Dermatology Practical & Conceptual

Visualizing Touton Giant Cells Under Reflectance Confocal Microscopy in Two Cases of Juvenile Xanthogranuloma

Dominga Peirano[1], Francisca Donoso[1], Sebastián Vargas[1], Leonel Hidalgo[1], Teo Feuerhake[2], Alon Scope[3,4], Caterina Longo[5,6], Cristian Navarrete-Dechent[1,7]

1 Department of Dermatology, Escuela de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile
2 Department of Pathology, Escuela de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile
3 The Kittner Skin Cancer Screening & Research Institute, Sheba Medical Center, Ramat Gan, Israel
4 Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel
5 Department of Dermatology, University of Modena and Reggio Emilia, Modena, Italy
6 Centro Oncologico ad Alta Tecnologia Diagnostica-Dermatologia, Arcispedale Santa Maria Nuova, Azienda Unità Sanitaria Locale - IRCCS Reggio Emilia, Reggio Emilia, Italy
7 Melanoma and Skin Cancer Unit, Escuela de Medicina, Pontificia Universidad Catolica de Chile, Santiago, Chile

Key words: confocal microscopy, Touton cells, diagnosis, juvenile xanthogranuloma

Citation: Peirano D, Donoso F, Vargas S, et al. Visualizing Touton Giant Cells Under Reflectance Confocal Microscopy in Two Cases of Juvenile Xanthogranuloma. *Dermatol Pract Concept.* 2023;13(2):e2023137. DOI: https://doi.org/10.5826/dpc.1302a137

Accepted: November 28, 2022; **Published:** April 2023

Funding: None.

Competing Interests: None.

Authorship: All authors have contributed significantly to this publication.

Corresponding Author: Cristian Navarrete-Dechent, MD, IFAAD, Department of Dermatology, Escuela de Medicina, Pontificia Universidad Católica de Chile Diagonal Paraguay 362, 6th floor Santiago, Chile. 8330077 Phone: +56-2-2435 3574 E-mail: ctnavarr@gmail.com

Introduction

Juvenile xanthogranuloma (JXG) is a benign non-Langerhans -cell histiocytosis occurring most frequently in childhood [1]. As JXG is rare in adults, it may clinically simulate malignant skin tumors, such as basal cell carcinoma (BCC) or amelanotic melanoma [2].

Histopathologically, JXG is characterized by a granulomatous inflammation pattern, whereby the dermal infiltrate consists of histiocytes with abundant cytoplasm and of Touton giant cells with a ring-like arrangement of multiple nuclei, separating a central eosinophilic area from the peripheral foamy and pale cytoplasm [3]. Reflectance confocal microscopy (RCM) is a non-invasive optical imaging tool that allows for in vivo visualization of skin at cellular-level resolution [4]. Herein, we report that an infiltrate of Touton giant cells, a key criterion for diagnosis of JXG, can be readily identified via RCM.

Case Presentation

Case 1. A 63-year-old female was referred for evaluation of a long-standing lesion on the back. On physical examination, a 4-mm orange-pink papule was seen (Figure 1A). On dermoscopy, the lesion showed a red-yellow center and discrete

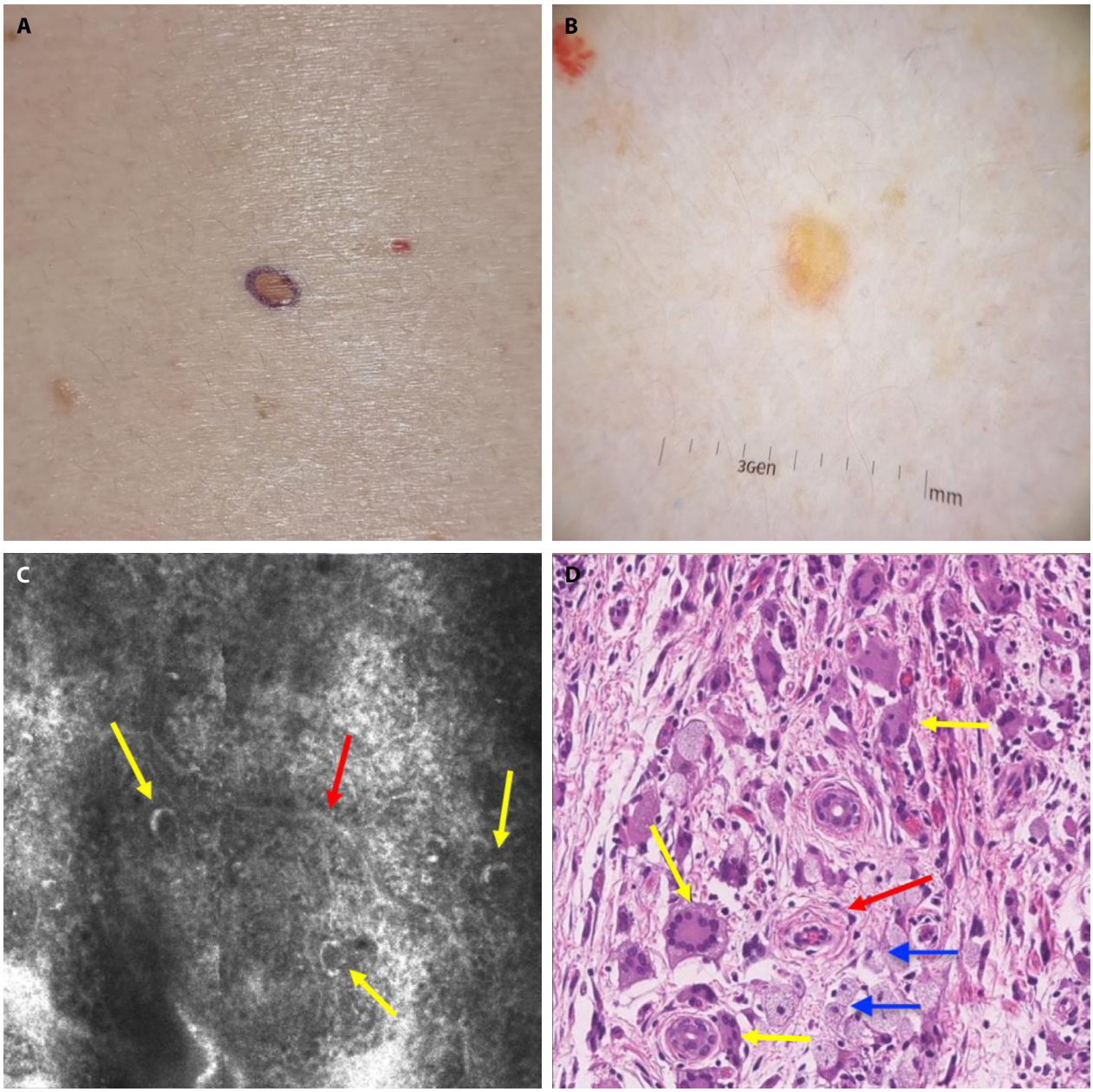

Figure 1. Juvenile xanthogranuloma. **A.** 4-mm orange-pink papule **B.** Dermoscopy showed a red-yellow center and discrete erythematous halo ('setting-sun appearance') (polarized light dermoscopy, original magnification 10x). **C.** On reflectance confocal microscopy (RCM), a disarranged dermal-epidermal junction was seen, filled with clusters of roundish, large, cells. These were large cells (40-50 microns largest diameter) with a hyperrefractile cytoplasm forming a peripheral rim and a large hypo-reflective nucleus, suggestive of Touton cells (yellow arrow). Horizontal blood vessels were also seen (red arrows) (0.5 x 0.5 mm, 30x) **D.** Large cells seen on RCM corresponded to the Touton cells seen on histopathology (yellow arrows), blood vessels (red arrow) and foamy histiocytes (blue arrows) (H&E, 40x).

erythematous halo ("setting-sun appearance") (Figure 1B). On RCM, at the superficial dermis level, an infiltrate of roundish large cells was seen. These were characterized by a hyper-refractile peripheral rim and a hypo-reflective center, measuring 40-50 microns in diameter, suggestive of Touton cells (Figure 1C). A punch excision of the lesion showed a dense dermal infiltrate of histiocytes. At higher magnification, multinucleated giant cells with nuclei surrounding a central homogeneous cytoplasm measuring 30-50 microns corresponding with Touton giant cells, were seen. Foamy histiocytes were also visualized (Figure 1D). These findings pointed to the diagnosis of JXG. When performing a side-by-side RCM to histopathological correlation, it became clear that the roundish large cells under RCM corresponded to the Touton giant cells seen on histopathology.

Case 2. A 13-year-old healthy boy was referred for evaluation of a solitary pink-yellow lesion on the left arm (Figure 2A). Dermoscopy revealed homogeneous yellow color (Figure 2B). On RCM, a dense infiltrate of roundish, large cells with dark center, surrounded by a hyper-refractile peripheral ring, were visualized (Figure 2C). The lesion was excised and diagnosed histopathologically as XGJ (Figure 2D).

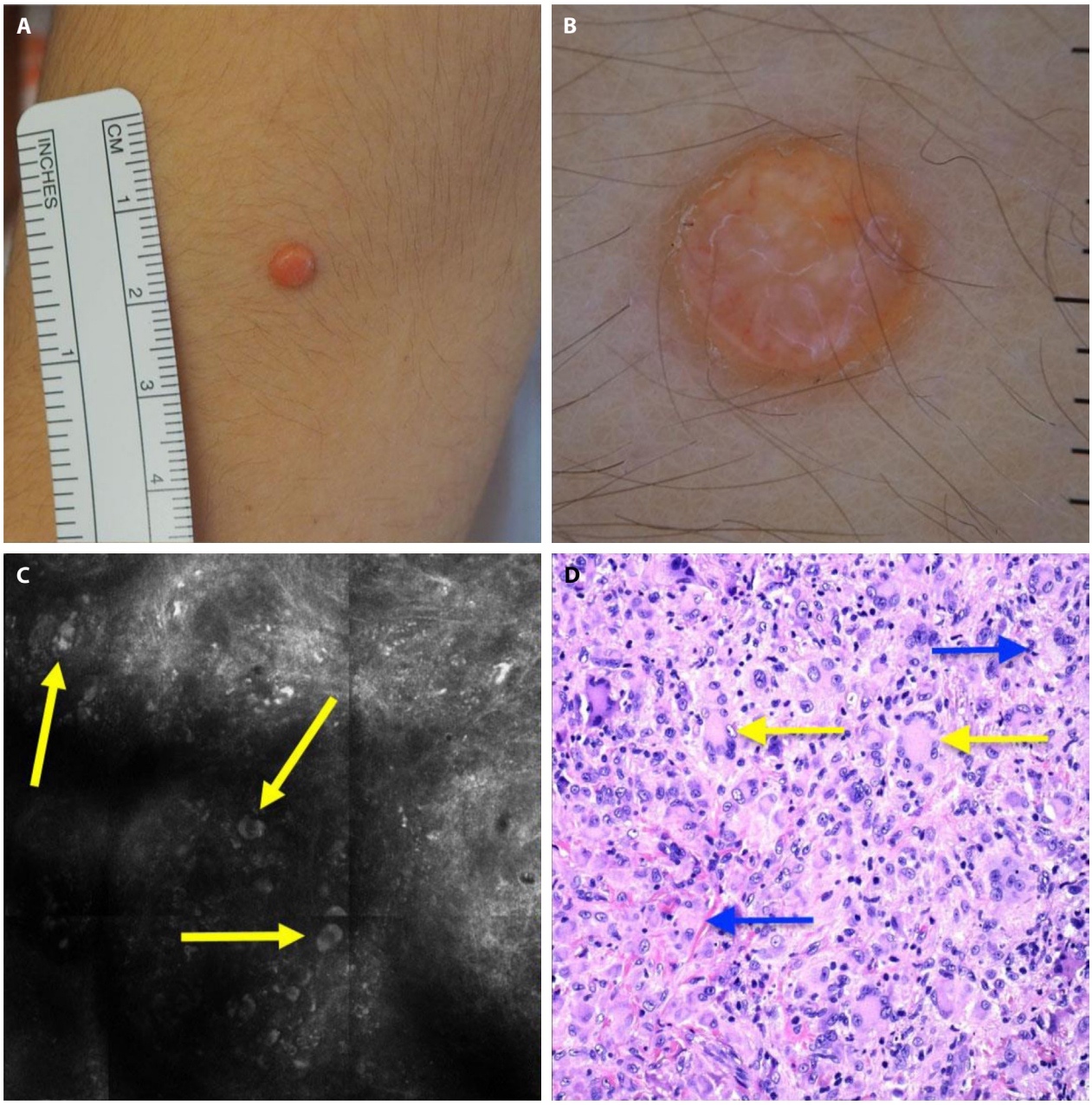

Figure 2. Juvenile xanthogranuloma. **A.** A solitary pink-yellow lesion on the left arm **B.** On dermoscopy, a homogeneous yellow color was seen (polarized light dermoscopy, original magnification 10x) **C.** Reflectance confocal microscopy shows dilated dermal papillae at dermal-epidermal junction filled with clusters of roundish, large, multinucleated and hyper-refractile atypical cells corresponding to Touton cells (yellow arrows) (0.5 x 0.5 mm, 30x). **D.** Histopathology showed a dense histiocytic infiltrate with Touton cells (yellow arrows) and foamy histiocytes (blue arrows) (H&E, 40x).

Conclusions

JXG is a benign disease, mostly presenting as a solitary papule or nodule in childhood. We present two cases of JXG, in an adult and in a child, whereby RCM revealed large roundish cells with hypo-reflective center and surrounding hyper-refractile rim appearing as bright halo, corresponding to Touton giant cells upon comparison with histopathology. In contrast to Touton cells, the foamy cytoplasm of foamy histiocytes does not provide reflectance and are not readily visible under RCM, despite being seen under histopathology in both cases. As the identification of Touton giant cells is a key diagnostic finding in JXG, these cases highlight the potential for the bedside diagnosis of JXG with the aid RCM [4,5].

References

1. Lacarrubba F, Verzì AE, Puglisi DF, Broggi G, Caltabiano R, Micali G. Line-field confocal optical coherence tomography of xanthogranuloma: Correlation with vertical and horizontal histopathology. *J Cutan Pathol.* 2021;48(9):1208-1211. DOI: 10.1111/cup.14067. PMID: 34028070. PMCID: PMC8453847.

2. Reilly C, Chuchvara N, Rao B. Diagnosing juvenile xanthogranuloma with reflectance confocal microscopy. *JAAD Case Rep*. 2020;6(10):975-976. DOI: 10.1016/j.jdcr.2020.07.034. PMID: 32995422. PMCID: PMC7508718.
3. Janssen D, Harms D. Juvenile xanthogranuloma in childhood and adolescence: a clinicopathologic study of 129 patients from the Kiel pediatric tumor registry. *Am J Surg Pathol*. 2005;29(1): 21-28. DOI: 10.1097/01.pas.0000147395.01229.06. PMID: 15613853.
4. Lovato L, Salerni G, Puig S, Carrera C, Palou J, Malvehy J. Adult xanthogranuloma mimicking basal cell carcinoma: dermoscopy, reflectance confocal microscopy and pathological correlation. *Dermatology*. 2010;220(1):66-70. DOI: 10.1159/000264670. PMID: 19996569.
5. Pimenta R, Leal-Filipe P, Oliveira A. Reflectance confocal microscopy for the noninvasive diagnosis of cutaneous juvenile xanthogranuloma. *Skin Res Technol*. 2019;25(1):106-107. DOI: 10.1111/srt.12616. PMID: 30019531.