

## Case report

**Yellow palms and feet in a child**Anca Chiriac<sup>1</sup>, Anca E. Chiriac<sup>2</sup>, Tudor Pinteala<sup>2</sup>, Elena Gologan<sup>2</sup>, Caius Solovan<sup>3</sup>, Piotr Brzezinski<sup>4</sup><sup>1</sup>Nicolina Medical Center, Iasi, Romania<sup>2</sup>University of Medicine and Pharmacy "Gr. T. Popa", Iasi, Romania<sup>3</sup>University of Medicine Victor Babes, Timisoara, Romania<sup>4</sup>6<sup>th</sup> Military Support Unit, Ustka, Poland

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**Abstract:** The yellowish discoloration of the palms and skin is reported under different terms: xanthoderma, hypercarotenemia, carotenemia, carotenoderma. Yellow discoloration of the skin may be associated with carotenemia, hypothyroidism, diabetes mellitus, hyperlipoproteinemia, liver disease, and renal disease, meaning that carotenemia is not synonym with yellow skin, but rather one of the cause. We presented an 8 year-old boy with a yellow discoloration of the palms and soles, observed by the mother 3 weeks prior to medical examination. The discoloration was uniformly distributed, rather symmetrically, no nails changes, just a mild xerosis palmaris on the right hypotenar area. In lab investigations only were: hypercholesterolemia. The final diagnosis was xanthoderma in context of hyperlipoproteinemia type II A.

**Keywords:** child, skin disease, hypercholesterolemia, hyperlipoproteinemia

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**Case report**

An 8 year-old boy was addressed to us for a yellow discoloration of the palms and soles (Figures 1 and 2), observed by the mother 3 weeks prior to medical examination. At physical examination a yellowish pigmentation on the palms and soles was observed, no hyperkeratosis, no erythema, and no excoriations due to pruritus (which was not declared by the child or other member of the family). The discoloration was uniformly distributed, rather symmetrically, no nails changes, just a mild xerosis palmaris on the right hypotenar area. No other complains, no systemic symptoms, a very good health curve for the age.

A genetic examination was asked for the child and parents, he was the only child to the family; normal results were obtained.

Lab investigations were done and the only abnormal values were noticed for lipid profile: hypercholesterolemia; no signs of diabetes mellitus, no thyroid disturbances, no exaggerated carotene and/or orange food intake.

The final diagnosis was xanthoderma in context of hyperlipoproteinemia type II A, no treatment was recommended, and the child was referred to Diabetes and Nutrition Department for further investigations of hypercholesterolemia and follow-up.

**Discussion**

The yellowish discoloration of the palms and skin is reported under different terms: xanthoderma, hypercarotenemia, carotenemia, carotenoderma, xanthodermie cutanée in French literature



Figure 1. Yellow discoloration of the soles in an 8 year-old boy

Table 1. Childhood hyperlipoproteinemia

	Type					
	I	IIA	IIB	III	IV	V
Origin	exogene				endogene	exogene
Age of onset	childhood	childhood	adult	adult	adult	adult
Familial character	present					present
Transmission	autosomal recessive					autosomal recessive
Tryglycerides	+++	normal	+	++	++	+++
Cholesterol		+++	+	+	normal	
HDLc		normal	low			low
LDLc		+++	+	low	normal	
VLDLc				++	+++	+
Chilomicrons	+					+
Tryglycerides/cholesterol	>2.5					elevated
Serum	clear with a creamy ring	clear	turbid	turbid	lactescent	lactescent with a creamy ring
Xantomas	++	+	-	+++		+
Hepatosplenomegaly	+					+
Retinian lypemia	+					+
Pancreatitis risk	+					+
Xantelasma		+				
Ateromatosis		+++	+++	++		
Gerontoxon			+			
Metabolic syndrome			+++			
Wavy character			++		++	+

VLDLc, very low density lipoprotein cholesterol.



Figure 2. Yellow discoloration and hyperkeratosis of the palms in an 8 year-old boy

The first description appeared in 1925 in anglo-saxon publications while French Labbé in 1914 proposed the terminology of cutaneous xanthoderma [1]. Labbé's definition of xanthoderma was: discoloration of type golden yellow of the palms and soles in individuals suffering from severe diabetes mellitus and terminal stages of caseia, but also a manifestation observed in normal persons without any medical explanation. He thought, at that time, that the presence in the blood of a pigment: lipochrome (an equivalent of caroten) could explain the yellow aspect of the skin.

Even the term carotenoderma has its origin in Greek language: karōton means carotene and hāima blood. Hypercarotenemia signifies the presence in large quantity of carotene in the blood and carotenoderma high levels in the skin. Today the term xanthoderma/xanthoderma is more often used.

Yellow discoloration of the skin may be associated with carotenemia, hypothyroidism, diabetes mellitus, hyperlipoproteinemia, liver disease, and renal disease, meaning that carotenemia is not synonym with yellow skin, but rather one of the cause [2, 3].

Yellow palms and soles are associated with:

- Excessive food intake of carotene (especially from carrots, squash, sweet potatoes, oranges and spinach) is followed by the deposition of pigment in the tissues and the characteristic color. This is most seen in babies with too much carrot in alimentation (especially juice).

Columbia University's Health Services department point out that an intake of over 20 mg of beta carotene, is enough to set off hypercarotenemia [4].

Hypercarotenemia can sometimes be an indicator of anorexia nervosa [4].

- Diabetes mellitus is well known today to cause yellow discoloration of the palms and soles [2, 5].
- Childhood hyperlipoproteinemia (Table 1);
- The various phenols, quinoline, diphenyls found in many hair lotions are photoactivated, and condensed to form polynuclear quinonoid compounds which are often colored and can induce transitory yellow coloration of the palms [6];
- The explosive trinitrotoluene (TNT) when it was handled for hours, by workers during the World War I, induced yellow skin over the palms; the women at those times were called "Canary Girls"--due to "nitro groups" within the TNT that reacted with melanin in the workers' skin (2008 paper in the Chemical Educator Journal);
- Sorafenib-Sunitinib are two drugs with known adverse reaction of yellow skin discoloration [4];
- Myxedema also can be associated with yellow skin and but not limited to the palms and soles [7];

- An intrigue correlation has been described between high cholesterol levels and hypothyroidism [8] but no parallel with yellow color of the skin from palms and soles.

Our case is interesting for the following reasons:

- It describes a peculiar and rare form of yellow discoloration of the skin limited to the palms and soles in a small child;
- Diabetes mellitus, exaggerated carrots intake, medication, thyroid dysfunction were not proven to be the cause.
- It is a hyperlipoproteinemia type II A, diagnosed by: elevated serum low-density lipoprotein cholesterol (LDLc) with normal high-density lipoprotein cholesterol (HDLc), clinical aspect (xanthoderma), clear serum at direct examination. Hyperlipoproteinemia type II A has two forms: primitive and secondary (associated with cholestasis or hypothyroidia). The familial form is caused by mutations of LDLc receptor gene. In homozygote forms the values of cholesterol are very high even in the first days of life and the medium survival rate is no more than 20 years due to cardiovascular risk. In heterozygote forms the survival is longer (about 30 years) and prognosis better. The polygenic forms have a moderate course and a good response to diet [9].
- Later in life gerontoxonum, xantelasma and xantomias may appear as a consequence of tissue storage of cholesterol and the risk of premature onset of vascular abnormalities secondary to atheromatosis.
- Genetic analysis for familial forms are necessary for confirmation of the diagnosis; follow-up of the patients by laboratory investigations, elasticity tests for vessels and Doppler ultrasound for the risk of atheromatosis.

**Conflict of interest:** none declared.

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