



Local skin reaction following an accidental injection from a BCG vaccine in a healthcare worker

Kundan Mittal,¹ Manish Kumar Goel,² Preeti R,³ Pardeep Khanna⁴

¹ Professor Pediatrics, ² Assistant Professor Community Medicine, ³ Senior Professor & HOD Community Medicine, ⁴ Assistant Professor Pediatrics
Pt. B. D. Sharma PGIMS, Rohtak, Haryana, India

CASE REPORT

Please cite this paper as: Mittal K, Goel MK, Preeti R, Khanna P. Local skin reaction following an accidental injection from a BCG vaccine in a healthcare worker. AMJ 2011, 4, 2, 94-6 Doi: <http://doi.org/10.21767/AMJ.2011.535>

Corresponding Author:

Name: Dr Manish Kumar Goel

Address: Asst. Professor, Dept. Of Community Medicine, PGIMS, Rohtak, India

Email@address:drmanishgoel2000@yahoo.co.in

Abstract

Exposure to blood-borne pathogens from sharp injuries continue to pose a significant risk to healthcare workers (HCW). The number of sharps injuries sustained by HCW is still unclear, primarily due to under-reporting of events. Healthcare professionals are at risk of sustaining such injuries from hollow-bore needles. Sharps injuries are associated with risk of infection with blood-borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) hepatitis C virus (HCV) and other live organisms. Here we are reporting a case of an adverse reaction in a HCW due to an accidental sharps injury by a needle used to administer the Bacillus Calmette Gurien (BCG) vaccine.

Key Words

BCG vaccine, adverse reaction; healthcare worker; medical error

Introduction

Exposure to blood-borne pathogens from sharps injuries continues to pose a significant risk to healthcare workers (HCW). The number of sharps injuries sustained by HCW has been estimated to be around 6% but this is probably an underestimate due to under-reporting of these events.¹ Healthcare professionals are at risk from sustaining such injuries due to their exposure to sharps, for example, hollow-bore needles, while administering treatment and immunizations. Injuries sustained from used hollow-bore needles are associated with a risk of infection with blood-borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) hepatitis C virus (HCV) and other live organisms.² However, if the injury was sustained from a

needle used to administer a medication or vaccination, there is a risk of an adverse effect from the therapeutic substance itself if the subject not only breaks the skin but manages to inoculate themselves at the same time.

The Bacillus Calmette Gurien (BCG) vaccine was developed in 1921. Between 1921-25 it was given orally, but since 1927 the recommended route of administration of the BCG vaccine in humans has been through intradermal injection.³ Though the efficacy of BCG is uncertain in terms of reduction in incidence of tuberculosis, its importance in minimizing the severity of disease has been well established.³ Generally, BCG vaccination is considered safe but some rare unwanted reactions to the vaccination are documented. In immuno-compromised individuals, lupus vulgaris, BCG osteitis, juvenile sarcoidosis and disseminated tuberculosis can occur and in immune-competent subjects localized abscess at the injection site, regional lymphadenitis or lymphadenopathy may occur following vaccination.⁴ We are reporting a case of adverse reaction in a health worker due to accidental injury from a needle used to administer the BCG vaccine. To the best of our knowledge it is the first documented case of a BCG reaction in a healthcare worker.

Case detail

A female healthcare worker in the outpatient department of Post-graduate Institute of Medical Sciences PGIMS in Rohtak presented with a localized tender swelling on the palmar aspect of her skin overlying the distal phalanx of her left thumb. She gave the history of a needle stick injury with a needle used to administer the BCG vaccine during an immunization session held one month previously. The healthcare worker had no previous history of skin allergy such as eczema or infective dermatosis, hypogammaglobulinaemia or other immune-deficient state nor a recent insect bite or other infection. She had no history of fever but complained of a localized tender swelling. The swelling appeared four weeks after the needlestick injury and was oval in shape and 2.5cm X 3.2 cm in diameter (along the transverse and longitudinal diameter respectively) (see Figure 1.). There was no history of swelling in any other part of the body. She was assumed to be immune-competent as there was no history of any prolonged fever, diarrhoea or any recurrent respiratory or any other infection. All other investigations (hemoglobin, total leukocyte count, differential leukocyte count, and erythrocyte sedimentation rate) were within normal limits.



Figure 1: Lesion on the left thumb of the female health worker following accidental needlestick injury with BCG



The patient was assured that the swelling would resolve spontaneously and was advised to return for follow-up after seven days. Over time the swelling diminished in size and resolved spontaneously after 6 weeks.

Discussion

The BCG vaccination had been widely used to vaccinate children against tuberculosis since 1921. In 1948 it was accepted by experts from all over the world to vaccinate children against tuberculosis with BCG and the BCG vaccination has been an integral part of the Expanded Programme on Immunization (EPI) in India since the programme was launched in 1978.^{3,5} In India and most of the world, a one-off vaccination of BCG is recommended in national immunization schedules.

As the case was a needle stick injury faced with needle used for BCG vaccination during an immunization session and we use only sterilized single use syringes supplied for the purpose, we presumed that the case was similar with re-vaccination with BCG vaccine. Moreover we had carried out other investigations e.g. total leukocyte count, differential leukocyte count, erythrocyte sedimentation rate etc. to rule out the possibility of other infective conditions. Also the condition resolved spontaneously.

Generally BCG vaccination is considered safe but some rare unwanted reactions to the vaccination have been documented. These conditions may occur as a result of a reaction to the vaccine or through vaccination programme errors. Among immune-competent subjects the incidence of localized abscess at the injection site and suppuration lymphadenitis had been reported to be in the range of 0.1% to 1%, by many researchers.⁴ Overdose or poor vaccination techniques are commonly considered as the reasons for the adverse effects and generally the subsequent conditions resolve spontaneously.⁶ In some cases, revaccination with BCG vaccine have been attributed to the occurrence of adverse effects. Although programs involving repeat doses are not used worldwide they have been recommended in some countries, for example, Brazil.⁷ Published reports of adverse reactions due to revaccination include 13 cases of children and adolescents with complications due to BCG revaccination in a Brazilian pneumology unit of a university pediatric hospital between May 1996 to December 2000. Adverse reactions occurred between twenty-one days and nine months after BCG revaccination. All cases were successfully cured by isoniazid, 10 mg/kg/day, but the duration of treatment required was varied.⁷

A retrospective study over a period of five years reported twelve patients presenting with complications following revaccination with BCG. Out of these, subcutaneous abscess was reported in eight cases, deep chronic ulcers in four cases complicated by humeral osteitis in one case and the other three cases erroneously received 1 ml of vaccine.⁶

The risk of adverse effects is usually associated with type of BCG strain administered, the dose given, the patient's age at vaccination, the method of immunization and the skills of the vaccinator. Many of factors are modifiable. Adverse effects can occur due to the extremely complex medical environment that currently exists, which involves a variety of personnel, equipment, and procedures. By seeking to eliminate errors in the system of providing care and raising the awareness of health care providers about the potential for adverse effects, programs can be established to address and possibly remedy potential or actual significant problems.⁸

Although adverse reactions are rare, it is important to document, monitor and learn from them. Education and training on the safe handling and disposal of sharp devices, awareness campaigns, legislative action, and use of needle protective devices, such as eye goggles, face shields, gloves, masks, and gowns as appropriate, may reduce the rate of sharps injuries. Substituting injections by administering medications via another route, such as tablet, inhaler, or trans-dermal patches or by adopting the use of tools that improve safety, such as needles that retract, sheathe, or blunt immediately after use, can also decrease the risk of needle stick injuries.

However, health professionals must be aware of the potential for these injuries and, if they do occur, they should be able to assess these in an appropriate way and should seek timely treatment.

References

1. Wilburn SQ, Eijkemans G. Preventing needle-stick injuries among healthcare workers: A WHO-ICN collaboration. *Int J Occup Environ Health* 2004;10:451-6.
2. Mehta A, Rodrigues C, Singhal T, Lopes N, D'Souza N, Sathe K, Dastur FD. Interventions to reduce needle stick injuries at a tertiary care centre. *Indian J Med Microbiol* 2010;28:17-20
3. Park K. *Park's Textbook of Preventive and Social Medicine*. 20th ed. Jabalpur: Banarsidas Bhanot; 2009. p. 170-2
4. WHO. *Immunization Safety Surveillance, Guidelines for managers of immunization programmes on reporting and investigating adverse events following immunization*. Geneva:WHO; 1999.
5. WHO. *Expanded Programme on Immunization, Report and Working Papers, 31st session of the WHO Regional Committee; 1978 Aug 21-28; Mongolia: SEARO; 1978.*



6. El Ouazzani H, Lamsyah H, Alioua Z, Rhorfi I, Rguibi M, Ghfir M et al. Adverse effects of BCG revaccination: 12 cases. *Ann Dermatol Venereol*. 2007 Feb;134(2):129-32.
7. Cunha A J L A, SantAnna C C, Mannarino R, Labanca T C, Ferreira S, March M F B P. Adverse effects of BCG revaccination: a report on 13 cases from Rio de Janeiro, Brazil. *The International Journal of Tuberculosis and Lung Disease* 6 (12), Number 12, December 2002, pp. 1110-3.
8. Leape LL, Lawthers AG, Brennan TA, Johnson WG. Preventing medical injury. *Qual Rev Bull* 1993 May; 19(5):144-9

PEER REVIEW

Not commissioned, externally peer reviewed

CONFLICTS OF INTEREST

None

CONSENT

The authors declare that

1. They have obtained informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.