دراسة تشريح أوتار أندغام العضلات الخارجية للعين فى الخنزير

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بالدراسة التشريحية لاوتار أندغام العضلات الخارجية للعين فى الخنزير لوحظ أنها تتفق مع بعض الحيوانات فى بعض الصفات وتختلف مع غيرها فى صفات أخرى كذلك أوضحت الدراسة أهمية هذا البحث فى مجال العلاج الجراحى لبعض الاصابات الجراحية فى العيون ، وكذلك أهميتها فى مجال الطب الشرعى .

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THE ANATOMY OF THE TENDONS OF INSERTIONS OF THE EXTERINSIC MUSCLES OF THE EYEBAIL IN THE PIG.

(With One Figure)

By

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SUMMARY

The insertion of the extrinsic muscles of the eyebll is of imprtance in the surgery and forensic medicine.

The extrinsic muscles of the eyeball in the pig can be differentiated from that of other domestic animals with regard to the form, position and direction of the line of insertion of the these muscles specially that of dorsal and ventral obliques.

INTRODUCTION

The extraocular muscles are not inserted at equal distances from the corneo-scleral junction (SMYTHE, 1958, WILLIAM , 1971; GETTY, 1975; and HIFNY and MISK, 1977 & 1978). The movements of the eyeball are by no means so simple and are produced by the coordinated action of these muscles, involving combinations which are quite complex.

The study of the insertion of the ocular muscles is of importance for the treatment of surgical affections and can be of much help in. Forensic medicine.

MATERIALS AND METHODS

Twenty eyes (10 right and 10 left) were obtained from newly sacrificed pigs. Each extraocular muscle was examined fully including the length, breadth and direction of its tendionus part, and the distance of its line of insertion from the limbus.

For the muscles having a curved or oblique line of insertion more than one reading was taken to identify more accurately the distance of this line from the limbus. The horizontal and vertical diameters of the cornea were measured to show the relative size of the eyeball on which the extrinsic muscles were studied.

RESULTS

(Fig. 1): The dorsal rectus muscle is inserted into the sclera 0.43 cm from the corneal margin. The line of insertion is nearly straight on the globe. It is 1.20 cm wide and the tendon of insertion is 0.90 cm long.

The tendon of insertion of the ventral rectus is 0.74 cm long. The line of insertion is oblique, 1.00 cm wide and is completely situated medial to the vertical plane of the cornea. Its lateral end is nearer to the cornea (0.40 cm)than its medial one (0.50 cm).

The medial rectus has the most caudal line of insertion of the recti and oblique muscles of the eyeball. The tendon of insertion is 0.90 cm long and forms a convex line of insertion towards the cornea. The apex of the convexity is 0.73 cm from the limbus. Its lower end is nearer to the cornea (0.78 cm)

than its upper end (1.00) cm. It has the widest line of insertion of the recti and oblique muscles of the eyeball (1.39cm).

The insertion of the lateral rectus is the nearest to the limbus than any of the extraocular muscles. The line of insertion is slightly concave towards the corneal margin. The centre of the concavity is 0.29 cm from the corneal margin and the lower end is nearer toward the cornea (0.29) cm than its upper end (0.50 cm). The tendon of insertion is 0.80 cm long and 1.00 cm wide at its point of insertion.

The dorsal oblique muscle presents the longest tendon of the extrinsic muscles of the eyeball(1.40)cm and the narrowest line of insertion which is 0.83 cm wide. It is situated completely below the tendinous insertion of the dorsal rectus muscle and is almost directed caudad. The near end lies 0.57cm from the corneo-scleral junction while the far one about 1.26 cm.

The tendinous insertion of the ventral oblique muscle is the shortest of the extrinsic muscles of the eyeball,(0.50cm). The line of insertion is slightly convex towards the cornea. The apex of the convexity is attached to the ventral end of the tendinous insertion of the lateral rectus muscle.Its lower end is 0.30 cm from the limbus while the upper one is 1.00 cm. The line of insertion is 1.17 cm wide.

The retractor bulbi is cone-shaped and its insertion into the sclera is macroscopically muscular. The line of insertion is further from the corneal margin superior (1.93 cm) than inferior (1.10 cm) and more medial (1.33 cm) than lateral (1.20 cm).

The length of the vertical plane of the cornea is 1.60 cm and the horizontal plane is 2.00 cm.

DISCUSSION

Some authors (PRINCE / DIESEM / EGLITIS / RUSKELL, 1960; MILLER / CHRISTENSEN / EVANS, 1964, SISSON / GROASMAR, 1967, AKAEVSKY, 1968, MAGRANE, 1971, BRADLEY, 1973 and GETTY, 1975) have described the insertion of the extrinsic muscles of the eyeball into the sclera in domestic animals but without indicating the width, direction and distance of the line of insertion of these muscles from the limbus.

The measurements of the line of insertion of the extraocular muscles and the distances of their insertions from the limbus in the pig given by PRINCE, et al., (1960) are to some extend in correspondance with the results of the present work. The authors did not record the length of the tendons, shape and direction of the line insertions of any of the extrensic muscle and nothing was given on the retractor bulbi.

The detailed anatomy of the tendons of insertion of the extrinsic muscles of the eyeball in large and small ruminants, equines and canines are described by (HIFNY / MISK,1977 & 1978 and MISK / HIFNY, 1978).

The insertion of the extrinsic muscles of the eyeball in the pig is characterized by several features. The line of insertion of the lateral rectus is the nearst to the limbus, while that of the medial rectus is the widest. The dorsal oblique has the longest tendon and narrowest line of insertion which is completely situated under the tendon of insertion of the dorsal rectus. The ventral rectus is completely situated medial to the vertical plane of the cornea, has the shortest

tendon of insertion and its line of insertion is situated between the ventral and lateral rectus muscles.

The tendons of insertion of the extrinsic muscles of the eyeball in small ruminants and canine can be differentiated from that of pig by several features.

The line of insertion of the dorsal rectus is oblique in canine, convex in goat and straight in sheep and pig, and that of the ventral rectus is convex in small ruminants, straight in canine, and oblique in the pig. The line of insertion of the medial rectus is straight in small ruminants, oblique in cat and convex in dog and pig.

The line insertion of the lateral rectus is oblique in small ruminants and canine and is slightly concave in the pig.

The tendon of insertion of the dorsal oblique in the pig and dog completely lies under the tendon of the dorsal rectus, while in small ruminants the medial end only lies under the tendon of the dorsal rectus and the lateral end lies between the dorsal and lateral rectus. In cat the tendon is splited into two parts.

The tendon of insertion of the ventral oblique in canines is splited into two parts and not in small ruminants and pig. The differentiation between the latter is possible by the fact that the tendon of insertion of the ventral oblique in small ruminants is the widest tendon of insertion of the extraocular muscles.

The retractor bulbi is easily differentiated in canine by its splitting into four completely separated muscles. In small ruminants and pig the muscle is cone-shape.

The extrinsic muscles of the eyeball in large ruminants and equine can be differentiated from that of pig by several features.

The line of insertion of the dorsal rectus is irregular in equine and straight in large ruminants and pig. The line of insertion of the ventral rectus is oblique in the pig, equine, and camel and convex in buffalo and cow. The line of insertion of the medial rectus is convex in the pig and equine and straight in large ruminants. The line of insertion of the lateral rectus is concave in the pig and equine and straight in large ruminants. In camel the line of insertion of the dorsal oblique is completely situated between and behind the line of insertion of the dorsal and lateral rectus. In equine, cow and buffalo one end of this line is undercovered by the tendon of the dorsal rectus, while its other end lies between and behind the lines of insertion of the dorsal and lateral rectus muscles. In pig the line of insertion of the dorsal oblique completely lies under the tendon of insertion of the dorsal rectus.

The line of insertion of the ventral oblique muscle is completely situated between the insertions of the lateral and ventral rectus in equine while in the pig and camel, the lateral end lies under the tendon of the lateral rectus and the medial end lies between the insertions of the lateral and ventral rectus. In buffalo and cow the lateral end lies between the insertions of the dorsal and lateral rectus but the medial end in buffalo lies under the tendon of insertion of the lateral rectus and in the cow below and behind the lower end of insertion of the lateral rectus.

In forensic medicine the eyeball of the pig can be easily differentiated from that of other domestic animals by several features concerning the tendons of insertion of the extrinsic muscles.

The movements of the eyeball are very complicated due to the variations in the length of the tendons of insertion of the extrinsic muscles and to the shape, width direction of their line of insertion and its distance from the limbus.

The knowledge of insertion of the extraocular muscles is of importance in the treatment of surgical affection as suppurative endophthalmitis, irreplaceable and gangrenous luxated eyeball with nerve and vessel rupture, massive anterior staphyloma, intraocular or retrobulbar malignant neoplasm and in other cases which necessitate enucleation of the eyeball be severing the tendons of insertion of the ocular muscles.

In cataract glaucoma and strabismus it is important to know accurately the position, shape and direction of the line of insertion and length, width and distance of the tendon of insertion from the limbus to avoid their injury during extraction of the lens (cataract), cyclodialysis (glaucoma) and resection or repositioning of one or more of the tendons of the extraocular muscles (strabismus).

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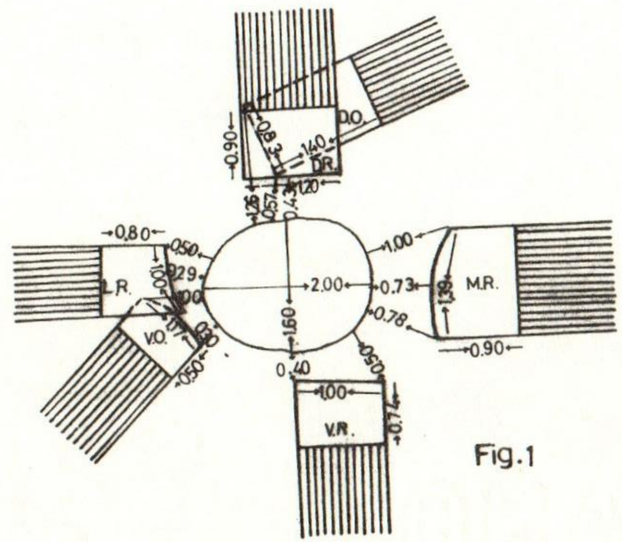

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Fig.1