Case Report

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Erythema induratum: a rare case with unusual presentation

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Abstract: Tuberculosis, still one of the most common infectious diseases globally, manifests primarily as pulmonary tuberculosis. Extra-pulmonary tuberculosis can occur in other sites including skin. Cutaneous tuberculosis, comprising merely 1-2% of all forms of tuberculosis, has been classified into various morphological variants. One of the morphological variants of cutaneous tuberculosis is erythema induratum, a tuberculid, which is caused by hematogenous spread of tuberculosis, the pathogenesis of which is due to hypersensitive reaction against the mycobacterial antigens. The skin biopsy findings of erythema induratum are characterized by panniculitis with formation of non-caseating epithelioid granulomas with no mycobacteria detected in the lesions, though mycobacterial antigens or DNA could be detected by polymerase chain reaction (PCR). In this context, being presented here is a case of erythema induratum which is rare and unusual in its presentation inasmuch as caseating epithelioid granulomas were seen in the lesional skin biopsy along with detection of acid-fast bacilli. In our study a 57-year-old male presented to the Dermatology OPD with multiple erythematous lesions bilaterally over the groin and thigh regions. Clinically the lesions were considered to be equivocally suggestive of migratory erythema or erythema marginatum. The skin biopsy taken from the lesions revealed multiple epithelioid granulomas in the dermis with central areas of caseation necrosis. Sections stained with Ziehl-Neelsen stain showed the presence of occasional acid-fast bacilli. Erythema induratum, a rare tuberculid form of cutaneous tuberculosis, which is pathogenetically considered to be occurring as a result of hypersensitivity reaction against mycobacterial antigens with characteristic absence of tubercle bacilli. In the case presented here erythema induratum presents in a rare unusual manner as a caseating granulomatous lesion with presence of demonstrable acid-fast bacilli.

Key words: Erythema induratum; cutaneous tuberculosis; tuberculids; panniculitis; Meischer's granuloma.

Introduction

Tuberculosis remains a serious global health problem. Though the incidence of tuberculosis has come down globally and in India, the reported incidence and number of deaths due to tuberculosis stand still at a higher rate as 10.4 million new cases were reported from all over the world in 2015 that resulted in 5.9 million deaths [1]. Tuberculosis mainly affects the respiratory system, specifically the lungs, but it also affects extra-pulmonary sites such as lymph nodes, central nervous system, gastrointestinal system, genitourinary system, musculoskeletal system including bones, and skin. Cutaneous tuberculosis is uncommon and represents 1-2% of all cases of tuberculosis [2]. Tuberculosis is caused characteristically by Mycobacterium tuberculosis, though opportunistic infections by atypical mycobacteria are common in immunocompromised patients. Cutaneous tuberculosis is caused by inoculation or hematogenous spread from primary or secondary tuberculosis in lung and the causative organism responsible is Mycobacterium tuberculosis and occasionally by Mycobacterium bovis and even Calmette Guerin bacillus [3, 4].

Erythema induratum, a tuberculid, one of the morphological variants of tuberculosis which is caused by hematogenous spread of tuberculosis, the pathogenesis of which is due to hypersensitive reaction against the mycobacterial antigens. The skin biopsy findings of erythema induratum are characterized by panniculitis with formation of non-caseating epithelioid granulomas with no mycobacteria observed in the lesions, though mycobacterial antigens or DNA are detected by polymerase chain reaction (PCR). The case of erythema induratum being presented here is rare and unusual in its presentation inasmuch as caseating epithelioid granulomas were seen in the lesional skin biopsy along with detection of acid-fast bacilli.

Case report

A 57- year old male presented to the out-patient department with history of erythematous lesions bilaterally over the regions of groin and thigh since two years. The clinical findings favored a diagnosis of erythema marginatum or migratory erythema for the confirmation of which a lesional skin biopsy was taken.

Histopathological examination

Multiple sections from the skin biopsy revealed skin tissue composed of epidermis, dermis and a tiny portion of subcutis. Epidermis showed mild hyperkeratosis and diffuse atrophic changes with flattened to shortened rete ridges. Superficial dermis showed extensive edema. Lower dermis showed presence of multiple epithelioid granulomas, some of them showing central areas of

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caseous necrosis along with scattered Langhans type of giant cells. Occasional dispersed nerve fibres were also noted in the deeper dermis along with few atrophic adnexal dermal structures. Sections studied from modified Zeihl-Neelsen Stain revealed presence of occasional acid-Fast Bacillus.

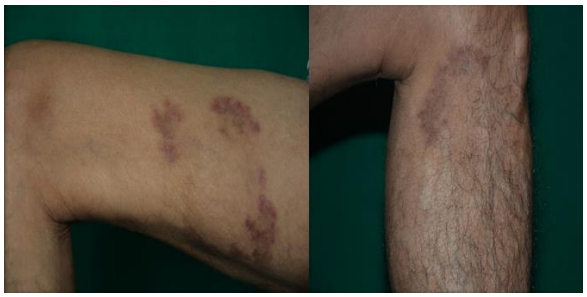

Figure 1: Photograph showing erythematous skin lesions on the medial aspect of right thigh (left) and medial aspect of left knee joint and adjoining areas (right)

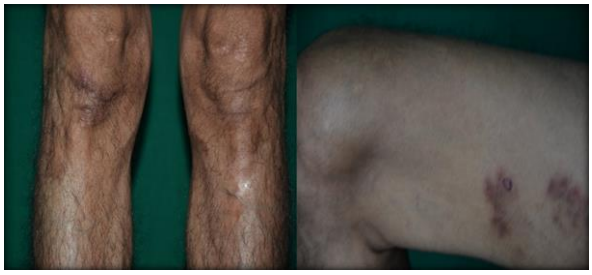

Figure 2: Photograph showing poorly defined areas of erythema over the anterior aspect of skin over the both knee joints (Left) and irregular erythematous lesions over medial aspect of right thigh (Right).

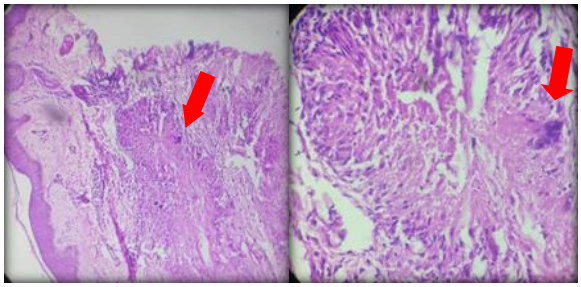

Figure 3: Photomicrograph showing skin tissue with a large epithelioid granuloma (Arrow) with central area of caseation necrosis (Left, H and E, 10X); Epithelioid granuloma with palisading epithelioid histiocytes, a multinucleated giant cell (Arrow) and central area of caseation necrosis (Right, H and E, 40X).

Discussion

Cutaneous tuberculosis manifests in many of the clinico-morphological variants. Depending on the features of mode of spread, histomorphological and clinical features, cutaneous tuberculosis has been classified into various disease forms (Table 1).

Table 1: Classification of cutaneous tuberculosis

Bacterial Load	Mode of Propagation	Disease Form
Multibacillary	I. Direct inoculation	Primary inoculation TB (Chancre)
	II. Through contiguous infection	Scrofuloderma Tuberculosis periorificialis
	III. Hematogenous dissemination	Acute miliary TB Gumma (cold abscess)
Paucibacillary	I. Direct inoculation	Papulonecrotic tuberculid
	II. Through contiguous infection	Lichen scrofulosorum
	III. Hematogenous dissemination	Erythema induratum of bazin Erythema nodosum

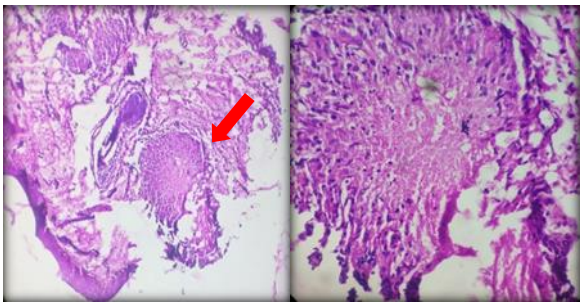

Figure 4: Photomicrograph showing skin tissue showing an epithelioid granuloma with central area of necrosis (Left, H and E, 10X); Epithelioid granuloma with palisading epithelioid cells around a central areas of caseation necrosis (Right, H and E, 40X).

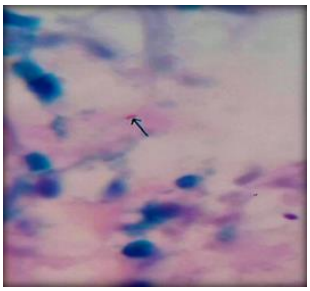

Figure 5: Photomicrograph showing an acid-fast bacillus (Arrow) in sections stained with modified Ziehl-Neelsen stain (100X)

Classification of clinical variants of cutaneous tuberculosis

There are many proposed classifications of variants of cutaneous tuberculosis [5] and the one proposed to be most widely accepted classification is founded on the mode of spread of tuberculosis (Table 1) to which bacterial load has been added [5, 6]. The multibacillary forms are visualized directly in the lesional skin biopsies by using special stains such as modified Zeihl-Neelsen stain. Paucibacillary forms are secondary forms of cutaneous tuberculosis with few demonstrable tuberculous bacilli while some forms such as tuberculids like erythema induratum belong to that form of cutaneous tuberculosis which occur as a result of hypersensitivity reaction against mycobacterium tuberculosis [7,8].

Erythema Induratum, also known as Erythema induratum of Bazin, one of the rare tuberculids, named by Bazin in 1861 when he described a nodular lesion over the lower legs of a young female with history of tuberculosis [9]. It was Jean Darier, who coined the term tuberculids in 1896 to describe a group of eruptive skin lesions in patients with history of active tuberculosis, who had tuberculoid histopathology in skin lesions and who exhibited strong reaction to tuberculin [8, 9]. In 1945, Montogmery *et al.,* in an attempt to differentiate erythema induratum associated with tuberculosis, used the term nodular vasculitis to describe erythema induratum of nontuberculous origin [8, 9].

Erythema induratum, one of the tuberculids, affects males and females equally, though with a slight preponderance among female in the age group of 20 to 40 years [11]. It manifests as tender, violaceous erythematous plaques or nodules characteristically on the bilateral pretibial areas. The lesions can also occur in other sites such as posterior and anterolateral pretibial aspects of lower legs, on the trunk, buttocks, thighs and arms [9-11]. The patients with erythema induratum have history of tuberculosis and generally elicit a strong tuberculin test. Skin biopsies often show features of panniculitis with non-caseating granulomas. Tubercle bacilli are not detected, even though mycobacterial DNA is detected in up to 88% of erythema induratum cases [9]. Rarely, occasional cases of erythema induratum with unusual presentation in which atypical mycobacterium such as Mycobacterium chelonei have been detected in immunocompetent individuals have been reported in literature [10], though the available literature about tuberculids rules out presence of tubercle bacilli.

Erythema induratum is one of the three tuberculids along with Lichen scrofulosum and papulonecrotic tuberculids. It is considered by most authors as a form of panniculitis which is associated with vasculitis of small or medium sized blood vessels adjacent to suppurative and/or granulomatous panniculitis occurring as a result of infection with Mycobacterium tuberculosis-complex [2, 3, 5-10, 13]. Though erythema induratum is uncommon in developed countries, its incidence is still found to be high in countries such as India, Hong Kong and South Africa [9]. It can occur in both sexes and at any age but there is a female preponderance usually seen through second to fourth decade of life [11]. The lesions commonly present as tender violaceous nodules or erythematous plaques characteristically on the bilateral pretibial areas. The lesions could also occur on the posterior and anterolateral aspects of lower legs, on the trunk, buttocks, thighs and arms [9-11]. The nodules may produce a shallow irregular ulcer leading to permanent atrophic hyperpigmented scarring [9-11]. These patients generally have past history of tuberculosis and when subjected to tuberculin test, the patients usually display a strong reaction to tuberculin skin test [8-11]. On Histopathological examination of skin biopsy from the lesional area no tubercle bacilli are detected, though polymerase chain reaction for mycobacterial DNA is detected in 56% - 88% of patients with cutaneous tuberculosis, though rare presence of atypical mycobacteria in the lesions of erythema induratum has been reported [10]. Main histopathological findings of erythema induratum include lobular, septal or septolobular panniculitis associated with vasculitis and epithelioid granulomas rarely with caseation necrosis [9-13]. Some authors proposed that early and late lesions of erythema induratum could show granulomatous features, ranging from Miescher's microgranulomas accompanying the early acute inflammation leading to widened, fibrotic subcutaneous septa with multinucleate giant cells in late lesions [11].

Conclusion

Erythema induratum, a form of cutaneous tuberculosis, which is classified as tuberculid, is an uncommon form of cutaneous tuberculosis. It is considered as a form of panniculitis associated with vasculitis of small and medium-sized blood vessels. Erythema induratum manifests as violaceous nodules or erythematous plaques, which histomorphologically are characterized by panniculitis and vasculitis with formation of epithelioid granulomas. Erythema marginatum occurs as a result of hypersensitivity reaction against mycobacterial antigens with no detectable tubercle bacilli, though mycobacterial antigens or mycobacterial DNA could be detected by polymerase chain reaction (PCR) in most of the cases. The case presented here is very rare and unique, which histomorphologically presented as caseating granulomatous lesion in which acid-fast bacilli were detected, a very rare finding in tuberculid form of cutaneous tuberculosis such as erythema induratum.

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