The Use of Ultrasound in Assessing Injection Site Reactions Following Multivalent Clostridial Vaccination in Cattle

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A mixed group of 77 beef cattle between 400 and 600 lb (180 and 270 kg, respectively) live weight were injected with one of two multivalent clostridial vaccines: Alpha® 7 (product 1) or Vision™ 7 with Spur® (product 2). The vaccine was injected obliquely into the subcutaneous (SC) tissues on the right side of the neck. The diameter, or width and length of the injection site swellings were measured with calipers on days 7 and 30 post-vaccination; these measurements were used to calculate the reaction area. A 7.5 MHz sector transducer with fluid offset, and a portable ultrasound machine were used to measure the SC tissue depth at the injection site before, and 7 and 30 days after vaccination.

On days 7 and 30 post-vaccination the mean reaction area and mean SC depth were significantly smaller in the cattle treated with product 2, when compared with those treated with product 1. Between days 7 and 30 the mean reaction area significantly decreased in the animals treated with product 2, whereas there was no significant change in mean reaction area during this period in the animals treated with product 1. The mean SC depth during this time was unchanged in the animals treated with product 2, but it increased significantly in the animals treated with product 1.

The ultrasonographic appearance of the injection sites post-vaccination could be divided into four categories: (1) normal skin, (2) diffuse thickening of the SC tissues, (3) discrete fluid accumulation within the SC tissues, and (4) evidence of abscessation (areas of mixed echogenicity). When the data for both treatment groups were combined, approximately 50% of the animals showed diffuse thickening of the SC tissues, about 20% showed evidence of abscessation, and about 5% showed a discrete accumulation of fluid within the SC tissues on both days 7 and 30 post-vaccination.

On each of the three measurement days (zero, 7 and 30), twenty animals were randomly selected to have three consecutive SC depth measurements taken. The coefficient of variation was calculated for each animal on each day. The variability of the ultrasonographic method used in this study was between zero and 15%, although the mean was generally less than 6.5%.

This study concluded that ultrasonography was a very useful tool in quantitating the depth of SC tissue reactions post-vaccination. It also enabled a better understanding of the nature of injection site reactions. The method used in this study was quick, non-invasive, and repeatable.