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Animal Health
Fact Sheet

REALIZING THE IMPACT OF INJECTION SITE LESIONS

(Companion to Video Demonstration of Lesions)

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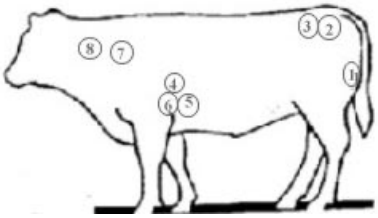
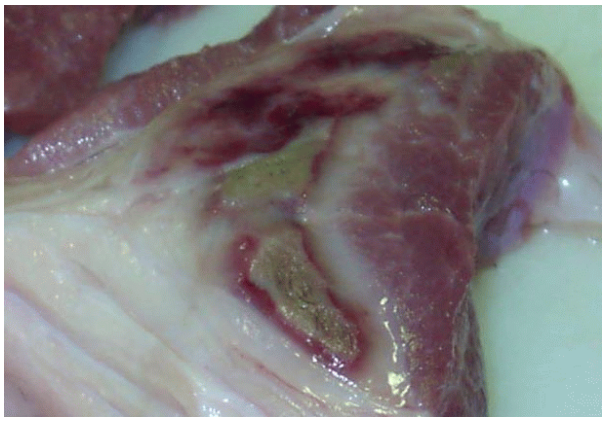
March 2001 AH/Beef /38

A major effort has been made by the beef industry in recent years to reduce the economic loss from injection site lesions. Injections of almost any vaccine or medication causes some lesion. The extent, severity and economic loss of the resulting lesion can be greatly reduced with cleanliness and by use of careful techniques for the placement of product into specific, designated sites.

A video was prepared to demonstrate the lesions which can result from injections. (Available from the author for $20 single copy or $15 if ordering more than five, includes shipping in US.) Dr. Jerry Woodruff of Fort Dodge Animal Health presented the video demonstration of injection site lesions which can result from just a few errors being made in a normal feedlot environment. For the demonstration shown in this video, a "realizer" calf was purchased from a Utah feedlot by Fort Dodge Animal Health. The calf had chronic pneumonia and its economic value was greatly reduced. Commercially available products were injected into the calf and 11 days later he was taken to slaughter and the carcass used for the demonstration. The carcass was condemned at slaughter and was never considered for use because of the drug residues present.



An injection site "map" was prepared to record the product, dose, route, needle size used and the site where given. Very definite lesions were produced. Procedures used for injections were typical of what has occurred at feedlots in the past. Most feedlots have improved their techniques in recent years resulting in a great reduction of lesions.



The problems and principles related to injection site lesions apply beyond the feedlot. It is important for cow-calf producers to understand that the same lesions produced in this feedlot-age animal would also occur in a young calf. A study by Colorado State University showed that lesions produced in young calves actually enlarged as the calves grew. Many lesions were larger from injections given to young calves than from similar injections given to feedlot animals. Cow/calf producers tend to think that calfhood injections

provide extra time for the lesions to “resolve.” But these lesions do not resolve, and they may enlarge.

The back side of the lower, rear leg has been a favorite site for injection of medications. This area was used for injection site number 1. There is considerable muscle action in this area as the fibers stretch and contract. There are also multiple muscles in this area with planes between them.

Muscle movement causes the medication and irritation to spread beyond the site of original injection. In this case there was also some infection involved in the process due to use of a dirty needle and syringe. Several inches of the entire muscle mass was ruined from this one injection.

The lesion would form scar tissue with time and become more defined. If found at slaughter in an animal, it could be trimmed out and would remove several inches of muscle tissue. If the lesion was not found until it was served to someone it would create a VERY negative eating experience.

Injections were also given at sites 2 and 3 as shown on the site map. This area of the animal has also been a favored site for injections because it is so easy to get to when handling cattle. But, it is also one of the primal cut areas of the carcass. A 10 milliliter dose of long acting antibiotic was given in site 2 with a 1 inch long, 16 gauge needle. At site number 3, a 5 milliliter dose of vitamin A and D was given with a 1½ inch needle. It has long been recognized that vitamin A and D injections are irritating, but this has also been a favored site for the injection, often given to cows at the time of preg checking. However, this cut of meat, even from older cows, is often used for roasts and roast beef sandwiches and is considered a prime cut.

The injection at site 3 caused is a large area of inflammation and an extensive lesion. Scar tissue was already forming by 11 days. The question is often asked, “How long will the lesion remain?” The answer is, “For the life of the animal.” It will not just go away. It may actually increase in amount and size for a time. It will eventually constrict down slightly from that maximum size but will still produce a large lesion area.

The lesion produced at site 2 was even more severe and the damage more extensive than the one at site 3. The type of lesion seen here could easily develop into a walled off, fluid filled lesion - an abscess. Because of its depth within the tissue, it is likely that it may not be seen at processing. This lesion would certainly create a negative eating experience, especially if a walled off abscess were not discovered until it reached the dinner table.

The neck region is the preferred site for all injections. A triangular area on the side of the calf’s neck is the preferred site for IM injections on the calf. It is important to recognize that this area for intramuscular injections in the neck region is really quite small. The lower border of the triangle, is the vertebrae of the neck. The spinal column actually runs along at about the middle of the neck in this region of the body. The vertebrae are quite large and are covered only by the skin and a small thickness of tissue. If any injections are given into this area, the needle would hit directly into the bone of the vertebrae, which is not acceptable.

There is a large ligament at the top of the neck, called the nuchal ligament. This is a very strong fibrous ligament and enables the animal to carry its head in an extended position. It is very tough, with a poor blood supply and is not acceptable for any sort of injection.

The rear border of the triangle for IM injections into the neck region, is the front edge of the shoulder blade. This, too, is bone and not acceptable for injections. Injections given

subcutaneously can be given in a much larger area of the neck region. Any of the area just in front of the shoulder is acceptable, down to the lower edge of the neck vertebrae. However, if an injection is given below this area, it could be placed in the area of the jugular vessels and could cause problems, even though given subcutaneously. It is important that products which are given in large volumes are approved for and are given subcutaneously. It is recommended that the same person give injections on one side of the animal and that they use definite landmarks in order to keep the injection sites consistent and adequately separated. If additional injections are given at the same time, it may be necessary to use the other side of the animal.

A sub-Q injection was given to this calf, using a new needle and syringe. The site of that subcutaneous injection was not discernable on this calf. It is important to recognize that any small lesion would be removed with the hide or it could be removed with minimal trimming.

There are two muscle bundles in this area but they can be held in two hands. This means that IM injections into this area should be given rather precisely, with the animal well restrained. It may be necessary to use both sides of the neck to give larger amounts of an injectable product.

The needle size or gauge and its length are important considerations in giving proper injections. If the needle is too small, it may bend, break and remain in the tissue. If it is too large it causes unnecessary tissue damage. A 16 gauge by five-eighths inch needle is ideal for giving medications to calves over 500 pounds. A smaller 18 gauge needle could be used for most vaccines and for young calves. A needle length of one-half to five-eighths inches is ideal for sub-Q injections. You may think it is not long enough, but a five-eighths inch needle is adequate to get through the skin. If it is too long, it is more likely to go into the muscles underneath the skin and become an intramuscular rather than a sub-Q injection.

Be aware there is a large lymph node near the point of the shoulder and injections should certainly not be given directly into it or very close to it. Also be aware of this area when catching animals in a squeeze chute. Try to keep them from jamming into the front of the chute so hard as to bruise this area or their shoulders. Bruising or inflammation of this area will interfere with absorption of the product and proper development of immunity.

It is common when working young calves at branding, to inject them under the front leg. There are two problems with this: first, the injection is very likely to be given IM instead of sub-Q. Secondly, there is another lymph node in this area and it is very likely that it may be injected. This is not the ideal site as would be supposed. Even in young calves, sub-Q injections should be given in front of the shoulder.

It is important that hormonal implants be placed out on the ear, not down close to the head. The ears are cut off at slaughter at about two-thirds of the ear area. But the bottom one-third of the ear is not cut off and if the implant is placed there it could remain on the carcass after skinning and get into a meat product. Don't place implants close to the head.

The cartilage of the ear has three natural "valleys," bounded by a "top ridge" and a "lower ridge." Use of the middle "valley" is ideal but the "top valley" could be used instead, if necessary. It is best not to place the implant directly over any of the "ridges" as there is less skin flexibility in these areas and it will be more difficult to implant and may affect absorption.

A "painting tray" or other container can be used to hold sanitizing materials for implanting. A sponge soaked with diluted chlorhexidine is ideal for cleaning the implant needle between calves. Cleanliness of the needle is critical at implanting. It should always be sanitized after each implant by wiping it across a sponge soaked in disinfectant.

A small quantity of disinfectant from the tray can be used along with a brush to clean the ear prior to implanting. It is best to clean every ear with a brush and sanitizing solution. At least clean those that are obviously dirty. It is important to change the sanitizing solution periodically It would be ideal to dry the ear after brushing with the disinfectant, prior to implanting.

Insert the implant needle all the way to the hub and then deposit the implant as the needle is being withdrawn.

In summary, here are ten guides to consider when you are giving injections to beef cattle.

Rule 1. ALWAYS give injections in front of shoulder

Rule 2. Use the route that is most carcass friendly and still compatible with the label. Give injections subcutaneously when possible.

Rule 3. Keep injection sites at least 4 inches apart.

Rule 4. The maximum dose that should be given at one site is 10 milliliters.

Rule 5. Change needles after every 10 to15 head, when you reload the syringe, or when the needle is bent, burred or dirty. Always use a new or separate needle to withdraw vaccine or medication from the container.

Rule 6. When giving subcutaneous injections, "tent" the skin for the best injection possible but also recognize the extra risk for hand injuries, and be careful.

Rule 7. Use the proper size and length needles. An 18 gauge needle is large enough for young calves and for many vaccines. A 16 gauge needle can be used for larger cattle. A one-half to five-eighths inch long needle is ideal for subcutaneous injections. For IM injections a 1½ inch needle is preferred for larger cattle but a 1 inch needle is adequate for smaller calves.

Rule 8. For vaccines which must be mixed, pre-mix only what can be used within 1 hour. Keep these vaccines out of the sun, heat and freezing.

Rule 9. Refrigerate products during storage and at the working site, until they are to be used.

Rule 10. READ and follow directions, for the specific product. Double check the dose and the actual product put into the syringe.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert L. Gilliland, Vice-President and Director, Cooperative Extension Service, Utah State University, Logan, Utah.(EP/DF/03-2001)