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Editorial

Current Topics in the Diagnostic Approach to Skin Diseases

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1. Introduction

The introduction of novel, non-invasive techniques capable of improving the diagnostic accuracy and sensibility of both inflammatory and neoplastic cutaneous diseases has always been one of the most practical objectives of dermatological research. Although we are aware that histological examination firmly remains the "gold standard" for the diagnosis of most skin diseases, numerous techniques have been introduced that guarantee the patient a less invasive and more accurate clinical diagnosis, often giving biopsy only a confirmatory role [1,2]. The first tool that undoubtedly represented a crucial step forward in this sense was dermoscopy, followed by in vivo reflectance confocal microscopy (RCM) and line-field confocal optical coherence tomography (LC-OCT); the latter techniques allow vertical and horizontal views of the skin with a resolution almost comparable to that of histopathology, improving the sensibility and accuracy of the clinical diagnosis [1–3].

The present Special Issue collects original articles, reviews and case reports in which the "state of the art", along with novel findings in the diagnostic approach to inflammatory and neoplastic cutaneous diseases, is provided. In this regard, we strongly emphasize that the correlation between RCM, LC-OCT and histopathological features of the same disease helps both clinicians and pathologists to validate the emerging technique used.

2. Dermoscopy

The first binocular dermoscope was introduced for melanoma diagnosis at the beginning of the 20th century, rapidly becoming a globally used tool in the diagnostic approach of both neoplastic and non-neoplastic cutaneous diseases [4–6]. In addition, a particular field of application of dermoscopy is represented by the diagnosis of hair/scalp and nail diseases (trichoscopy and onychoscopy, respectively) [4]. The dermoscope is a sophisticated optical device that has a magnifying function, allowing visualization on a horizontal plane of the skin from the epidermis to the superficial/papillary dermis. In the last few decades, numerous studies demonstrated that the local dermoscopic findings of cutaneous lesions are strongly related to specific histopathologic features [4–9].

Dermoscopy undoubtedly enhances diagnostic sensitivity and accuracy compared to naked-eye clinical examination, often reducing the adoption of more invasive procedures such as biopsy. It may also be used in contexts other than diagnosis, including the choice of the correct biopsy site and in monitoring the treatment response [4–9].

3. In Vivo Reflectance Confocal Microscopy

In vivo RCM is a relatively novel diagnostic procedure that, through a light source emitting monochromatic coherent light, provides high-resolution (horizontal ~1.25 µm, vertical ~5 µm) images of the skin from the stratum corneum to the upper dermis, up to 250 µm maximum depth, of an en face/horizontal point of view [10–12]. Due to its high resolution and the possibility of visualizing the skin in depth, RCM is increasingly used in the diagnosis of several inflammatory conditions and skin neoplasms [10–12].

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As RCM produces a horizontal plane of the skin, the correlation with conventional histopathology (Figure 1A), which provides a full-thickness vertical view of the skin, is not optimal. In this regard, some clinicians compared the RCM features of both inflammatory/infectious and neoplastic skin diseases, such as psoriasis, discoid lupus erythematosus, molluscum contagiosum, mycosis fungoides, and squamous cell carcinoma, with horizontal histopathology (Figure 1B) that, instead, reflects a similar observation plane [1,2,13–16]. Their findings were very encouraging and ensured better validation of the use of RCM in clinical practice.

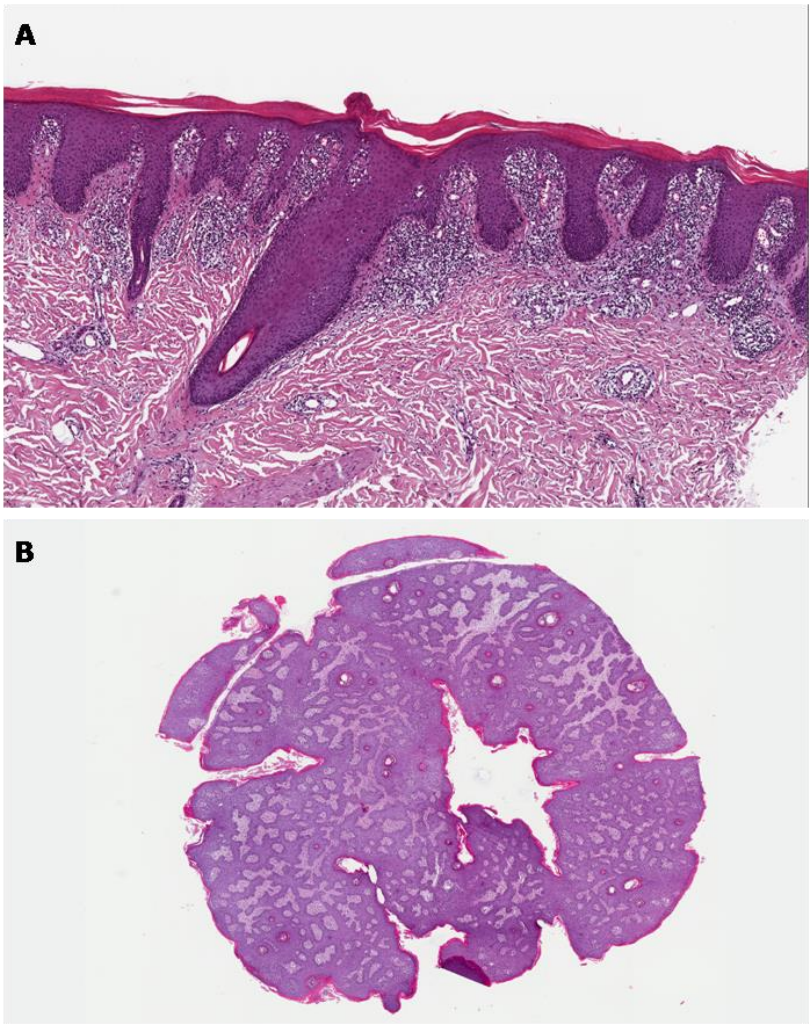

Figure 1. (**A**) Conventional histopathology of psoriasis: elongated rete ridges, alternating areas of hypo- and hypergranulosis, thinning of the suprapapillary plates and Munro microabscesses are seen (hematoxylin and eosin; original magnification 150×); (**B**) Horizontal histopathologic image from psoriasis showing a better correlation with the horizontal plane observed by dermoscopy and RCM; the psoriasiform pattern of rete ridges is seen (hematoxylin and eosin; original magnification 25×).

4. Line-Field Confocal Optical Coherence Tomography

LC-OCT is a recently introduced non-invasive technique that, through a super continuum laser source (600–900 nm) and a line-scan camera (8 frames per second), provides both vertical and en face high-resolution images (axial: 1.1 µm; lateral: 1.3 µm) up to a depth of about 500 µm, measuring the echo time delay and amplitude of light backscattered from skin structures [17–22]. LC-OCT also contains integrated software that emits three-dimensional reconstructions of the skin [17,18]. As it represents a "bridge" between the resolution, penetration and orientation of the above-mentioned RCM and those of the "old" OCT, LC-OCT is increasingly used for the diagnosis of many skin disorders, including

infectious diseases, autoimmune bullous diseases and skin neoplasms [17–22]. Dermatologists, through LC-OCT, may identify and measure the different epidermal/dermal layers, visualizing them with almost "cellular" definition.

In this context, a recent paper by Verzì et al. described the LC-OCT features of some cases of plaque psoriasis, atopic eczema and lichen planus [3]; the authors observed a strong correlation with some of the conventional histopathologic features of these diseases, emphasizing that LC-OCT may be a promising non-invasive technique for the diagnosis of inflammatory cutaneous diseases with potential further applications such as choice of the correct biopsy site and follow-up/treatment monitoring [3].

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