قســـــم : التشريح والهستولوجيا - كلية الطب البيطرى - جامعة أسيوط
رئيس القسم : د . / عبد اللـــه حفـنى

دراسة هستومورفولوجية على الجزء الحجابى من العصب البصرى فى الجمل وحيد السنام

محمد فتح الباب ، أنور قاسم ، عبد الله حفنى ، أحمد قناوى ، محمد عبد المنعـــم

تزداد طبقـة الألياف العصبيـة فى السـمك تدريجيـا حتى تصل الى القرص البصرى حيث يتدرج سـمكها من ٥٦٣ - ٧٥٠ ميكرميتر يغطـى بالكساء الدهـنى بمجـرد مرور الألياف العصبيـة خـلال الطبقـة الصلبة مـن الجزء المقلى من العصب البصرى . قطر العصب البصرى خلف مقلة العين يصل الى نصف ملليمتر . الكساء الدهنى رقيق فى المنطقة الأماميـة من العصب البصرى ويزداد فى السمك كلما اتجهنا الى الخلف حيث تكون الألياف العصبيـة بعيدة عن بعضهـا البعض . الحنـون الام غنيـة فى الألياف المرنة وترسل حـواجز رقيقـة فى داخل العصب البصرى ، ولكن لا توجد حزمة من النسيج الضام فى وسط العصب البصرى .

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A HISTOMORPHOLOGICAL STUDY OF THE ORBITAL (RETROBULBAR) PORTION OF THE OPTIC NERVE IN ONE HOMPED CAMEL

(With 6 Fugures)

By

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(Received at 7/1/1981)

SUMMARY

The nerve fiber layer increases gradually in thickness as it reaches the optic disc-where it ranges 563-750 um. The optic nerve gains its mayelin sheath while the axons had passed through the scleral layer of the intraoculer portion of the optic nerve. The diameter of optic nerve is about 5.0 mm just behind the globe. The myelin sheath is relatively thin rostrally and increases in thickness caudally where the axons are demonstrated apart from each other. The pia mater is relatively rich in elastic fibers, and sends few fine septa in the texture of the optic nerve. There is no central connective tissue band, but the pial septa decrease in thickness towards the center of the optic nerve.

INTRODUCTION

The present study is important to recognize the histomorphological study of the optic nerve in camel.

Animal literatures on this work is not available in sufficient quantity specially in camel. Many authors described the histomorphological features of the optic nerve in man (VANGHAN and ASHURY, 1961; WOLTER, 1961; COBENHAVER, 1964; FOSTER, 1964; FINE and YANOFF, 1972 and HAM, 1974).

The optic nerve composed of intraocular and orbital portions. The present study is complete our last observation on the orbrtal portion of the optic nerve.

MATERIAL AND METHODS

For histomorphological study of the orbital protion of the optic nerve of single humped camel, specimens were taken from ten camels of both sexes and ages.

The Orbital Region Classified Into:-

A- In the vicinity of the globe.

B- In the vicinity of the apex of the orbit.

C- The specimes were fixed in 10% formalin and were embeded in paraffin.

Sections were cut at about 5 um. thickness for the collected specimens as follows:

A- The eye ball:

a- Transverse sections parallel to the equator.

b- Transverse meridianal sections.

B- The optic nerve:

a- Longitudinal sections.

b- Transverse sections.

For studing the myelination, frozen sections were cut at 20 um. thickness.

The following stains were employed:

1- Harris's Haematoxylin and Eosin for general histological examination (HARRIS, 1898).

2- Weighert's resorcin fuchsin for the demonstration of elastic fibers (WEIGHERT, 1898).

3- Heidenhain's Azan modification for demonstration of collagenous fibers (HEIDENHAIN, 1915).

4- Gros-Bielschowsky's silver stain for axons in frozen and paraffin sections (MODIFIED) (BENCROFT and STEVENS, 1977).

5- Sudan black stain for demonstration of lipids (LISON and DANGENLIE, 1935).

Measurment were made by using eye piece micrometer.

The retinal nerve fiber layer at the nasal half of the globe ranges from 40-60 um. in thickness. However, it ranges from 20-22 um. in thickness at the temporal, 30-40 um. at the dorsal and 14-40 um. at the ventral half of the globe (Fig. 1).

The nerve fiber layer increases gradually in thickness as it reaches the optic disc where it ranges 563-750 um. (Fig. 2). The axons of the ganglionic cells run into bundles parallel to the retinal surface and converge caudally towards the optic disc. The bundles of the aforementined axons are found to be separated by the fibers of Muller cells. As the bundles reach the periphery of the optic disc they are separated by colums of glial cells. The orbital portion of the optic nerve gains its myelin sheath while the axons had passed through the scleral layer of the intrabulbar portion of the nerve. The myelination occurs about 850 um. caudal to the globe. The diameter of the optic nerve just behind the globe is found to be about 5.0 mm. The axons are found to be thin at the origin of the orbital portion of the optic nerve, however, they become gradually thicker towards the apex of the orbit. The myelin sheath is relatively thin rostrally and increases in thickness caudally where the axons are demonstrated apart from each other (Fig. 3 A,B). The axons persue a longitudinal course parallel to the long axis of the nerve. Basophilic concentrically lamellated,hyalinized, rounded or oval bodies of different sizes demonstrate themselves inbetween the nerve bundles 4-4.8 cm. far from the globe. The latter bodies are surrounded by a single layer of flat cells (Fig. 4), and are mostly found in aged specimens.

The sheaths of the optic nerve range from 405-810 um. in thickness (Fig. 5). The pia mater is relatively rich in elastic fibers, and sends few fine septa in the texture of the optic nerve. In the camel, there is no central connective tissue band, but the pial septa decrease in thickness towards the center of the optic nerve (Fig. 6 A, B). The pial septa are relatively rich in elastic fibers.

The central blood vessels of the retina are not demonstrated within the orbital portion of the optic nerve.

DISCUSSION

The histomorphological features of the optic nerve of the camel agree in general with the description given by COPENHAVER (1964), FOSTER (1964) and HAM (1974), in man. Moreover, the detailed description of the optic nerve in man given by FINE and YANEFF (1972) coincides to a great extend with the results observed in the present investigation with exception of some variations dealing with the dimentions of the different portions of the optic nerve.

In agreement with the structure of the optic nerve in human eye (FINE and YANOFF, 1972) the optic nerve in camel was found to be composed of two portions namely;the intraocular (bulbar) and orbital (retrobulbar) portions.

In the present study the diameter of the optic nerve just behind the globe was about 5.0 mm, while it was recorded in man to be 3.0 mm (FINE and YANOFF, 1972). Although myelination doubles the cross sectional thickenss of the human optic nerve to reach its maximum diameter of about 3.0 mm at the posterior surface of the sclera, the present investigation showed that the optic nerve of the camel reached 5.0 mm in thickness in this region.

The present study showed that the myelin sheath was relatively thin rostrally and increased in thickness caudally. Basophillic, concenterically, lamellated, hyalinized rounded or oval bodies of different sizes were demonstrated inbetween the nerve bundles of the optic nerve of the camel. These latter bodies were found in aged specimens. They may be produced by glial cells simulating the corpora arenacea which was found to be produced by meningothelial cells within the sheathes of the orbital portion of the optic nerve in man (FINE and YANOFF, 1972). Although the orbital portion of the optic nerve in camel, as shown by the present investigation, is enveloped by the common optic nerve sheathes namely, the dura mater, the arachnoid and the pia mater. The latter was found to be relatively rich in elastic fibers and peculiarly sends fine septa in the texture of the optic nerve of the camel. The aforementioned septa failed to separate definet bundles and to meet in the center to form a central connective tissue band which was described in human optic nerve by COPENHAVER (1964); FOSTER (1964) and FINE and YANOFF (1972).

The pial septa in camel decreased in thickness gradually towards the center of the optic nerve and were found to contain elastic elements.

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LEGENDS

Fig. 1: The retina at the naeal (A), terporal (B), dorsal (D) and ventral (D) portions of the globe.Not the variations in the thickness of the retinal nerve fiber layer (layer 0) (Haemotoxylin and eosin stain oc. 10 x ob. 16).

Fig. 2: The retina near the optic disc. Note the relatively thick retinal nerve fiber layer (R) (Hematoxylin and eosin stain. oc. 10 x ob. 16).

Fig. 3: Longitudinal section into the 'orbital portion of the optic nerve near the globe (A) and near the optic foramen (B) Silver imprignation. oc. 10 x àb. 25).

Fig. 4: Concentrically lamillated hyalinized basophilic body inbetween the bundles of the optic nerve.(Haematoxylin and eosin stain. oc. 10 x ọb. 40).

Fig. 5: The sheaths of the optic nerve. Note the dura mater (D),the arachnoid (A), the pia mater (P) and the pial septum (S) (Haematoxylin and eosin stain. oc. 10 x ob. 16).

Fig. 6: The pial septa at the periphery (A) and the center (B) of the optic nerve (Haematoxylin and eosin stain. A: oc. 10 x ob. 6.3 - B. oc. 10 x àb. 16).

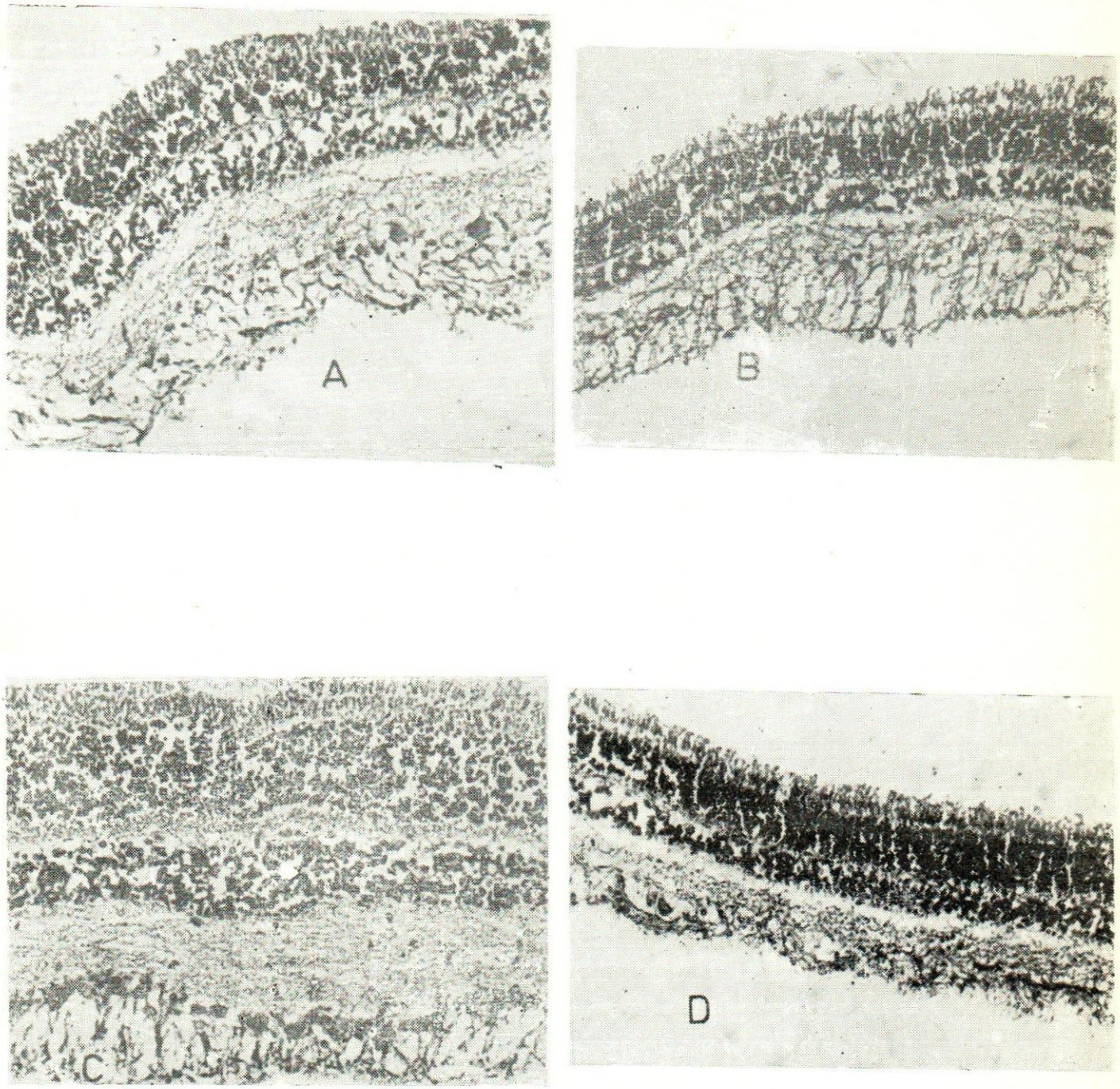
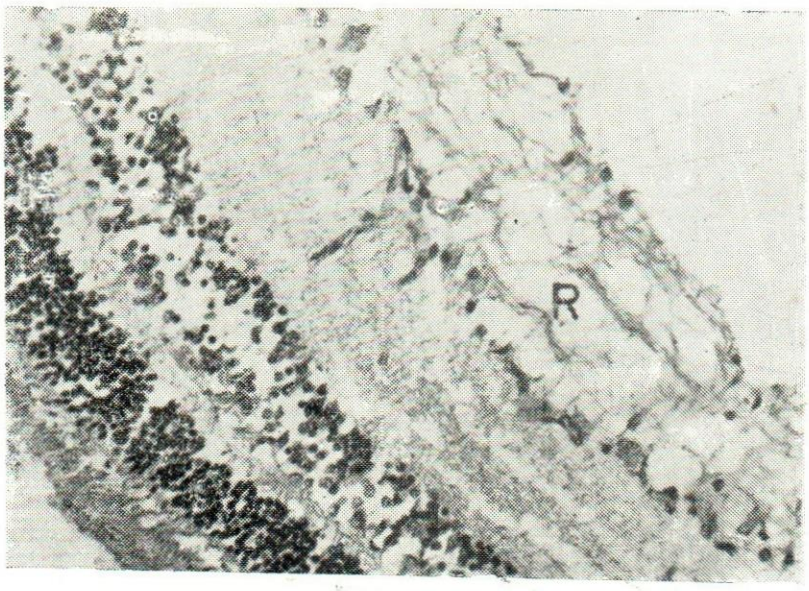


Fig. 1 : The retina at the naeal (A), terporal (B), dorsal (D) and ventral (D) porrions of the globe. Note the vaviations in the thickness of the retinal nerve fiber layer (layer 9) (Haemotoxylin and eosin stain oc. 10x ob. 16).



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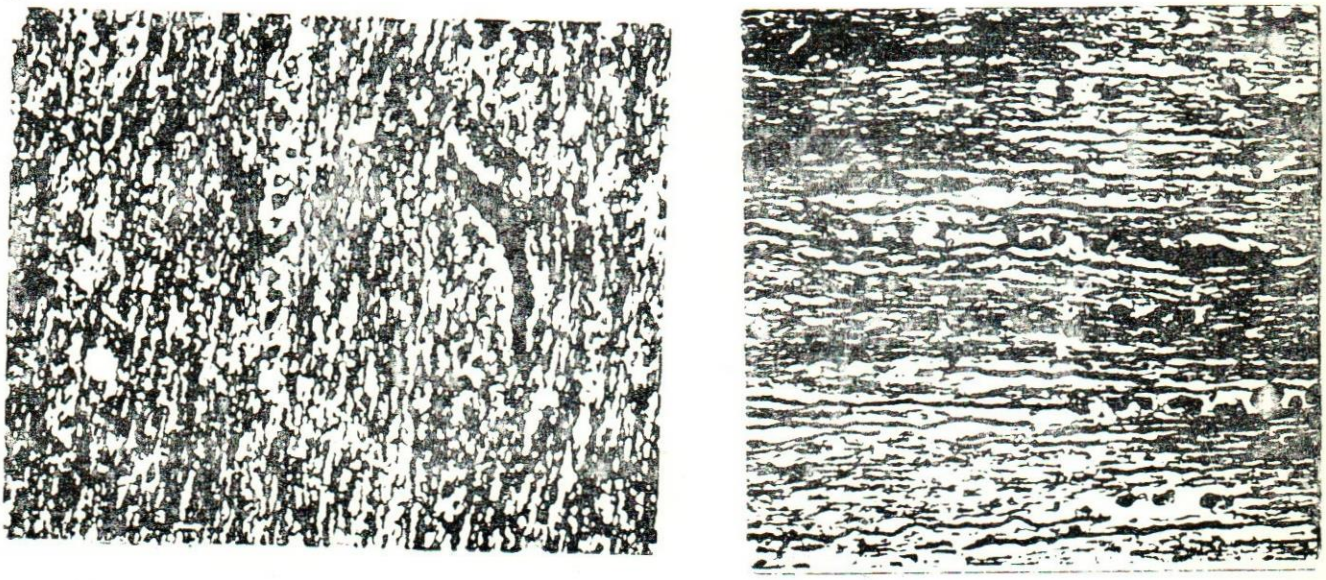

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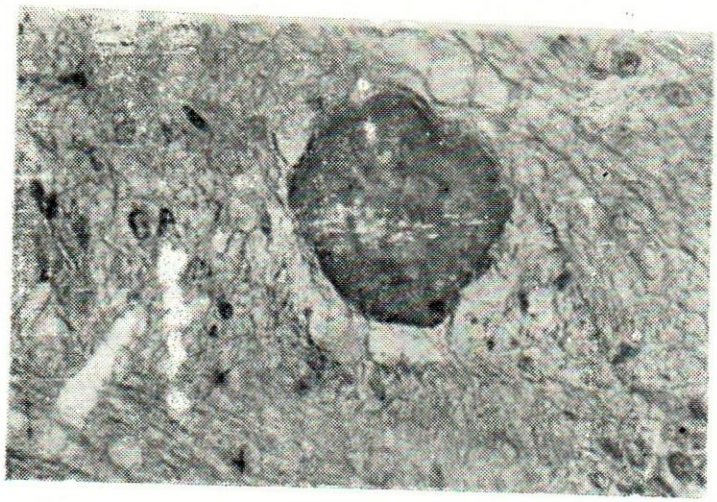
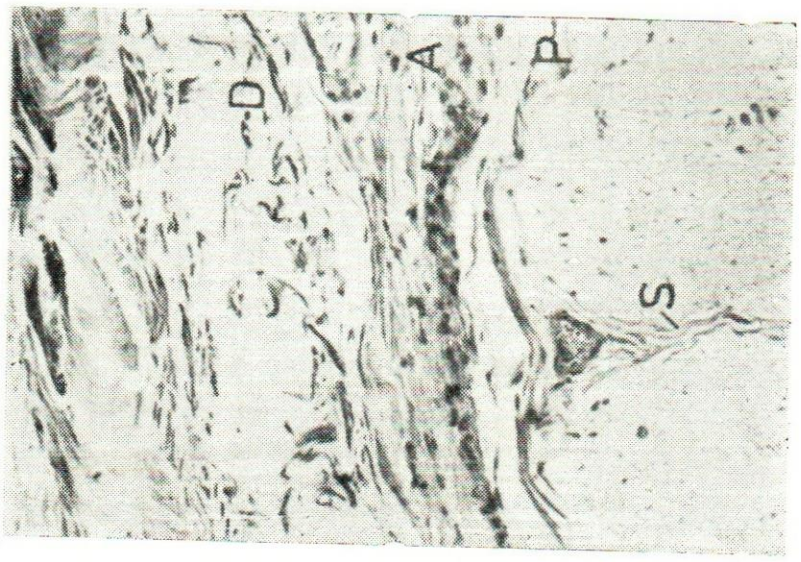


Fig. 4 : Concentrically lamillated hyalinized basophilic body inbetween the bundles of the optic nerve. (Haematoxylin and eosin stain 10x ob. 40).



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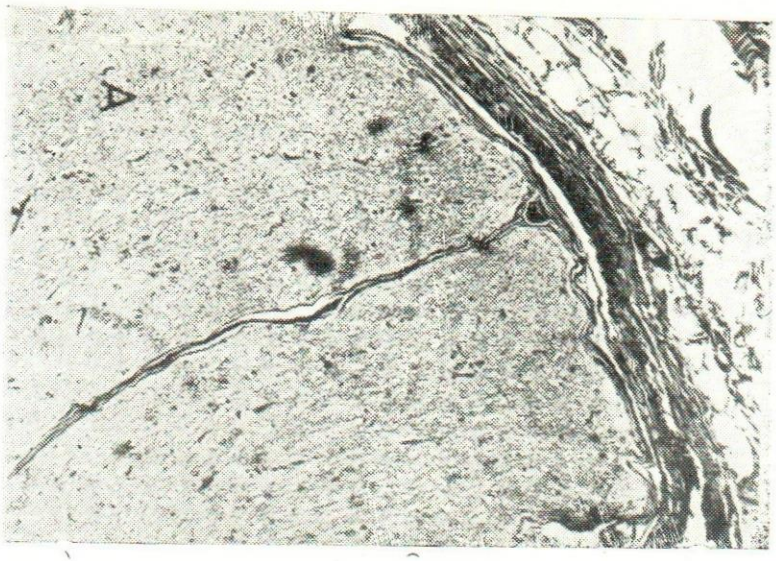

Fig. 6 : The pial septa at the periphery (A) and the center (B) of the optic nerve (Haematoxylin and eosin stain: A : oc. 10x ob. 6.3 – B. oc, 10x ob, 16).