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CASE REPORT

Bilateral Subconjunctival Hemorrhage (SCH) Following Delivery

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Abstract

Introduction: Subconjunctival hemorrhage (SCH) occurs when blood enters from the conjunctival or episcleral blood vessels into the subconjunctival space. SCH is classified as traumatic and non-traumatic (NTSCH). Microvascular diseases and increased intraabdominal pressure are associated with NTSCH; consequently, SCH can develop after vaginal delivery. However, reports regarding postpartum SCH are still scarce. This study aims to enhance awareness and comprehension of postpartum SCHs rather than minimize their significance. **Case Presentation:** A 17-year-old female presented with bilateral redness in both eyes one day post-delivery with no other ocular complaints. There were no complications in pregnancy and labor. The patient had no medical history of anticoagulant usage, trauma, hypertension, or blood disorders. Ophthalmic examination revealed visual acuity 20/20 on both eyes and bilateral subconjunctival hemorrhage, while other examinations were unremarkable. Treatment included a cold compress for 24 hours, followed by warm compresses every two hours on both eyes. Pharmacological therapy included artificial tears and naphazoline eye drops. **Conclusions:** Increased intra-abdominal pressure during labor can contribute to SCHs. While spontaneous resolution is common, accurate differentiation of SCH etiology is crucial for effective management. Obstetricians and ophthalmologists must collaborate to identify risk factors early, including routine eye screenings during the perinatal period, to enhance patient comfort and safety. Furthermore, additional research endeavors and investigations are necessary to deepen our understanding of the frequency and risk factors associated with postpartum SCHs and to develop effective prevention and treatment measures.

Keywords: subconjunctival hemorrhage (SCH); postpartum; ocular complications; vaginal delivery; intraabdominal pressure

Introduction

Subconjunctival hemorrhage (SCH) is characterized by the influx of blood into the conjunctival or episcleral veins, subsequently accumulating in the subconjunctival space.[1] The conjunctiva comprises two distinct components: the inner portion of the eyelid covered by the tarsal conjunctiva and the bulbar conjunctiva, which envelops the sclera. The minuscule blood vessels above the sclera serve as the source of blood for SCH. This physiological phenomenon resembles a bruise on the whites of the eyes, typically unaccompanied by notable pain complaints.[1],[2]

SCH arises from two principal etiologies: traumatic and non-traumatic.[2] Microvascular disorders, elevated intracranial venous pressure, heightened intra-abdominal pressure, systemic hypertension, the administration of anticoagulants or non-steroidal anti-inflammatory drugs (NSAIDs), and Valsalva maneuvers (coughing, lifting, straining, vomiting) represent potential causative factors for non-traumatic SCH (NTSCH).[1],[2],[3] NTSCH manifests as an ocular disorder affecting approximately one in 167 individuals annually within the entire East Asian population, with an average annual incidence of 65 cases per 10.000 people. While SCH prevalence generally exhibits no discernible gender predilection, the incidence of NTSCH is elevated in women, particularly in the postpartum period.[4] Individuals aged over 50 years are more predisposed to spontaneous or non-

traumatic SCH, primarily attributable to age-related fragility of elastin and connective tissue. Moreover, comorbidities such as diabetes mellitus, hyperlipidemia, and poorly controlled hypertension further contribute to susceptibility in this demographic.[1],[2],[5] In cases involving increased intra-abdominal pressure, post-delivery patients, especially those who have undergone vaginal delivery or present postpartum, may be predisposed to SCH. Pregnant women with diabetes, hypertension, or under anticoagulant therapy are more prone to experiencing SCH during this period.[5]

This case report addresses the diagnostic challenges associated with SCHs, which can manifest with indicative signs of underlying conditions unbeknownst to the patient, necessitating further investigations and timely intervention to avert future morbidity. Additionally, the management strategies for SCH in postpartum patients may be influenced by the physiological changes induced by pregnancy and childbirth, underscoring the importance of tailored approaches to optimize patient outcomes and safety. Lastly, the fact that there is limited literature on postpartum SCHs in the fields of obstetrics, gynecology, and ophthalmology further emphasizes the potential for enhancing awareness. It can initiate broader research endeavors that could advance clinical practice guidelines for managing SCH in the postpartum period.

Case Presentation

A 17-year-old female patient presented with bilateral redness and a perceived "bleeding" appearance in both eyes one day after the delivery of her second child, facilitated by obstetricians and midwives without any complications. The patient reported an uneventful gestational period with no associated problems or complications. Initial examination upon hospital admission revealed normal vital signs, and the second stage of labor lasted 28 minutes. The patient denied experiencing pain, itching, vision impairment, eye discharge, photophobia, or a foreign body sensation in either eye. Notably, there was no history of contact lenses or glasses, use of eye drops, or routine medication. The patient reported no medical history of blood disorders, trauma, excessive eye rubbing, eye surgery, coughing, hypertension, or diabetes mellitus. Furthermore, there was no previous history of similar complaints or family history of eye diseases and systemic conditions.

The patient was conscious and appeared mildly ill, and vital signs were recorded as follows: pulse 80 beats per minute, blood pressure 100/70 mmHg, respiratory rate 20 breaths per minute, SpO2 98% on room air, and temperature 36.5°C. A general physical examination of the lungs, heart, and extremities revealed no abnormalities. Ophthalmological examination showed bilateral SCH without corneal lesions (Figure 1). Visual acuity was recorded at 20/20, and intraocular pressure was within

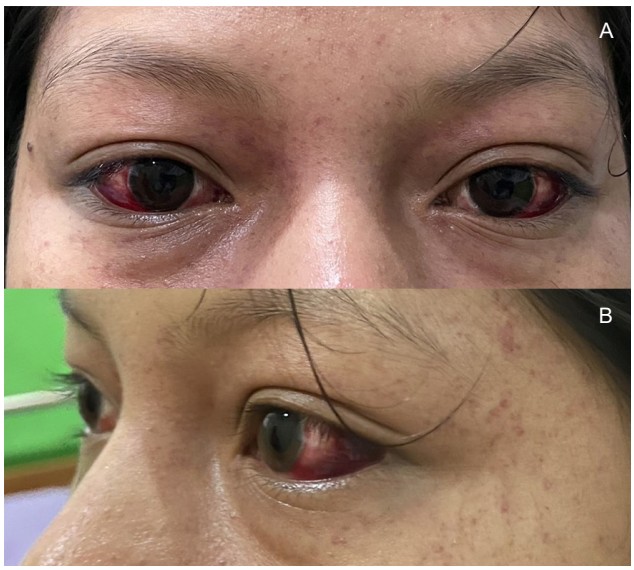

Figure 1. Bilateral subconjunctival hemorrhage following vaginal delivery (postpartum); (A) Front view, and (B) Side view.

normal limits upon palpation. Accommodation and extraocular motor functions were found to be within normal parameters. The anterior eye chambers exhibited clear depth without signs of hyphema or hypopyon. Pupils were symmetrical with positive direct and indirect responses. The lens appeared clear, and the shadow test yielded negative results. Slit-lamp and funduscopic examinations were unavailable due to the patient's discomfort with the slit-lamp, attributed to the sudden onset of SCH following delivery, a decision respected despite ophthalmological review ruling out other conditions.

Based on the comprehensive anamnesis and physical examination, the patient received a diagnosis of postpartum extensive bilateral SCH. The prescribed treatment regimen involved cold compress education for 24 hours, followed by warm compresses every two hours on both eyes. Pharmacological therapy included artificial tears eye drops administered six times daily in both eyes and naphazoline eye drops. Conservative management of subconjunctival bleeding was implemented without resulting in long-term complications.

Discussion and conclusions

A prospective study involving 8.726 patients attending ophthalmology clinics reported an incidence of SCH in 225 patients (2.9%), with a notable positive correlation observed with advancing age, particularly among individuals aged 50 years and above.[6] On the other hand, a study conducted in a rural outpatient facility in India in 2016 reported the incidence rate of non-traumatic spontaneous hemorrhage (NTSH) as 3.07 per 1000 individuals. The prevalence of various comorbidities such as diabetes, hypertension, and the use of antiplatelet medications have been associated with a progressive increase in the incidence of NTSH beyond the age of 40,

with the highest prevalence observed after the age of 60.[7] In antenatal and postpartum patients, the presumed prevalence of SCH is estimated to be as high as 10%, often correlated with severe blood pressures such as those seen in preeclampsia.[8] Despite its initial intimidating appearance, this condition is typically benign. SCH arises from hemorrhaging within the subconjunctival space, which is consequent to the rupture of conjunctival or episcleral blood vessels, often resolving spontaneously without any intervention.[2],[9] The temporal bulbar conjunctiva of the eye exhibits a larger surface area than its nasal counterpart, rendering trauma-induced SCH more prevalent and impactful in the ocular region.[2] The absence of a valve in the orbital vein can contribute to increased intra-abdominal pressure, fostering congestion and subsequent rupture.[1],[2],[3]

The etiology of SCH can categorized into traumatic and non-traumatic origins (spontaneous). Trauma-induced SCH is typically associated with a higher occupational workload and a tendency for younger people to engage in more aggressive activities, such as direct physical injury, ocular surgery, contact lens utilization, and manipulation of the eyes.[1],[2],[9] Conversely, NTSCH primarily arises from underlying conditions such as hypertension and vascular disorders like diabetes and hyperlipidemia, predisposing arterial vessels to spontaneous rupture. Vascular disease and the administration of anticoagulant therapies such as warfarin, heparin, rivaroxaban, and apixaban are also implicated in SCH etiology. Furthermore, aspirin, NSAIDs, and P2Y12 inhibitors like clopidogrel can increase the risk of NTSCH development.[9] Purpura (thrombocytopenic and non-thrombocytopenic) and coagulation abnormalities emerge as the principal risk factors for NTSCH. Additional non-traumatic triggers encompass activities such as coughing, vomiting, and strenuous physical exertion such as weightlifting.[4] Instances of SCH, frequently encountered daily, may be linked to elevated intra-abdominal pressure, notably evident during labor. This condition predisposes postpartum patients to SCH occurrences, particularly in instances of prolonged second-stage labor. However, such occurrences are sparsely documented in the literature and few case reports. A study found that excessive pushing leading to increased intra-abdominal pressure during vaginal delivery can precipitate spontaneous unilateral exophthalmos and orbital bleeding. It is due to a rupture of the ophthalmic vein in a patient with no known risk factors for SCH.[1] Nonetheless, the etiology of NTSCH often remains elusive, with many cases classified as idiopathic or unknown.[2],[7]

Three primary categories of ocular changes are observed during pregnancy: physiological alterations, pregnancy-specific eye disorders, and modifications in pre-existing ocular conditions. Physiological changes include reductions in sensitivity, increased corneal thickness, and altered corneal curvature affected by fluid retention. Elevated levels of progesterone and estrogen during pregnancy initiate systemic vasodilation and a decrease in intraocular pressure (IOP), alongside decreased lacrimal acinus cell function, potentially leading to dry eye syndrome and heightened susceptibility to contact lens intolerance.[2] Moreover, pregnancy induces increased aqueous flow, reduced episcleral venous pressure, and diminished scleral stiffness, contributing to lowered IOP. Hormone-driven chloasma, characterized by heightened pigmentation around the eyes and cheeks, may impact the ocular adnexa. Additionally, other changes can happen, such as unilateral ptosis, occurring during or post-pregnancy, which is often attributed to anomalies in the levator aponeurosis, influenced by fluctuations in bodily fluids, hormonal levels, and the stresses encountered during childbirth.[10]

Complaints of "red" spots or red eyes frequently represent the sole indicator of SCH. This clinical presentation typically is not accompanied by pain or visual acuity impairment and does not elicit any discharge. The primary symptoms for discerning the etiology of red eyes in a patient's medical history are pain, photophobia, and diminished visual acuity. Additionally, symptoms such as a foreign body sensation and headaches have to be collected to explore alternative/differential etiology.[3],[5] Conjunctival hemorrhages often exhibit a deeper red hue due to dilation of the more superficial and posterior conjunctival blood vessels.[3] Diagnosis of SCH generally relies on clinical assessment alone; slit-lamp examination with fluorescein may reveal ocular trauma or underlying ocular conditions, while funduscopy is typically unnecessary. Evaluation for blood disorders or coagulation abnormalities should be considered in cases of recurrent or persistent SCH.[2],[3]

In our case, the patient lacks a history of trauma, prior medical conditions, or prolonged labor. The absence of vascular disease history, hypertension, and anticoagulant use leads us to attribute the cause of NTSCH to increased intra-abdominal pressure during labor. In line with our findings. Riggs et al.[3] reported a case of bilateral ocular hemorrhage accompanied by complaints of diplopia, blurred vision, and ocular pain following an uncomplicated delivery, which led to a conclusion of SCH, orbital hematoma, and suspicion of glaucoma following CT imaging. Similarly, Oporto et al.[5] described cases of atypical SCH in hypertensive patients presenting with photophobia, reduced visual acuity, and foreign body sensation after lifting a heavy box. Several other reports have also linked atypical SCH occurrences to actions such as sneezing and vomiting.[11] Nevertheless, atypical cases of orbital hemorrhage may occur. Recurrent atypical SCH may also be caused by other possible etiological variables, such as the COVID-19 vaccination[12] and hormone changes, called ocular

vicarious menstruation.[13] Other potential etiological factors contributing to the occurrence of atypical SCH may involve the administration of the antimalarial drug artemether or lumefantrine and, recently, covid vaccine; however, further investigations are needed to confirm this association.[14] Subiras et al.[15] documented a case of subperiosteal hematoma in the orbit resulting from self-induced hypoxia in a patient who attempted suicide unsuccessfully. These cases demonstrate the variability in the etiology of orbital hemorrhages, particularly SCH, and emphasize how crucial it is to determine the underlying etiology to provide patients with a precise treatment plan.

Management of SCH is recommended when associated with significant comorbidities such as coagulopathic disorders, severe asthma exacerbations, trauma, or severe orbital injury.[2] Patient education regarding the 1-2 week resolution period, depending upon lesion size, is paramount. In individuals taking anticoagulants, it tends to require a longer recovery time of up to three weeks.[2],[9] Non-pharmacological interventions such as cold compresses for the initial 24 hours followed by warm compresses every two hours to alleviate swelling and provide patient comfort are recommended.[2] Adjunctive therapies such as artificial tears can be administered to help alleviate discomfort and the sensation of a foreign body in patients.[2] Generally, SCH does not necessitate specific treatment unless it is associated with a severe underlying condition. Vasoconstrictors targeting the alpha-adrenergic agonist, such as dilute brimonidine, oxymetazoline, and naphazoline, have been utilized to enhance patient comfort and reduce the incidence of SCH following intravitreal injections.[2] A study suggests that brimonidine eye drops may exhibit superior efficacy compared to naphazoline + pheniramine eye drops in reducing bleeding associated with SCH; however, further research is warranted to corroborate these findings.[16]

SCH typically carries a favorable prognosis with rare occurrences of complications.[2] According to Oporto et al.[5], patients exhibiting alarm symptoms associated with SCH normally experience complete resolution by the second week. On the other hand, the presence of SCH findings may serve as a potential indicator of underlying severe medical conditions, such as coagulopathy disorders, exacerbated asthma, or orbital trauma.[9] Riggs et al.[3] reported observations of early glaucoma symptoms or signs upon follow-u examinations of postnatal bilateral SCH patients with orbital hemorrhage. Given the decrease in IOP during pregnancy, as mentioned, the incidence of glaucoma in pregnancy is exceedingly rare. Through consistent observation or monitoring, this patient's red eyes exhibited improvement within weeks without any subsequent complications.[3],[5] This report underscores the importance of maintaining a high clinical suspicion for ocular diseases during pregnancy and the postpartum period and emphasizing the significance of follow-up examinations. Vigilant monitoring of the patient's condition enables early detection of complications or the emergence of new symptoms, potentially altering the initial diagnosis and treatment plan.[2],[5]

This case report describes a unique occurrence of SCH in postpartum patients. We conclude that vaginal delivery could contribute to SCH occurrence due to increasing intra-abdominal pressure during the second stage of labor, especially in the absence of other predisposing factors. This study further underscores the significance of comprehensive education and reassurance to promote transparent communication between patients and healthcare providers regarding the sudden onset of subconjunctival bleeding following delivery (postpartum). To ensure thorough patient education regarding delivery methods and enhance patient comfort and safety, obstetricians and ophthalmologists must collaborate in identifying risk factors early, including through routine eye screenings during the perinatal period. Furthermore, additional research endeavors and investigations are necessary to deepen our understanding of the frequency and risk factors associated with postpartum subconjunctival bleeding and to develop effective prevention and treatment measures.

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