

## FAITS CLINIQUES

## Traumatic sub-macular hemorrhage: favorable spontaneous course

Hématome maculaire post-traumatique : une évolution spontanée favorable.

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## Key-words

submacular, traumatic, course, hemorrhage

## Abstract

**Purpose.** This study aims to evaluate the anatomical and functional outcomes of patients with traumatic submacular hemorrhage (SMH).**Methods.** Retrospective, observational case series of patients with submacular hemorrhage secondary to blunt trauma, presenting between January 2020 and December 2020 to the Department A of the Hedi Raies Institute of Ophthalmology (Tunis, Tunisia).**Results.** Six patients were enrolled in the study. Mean age was 27 years old [17-42 years old]. A male predominance was recorded (4 men). The hematoma was small in 3 patients, and medium otherwise. Retrofoveal location was described in 1 patient. Non-surgical option has been adopted in these cases. All patients were monitored. All hematomas resolved spontaneously after a period of time. A rupture of the underlying Bruch's membrane was observed in all patients. The final best corrected visual acuity ranged between 20/63 and 20/20 (Snellen chart).**Conclusion.** Traumatic subretinal hematoma may occur after closed globe injury. Its management remains a subject of debate. A rapid and spontaneous resolution of the hematoma without substantial damages is rare.

## Mots-clés

sous-maculaire, traumatique, évolution, hémorragie

## Résumé

**Objectif.** Cette étude vise à évaluer les résultats anatomiques et fonctionnels chez les patients atteints d'hémorragie sous-maculaire traumatique (SMH).**Méthodes.** Il s'agit d'une série de cas rétrospective et observationnelle de patients présentant une hémorragie sous-maculaire secondaire à un traumatisme contondant, ayant consulté entre janvier 2020 et décembre 2020 au Département A de l'Institut d'Ophthalmologie Hedi Raies (Tunis, Tunisie).**Résultats.** Six patients ont été inclus dans l'étude. L'âge moyen était de 27 ans [17-42 ans]. On a noté une prédominance masculine (4 hommes). Le volume de l'hématome était petit chez 3 patients et de taille moyenne chez les autres, avec une localisation rétrofovéale chez 1 patient. Une approche non chirurgicale a été adoptée dans ces cas. Tous les patients ont été suivis. Tous les hématomes ont disparu spontanément après un certain laps de temps. Une rupture de la membrane de Bruch sous-jacente a été observée chez tous les patients. L'acuité visuelle finale corrigée variait entre 20/63 et 20/20 (tableau de Snellen).**Conclusion.** Les complications infectieuses liées aux corps étrangers intraoculaires végétaux sont des complications sévères qui représentent une menace importante pour la fonction visuelle, avec un pronostic réservé.

## Introduction

Traumatic sub-macular hematomas often lead to severe visual acuity loss. Mechanical tissue damage is exacerbated by hemosiderin toxicity and is often irreversible after 24 hours [1]. However, in some cases, particularly when the hemorrhage is not extensive, the evolution may show spontaneous improvement. In this study, we present 6 cases of post-traumatic sub-macular hemorrhage that showed favorable spontaneous resolution without the need for medical or surgical intervention.

## Methods

A retrospective, observational case series was conducted to investigate patients presenting with submacular hemorrhage secondary to blunt trauma between January 2020 and December 2020 at the Department A of Hedi Raies Institute of Ophthalmology in Tunis. Prior approval was obtained from all patients, and the study was conducted in accordance with the principles of the Declaration of Helsinki. A minimum follow-up period of six months was required for inclusion in the study. Demographic data, nature of the injury, time between the injury and consultation, and the

findings from a comprehensive ocular examination were recorded. Submacular hemorrhage (SMH) was defined as the presence of blood between the retinal pigment epithelium (RPE) and the neurosensory retina at the macula. Baseline fundus photographs and optical coherence tomography (OCT) scans were taken to analyze the location, extent, and size of the SMH. No patients underwent surgical intervention for their SMH. Instead, close fundus monitoring was adopted for all the patients throughout the follow-up period.

## Results

Six patients with a history of blunt trauma were included in this study (Table I). Four males patients, and two women. The average age of the patients was 27 years (ranged from 17 to 42 years). The mean duration of SMH was 13.16 days (ranged from 5 to 30 days). The size of the SMH in 3 patients was small and medium in three patients. Initial visual acuity ranged from light perceptions (retrofoveal hemorrhage) to 10/10 (peripheral hemorrhage). The final visual acuity depended on the extent and the evolution of the hematoma (Table I).

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Table I. Demographic and clinical characteristic of our population

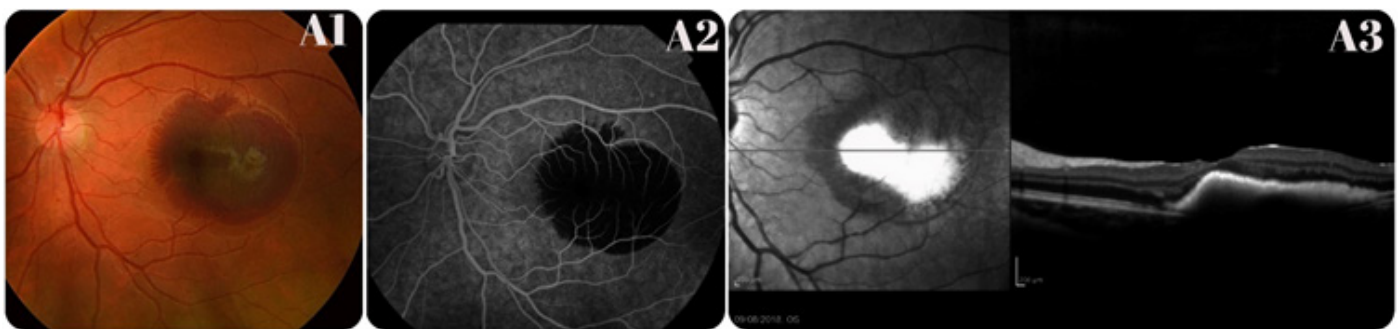
Patient	Age and sex	Duration of the hematoma (days)	Size of the hematoma	Initial visual acuity	FTMH	ERM
1	17/M	30	medium	3/10	Temporal juxta foveal	6/10
2	42/M	42	small	8/10	temporal	10/10
3	18/M	22	medium	Light perception	macular	3/10
4	22/F	25	small	10/10	Inferior	10/10
5	30/M	15	medium	3/10	Temporal	7/10
6	27/F	20	small	10/10	Inferior	7/10

All hematomas resolved spontaneously after a period of time. A rupture of the underlying Bruch's membrane was diagnosed in all patients.

#### Case report

18-year-old man reported left ocular trauma by punch, 3 days before presentation. Left eye examination revealed a well-oriented light perceptions, palpebral ecchymosis and submacular hemorrhage in fundus examination. Color fundus photography and

optical coherence tomography showed foveal and juxta foveal hematoma extended to all retinal layers and choroid (**Figure A1, A2, A3**). Vitrectomy with intravitreal injection of gas with recombinant tissue plasminogen activator (rt-PA) was scheduled nevertheless patient didn't show-up. One month after traumatism, the patient re-consulted. Visual acuity improved to 10/50. Fundus examination showed spontaneous resolved hemorrhage underlying a temporal Bruch's membrane rupture and integrity of the retinal layers (**Figure B1, B2, B3**).

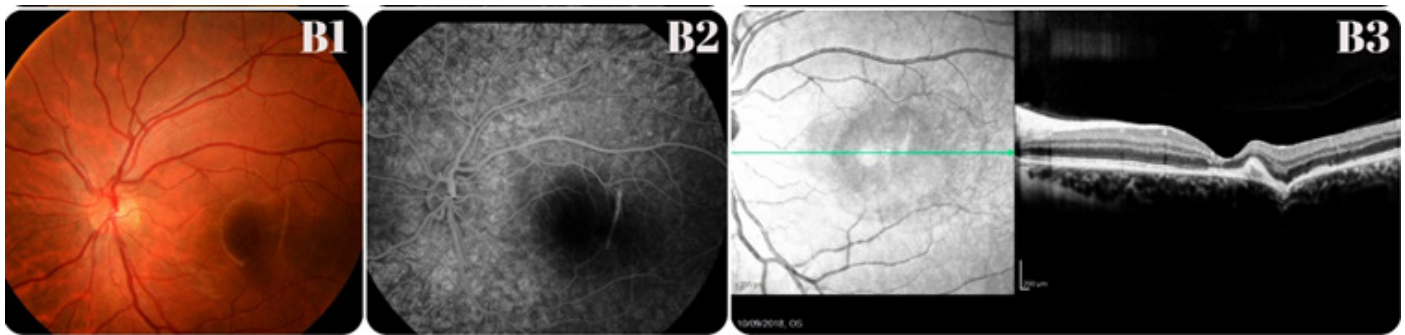


**Figure A.** Multimodal imaging including color fundus photograph, angiography and OCT of the left eye of a young man with recent post traumatic submacular hematoma. On the color fundus (**A1**), a large and deep hematoma, more than 5 papillary diameter, taking all the macula and temporal region. The angiography (**A2**) showed a central, deep window effect, not hiding the superficial retinal vessels, thus being located in the deep layers of the retina and choroid. The SD OCT (**A3**) confirmed the localization of the hematoma in the deep layers of the retina and choroid. The blood manifests itself as a juxta foveal and temporal hyperreflectivity taking the pigmentary epithelium and the Bruch membrane and lifting the IS/OS line and all the layers above without any posterior shadow cone.

#### Discussion

Traumatic subretinal hematoma is a clinical manifestation commonly observed in closed globe injuries, and it is often associated with tissue damage caused by multiple mechanisms, including blood coagulation, erythrocyte degeneration with the release of iron and hemosiderin, and subsequent oxidative stress [2]. Additionally, the blood clot acts as a barrier to the nutrition and oxygenation of the photoreceptors, significantly impairing their metabolism [3]. Submacular hemorrhages can be classified based on their size: small SMH measures less than 4 disc diameters, medium-size SMH has a diameter greater than 4 disc diameters but does not extend beyond the temporal

vascular arcade, and massive SMH overspreads the temporal vascular arcade [4]. Over time, the management of traumatic SMH has evolved, and various approaches have been attempted, such as intravitreal or subretinal injection of recombinant tissue plasminogen activator (tPA), intravitreal gas injection, a combination of these methods, or intravitreal injections of anti-vascular endothelial growth factor (VEGF) agents [5]. The visual prognosis primarily depends on the extent, location, and persistence of the hemorrhage. A delay of more than 2 weeks before treatment is associated with a poor final prognosis. Early surgical treatment is therefore recommended, especially for extensive hemorrhages. However, simple fundus monitoring may suffice for young patients with small-size hemorrhages



**Figure B.** Multimodal imaging showing the spontaneous resolution of the hematoma, 1month after the traumatism. On color fundus (B1), the hematoma has completely reabsorbed leaving a minimal yellowish reflection, the fovea is normal. The rupture of the Bruch membrane appears as a vertical white temporal line. The angiography (B2) showed the same sharp vertical and temporal line and the OCT (B3) confirms the rupture of the Bruch membrane, exactly located 1dp from the fovea. the different layers of the retina are preserved, specially the IS/OS line below the foveal depression

showing favorable spontaneous evolution [6]. In this article, we report 6 cases of subretinal hemorrhages with a favorable spontaneous evolution without treatment. Indeed, it is preferable to abstain and wait for spontaneous resorption, particularly in cases of small hemorrhages, especially in young patients, and to avoid rushing into a surgical procedure, which carries inherent risks. Conversely, extended or persistent hemorrhages should be promptly operated on to prevent serious and irreversible retinal damage.

### Disclosure statement

**Declaration of conflicting interests.** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding.** The author(s) received no financial support

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