Terson's syndrome

First described by the French ophthalmologist Albert Terson.

In 1881, Litten first described an intraretinal hemorrhage associated with subarachnoid hemorrhage in the German literature.

However, Terson's description of vitreous hemorrhage following subarachnoid hemorrhage in 1900 is now associated with this syndrome.

Terson syndrome originally was defined by the occurrence of vitreous hemorrhage in association with subarachnoid hemorrhage. Terson syndrome now encompasses any intraocular hemorrhage associated with intracranial hemorrhage and raised intracranial pressures. Intraocular hemorrhage includes the development of subretinal, retinal, preretinal hemorrhage, subhyaloidal, or vitreal blood. The classic presentation is in the subhyaloidal space.

Epidemiology

Occurs in 4–27% of cases of aneurysmal SAH Reports have shown an incidence of 10-50% of intraocular hemorrhage with subarachnoid hemorrhage. This association is statistically associated with the severity of the subarachnoid hemorrhage based on the Hunt Hess classification system of subarachnoid hemorrhages. The incidence of vitreous hemorrhage is much lower (3-13%). Papilledema and unconsciousness are both positively correlated with Terson syndrome.

Terson syndrome has been described most commonly in subarachnoid hemorrhages due to ruptured cerebral aneurysms. Although early studies attempted to link this syndrome with anterior communicating artery aneurysms, statistical analysis has not correlated it with a specific aneurysmal location. Other reports include such causes as strangulation, trauma, hypertension, tumor, and perioperative and postoperative intracranial bleeding.

Etiology

May occur with other causes of increased ICP including ruptured AVMs. Funduscopy reveals vitreous opacity. The location of the origin of the vitreous hemorrhage differs in various reports (subhyaloid, epiretinal, subinternal limiting membrane).

May be more common with anterior circulation aneurysms (especially ACoA), although 1 study found no correlation with location.

Also rarely reported with SDH and traumatic SAH. Often missed on initial examination. When sought, usually present on initial exam; however, it may develop as late as 12 days post SAH, and may be associated with rebleeding.

Treatment

Patients should be followed for complications of OH (elevated intraocular pressure, retinal membrane formation → retinal detachment, retinal folds). Most cases clear spontaneously in 6–12 mos. Vitrectomy should be considered in patients whose vision fails to improve67 or if the more rapid improvement is desired.

Outcome

Early identification is important for the recovery of the patient's nervous system and ophthalmology. Neurosurgeons should be aware of the pathology and pay attention to it to maximize the patient's benefit [1)].

Kumaria A. Terson syndrome as a marker of severity in acute brain injuries: More than meets the eye. Neurologia (Engl Ed). 2022 Nov-Dec;37(9):827-828. doi: 10.1016/j.nrleng.2022.06.008. PMID: 36468433 [2)].

The mortality rate may be higher in SAH patients with vitreous hemorrhage than in those without.

The long-term prognosis for vision is good in ≈ 80% of cases with or without vitrectomy.

Systematic reviews

Papers relating to vitreous haemorrhage in patients with subarachnoid haemorrhage were retrieved. The only studies considered were those with at least 10 consecutive cases of subarachnoid haemorrhage with or without vitreous haemorrhage. The frequency of vitreous haemorrhage in such cases was calculated in prospective and retrospective studies. Mortality was compared in patients with and without Terson's syndrome.

154 papers were reviewed. Three prospective studies and six retrospective studies satisfied the inclusion criteria. Of 181 patients with subarachnoid haemorrhage assessed prospectively (mean age, 51.7 years), 24 (13%) had vitreous haemorrhage; among 1086 retrospective records, 37 (3%) had documented vitreous haemorrhage ($p<0.001$). Patients with Terson's syndrome had higher Hunt and Hess grades than those without (mean grade, 3.6 v 2.6). Patients with Terson's syndrome were also more likely to die (13 of 30 (43%) v 31 of 342 (9%); odds ratio 4.8; $p<0.001$).

Prospective studies show a higher frequency of Terson's syndrome than retrospective studies, suggesting that vitreous haemorrhage is not well documented. Vitreous haemorrhage is an adverse prognostic finding in patients with subarachnoid haemorrhage [3)].

Case series

2016

Six out of 36 included patients had Terson syndrome (TS) (16.7 %), which was associated with unfavorable admission scores. Twenty-nine patients (80.5 %) required ventriculostomy; TS was associated with higher ICP (median, 40 vs. 15 cm cmH2O, p = .003); all patients with TS had pathological ICP values of >20 cmH2O. Patients with a ruptured aneurysm of the anterior cerebral artery complex were ten times as likely to suffer from TS (OR 10.0, 95 % CI 1.03-97.50). Detection of TS on CT had a sensitivity of 50 %, a specificity of 98.4 %, a positive predictive value of 83.3 %, and a negative predictive value of 92.4 %. Mortality was 45 times as high in patients with TS (OR 45.0, 95 % CI 3.86-524.7) and neurologic morbidity up until 3 months post-aSAH was significantly higher in patients with TS (mRS 4-6; 100 vs. 17 %; p = .001).

This findings demonstrate an association between raised ICP and the incidence of TS. TS should be ruled out in aSAH patients presenting comatose or with raised ICP to ensure upfront ophthalmological follow-up. In alert patients without visual complaints and a TS-negative CT scan, the likelihood for the presence of TS is very low [4].

Case reports

see Terson's syndrome case reports.

1)
Ren Y, Wu Y, Guo G. Terson syndrome secondary to subarachnoid hemorrhage: a case report and literature review. World Neurosurg. 2018 Dec 29. pii: S1878-8750(18)32907-3. doi: 10.1016/j.wneu.2018.12.084. [Epub ahead of print] PubMed PMID: 30599249.
2)
Kumaria A. Terson syndrome as a marker of severity in acute brain injuries: More than meets the eye. Neurologia (Engl Ed). 2022 Nov-Dec;37(9):827-828. doi: 10.1016/j.nrleng.2022.06.008. PMID: 36468433.
3)
McCarron MO, Alberts MJ, McCarron P. A systematic review of Terson's syndrome: frequency and prognosis after subarachnoid haemorrhage. J Neurol Neurosurg Psychiatry. 2004 Mar;75(3):491-3. Review. PubMed PMID: 14966173; PubMed Central PMCID: PMC1738971.
4)
Joswig H, Epprecht L, Valmaggia C, Leschka S, Hildebrandt G, Fournier JY, Stienen MN. Terson syndrome in aneurysmal subarachnoid hemorrhage-its relation to intracranial pressure, admission factors, and clinical outcome. Acta Neurochir (Wien). 2016 Jun;158(6):1027-36. doi: 10.1007/s00701-016-2766-8. Epub 2016 Apr 1. PubMed PMID: 27038169.