

Intraocular Hemorrhage in Sudden Increased Intracranial Pressure (Terson Syndrome)

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Key Word. Subarachnoidal hemorrhage

Abstract. We examined 19 cases with SAH, 4 of which presented intraocular hemorrhages (retinal, subhyaloid and in vitreous). The mortality rate was 50% when the intraocular hemorrhages were present compared to 20% when they were absent.

Intraocular hemorrhages following a sudden increased intracranial pressure (subarachnoid hemorrhage (SAH) or cranio-cerebral trauma) is a neuro-ophthalmologic syndrome of a great importance due to its prognostic value, because the mortality rate in the patients with a SAH is twice higher when they present an intraocular hemorrhage as well, and *Vanderlinden and Chisholm* [1974] described that it is even higher when these are bilateral.

Materials and Methods

We examined 19 cases of SAH, 4 of which presented intraocular hemorrhages (table I).

Cases 2 and 3 died soon after their admission to hospital with a massive SAH due to the rupture of an aneurysm of the middle cerebral artery. Both

presented with a great bilateral subhyaloid hemorrhage of very similar characteristics that hid the optic disc (fig. 1, 2).

In the 2 other cases who were alive, the first (case 1) was diagnosed as having an aneurysm of the anterior communicating artery, and presented in the right eye three small peripapillary retinal hemorrhage (fig. 3), and in the left eye a vitreous hemorrhage; the second (case 4) was diagnosed as having an aneurysm of the middle cerebral artery and presented in the right eye a vitreous hemorrhage, and the left eye was normal. In these 2 cases, vitreous hemorrhage was present on the day of admission.

Discussion

The syndrome of intraocular hemorrhage following an SAH was described in 1912 by *Terson*. Since then, there have been very few

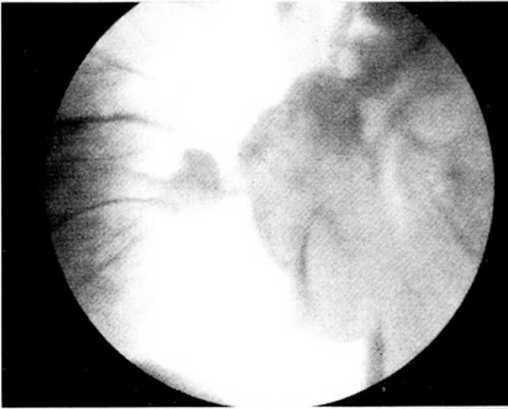


Fig. 1. Case 2: left eye, a great subhyaloid hemorrhage hid the optic disc.

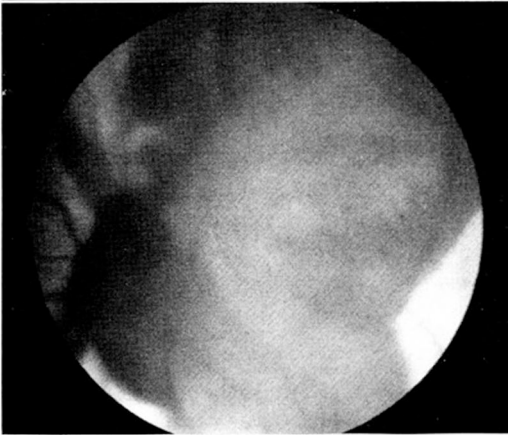


Fig. 2. Case 2: left eye, subhyaloid hemorrhage (central partial aspect).

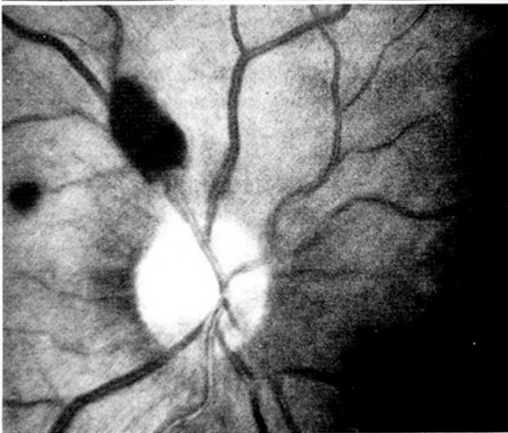


Fig. 3. Case 1: right eye, three small peripapillary retinal hemorrhages.

Table 1. Summary of cases of SAH with intraocular hemorrhage

Patient No.	Age years	Sex	Aneurysm (localization)	Right eye	Left eye
1	35	F	communicating anterior	RH	VH
2	33	M	middle cerebral (right)	SH	SH
3	18	M	middle cerebral (left)	SH	SH
4	59	F	middle cerebral (right)	VH	normal

RH = retinal hemorrhage; VH = vitreous hemorrhage; SH = subhyaloid hemorrhage.

papers about this syndrome, and its real incidence is unknown, although it is higher than the 16 cases found by *Paunoff* [1962] in the world literature up to 1962. The incidence in our series (21%) is similar to the 20% reported by *Timberlake and Kubik* [1952] and *Manschot* [1944]. The greater part of the papers on the Terson syndrome do not report the total number of patients examined.

With respect to its prognostic value, the mortality rate in our series increased from 20%, when the intraocular hemorrhages were absent, to 50% when they were present, these results being similar to those of other authors [*Manschot*, 1944; *Richardson and Hyland*, 1941].

The intraocular hemorrhage following an SAH can be retinal, subhyaloid, and in vitreous, decreasing in this sense its incidence, basically because, due to the death of the patient, many subhyaloid hemorrhages have not time enough to break in vitreous. *Walsh and Hoyt* [1969] described, however, that the extension of preretinal

hemorrhages into the vitreous body is a rare complication of SAH.

Although in 2 of our cases vitreous hemorrhages were present on the day of admission, they can also appear some days following the SAH as a consequence either of breaking in vitreous a subhyaloid hemorrhage or, sometimes, as a consequence of a second SAH [*Vanderlinden and Chisholm*, 1974].

The pathogenesis of these intraocular hemorrhages has been the cause of great controversies. The hypothesis mostly accepted actually is the one of *Muller and Deck* [1974]; they think these hemorrhages result as a consequence of the obstruction of the central retinal vein at the level of the retinochoroidal anastomosis, produced by the diffusion of CSF in the optic nerve sheath through the subarachnoid communication in the optic canal with the intracranial cavity.

Résumé

Examen de 19 cas de SAH, dont 4 ont présenté des hémorragies intra-oculaires. Le degré de mortalité a été 50% quand il y a eu des hémorragies intra-oculaires comparé aux 20% dans les cas sans hémorragies.

Zusammenfassung

Wir haben 19 SAH-Fälle untersucht, von denen 4 intraokulare Blutungen aufwiesen. Der Sterblichkeitsgrad war, wo intraokulare Blutungen erschienen, 50% im Vergleich zu 20%, wo diese fehlten.

References

- Ballantyne, A. J.: The ocular manifestations of spontaneous subarachnoid hemorrhage. *Br. J. Ophthal.* 27: 383-414 (1943).

- Cordes, F. C.: Subhyaloid hemorrhage following subarachnoid hemorrhage. Report of two cases. *Am. J. Ophthalm.* 36: 1192-1198 (1953).
- MacDonald, A. E.: Ocular lesions caused by intracranial hemorrhage. *Trans. Am. ophthalm. Soc.* 29: 418-432 (1931).
- Manschot, W. A.: The fundus oculi in subarachnoid hemorrhage. *Acta ophthalm.* 22: 281-299 (1944).
- Miller, A. J. and Cuttino, J. T.: On the mechanism of production of massive preretinal hemorrhage following rupture of a congenital medial defect intracranial aneurysm. *Am. J. Ophthalm.* 31: 15-24 (1948).
- Muller, P. J. and Deck, J. H. N.: Intraocular and optic nerve sheath hemorrhage in cases of sudden intracranial hypertension. *J. Neurosurg.* 41: 160-166 (1974).
- Paunoff, F.: Glaskörperblutungen bei Subarachnoidalblutung (Terson Syndrom). *Klin. Mbl. Augenheilk* 141: 625 (1962).
- Richardson, J. C. and Hyland, H. H.: Intracranial aneurysms. A clinical and pathological study of subarachnoid and intracerebral hemorrhage caused by berry aneurysms. *Medicine, Baltimore* 20: 1-83 (1941).
- Smith, D. C.; Kearns, T. P., and Sayre, G. P.: Pre-retinal and optic nerve-sheath hemorrhage: pathologic and experimental aspects in subarachnoid hemorrhage. *Trans. Am. Acad. Ophthalm. Oto-lar.* 61: 201-211 (1957).
- Terson, A.: Hémorragie dans le corps vitré au cours d'une hémorragie cérébrale. *Annls Oculist.* 147: 410-417 (1912).
- Timberlake, W. H. and Kubik, C. S.: Follow-up report with clinical and anatomical notes on 280 patients with subarachnoid hemorrhage. *Trans. Am. neurol. Ass.* 77: 26-30 (1952).
- Vanderlinden, R. G. and Chisholm, L. D.: Vitreous hemorrhages and sudden increased intracranial pressure. *J. Neurosurg.* 41: 167-176 (1974).
- Walsh, F. B. and Hedges, T. R.: Optic nerve sheath hemorrhage. The Jackson Memorial Lecture. *Am. J. Ophthalm.* 34: 509-526 (1951).
- Walsh, F. B. and Hoyt, W. F.: *Clinical neuro-ophthalmology*, vol. 2 (Williams & Wilkins, Baltimore 1969).

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