Choroidal Folds

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Core Messages

- Choroidal folds involve at a minimum: the retinal pigment epithelium, Bruch's membrane, and the inner choroidal layers
- Choroidal folds are best observed on fluorescein angiography, but are also evident on ophthalmoscopy especially when using the technique of retro-illumination
- Idiopathic acquired hyperopia is the most common entity associated with choroidal folds
- Bilateral choroidal folds may be associated with more benign ocular and orbital pathology
- Unilateral choroidal folds may be associated with more significant ocular and orbital disease processes

5.1 Introduction

In the first reported case of choroidal folds in 1884, Nettleship identified "peculiar lines in the choroid" [23] in association with papillitis. Since then, the understanding of the mechanisms, aetiologies, and management of choroidal folds has expanded.

Anatomically, choroidal folds, often called chorioretinal folds, are undulations in the retinal pigment epithelium (RPE), Bruch's membrane, and the inner choroidal layers that may or may not involve the retina [10, 12, 15, 18]. The basic cause in the formation of choroidal folds is the excessive potential surface area of the choroid for the space that it has to occupy. This can result from various factors, but is most commonly associated with either scleral shortening or choroidal congestion [3, 5, 12, 15, 24].

5.1.1 Clinical Evaluation

Symptoms from choroidal folds can vary. Conditions that cause newly acquired folds may lead to the complaint of metamorphopsia or distortion. Most patients with long-standing choroidal folds have no visual complaints related to their folds and often have no Amsler grid abnormalities either [12].

With ophthalmoscopy, choroidal folds can be appreciated by the light and dark bands observed deep to the retina. The light lines are thought to be the crests of the folds where the underlying RPE is stretched thin and light exposed. The dark lines are the troughs of the folds where the RPE is condensed and shadowed from the light. The folds are often found temporal to the disc, confined to the posterior pole, and rarely extend beyond the equator of the eye [3, 24, 25]. Newly acquired choroidal folds may be difficult to see by ophthalmoscopy, while long-standing choroidal folds may develop more pigmentation contrast and

hence are easier to distinguish [24]. In order to best observe choroidal folds, the technique of retro-illumination can be used. Retro-illumination directs the light beam adjacent to the area that is studied and provides increased contrast, making the alternating lines stand out [24]. In some patients there may be some pigment proliferation, causing pigmented lines after the acute cause of the chorioretinal folds has subsided.

The pattern of folds can be divided into five varieties: horizontal, oblique, vertical, radial, and irregular. Horizontal and oblique folds are most typical and are usually parallel in nature. Oblique folds may be curved and located outside the posterior pole. Vertical folds are relatively rare [24]. The characteristics of choroidal folds can be used to help establish the reason for their existence.

5.1.2 Ancillary Testing

While choroidal folds are visible on ophthalmoscopic examination, they are more easily identified using fluorescein angiography (FA) [33]. Angiographically, the crest of the fold appears relatively hyperfluorescent because the stretched and attenuated RPE facilitates transmission of choroidal fluorescence. Conversely, the trough of the fold is relatively hypofluorescent because the tightly packed RPE blocks the underlying choroidal fluorescence. These findings are appreciated in the early phases of the angiogram as the choriocapillaris fills. Late staining of the choroidal folds typically does not occur [25].

Ultrasonography is another diagnostic method used to locate and confirm the presence of choroidal folds. A-scan ultrasound may reveal a shortened axial length. Common B-scan ultrasonographic findings include thickening of the choroid in cases of infiltrative or inflammatory disorders, thickening of the sclera, such as in posterior scleritis, or flattening of the posterior aspect of the globe [6].

Summary for the Clinician

- **Newly acquired choroidal folds may be difficult to detect on ophthalmoscopy. Fluorescein angiography is the best diagnostic modality to observe choroidal folds of any duration**

5.1.3 Choroidal Versus Retinal Folds

Retinal folds occur when the neurosensory retina alone is involved and the choroid is not involved in the actual fold. With ophthalmoscopy, retinal folds are typically radial and can be distinguished from choroidal folds by the alternating light and dark lines that are finer, narrower and more diaphanous compared to the broader, thicker bands of choroidal folds. Also, retinal folds are not visibly apparent on fluorescein angiography as opposed to choroidal folds that are seen clearly [12]. Causes of retinal folds are many and may

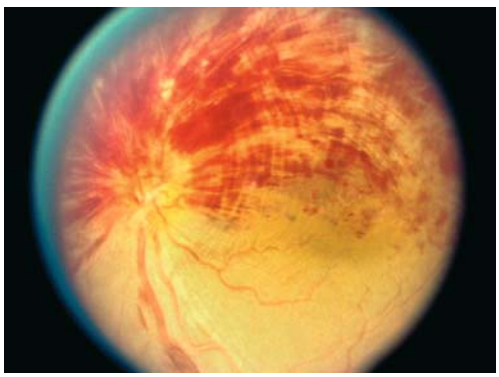

Fig. 5.1. Retinal folds in a hemiretinal vein occlusion in an elderly female patient (colour photo)