Cutis marmorata telangiectatica congenita: a prospective study of 27 cases and review of the literature with proposal of diagnostic criteria

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doi:10.1111/j.1365-2230.2008.03074.x

Summary

Background. Cutis marmorata telangiectatica congenita (CMTC) is a congenital vascular anomaly of unknown aetiology. About 300 cases have been reported in the literature. The rate of associated anomalies varies between 20% and 70%.

Methods. We report a series of 27 children with CMTC, 18 of whom were followed-up prospectively for a median of 22 months (range 2 months–5.3 years).

Results. Both genders were equally affected (13 male/14 female). The legs were involved in 20 cases (74%), the arms in 10 (37%), the face in 4 (15%) and the trunk in 18 (67%). There were 20 (74%) patients who presented with involvement of both trunk and limbs, a further 20 patients had lesions affecting the limb on only one side of the body, and 7 children (26%) had bilateral lesions; 1 child had generalized CMTC lesions. The involved areas covered a mean of 18% of body surface area (range 3–90). Associated anomalies were found in 15 patients (56%), with some exhibiting more than one. There was body asymmetry (hypertropy or hypotrophy of the affected limb) in nine patients (33%), seven patients had a variety of other malformations (congenital glaucoma, syndactyly, lipoma, macrocephaly, renal hypoplasia, Kartagener's syndrome), and other vascular lesions were present in four patients (15%). There was no correlation between the extent of skin lesions and likelihood of associated anomalies. On follow-up, fading of skin lesions was noted in 67% of our patients.

Conclusion. Body asymmetry is the most common anomaly associated with CMTC; other associations might be pure chance. In order to separate CMTC from other vascular malformations, notably Klippel–Trénaunay syndrome, we suggest diagnostic criteria for their differentiation.

Introduction

Cutis marmorata telangiectatica congenita (CMTC) is an uncommon congenital vascular anomaly of unknown aetiology. It was first described in 1922 by van Lohuizen[1] as a pattern of reticulate erythema and telangiectasia, skin atrophy and/or ulceration. About 300 cases have been described in the literature to date. Diagnosis of CMTC is usually made on clinical grounds. Histopathological examination reveals multiple dilated capillaries and veins within the dermis.[2,3]

The issue of various anomalies being associated with CMTC has been a matter of debate since the original description of this condition. The rate of anomalies reported in association with CMTC varies between 18.8% and 70%,[4,5] but it is unclear whether or not these are pure chance findings or due to reporting bias.

We report a series of 27 cases of CMTC, 18 of which were followed up prospectively at the Departments of Paediatric Dermatology, University Hospital Eppendorf, and Catholic Children's Hospital Wilhelmstift, Hamburg, Germany, over a period of 8 years.

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Conflict of interest: none declared.

Accepted for publication 14 July 2008

Methods

Patients (14 girls and 13 boys, mean age at first visit 16 months, range 5 days–12 years) were referred for evaluation of a cutaneous vascular anomaly between January 2000 and January 2008. CMTC was defined as a cutaneous pattern of congenital reticulate erythema with or without telangiectasia. In accordance with van Lohuizen's first report,[1] atrophy and ulceration of the involved areas, and clinical improvement over time (assessed by standardized photographs), were additional criteria typical of, but not mandatory for the diagnosis of CMTC. In order to separate CMTC from livedo racemosa, only congenital presentation was considered diagnostic. Venectasia or lymphangioma within the affected area were considered suspicious for Klippel–Trénaunay syndrome (KTS). We recorded the distribution of lesions, other cutaneous findings, limb length and circumference, and the presence or absence of associated anomalies. Of the 27 patients, 18 (67%) were followed up for a mean time of 22 months (range 2 months to 5.3 years).

Results

All children were delivered after an uneventful pregnancy. Three were preterm infants with gestational ages of 27, 33 and 34 weeks, respectively. According to parental reports, lesions were found in all patients at or shortly after (within 2–3 days) birth.

The mean area involved was 18% of body surface area (BSA) (range 3–90%). There were 20 (74%) patients who presented with involvement of both trunk and limbs, a further 20 patients had unilateral lesions affecting a limb on only one side of the body and 7 children (26%) had bilateral lesions; 1 child had generalized lesions, covering 90% of BSA. In 19% of patients, segmental distribution was found. Telangiectasias were noted in only five patients.

Associated abnormalities were seen in 15 patients (56%). Body asymmetry (defined as unilateral overgrowth of trunk and/or limbs) was noted in nine patients (33%), and was confined to the areas affected by CMTC, seven children had a variety of other malformation (syndactyly, congenital glaucoma, lipoma, macrocephaly renal hypoplasia, Kartagener's syndrome), and other vascular lesions (port wine stains, haemangiomas, venectasia, lymphangioma) were present in four patients (15%). Two children (7%) developed or presented with cutaneous ulcerations. No familial cases were noted. There was no correlation between the extent of the lesions and the likelihood of associated anomalies: Major anomalies were noted in two of seven patients with lesions affecting < 10% of BSA, and in 6/20 patients with CMTC > 10% BSA. Lesions tended to fade within the first 2 years of life in 67% (12/18) of our patients (Table 1).

Discussion

We report a series of 27 patients with CMTC. CMTC was present at birth and preferentially involved the limbs, followed by the trunk and face. The rate of reported anomalies in association with CMTC varies between 18.8% and 70%.[4,5] Body asymmetry (usually limb hypoplasia or hyperplasia) and vascular anomalies are most commonly reported, followed by neurological disorders, ocular malformations and syndactyly (Table 2).[4–7]

In our series of 27 patients, 15 (56%) had associated anomalies, with body asymmetry being the most common (9/27 = 33%) (Table 2). Higher rates were reported by Pehr and Moroz,[8] who found a prevalence of 68% in their review of 126 patients previously reported in the literature. Two groups[4,9] found lower rates (18.8% and 27%, respectively) of associated anomalies, but Amitai *et al.*[4] excluded patients with body asymmetry and additional capillary lesions, so that their data are not directly comparable with other reports. It must be noted that many of the anomalies (such as haemangiomas or lipomas) previously reported as being 'associated' may of course be coincidental. If we add all patients from studies involving > 10 patients to our series [and exclude patients with macrocephaly-CMTC (M-CTMC) syndrome; OMIM 602501], a total of 132/215 patients (61%) had associated abnormalities.

Associated vascular anomalies were found in 15% of our patients, 50% of which were capillary malformations. Similar data were reported by Amitai *et al.*,[4] who suggested that (other) capillary malformations may indeed represent a typical feature of CMTC itself. Two of our patients presented with skin ulceration and/or atrophy of the affected lesions, whereas Amitai *et al.*[4] did not report any patients with atrophy or ulceration. As body asymmetry and other vascular malformations each occur in a quarter of all patients (Table 2), we suggest that these might be included in a list of diagnostic criteria of CMTC. One child had renal hypoplasia, which might be considered a chance association.

One patient with disseminated CMTC lesions also had glaucoma and brachysyndactyly. In the literature, 10 glaucoma cases associated with CMTC involving the facial area have been reported.[10] It thus appears

Table 1 Patients with cutis marmorata telangiectatica congenita in our series.

Patient	Gender	Extent (% BSA)	Associated anomalies	Hypertrophy/hypotrophy of affected limbs difference in circumference (in mm)	Fading of skin lesions with age
1	F	40	Lipoma, naevus flammeus	–	–
2	M	5	–	–	+
3	F	15	–	+ (+5)	+
4	M	17	Macrocephaly, slight ulceration and skin atrophy	–	+
5	M	11	–	–	ND
6	F	3	–	–	ND
7	M	20	–	+ (+10)	–
8	F	6	–	– (+15, length +10)	+
9	M	9	–	–	ND
10	F	16	Three haemangiomas	–	+
11	M	3	–	–	ND
12	F	14	–	–	–
13	M	34	Naevus flammeus	–	–
14	F	20	–	–	–
15	F	16	–	+ (+10)	+
16	M	12	–	– (+20, length +5)	+
17	M	90	Glaucoma, brachysyndactyly, (telangiectasia)	– (length +10)	+
18	M	17	–	– (+20, length +30)	+
19	M	7	Renal hypoplasia	+ (+15)	+
20	F	15	–	–	+
21	F	18	Ulceration, atrophy	–	+
22	M	12		+ (+10)	–
23	F	5		–	ND
24	F	18	–	–	ND
25	F	15	–	–	ND
26	F	40	Microsomia, Kartagener's syndrome, lymphangioma	–	ND
27	M	20		–	ND

BSA, body surface area, ND, not done.

Table 2 Types of associated anomalies, atrophy and ulceration in 215 patients with cutis marmorata telangiectatica congenita described in the literature.[4,5,9,19–21]

Anomaly	Associated anomalies, *n*		
	Previous reports (*n* = 188)	Our study (*n* = 27)	Associated anomalies, % (*n* = 215)
Body asymmetry	45	9	25.1
Vascular	46	4	23.2
Atrophy	10	2	5.6
Neurological	10	1	5.1
Ocular	7	1	3.7
Syndactyly	5	1	2.8
Ulceration	1	2	1.4

advisable to perform tonometry in all patients with facial CMTC.

Syndactyly is another common finding in patients with CMTC (Table 2). Although Adams–Oliver Syndrome (AOS) is often associated with CMTC and syndactyly,[11] our patient did not present other features characteristic for AOS such as aplasia cutis congenita or cardiac malformations.

One of our patients presented with macrocephaly, which has been reported in > 50 cases with CMTC.[6,7,12–14] Recently, Torriello and Mulliken[15] proposed that the term 'macrocephaly–cutis marmorata telangiectatica congenita syndrome' should be renamed 'macrocephaly–capillary malformation' (M-CM). This syndrome could be excluded in our patient, however, due to the absence of angioma, syndactyly, intracranial structural defects or mental retardation, respectively.[16,17]

Other differential diagnoses of CMTC include Bockenheimer's syndrome (diffuse phlebectasia), a rare and progressive condition which is characterized by the development of often large and painful venous ectasias usually of one limb during childhood, livedo, and, most importantly, Klippel-Trinaunay-syndrome (KTS).

Table 3 Suggested diagnostic criteria for cutis marmorata telangiectatica congenita.

Diagnostic criteria	Patients positive for these features, % (*n*)
Major criteria	
Congenital reticulate (marmorated) erythema	100 (27)
Absence of venectasia	100 (27)
Unresponsiveness to local warming	100 (27)
Minor criteria	
Fading of erythema within 2 years	67 (18)
Telangiectasia*	19 (5)
Port-wine stain outside the area affected by CMTC	7 (2)
Ulceration*	7 (2)
Atrophy*	7 (2)

CMTC, cutis marmorata telangiectatica congenita. *Within the CMTC-affected area (note: due to focal atrophy, dermal veins can become more visible in CMTC while their calibre remains unchanged unlike in Klippel–Trénaunay syndrome).

Patients with KTS have vascular lesions, most often a port-wine stain (PWS), in association with venectasia and soft-tissue hypertrophy. Although a vascular naevus is always present at birth, venectasia may not be visible during the first years of life, so that KTS may easily be confused with CMTC during early childhood. Reticular haemangioma syndrome can be distinguished by the presence of a vascular tumour and coexistence of intractable ulceration, anogenital-urinary–sacral anomalies, and sometimes cardiac overload.[18] In accordance with previous reports, telangiectasia seems to be a rather rare finding in patients with CMTC, so that the term 'cutis marmorata *telangiectatica* congenita' may be misleading. On the other hand, milder forms of CMTC may be overlooked or mistaken for either PWS or KTS.[4]

Surprisingly, diagnostic criteria for CMTC, which would help to distinguish this condition from the other vascular anomalies mentioned, have not yet been defined. Based on case series reported in the literature and our own series, we propose the presence of three major and two out of five minor criteria to be sufficiently indicative of CMTC (Table 3). Congenital presentation of a reticulate erythema is a common denominator of all reported cases and thus represents a major defining criterion for CMTC. Unlike physiological cutis marmorata, which is induced in otherwise healthy infants by a cold environment, CMTC does not respond to local warming. To differentiate CMTC from KTS, the absence of venectasia within the affected region at the age of 1 year is also considered a major criterion, but venectasia often cannot be identified until this age. Telangiectasia and ulceration are considered optional and thus minor positive criteria, as their presence is strongly in favour of CMTC, but their absence does not exclude it. Fading of erythema and marmoration during the first 2 years of life occurs in > 50% of patients and is thus also suggested as a minor criterion (Table 3). To screen affected patients for the presentation of associated anomalies, we suggest annual follow-up for at least 3 years. The diagnostic validity of the proposed criteria needs to be evaluated in future prospective studies.

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