BRANCH RETINAL VEIN OCCLUSION

ESSAY

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BY

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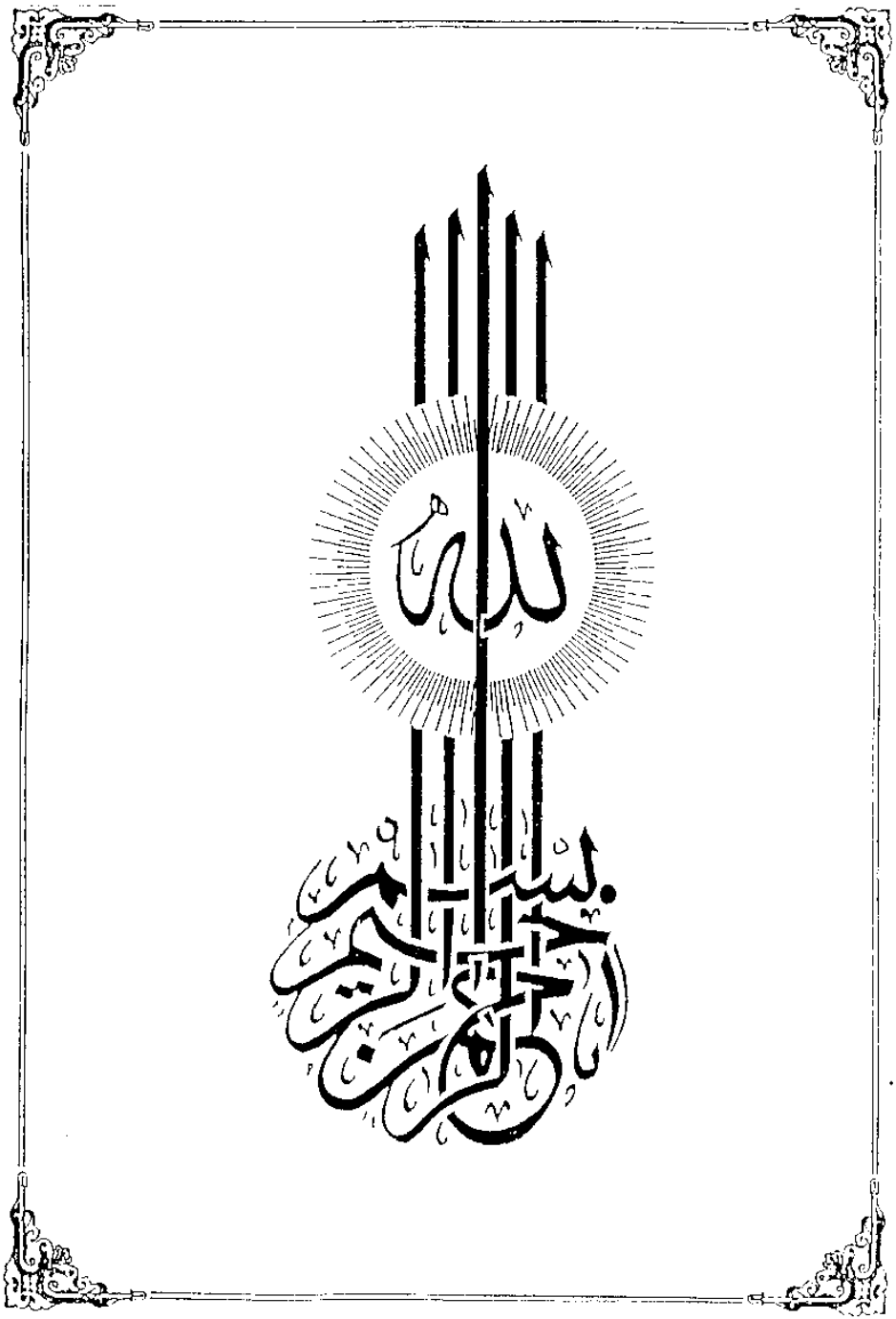

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INTRODUCTION

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Retinal branch vein occlusion is a frequent retinal vascular abnormality .

It is second only to diabetic retinopathy in the frequency with which it produces retinal vascular abnormality.

The present study tries to spot light on the natural history of that disorder through the study of the anatomy of retinal venous system , pathogenesis, different aspects of diagnosis and management of branch vein occlusion which will be evaluated and discussed under the titles of fluorescein angiography and recent laser photocoagulation.

HISTORY

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HISTORY OF BRANCH RETINAL VEIN OCCLUSION

In recent years there has been an increasing awareness of the visual morbidity associated with branch retinal vein occlusion .

It is known to be second common, after diabetic retinopathy, retinal vascular disease seen by the ophthalmologists.

The first ophthalmoscopic description was by *Leber in 1877*. Toward the end of the last century, *Elschnig and Everbush* described the typical findings of a vein occlusion with a classic collateral system present secondary to the occlusion. *Moore in 1924* was the first to report series of cases of patients presenting with branch vein occlusion. In *1936 Jensen* provided the most comprehensive work on this entity available at that time .

The increasing use of photocoagulation therapy in the late 1960s and early 1970, along with the increasing expertise in fluorescein angiography aided recognition of the disease, nature, course, Management, and trials of photocoagulation for compilcations of macular oedema and neovascularization.

(Orth and Patz , 1978).

ANATOMY

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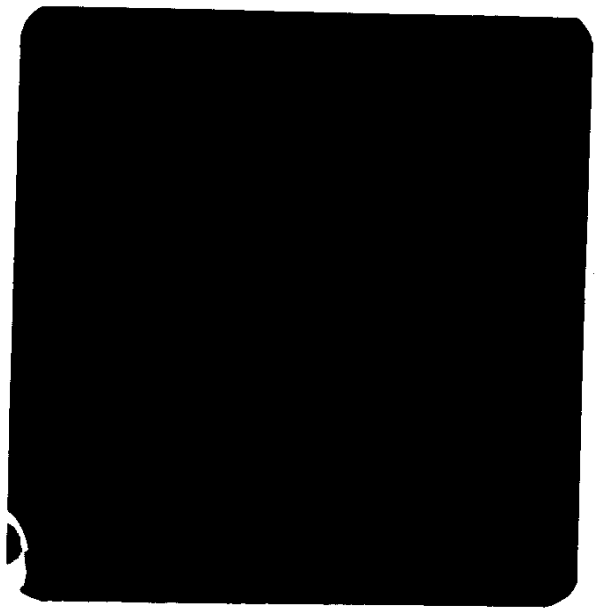
ANATOMY OF THE RETINAL VENOUS SYSTEM

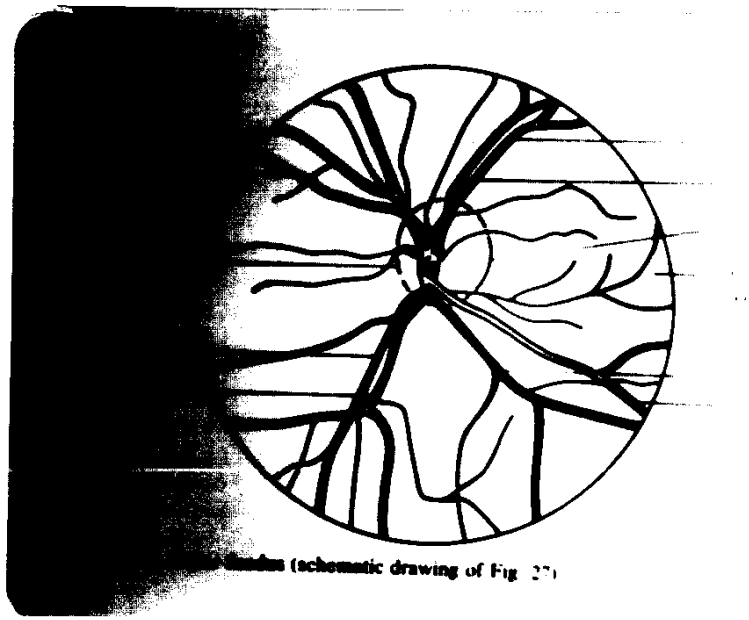
The whole of the Retinal venous circulation is undertaken by the central retinal vein, a large and important vessel formed by the confluence of the retinal veins.

In the periphery of the retina,the retinal veins do not follow the Cousre of the retinal arteries, the terminal venules bend round to form an incomplete ring extending nearer to the ora serrata than the arteries; and for some distance run independently of them.

In the more Central parts of the retina, however the retinal veins run in closer association with the arteries, they follow the pattern of the arteries more or less. Here and there a vein will cross the artery superficially or deeply or may be at some distance from it. The circulation thus converge until one main retinal vein forms in each retinal quadrant. In the peripapillary part of the retina near the disc margin or on the disc itself, or even in the region of the optic cup within the optic nerve-head there is a union between the superior temporal and superior nasal retinal veins and between the inferior temporal and inferior nasal retinal veins with formation of the superior and inferior papillary veins. (fig.1- A,B) .



(Fig.1-A):- Normal occular fundus ; Even red colour :in the centre is the optic nerve head with a physiologic excavation .*(Nover,1981)* .



(Fig.1-B):- Normal occular fundus (Schematic drawing) *(Nover , 1981)* .

This arrangement however, is subject to as much variations as occur in the case of the arteries and a number of veins may reach the disc indepentdly or may show unusal branching. *(Duke - ELder and Wybar, 1976)* .

The retinal veins can be distinguished from the arteries by several factors, the veins are slightly larger, the diameter of the artery is about two-thirds to three-quarters that of the vein with which it runs.

The veins are of deeper hue, the vein is slightly compressed in cases of arteriovenous crossings, the vein is of less brighter light reflex.

(Michaelson and Benezar , 1980) .

The central retinal vein (vena centralis) is formed from the superior and inferior retinal veins, and this takes place at about the level of the lamina cribrosa, that is some what proximal to the division of the central retinal artery into its primary branches, which occurs in the retinal portion of the optic nerve *(wolff, 1976)* .

The central vein leaves the eye ball by piercing the lamina cribrose in company with the artery. The vein now passes backward withen the optic nerve on the temporal side of the central retinal artery until about 10 mm.benhind the globe, it turns downwards at right angle to pass out of the optic nerve, crosses the extension of the subarachnoid space around the nerve

and emerges from the dura-arachnoid sheath behind the artery. The central retinal vein runs backward in the the orbit, usually continuing through the superior orbital fissure withen the annulus of zinn to enter the cavernous sinus as an independent branch. It may join the superior ophthalmic vein *(Snell and Lemp , 1980)* .

The central retinal vein allways has a longer course in the subarachnoid space than the artery but it has blood in much lower pressure. So if the cerebrospinal fluid pressure rises therefore, it is the vein which will be obstructed, a fact which may explain the occurence of oedema at the disc in such conditions *(wolff, 1976)*.

The major branches of the retinal vein run peripherally from the papilla at a superficial level in the nerve fibre layer. Successive divisions of the vessel remain at this level until the intermediate precapillaries are reached*(Michaelson and Benezar,1980)*

From these precapillaries two capillary plexuses are given off which are not however, independent; anastomotic capillaries run from one to the other, and the same capillary may run for part of its course in onelayer and then change to the other .

The superficial (inner) capillary network; lying in the more superficial part of the nerve-fiber layer.

The deep (outer) capillary network: lying in the boundary plane between the inner nuclear layer and the outer plexiform layer. This deep capillary net is denser and more complex than the superficial one *(Michaelson and Benezar, 1980)* .

In the equatorial zone of the retina, where the two layered pattern is the most distinct,it had been found in representative fields of this zone that at 9 to 10 mm. lateral to the nerve head, the average width of the capillary mesh was 54 μ. in the deep net and 65 u in the superficial. for fields 9 to 10 mm. medial to the nerve head the corresponding figures were 63 and74μ. *(Michaelson and Benezar , 1980)* .

This basic two-layered pattern of the vascular architecture is modified in certain parts of the retina by the addition of other layers and by the reduction to single layer . In the peripapillary region 4 mm. medially and 7 mm. laterally to the nerve head, the nerve fiber layer is thick,the deep capillary plexus is not modified, but the superficial net becomes thicker and increasing three diminsional:

(1) A peripapillary radial net, in the most superficial layer,it is dense and of radial arrangment.

(2) The superficial plexus proper.

(3) A reduplication of this layer. together with the deep capillary net, therefore, four capillary networks in this region.*(Duke-Elder and Wybar, 1976)* .

Therefore, in the peripapillary retina, an additional layer of capillaries are present. These four layers support the extremely thick nerve fibre layer characteristic of this region. Most of this extramacular fundus is supported by two layers of capilleries. Peripherally, this is reduced to a scanty single layer as the ora serrata is approached.

(Peyman et. al., 1980) .

Around the macula; the most superficial net disappears., so that a three layered network exists. Around the fovea of course all the capillaries disappear forming an avascular area 0.4 to 0.5mm. diameter *(Michaelson and Benezar, 1980).*

In the peripheral retina; the capillary network becomes wider and the deep network becomes intermittent being represented only around the efferent veins until as the periphery is approached (11.5 - 14.5 mm. from the nerve head), it disappears altogether . Here, there is only a single (superficial) increasingly wide mesh and wide calibre capillaries

(Duke-Elder and Wybar, 1976) .

The extreme margins of the retinal vascular system lies about 1 mm. behind the ciliary body leaving a narrow peripheral zone of the retina, entirely without blood vessels *(Michaelson and Benezar, 1980)* .

The capillary free zone; around the arteries down to the level of the pre-capillaries is about 50 μ on