Orbital Varices: A New Technique for Noninvasive Diagnosis

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Orbital venous varices can be a perplexing imaging problem, as they typically are expanded only during periods of venous hypertension, which is transmitted cephalad owing to the lack of valves in the internal jugular veins [1]. When venous pressure is not elevated, orbital varices may collapse and be undetectable on routine imaging studies, such as axial CT scans of the orbit. A provocative test frequently is necessary to demonstrate these lesions, and should be performed in patients with intermittent proptosis and diplopia, such as when coughing, straining, or leaning forward.

Improved visualization of orbital varices on CT scans obtained during the Valsalva maneuver and in coronal (as compared with axial) scans has been described [1, 2], and methods of diagnosis that make use of manual compression of the neck have been described in the Chinese literature [3]. We describe a new technique for evaluating patients with symptoms suggestive of orbital varices that is noninvasive and does not require IV contrast administration. We believe this technique will produce more reliable and consistent results than studies that use the Valsalva maneuver and manual neck compression. Our technique is also useful for patients who are unable to assume the position for direct coronal CT scanning.

Materials and Methods

We evaluated four patients with either clinical evidence suggesting orbital varices (50%) or suspected orbital varices on other studies (50%).

Initially, contiguous axial 3-mm slices were obtained through the orbits on a GE 9800 CT scanner (GE Medical Systems, Milwaukee) without IV contrast medium. An elastic tourniquet was then placed around the patient's neck (Fig. 1) sufficiently tight to just produce dilatation of the external jugular veins without producing discomfort, complete occlusion of the internal jugular veins, or arterial or respiratory compromise. The tension in the tourniquet was similar to a moderately tight shirt collar. At this degree of tension the radiologist's finger could readily be placed between the tourniquet and the patient's skin. The tourniquet was applied by the radiologist, who closely monitored the patient throughout the procedure. The axial CT scan was then repeated, and a positive test was indicated by the appearance of, or by a marked increase in the size of, a retrobulbar mass lesion.

Results

Images confirming the diagnosis of orbital varix were obtained in all four patients. The precompression axial scans were either normal (50% of patients) or showed minimal orbital apical opacity (Fig. 2A). The typical appearance of orbital

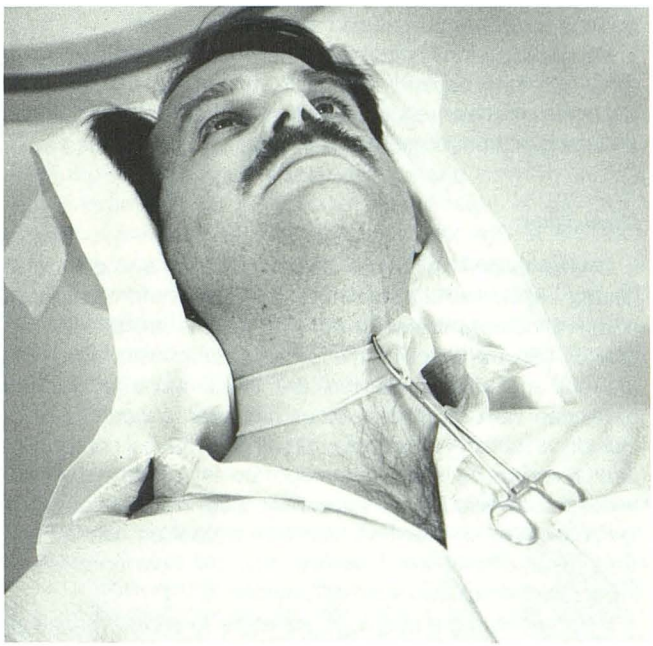

Fig. 1.—Technique of gentle neck compression. Photograph shows one of the authors with neck tourniquet in place. The band is sufficiently tight to produce venous hypertension but does not cause marked skin indentation or discomfort.

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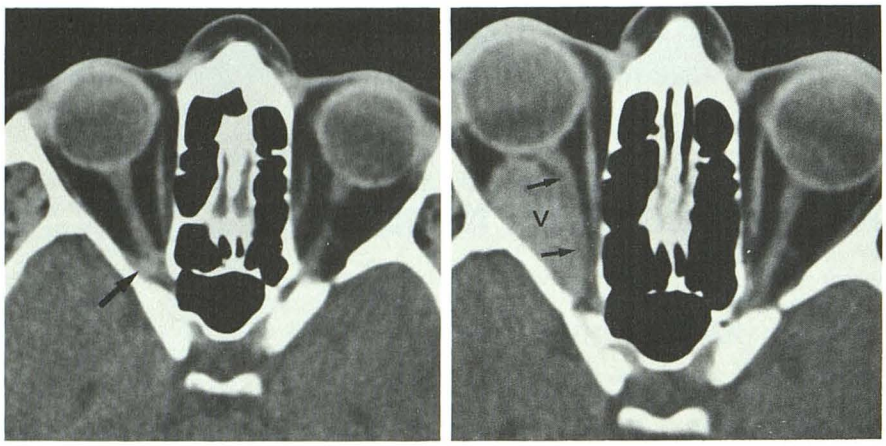

Fig. 2.—*A*, Routine axial CT scan shows minimal opacity at right orbital apex (*arrow*) caused by a collapsed varix.

B, Postcompression axial CT scan in same patient shows marked distension of right orbital varix (V) with medial displacement of optic nerve (*arrows*). Marked exophthalmos is present after compression.

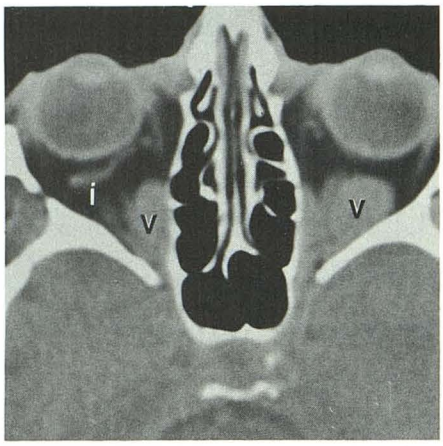

Fig. 3.—Postcompression axial CT scan in another patient shows bilateral orbital varices (V). The inferior ophthalmic vein (i) is dilated on the right side. The routine axial CT scan in this patient showed a smaller left orbital apical mass, but the right-sided varix was seen only after neck compression.

varices after compression is shown in Figure 2B. One patient was found to have bilateral orbital varices (Fig. 3) after initial CT and MR examinations to evaluate a possible cerebellopontine angle tumor revealed a left orbital mass.

No complications occurred in our patient series. Moreover, three additional patients have been studied with this technique for other possible venous disorders of the extracranial head and neck without complications.

Discussion

Orbital varices can be simple (consisting of a single tubular dilated venous structure) or complex (as when multiple venous varicosities are present). The lesions are usually congenital venous vascular malformations, in which both the afferent and efferent vessels are veins. More recently, an expanded view of orbital varices has been suggested [4] to include vascular hamartomas that have a variceal component. Orbital varices have also been reported as an element of more widespread vascular malformations and in cases of orbital lymphangioma. In addition, venous varicosities can be seen as a result of prominent venous drainage from an orbital or intracranial arteriovenous malformation [5–7].

References in the radiologic literature to orbital varices are sparse, reflecting the difficulty in diagnosing this entity. Previous techniques, such as manual neck compression or Valsalva maneuver, are highly dependent on patient cooperation and thus difficult to reproduce. We believe our technique is safe and able to produce more reliable and consistent venous hypertension than that obtained from previously used methods. This technique is also applicable to MR investigation of orbital vascular disease.

Particular care should be exercised when using this technique with elderly patients, and its use in children who are unable to verbalize discomfort is not suggested. The tourniquet should be released immediately if there is any evidence of patient discomfort or distress.

REFERENCES

1. Winter J, Centeno RS, Bentson JR. Maneuver to aid diagnosis of orbital varix by computed tomography. *AJNR* **1982**;3:39–40
2. Bryan RN, Craig JA. In Bergeron RT, Osborn AG, Som PM, eds. *Head and neck imaging (excluding the brain)*. St. Louis: Mosby, 1984:599–601
3. Wu EH, Bai RJ, Zhang YT, Sang GY. CT with pressure exerted on neck veins in the diagnosis of primary orbital varices. *Chin Med J (Eng)* **1985**;98:287–288
4. Jinkins JR. Orbital varicose capillary angioma: radiologic description of a distinct vascular entity. *AJNR* **1988**;9:589–591
5. Tan ST, Wilbur AC, Mafee MF. The role of the neuroradiologist in vascular disorders involving the orbit. *Radiol Clin North Am* **1987**;25:849–860
6. Flanagan JC. Symposium on orbital diseases. *Ophthalmology* **1979**;86:904–913
7. Troost BT, Glaser JS. Aneurysms, arteriovenous communications and related vascular malformations. In: Duane TD, Jaeger EA, eds. *Clinic ophthalmology*, vol. 2. Philadelphia: Lippincott, **1988**:Ch. 17, 22–30