Slit-skin smear in post kala-azar dermal leishmaniasis and leprosy: How a negative report for Leishman-Donovan bodies in Giemsa stain may indicate leprosy

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CHALLENGE

Post kala-azar dermal leishmaniasis (PKDL) and leprosy are endemic in India and parts of Africa. Their diagnosis is confounded by overlapping clinical features. In our experience over the years, we stumbled upon an observation that pointed to multibacillary leprosy in Giemsa-stained smears from suspected cases of PKDL. Classically, bacilliferous leprosy is detected by the presence of acid-fast bacilli (AFB) within foamy macrophages, whereas PKDL reveals amastigotes appearing in a dot-and-dash pattern within macrophages in the Giemsa stain.

Mycobacterium leprae has a thick mycolic acid cell wall that is not readily penetrated by ordinary aniline dyes. Basic fuchsin and phenol in conjunction with heat are used to facilitate staining. The basic dye in combination with mineral acid used as a decolorizer produces a compound that dissolves out of all structures except AFB. Romanowsky stains such as Giemsa used for staining of the chromatin material of intracellular parasitic structures such as Leishman-Donovan bodies cannot penetrate this layer. Thus, AFB-loaded foamy macrophages appear as well-demarcated clear spaces. Similarly, Leishman-Donovan bodies lack mycolic acid and cannot resist decolorization when stained using the modified Ziehl-Neelsen technique.

PKDL and lepromatous leprosy are known clinical simulants with similar pathogenesis and histomorphological picture. However, the characteristic morphology of infecting organisms is different in a stained slit-skin smear preparation or tissue aspirate. Because these organisms are intracellular, specific staining techniques are used. Other alternative staining procedures that cover both are not known yet. An rK39-based dipstick test for rapid diagnosis of PKDL cases is unreliable because antibodies can persist due to a previous infection of visceral leishmaniasis.

SOLUTION

We observed macrophages along with numerous well-demarcated "clear spaces" in the Giemsa stain conforming to areas occupied by AFB, whereas the modified Ziehl-Neelsen stain revealed AFB with a bacillary index of >4 in 3 patients with suspected PKDL who presented with papulonodular eruptions on the face (Figs 1 and 2). This highlights the importance of screening patients with suggestive clinical features for both dermatoses. It is important in endemic countries where field surveys are dedicated to detecting only one of them. It is easy to implement at ground level because slit-skin smear is a simple procedure used in both

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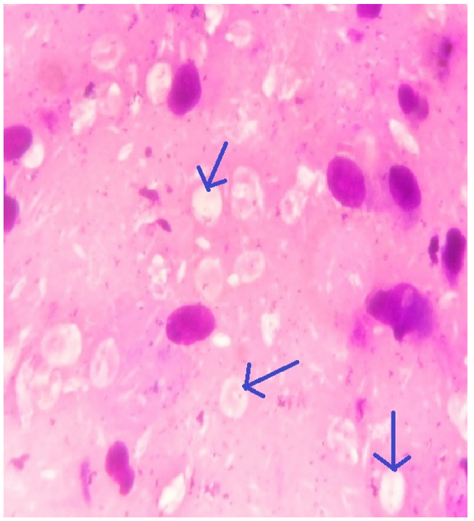

Fig 1. A Giemsa-stained slit-skin smear from a patient with lepromatous leprosy showed clear spaces (blue arrows).

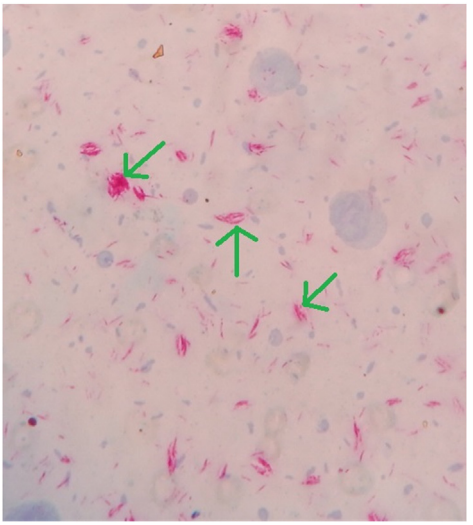

Fig 2. A modified Ziehl-Neelsen–stained slit-skin smear from the same patient showed globi of acid-fast bacilli within foamy macrophages (green arrows).

dermatoses. Clinicians and field workers should be made aware of this observation which even when excluding the presence of Leishman-Donovan bodies helps detect multibacillary leprosy. This would help in minimizing misdiagnosis crucial to control programs.

Conflicts of interest

None disclosed.