Vitreous Diseases

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The vitreous cavity occupies four-fifth the volume of the eyeball and contains the vitreous humor or vitreous, the natural clearance of vitreous cavity or space make the stereo examination possible [1–3]. The vitreous is attached with the retina tightly in the area of optic disc, macula and vitreous base. The vitreous is shaped like a sphere with an anterior depression and attached with the lens peripherally with Wieger ligament. It is traversed by a central fluid-filled canal, called Cloquet's canal, which represents the remnants of the course taken by the hyaloids artery that supplied the vitreous and lens in the fetal eye. The anterior end of Cloquet's canal is condensed at the posterior pole of the lens with a width of 1–2 mm, called Mittendorf point. The posterior end is attached with the rim of optic cup, which can be seen as a translucent residual, called Bergmeister papilla, if not fully degenerated (Fig. 4.1).

During the development of vitreous (Fig. 4.2A), the primary vitreous is compressed by secondary vitreous to the center; it goes nasally and forward to the center of the cavity from the posterior lens, then it goes temporally and backward to the optic disc until it is surrounded by Cloquet's canal and connected with Erggelet's canal. Primary vitreous is only the condensation of the membranes, which separates the primary and secondary vitreous. Secondary vitreous occupies the largest part of the vitreous cavity. Tertiary vitreous derives from the nonpigmented ciliary epithelial cells, extends to the lens and fuses with capsule, which forms the zonular fibers (Fig. 4.2).

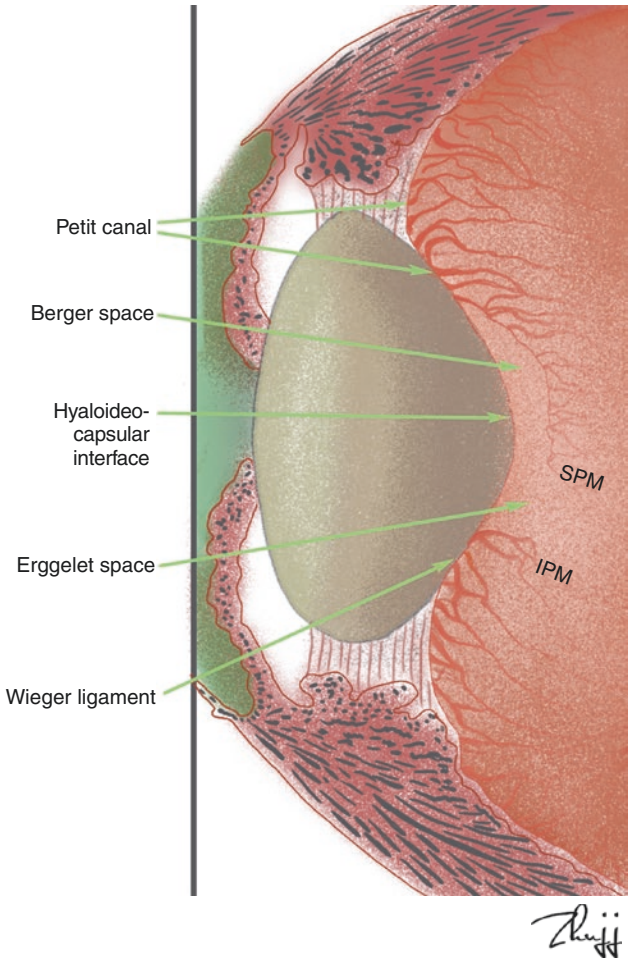

Fig. 4.1 Structure of interface between lens and vitreous

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Lesions of the vitreous include congenital dysplasia, age-related opacities, liquefaction, posterior vitreous detachment, neovascularization, proliferation, etc. Most of the vitreous changes are complications of adjacent diseases [4]. For example, vitreous hemorrhage is the most common complication due to retinal tears, proliferative diabetic retinopathy, retinal vein occlusion, posterior vitreous detachment, etc. What's more, the hemorrhage will show various manifestations. If it is confined to the inner limiting membrane, the border will be well-defined and like a boat. Sometimes, the different layers of the blood will be discriminated carefully. If the hemorrhage breaks into the vitreous cavity, the amount, the time, and the course of the primary disease will decide its appearance. If the hemorrhage is secondary to the retina tear, the retina tear, the traction of the vitreous on the apex of the retinal valve, the crossing blood between the two points of the break will be seen most temporarily and superiorly. Of course, the blood will precipitate on the lower half of the vitreous cavity with red or pale color according to its course. In some cases, the blood will become fibrous and make the retina contract, and tractional retinal detachment will be seen. When we observe the vitreous changes, the primary cause will be considered in mind. Due to the filamentous collagen of vitreous body, the various appearances of opacity, hemorrhage, and fibrous tissue can be detected (Fig. 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20, 4.21, 4.22, 4.23, 4.24, 4.25, 4.26, 4.27, 4.28 and 4.29).

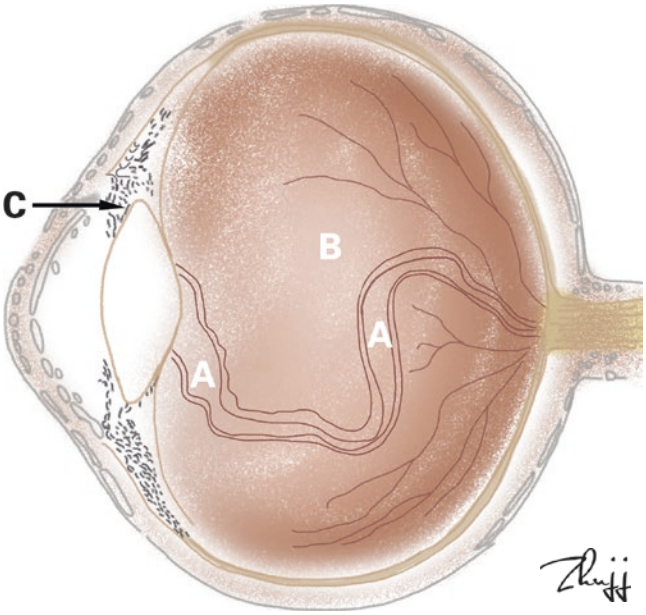

Fig. 4.2 Schematic diagram of three grades of vitreous. A, B, and C represent primary, secondary and tertiary vitreous respectively

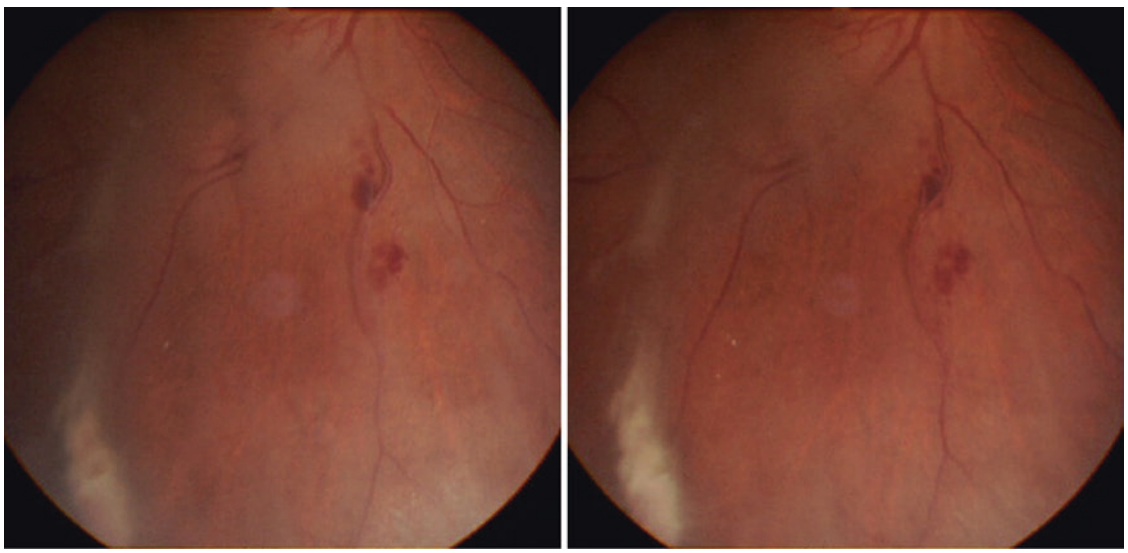

Fig. 4.3 Vitreous opacities
I. Location of occlusion of the inferior retinal vein branch, the diameter of the vein is increased sharply
II. Elevated and dilated retinal vessel, within it a grey column could be seen in the center and two blood streams on both sides. Suspected neovascularization is on it

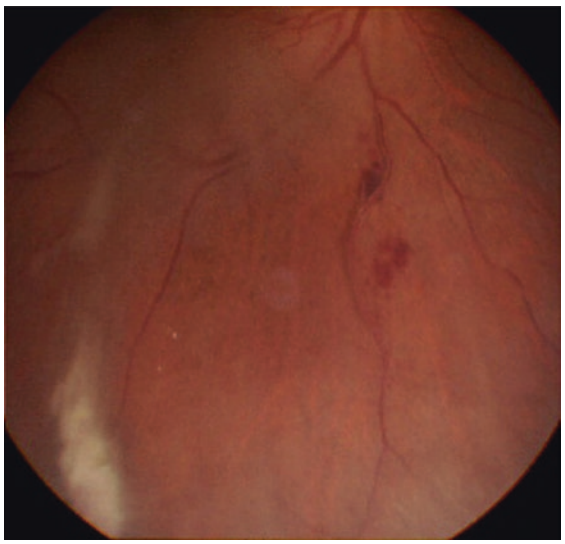

Fig. 4.3 (continued)

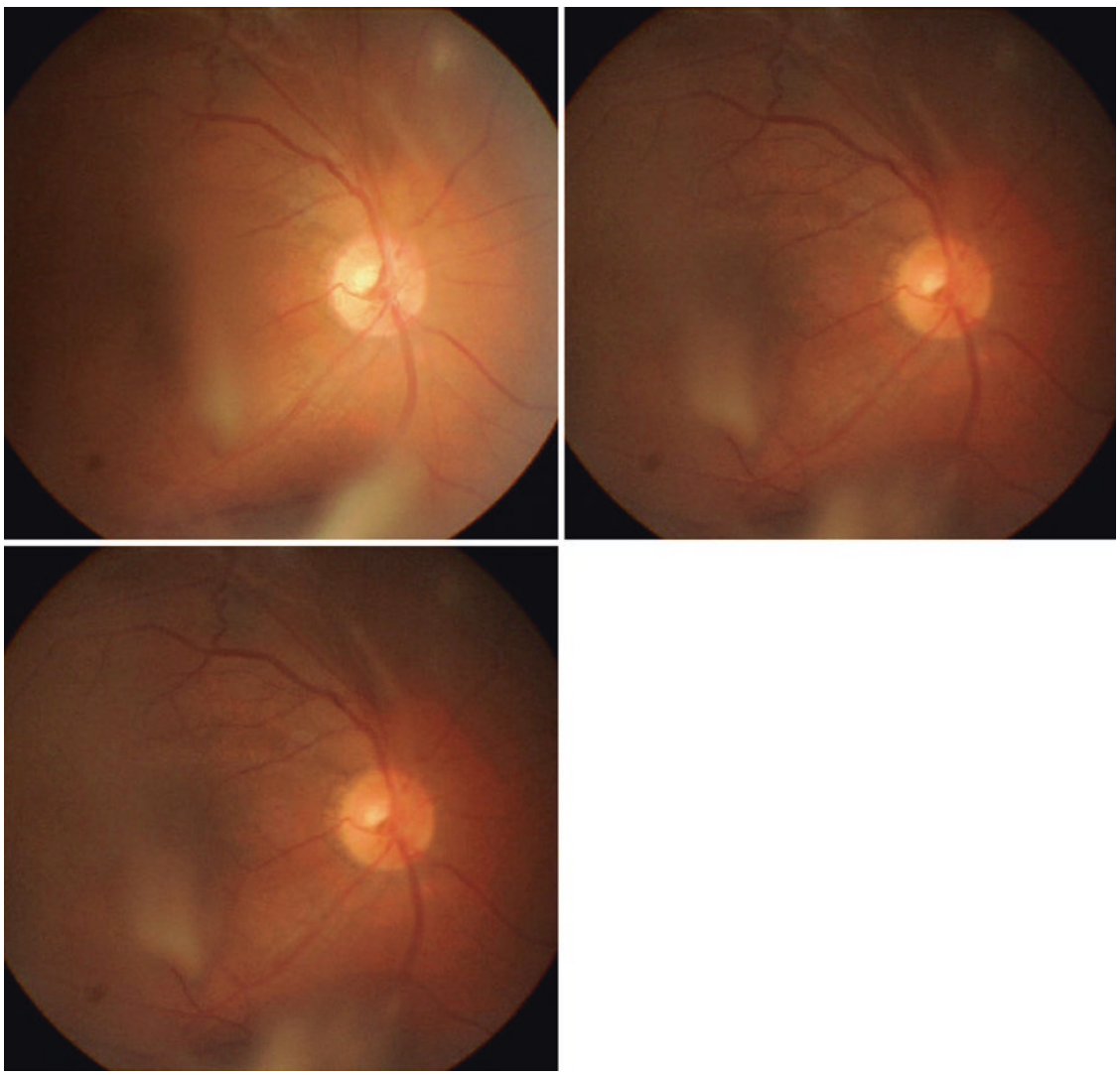

Fig. 4.4 Vitreous opacities
I. Ghost vessels of retinal vein
II. Dilated retinal veins (communicating branch)
III. Thinning and straight retinal artery
IV. Vitreous opacities of different layers

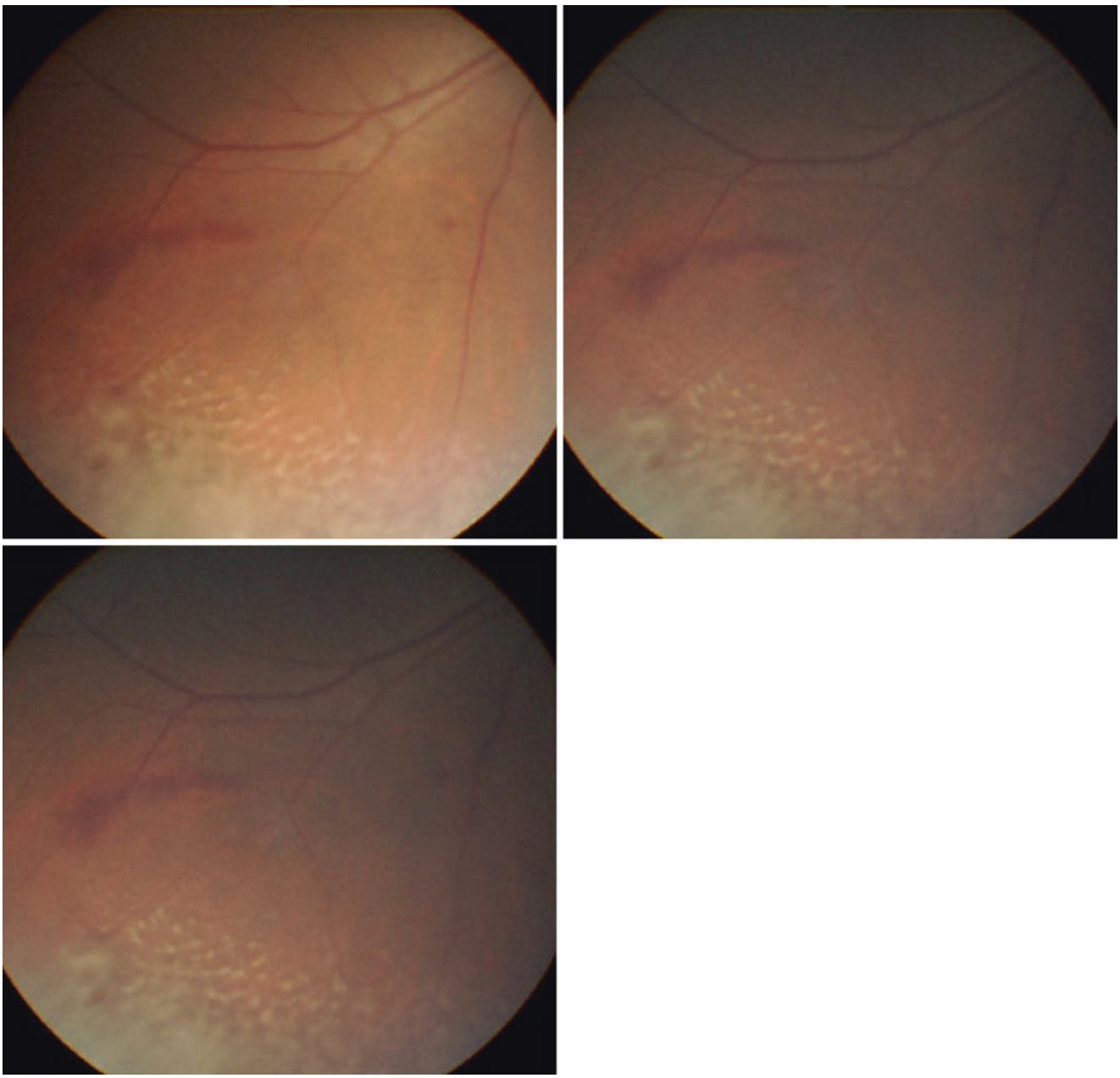

Fig. 4.5 Vitreous opacities
I. Chronic vitreous hemorrhage
II. Subretinal hemorrhage
III. Deep retinal hemorrhage
IV. Chronic vitreous hemorrhage

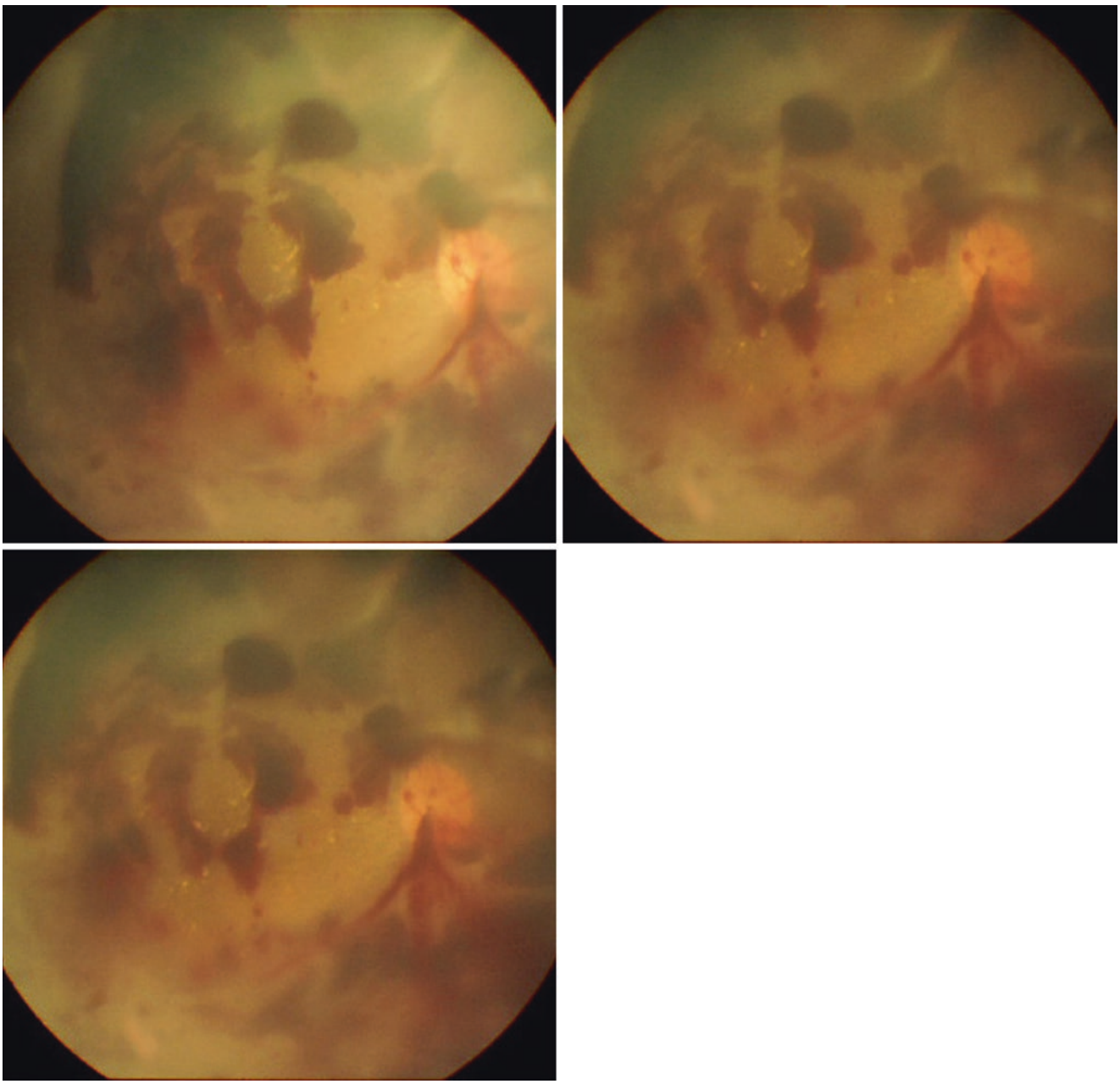

Fig. 4.6 Vitreous opacities
I. Neovascularization of the optic disc
II. Hemorrhage in the anterior vitreous
III. Hemorrhage in the middle vitreous
IV. Hemorrhage near the posterior hyaloids
V. Deep retinal exudates

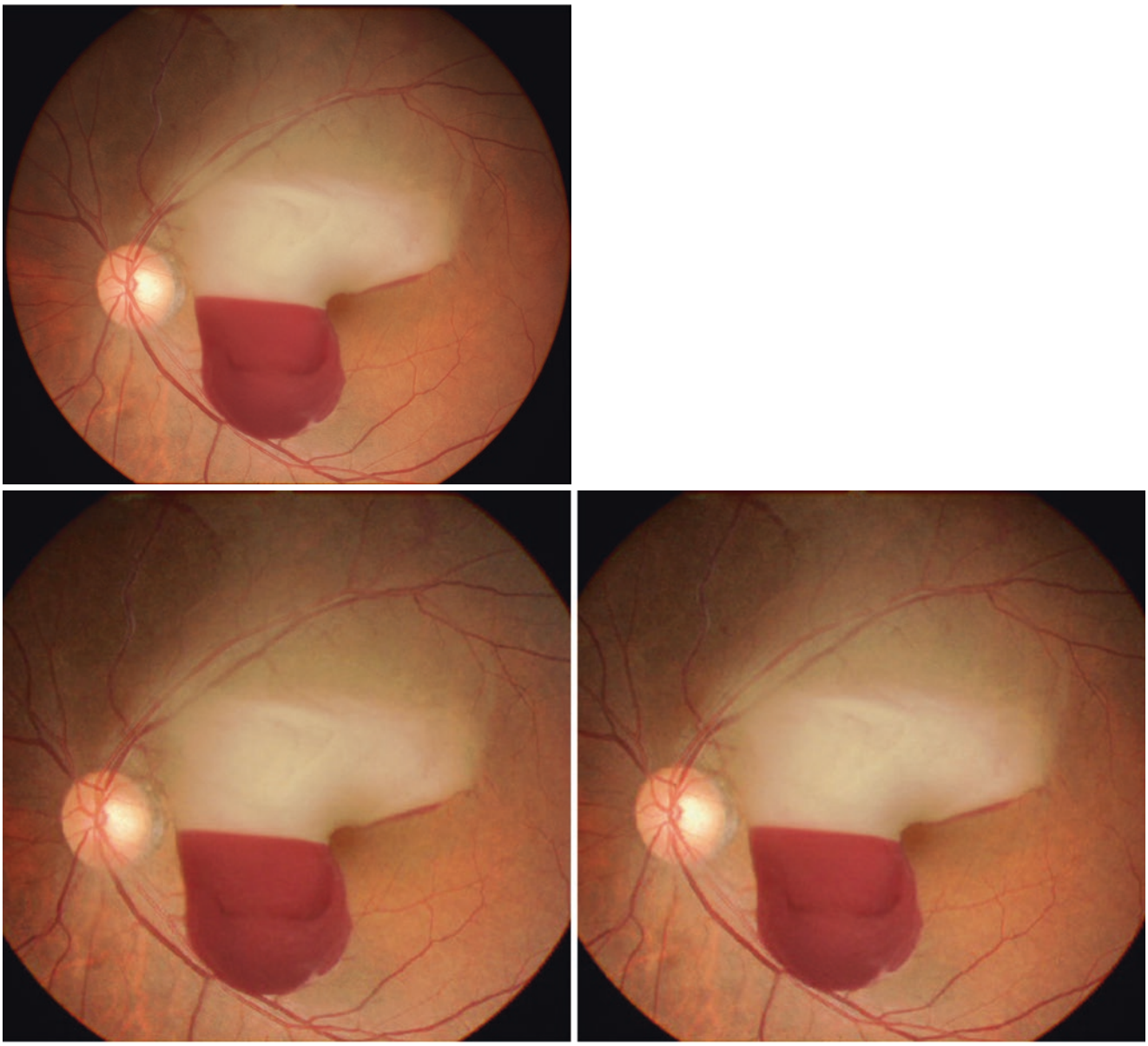

Fig. 4.7 Boat-like pre-retinal hemorrhage
I. The layer of serum
II. The layer of platelets
III. The layer of white blood cells
IV. The layer of deoxygenerated hemoglobin
V. The layer of oxygenated red blood cells

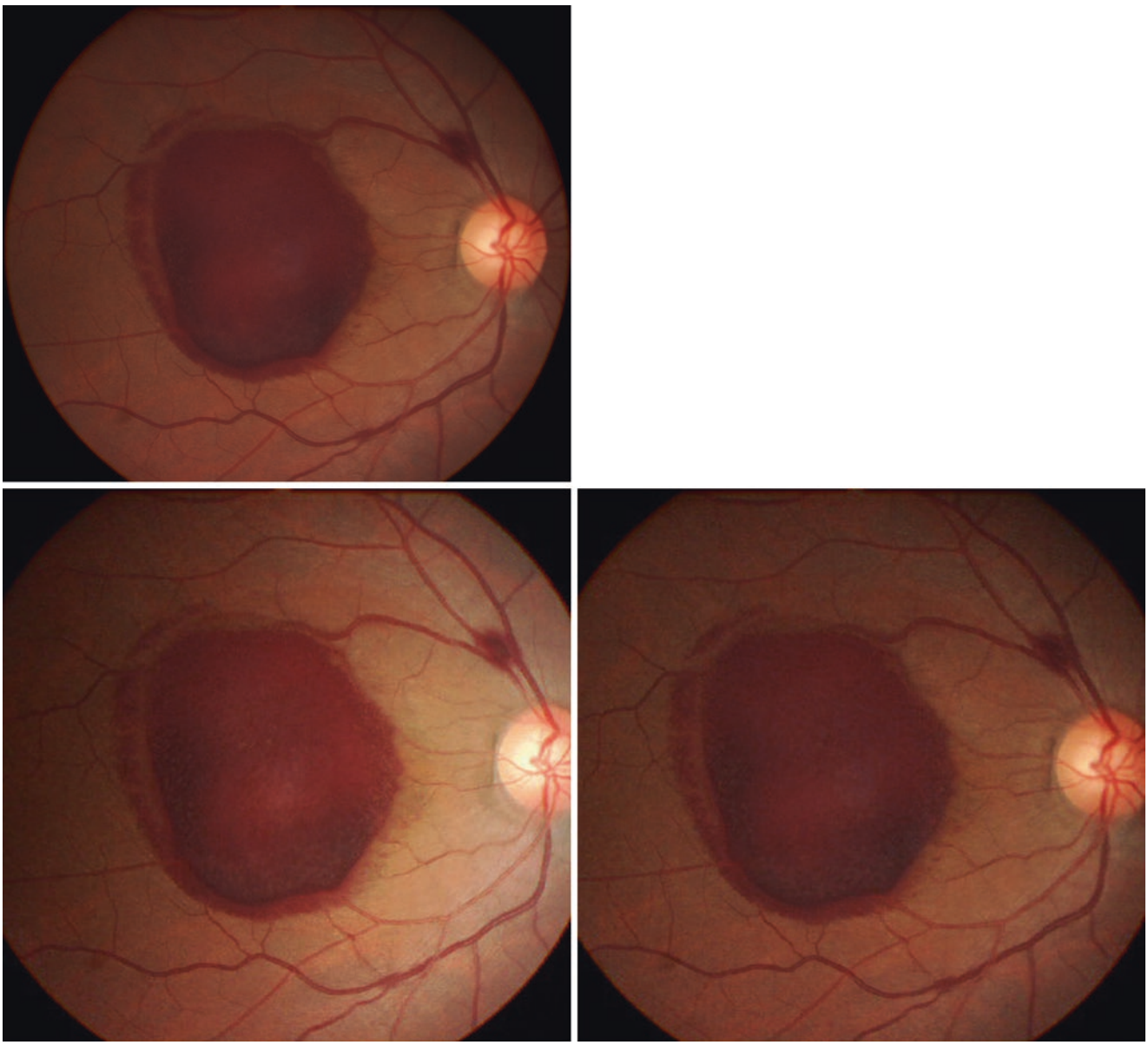

Fig. 4.8 Sub-ILM hemorrhage
I. Sub-ILM hemorrhage in the macula
II. Flame-shaped retinal hemorrhage

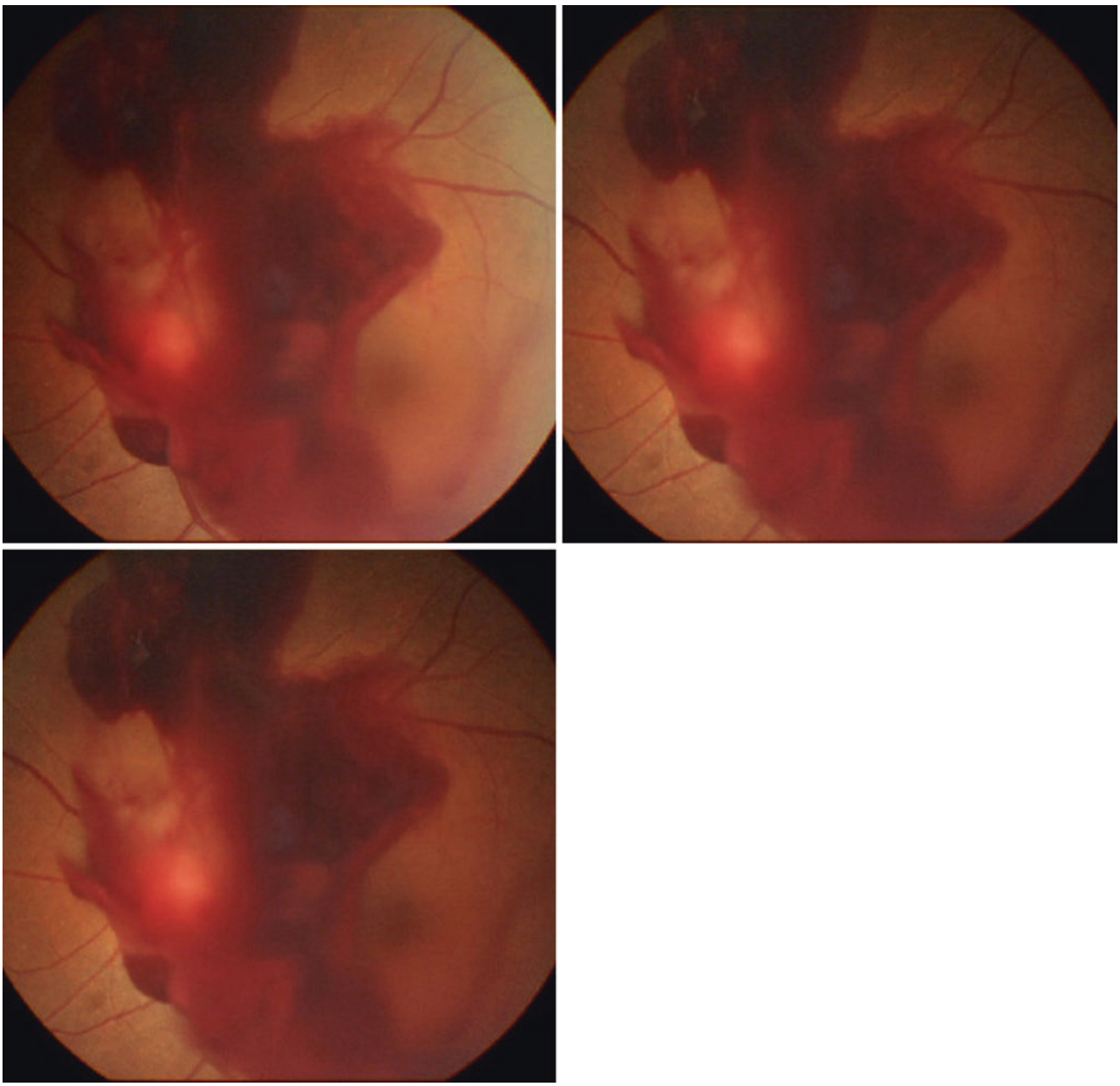

Fig. 4.9 Vitreous hemorrhage
I. Vitreous hemorrhage located anterior to the retina and posterior to the posterior hyaloids
II. Optic disc
III. Subretinal hemorrhage

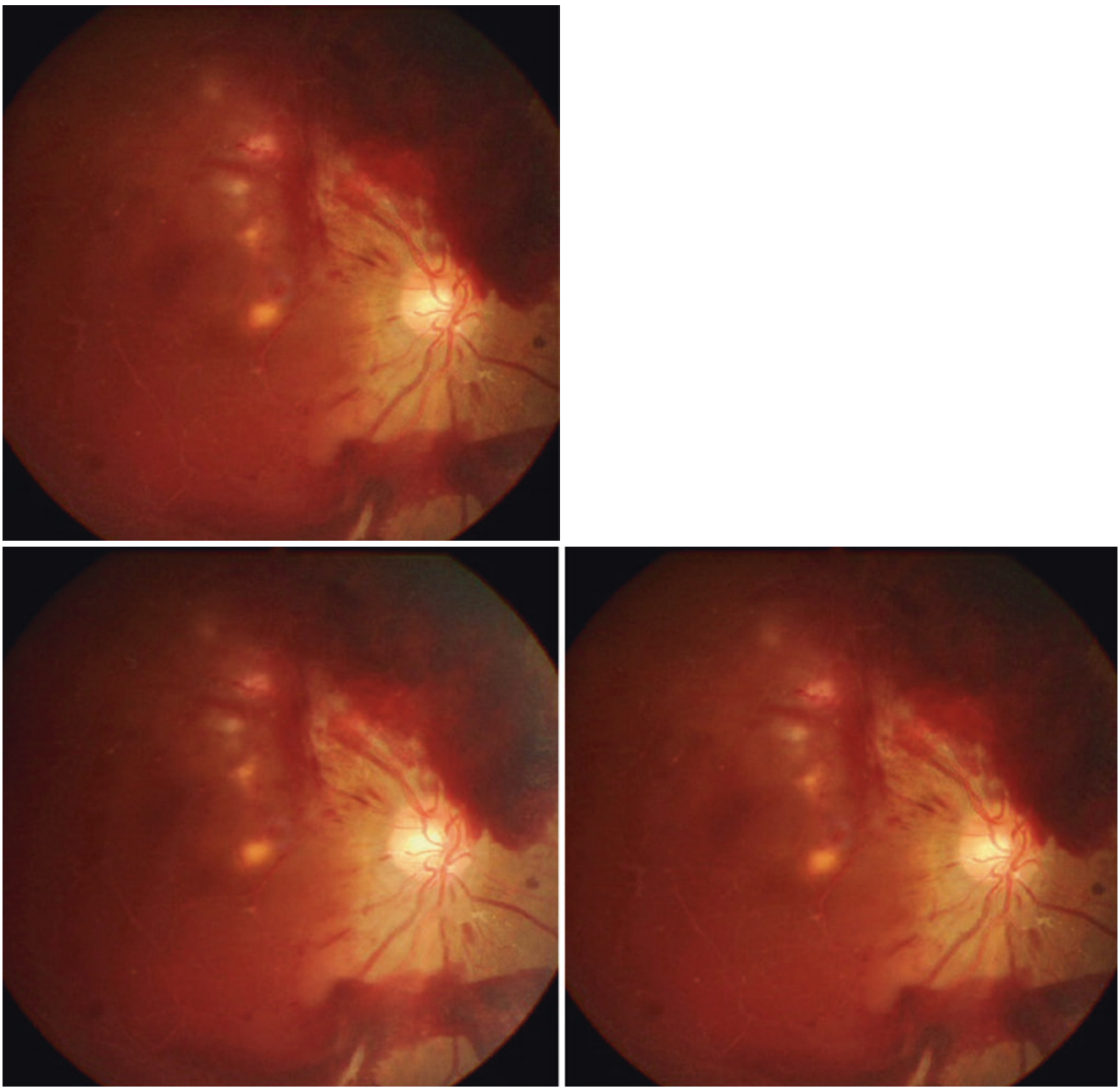

Fig. 4.10 Vitreous opacities
I. Cup-like neovascularization in the posterior pole
II. Branch of neovascularization
III. Deep exudates
IV. Vitreous hemorrhage
V. Superficial retinal hemorrhage

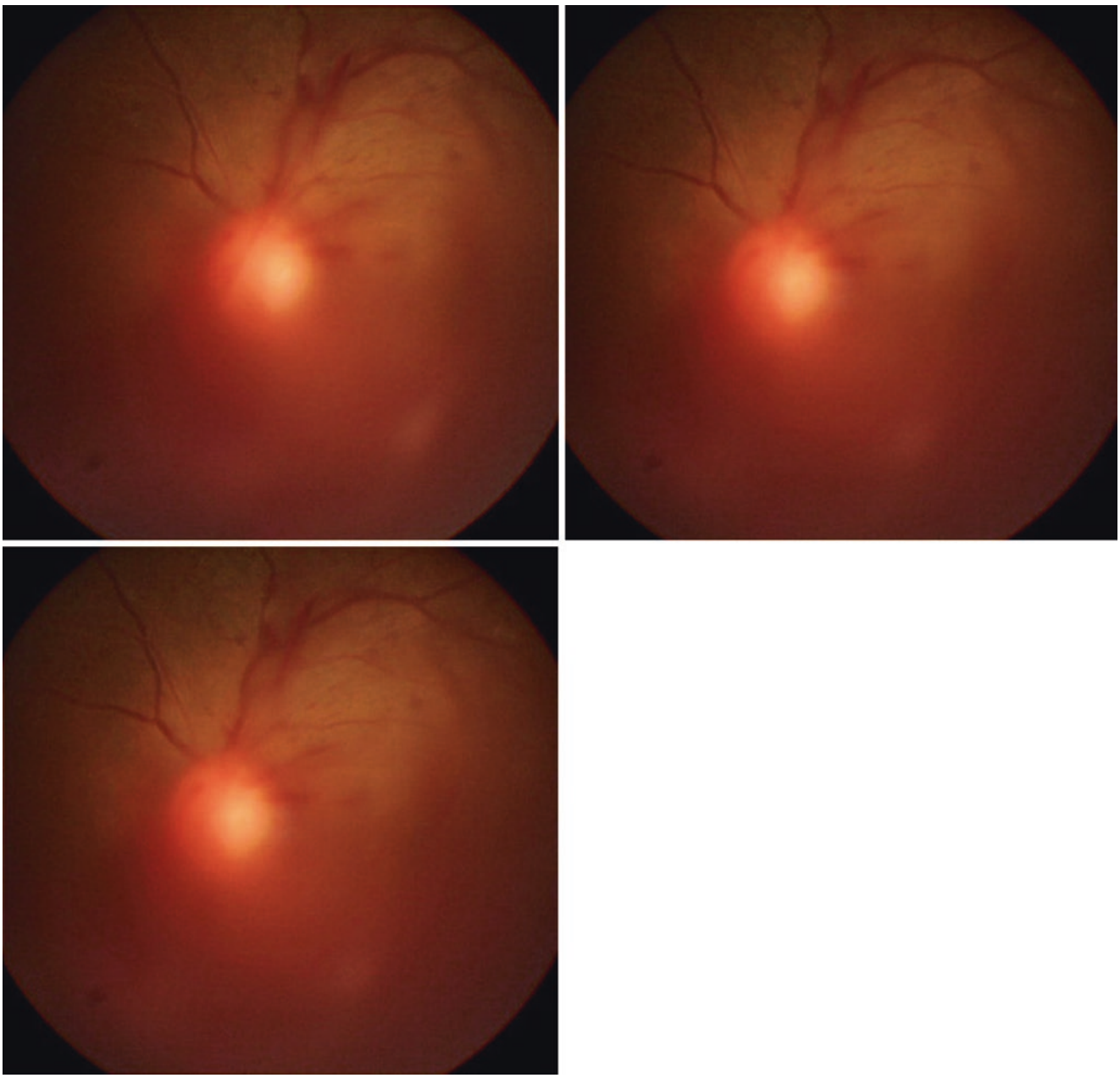

Fig. 4.11 Vitreous opacities
I. Dense vitreous hemorrhage in the inferior cavity
II. Superficial retinal hemorrhage
III. Dilated retinal veins
IV. Retinal neovascularization
V. Artery-Vein nicking

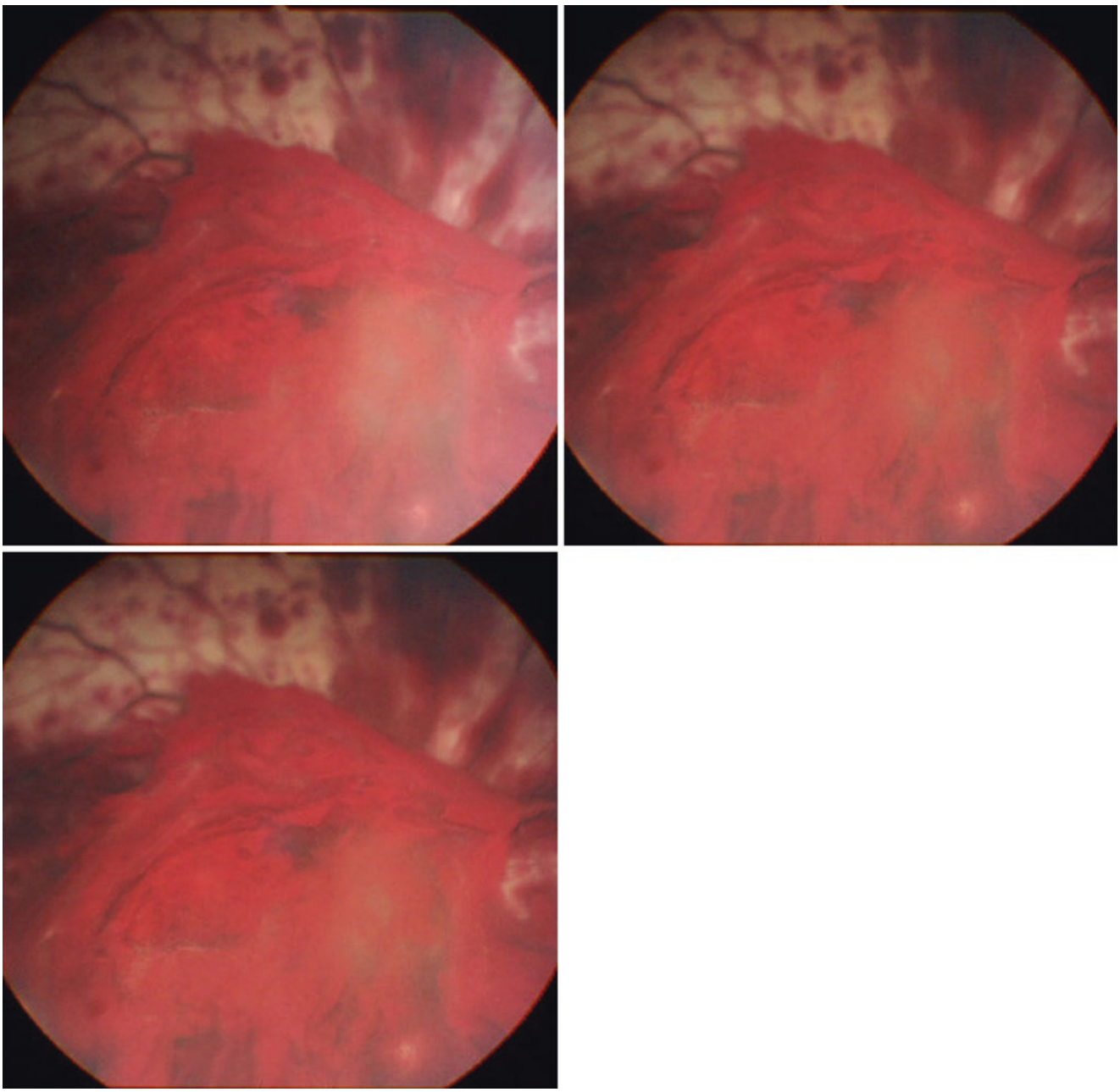

Fig. 4.12 Vitreous hemorrhage (Anemia)
I. Dense vitreous hemorrhage in the posterior pole
II. Dilated retinal veins and retinal beading
III. Retinal ischemia, with pale color

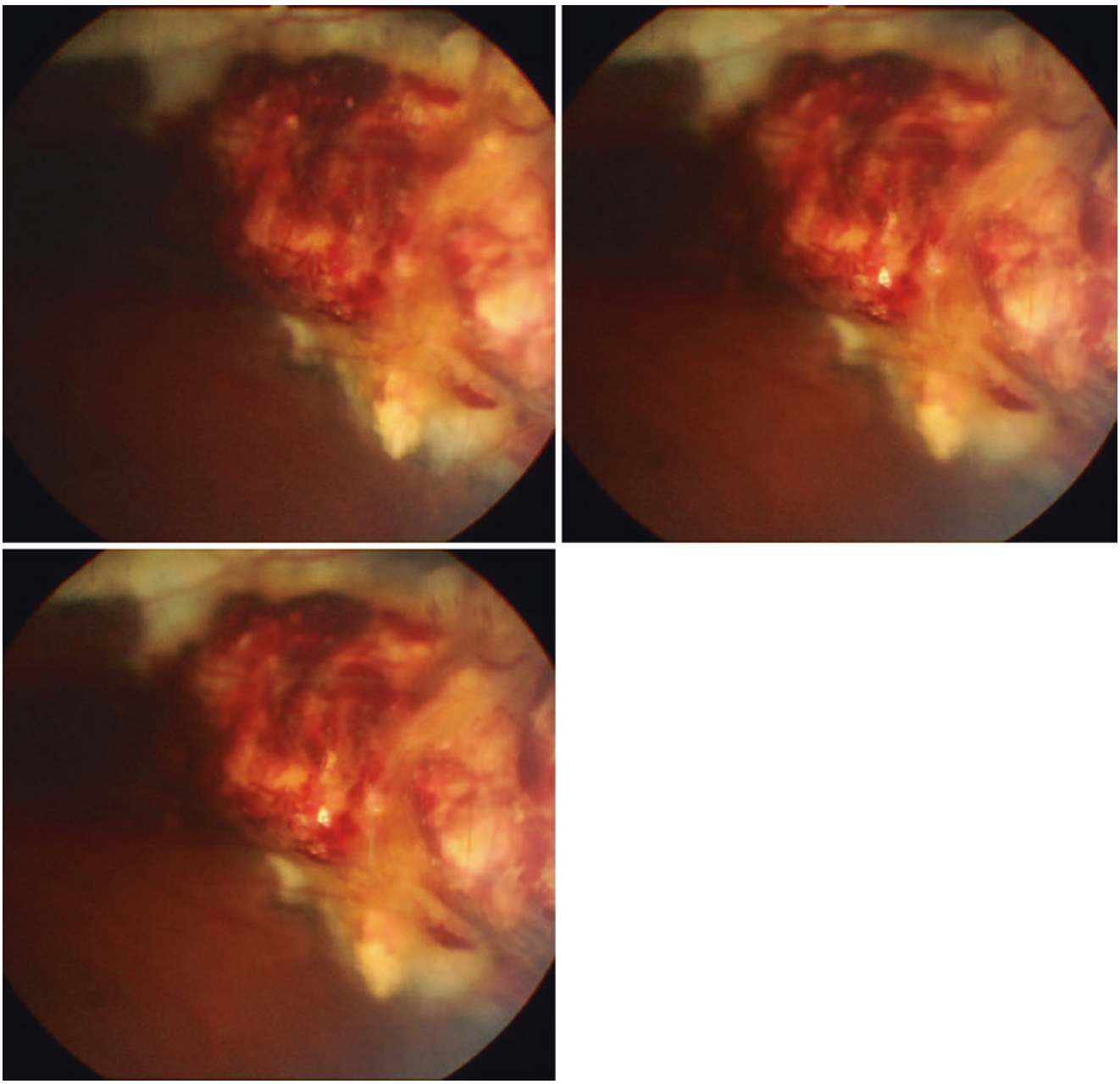

Fig. 4.13 Vitreous hemorrhage
I. Apex of vitreous hemorrhage
II. Fresh hemorrhage in the surface
III. Retinal vessels
IV. Choroidal atrophy

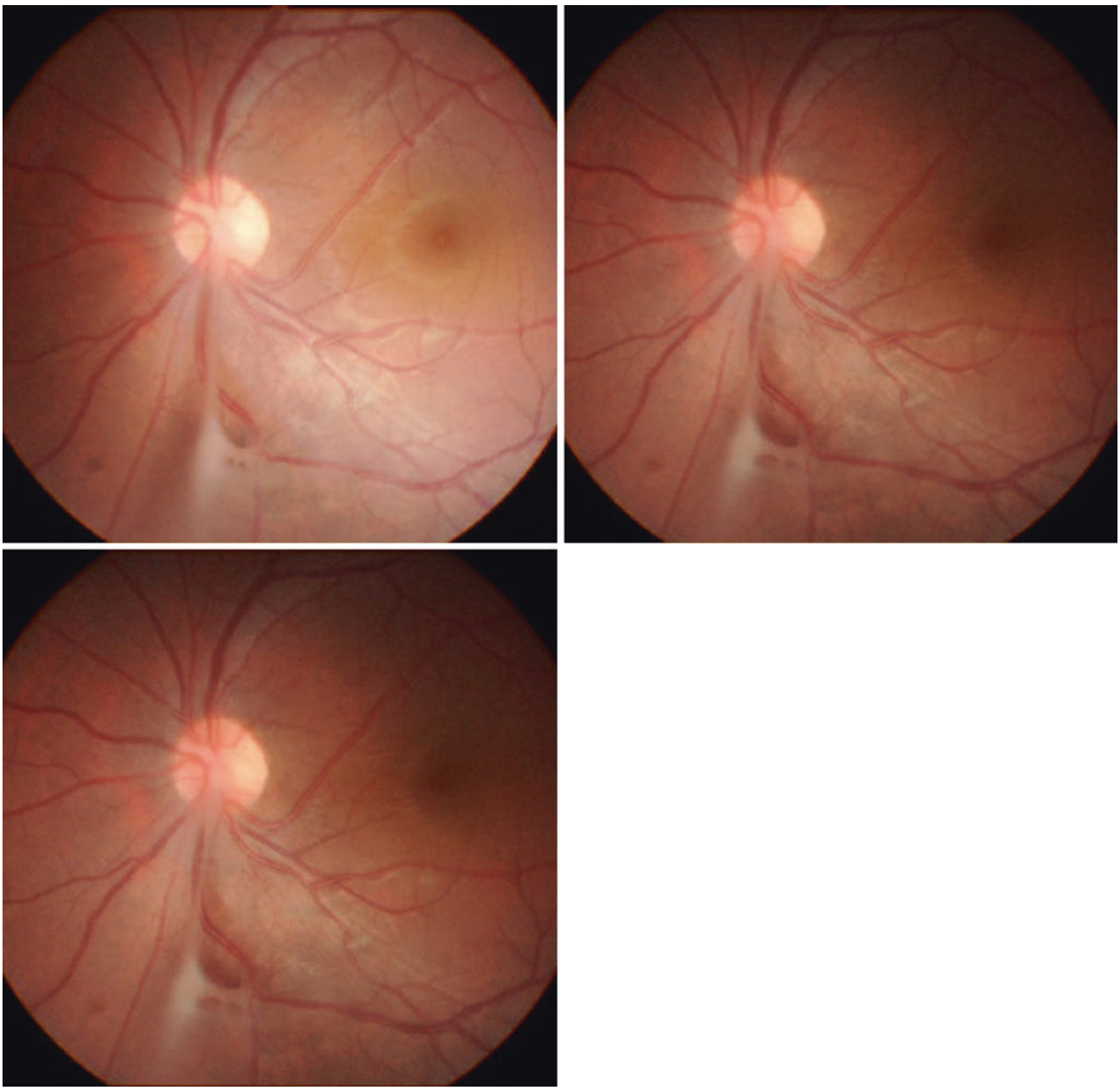

Fig. 4.14 Streaks in the vitreous
I. Streak inferior to the optic disc
II. The inferior end of streaks adhesive to the retinal vessel to form a right angle to the vessel
III. Projection of the membrane onto the retina
IV. Abnormal inferior temporal branch and went upward

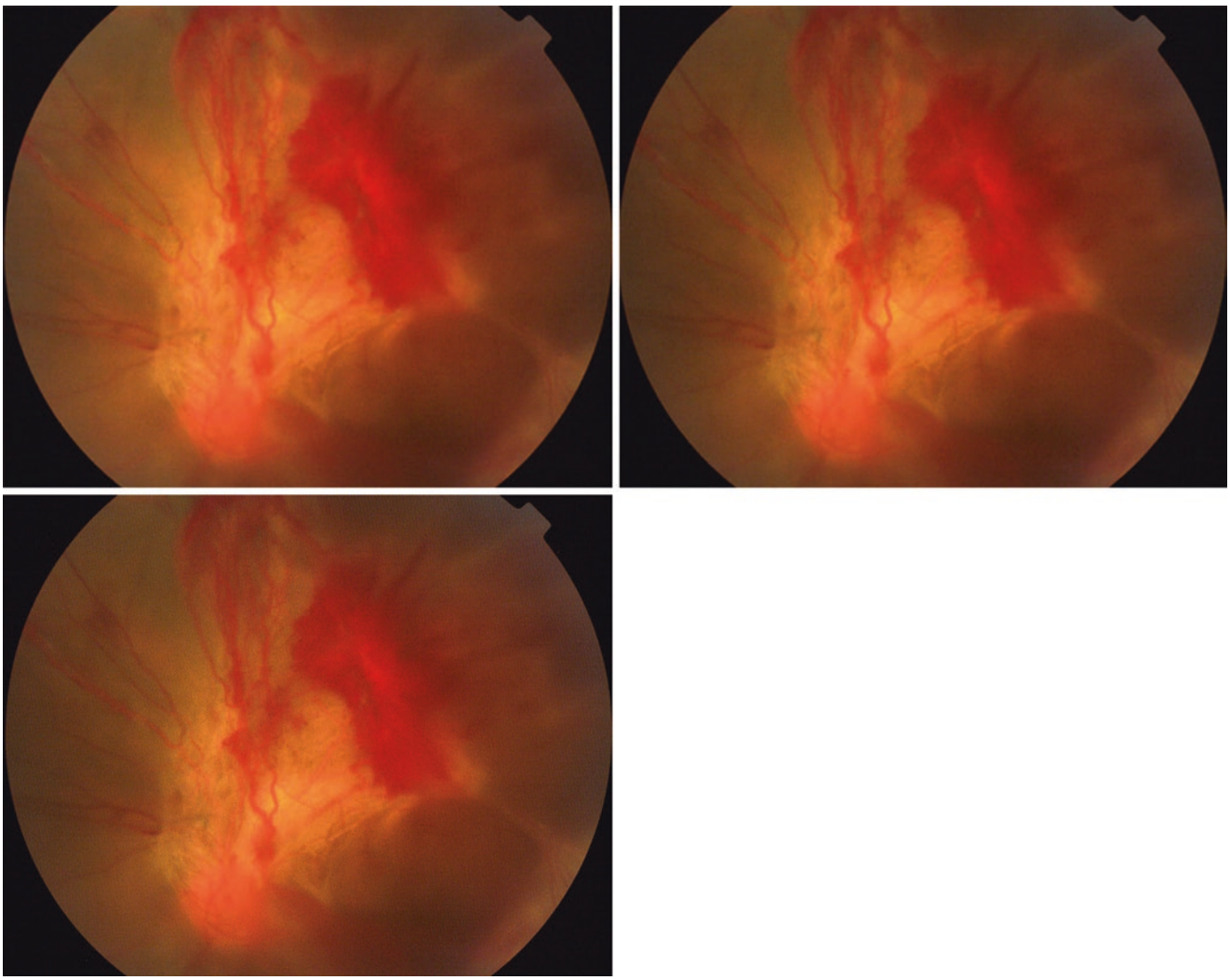

Fig. 4.15 Proliferative vitreoretinopathy
I. Abnormal neovascularization originated from the optic disc and extended to the periphery
II. Massive hemorrhage into the vitreous
III. Reflex of the retinal artery like a copper wire
IV. Distorted retinal veins
V. Vitreous hemorrhage

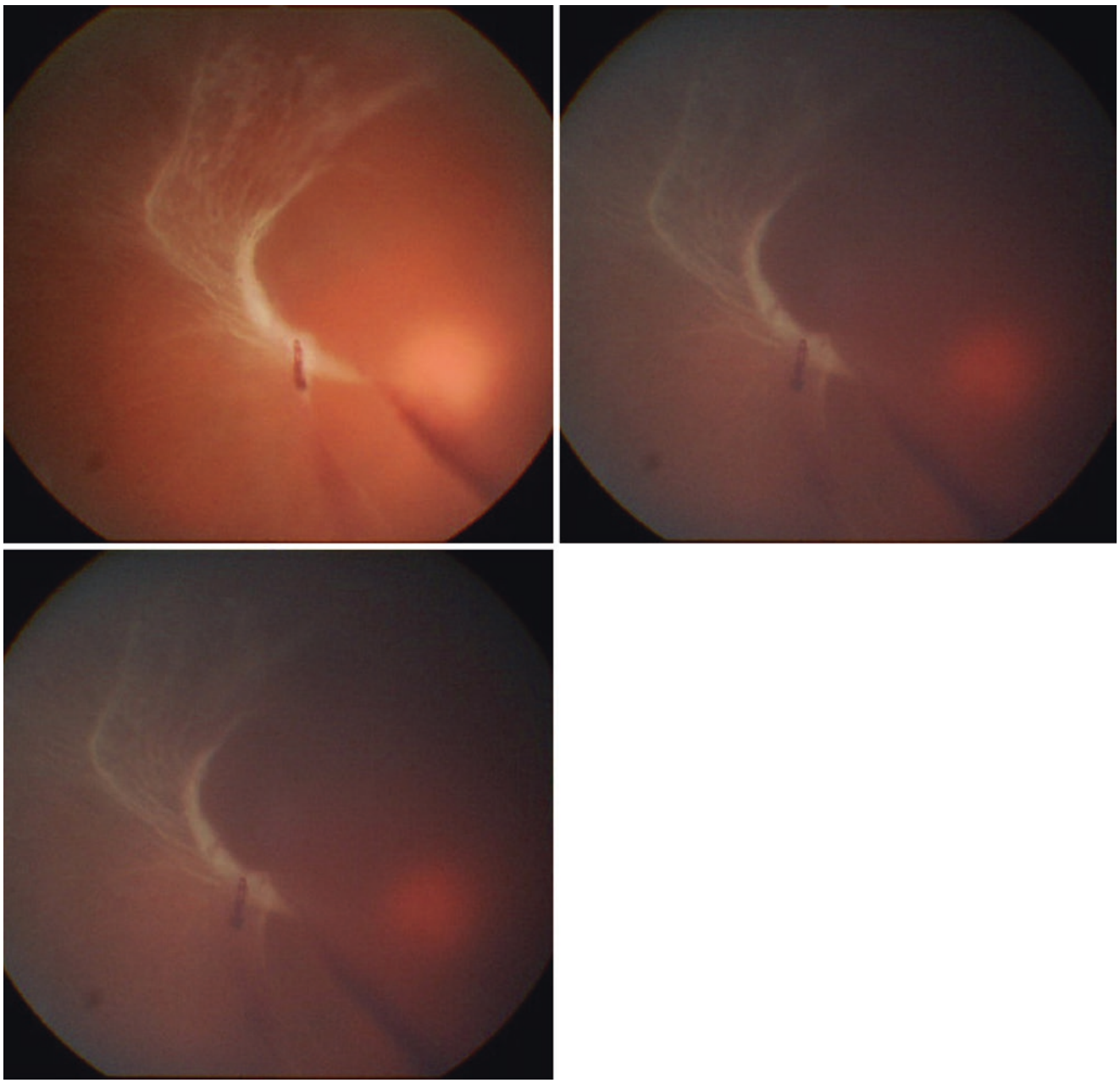

Fig. 4.16 Vitreous hemorrhage
I. Hemorrhage like a streak
II. Fan-like sector membrane in the vitreous
III. Obscured optic disc

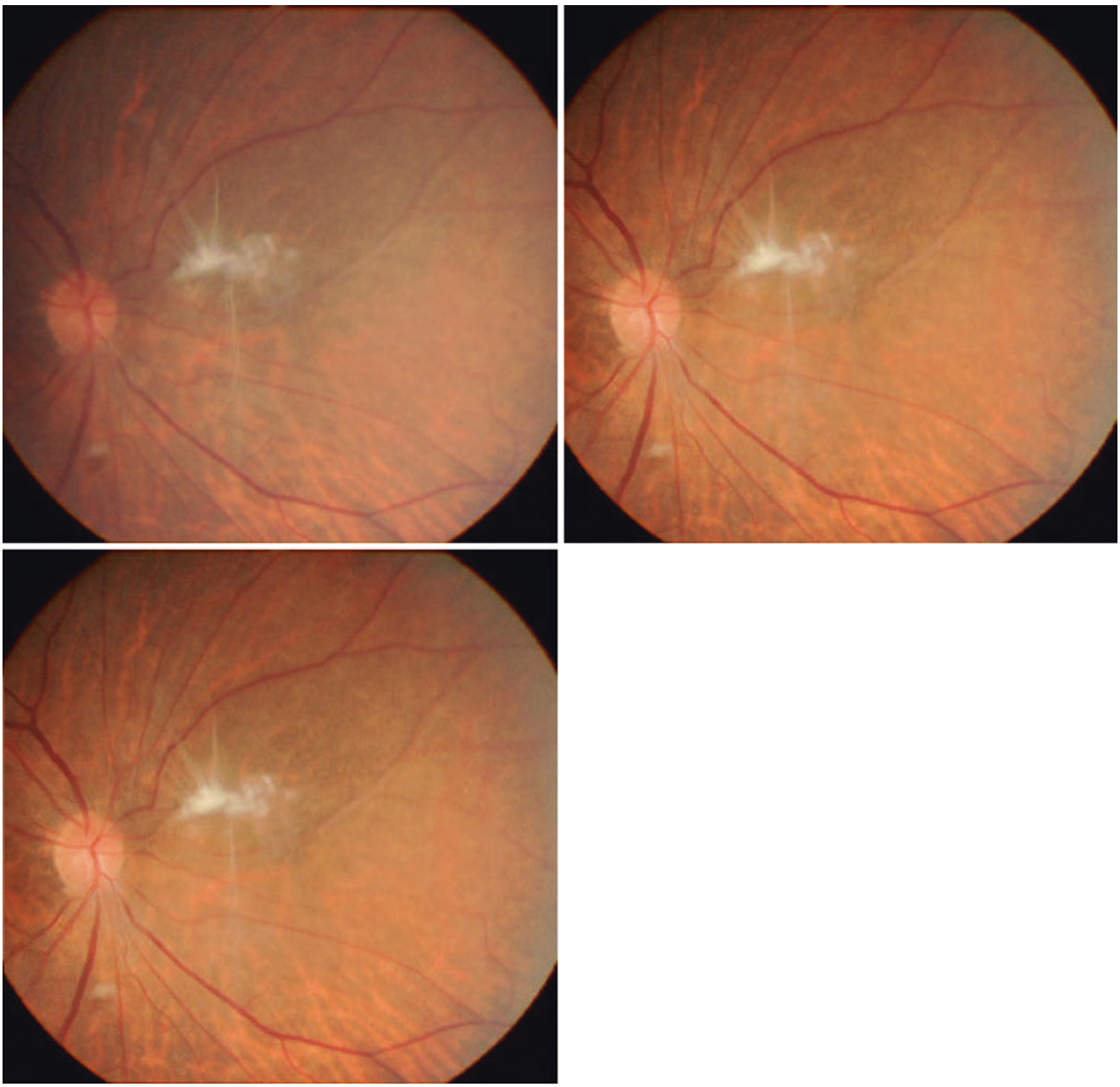

Fig. 4.17 Fibrovascular organization in the vitreous
I. Branch-like membrane between the optic disc and macula
II. Stretched retinal veins and insufficient blood supply in segmental vessels
III. Areas of tractional retinal detachment

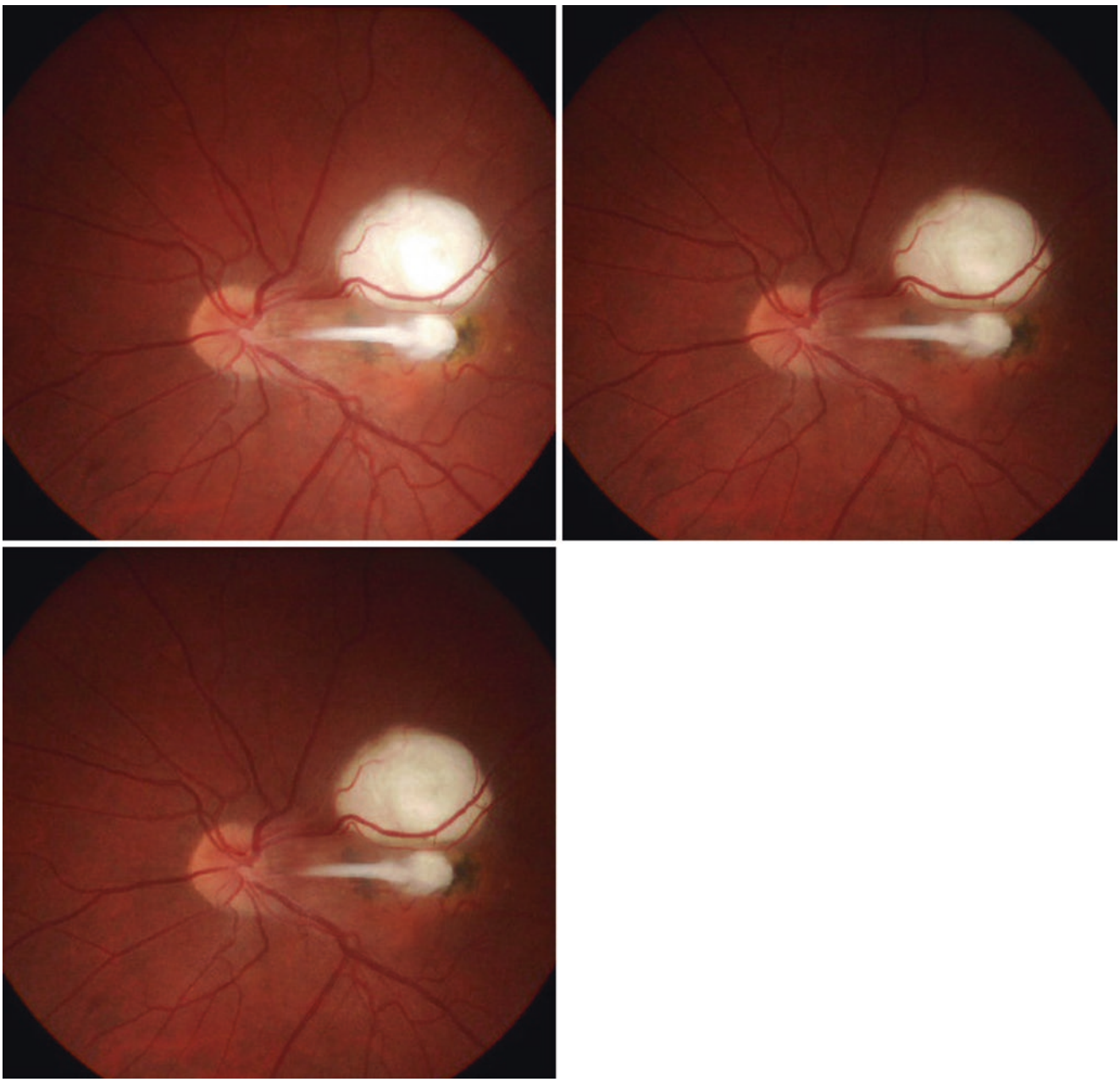

Fig. 4.18 Parasitic infection
I. Subretinal lesion of parasitic infection
II. Vitreous streak
III. Subretinal pigment proliferation
IV. Distorted retinal veins in the macula

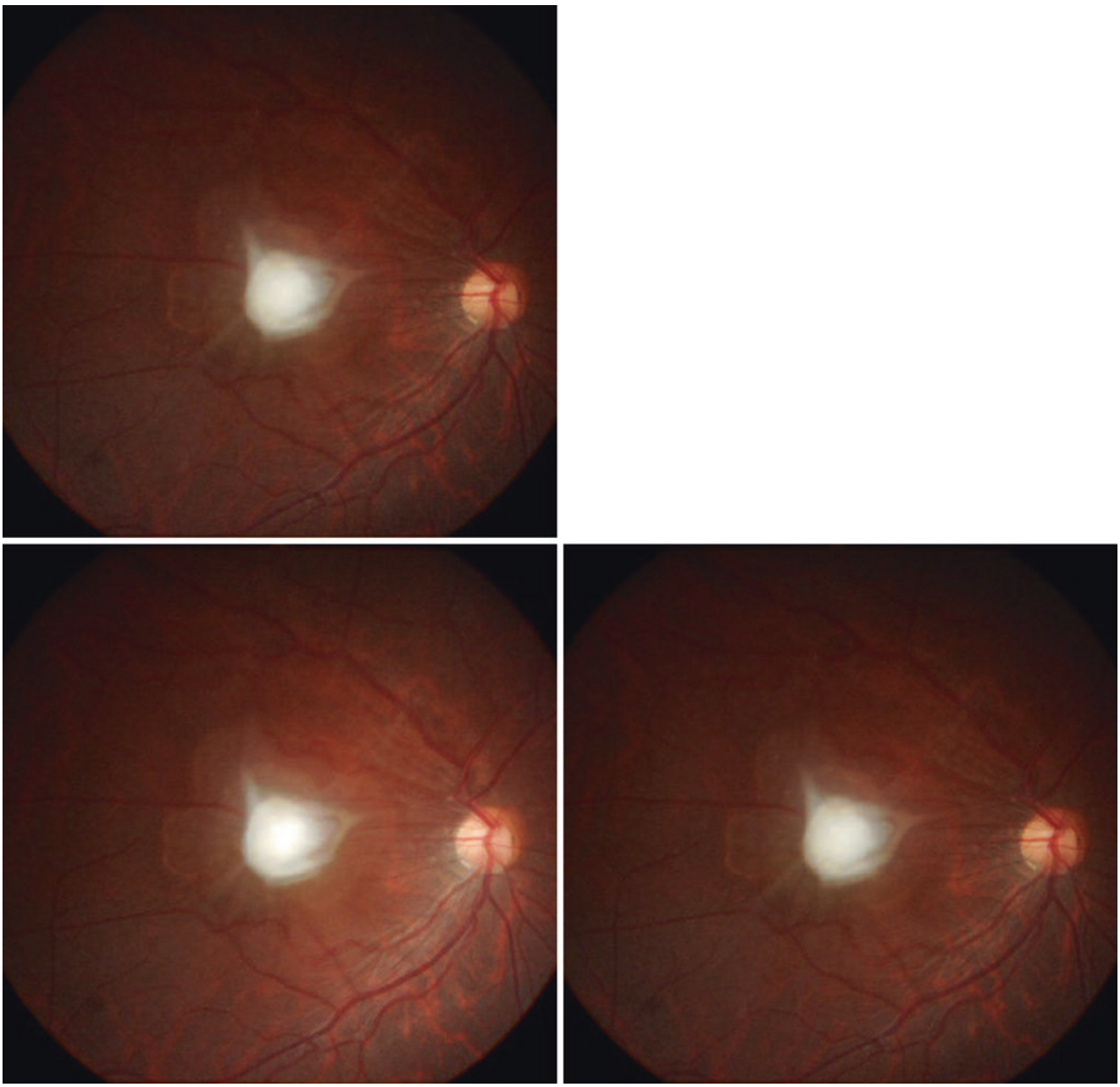

Fig. 4.19 Fibrovascular organization in the vitreous
I. Dense white membrane anterior to the macula, and the tentacles extending to its neighbor
II. Subretinal reactive change
III. RPE reactive change
IV. Distorted retinal vessels

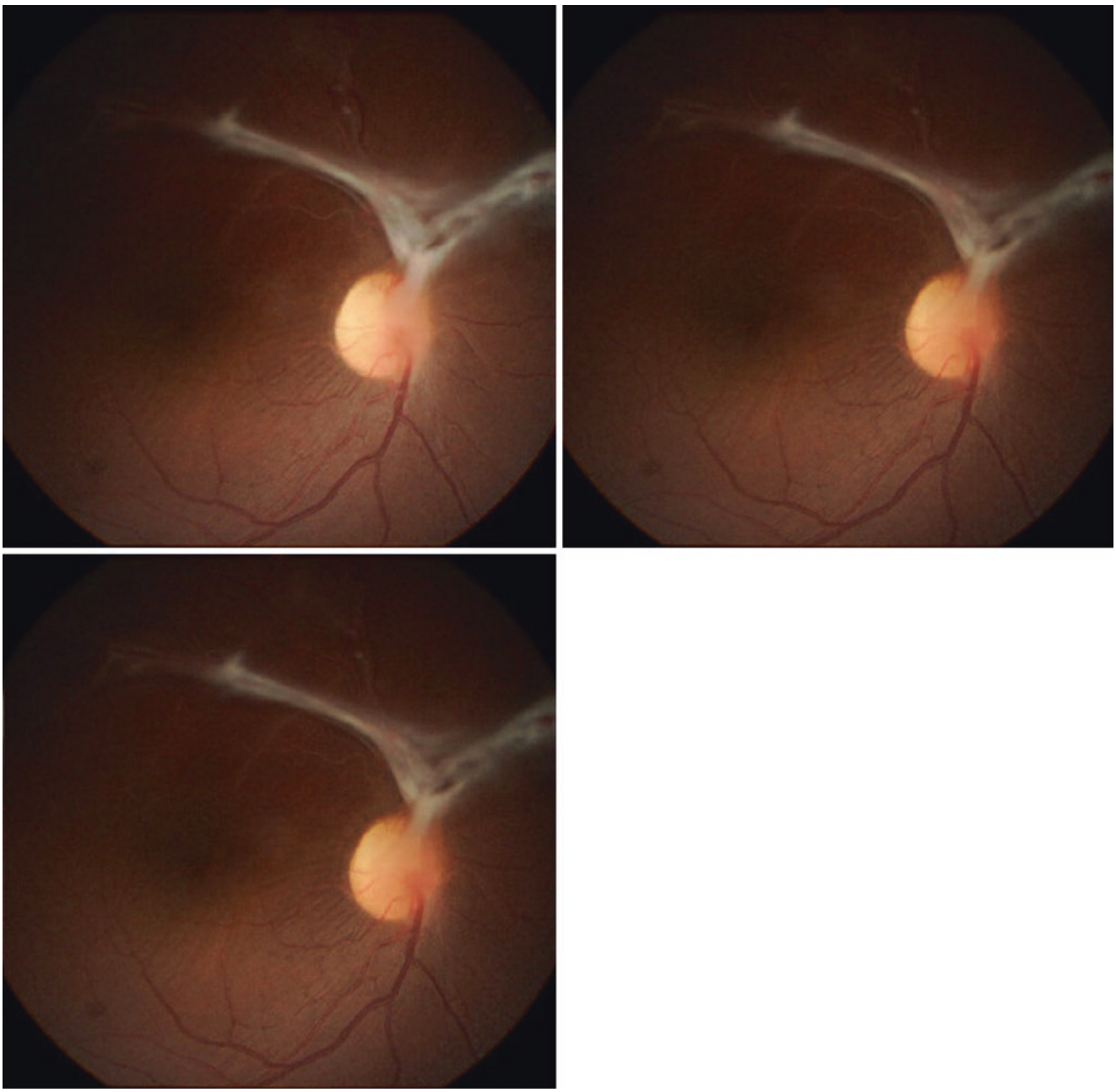

Fig. 4.20 Fibrovascular organization in the vitreous
I. Streak superior to the optic disc like a jug to stretch the retinal vessels
II. Ghost vessel of the retinal vein
III. Retinal fold
IV. Dilated retinal veins
V. Distorted superior branch like a loop

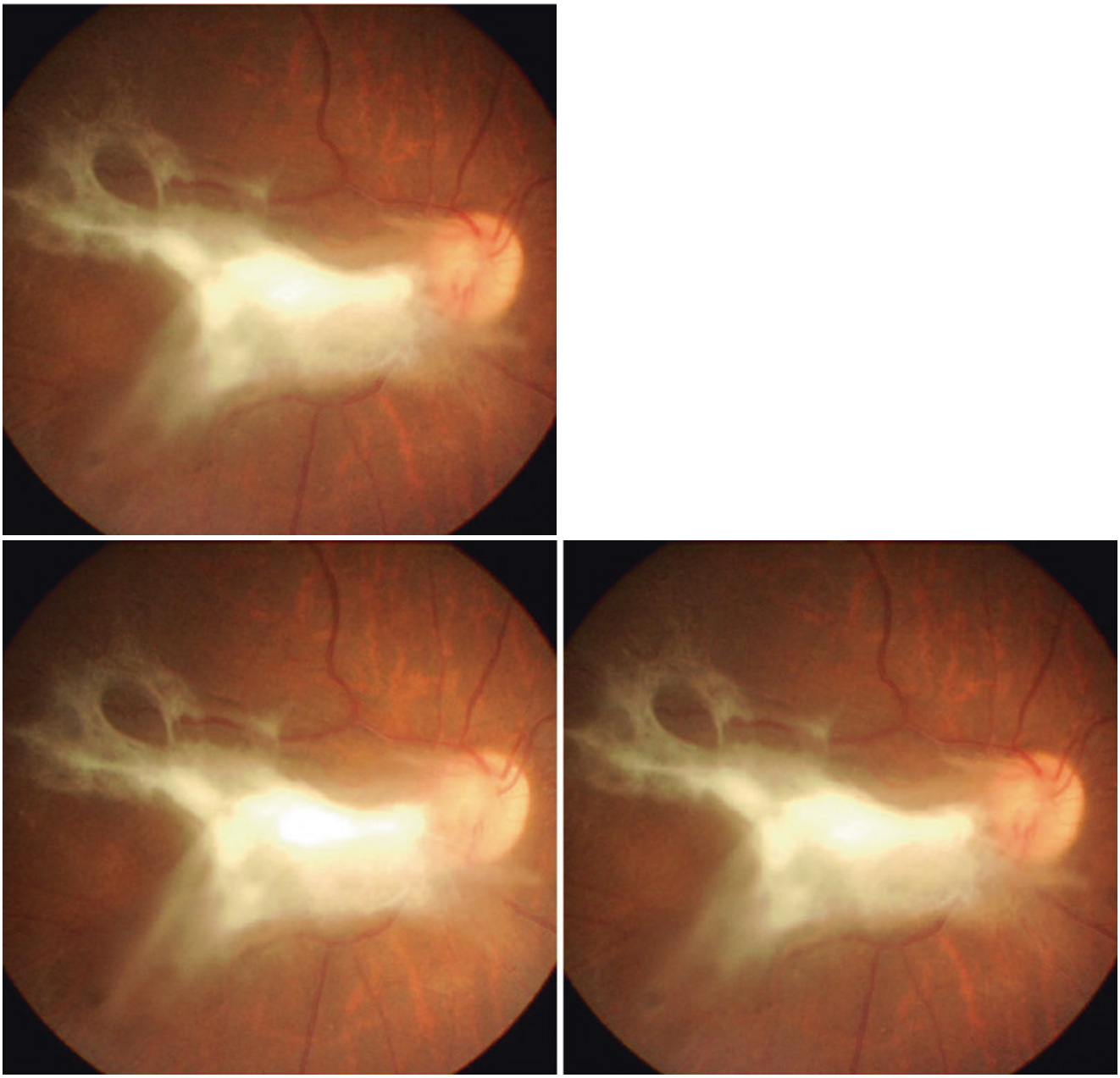

Fig. 4.21 Membrane in the macula area
I. Dense membrane of the vitreous to block the macula
II. Optic disc

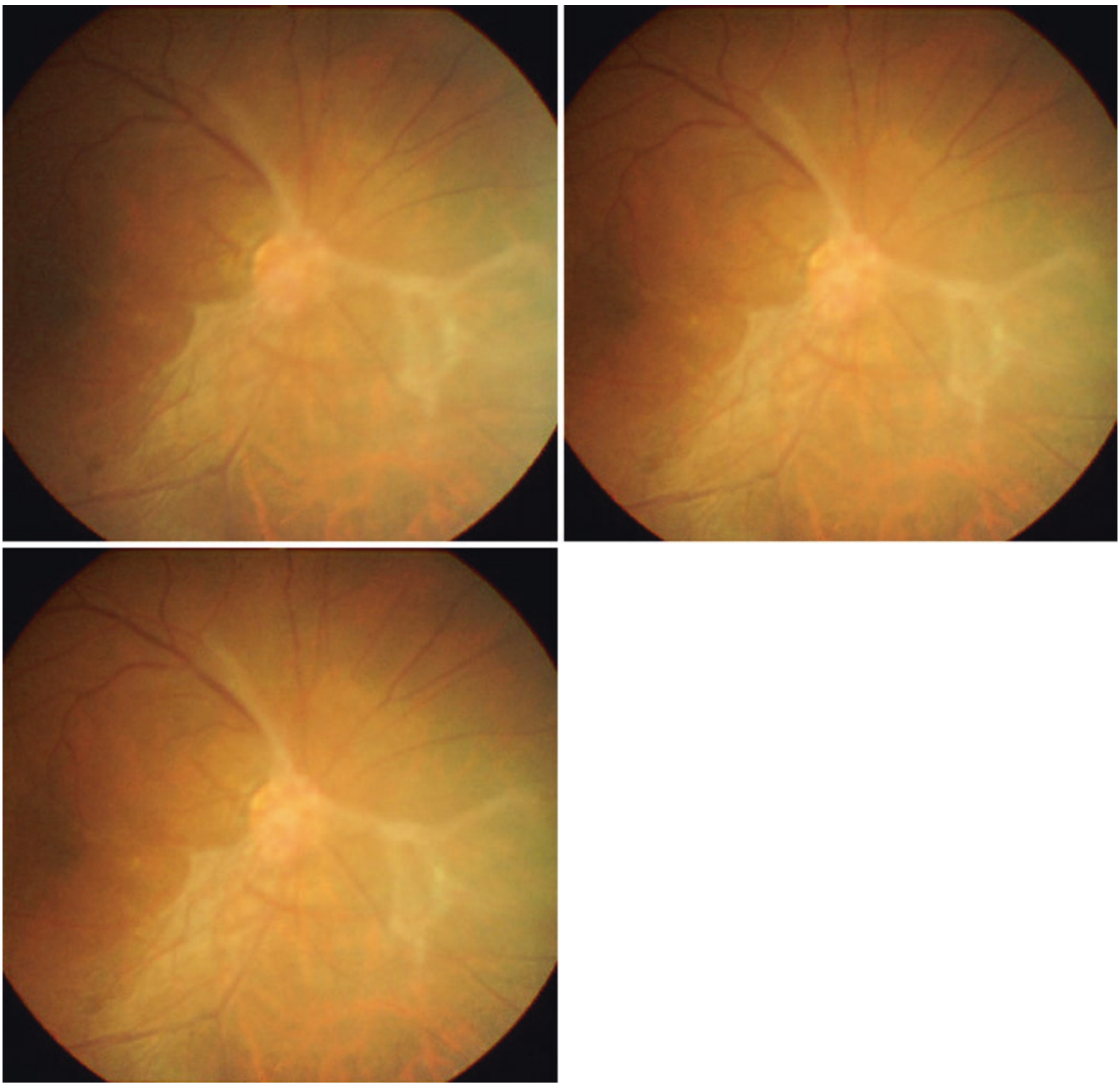

Fig. 4.22 Organized streak in the vitreous
I. Streak superior to the optic disc
II. Dilated retinal veins
III. Suspending retinal vessels

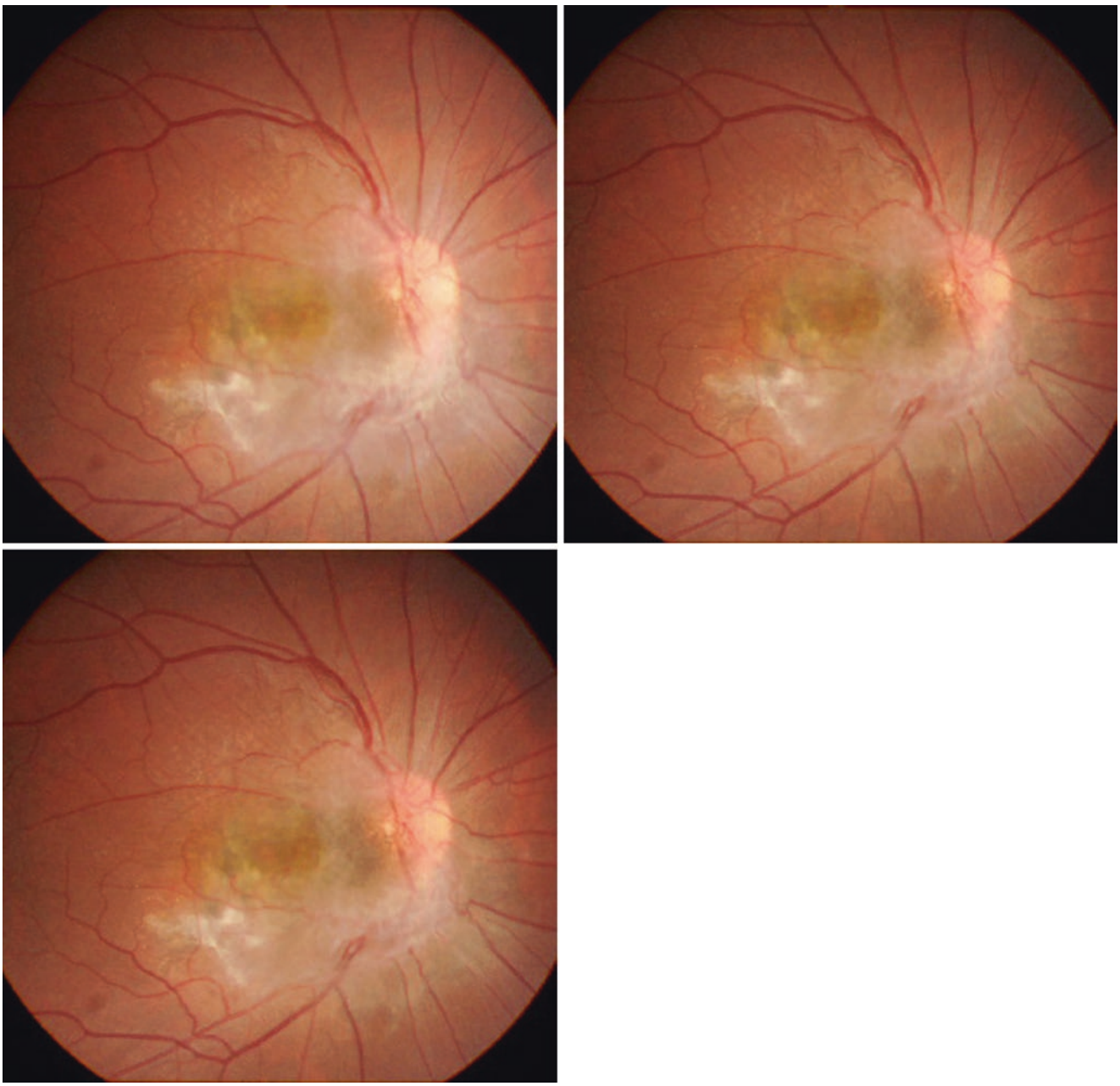

Fig. 4.23 Fibrovascular membrane in the vitreous
I. Carpet-like membrane in the vitreous
II. Dilated retinal veins
III. Subretinal membrane
IV. Retinal folds
V. Subretinal depigmentation

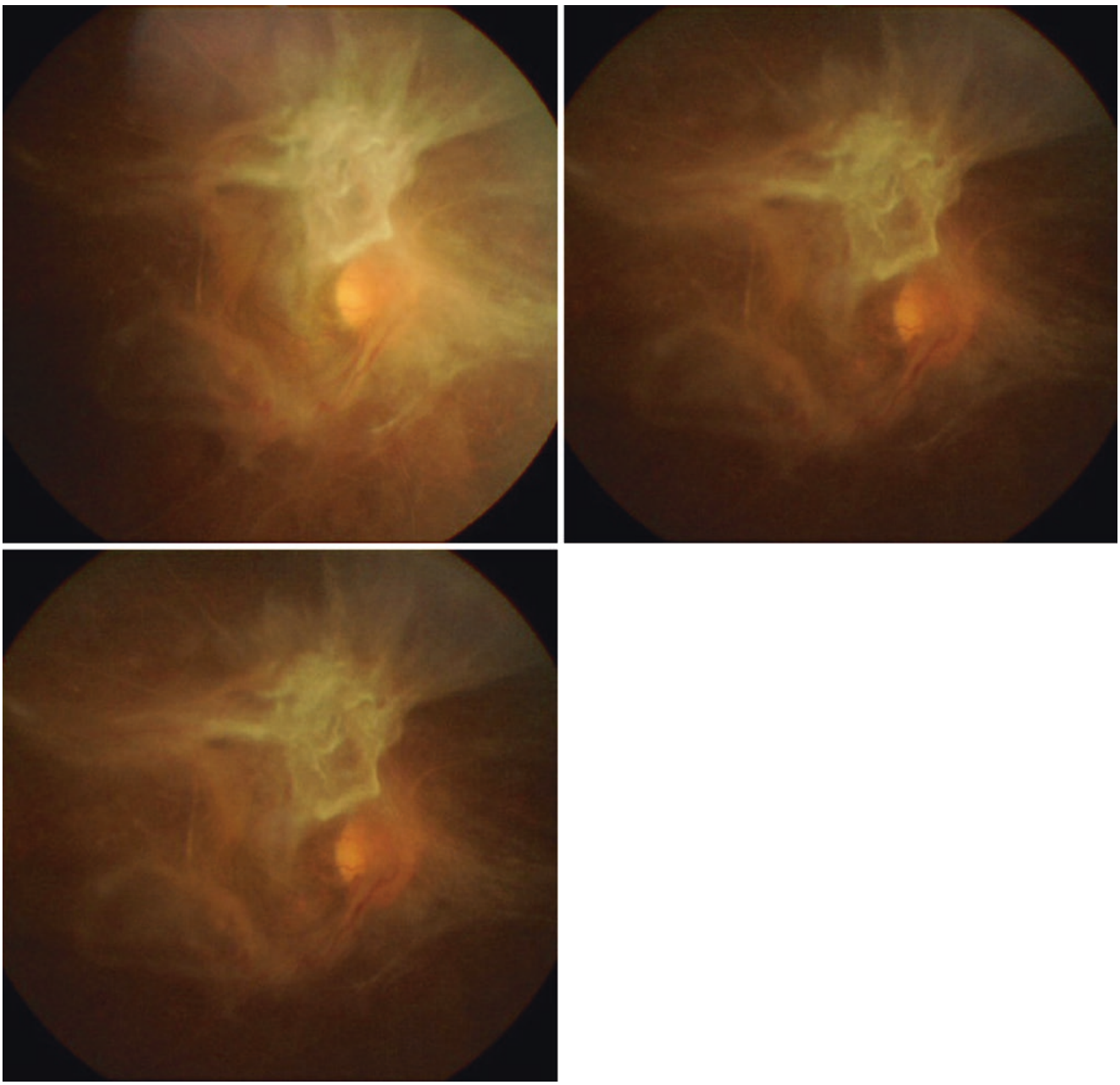

Fig. 4.24 Vitreous fibrovascular membrane
I. Membrane superior to the optic disc
II. Neovascularization of the optic disc
III. Retinal veins
IV. Neovascularization in the vitreous
V. Multiple ghost vessels

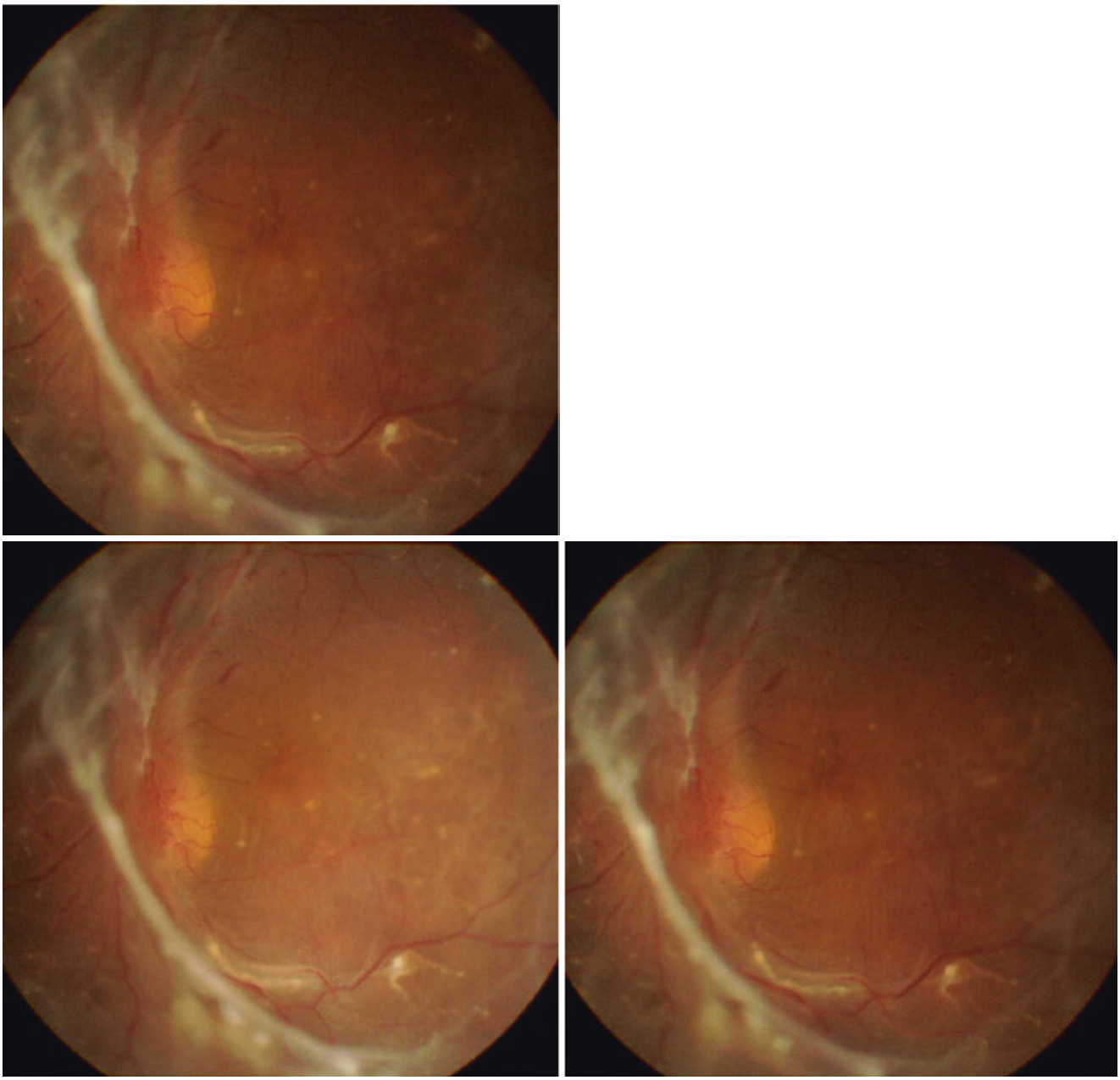

Fig. 4.25 Vitreous proliferation
I. Membrane anterior to the optic disc and made traction to the retinal vessels
II. Neovascularization of the optic disc
III. Retinal detachment and retinal vessels
IV. Subretinal membrane
V. Superficial retinal hemorrhage

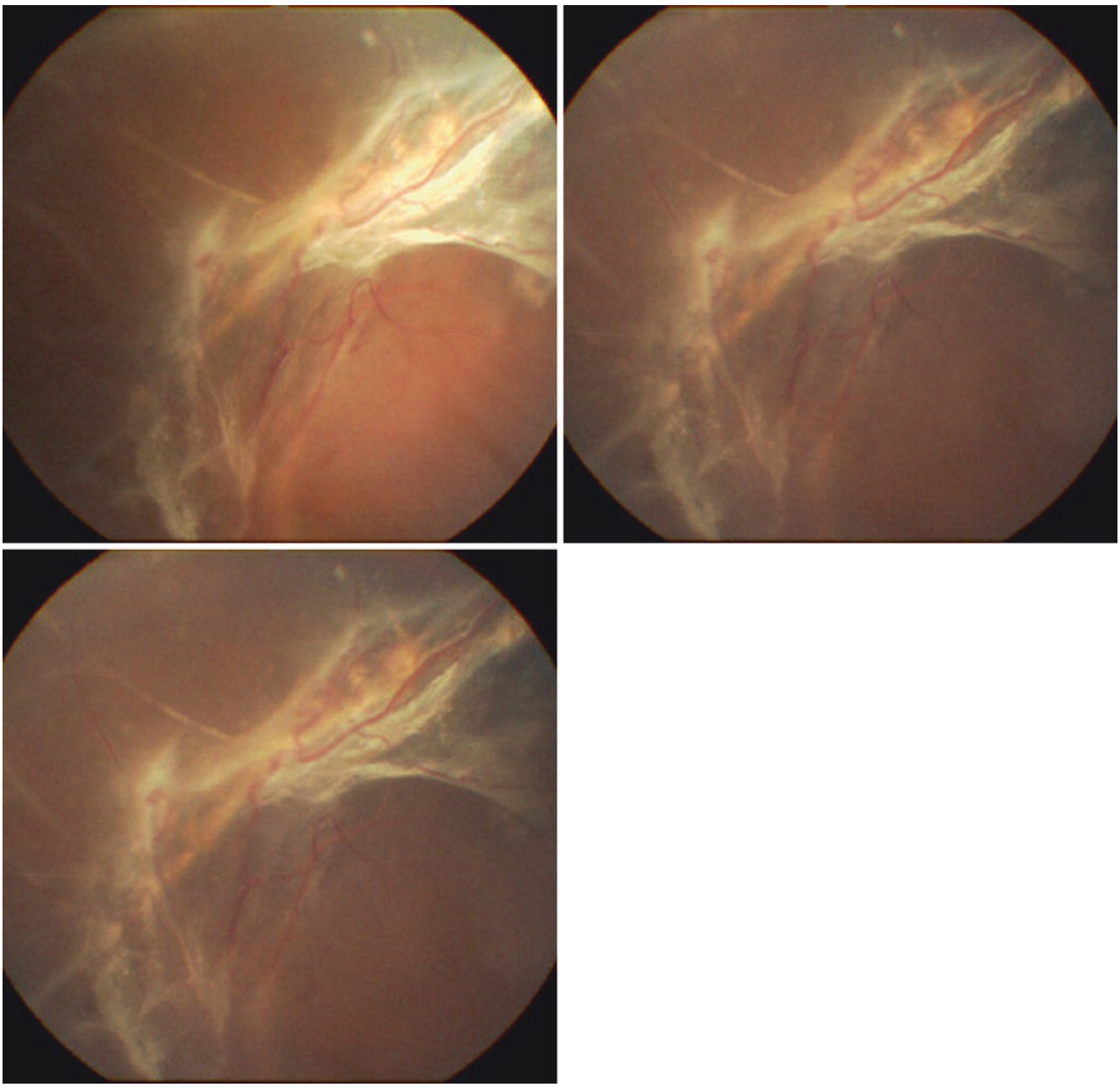

Fig. 4.26 Streaks in the vitreous
I. Membrane superior to the optic disc and tractional retinal detachment
II. Distorted retinal vessels and disappearing ends in the membrane
III. Subretinal streak

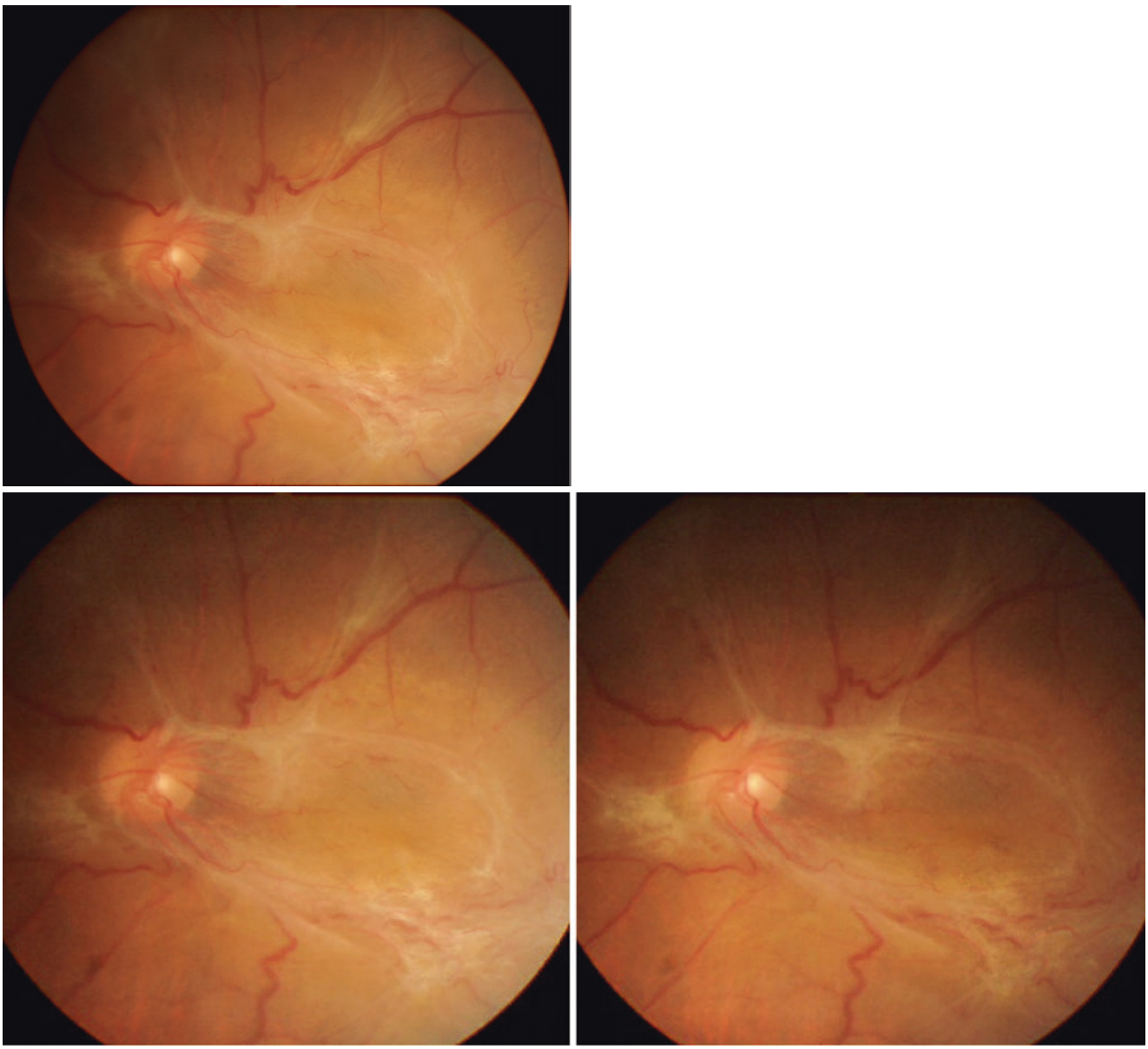

Fig. 4.27 Membrane in the vitreous
I. Membrane in the posterior pole and tractional retinal detachment
II. Distorted retinal vessels
III. The membrane extended to the mid-periphery

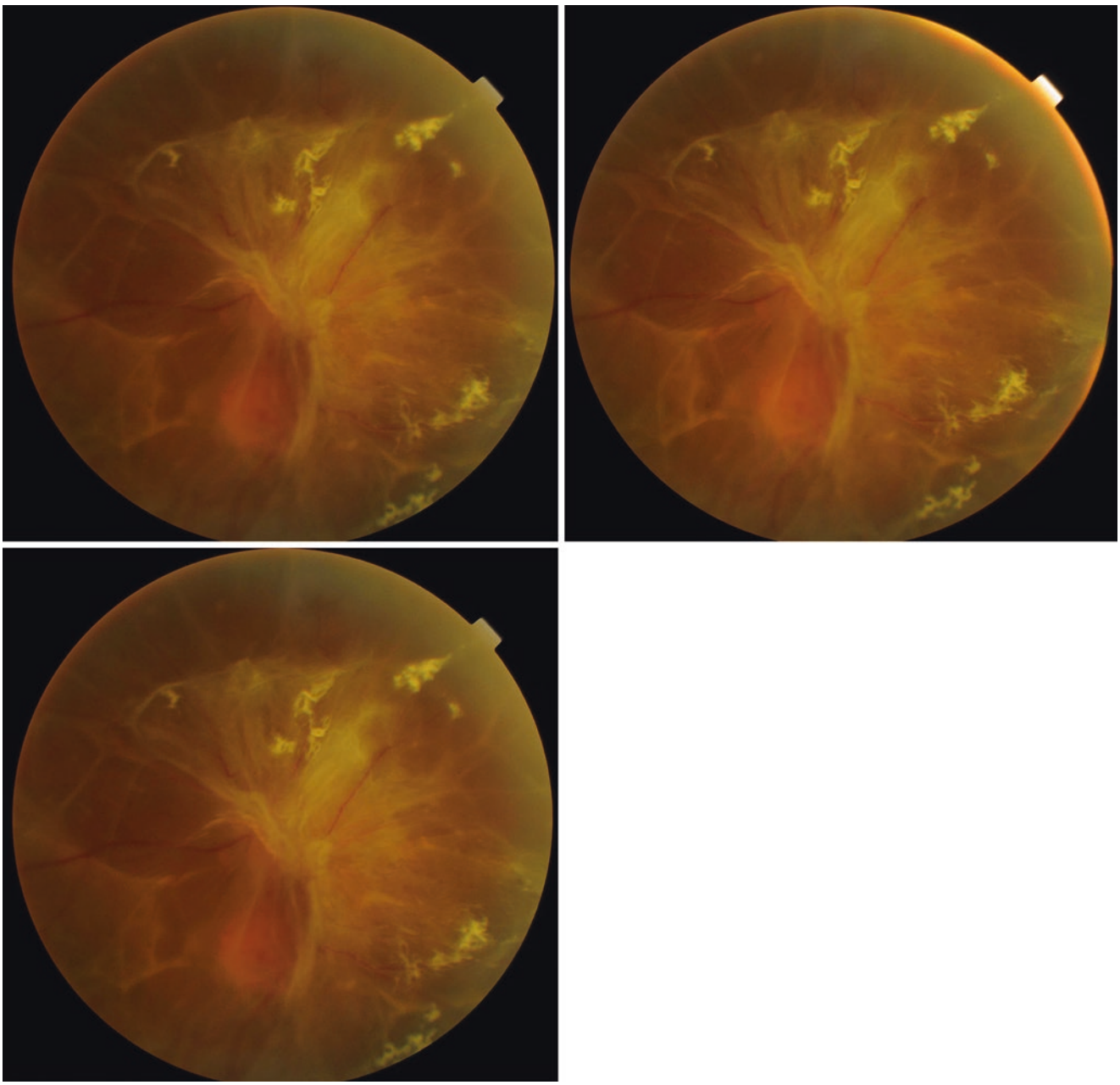

Fig. 4.28 Fibrous membrane and tractional retinal detachment
I. Fibrous membrane with branches attaching to the retina
II. Distorted retinal vessels
III. The membrane extended to the mid-periphery
IV. Retinal detachment
V. Old vitreous hemorrhage

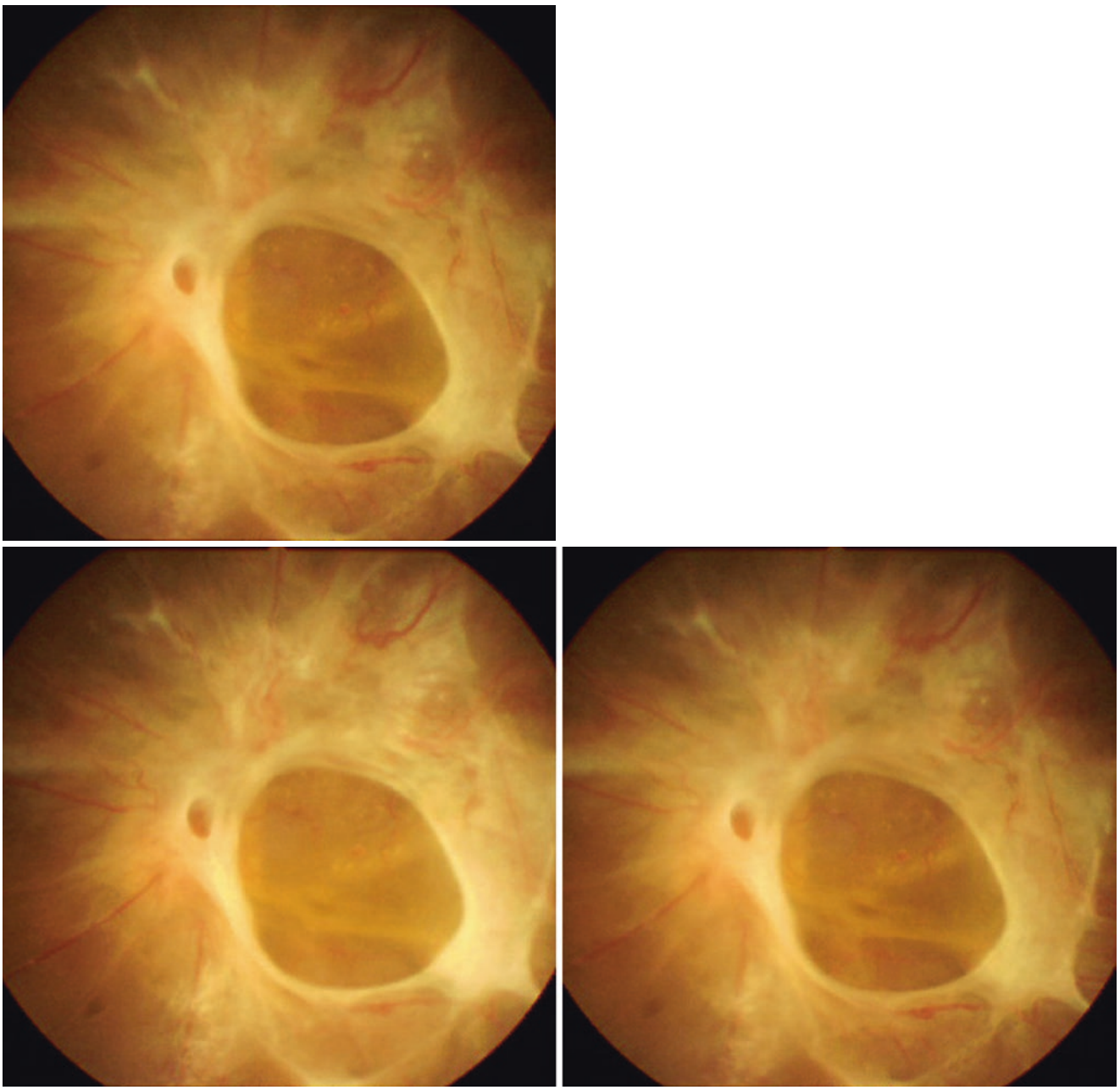

Fig. 4.29 Membrane in the vitreous
I. Membrane in the posterior pole and tractional retinal detachment
II. Epiretinal membrane in the posterior pole
III. Retinal detachment in the macula

References

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