Terson Syndrome: Assessment of 53 Patients with Subarachnoid Hemorrhage by a Ruptured Aneurysm

Síndrome de Terson: avaliação de 53 pacientes com hemorragia subaracnóidea por ruptura de aneurisma

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Abstract

Objective Terson syndrome (TS), also known as vitreous hemorrhage, is reported in patients with subarachnoid hemorrhage caused by a ruptured aneurysm. This study aims to evaluate the presence of ocular hemorrhage in such patients, trying to identify those who could benefit from the specific treatment for visual deficit recovery.

Methods Prospective study of 53 patients with spontaneous subarachnoid hemorrhage (SSAH) due to ruptured aneurysm. The patients were evaluated for vitreous hemorrhage through indirect fundoscopy with 6 to 12 months of follow-up.

Results The ages of the patients ranged from 17 to 79 years-old (mean age, 45.9 ± 11.7); 39 patients were female (73%) and 14 were male (27%). Six patients (11%) presented TS, and 83.3% had a transient loss of consciousness during ictus.

Conclusions An ophthalmologic evaluation must be routinely performed in subarachnoid hemorrhage patients, especially in those with worse neurological grade. Moreover, prognosis was bad in TS patients.

Keywords
- spontaneous subarachnoid hemorrhage
- aneurysm
- vitreous hemorrhage

Resumo

Objetivo A síndrome de Terson (ST), também conhecida como hemorragia vítrea, tem sido relatada em pacientes com hemorragia subaracnóidea por ruptura de aneurisma. O presente estudo tem por objetivo avaliar a presença de hemorragia ocular em tais pacientes, visando identificar os que se beneficiariam com o tratamento específico para recuperação do déficit visual.

Métodos Foram estudados, prospectivamente, 53 pacientes com hemorragia subaracnóidea espontânea (HSAE) por ruptura de aneurisma, em relação à presença de hemorragia vítrea, através de fundoscopia indireta, com seguimento de 6 a 12 meses.

Resultados As idades dos pacientes variaram de 17 a 79 anos (média 45,9 ± 11,7), sendo que 39 pacientes (73%) eram mulheres, e 14, homens (27%). Observou-se que 6 pacientes (11%) apresentavam ST, sendo que 83,3% tiveram perda de consciência transitória durante o íctus.

Conclusão A avaliação oftalmológica deve ser realizada rotineiramente nos pacientes portadores de HSAE, especialmente naqueles com pior grau neurológico. Além disso, os pacientes portadores da ST apresentaram pior prognóstico.

Palavras-chave
- hemorragia subaracnóidea espontânea
- aneurisma
- hemorragia vítrea

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Introduction

The first case reported in the literature showing an association between vitreous hemorrhage and subarachnoid hemorrhage occurred in 1881, and it was described by a German ophthalmologist.[1] In 1900, French ophthalmologist Albert Terson reported a case of vitreous hemorrhage associated with spontaneous subarachnoid hemorrhage (SSAH).[2,3] Dupuy-Dutemps (1926) named the bleeding of the vitreous body following SSAH by a ruptured cerebral aneurysm Terson syndrome (TS).[4]

The incidence of TS in several studies can range from 3 to 33% of SSAH cases.[3] However, up to 1950, only 16 cases of this syndrome were reported in the literature.[2] Therefore, we believe that it is reasonable to assume that this condition has been underdiagnosed.

According to statistics from the United States, the mean incidence of SSAH from a ruptured aneurysm is 30,000 cases per year.[5] Based on an average ST incidence of 10%, there would be around 3,000 cases per year. Projecting such numbers to Brazil, there would be ~15,000 cases of SSAH annually and 1,500 cases of TS per year. The objective of the present study is to evaluate the incidence of vitreous hemorrhage in patients with SSAH due a ruptured aneurysm, its evolution and relation to prognosis, as well as the evolution from an ophthalmological point of view, especially regarding the need for specific treatment.

Casuistry and Methods

Fifty-three consecutive patients with SSAH due a ruptured aneurysm were evaluated; all patients were treated at the neurology and neurosurgery department of Santa Casa, Belo Horizonte, Brazil, from March 1997 to December 2003. Patients with SSAH without angiographic evidence of aneurysm and those who died prior to the ophthalmologic evaluation were excluded from the study.

All patients underwent a computed tomography (CT) of the head and/or a lumbar puncture followed by cerebral angiography with four vessels visualization. The neurological evaluation included Fischer, Hunt-Hess and Glasgow scales. The ophthalmologic examination consisted of indirect fundoscopy performed by an ophthalmologist and an ocular ultrasound in selected cases. Follow-up ranged from 6 months to 1 year, evaluating the presence or absence of unilateral or bilateral focal deficit and visual complaints.

Statistical analysis was performed using the Student *t*-tests and chi-square tests with a Cornfield confidence limit of 95%.

Results

From the 53 studied patients, 39 were women (73%) and 14 were men (27%). Vitreous hemorrhage occurred in 6 cases (11%), retinal hemorrhage in 6 (11%), and other alterations in fundoscopy were observed in 15 patients (28%). As for the loss of consciousness during ictus, 83.3% of the patients with vitreous hemorrhage presented a period of unconsciousness against 56.2% of the patients from the general group ($p < 0.05$).

The amount of blood at head CT, assessed with the Fischer scale, and the clinical neurological score, based on the Glasgow and Hunt-Hess coma scales, did not differ statistically between the groups with or without vitreous hemorrhage. Regarding the location of the aneurysms in the general group, 44 cases were at the anterior circulation (93.6%), and three at posterior circulation (6.4%). All patients with vitreous hemorrhage had an anterior circulation aneurysm.

Morbidity, that is, presence of focal deficits, was 21% in the general group and 33% in the TS group, while mortality was 15% and 17%, respectively ($p < 0.05$). Five of the TS cases were unilateral, whereas one was bilateral. Only four patients (67%) had visual complaints. Five patients presented spontaneous resolution of vitreous hemorrhage, and only one required specific treatment, a vitrectomy, with visual deficits recovery.

Discussion

Terson syndrome is common, occurring in 20% of SSAH cases.[6] However, the pathophysiology of TS is not fully understood.[1] Subarachnoid hemorrhage was initially thought to accompany the optic nerve, rupturing the cryptic lamina and reaching the vitreous body.[5] Electron microscopy studies negate this hypothesis by demonstrating that there is no continuity relationship between the subarachnoid space and the vitreous body.[2] Another theory on the cause of vitreous hemorrhage states that it occurs due to blood infusion through the subarachnoid space, compressing the central retinal vein, resulting in its engorgement and rupture.[7] Anatomical studies have shown that when the cavernous sinus or even the central retinal vein is occluded, there is no significant increase in venous pressure or rupture, because there are communicating venous branches, choroidal anastomoses, which drain the venous circulation of the eye.[2] More recent theories postulate that the sudden increase in intracranial pressure, both in SSAH and some other conditions, would cause an infusion of cerebrospinal fluid (CSF) through the optic nerve sheath, with consequent compression of the central retinal vein and its anastomoses, resulting in their rupture and vitreous hemorrhage.[1] This theory would explain the higher incidence of ictal loss of consciousness in SSAH in patients with TS, since this loss of consciousness seems to be associated with a greater increase in intracranial pressure and a transient interruption of the cerebral blood flow during bleeding.

It has also been shown that patients with worse clinical status after SSAH have an increased incidence of TS.[8] Despite this, there appears to be no difference in the amount of blood at head CT between the two groups or in Glasgow and Hunt-Hess coma scales scores, contrary to the literature.[7] This suggests that the main mechanism of injury is the sudden intracranial pressure increase, not blood.[9]

Regarding the evolution of vitreous hemorrhage, most cases (80%) improve spontaneously, not requiring specific treatment, which may vary from vitrectomy to laser use.[7]

Conclusion

Based on the presented data, we suggest the routine performance of an ophthalmologic evaluation in patients with SSAH, especially those with severe neurological status, with or without visual complaints, since they have a worse prognosis and a higher mortality rate.

There was no relationship between the location of the aneurysm, the amount of blood at head CT and vitreous hemorrhage.

In addition, patients with TS should be observed for at least 6 months prior to vitrectomy, since most of them present spontaneous resolution of the condition.

Conflict of Interest

The authors have no conflicts of interest to report.

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