BCG-related lesions in young children

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Introduction

BCG vaccination is given to all newborn babies in Hong Kong via intradermal route. After BCG vaccination, a red, indurated papule sized about 5-15 mm would form in about two to three weeks with crusts around this induration. At six to ten weeks, the crust would fall off leaving a flat 3-7 mm scar. It is generally considered as a safe vaccination, but complications can also occur in some individuals. We report two cases of such complications.

Case 1

A 17-month-old boy was referred from MCH at the age of 12 months for left axilla lump since he was two to three months old. The size of the lump had remained static over the year and there was no discharge. He had neither fever nor chronic cough.

On examination, there was a left axilla lump of 2 cm in diameter, round in shape. It was firm to cystic in consistency with smooth edges. It was attached to skin and not transilluminate. There was no overlying skin change or discharge. The boy was afebrile. He had a BCG scar over his left deltoid with no active discharge or overlying skin changes. No other lymphadenopathy was detected. Chest, cardiovascular, abdominal and neurological examinations were unremarkable.

Complete blood profile, ESR were all normal. CXR showed calcification over the axillary region and lung fields were clear. The lesion remained static in size and no new lesions were noted on follow up.

Case 2

A 17-month-old boy enjoying good past health was referred from MCH at the age of 12 months for two left shoulder masses since he was two-month-old. The masses were initial only palpable, but they gradually increased in size with erythema of the overlying skin. There was no pain or discharge from the lesions. He did not receive any treatment for the lesions previously. There was no chronic cough or prolonged fever. He was thriving well with steady weight gain.

On examination, there were two oval masses over the left shoulder. One lesion was in the supra-clavicular fossa and another lesion was in the infra-clavicular region both measured about 2 x 1.5 cm in size. They were fluctuant but non-tender. They were mobile, not attached to underlying structures but to the overlying skin. Erythema

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was also noted on the overlying skin (Figure 2). No other lymphadenopathy was detected. BCG scar was intact with no discharge. Chest, cardiovascular, abdominal and neurological examinations were unremarkable.

Complete blood profile and ESR were normal. CXR showed soft tissue swelling with calcification over left axilla, left shoulder and lower part of the left side of the neck. There was suspicion bony erosion over lateral aspect of the proximal metaphysis of the left humerus (Figure 3). Mantoux test showed an induration of 10 mm. Fine needle aspiration showed thickened pus-like material. Culture of the material showed no organism or acid-fast bacilli. PCR detection of the DNA of MTB complex target IS 6110 was negative. Cytology showed no granuloma or malignancy.

Contrast CT left shoulder showed calcification at subcutaneous layer anterior to left clavicle and left lower neck with enlarged calcified LN over left axillary region. No definite bony lesion or suspicious bony erosion was found (Figure 4). CXR was repeated one month later which showed persistence of the soft tissue swelling around the left shoulder, however the calcified foci are less prominent. Mild irregularity was still present over the lateral aspect of the proximal metaphysis of the left humerus. Bone scan showed no active uptake and repeated blood tests were normal.

Follow up of clinical progress showed decrease in size of both lesions after fine needle aspiration and there was no new lesion. Other lymphadenopathy was not detected.

Discussion

BCG complications can be classified into non-infectious and infectious complications.

Non-infectious BCG complication is a hypersensitive reaction, which usually occurs within a few days after vaccination. Patient would develop erythema, soreness and blistering over the injection site. Keloid
scarring may occur as a late hypersensitive reaction especially if BCG is given to an area near the acromion process. Distant immune reactions including erythema nodosum, phlyctenular conjunctivitis are not commonly seen. These reactions are self-limiting and only observation is needed.1

For infectious complications, it is subdivided into local abscess or ulcer, regional lymphadenitis, osteitis and disseminated BCG infection.

With local abscess or ulcer, it occurs at one to five months after vaccination and can persist for more than three months. Severe abscess formation may occur in case of intradermal injection of percutaneous preparation.2 The management of local abscess and ulcers is controversial, ranging from observation to surgical drainage. Medical treatments include the use of topical isoniazid; systemic isoniazid or systemic erythromycin. However, there is no proven effectiveness in controlled study for the use of topical or systemic medications.

BCG lymphadenitis is defined as ipsilateral regional LN enlargement after BCG vaccination with no other identifiable cause of adenitis. There is a history of BCG vaccination on the same side with the absence of fever, local tenderness or other constitutional symptoms. It occurs from two weeks to six months after vaccination. It is a clinical diagnosis and investigations such as chest X-ray, Mantoux reaction, haematological analysis are not helpful apart from the use of fine needle aspirate (FNA) for cytology in doubtful cases. Several risk factors are associated with development of BCG lymphadenitis. They include the vaccine strain; the percentage of viable and non-viable bacilli in vaccine; the dose of the vaccine and the age at vaccination (BCG given during the neonatal period is associated with higher risk of lymphadenitis).3

BCG lymphadenitis is classified into non-suppurative and suppurative forms. The non-suppurative form usually resolves spontaneously within a few weeks. Suppurative lesions, which account for 30% to 80% of the cases4 would present with fluctuations, erythema, oedema of the overlying skin which may drain spontaneous with sinus formation. Lesions heal by cicatrisation and closure of sinus will take several months.

Management of BCG lymphadenitis can be achieved by surgical or medical interventions. Surgical interventions include needle aspiration or surgical excision.5

For needle aspiration, it is a safer option and helps to prevent the development of sinus with shortening of the duration of healing. However, repeated aspiration may be required. In surgical excision, there is a risk of general anaesthesia, is usually used in lymph node with presence of sinus, or matted and multi-loculated lymph nodes.6 Medical treatment including use of oral erythromycin, isoniazid, rifampicin has been described.7,8 However, controlled trials did not show a reduction of risk of suppuration nor a shortening of the duration of healing. A meta-analysis by Goraya et al compared the use of oral medications versus conservative management. Their results showed that there were insignificant differences between the use of medical treatment versus conservative management. It concluded that medical treatment did not reduce the frequency of suppuration in BCG adenitis.9

More serious BCG complications include BCG osteitis and disseminated BCG infection. BCG osteitis usually occurred between three months to three years of age, presenting with septic arthritis; subcutaneous abscess or even fulminant osteomyelitis.

Majority are single lesion with local soft tissue swelling. Occurrence may be related to the strain of BCG vaccine. The gold standard is to biopsy the lesion for AFB culture, however, up to 50% of lesions are culture negative. The treatment of BCG osteitis is similar to that of tuberculosis treatment. Rifampicin and isoniazid are the core treatment and a third drug selected from ethambutol, ethinoamid or streptomycin. Pyrazinamide is not used.
as the vaccine M. Bovis is naturally resistant to this drug. The treatment duration should last for six months.¹

Disseminated BCG infection is usually seen in immunodeficiency patients, including patients with severe combined immunodeficiency, chronic granulomatous disease, Di-George syndrome and homozygous complete or partial interferon deficiency. Treatment regime is same as those of BCG osteitis but treatment duration usually lasts more than six months.¹

Conclusion

BCG is an effective vaccine against tuberculosis infection and is given to all newborns in Hong Kong. Potential complications including cutaneous and systemic complications are discussed above. For the two cases stated above, the likely diagnosis is BCG lymphadenitis. Observation and follow up is all it is needed.

References