Our Dermatology Online

Case Report

High-frequency ultrasonographic pattern of cutaneous sarcoidosis: A case report

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ABSTRACT

Sarcoidosis is characterized by the presence of non-caseating epithelioid granulomas. Its etiology is not fully understood. A range of predisposing factors for the development of sarcoidosis has been documented, yet it remains a diagnostic and therapeutic challenge for contemporary medicine. The literature documents cases of cutaneous sarcoidosis induced by laser therapy. Herein, we present the case of a 38-year-old female who was diagnosed with cutaneous sarcoidosis following a fractional CO_2 laser procedure. The patient's diagnosis procedures were supported by high-frequency ultrasonography (HFUS). The gold standard to diagnose sarcoidosis is histological examination, while HFUS, an easy-to-use and non-invasive diagnostic tool, allows for precise monitoring of the disease course and serves as an additional instrument to confirm the diagnosis.

Key words: Skin pathology, Sarcoidosis, Diagnostic imaging

INTRODUCTION

Sarcoidosis is a systemic disease characterized by the formation of non-caseating epithelioid granulomas in various organs. The development of sarcoidosis is caused by an enhanced immune response triggered by interacting genetic and environmental factors [1]. Also, local exposure to certain substances such as silica or silica dust [2], microorganisms such as *Mycobacterium tuberculosis* [3] *Propionibacterium acnes* [4] and medications used in highly active antiretroviral therapy [5] are considered triggering factors for cutaneous sarcoidosis. In the available literature, there are cases described in which laser therapy induced cutaneous sarcoidosis [6,7]. The most common sites of sarcoidosis are the lungs and thoracic lymph nodes, which are affected in over 90% of cases, although the disease may involve any organ [8]. In Europe, most cases are reported in the northern regions, with an estimated prevalence of around 60 cases per 100,000 [9]. Cutaneous sarcoidosis is more common in young people, females, non-smokers, and those living in rural areas [10].

CASE REPORT

A female patient aged 38 without chronic diseases and genetic predisposition was admitted to the University Department of Dermatology, Venereology, and Allergology in Wrocław because of the appearance of erythematous and infiltrative skin lesions on her face, one month after laser therapy (Fig. 1). The procedure was performed by a non-medical aesthetician, utilized a 125 mm handpiece with an 8 mm spot size, a density of 25%, and an energy output of 12 watts. The laser therapy comprised a single session.

The first medical consultation was at the outpatient department after one month of laser treatment, herpes virus infection was initially suspected, and acyclovir

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Figure 1: The patient's forehead with numerous erythematous, infiltrated skin changes. Characteristic iatrogenic pattern as the lesions were induced by laser.

was administered, yet this did not yield positive results. Subsequently, a treatment regimen involving topical clobetasol propionate at a concentration of 0.5 mg/g twice a day and oral chloroquine at a dose of 250 mg b.i.d. for two months were implemented. This treatment resulted in a reduction of erythema and infiltration, yet the skin lesions recurred after the discontinuation of the medication.

Consequently, the patient was admitted to the University Department of Dermatology, Venereology, and Allergology for further diagnostics. A skin biopsy was performed, and histological examination revealed granulomatous inflammation mainly in the superficial dermis, without the involvement of the subcutaneous tissue. The confluent granulomas consisted of epithelioid histiocytes with abundant eosinophilic cytoplasm and oval vesicular nuclei. Several multinucleated giant cells were present. The granulomas were surrounded by several adjacent lymphocytes ("naked granulomas") and a fibrotic border in the dermis. Discrete, small, central foci of fibrinoid necrosis were present. The epidermis showed mild acanthosis. The histological picture confirmed cutaneous sarcoidosis (Fig. 2). A high-frequency ultrasonographic image of a skin lesion revealed the broad-band hypoechogenic zone (0.2 mm) interpreted as infiltration in the granulomatous pattern located under the epidermis (Fig. 3).

A chest X-ray, including the lung hilum, an abdominal and peripheral lymph nodes sonography was performed,

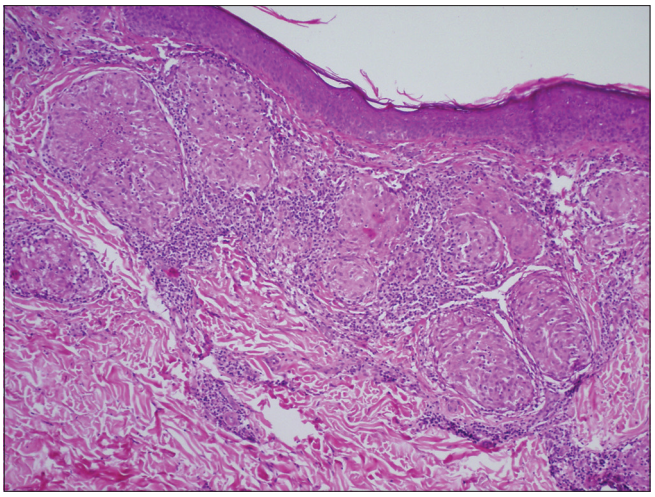

Figure 2: The histological features confirmed cutaneous sarcoidosis (H&E; 100x).

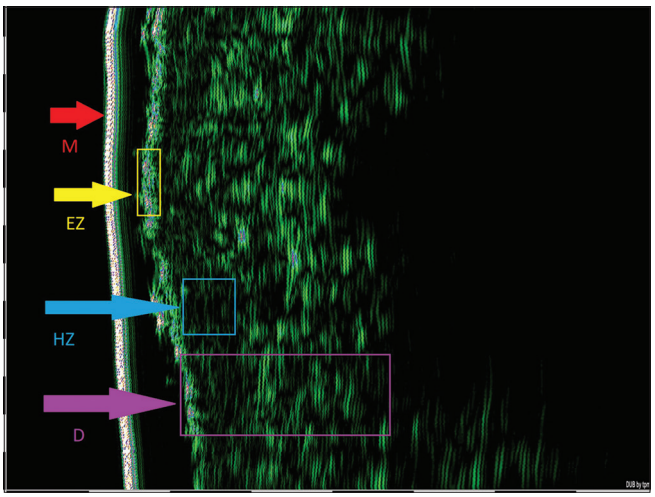

Figure 3: Infiltration in the dermis. Characteristic pattern of the hypoechogenic shadow (hypoechogenic zone, HZ) (sonographic imagine, 22.5 MHz); M–membrane, E–entry zone, HZ–hypoechogenic zone, D–dermis.

revealing no pathological changes. The patient was discharged from the hospital with recommendations to continue treatment with tacrolimus 0.1% ointment b.i.d. and clobetasol 0.05% cream b.i.d., which resulted in a slight improvement.

After two months, the patient was hospitalized again. The erythematous, infiltrated skin lesions had slightly decreased in intensity since the previous hospitalization and were mainly located on the forehead, cheeks, and nose. Laboratory tests, which were performed at that time, were within normal limits, and the Quantiferon test was negative. The treatment was changed to subcutaneous methotrexate at a dose of 15 mg p.w., yet due to dissatisfaction with the treatment results, methotrexate was replaced with prednisone. In the

subsequent phase of treatment, the prednisone dose was gradually reduced (20–10–5 mg daily), which resulted in positive effects and the reduction of skin lesions. After three months, an HFUS examination was performed, which showed a smaller hypoechogenic zone (0.1 mm).

DISCUSSION

High-frequency ultrasound (HFUS) is a non-invasive and inexpensive diagnostic tool in dermatology. The range that it operates on goes from 20 MHz up to 50 MHz [11]. In our case, we used the tpm (taberna pro medicum) GmbH device with a head of a 22.5 MHz frequency, 100 μm width, and a length of 12.8 mm. Because of its small cost and availability, it may dramatically expedite diagnosis during wait time for methods such as MRI and TK [12]. It is also non-invasive compared to histopathology, in which a patient might not give his permission for a biopsy. Although the cost and invasion of this method is minimal, its diagnostic capabilities are on par with other less available tools [13].

It is important to note that, in the literature, we found only two studies describing the use of HFUS in monitoring cutaneous sarcoidosis [14,15]. In a study by López-Llunell et. al [14], sarcoidosis lesions were described as nodules with reduced echogenicity in the skin or subcutaneous tissue, or as pseudonodules, which exhibit increased echogenicity in the surrounding subcutaneous tissue. Furthermore, the longer evolution of sarcoidosis seems to correspond to septal involvement rather than only the lobular pattern in subcutaneous sarcoidosis. Also, a clear correlation was demonstrated between the mean brightness of HFUS images and the results of CSAMI (Cutaneous Sarcoidosis Activity and Morphology Instrument), as well as the histological involvement of the dermis with granulomas [15].

CONCLUSION

Overall, the findings underscore the importance of vigilant monitoring and comprehensive diagnostic approaches in managing cutaneous sarcoidosis. Additionally, HFUS seems to be an especially helpful, non-invasive diagnostic tool for cutaneous sarcoidosis, and further research is needed to cement HFUS in everyday medical use.

Consent

Clinical research is based on the Declaration of Helsinki. All personal details of the patients are kept confidential.

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