Paratuberculosis Vaccination

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KEYWORDS
• Johne's • Paratuberculosis • *Mycobacterium* • Ruminants
• Vaccination

Although the earliest record of vaccination for Johne's disease (JD) dates back to 1926, it has not been widely used in the United States.[1] Currently, there is only one approved vaccine for JD in the United States, Mycopar (Boehringer Ingelheim, Ridgefield, CT, USA). It is a whole-cell bacterin consisting of inactivated *Mycobacterium avium* subsp. *paratuberculosis* (also known as MAP) mixed with an oil adjuvant. Although multiple studies on the efficacy of Johne's vaccine have been published, differences in study design and outcome measures have made direct comparisons challenging. The vast majority of such studies, however, have shown a protective effect of vaccination on MAP infection and clinical disease.[2,3]

REQUIREMENTS FOR JOHNE'S DISEASE VACCINATION

Purchase and administration of Johne's vaccine in the United States is limited to veterinarians approved by state animal health officials. Participating states must follow regulations in USDA Veterinary Services Memo No. 553.4, *Mycobacterium Paratuberculosis Bacterin: Use in Johne's Disease Vaccination Programs in Participating States.* The memorandum requires that the herd owner and herd veterinarian enter into an agreement with the state animal health official regarding the use of the vaccine. Several prerequisites must be completed before the agreement can be approved by the state animal health official. These include (1) confirm premises is infected with MAP (ie, at least 1 positive fecal culture or polymerase chain reaction for MAP on individual, pooled, or environmental fecal samples), (2) negative tuberculin test on all test-eligible animals as defined under herd accreditation test in the Bovine Tuberculosis Eradication Uniform Methods and Rules, (3) herd owner and State animal health agency sign agreement for vaccine use. In addition, there are TB testing requirements for purchased replacement stock that must be met prior to introduction of the animals into vaccinating herds.

The author has nothing to disclose.
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SPECIFICS OF JOHNE'S DISEASE VACCINE ADMINISTRATION

In the United States, only replacement heifers and bull calves between 1 and 35 days of age are currently eligible to receive JD vaccine. It is administered subcutaneously in the dewlap approximately 1 inch proximal to the brisket. Vaccinated calves must be identified with an official identification, including external identification and a tattoo indicating the animal is a JD vaccinate, in the left ear, as specified by the USDA memorandum on JD vaccine use. A vaccination report must be submitted to the state animal health official by the veterinarian administering the vaccine.

NEGATIVE ASPECTS OF CURRENT JOHNE'S DISEASE VACCINES

There are several disadvantages to the currently available JD vaccines that include risk of granuloma at the injection site, human health risks from accidental inoculation, and interference with diagnostic testing for bovine tuberculosis (TB) and paratuberculosis.

Cattle may develop a granulomatous lesion at the site of JD vaccine injection (**Fig. 1**); however, approximately 80% of lesions are less than 10 cm in diameter and do not appear to cause discomfort.[3] The vaccine is administered in the dewlap region in an effort to prevent trauma to the site, that might exacerbate the granuloma. In rare instances, granulomas may become abscessed and drain.[3] A study using Gudair vaccine (Pfizer, NSW, Australia; not licensed for use in the United States) in sheep showed that 20–25% of vaccinates had a palpable injection site lesion after 12 months of age and no significant losses were noted at slaughter.[4] There is a clinical impression among veterinarians that when using the Mycopar vaccine, fewer vaccination reactions occur when smaller-gauge needles are used (18 gauge or smaller); however, the product is very viscous and must be warmed in order to flow through smaller-gauge needles (personal communication with various Wisconsin veterinarians).

Accidental inoculation of humans with JD vaccines may also cause a granulomatous lesion at the injection site.[5,6] The severity of lesions may depend on the amount of vaccine injected and the amount of trauma to the injection site. In the event of an accidental inoculation, veterinarians are advised to contact their health care provider and state public health office immediately for specific treatment recommendations.

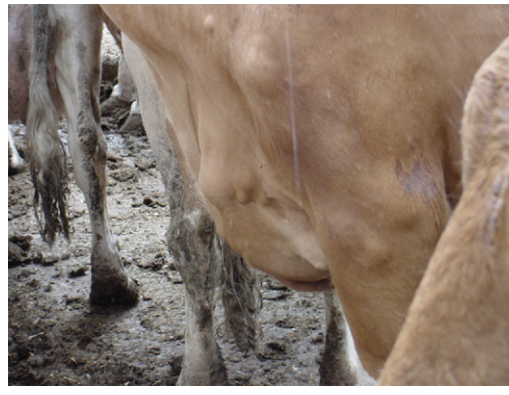

Fig. 1. Granuloma induced by a killed, oil-adjuvanted Johne's disease vaccine. (*Courtesy of* Michael T. Collins, DVM, PhD, Madison, WI.)