

Scientific Report

Accidental self-inoculation in a veterinarian with attenuated vaccine of bovine Johne's disease

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Summary

Herein, we described the first case of self-inoculation in a veterinarian with bovine Johne's disease (BJD) attenuated vaccine in Iran that required medical attention. A needle-stick injury to the right thumb of a young veterinarian during vaccination of cattle with BJD vaccine resulted in an inflammation that not only failed to resolve but also progressed to a lesion 2.5 cm in diameter. The usual conservative treatment of this wound was not effective. Surgical intervention for debridement of the inflammatory tissue was not performed. For diagnosis of lesion, needle biopsy was prepared from the inflamed tissue mass. Histopathologic examination revealed a tuberculoid granulomatous inflammation without any caseous necrosis. The wound healed by taking rifampin.

Key words: Self-inoculation, Paratuberculosis, Vaccine

Introduction

Bovine Johne's disease (BJD) is a chronic wasting disease of cattle caused by *Mycobacterium avium* paratuberculosis (MAP) (Jubb *et al.*, 1993; McGavin *et al.*, 2001).

In Iran, since 1994 Bazargani and his co-workers have used Merial attenuated vaccine to control BJD. The vaccine is injected subcutaneously in the middle of brisket region.

Despite education of vaccinators, till now, several documented cases of accidental self-inoculation have been reported in Iran. In most cases, the affected site became hard, inflamed and painful for some days. Herein, we want to describe a case of self-injection who developed unusual and complicated reactions.

Case history

A young veterinarian became infected

with a needle-stick in his right thumb with attenuated vaccine of BJD. Gradually, his finger became inflamed (2.5 cm diameter) and painful with exudative discharge (Fig. 1).

Radiographs of right thumb revealed soft tissue and bone involvement. For accurate diagnosis, needle biopsy was taken from the affected tissue and then fixed in 10% buffered formalin solution. After processing, the sample was sectioned in seven-micron thick sections and stained with haematoxylin and eosin (H&E), and Ziehl-Neelsen staining.

Grossly, tissue mass was gray-white, firm and widely attached to dermis and bone. Microscopic findings included tuberculoid granulomatous inflammation without any caseous necrosis. Macrophages, lymphocytes, plasma cells and Langhans giant cells were infiltrated into the dermis. The granuloma was surrounded by a connective tissue. No acid-fast bacteria in macrophages, giant cells and other inflammatory cells

were seen.

The patient did not respond to common antibiotics including 150 mg of clindamycin and 500 mg of cephalexin every six hrs. After pathologic diagnosis, the patient was given 300 mg/d rifampin for approximately 4.5 months which was effective.

Fig. 1: Right thumb; the inflammation and exudative discharge are prominent

Discussion

In humans, accidental injection or exposure of the skin surface or mucous membrane to BJD vaccine may usually cause a severe local reaction and, uncommonly, a systemic reaction. Illness from accidental inoculation of the bacterium is a potential veterinary occupational hazard. Bjornsson *et al.* (1971) and Richardson *et al.* (2005) reported a case of paratuberculosis in hand.

Chapel and August (1976) reported nine cases of accidental injury to man with Freund's complete adjuvant.

Patterson *et al.* (1988) surveyed Wisconsin veterinarians to assess the frequency and severity of accidental self and other human exposure to MAP bacterium. They explained that veterinarians were affected with needle-stick exposures, skin surface exposures, and oral mucosa exposures. Most cases of needle-stick exposures

took place during the injection process.

Richardson *et al.* (2005) reported a case of Gudair (ovine Johne's disease) vaccine self-inoculation in a 50-year-old woman.

Windsor *et al.* (2005) reported 21 self-inoculation with the vaccine of a Freund's complete adjuvant used for control of ovine paratuberculosis. In five of these incidents there was only superficial skin contact with the vaccine and in 16 there was needle penetration without vaccine injection.

After self-inoculation, early surgical debridement of the damaged tissue and drainage to remove the vaccine material are advised to avoid progression to extensive necrosis. For hand wounds, many authors recommended conservative management. Surgical intervention should be considered if a granuloma persists and causes the patient functional difficulty. For mucous membrane exposures, thoroughly rinse the exposed areas with tap water. For skin surface exposures without breaks in the skin, wash the exposed area thoroughly with soap and water. For needle scratches with epidermal exposure only, wash the exposed area thoroughly with soap and water, and apply a disinfectant. For exposure associated with needle stick injury, allow the wound to bleed (suction other than oral suction can be used to further facilitate removal of the bacterium). Care should be taken to avoid squeezing or traumatizing the injection site. Cleans the wound thoroughly with soap and water and keep the wound clean and dry. For any of the aforementioned exposures, consult a physician if local irritation develops and persists. Early topical application of a corticosteroid preparation may decrease the severity of the reaction to the bacterium inoculation, but there is no data available regarding the efficacy of such treatment.

Since the vaccine used was attenuated, it should have acid-fast bacilli which can be stained with Ziehl-Neelsen method. The adjuvant of this vaccine, like many other vaccines, could not cause any skin reactions. On the other hand, this inflammation could be produced by acid-fast bacilli which were in the vaccine. The severity of reactions observed, therefore could be correlated to the dose of bacilli inoculated.

In this case, because the veterinarian was

vaccinated against tuberculosis many years ago, he has already been immune against not only *Mycobacterium tuberculosis* but also MAP which has similar antigens. This case revealed that human can be infected with MAP vaccine. Therefore, during vaccination of animals, all health programs must be considered.

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