International Journal of
Rheumatic Diseases

International Journal of Rheumatic Diseases 2014; **17:** 327–332

ORIGINAL ARTICLE

Alkaptonuric ochronosis: a clinical study from Ardabil, Iran

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Abstract

Objective: Ochronosis is a term used to describe pigment deposition that occurs in the connective tissues of patients with alkaptonuria, an autosomal recessive disorder that results from a deficiency of homogentisic acid oxidase. Brown or blue-gray discoloration of the skin may be seen on the axillary and inguinal areas, face, palms or soles. In addition, blue-black discoloration can be apparent on skin overlying cartilage in which the pigment is deposited, such as the ears. The sclerae are also typically involved. The cheapest screening test to perform prior to expensive lab tests is the urine oxidation test: having it standing in light for a period of 24 h when suspicion has risen.

Methods: Retrospective analysis of patients with ochronotic arthropathy seen between September 2011 to September 2013 was carried out.

Results: Seven patients (four male, three female) with ochronotic arthropathy were seen, their mean age was 46.1 years. All patients had bluish-black pigmentations of the ear cartilage and sclera. Spondylosis was seen in all, whereas peripheral arthritis was present in five patients. Moderate aortic insufficiency and calcification of the aortic valve was detected in one male patient. Urine screening for homogentisic acid was positive in all seven patients.

Conclusion: Alkaptonuria is a rare autosomal recessive disorder of the metabolism caused by deficiency of homogentisic acid oxidase. It is suggested that more widespread screening should be undertaken in order to assess the true incidence of the disorder.

Key words: alkaptonuria, homogentisic acid, ochronosis, spondylosis.

INTRODUCTION

Ochronosis is an autosomal recessive disorder that results from deficient activity of homogentisic acid dioxygenase (HGD), the third enzyme in tyrosine degradation.[1] The description of alkaptonuria by Garrod in 1902 led to recognition of the concept of a single enzyme deficiency resulting in lifelong disease.[2] The gene encoding HGD has been mapped to chromosome 3q21-q23 and mutations have been identified in patients with ochronosis.[3] Affected patients usually are asymptomatic in childhood. During the third decade, deposits of the brownish or bluish pigment become apparent, typically first in the ear cartilage and sclerae. Additional pigment is deposited in the large joints and the spine, especially the lumbosacral region. Calcification of multiple intervertebral discs is a characteristic radiographic finding. Axillary and inguinal areas may have a brownish discoloration. Perspiration can stain clothing in affected patients.[4]

Ochronosis is characterized by the excretion of urine that appears normal when fresh, but turns dark brown or black if left standing or after alkalinization. The dark color is caused by oxidation of homogentisic acid (HGA), and alkaptonuria has also been called black urine disease. Cloth diapers that are washed in alkaline solutions will have dark brown staining. The diagnosis is confirmed by quantitative measurement of HGA in urine.[5]

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