Case Report

DOI: 10.7860/JCDR/2022/51727.15944

Ophthalmology Section

Scleral Necrosis in Porphyria Cutanea Tarda: A Case Report

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ABSTRACT

Scleral necrosis is a rare but well documented ocular manifestation of Porphyria Cutanea Tarda (PCT). The PCT is caused by a deficiency of Uroporphyrinogen Decarboxylase (Uro-D). The typical clinical manifestations of PCT in the form of cutaneous photosensitivity are due to the accumulation of fluorescent polycarboxylated porphyrins. Here, a case of 30-year-old male patient who was referred to the cornea services department for scleral thinning in right eye has been presented. Slit lamp biomicroscopy revealed focal area (5×5 mm^2) of punched out scleral thinning (>80%) with uveal show in the interpalpebral area, 2 mm temporal to the limbus in right eye and a partial thickness scleral melt in nasal area. The left eye was phthisical. Patient had multiple blisters and pigmented, slightly depressed scars on the skin, especially in the sun exposed parts such as face, hands and legs. Digital shortening, atrophy and contractures were seen in hands and legs. Based on the clinical, biochemical and dermatological evaluation, the diagnosis of PCT was made. A rare case of scleral necrosis with uveal show in a patient with PCT which was successfully treated with allogenic scleral patch graft has been reported. On follow-up visits scleral patch graft was well taken up.

Keywords: Scleral patch graft, Scleral thinning, Uroporphyrinogen

CASE REPORT

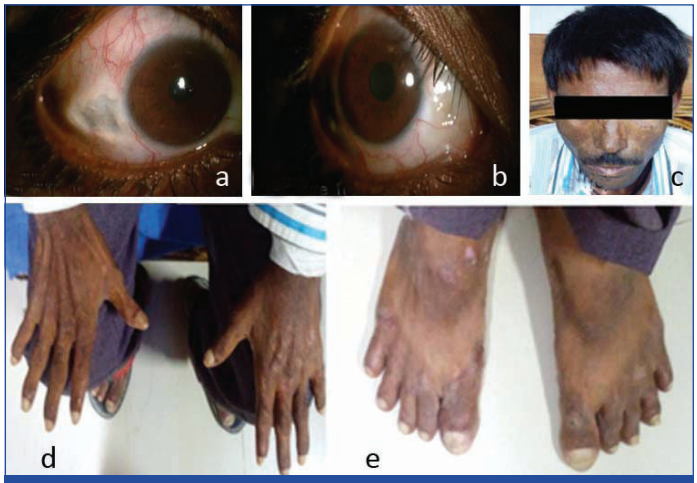
A 30-year-old male patient was referred to cornea services department with scleral thinning in right eye. Patient complained of depression in white area of right eye since one year and loss of vision in the left eye since five years. He was not an alcoholic and there was no history of any drug abuse. His family history was positive, as his elder brother was affected with the same disease who expired one year back.

Ocular examination showed visual acuity of 6/9 in the right eye and perception of light was absent in the left eye. Slit lamp biomicroscopy revealed focal area (5×5 mm^2) of punched out scleral thinning (>80%) with uveal show in the interpalpebral area, 2 mm temporal to the limbus in right eye [Table/Fig-1a] and a partial thickness scleral melt in nasal area [Table/Fig-1b]. Fundus examination was within normal limits in the right eye whereas left eye was phthisical. Patient had hyperpigmented patches, hypopigmented scars on the sun exposed skin of face hands and legs [Table/Fig-1c]. Digital shortening, atrophy and contractures were also seen in hands and legs [Table/Fig-1d,e].

According to the patient cutaneous symptoms appeared much earlier than ocular symptoms. Skin manifestations started at the age of five years in form of hyperpigmented patches which increased in size and severity as age progressed. Gradually, other manifestations such as digital shortening and contractures started showing. Patient reported a history of excretion of red coloured urine for three years.

Laboratory evaluation revealed red coloured urine on exposure to light, qualitative analysis of urine was positive for porphyrins. Quantitative analysis which comprises of a 24 hours urine test, showed total porphyrins level of 4489 µg/L (normal levels: 20-120 µg/L in 24 hours). Liver function tests included raised levels of Serum Glutamic Oxaloacetic Transaminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT) enzymes. The patient was Human Immunodeficiency Virus (HIV), Hepatitis-B Virus (HBV) and Hepatitis-C virus (HCV) negative.

The patient was referred to a dermatologist where he underwent skin biopsy which showed thick parakeratotic scale crust overlies focally flattened epidermis, upper 2/3rd dermis showed fibrosis with increased fibroblasts, mild perivascular infiltrate of lymphocytes and eosinophils with few neutrophils.

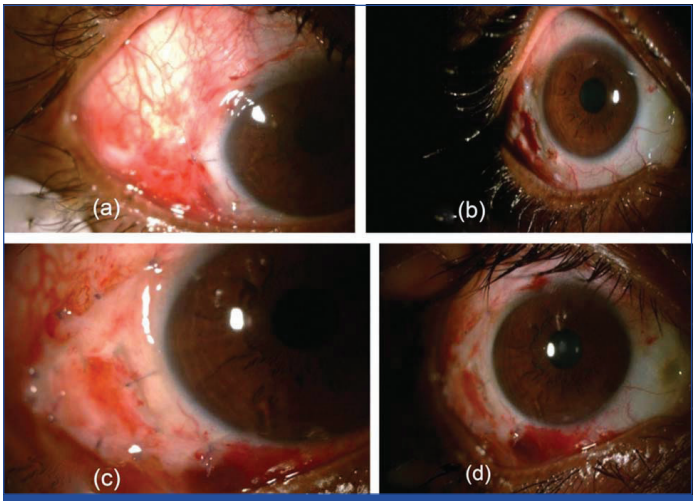


[Table/Fig-1]: a) Right eye shows an area of punched out scleral thinning with uveal show 2 mm temporal to the limbus in right eye in the interpalpebral area; b) Partial thickness scleral melt in nasal area of right eye; c) Hyperpigmentation of the skin of the whole face; d) Shortening of distal phalanges, contractures of the interphalangeal joints with skin changes on the dorsum of hand; e) Skin changes on the foot with contractures of the interphalangeal joints with shortening of digits.

Based on the clinical, biochemical and dermatological evaluation, a diagnosis of PCT was made. Confirmation of clinical diagnosis of PCT by molecular studies demonstrating mutations affecting both (UROD) alleles could not be conducted due to financial constraints. On basis of the above findings clinical diagnosis of necrotising scleritis without inflammation i.e., Scleromalacia Perforans (SP) in the right eye secondary to PCT was made. Considering near total scleral melt with uveal show in right eye, it was decided to schedule the right eye for scleral patch graft and start artificial tear drops (Sodium carboxymethyl cellulose 1%) and a topical broad spectrum antibiotics gatifloxacin 0.3% w/v (Zymar), Chloramphenicol 1% ophthalmic ointment (Chlorocol) in right eye for two weeks.

Intraoperatively the necrotic area was debrided, and donor sclera was fashioned. A 5.5×5.5 mm^2 scleral patch graft which was reinforced with interrupted 10-0 nylon sutures along with advancement

of both tenon capsule and conjunctiva was performed in order to cover the scleral patch graft [Table/Fig-2a]. Postoperatively the patient was started on lubricants (Sodium carboxymethyl cellulose 1%) and antibiotics (Gatifloxacin 0.3%, Chloramphenicol 1%) for one week. One week later patient was examined, the scleral graft in right eye was healing well but conjunctiva was seen to recede in right eye [Table/Fig-2b] hence decision was taken to undergo conjunctival autograft over scleral patch graft [Table/Fig-2c]. At patient's last follow-up visit at two months [Table/Fig-2d], the right eye was stable and left eye was pthisical. Patient did not turn up for further follow-ups.



[Table/Fig-2]: a) Scleral patch graft was reinforced in right eye with interrupted 10-0 nylon sutures along with advancement of both tenon capsule and conjunctiva; (b) At one week scleral graft was well taken up but conjunctiva was seen to recede in right eye; (c) postoperative photograph of conjunctival autografting which was done over the scleral patch graft; (d) At two month follow-up sclera patch graft was well taken up and stable.

Effective photoprotection in the form of good Ultraviolet (UV) protective sunglasses along with avoidance of outdoor activities in bright sunlight was advised. In consultation with a dermatologist; sunscreen was advised thrice a day for skin lesions.

DISCUSSION

Porphyrias are a group of rare metabolic disorders characterised by the accumulation of photosensitive, toxic intermediates of haem metabolism in various organs including the skin, eye, and neural tissue [1]. Porphyrias are categorised into two groups of erythropoietic or hepatic based on the defects of specific enzymes in the haem synthesis pathway. The exact diagnosis is based on measurement of defective enzyme, or the accumulated precursors in haem synthesis [2]. Porphyrias are also classified as acute or cutaneous, depending on the primary clinical manifestations. The PCT is the most common type of porphyria, is caused by a deficiency of enzyme uroporphyrinogen decarboxylase, a crucial enzyme in heme biosynthesis, which results in an accumulation of photosensitive intermediates, such as uroporphyrinogen, which leads to the fragility and blistering of sun exposed skin [3].

The PCT was first described by Waldenstrom J in 1937 as a chronic multifactorial disorder characterised by typical skin and liver findings, as well as pronounced uroporphyrin excretion in the urine [4]. Skin manifestations are due to ischemia and inflammation secondary to accumulation of porphyrins in sun exposed areas of the skin causing blisters, hyperpigmentation, scleroderma like changes, and hypertrichosis [2,5,6]. Ocular involvement in porphyria is rarely reported, caused by accumulation of photoactive porphyrins in the ocular tissues, but may manifest as lid scarring, ectropion, pingueculae, pterygium, acute scleritis with scleral necrosis, corneal thinning and corneal perforation [2,7,8].

The mechanism by which ocular damage occurs is still unclear, however photic damage, ischaemia and inflammation secondary to accumulation of porphyrins remains the leading cause [9]. The SP is rare and is commonly associated with long standing rheumatoid arthritis and other collagen vascular diseases: systemic lupus erythematosus, periarteritis nodosa, Wegener's granulomatosis, Behçet's disease, limited scleroderma, Crohn's disease, graft-versus-host disease [10,11]. SP is also observed in porphyria and herpes-zoster infection [12-17]. The SP with skin manifestations have also been observed in Pemphigus vulgaris, but in this case it was differentiated with the help of laboratory investigations and dermatologist opinion [18].

Our patient was likely a case of hereditary PCT as he had very early onset of symptoms, scleral necrosis in interpalpebral area, a positive family history and skin biopsy revealed features correlating with that of PCT, but the diagnosis could not be confirmed by molecular assay due to financial constraints. Patient was not found to have any collagen vascular disease or rheumatoid arthritis hence all the findings were considered to be correlating with PCT. There are limited number of case reports of scleral patch grafting in PCT patients, ours is the one to add in this series. The [Table/Fig-3] shows the reported cases of scleral compromise in PCT [5,8,19-22]. In the present case report, scleral grafting was performed to

Author's name and year	Number/Age/Gender of the patient	Clinical features	Treatment	Follow-up duration and prognosis
Sevel D and Burger D, 1971 [5]	1/51 yrs/male	OU: Scleral thinning with eyelid scarring OS: Corneal perforation	Topical steroids, cyclosporine, lubricants OS: Enucleated	Not mentioned OD: stable
Zaborowski AG et al., 2004 [19]	1/54 yrs/female	Bilateral, symmetrical areas of punched out scleral thinning with choroidal show temporally in the interpalpebral fissures	Oral prednisolone 60 mg daily and cyclosporine 2% drops QDS	Not mentioned
Altiparmak UE et al., 2008 [20]	1/52 yrs/male	Scleral necrosis in the interpalpebral area nasally OU	Intensive topical lubrication and topical and oral immune-suppressive medication. They underwent amniotic membrane grafting	4 years/symptom free
Sati A et al., 2013 [21]	1/56 yrs/male	Failed and vascularised corneal graft	Boston type 1 keratoprosthesis	9 months/stable
Yan F et al., 2014 [22]	1/27 yrs/male	Scleral necrosis area approximately 3 mm in diameter at corneoscleral limbus in both eyes	Allogeneic corneoscleral limbus transplantation	3 months/stable
Gogri PY et al., 2014 [8]	1/24 yrs/male	Bilateral, symmetrical areas of punched out scleral thinning with uveal show temporally in the interpalpebral fissures in both eyes	Tear substitutes/antibiotic coverage	3 weeks/scleral thinning stable
Present study	1/30 yrs/male	Scleral thinning in right eye, left eye pthisical	Scleral patch grafting in right eye	2 months/scleral graft stable

[Table/Fig-3]: Reported cases of scleral compromise in Porphyria Cutanea Tarda (PCT) [5,8,19-22].
*OU: Oculus uterque (both eyes), OD: oculus dexter (the right eye), OS: oculus sinister (the left eye)

secure the ocular integrity. By the help of scleral graft we were able to save the only eye with vision of the patient and moreover to prevent recurrence of scleral necrosis UV protection in form of UV protecting goggles and sunscreen were provided.

CONCLUSION(S)

This is a rare case report of scleral necrosis with uveal show in a patient with PCT which was successfully treated with scleral patch graft. To conclude PCT, rarely presents with ocular manifestations, hence prompt diagnosis and appropriate multidisciplinary management can prevent progression to globe threatening conditions.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Aug 11, 2021
- Manual Googling: Sep 28, 2021
- iThenticate Software: Jan 12, 2022 (17%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Aug 08, 2021**
Date of Peer Review: **Sep 28, 2021**
Date of Acceptance: **Dec 02, 2021**
Date of Publishing: **Feb 01, 2022**