical findings were suggestive of synchysis in this case. While synchysis scintillans is seen in a younger age group, asteroid hyalosis is commonly observed in older adults. Asteroid hyalosis is rarely associated with other pathologies, whereas synchysis is usually secondary to other ocular diseases or tumors. Moreover, synchysis freely moves and falls to the vitreous floor due to gravity, whereas asteroid hyalosis moves with the vitreous and returns to its original position. The patient in this case was young and had proliferative diabetic retinopathy, and the clinical presentation was consistent with synchysis. These clinical findings strongly supported the diagnosis of synchysis. Only the unilateral presentation observed in this case is atypical of synchysis, which is usually bilateral.

In conclusion, anterior chamber synchysis scintillans is an extremely rare ocular pathology that may occasionally be encountered in a patient with neovascular glaucoma.

## Ethics

**Informed Consent:** Obtained.

**Peer-review:** Externally and internally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: M.A.Ş., Concept: S.B., M.A.Ş., Design: S.B., M.A.Ş., Data Collection or Processing: A.A., M.A.Ş., Analysis or Interpretation: S.B., M.A.Ş., Literature Search: S.B., A.A., Writing: S.B.

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