

Injection Questions

By Clint Peck

Anyone in the cattle business who hasn't gotten word of the recommended site to give a cow a shot must have been asleep for the past 20 years. So, once you know the proper location to give an injection is in front of the shoulder (see graphic), the question becomes whether to give the injection subcutaneously (SQ), intravenously (IV) or in the muscle (IM).

"First and foremost, follow label directions," answers David Thain, University of Nevada-Reno Extension veterinarian. Then, he says, set your treatment goals.

"IV treatment results in very rapid blood levels of a drug, in higher concentrations, as oppose to other routes," Thain says. "SQ injected medications are absorbed more slowly, reaching a lower blood level and persisting longer. Typically, IM injections land somewhere in the middle."

While IV gives very rapid response, it will usually need to be repeated, Thain adds.

If a product is labeled for both IV and SQ then there's probably not much difference in overall efficacy, adds Ronald Gill, professor, Texas AgriLife Extension.

"You'll have quicker distribution of product throughout the circulatory system when given IV compared with SQ," Gill explains. "If it is given SQ it has to be absorbed into the blood stream and then distributed via the blood. SQ might give a longer pay out period though, perhaps due to the slower absorption."

Dan Thomson, PhD, DVM, College of Veterinary Medicine, Kansas State University, leans towards SQ administration of antimicrobials. He never recommends IV unless that's the only route of administration on the product label. Distribution patterns for the drugs given SQ or IV can vary, he says, which are often at blood levels within 4-10 hours.

Thompson agrees with others who mention worker proficiency with regard to administering a product IV versus SQ. Consensus is that it's simply easier for most workers, and vets, to give an injection under the skin versus in a vein. "With workman's compensation in mind, and the lack of difference in case fatality rate, IV is not the best option compared to SQ," Thompson says.

He's also concerned about physical stress on animals when treating them multiple times. "In most cases people using IV drugs treat several days in a row which can cause tissue damage in jugular veins and surrounding tissue," he explains. "We've seen in our research that we double the death loss in

multiple-day treatments verses one-time antimicrobial therapy. We think it is because of wear and tear on the animals when handling them too many times.”

Fred Hopkins, University of Tennessee veterinarian says that a product given IV will circulate through the blood stream 2-3 hours faster than one given SQ. However, he says it’s also true that an antibiotic begins leaving the body more quickly since it is readily available for excretion.

“Antibiotics are generally most effective when they’re available above their MIC (minimum inhibitory concentration) and the level above MIC does not matter to the bacteria,” Hopkins says. “SQ injections will be somewhat slower to get above the MIC but will stay above it a good deal longer.”

There are differences in reaction rate between products. Gill says many products labeled IV are given extra-label via SQ or IM and there are tremendous differences in efficacy.

Other treatment issues

Last year the Food and Drug Administration (FDA) banned IM use of flunixin meglumine (Banamine[®]) which now may only be given IV in cattle. In fact, FDA banned all extra-label use of flunixin because there were numerous cases of drug residues when it was given SQ or IM at a time when no withholding times were published.

Only a veterinarian can prescribe a drug in an extra-label manner. But, federal law limits extra-label drug use to treatment when the health of an animal is threatened or suffering or death may result from failure to treat. In such cases, the veterinarian must establish a substantially extended withdrawal period supported by appropriate scientific information prior to the marketing of milk, meat, eggs, or other edible products to assure that violative drug residues do not occur.

For cattle, the label also restricts administration of tilmicosin (Micotil[®]) to SQ. IV use of this product in cattle will be fatal.

The National Institute for Occupational Safety and Health (NIOSH) recommends extreme care be given to following safe drug handling and injection procedures to avoid the possibility of self injection – especially with Micotil.

There’s extreme hazard to humans exposed to Micotil through needlestick injuries, skin cuts, puncture wounds, and contact with skin and mucous membranes. Cardio-toxic effects of Micotil on the human heart can be severe enough to cause death. Although no antidote exists for Micotil, exposed persons should seek immediate medical intervention as the drug’s cardio-toxic effects may be reversed.

How about vaccines?

“I don’t know of a vaccine with an IV label, so this discussion is with respect to drugs/medications,” Thain says.

And, one more thing...

Thain has stern advice for anyone who’s been asleep for the past 20 years. “To help keep our beef wholesome, never inject a calf at any age, cow or bull in the top butt, rump or loin muscle.”

Clint Peck is contributing editor and director Beef Quality Assurance, Montana State University.

<sidebar>Still room for improvement

The 1995 Beef Quality Audit reported 11% of beef carcasses presented for commercial processing had at least one injection site blemish. The cost to the U.S. beef industry was an average of \$7 for every animal harvested.

Since 1995 the industry has significantly reduced the incidence of injection lesions in both fed and cull cattle.

“Although identified as a key industry success story in the 2005 Beef Quality Audit, reduction of injection sites lesions still remains among leading goals of national and state Beef Quality Assurance programs,” says Ryan Ruppert, National Cattlemen’s Beef Association director of quality assurance programs.

Ways to improve your injection techniques

- Recognize that the best injection site isn’t always the most convenient.
- Don’t use bent, dirty or broken needles.
- Mix enough vaccine for only one hour or less.
- Keep good treatment records.
- Keep all injections in front of the shoulder.
- Injection technique for both SC and IM injections.
- Never inject more than 10cc into one site.
- Don’t re-inject into injection sites.
- Minimize the risk of injection site reactions.
- Don't combine vaccines.
- Use clean transfer needles.
- Don't mix too many products.
- Keep shaking the bottle.
- Mark and separate syringes.
- Don’t use disinfectants with modified live vaccines.
- Get air out of syringes.

Proper injection sites

