

A case of congenital erythropoietic porphyria

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Abstract Congenital erythropoietic porphyria (CEP) is a rare form of porphyria. It is an autosomal recessive disorder, which results from deficiency of enzyme uroporphyrinogen III cosynthase (or uroporphyrinogen III synthase). Due to the impaired function of this enzyme, excessive amounts of particular porphyrins accumulate, particularly in the bone marrow, plasma, red blood cells, urine, teeth, and bones. Due to photosensitivity, after exposure to light, the photo-activated porphyrins in the skin cause bullae (blistering) that often get infected. These infected lesions can lead to scarring, bone loss, and deformities. The hands, arms, and face are the most commonly affected areas. We report a 6-year-old male child presenting with CEP.

Key words

Photosensitivity, congenital erythropoietic porphyria, porphyria, autosomal recessive.

Introduction

Congenital erythropoietic porphyria (CEP), also known as Günther's disease, is a rare inborn error of porphyrin-heme synthesis inherited as an autosomal recessive (AR) trait. It is caused by deficient uroporphyrinogen III synthase (URO-III-synthase), the fourth enzyme in the heme biosynthetic pathway. It typically begins in infants or young children. The presentation of CEP at birth in a patient with history of a difficult perinatal course and concomitant jaundice usually indicates a severe disease.^{1,2,3} We present a case of five-year-old male child presenting with features of CEP since infancy.

Case Report

A five-year-old boy, born of a second-degree consanguineous marriage presented to Dermatology outpatient department of our hospital. His father gave history of

photosensitivity and spontaneous development of blisters on sun-exposed sites soon after birth. The blisters used to heal with significant scarring. There was destruction of cartilage of ear and nose (**Figure 1**). Since early infancy the father had noticed reddish colored urine. The child's mental and physical development had been normal according to age. There was no family history of a similar problem. There was no history of acute attacks. On examination, the child's face showed many scars (**Figure 2**). There was hypertrichosis on the face, shoulders and arms. The teeth were of coppery-red color (erythrodontia), (**Figure 3**). There were a few crusted lesions on the hands and feet. Atrophic scars were also present on the extremities. There was cicatricial alopecia on scalp at few places. Wood's lamp examination of urine showed red fluorescence (**Figure 4**). On the basis of the history of blistering on the exposed areas since early infancy, healing with atrophic scarring, erythrodontia, and red-colored urine, we made a clinical diagnosis of CEP.

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Figure 1 Clinical photograph showing destruction of ear cartilage.



Figure 2 Clinical photograph showing scars on face.



Figure 3 Clinical photograph showing erythrodonτία.

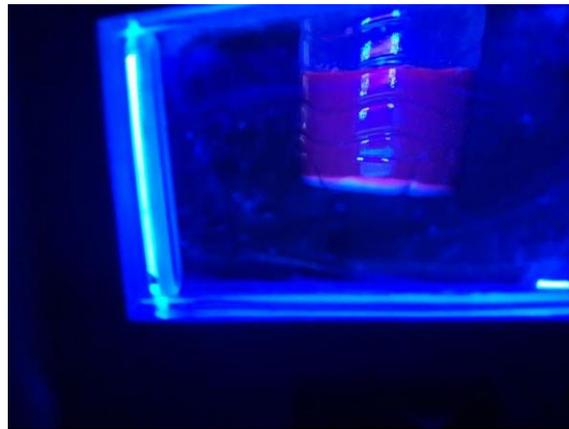


Figure 4 Photograph showing orange-red fluorescence on Wood's lamp examination of urine.

Routine investigations were within normal limits except for mild iron deficiency anemia and elevated transaminases (SGOT 76U/L, SGPT 54 U/L). The urine did not show increased level of porphobilinogen (PBG). Total urinary porphyrin levels were raised. Twenty-four-hour urinary levels of uroporphyrin and coproporphyrin were raised. Genetic analysis could not be done because of unavailability of resources in our set-ups.

Discussion

Porphyrias are caused by partial deficiency of enzymes required for heme synthesis. Heme is synthesized from glycine and succinyl CoA via an eight-step pathway, with each step being catalyzed by a separate enzyme. Accumulation

of porphobilinogen (PBG) leads to acute attacks. Accumulation of products of subsequent reactions does not lead to acute attacks but, instead, cause photosensitivity.

Clinically, porphyrias are classified as (a) acute attacks (neuropsychiatric) only, e.g., acute intermittent porphyria (AIP) and ALA dehydratase deficiency; (b) cutaneous (photosensitivity), e.g., porphyria cutanea tarda (PCT), congenital erythropoietic porphyria (CEP), and erythropoietic protoporphyria (EPP); (c) both cutaneous disease and acute attacks, e.g., variegate porphyria (VP) and hereditary coproporphyria (HCP). Blisters are the presenting features of PCT, CEP, VP, and HCP, and these constitute the bullous porphyrias. The common features of all bullous porphyrias are vesicobullous lesions on photo-exposed parts, hypertrichosis, atrophic scars, hyperpigmentation, milia, and scleroderma-like lesions.⁴

Repeated episodes of blistering result in mutilation of ears, nose and hands. Hypertrichosis is also present. There is passage of port-wine coloured urine since birth. As the porphyrins within the RBCs in the cutaneous microvasculature are exposed to light, hemolytic anemia can occur. This may be severe enough to lead to gallstones, splenomegaly, acroosteolysis, osteopenia and compression fractures. Our patient had only mild iron deficiency anemia and there was no evidence of hemolytic anemia. The patients may have ophthalmological changes in the form of photophobia, keratoconjunctivitis, ectropion, symblepharon and loss of vision. Erythrodontia is characteristic. The typical biochemical findings include elevated levels of uroporphyrin in urine with levels even upto sixty times the normal. Coproporphyrin I is also present in urine and excreted in large amounts in feces. Histopathology of bulla shows subepidermal separation with minimal

inflammation. Thickening of collagen bundles may be seen with areas of scarring. In our case, skin biopsy couldn't be done as patient's father refused to go for any other invasive procedure.

Treatment includes symptomatic measures in the form of sun protection, beta-carotene and also splenectomy for intractable hemolytic anemia. Transfusion of erythrocytes, intravenous hematin and oral activated charcoal, bone marrow transplant and gene therapy is also advocated.^{5,6} In our case, sun protection in the form of broad spectrum sunscreen, beta carotene, protective eye goggles were advised.

There is no FDA-approved treatment for CEP or specific treatment for the photosensitivity. The only effective management is prevention of blistering by avoidance of sun and light exposure, including the long-wave ultraviolet light that passes through window glass or is emitted from artificial light sources. Therefore, the use of protective clothing, wrap-around sun glasses, protective window films, reddish incandescent bulbs, filtering screens for fluorescent lights, and opaque sunscreens containing zinc oxide or titanium oxide is recommended. Wound care is necessary to prevent infection of opened blisters; blood transfusions are necessary when hemolysis is significant. Bone marrow transplantation (BMT) is the only cure for CEP and should be considered in children with severe cutaneous and hematologic involvement.

There are very few case reports of CEP in Indian literature till date. But, CEP without hemolysis is very rare. Recently some Indian authors have reported cases with mild anemia without hemolysis and presence of hypertrichosis on face.⁷ In our case there was no feature of hemolysis. We report the case because of its rarity

References

1. Murphy GM. The cutaneous porphyrias: A review. The British Photodermatology Group. *Br J Dermatol*. 1999;**140**:573-81.
2. Fritsch C, Bolsen K, Ruzicka T, Goerz G. Congenital erythropoietic porphyria. *J Am Acad Dermatol*. 1997;**36**:594-610.
3. Bari A. Congenital erythropoietic porphyria in three siblings. *Indian J Dermatol Venereol Leprol*. 2007;**73**:340-2.
4. Koley S, Saoji V. Congenital erythropoietic porphyria: Two case reports. *Indian J Dermatol*. 2011;**56**:94-7.
5. Poh-Fitzpatrick MB. Erythropoietic porphyrias: current mechanistic, diagnostic and therapeutic consideration. *Semin Hematol*. 1997;**14**:211.
6. Laorr A, Greenspan AA. Severe osteopenia in congenital erythropoietic porphyria. *Can Assoc Radiol J*. 1994;**45**: 307-9.
7. De AK, Das K, Sil A, Joardar S. A case of congenital erythropoietic porphyria without hemolysis. *Indian J Dermatol*. 2013;**58**:407.