Transcranial Decompression of Optic Nerve After Trauma

J. Brihaye, Brussels/Belgium

The decision to operate, the operative technique and the appraisal of results in surgery of traumatic amaurosis are in relation with the clinical data, themselves dependent upon the pathology of the lesion. Therefore, before dealing with the surgical treatment, we will examine the clinical course and, afterwards, we will discuss the pathological factors which can be considered as responsible for the loss of vision.

As was previously demonstrated by the author [1], we have to consider two main clinical situations according to whether the visual loss is contemporaneous with the trauma or as it occurs some time after the trauma.

Visual loss, contemporaneous with the trauma, can be complete (amaurosis) or partial.

Amaurosis is recognized by the association of mydriasis with the abolition of the pupillary reflex to light, and by the occurrence of optic atrophy which appears a variable time after the injury, dependent upon the more or less remote site of the lesion on the optic nerve. Usually the nerve is injured at the level of the optic canal and the optic atrophy is observed 4 or 6 weeks afterwards.

In most cases, immediate amaurosis is irreversible, although a partial or total spontaneous recovery may rarely occur within the hours or days following the trauma. Favory and Sedan [9] have observed immediate amaurosis of a few minutes duration in boxers. In our department we saw a patient, 42 years old, who fell from his motor bike; he did not lose consciousness but was immediately blind. Within minutes he recovered the vision of the right eye, but the left eye remained amaurotic with the development of an optic atrophy.

The frequency of traumatic amaurosis is difficult to determine. Many injured people are in a comatous or non-responsive state; therefore, in the absence of a careful examination of the eyes it is not possible to know if there was a total but transitory loss of vision. So it is with patients who complain of amaurosis at the time of their recovery from unconsciousness; we do not always know if the amaurosis developed early or later.

When the visual loss is immediate but partial, one notices a sudden fall of the visual acuity associated with perimetric alterations.

We have seen cases with an abrupt but stable decrease in visual acuity as well as progressive deterioration of the vision up to an amaurosis. Turner [21] observed in 10 patients a visual acuity less than 1/10 and between 1/10 and 10/10 in 23 other people.

The fundus oculi in general has a normal appearance. The perimetric alterations are unpredictable. We have observed concentric narrowing as well as quadrantal or horizontal hemianopia, inferior or superior. The outline of the deficit is usually irregular [1].
Spontaneous recovery is as rare as in those patients with immediate and total loss of vision.

*Delayed visual loss* can occur a short time (a few hours up to a few days) after the trauma or several weeks or even months later. In cases of an early visual alteration, as reported by Pringle [15] and Calmettes et al. [5], the decrease of the visual acuity is progressively rapid and the clinical course is similar to retrobulbar neuritis, more especially as the visual loss is often associated with a central scotoma. In rare cases, the decrease in vision occurs much later after the trauma and is due to slow compression of the optic nerve. In one of our patients [2] the lesion was a traumatic aneurysm of the carotid artery just beneath the optic nerve. In other cases, the lesion was an osseous callus in the optic canal or a secondary adhesive arachnoiditis [12, 19].

These differences in the clinical course are the direct expression of the underlying traumatic pathology which depends partly on the anatomical characteristics of the optic canal and optic nerve. We must recall the existence of the falciform ligament at the superior border of the intracranial optic foramen, the irregular shape of the optic canal with its narrowest and thickest portion at the intraorbital optic foramen [13], the importance of the vascular network in the pia-

![Fig. 1. The left optic foramen (left side of the figure) has a normal appearance. The right optic foramen is completely disrupted](image-url)