



Lateral Flank Approach for Ovariohysterectomy in Small Animals

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ABSTRACT:

The lateral flank approach is an alternative to the conventional ventral midline approach for ovariohysterectomy in dogs and cats. Indications for its use include excessive mammary development or situations in which postoperative examination may be limited. Advantages include decreased likelihood of evisceration if wound dehiscence occurs, the ability to monitor the incision from a distance after surgery, and the efficiency of the procedure once a surgeon becomes comfortable with the approach. The primary disadvantage of the lateral flank approach is lack of exposure to the contralateral side if complications arise.

In practices outside the United States, the lateral flank approach is considered conventional for ovariohysterectomy and is used routinely in cats and some dogs.¹ In contrast, veterinarians in the United States almost exclusively use the ventral midline approach for ovariohysterectomy in small animals, although the lateral flank approach is commonly used in bovine and equine species.^{2,3} The lateral flank approach has been described for both dogs and cats in a number of references.⁴⁻⁸ However, its use in small animals has failed to gain widespread acceptance in the United States, perhaps because of differences in surgical ideology, anesthesia protocols, and postoperative management. Recently, there has been renewed interest in the lateral flank approach among veteri-

narians associated with feral animal and shelter medicine programs.⁷ This article reviews the indications, contraindications, advantages, disadvantages, and surgical technique for the lateral flank approach for ovariohysterectomy in small animals (see box on page 923).

INDICATIONS

Conditions for which the lateral flank approach for ovariohysterectomy is indicated include excessive mammary gland development due to lactation or mammary gland hyperplasia (Figure 1). When it is necessary to perform an ovariohysterectomy on a lactating animal, using the lateral flank approach can avoid potential complications that may be associated with the ventral midline approach, such as excessive hemorrhage from the skin and subcutaneous tissue, wound inflammation or infection, and leak-

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age from mammary tissue. In addition, using the lateral flank approach in lactating animals minimizes disruption to the mammary glands so that animals are more likely to continue nursing appropriately after surgery.

Mammary hyperplasia, also known as *fibroadenomatous hyperplasia* or *mammary hypertrophy–fibroadenoma complex*, is a benign condition in cycling or pregnant cats characterized by rapid abnormal growth of one or more mammary glands.⁹ The treatment of choice is ovariectomy or ovariohysterectomy, which results in regression of mammary hyperplasia within 3 to 4 weeks.¹⁰ As with lactating animals, using the lateral flank approach in animals with mammary hyperplasia avoids dissection close to the mammary glands and minimizes potential perioperative complications due to disruption of an enlarged mammary gland(s).

ADVANTAGES

Advantages of the lateral flank approach for ovariohysterectomy include the ability to observe the surgical wound from a distance and reduced potential for evisceration if wound dehiscence occurs.^{4,5,7} These advantages are especially important when managing feral or stray animal populations. The opportunity to examine these animals after surgery is often very limited; therefore, it is often necessary to monitor them from a distance. A lateral flank incision allows visual assessment of the wound without handling the animal, which would not be possible with a ventral midline incision. Evisceration of abdominal organs or other catastrophic consequences due to breakdown of the body wall closure are less likely to occur with the flank approach because

Summary of the Flank Approach for Ovariohysterectomy

Indications

- Enlarged mammary glands due to lactation
- Mammary gland hyperplasia

Contraindications

- Pregnancy
- Pyometra
- Estrus
- Obesity
- Patient age younger than 12 weeks

Advantages

- Evisceration is less likely if the body wall incision breaks down
- Ability to observe incision from a distance

Disadvantages

- Limited exposure to the patient's contralateral side if complications arise
- Difficulty identifying a previous ovariohysterectomy if the animal is not properly marked
- Possible imperfections in hair color or regrowth on the flank

time normally required to locate an ovary using the ventral midline approach, thereby minimizing surgical time.

CONTRAINDICATIONS

Contraindications for the lateral flank approach for ovariohysterectomy include uterine distention due to

Veterinarians in feral animal and shelter medicine programs have shown renewed interest in the lateral flank approach.

gravitational forces exerted on a flank incision are less than those exerted on a ventral midline incision.^{4,5,7,11} Also, the overlapping arrangement of the oblique muscles in the flank helps maintain integrity of the body wall if wound complications occur.

Another advantage of the flank approach is the efficiency with which an ovariohysterectomy can be performed once a surgeon becomes comfortable with the approach. With a flank incision, the ipsilateral ovary and uterine horn lie immediately below the incision, making them very easy to locate. This eliminates some of the

pregnancy or pyometra, obesity, or patient age younger than 12 weeks.^{4,7,11–13} Also, using the flank approach in show animals is discouraged by some authors because of the risk of visible scarring or imperfections in hair color or regrowth.¹¹ For animals that are pregnant or have uterine distention due to pyometra, the flank approach is not recommended because it generally does not provide sufficient exposure to manipulate the distended uterus. If pregnancy or pyometra is identified unexpectedly, the flank incision can be extended to facilitate removal of the uterus; however, extending the incision



Figure 1. Mammary gland hyperplasia in a cat.

can lead to increased muscle trauma and additional hemorrhage, undermining some of the primary advantages of the lateral flank approach.¹² For animals in estrus, increased tissue vascularity and friability pose the

In addition, the lateral flank approach is generally not recommended for early age ovariohysterectomy in dogs or cats because of relative differences in the conformation of the uterus compared with that in older animals. In kittens and puppies younger than 12 weeks of age, the uterine body is relatively short compared with the uterine horns, making it more difficult to expose the bifurcation of the uterus through the lateral flank approach. The lateral flank approach can also be problematic in obese animals.¹¹ Excessive adipose tissue surrounding an ovary can make it difficult to locate and exteriorize it through a small grid incision.

DISADVANTAGES

The primary disadvantage of the flank approach is limited exposure to the abdomen if complications arise.^{4,5,7,11} Satisfactory exposure using the lateral flank approach requires that the incision be positioned optimally from the onset because the benefit from extending the incision in the dorsoventral direction with the flank approach is not the same as that from extending the incision in the craniocaudal direction with the ventral midline approach. This caveat may translate into a steeper learning curve given that misplacing the incision during the approach may decrease exposure and impede access to the ovaries or uterine body. Another important concern with the flank approach is the difficulty in properly identifying animals that have already had an ovariohysterectomy because the incision scar may be located in the flank region and not in the typical ventral midline location.⁷ This may lead to unnecessary surgery if a surgeon is not aware that the flank approach has been used for ovariohysterectomy. Therefore, when using a flank approach, other means of identifying animals that have had an ovar-

Proper patient selection is important to avoid complications associated with the lateral flank approach for ovariohysterectomy.

same concerns for both the flank and ventral midline approaches; therefore, estrus is not a specific contraindication for the flank approach.¹⁴ With the flank approach, however, exposure of the uterine stump and contralateral ovarian pedicle is generally more limited, making it difficult to achieve hemostasis if a pedicle is accidentally dropped or bleeding occurs in these areas.

iohysterectomy, such as tattooing the umbilicus or ventral midline of the abdomen or notching the tip of the left ear of feral animals, are particularly important.⁷

SPECIES DIFFERENCES

The lateral flank approach is more commonly used in cats primarily because of anatomic considerations. Cats

have a very consistent body conformation that makes proper orientation and entry into the abdomen relatively easy. The thin, pliable musculature of the flank region facilitates dissection and results in minimal hemorrhage⁵ compared with that in dogs, which have thicker body-wall musculature. Also, access to the contralateral ovary in cats is relatively easy because of a narrow abdominal width.

Using the lateral flank approach in dogs should be considered on an individual basis because of variation in body size and conformation. The approach is generally easier to perform in smaller dogs or dogs with a narrow body conformation, which permits easier access to the ovaries and uterus. The flank approach should be avoided in dogs with a wide body conformation, increased trunk musculature, or tight suspensory ligaments (e.g., rottweiler, English bulldog) because of the inherent difficulty in accessing the contralateral ovary.⁴ However, access to the ipsilateral ovary is improved via the lateral flank approach. Because the distance to the contralateral ovary may be the same as or less than that from the ventral midline, depending on the conformation of the dog, using the flank approach would not necessarily be a disadvantage in every dog with a wide body conformation.

SURGERY

Animal Positioning

When using the lateral flank approach, animals can be placed in either right or left lateral recumbency, depending on the surgeon's preference. The right flank approach is preferred by some surgeons because it offers improved access to the more cranially located right ovary and because the omentum covers the viscera when approached from the left.⁴ In our experience, however, there is no advantage to the right lateral approach compared with the left approach, and the argument could be made that the left flank approach is better for right-handed surgeons because their dominant hand is properly oriented for manipulating the suspensory ligament. Animals can be positioned on the table with their legs secured in an extended position or placed in a relaxed position with their legs unsecured.^{5,a}

Surgical Preparation

The surgical field should be clipped from just cranial to the last rib to the iliac crest in a craniocaudal direc-

^aDr. Arnold Brown: Personal communication, Mobile Veterinary Clinic, Trumbull, CT, July 2003.

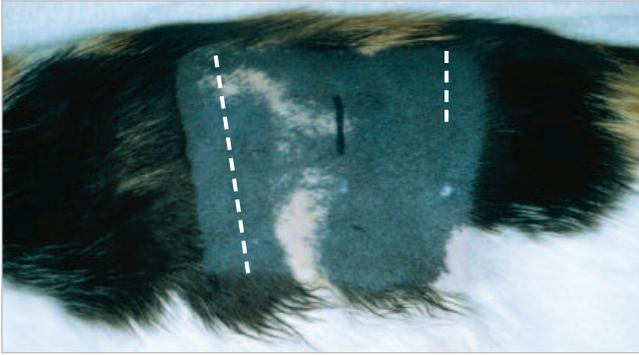


Figure 2. Prepped surgical area and proper incision location for a left lateral flank approach in a cat (*dashed line on left: location of the last rib; dashed line on right: location of the iliac crest*).



Figure 3. Exposure of the ipsilateral ovary in a cat.

tion and from the transverse process of the lumbar vertebrae to the flank fold in a dorsoventral direction (Figure 2).

Landmarks for Incision

For both dogs and cats, the incision should be made in a dorsoventral direction starting just caudal to the midpoint between the last rib and iliac crest. Alternatively, in cats, the incision should be located two finger-widths behind the last rib and one finger-width below the transverse process.^a In general, the length of the

is important to grasp the transverse abdominis muscle with thumb forceps to maintain control of the body wall. The ovary or uterine horn should be apparent directly below the incision. The ovary or uterine horn should then be grasped with thumb forceps and delivered through the incision similar to the ventral midline approach (Figure 3). In older or obese dogs, the ovarian pedicle may be surrounded by adipose tissue, requiring that the body wall incision be enlarged or stretched with hemostat or Carmalt forceps to improve exposure. The ovarian pedicle should then be isolated the same as is

Stray animals should be permanently identified to indicate that they have had an ovariohysterectomy.

incision should be approximately 3 cm in dogs and 2 cm in cats, but it can vary with the size of the animal, stage of estrus, or presence of other complicating factors.

Surgical Technique

The skin incision for the lateral flank approach should be made in a dorsoventral direction, taking care to avoid superficial vessels located near the ventral aspect of the flank. The subcutaneous tissue should be incised using a combination of blunt and sharp dissection. The abdominal wall should be identified and entered via a grid approach using a hemostat or Carmalt forceps to bluntly dissect through the separate layers of the abdominal oblique muscles. Once the abdomen has been entered, it

done with a ventral midline approach and double ligated in routine fashion. The broad ligament (including the round ligament) should then be bluntly separated parallel to the uterine artery to the level of the bifurcation of the uterus, taking care not to tear the uterine artery. If necessary, vessels in the broad ligament can be ligated, depending on the degree of vascularity. The uterine horn should then be elevated to expose the bifurcation and contralateral uterine horn, which should then be grasped and traced cranially until the ovary can be identified. The suspensory ligament should be broken down and the ovary delivered through the incision in the same manner as in the ventral midline approach (Figure 4). The ovarian pedicle should be ligated and the broad lig-



Figure 4. Exposure of the contralateral ovary in a cat.



Figure 5. Exposure of the uterus in a cat.

ament separated similar to the first side. Traction should be applied to both uterine horns, exposing the uterine body (Figure 5). The uterus should then be double ligated in a routine fashion, taking care to avoid the ureters.

Visualizing the contralateral ovarian pedicle and uterine stump can be difficult through a small flank incision. However, in contrast to the ventral midline approach, the ipsilateral ovarian pedicle is relatively easy to access through the flank approach because it lies directly below the incision and is generally not obscured by abdominal viscera. Visualizing the contralateral ovarian pedicle and uterine stump generally requires enlarging the incision to increase access to the abdomen. To view the contralateral ovarian pedicle, the duodenum (left flank approach) or descending colon (right flank approach) is used to help retract the small intestine dorsally while simultaneously retracting the body wall ventrally so that the pedicle can be brought into view below the incision. To view the uterine stump, the small intestine and urinary bladder should be retracted in a cranial and ventral direction while retracting the body wall caudally so that the uterine stump can be brought into view lying dorsal to the neck of the bladder.

In cats, the body wall can generally be closed in a single layer by placing one or two simple interrupted or cruciate sutures through all three layers of the oblique musculature. In dogs, the body wall should be closed in two layers, with the transverse and internal oblique muscle as the first layer and the external oblique as the second layer. The subcutaneous tissue and skin should be closed routinely based on the surgeon's preference. In feral or aggressive animals, an

intradermal suture pattern is recommended for skin closure so that suture removal is not needed.

Postoperative Care

Postoperative care after the lateral flank approach is basically the same as that for the ventral midline approach. With the flank approach, however, the incision can be observed from a distance, providing some advantage in managing feral and stray animals that cannot be easily handled after surgery.

CONCLUSION

Although not used routinely in the United States, the lateral flank approach is gaining acceptance among veterinarians involved in managing feral and stray animal populations. The procedure has a relatively steep learning curve, but with practice, it can be performed with the same efficiency as the ventral midline approach, providing an alternate technique for ovariohysterectomy in small animals. It is important to have thorough knowledge of the indications and advantages as well as the contraindications and disadvantages of this technique so that cases can be selected properly and potential complications can be avoided.

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1. _____ is an indication for using the lateral flank approach for ovariohysterectomy.
 - a. Pregnancy
 - b. Estrus
 - c. Mammary gland development
 - d. Obesity
2. Which of the following is not an advantage of the lateral flank approach?
 - a. reduced potential for evisceration
 - b. decreased potential for hemorrhage from ovarian pedicles
 - c. avoiding mammary gland disruption in lactating animals
 - d. easy location of the ipsilateral ovary directly below the incision
3. The right flank approach is preferred by some surgeons because
 - a. of improved access to the right ovary.
 - b. the omentum covers viscera on the right.
 - c. the jejunum obscures the approach from the left.
 - d. the right liver lobe is smaller.
4. The lateral flank approach is contraindicated in animals younger than 12 weeks of age because of
 - a. reduced ability to metabolize anesthetic drugs.
 - b. a relative increase in adipose tissue within the dorsal flank region.

- c. increased risk of hemorrhage from the ovarian pedicles.
 - d. difficulty in exposing the uterine body.
- 5. The decision to use the lateral flank approach in dogs should be made on an individual basis because of wide variation in**
- a. the timing of estrous cycles.
 - b. body conformation.
 - c. mammary gland development.
 - d. the location of the ovaries and uterine horns.
- 6. Which of the following is a disadvantage of the lateral flank approach?**
- a. decreased exposure to the contralateral side of the abdomen
 - b. delayed healing of the incision
 - c. increased likelihood of evisceration if the body wall incision breaks down
 - d. additional ligatures required on the ovarian and uterine pedicles
- 7. Using the lateral flank approach for ovariohysterectomy in feral and stray animals is advantageous because**
- a. of the ease of monitoring anesthesia.
 - b. the incision can be observed from a distance after surgery.
 - c. less time is needed to prepare the flank for surgery.
 - d. the procedure is easier for right-handed surgeons.
- 8. To perform the lateral flank approach, the**
- a. skin incision should be made directly caudal to the last rib to avoid the superficial vessels.
 - b. oblique muscles should be sharply incised in a dorsoventral direction.
 - c. skin incision should be made in a dorsoventral direction just caudal to the midpoint between the last rib and iliac crest.
 - d. subcutaneous tissue should be dissected in a grid pattern until the abdominal oblique muscles have been reached.
- 9. Using the lateral flank approach in a large, obese dog with wide body conformation is contraindicated because of**
- a. decreased access to the contralateral ovary.
 - b. relative changes in the conformation of the uterus compared with that of smaller dogs.
 - c. increased time necessary for patient preparation.
 - d. increased potential for hemorrhage from the skin incision.
- 10. The lateral flank approach is used more often in cats because**
- a. of their relatively thin body conformation.
 - b. of the decreased likelihood of encountering a distended uterus.
 - c. of the improved ability to break down the tight suspensory ligaments.
 - d. a flank incision is easier to examine in cats after surgery.