Glaucoma associated with sickle cell trait hyphema and non invasive treatment: transcorneal oxygen therapy
I. Figueras1, A. Carceller2, A. Dou2, L. Loras2
1Hospital Dos de Maig, Hospital de Viladecans, Barcelona, Spain; 2Hospital Vall d’Hebron, Barcelona, Spain

We present a case report of hyphema as a result of minor blunt trauma and raised intraocular pressure (IOP) with difficult control. The case illustrates the need to consider sickle cell trait or other haemoglobinopathies in our multiethnic society. We also show a particular non invasive treatment for acute glaucoma associated to hyphema based on transcorneal oxygen therapy. A 19-year-old male from West Africa presented a left hyphema of 2 mm as a result of trauma. The IOP was 50 mmHg, visual acuity (VA) was 10/10 on his right eye and 2/10 on his left eye. Familiar and medical history was not remarkable. He was initially treated with topical hypotensives (prostaglandin, timolol, alpha-agonist), corticosteroids, atropine and oral acetazolamide. The hyphema disappeared but despite maximal therapy, IOP was more than 35 mmHg, thus, we performed an anterior chamber (AC) paracentesis (PC) four times in order to decrease IOP. Even with PC, topical and oral treatment, we could not control the rise of IOP (around 40 mmHg) so we suspected sickle cell trait and stopped oral acetazolamide because of his acidotic power. Hemoglobine electrophoresis revealed sickle cell trait (HbS 38.5%). Since IOP was uncontrollable we decided to treat the patient with transcorneal oxygen therapy using a face mask over the left eye with humidified oxygen at a flow rate of 3 L/min during 4 hours approximately. No adverse effects were associated with this therapy which was well tolerated. We achieved a significant and stable reduction of IOP < 20 mmHg and final VA of left eye was 4/10. The fundus on left eye showed a cup-to-disc ratio 3/10, symmetric between two eyes, without disc hemorrhages or pallor. We observed a temporal-superior arteriolar pseudo occlusion with an area of retinal edema. Patients with this trait are at greater risk of increase IOP and visual loss when they suffer a trauma and hyphema. Normal red blood cells pass easily through the trabecular meshwork, but after a blunt trauma, aqueous humor flow is reduced and an hypoxic situation is founded in AC. High levels of ascorbic acid and carbon dioxide brings to an acidosis situation in AC. This favors cell sickling and obstructs the trabecular meshwork, leading to greater levels of IOP and the cycle goes on. The appropriate management of hyphema must reach IOP lower than 24 mmHg and paracentesis of AC could be used to decrease quickly IOP. Other more aggressive surgical techniques as washout of AC or trabeculectomy had been performed in some cases. In order to decrease the percentage of sickled cells and reduce IOP, we tried to increase the partial pressure of oxygen of the aqueous humor establishing an hyperoxic gradient across the cornea, obtaining great results. This therapy is cheap, effective and easy. It is also well tolerated, without adverse effects and it can be considered before applying other invasive treatments. We also must avoid drugs that promote aqueos acidosis and hemoconcentration (carbonic anhydrase inhibitors and hiperosmolar agents). We must suspect sickle cell trait in patients with hyphema, maximal medical treatment and a difficult IOP control, especially in some ethnic groups.