ORBITAL VENOGRAPHY - ITS ROLE IN SPACE OCCUPYING LESIONS OF ORBIT

Om Prakash¹, S.K. Jain², R.K. Jain³, G.C. Mourya⁴

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ABSTRACT: Orbital Venography is a radiological technique to gather the information regarding the site of tumor, its vascularity and relationship with eyeball and other intra-orbital structures. Disturbance in parallelogram formed by the superior ophthalmic vein suggests the actual site of intra-orbital space occupying lesion. Recently the value of this technique has increased by many folds after advent of computerized tomography. **AIMS & OBJECTIVE:** Aim of this research article is to see the orbital venography in its new perspective. **MATERIAL & METHODS:** This study was conducted in the department of radio-diagnosis of BRD Medical college, Gorakhpur on 45 patients (male: female) was 7:1, and age ranged between 3 to 65 years. Surgery was done in 30 cases and biopsy was performed in all cases. **RESULT:** 40 cases were divided into 3 groups; as per location and histological typing. (a). Intraconal lesion (12 cases). (b). Extraconal lesion (19 cases) and (c). Cases where no exact localization was possible (9 cases). **CONCLUSION:** In unilateral exophthalmos it is the most valuable study.

KEYWORDS: Orbital venography, extra-conal, intra-conal, Superior ophthalmic vein.

INTRODUCTION: Orbital venography, has been established as a research tool in the study of the anatomy of the orbital veins and cavernous sinuses and was introduced by Defeen and Bondet in year 1951 by injecting contrast media into the frontal and supraorbital vein¹.

Orbital Venography is a very easy radiological procedure without any serious complication and gives the information regarding site of tumor, its vascularity and relationship with eyeball and other intra-orbital structures². Displacement of the superior ophthalmic vein in any direction from its normal course should be considered as abnormal. Radiologically, the Superior ophthalmic vein forms a parallelogram in antero-posterior projection and has been divided in 3 segments which assist the surgeon in describing the location of a tumor within the orbit; the posterior third extends from the superior orbital fissure to where the vein enters the muscle cone. The middle third refers to the course of the vein in the cone. The anterior one-third includes the vessel from where it leaves the cone to where it leaves the orbit at the trochlea of the inferior oblique muscle. The clinical usefulness of the method recently has become a valuable supplement to the computerized axial scanner which is noninvasive and highly accurate. Orbital venography has been of clinical and research value to the ophthalmologist and radiologist. The technique should continue to be available to those specialists operating in or adjacent to the orbit.

MATERIAL & METHOD: This study was conducted in the department of Radio-diagnosis of BRD Medical College Gorakhpur, during the period from 2009 to 2012. Total number of cases who had unilateral proptosis were 45. Age of patients ranged between 3yrs to 65. Ratio of patients (male: female) was 7:1, who underwent orbital venography, because 5 patients didn't turn up for

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procedure. Orbital venography was done in all 40 cases and in 5 cases procedure was unsuccessful. Surgery was contemplated in 30 cases and operative findings were correlated with radiological diagnosis. Biopsy was done in all cases except in case of orbital varices where the radiological diagnosis was itself confirmatory.

RESULTS: Radiologically venograms were divided into 3 groups; (a). Intraconal lesion (12 cases). (b). Extraconal lesion (19 cases) and (c) where no exact localization was possible (9 cases).

Histological typing	Localization		
	Intra-conal lesion	Extra-conal lesion	No exact Localization possible
Carcinoma ethmoid	-	3	-
Carcinoma maxilla	-	2	1
Carotico cavernous fistula	-	-	1
Leukemic deposit	1	1	-
Lymphoma	2	1	-
Lacrimal gland tumor	-	1	-
Metastatic deposit	-	1	-
Meningioma	2	2	1
Orbital cellulites	-	-	1
Orbital haemangioma	-	-	1
Orbital varices	-	-	1
Panophthalmitis	-	-	1
Pseudo tumors	2	2	-
Retinoblastoma	3	2	-
Frontoethmoidal	-	2	2
Ectopic lacrimal gland	-	2	-
Non- specific granuloma	2	-	-
	12	19	9

Table-1: Localization of Proptosis cases (40) by orbital venography

Site of tumor mass in Intraconal and Extraconal lesions were decided upon displacement of 1st and 2nd segment of S.O.V. as fig (1, 2& 3). In our series, out of 12 intra-conal lesions 9 were situated in middle and apical region which was confirmed surgically.

Fallacy in tumor localization was in 4 cases that had extra-conal extension. Compression of venogram was seen in 10 cases of extraconal lesion. In 9 cases parallelogram was normal. In these cases, tumor mass was found a way from S.O. V at the time of surgery. It has been found that lesions inside muscle cone widened the parallelogram and those of extraconal lesions caused its compression. Few of the extraconal lesions resulted in partial filling of parallelogram. Dilated tortuous veins were seen in one case of orbital varices (fig. 4).

DISCUSSION: Orbital venography is a simple and easily performed procedure without any serious complication; hence, it can be carried out as outdoor procedure. The course of S.O.V. has a close relation with the structures of orbit, thus, its deviation from normal anatomy serves as reliable guide in tumor localization^{1,2}.

Partial filling or non-filling of parallelogram was due to venous thrombosis, inflammatory conditions such as panophthalmitis or tumor causing extraneous pressure such as CA ethmoid, Frontoethmoidal tumor, Lacrimal gland tumor and ivory osteoma of Frontal bone in our series of cases, like that of studies performed by¹⁻⁴.

Arseni (1964) recommended venography as the most accurate diagnostic method in expanding intra-orbital masses⁵. The course of the vessel as seen by the antero-posterior radiographic projection resembles a parallelogram with the arc of the vessel under the levatorpalpebrae superior being referred to as the second segment. The authors suggested that a tumor in the muscle cone would broaden or push out the angles of the parallelogram while a tumor out of the cone by compression would produce more acute angles. This confusion in the radiologic anatomy of the superior ophthalmic vein now has been taken care of and re-judged by Zizmor and Lombardi⁶. Offret and Aron-Rosa⁷ wrote a report relating the major anatomical points of reference to similar points as seen on the radiograph after orbital venography. This work had impact on other researchers and then modified in subsequent reports^{8,9}. It has been affirmed that orbital venography is more reliable investigation for avascular orbital tumors and vascular tumors of venous origin.

CONCLUSION: Economic as well as scientific reasons have made it essential to evaluate the older techniques and retain the useful features of each method and discard that which can be obtained by a simpler and safer method. New techniques in medicine always seem to require a period of time before the clinician is able to digest and establish priorities with respect to the superiority of one method over another. This has proven true for diagnostic techniques to be used in space occupying lesions of the orbit. Orbital venography was initially recommended as a means of investigation of orbital tumors with a large venous component. Even in relatively recent reviews the method is still primarily recommended in hemangiomas, varices, and venous obstruction; otherwise, it is considered as a technique with inconclusive findings. Now-a-days venography has limited use, but in unilateral exophthalmos, is the most valuable study.

REFERENCES:-

1. Dejean, C. and Boudet, C.. Orbital Venography Bull.Soc.P.Ophthal. 1951; 64, 374.
2. Ranjan, B., Bhopa N.S and Khosla, I.N. Unilateral proptosis, Ind Jour Radiol. 1978; 32:278-281.
3. Hanafee W: Orbital venography. Radiol Clin North Am 1972;10:63-81.
4. Lombardi G. & Passerini A.: Venography of orbit, Britesh-J. Rad, 1969;42: 184-188,
5. Arseni C, Mihailescu N, Simonescu M, Trung L X: Orbital phlebography. Acta Neurochir(Wien) 1964; 12:521-542.
6. Zizmor J & Lombardi G: Atlas of Orbital Radiography. Birmingham, Mass., Ausuclapius Publishing Co. 1971, pp 123.
7. Offret G, Aron-Rosa D: Le phlebogramme orbitaire. Arch Ophtalmol (Paris) 1965; 25:84-96.
8. McNulty JG: Phlebography of the orbital venous system and the cavernous sinus. BJR 1969;42:113-121.

9. Russel DB, Miller JDR: Orbital venography. Radiology 1972;103:267-273.

Fig. 1: Normal Orbital Venogram showing Limbs of parallelogram 1, 2, & 3 are first, second and third segments of superior ophthalmic vein.

Fig. 2: Orbital Venogram showing partial filling of Right side in case of ethmoidal Tumor.

Fig. 3: Orbital Venogram showing Nonfilling of Left parallelogram in case of Extraconal Tumour in Lacrimal gland Tumour.

Fig. 4: Orbital Venogram showing compression of Second Limb of Left parallelogram in case of Ectopic lacrimal gland

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AUTHORS:

1. Om Prakash
2. S.K. Jain
3. R.K. Jain
4. G.C. Mourya

PARTICULARS OF CONTRIBUTORS:

1. Professor & Head, Department of Radiodiagnosis, TMMC & RC, Moradabad.
2. Professor, Department of Anatomy, TMMC & RC, Moradabad.
3. Professor & Head, Department of Radiodiagnosis, BRD Medical College, Gorakpur.

4. Professor, Department of Radiodiagnosis, BRD Medical College, Gorakpur.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr.S.K. Jain,
Professor, Department of Anatomy,
TMMC & RC, Moradabad.
Email- drskjain2005@rediffmail.com

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