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ORBITAL VENOGRAPHY IN SHEEP
(With 2 Figures)

By

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(Received at 8/6/1992)

تصوير أوردة الحجـــاج بالأشعة في الأغنـــــــام

مجدي سليم ، سامية سليـــم ، إسماعيل إبراهيـــم

تم دراسة الأوردة داخل الحجاج في عشرة أغنام وذلك بتصويرها بالأشعة بعد حقـــن مادة معتمة للأشعة (يورجرافين ٧٦٪) داخل وريد زاوية العين عن طريق تركيب وتثبيـــت إبرة داخلة بعد فتح الجلد . وقد ظهرت الأوردة بوضوح وبصورة مرضية في الوضع الجانبـــي أفضل من الوضع الظهري البطني .

SUMMARY

Contrast radiographic study of the normal orbital veins was performed in ten sheep. The contrast medium (urografin 76%) was injected into the V.angularis oculi after skin cutdown and vein cannulation. The orbital veins were nicely outlined and more satisfactorly in the lateral projections.

INTRODUCTION

Contrast radiographic studies are one of the valuable procedures for diagnosis of diseases of the orbit. Orbital venography is the most useful of the contrast techniques for examining the orbit. It requires no especial equipments in addition there are no specific contra-indications for this procedures.

In man the investigation of orbital space - occupying lesions by filling the superior ophthalmic veins with contrast medium from an injection into the angular vein either by cutdown or percutaneous puncture, was first described by DEJEAN and BOUDET (1951) and YASARGIL (1957). This method has largely been superseded by the method of frontal vein injection which originally described by VRITOSIOS (1961), were the orbital venograph of both sides can be studed in one injection of contrast medium.

In dogs, techniques to outline the orbital arteries and veins were performed either secondary to the cranial vasculature (OLIVER, 1969 and GRIFFITHS & LEE, 1971), or by regional contrast procedures of the orbital vasculature by injection of contrast

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medium into the infraorbital artery and vein, or the angular vein (GELATT et al., 1970 and CARTER, 1972).

Diseases of the orbit for which radiography is an important diagnostic procedure include: congenital bony malformations, regional and diffuse inflammations, vascular abnormalities (displacement, compression or collapse of some veins) and neoplasms. Orbital arteriography and venography are useful to detect alterations, deviations and vascular proliferations which usually associated with neoplasms (GELATT, 1981 and SLATTER, 1981). RUBIN and PATTERSON (1965) used orbital angiography in the diagnosis of arteriovenous fistula of the orbit in dog.

The majority of space-occupying lesions in the orbit are demonstrated by venous displacement, and the type of displacment may indicate the location of the lesion in orbit -for example- whether it is intra- or extraconal (LIOYD, 1976). KERN (1985) used the orbital sinus venography to demonstrate the abnormal orbital vasculature, especially in soft-tissue origin tumours in 23 dogs after skull radiography did not satisfactorly delineate the nature or extent of the orbital neoplasm.

In the available literatures, the normal orbital venography in goat has been described (SELEIM et al., 1991). In continuation to our investigation concerning the study of orbital veins, this work was carried out on sheep.

MATERIAL and METHODS

Ten sheep of native breed from 3 to 6-year-old were used in this study. Venography was performed in both sides in each animal. The animal was anaesthetized with ketamine*, intravenously in a dose rate of11 mg/Kg B.W. and premedicated with intramuscular xylazine** in a dose rate of 0.2 mg/Kg B.W. Then the animal was placed with the head in lateral recumbency and the neck was extended. Two techniques for the orbital venography have been tested. The first technique select the infraorbital vein and the second one select the angular vein for injection of the contrast medium (GELATT et al., 1970; CARTER, 1972 and TICER, 1984). The area for angularis oculi venography (about 3-4 cm in diameter) around the medial canthus of the eye and for infraorbital venography at the level of infraorbital foramen were prepared for surgery.

The skin was incised over the course of V. angularis oculi, the subcutaneous fascia was bluntly separated to expose the vein. A segment of the vein approximately 1.5 cm long is isolated and elevated with one length of non-absorpable suture material. The vein was then cannulated in a proximal direction with 21-gauge Butterfly infusion set***, and the needle is tied into place with the previously placed ligature and another stitch was made into the skin to prevent the movement of the Butterfly needle

*: Ketalar, Parke-Davis & Co. USA.
**: Rompun, Registered trademark of Bayer A.G. Leverkusen.
***: Bertoni Nello, S.R.L. Italy.

(Fig. 1).

Heparinized physiologic saline solution was used to flush the needle and tubing periodically to prevent clotting and to maintain patency. A tourniquet of thin rubber tube was applied around the neck of the animal just cranial to the wings of the atlas to occlude the jugular vein.

Ascending doses of contrast medium (urografin 76%) starting by 5 ml was injected until complete visualization of the orbital veins. The contrast medium was injected with moderate pressure to produce retrograde flow into the vein. A lateral radiograph was produced near the end of the injection period. The injection and radiographic procedures were repeated in the dorsal projection. Radiographic exposure factors used were 6 mAs and 50 Kv.

The cannula was then removed and moderate digital pressure was applied to the vein for a short time. The skin incision was closed in a routine manner. The nomenclature used in this study was that adopted by the Nomina Anatomica Veterinaria (1983).

RESULTS

The sheep orbital venous system was well defined in the lateral projection. The ophthalmic plexus (Fig. 2 A,B/5) is well outlined and it is in a form of circle. It is formed by V. ophthalmica externa dorsalis and plexus pterygoideus (Fig. 2 A,B/4,7). Here, the V. ophthalmica externa dorsalis is the continuation of V. temporalis superficialis (Fig. 2 A,B/6). The V.supraorbitalis and V.ethmoidalis externa (Fig. 2 A,B/2) are well out-lined. They arise from the dorsolateral aspect of the ophthalmic plexus. The V. supraorbitalis is continued by V. angularis oculi (Fig. 2A,B/1).

DISCUSSION

The procedures of venography into the V. angularis oculi which used in this study was more easier, superficial and safer than the V. infraorbitalis. The later vein is deeply situated and related to the infraorbital artery and nerve which may injured during the dissection of the vein. It was noticed that the lateral venogram is more satisfactorly and more clearly outlined than the dorsal one. In the dorsal projection the structures especially the teeth are superimposed with orbital plexus.

The skin cutdown for cannulation of the vein was more preferable than percutaneous puncture, where the cannula had been placed and ligated inside the vein to garantee that the contrast medium not diffused subcutaneously outside the vein.

The orbital venous system was well defined and the number of veins completely visualized by injection of 10 ml of contrast medium. The ophthalmic plexus which is well defined in this investigation is formed by the dorsal external ophthalmic vein and the pterygoid plexus. In goat and as mentioned by SELEIM et al. (1991) this plexus is formed by the dorsal and ventral external ophthalmic veins. According to WILKENS

and MUNSTER (1981) the ophthalmic plexus is formed by the dorsal and ventral external ophthalmic veins in all domestic animals except pig.

The present work shows a connection between the ophthalmic and pterygoid plexuses a fact which is reported also in dog (WILKENS and MUNSTER, 1981). The ophthalmic plexus gives off the external ethmoidal vein as well as the supraorbital vein from its dorsolateral aspect. In goat only the external ethmoidal vein was recorded (SELEIM et al., 1991).

The V. ophthalmica externa ventralis and the V. emissaria foraminis orbitorotundi which were reported in goat by the a fore-mentioned authors were not observed in sheep.

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LEGEND

Fig. 1: Method of injection used for orbital venography. The butterfly set introduced and fixed in the V. angularis oculi of a sheep.

Fig. 2 A & B:

1- V. angularis oculi. 2- V. Supraorbitalis. 3- V. ethmoidalis externa.
4- V. Ophthalmica externa dorsalis. 5- Plexus ophthalmicus.
6- V. temporalis superficialis. 7- Plexus pterygoideus.
8- V. jugularis externa.

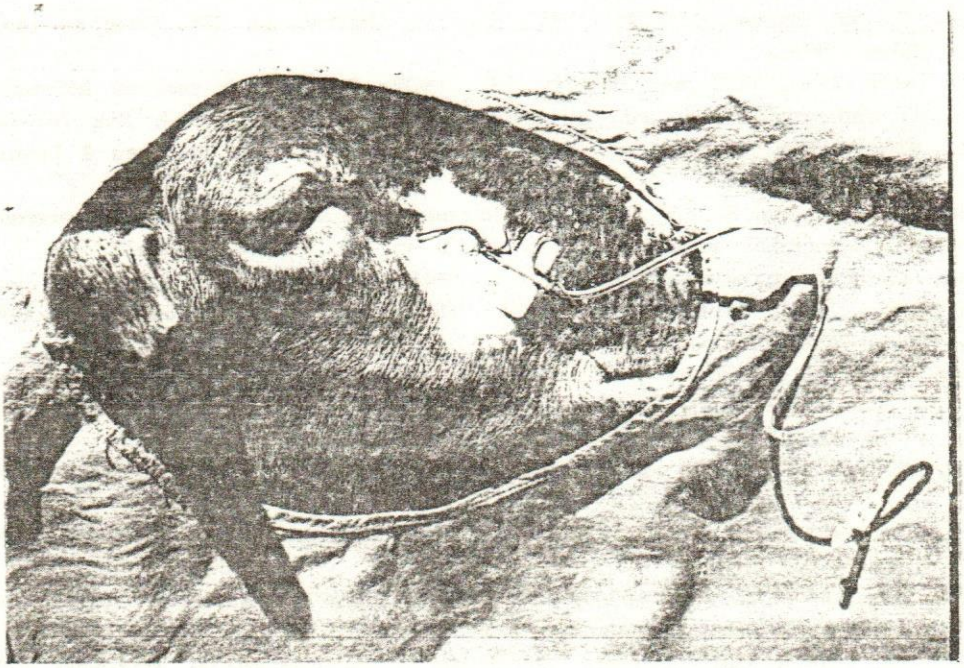

Fig. (1)

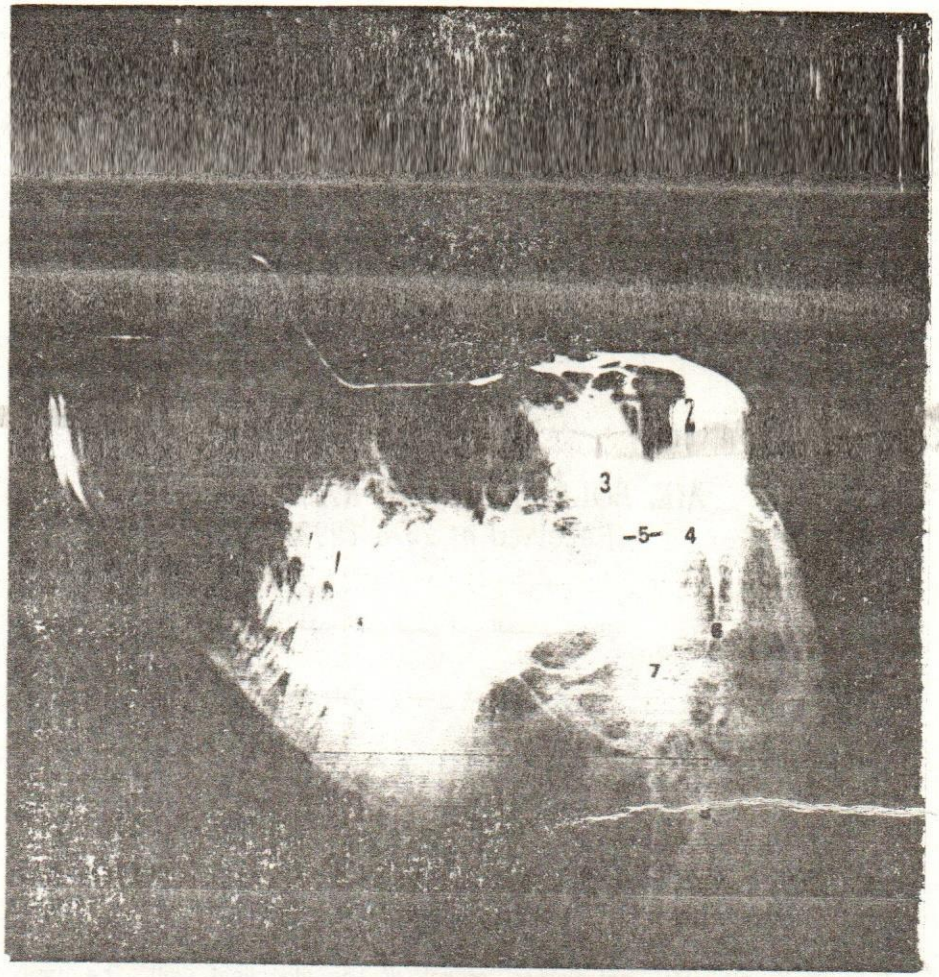

Fig. 2: A: Lateral orbital venogram of a sheep produced of a retrograde injection of contrast medium into the v. angularis oculi.

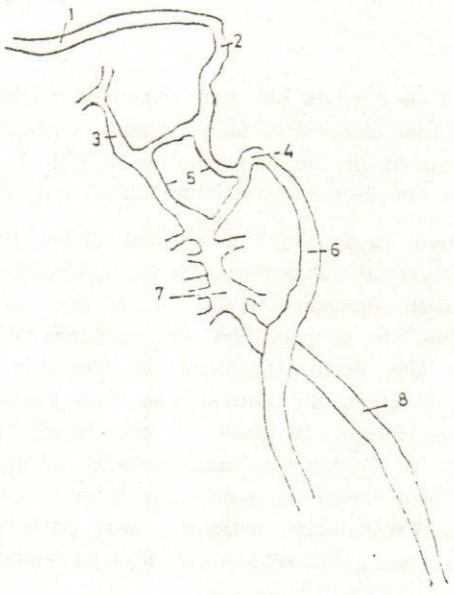

Fig. 2: B: Diagram of lateral orbital venogram.