Case report

**BCG INDUCED MYCOBACTERIAL SPINDLE CELL PSEUDOTUMOR IN AN INFANT**

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**Summary:** Mycobacterial Spindle cell Pseudotumor (MSP) is a rare complication of mycobacterial infection, especially the atypical variety. It is characterized by an exuberant spindle cell proliferation. This has been reported in the lymph nodes, skin, spleen, lungs, brain, etc. The incidence is higher in immuno-compromised patients, especially those with acquired immunodeficiency syndrome. It is rare to encounter this lesion in infants. We report a case of MSP in the axillary lymph node of a 7-month-old infant, following Bacillus Calmette Guerin (BCG) vaccination due to *Mycobacterium tuberculosis* complex, which was proved by PCR.  

**Key words:** Spindle cell pseudotumor, Mycobacteria, BCG vaccination.

**INTRODUCTION**

Spindle cell pseudotumors due to mycobacteria are characterized by an exuberant proliferation of spindle cells, mimicking a neoplasm. They have been described in various sites like lymph nodes, brain, spleen, lung, skin, bone marrow and appendix. These lesions are more common in immuno-compromised patients, including HIV positive individuals. The lesion may mimic spindle cell tumors in lymphnodes such as primary Kaposi sarcoma, inflammatory pseudotumor and palisaded myofibroblastoma of lymph nodes¹. MSP of lymph nodes may rarely occur in infants after BCG vaccination¹. Thus it is very important to recognize these lesions.

**CLINICAL RECORD**

A seven month-old infant who had received BCG vaccination, when three days old, presented with swelling in the left axilla and an ulcer at the site of BCG inoculation of three months duration. Routine investigations were within normal limits and he was HIV negative. A biopsy was undertaken and revealed a matted group of lymph nodes adherent to axillary vessels, which were excised.

**Pathological findings**

Gross examination revealed two gray white tissue masses, larger measuring 5x 3.5x2cm and the smaller measuring 5x2x1 cm. Cut surface of the masses were gray white and nodular. No area of necrosis was noted.

**Fig. 1:** Photomicrograph showing spindle cells in sheets and fascicles admixed with inflammatory cells (H&E stain x 40)

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On light microscopy, the lymph node showed effacement of architecture with proliferation of spindle cells arranged in sheets and fascicles (Fig. 1). The cells had indistinct cell borders with eosinophilic granular cytoplasm and round to oval nuclei. These cells were admixed with capillaries, inflammatory cells including small lymphocytes, plasma cells and neutrophils. No multinucleated giant cells, mitotic figures, pleomorphism or necrosis were observed. The Ziehl Neelsen stain revealed numerous elongated acid-fast bacilli both within and outside the macrophages (Fig. 2). The spindle cells were immunoreactive to CD 68. They were negative for desmin and showed focal positivity for S-100 protein. PCR was done on paraffin embedded blocks with two sets of extracts for the IS6110 gene of Mycobacterium tuberculosis complex (includes M. tuberculosis hominis and M. tuberculosis bovis strains). One of the tubes (Phenol-Chloroform extract) was positive by PCR (Fig 3), while the second tube (kit extract) was negative, which was attributed to improper protocol for DNA extraction using the kit.

DISCUSSION

Mycobacterial spindle cell pseudotumor (MSP) is an exuberant spindle cell lesion induced by Mycobacteria. This phenomenon occurs most commonly in immuno-compromised hosts, particularly those with acquired immuno-deficiency syndrome. One of the atypical presentations of mycobacterial infection is MSP. Wood et al. first described this lesion, in 1985. Since then, very few cases have been reported, mostly in adults, arising in lymph nodes and frequently associated with atypical mycobacterial species, especially Mycobacterium avium intracellulare (MAI)\(^3\). Only one report of two infants with MSP in lymph nodes associated with BCG vaccination could be accessed in published literature to date\(^4\).

Histopathologically, in lymph nodes there is partial or complete obliteration of architecture by proliferation of cytologically bland spindle cells lymphocytes, plasma cells and neutrophils\(^4,5\). Epithelioid cells, areas of necrosis, mild to moderate
nuclear pleomorphism in both spindle cells and epithelioid cells have been noted.

Mycobacterial spindle cell pseudotumor has been described in the lymph nodes of two infants after receiving BCG vaccination. Vaccination of all newborns with BCG is a standard practice in India. Although this practice generally is considered safe and effective, rarely complications have occurred. The associated disease is called 'BCGitis'.

The pattern of post vaccination BCG infection differs clinically and pathologically, based on the immunologic status of the patients. Patients with normal immunity have enlarged regional lymph nodes and abscess at the vaccination site. The microscopic appearance is similar to tubercular lymphadenitis, showing multiple epithelioid granulomas with or without caseous necrosis. Patients with disseminated BCG infection associated with immuno-deficiency usually have generalized skin rashes and skin nodules. Biopsies reveal diffuse (lepromatous-like) infiltrate of histiocytes and, often, polymorphonuclear cells. The histiocytes have abundant gray cytoplasm, which is packed with acid-fast bacilli. Another pathologic pattern has ill-defined epithelioid granulomas and giant cells. AFB are absent or rare in this type. In this case, the child had axillary lymphadenopathy. No granulomas, giant cells or lepra-like cells were seen. There was proliferation of spindle cells arranged in sheets and fascicles mimicking a spindle cell neoplasm.

The startling ability of this proliferative lesion to mimic spindle cell neoplasm suggests that acid-fast stains should be a part of evaluation of any spindle cell lesion lacking nuclear atypia, particularly in immunodeficient patients. In this case, the spindle cells revealed numerous acid-fast bacilli by Ziehl Neelsen staining.

The immuno-histochemical profile of MSP has been variable in different reports. It has been amply demonstrated by immuno-histochemistry and electron microscopy that the proliferating spindle cells of mycobacterial pseudotumor are histiocytic in origin. Positive staining with desmin and S-100 protein has been reported. In the present case, the spindle cells were positive for CD 68, focally positive for S-100 protein and negative for desmin.

The pathogenesis of this phenomenon is not clear. Some authors have contended that a complex host microorganism interaction rather than HIV infection may be responsible for the formation of pseudotumor. The tissue response is probably related to the interaction of the organism with the host’s defense capabilities.

The mycobacterial spindle cell pseudotumor of lymph nodes occurs in immuno-deficient patients such as with AIDS, steroid use, chemotherapy, immuno-suppressant therapy and in patients with idiopathic lymphocytopenia (CD4+Tcells). This was a seven month-old infant with prior history of BCG vaccination and was HIV negative. Although the lesion mimicked a spindle cell neoplasm, an infectious etiology was pursued on the basis of bland nuclear morphology, inflammatory cells and clinical settings. The immune status of the patient could not be assessed, as the child died 10 days after the surgery. Among the two reported instances, one of the infants did not respond to antitubercular treatment (isoniazid, rifampicin and streptomycin), deteriorated and died. The outcome in the other instance is not known.

The primary surgical treatment (incisional drainage or biopsy) is not considered an ideal form of management in BCG lymphadenitis because of high fistulisation and poor wound healing. Surgery should, therefore, be confined to the unusual event of real doubt about the underlying diagnosis with needle aspiration and anti-tubercular drugs being preferred as initial approach. All cases of idiopathic BCG infection (unknown immunodeficiency type) respond well to antimycobacterial drugs with immunomodulators (gamma interferons).

In summary, mycobacterial spindle cell pseudotumors are rare complications of mycobacterial infection. While MSP associated with atypical mycobacterial infection has been reported, its occurrence in infants following BCG vaccination is very rare. The role of immune...
deficiency in the poor outcome needs to be delineated. The mortality in our report and in the other report highlights the need for greater awareness of this condition. The patients could then receive early and appropriate care.

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