

Spaying/castration: How, complications, pain management

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Heifer “spaying” ovariectomy

Why

Before establishing a business of spaying heifers, you must first be able to understand and explain/sell the benefits of the procedure to your potential clientele. It is a good procedure to add to an existing practice, especially if you are a new grad trying to add value or it can be a solo career opportunity as this skill is one that is currently in short supply. Spaying heifers is a labor-intensive procedure that requires learned skill and technique. It is not for the faint of heart. It is very physically and emotionally taxing when you are first starting out. The learning curve is steep and could potentially be expensive early on.

It is a skill that cannot be taught, it must be learned only by doing. When I first wanted to learn how to spay heifers in my first year of being an associate veterinarian and wanting to add value to the practice, I called up one of my professors from vet school and asked if I could come back and have him teach me (as an associate veterinarian you are obligated to add value to the practices for which you work). To which he responded, “No you may not, you can’t see what I am doing in there anyway.” I was initially offended but quickly realized he was right. He could explain to me what he was doing, something I was more than capable of researching on my own, but without getting my hands dirty there was no way of learning for myself.

Spaying heifers has several industry benefits:

- Producers can maintain a herd of “open” stocker/feeder heifers.
- Prevention of pregnant feedlot heifers.
- The elimination of the need to feed estrus suppressant particular in the feedlot.
- Decrease in the cost associated with interstate movements by eliminating the need for brucellosis and tuberculosis testing.
- Improved feed and weight gain efficiencies in spayed and implanted heifers.
- The advantage of being able to feed heifers and steers together or graze spayed heifers near cow-calf herds with bulls during breeding season. Many of my producers will pasture their spayed heifers and replacement heifers in the same pasture with a bull during breeding season reducing pasture and labor costs.

Due to the above, there is also a potential increased economic value for buyers and feedlot managers to purchase spayed implanted heifers. With the elimination of feedlot pregnancies and related expenses and diminished value of pregnant feedlot heifers as well as the increased rates of gain and decreased feed costs, spayed implanted heifers typically sell at nearly the same value as their steer counterparts. A producer could potentially realize an added value of \$0.15-0.20 cent/cwt increase in spayed implanted heifers above their intact counterparts with only a potential \$15-20 per head increase in input costs.

Why not

As previously mentioned, learning this skill is going to take sheer numbers before proficiency is gained. In the meantime, you will be exhausted physically. This will be like nothing you’ve ever done with regard to palpation. The heifers are small, usually between 500-650 lbs. Their ovaries are often pre-pubescent and can be the size of a pea. You will be emotionally exhausted. Early on and still to this day, just not as much, I lose sleep worrying about the complications associated with spaying heifers. Mortality rates are somewhere around 0.35-0.5% but this is for established practitioners. You are going to kill some heifers – hemorrhage, peritonitis, bowel puncture and aortic puncture are the usual culprits resulting in mortality. You can either buy your own heifers to practice on or find a producer willing to let you learn with agreement that you may need to reimburse them early on for the death loss. Once you have performed enough, somewhere around 1,000 head, most veterinarians no longer reimburse for the death loss and merely chalk it up to the cost of doing business.

There is going to be a cost for a producer to have a veterinarian perform this procedure. Somewhere in the neighborhood of \$8-12/head, plus \$4-5/head for implantation and 0.35% death loss, not to mention the labor costs associated with working the animals. So, on a 1,000 head of heifers, the potential cost associated with spaying and implanting would be around \$20,000. This would hopefully be offset by the increased marketable value of the spayed implanted heifer of around \$120/head over their intact counterparts. Hopefully netting the producer approximately \$100,000 dollars profit on a 1,000 head.

This is obvious, but worth mentioning, that this procedure is irreversible. Once the ovaries are cut, there is no going back. This is a career-altering procedure that will change the heifer’s life trajectory permanently.

How to

Flank spay

I have personally never performed a flank spay, and therefore will not be discussing it, but in interest of being complete in this presentation, it can be done through a left flank laparotomy. Godspeed.

Vaginal spay techniques

Despite previously stating that teaching someone how to vaginally spay a heifer is a fruitless endeavor, I will attempt to do so. There are two main types of vaginal spay instruments:

Kimberling Rupp (K-R) instrument (Figure 1) which is essentially flute-shaped and sized instrument constructed of a tube within a tube, a pointed end for penetrating the vaginal fornix, a hole at the heifer end of the tubes for insertion and cutting

of the ovary, and an operating handle at the other end for rotation of the tube for cutting of the ovary. The K-R tool is used for ovariectomies and recovery of the ovaries.

The Willis instrument (Figure 2) is a stainless-steel rod approximately 20 inches in length with a tear-dropped shape at one end, with a hole in it a slot for insertion and cutting of the ovary. The operator's end has a 90° bend to form the operating handle. The Willis spay tool is used for ovariectomies and the ovarian drop technique.

I have exclusively used the Willis tool and the ovarian drop technique, although I would recommend becoming proficient with both tools as each has its own advantages. The K-R tool is popular for the producer because the ovaries are removed and can both be identified at the end of the procedure. The Willis tool is smaller, lighter and somewhat easier to operate but it is impossible to guarantee that you have performed a successful ovariectomy. I would recommend using the K-R tool for the majority of spaying for this reason but have a Willis tool on hand for the smaller heifers that you can't easily insert your arm and the instrument simultaneously, and for the heifers with larger ovaries that will not fit in the K-R tool's opening.

Success in spaying heifers depends on many factors. Heifer health, heifer size and maturity, heifer preparation, facilities, crew/help and heifer cleanliness.

The heifers need to have been properly vaccinated. Spaying heifers is a stressful procedure. They need to have received a 7- or 8-way clostridial vaccine and a respiratory vaccine at least 3-4 weeks prior to spaying. Ideally, they have been properly weaned for a minimum of 6-8 weeks and in good health and nutritional status.

In my opinion, the ideal weight to be spaying heifers is 500-650 lbs. Under 500 lbs. and I struggle to insert my arm rectally, let alone my arm and the spay instrument. Over 650 lbs. the heifers begin to cycle, and the ovaries are much larger and difficult to insert in the spay instrument and are much more vascular and are more likely to have bleeding complications.

The heifers need to be withheld from feed for 24-48 hours and water for 12-24 hours to decrease gut fill. I have spayed a lot of heifers that have been fed and watered right up until the procedure and have been fine, but knowing this made me more cautious and it required a lot more cleaning of the peritoneum before and during the procedure.

The facilities always matter when working cattle, but especially when spaying. Having a good quality hydraulic chute with a good operator makes all the difference. It increases efficiency and decreases stress on the heifers. The heifers need to stand as quietly as possible during the procedure. They can't be squeezed too tightly, otherwise the gut is pushed dorsally increasing the incidence of bowel puncture. They also can't be allowed to jump around in the chute while the spay is being conducted. Having a good hydraulic chute that can be easily manipulated by a good observant operator during the spay can be a life saver.

I always bring my own technician. They know the procedure. They can keep accurate records. They know what I need when I need it. They take orders well and pay attention to what I am doing. They can often operate the chute if need be. Having good-quality help is so important, but especially help that you trained, that you pay, can make things so much more efficient and enjoyable.

Cleanliness is crucial to preventing peritonitis. I don't care how much antibiotic or what antibiotic you give before, during or after spaying a heifer, if you introduce fecal contamination into the peritoneal cavity, you are going to have complications. There are various methods to clean the perineum prior to and during the spay procedure. Many veterinarians will use a hose and profuse amounts of clean water to wash away fecal matter. Often, I am in a location where there may not be a good constant water source available. In most locations, I will bring a large, pressurized weed spray filled with water, chlorhexidine, and alcohol to prevent freezing. Other veterinarians have constructed pressure tanks that they can fill with water and

Figure 1: Kimberling Rupp (K-R) instrument

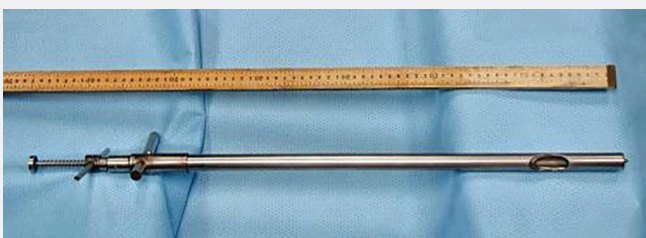


Figure 2: Willis instrument



chlorhexidine and pressurize with compressed air. Your assistant's job is to make sure the perineum is always clean prior to the procedure and during the procedure. I will start to use my left gloved hand to start knocking off any gross contamination prior to inserting my arm rectally while my assistant is spraying the antiseptic solution. I then insert my left, non-dominant arm in rectally and begin to evacuate the rectum of fecal material. All the while my assistant is spraying the perineum. I then dry the area with paper towels prior to inserting the spay tool between the parted labia and into the vagina. If at any time during the procedure the spay tool or the perineum become contaminated, it is my assistant's job to clean them. They also clean the instrument between animals in a separate chlorhexidine solution.

The actual procedure of vaginally spaying a heifer depends upon which spay tool you are using. With either tool, the instrument is inserted into the vagina through the parted labia at slightly dorsal orientation to avoid the urethra. It helps if the cervix is retracted cranially with the hand in the rectum during insertion of the instrument into the vagina in order to straighten the vaginal mucosal folds, much like when inserting an artificial insemination gun. The instrument is directed toward the vaginal fornix dorsal to the cervix. Once the instrument is in place, I move the rectum dorsally away from the reproductive tract to avoid puncturing the rectum during penetration of the instrument through the vaginal wall and into the peritoneal cavity. It takes quite a bit of force to push the instrument through the vaginal wall and entirely into the peritoneal cavity. Once in the peritoneal cavity, I palpate the end of the instrument and ensure it is entirely in the cavity and that it is free of serosa and mesentery. Being that my left hand is in the rectum, I find it harder to pick up the left ovary especially with the spay instrument in the peritoneal cavity taking up space. I usually try to cut the left ovary first. If you are using the Willis tool, you then place the ovary into the hole of the instrument; I find it easier to insert the ovary dorsal to ventral allowing gravity to help. I then place my left thumb over the hole, quickly retracting the instrument, caudally cutting the ovary off, dropping the ovary into the peritoneal cavity and trying to avoid retracting the instrument back into the vagina. I then repeat the procedure on the right ovary. The heifer gets an implant, a spay tag and an injection of penicillin for good measure.

The procedure is very similar using the K-R tool. The difference is that the ovaries are placed one at a time or 2 at a time into the hole of the tubes and the tube is then rotated cutting the ovary off, allowing the practitioner to remove both ovaries and visually inspect them. This ensures that both ovaries have been successfully removed entirely and that no other body tissue has been removed accidentally during the process.

Bull castrations

Depending upon your practice area and type, you may be called upon to castrate varying numbers of bull calves and bulls. At my practice, we castrate very few cattle. The majority of the castrations we perform are on problem cases that are either weanling or yearling age or yearling bulls that did not make the selection process for whatever reason. The problem cases are often cryptorchid bulls or bulls that were banded at branding that either missed a testicle or both or the band broke resulting in an intact animal.

Similar to heifer spaying, bull castrations are a stressful event. Ensuring the vaccine status is still best practice and visually inspecting the animal for health and nutritional status in order to be comfortable that the patient is healthy enough to endure the stress of the procedure.

Proper restraint is key. I have the luxury of having excellent haul-in facilities with a good hydraulic chute. All of my producers have either decent to good manual squeeze chutes or nice hydraulic squeeze chutes which facilitates proper restraint in an outcall situation. I do have a very nice portable hydraulic chute but have never hauled it to only castrate a bull. If facilities are an issue, do not be afraid to utilize chemical restraint. Xylazine at 0.1mls/100 pounds of body weight will lay the patient down and make the procedure a whole lot safer for all parties involved.

Once I have the patient properly restrained in the squeeze chute, I usually apply a belly band to hold the patient in a standing position. A brisket bar also works to keep patients standing. I tie the leg back on the side I am working on.

Analgesia in food animal species can be difficult. All NSAIDs (flunixin meglumine, meloxicam and aspirin) would be used in this case in an off-label manner. They can help, but I think their use would be determined based upon the patient and the client's expectations, i.e. show cattle. Always check your withdrawal times. Lidocaine ring blocks of the scrotum and testicular blocks can be of some aid mostly in keeping the veterinarian from getting kicked. Lidocaine does take several minutes to take effect.

I always scrub the surgical site with betadine scrub, and give penicillin and a tetanus vaccination.

The manner in which you castrate the bull will become personal preference. I prefer to blunt the scrotum approximately $\frac{1}{2}$ to $\frac{2}{3}$ of the way down the scrotum, exteriorize the testicles individually and perform a closed castration with a Henderson instrument and cordless drill. I then apply topical permethrin spray to the incision and surrounding areas and check for bleeding.

Alternatively, a Callicrate bander can be used on larger animals. It is important to use the instrument correctly and to apply the band with the appropriate tension to ensure complete arterial blood flow occlusion. This instrument is fairly large and a bit cumbersome, and can take more time to apply the band properly than it does to surgically castrate. Its advantage lies in the fact that when used properly, there is essentially no concern of hemorrhage. I have seen a few complications when the band was not applied with enough tension and the testicles swelled due to continued arterial blood flow to the testicles and occluded venous return. The scrotum sloughed off and the testicles were left attached to the patient. The procedure was revised with a surgical castration. There is a tensioning pin in the shaft of the instrument that will slide back within a slot indicating the proper tension has been applied to the band before the aluminum band is crimped and the excess band is cut with a tag knife.

It is always important to count to 2 before and after any castration procedure is performed.

