Best Practice & Research Clinical Rheumatology xxx (2018) 1–20

Contents lists available at ScienceDirect

Best Practice & Research Clinical Rheumatology

journal homepage: www.elsevierhealth.com/berh

9

Scleroderma in children

Francesco Zulian

Division of Pediatric Rheumatology, Department of Woman and Child Health, University of Padua, Padua, Italy

Keywords:
Juvenile systemic sclerosis
Juvenile localized scleroderma
Classification
Assessment
Monitoring
Severity score
Outcome measures
Treatment
Outcome

A B S T R A C T

Juvenile scleroderma with its two varieties, juvenile localized scleroderma and systemic sclerosis (SSc), represents the third most frequent rheumatic disease in childhood. In juvenile SSc, new developments have been recently reported in the fields of classification and monitoring. The introduction of new classification criteria for adult SSc has stimulated new ideas on how to improve the performance of the provisional 2007 PRES/ACR/EULAR pediatric criteria. The introduction of a multidimensional severity score, named "J4S," which includes parameters on growth, skin, and internal organ involvement, has improved the approach to the patients in the daily practice to guide decision-making.

In localized scleroderma, the wider application of clinical and instrumental scoring systems has greatly improved both assessment and monitoring. Finally, a multicenter consensus statement and long-term follow-up studies have confirmed the important role of methotrexate for the treatment.

Juvenile scleroderma represents the third most frequent rheumatic condition in childhood after juvenile idiopathic arthritis and systemic lupus erythematosus (SLE). The two main forms of the disease are juvenile localized scleroderma (JLS) and juvenile systemic sclerosis (JSSc).

JSSc is a multisystem connective tissue disorder characterized by fibrotic skin changes and abnormalities of internal organs. JSSc has a variety of clinical manifestations, sometimes different from the adult form. In general, the overall outcome is better in children, although, in some cases, the disease progression is rapid and severe due to the early involvement of internal organs.

E-mail address: francescozulian58@gmail.com.

https://doi.org/10.1016/j.berh.2018.02.004
1521-6942/

Please cite this article in press as: Zulian F, Scleroderma in children, Best Practice & Research Clinical Rheumatology (2018), https://doi.org/10.1016/j.berh.2018.02.004

JLS, otherwise called as morphea by some dermatologists, represents the most frequent condition in childhood and comprises a group of distinct clinical entities that involve the skin and subcutaneous tissues. The clinical manifestations range from very small plaques of induration to large and deep skin lesions that may cause significant functional and cosmetic deformities.

Juvenile systemic sclerosis

JSSc is a multisystem connective tissue disease characterized by hardening skin changes and widespread abnormalities of the viscera. The PRES-ACR-EULAR 2007 classification criteria require the presence of skin sclerosis/induration proximal to metacarpalphalangeal (MCP) or metatarsalphalangeal (MTP) joint and at least two of 20 minor criteria listed in Table 1 [1]. More recently, a review of the classification criteria for systemic sclerosis in adults was made [2]. According to these new criteria, the presence of skin thickening of the fingers extending proximal to the metacarpophalangeal joints is sufficient to classify the patient as having SSc. However, in the absence of this sign, seven alternative criteria (i.e., skin thickening of the fingers, fingertip lesions, telangiectasias, abnormal nailfold capillaries, interstitial lung disease or pulmonary arterial hypertension, Raynaud's phenomenon (RP), and SSc-related autoantibodies) are to be considered indicative. Each of these items has a different weight in defining SSc, and patients with a score $\geq$9 can be classified as having SSc. These criteria might also be applicable to JSSc patients, although some essential differences between the two age groups and the possible weak discrimination power with other pediatric conditions which enter in the differential diagnosis must be borne in mind. An evaluation of a cohort of patients with JSSc may serve as an example of how the existing classifications are still inadequate (personal data by the Author). Since 2011, 25 new patients with JSSc have been examined at the Pediatric Rheumatology Division of the University of Padua and 21 (84%) could be classified as having jSSc using the 2013 ACR/EURLAR adult SSc criteria as compared to 17 (68%) using the 2007 PRES/ACR/EULAR JSSc criteria. In all cases, the failure to meet the provisional criteria was due to a failure to meet the major criterion [3].

This calls to question whether the provisional criteria are too specific, at the cost of sensitivity for early disease manifestations.

Table 1
PRES/ACR/EULAR Provisional classification Criteria for Juvenile Systemic Sclerosis. Adapted from reference no. [1].

MAJOR CRITERION		Sclerosis/induration of the skin proximal to MCP or MTP joints
MINOR CRITERIA	- Skin	Sclerodactyly
	- Vascular	Raynaud's phenomenon
		Nailfold capillary abnormalities
		Digital tip ulcers
	- Gastrointestinal	Dysphagia
		Gastroesophageal reflux
	- Renal	Renal crisis
		New-onset arterial hypertension
	- Cardiac	Arrhythmias
		Heart failure
	- Respiratory	Pulmonary fibrosis (HRCT/X-ray)
		DLCO
		Pulmonary hypertension
	- Musculo skeletal	Tendon friction rubs
		Arthritis
		Myositis
	- Neurological	Neuropathy
		Carpal tunnel syndrome
	- Serology	Antinuclear antibodies.
		SSc selective autoantibodies
		(anticentromere, antitopoisomerase I, anti-fibrillarin,
		anti-PM-Scl, anti-fibrillin or anti-RNA polymerase I or III)

A patient, aged less than 16 years, shall be classified as having juvenile systemic sclerosis if the one major and at least two of the 20 minor criteria are present. This set of classification criteria has a sensitivity of 90%, a specificity of 96% and kappa statistic value of 0.86.

Please cite this article in press as: Zulian F, Scleroderma in children, Best Practice & Research Clinical Rheumatology (2018), https://doi.org/10.1016/j.berh.2018.02.004