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Case Report

Ophthalmology Section

Tardy Aschner-Dagnini Reflex following Topical Pterygium Surgery: A Rare Case Report

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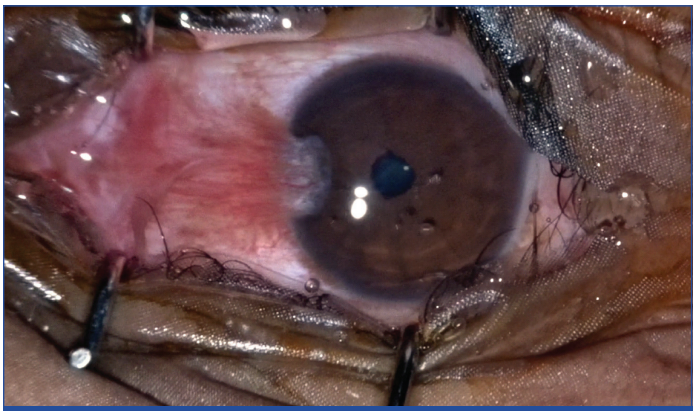
ABSTRACT

The Aschner-Dagnini reflex, also known as the Oculocardiac Reflex (OCR) or Trigeminovagal Reflex (TVR), is characterised by a reduction in heart rate due to direct pressure on the globe or traction on the Extraocular Muscles (EOM). It was first described in 1908 and is observed during strabismus surgery. However, it has also been reported following other ophthalmic procedures such as pterygium surgery or gonioscopy, as well as after facial trauma or regional anaesthesia. Sinus bradycardia is the most common presentation, accompanied by nausea and dizziness in conscious patients. In severe cases, it may also result in reduced blood pressure and life-threatening emergencies, including cardiac arrhythmias and arrest. Hereby, the authors present a rare case report of a 34-year-old male with delayed onset OCR following pterygium surgery under topical anaesthesia. The case was managed conservatively, as described in the case report, and the patient had a good recovery. To the best of authors' knowledge, the present is the first reported case of OCR in the early postoperative period, following pterygium surgery.

Keywords: Anticholinergic, Bradycardia, Strabismus, Trigeminal, Vagus

CASE REPORT

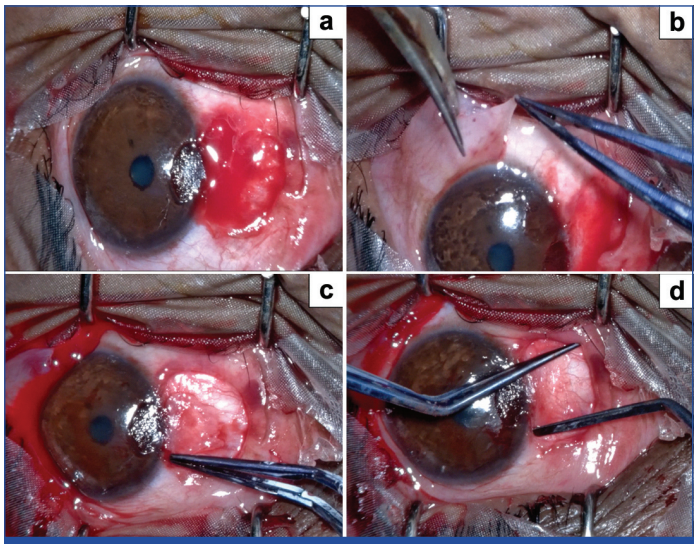
A 34-year-old male presented to the eye Outpatient Department (OPD) with a red fleshy mass over the inner aspect of the white part of his left eye. The lesion had developed six months prior and had gradually progressed to encroach upon the central clear part of the eye. The lesion was associated with irritation, especially on exposure to the outside environment. There was no history of vision loss, trauma, contact lens wear, or any prior ocular surgery. The patient had no systemic co-morbidities. Upon examination, the patient had unaided visual acuity of 6/6 in both eyes. The anterior and posterior segments of the right eye were normal. There was a pterygium over the nasal part of the bulbar conjunctiva of the left eye, encroaching onto the cornea, but not involving the pupillary axis [Table/Fig-1].



[Table/Fig-1]: Preoperative photograph showing a pterygium encroaching onto nasal peripheral cornea of left eye.

The remainder of the anterior and posterior segment examination was normal. The patient was diagnosed with a pterygium in the left eye. He underwent pterygium excision with conjunctival autograft (sutureless and glue-free limbal conjunctival autografting) under topical anaesthesia (0.5% Proparacaine eye drops) in the left eye after providing written and informed consent [Table/Fig-2a-d].

The surgery was completed in 23 minutes, after which an eye pad and bandage were applied. The intraoperative and immediate postoperative periods were uneventful.



[Table/Fig-2]: Suture less and glue-free limbal conjunctival autograft surgical procedure (a) Bare sclera bed after pterygium excision; b) Harvesting of inferotemporal conjunctival autograft; c) Placement of graft to the recipient bare sclera bed; d) Spreading of the graft over recipient bed with the help of flat instruments.

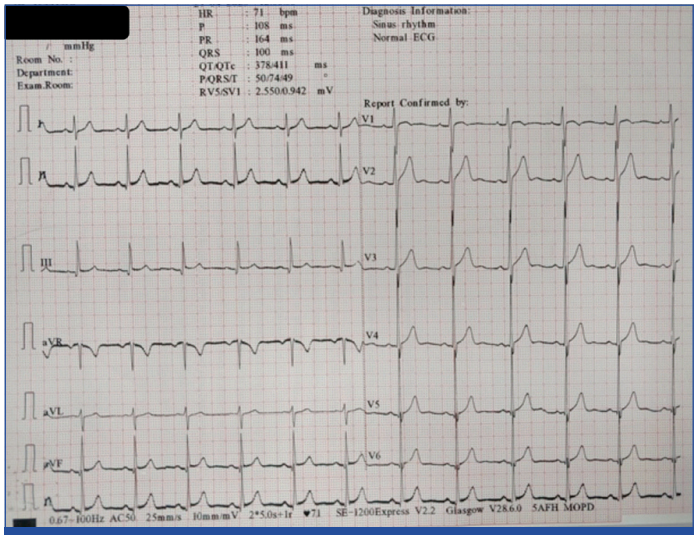
The patient was comfortable until 20-25 minutes post-surgery when he developed mild pain, irritation, and dragging sensations in the left eye. He was given a 500 mg tablet of Acetaminophen (PCM) in the post-op room. However, following the medication, he experienced light-headedness and dizziness. Upon evaluation, the patient was found to have bradycardia with sinus rhythm and hypotension, with a blood pressure of 78/46 mmHg in the right arm while in a supine position, a pulse rate of 44/min, and SpO_2 of 90% on ambient air. Systemic examination revealed no abnormalities.

The patient was immediately shifted to the Intensive Care Unit (ICU) and received a bolus dose of intravenous fluids (500 mL of normal saline). The eye bandage was also removed to relieve any pressure on the globe. The surgical site appeared normal, with the graft in place, slight graft oedema, and no ocular abnormalities [Table/Fig-3].

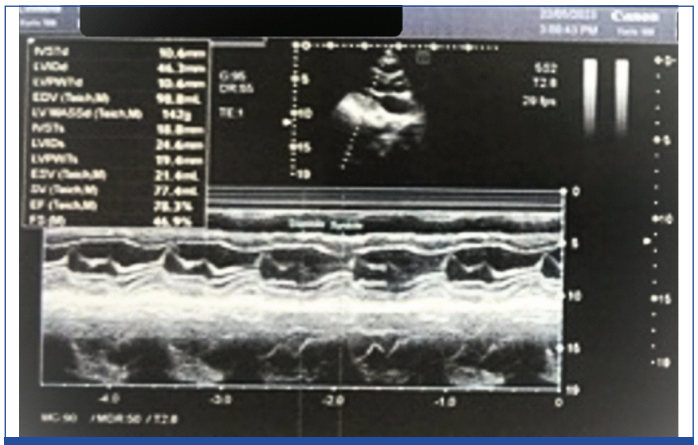
Symptomatically, the patient improved with the infusion of intravenous fluids, and his vital parameters returned to normal. The baseline Electrocardiogram (ECG) was within normal limits [Table/Fig-4].

[Table/Fig-3]: Immediate postoperative photograph showing well-opposed graft.

There was no need for anticholinergic or vasopressor medications. The patient was evaluated by an emergency physician who ruled out any significant systemic abnormalities. Subsequent investigations, including a complete blood count and echocardiogram, were normal [Table/Fig-5]. The patient was observed overnight in the ICU and discharged the next day.



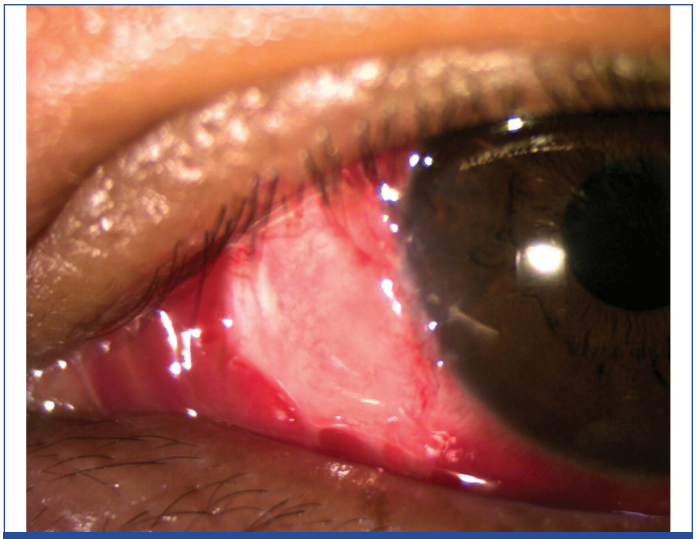
[Table/Fig-4]: Electrocardiography scan showing sinus rhythm with normal scan.



[Table/Fig-5]: A 2D echocardiography scan: Showing normal morphology of heart valves and normal left ventricular function.

During a follow-up visit with the physician after one week, no significant abnormalities were found. A review in the eye OPD at the same time showed good graft integration and healing of the donor site [Table/Fig-6].

The present case, along with patient photographs and investigations, is being reported with the informed consent of the patient.



[Table/Fig-6]: Follow-up diffuse slit lamp image showing well-adhered graft.

DISCUSSION

The Aschner-Dagnini reflex, commonly known as the Oculocardiac Reflex (OCR) or Trigeminovagal Reflex (TVR), is defined as a reduction of heart rate by 20% below baseline following direct pressure on the globe or traction on Extraocular Muscles (EOM) [1]. It is most commonly observed after strabismus surgery, but it has also been reported during procedures such as phacoemulsification surgery, intravitreal injections, and even less invasive procedures like pterygium surgery, gonioscopy, examination for Retinopathy of Prematurity (ROP), or vigorous eye rubbing [1,2]. OCR can also be triggered by orbital foreign bodies, facial trauma, or regional anaesthesia of the facial region [1]. Sinus bradycardia is the most common presentation of OCR, although it can also be associated with more severe features such as hypotension, cardiac arrhythmias (e.g., ventricular tachycardia), and even asystole [3].

The afferent pathway of OCR involves the trigeminal nerve, while the efferent pathway is carried by the vagus nerve. Impulses generated by stretch receptors in ocular tissues and the periorbita during globe manipulation are conveyed to the ciliary ganglion via the long and short ciliary nerves. From there, the impulses are transmitted to the trigeminal nucleus through the ophthalmic division of the trigeminal nerve via the Gasserian ganglion. Afferent nerves synapse with the visceral motor nucleus of the vagus nerve in the brainstem. The impulses are then carried by the vagus nerve to the myocardium at the Sinoatrial (SA) node, resulting in bradycardia [4].

The incidence of OCR following strabismus surgery has been reported as high as 68% [5]. Paediatric patients are more susceptible to OCR due to higher vagal tone, and its potential sequelae can be catastrophic due to their greater reliance on heart rate to maintain cardiac output [6]. There is no correlation between the incidence of OCR and specific EOM manipulation [7]. Furthermore, there is no significant difference in the occurrence of OCR based on the type of anaesthesia used during surgery. A study by Dandekar P et al., compared the incidence of OCR in patients undergoing uneventful phacoemulsification under peribulbar anaesthesia versus topical anaesthesia and found no statistically significant difference [8].

An interesting aspect of this case was the relatively delayed onset of OCR in the patient, occurring 20-25 minutes after the completion of pterygium surgery. Delayed onset OCR is rare, although cases of OCR due to infraorbital foreign bodies have been reported from 48 hours up to 40 years after the initial trauma [9,10]. A noteworthy case report published by Eldweik LT and Aljneibi S describes a case of restrictive strabismus along with gaze-evoked OCR in a patient following surgery for recurrent pterygium in the right eye. The patient had developed scarring over the medial rectus, leading to restrictive strabismus, and experienced recurrent OCR upon dextroversion,

characterised by bradycardia, nausea, and dizziness [11]. This is the only previously reported case of OCR following pterygium surgery in the literature [11]. However, the present case differed in that the patient underwent pterygium surgery for the first time and presented with OCR in the early postoperative period, without muscle restriction, and the OCR was not gaze-provoked.

The treatment of OCR is conducted as an emergency to prevent catastrophic sequelae. The first step is to remove the stimulus that incites the reflex, which may involve stopping the surgery or relieving pressure on the globe. This should be accompanied by cardiac monitoring, airway maintenance, and ensuring intravenous access. In many cases, this step alone is sufficient to revert the patient to sinus rhythm. However, if the patient remains unstable for more than 20 seconds after removing the inciting factor, intravenous injection of an anticholinergic (such as atropine 10-20 mcg/kg or glycopyrrolate 10 mcg/kg) may be required. If the above steps fail to stabilise the patient, epinephrine should be administered, and Cardiopulmonary Resuscitation (CPR) should be initiated [12].

It is important to have all necessary precautions in place for the prevention and management of OCR during procedures. Any sudden traction on the EOMs or manipulation of the globe should be avoided. A crash cart containing the necessary equipment for OCR management and patient monitoring should be available during ocular procedures. The role of prophylaxis in the form of intravenous anticholinergics or topical lidocaine has not been established [13].

CONCLUSION(S)

The OCR is an uncommon but potentially life-threatening complication of any ocular procedure or trauma that involves traction on the EOM or pressure on the globe. In the present case, it may be attributed to the constant conjunctival traction during the surgical procedure under topical anaesthesia, and its delayed precipitation due to tight eye patching. However, more case reports of similar nature will be required to study the mechanism of OCR following conjunctival surgery. The present case also highlights the importance of knowledge, precautions and management of OCR in day-care setting.

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