

PRESENTATION BROCHURE

Small animal surgery

José Rodríguez

Basic surgical techniques

Advanced surgical techniques

Cardiorespiratory system

Circulatory system

Gastrointestinal system

Genitourinary system

Reproductive system

Endocrine system

Surgery atlas, a step-by-step guide

Surgical techniques

Bloodless surgery



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56 SURGICAL
TECHNIQUES
VIDEOS

This new volume of the collection “Small animal surgery” is a selection of the main surgical procedures explained in the previous volumes. The greatest asset of this book is that it is based on high-quality videos, which accompany each of the surgical techniques. These are classified according to degree of difficulty.

This book is the result of the author’s thorough and careful work and is an essential resource both for veterinary professionals in practice and students of veterinary surgery.



Presentation of the book

A surgical procedure is based on incision, dissection and suturing techniques, which are all manual skills anyone can learn over time through appropriate training and practice. However, being a surgeon does not only mean being dexterous; surgery requires composure, confidence and mental control to face the different situations that may occur during an operation. To obtain the skills necessary to be a good surgeon, a good learning process and continuous professional development are essential, in addition to a good mental preparation.

This seventh volume gathers the surgical procedures most relevant and that most commonly appear in the operating theatre. These techniques, which are organised according to degree of difficulty (basic or advanced), include, among many other, entropion surgery, cystocentesis, neutering, enterotomy, perineal hernia surgery, pericardiectomy or lobectomy.

However, the true asset of this book is the high-quality videos that accompany each of the procedures. This new volume is the result of the author's thorough and careful work and combines technology and science. This provides a new, more immediate and pleasant approach to veterinary medicine and will be a highly useful resource for veterinary professionals and students.

In line with the previous volumes, this book has a highly practical and visual approach. This allows the reader to rapidly recognise the cases described and the different steps of the techniques performed. As previously explained, some of them are simple and can be performed by inexperienced surgeons, while others are more complex and will require more practice from the surgeon. However, videos are an excellent tool and will allow both novices and experts to understand the true "magic" of surgery.

The book you have in your hands is based on the wide experience of its author and all his collaborators in the operating theatre. It is a very useful and practical guide for both veterinary professionals in practice and students of veterinary surgery.

The objective of this seventh volume was to show surgery from a more updated, pleasant and innovative point of view. The aim of the videos is to make surgery simpler to the veterinary practitioner and ensure complications are minimised as much as possible and recovery is fast and easy. This will positively contribute to the patient's well-being and that of the surgeon.

This excellent, practical and innovative book should be present in the library of anyone wishing to become a skilled veterinary surgeon and of experienced professionals in this field.



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Ophthalmic surgery. Entropion

José Rodríguez, Carolina Serrano, Amaya de Torre,
Cristina Bonastre, Ángel Orillés

Prevalence	■	■	■	■	■
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Hotz-Celsus blepharoplasty

The Hotz-Celsus blepharoplasty is the technique of choice in cases of congenital entropion. It consists of the resection of a half-moon piece of skin in the inverted part of the eyelid, which is then sutured back into its normal position.

Entropion

Entropion is the folding or inversion of the eyelid into the eye, resulting in hairs touching, irritating and injuring the conjunctiva and cornea (Fig. 1). It can be caused by:

- Over-development of the palpebral skin.
- Sinking of the eyeball into the socket.
- Increased eyelid weight.
- Excessive skin laxity.
- Malformation of the palpebral fold.

The clinical signs observed are:

- The animal rubs at its face.
- Epiphora.
- Blepharospasm.
- Anophthalmia.
- Palpebral dermatitis due to continuous contact with tears.
- Redness of the eye due to hyperemia of the conjunctival vessels.
- Corneal injury and edema.
- Vascularization and corneal melanosis in chronic cases.

Fig. 1. Congenital entropion causes eye pain, blepharospasm and excess tear secretion (white arrow) (A), blepharitis (yellow arrow) and corneal injuries (blue arrow) (B).



Basic surgical techniques / Ophthalmic surgery. Entropion

After administering anesthetic drops to remove the blepharospasm, an assessment is made of the amount of skin invading the eye and the most affected palpebral area.

In order to resolve congenital entropion, the surgical technique of choice is an adapted Hotz-Celsus blepharoplasty (Figs. 2-6). This involves the resection of a crescent shape from the affected palpebral area to return the eyelid to its correct anatomical position (Fig. 2).

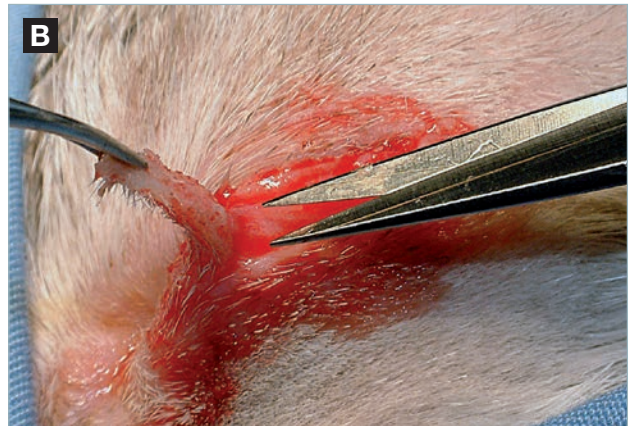
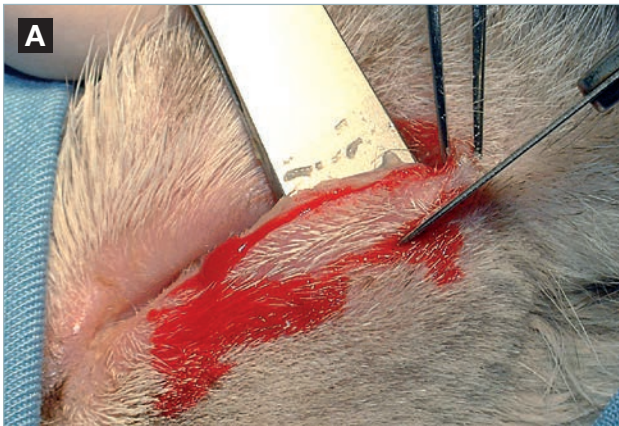


Fig. 2. The modified Hotz-Celsus blepharoplasty removes the section of skin causing the entropion. The first incision is made approximately 1-2 mm from the edge of the eyelid, and the second is made at a distance determined prior to the procedure, to remove excess skin and position the edge of the eyelid correctly.

The eyelids are highly vascularized, and this surgery causes considerable bleeding. Postoperative inflammation is very common.



Watch this video
[Congenital entropion \(Hotz-Celsus blepharoplasty\)](#)



This procedure causes hemorrhage as the eyelids are highly vascularized. In this case, bleeding is controlled by compression using a gauze sponge.

Palpebral sutures are made using simple stitches with fine multi-thread material (5/0 silk), taking care to keep the knots away from the edge of the eyelid in order to prevent the ends from injuring the eye (Fig. 3).

Fig. 3. When using simple stitches, the knots should be kept away from the eye; the tail ends should be left long to remain flexible and not injure the cornea should they touch it.

A one-year-old cat was brought in for an ophthalmic consultation with signs of pain in the left eye as a result of congenital entropion. After topical anesthesia of the eye, it was established that the excess skin measured

approximately 2-3 mm. The rest of the ophthalmological examination was normal. The surgical technique required in this case is a Hotz-Celsus blepharoplasty.

Bleeding can be avoided and the Hotz-Celsus blepharoplasty simplified using a CO₂ laser to make incisions and resect the affected skin. This is done as follows:

- The surface of the eye is protected with a layer of cotton wool soaked in saline solution.
- The lower point of the second incision is marked as a reference point (Fig. 1).
- The skin of the eyelid is held taut using a palpebral spatula covered with a gauze soaked in saline solution to absorb the energy from the CO₂ laser in case of impact. The first incision is made at 1-2 mm from the edge of the eyelid (Fig. 2).

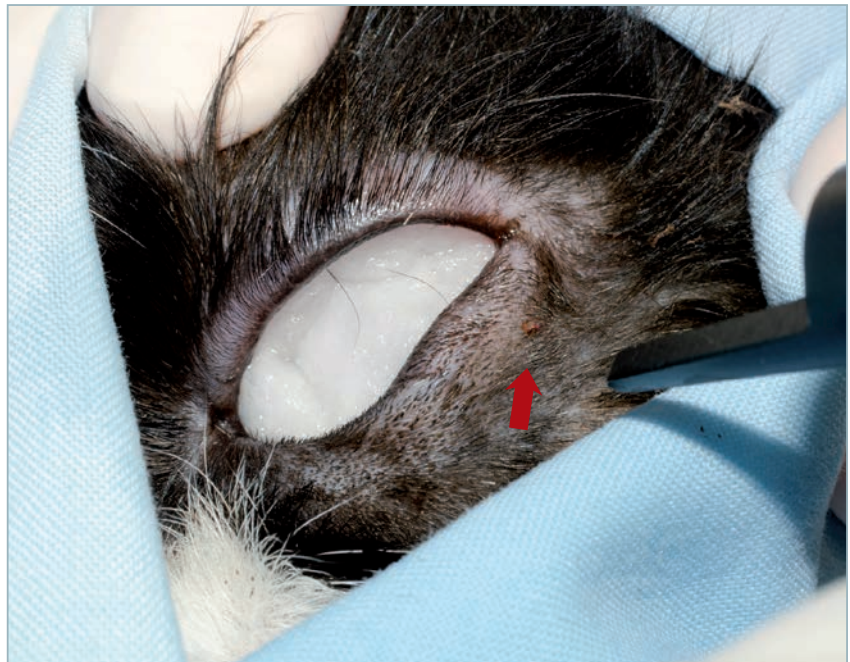


Fig. 1. The cornea is protected with a layer of cotton wool soaked in saline solution. The lower edge of the second incision line is marked to establish the skin area to be resected.

In this case the CO₂ laser was used in continuous mode and continuous wave, with an output of 5 W.

- The second incision is made between the ends of the previous incisions and the point initially marked as the bottom point of the V of this incision (Fig. 3).



Fig. 2. The first skin incision is made approximately 1.5 mm from the palpebral edge, keeping the skin tense using a spatula wrapped in a dampened gauze.



Fig. 3. The second incision connects the two ends of the first incision with the mark initially made to establish the extent of the resection.



- The skin marked by the previous incisions is also resected using a slanting laser beam to cause minimal damage to the orbicular muscle (Figs. 4 and 5).

Fig. 4. With the CO₂ laser the resection of the skin from the eyelid is bloodless.



Surgical laser hastens and simplifies palpebral surgery, as there is no intraoperative bleeding (Fig. 5).

Fig. 5. This image shows the immediate result of the skin resection using laser.



- In these cases the authors do not suture the palpebral incision, leaving it to heal by second intention (Fig. 6).

Fig. 6. Result of the above procedure in the immediate postoperative period.

Surgical techniques in small animals

After surgery an antibiotic and anti-inflammatory ointment should be applied three times a day for one week.

The final result is satisfactory as can be seen in other cases employing the same technique without sutures, such as a Shar Pei (Fig. 7) and a Pug (Fig. 8)



Fig. 7. Images of a Hotz-Celsus blepharoplasty performed using CO₂ laser on a Shar Pei, 24 hours (A) and 12 days after surgery (B).



Fig. 8. Images of a Hotz-Celsus blepharoplasty performed using CO₂ laser and a medial canthoplasty in a Pug, 4 days (A) and 10 days (B) after surgery.

Ovariohysterectomy

José Rodríguez, María José Martínez

Prevalence



Ovariohysterectomy (OVH) or **spay** is defined as the complete surgical removal of the uterus and the ovaries.

In pets, owner demand for this intervention is relatively high, mainly in order to control the population and to eliminate sexual behaviour during estrus. There are many other indications, for instance prevention and treatment of uterine and mammary disorders like pyometra, metritis, uterine and mammary neoplasia, uterine torsion or prolapse (Figs. 1 and 2).

Early spaying, before the first estrus, appears to reduce the risk of mammary tumors in later years, because hormonal influence on the development of this type of neoplasia is important.

Sometimes OVH is indicated to aid in the control of systemic disease, for instance diabetes mellitus or behavioral changes.

Removal of the female reproductive tract is possibly the most common surgical intervention in females in veterinary practice.

Fig. 1. Significant uterine distension caused by a pyometra.

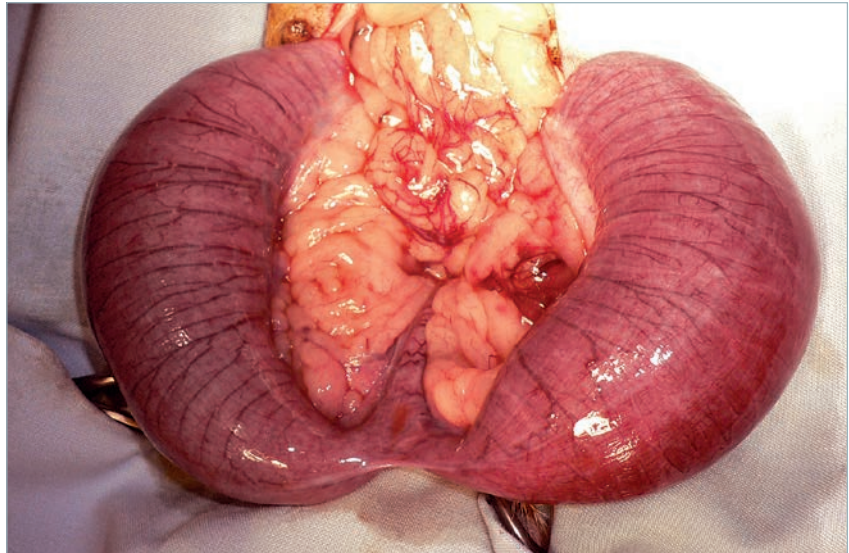
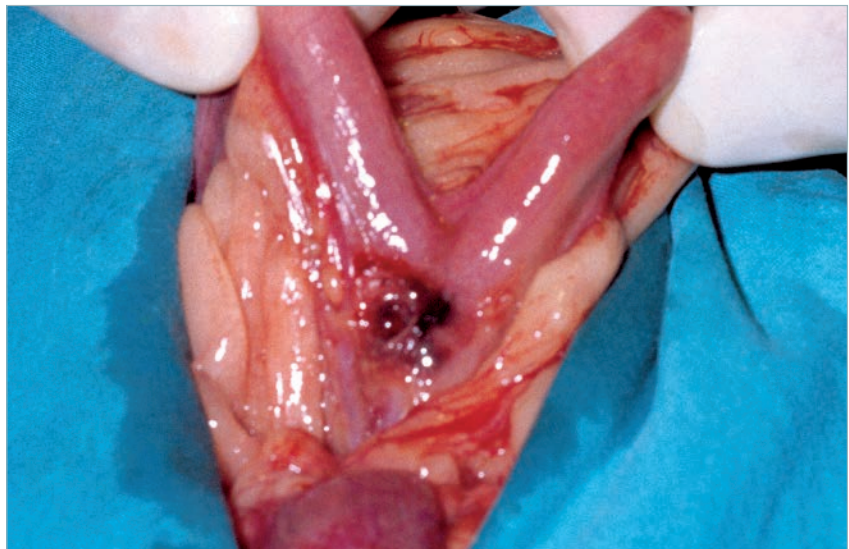


Fig. 2. Iatrogenic perforation of the uterus secondary to artificial insemination.



Ovariohysterectomy in the dog

José Rodríguez , María Eugenia Lebrero

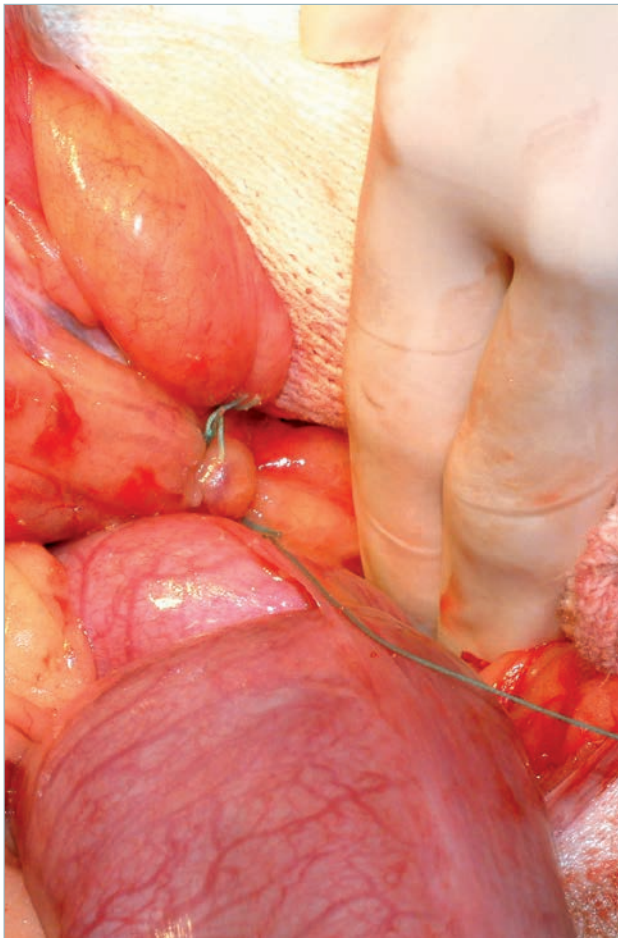


Fig. 1. Obesity is an additional problem in large dogs, because handling of the tissues and visualization of the ovarian vessels becomes difficult.

Technical difficulty

The difficult part of this surgery is the exteriorization of the ovaries and ligation of the ovarian pedicles, which are located deep in the abdomen. This becomes even more difficult in large and obese patients, when the operation can be challenging (Fig. 1).

To access the ovaries and uterus, a midline laparotomy is performed from the umbilicus to the pubic symphysis. For a routine OVH, an incision of this length is often unnecessary.

A full bladder makes visualization of the uterus difficult and may hamper the surgery. Empty it before starting.



Remember that traction on the suspensory ligament may cause a vagal reflex with cardiac consequences.

Exteriorization of the right ovarian pedicle is slightly more difficult, because it is located in a more cranial position to the left pedicle. In patients with a large amount of adipose tissue, the correct anatomical identification of the ovary and its pedicle is more difficult.



The ovarian pedicles are exteriorized, generally starting with the right pedicle, which is slightly more difficult. To do so, gentle but firm traction is applied to the uterine horn (Fig. 2).

Fig. 2. First, the ovaries are identified. Both are located inside the ovarian bursa, caudal to the kidneys, and are connected to the abdomen by the ovarian pedicles.

Where the ovary joins the abdominal wall, the different structures in the adipose tissue should be identified: the suspensory ligament of the ovary and the ovarian vessels. The vessels that form the ovarian pedicle should be ligated separately with an absorbable monofilament material of appropriate size (Fig. 3).

With a dissector, a hole is made in the mesovarium and the ligature for the suspensory ligament is passed through (Fig. 4). The ligament is then clamped distally with mosquito forceps and sectioned with scissors (Fig. 5).

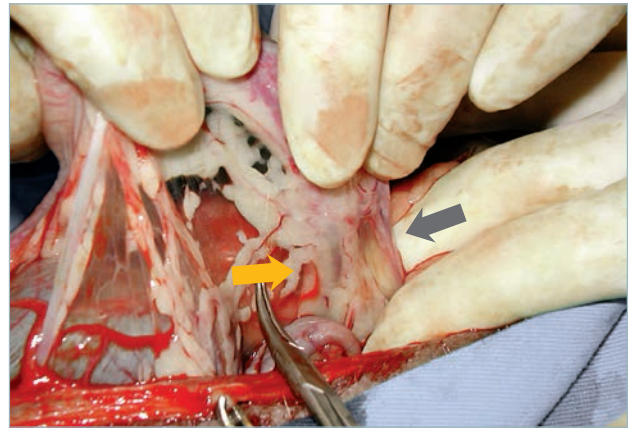


Fig. 3. The ovarian pedicle contains the ovarian artery and vein, which follow a tortuous course (orange arrow), and the ovarian suspensory ligament (grey arrow), which may be identified by its yellow-white color and tense structure. It is attached to the caudal pole of the kidney and has its own vascularization.

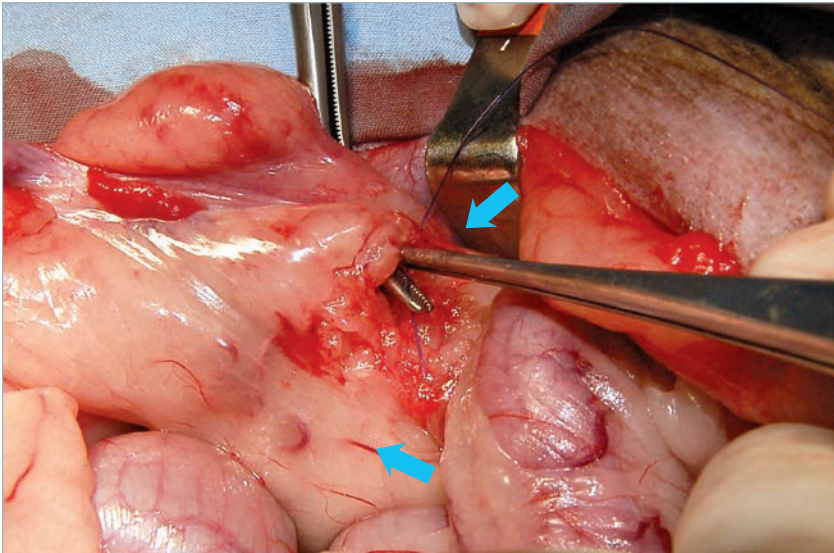
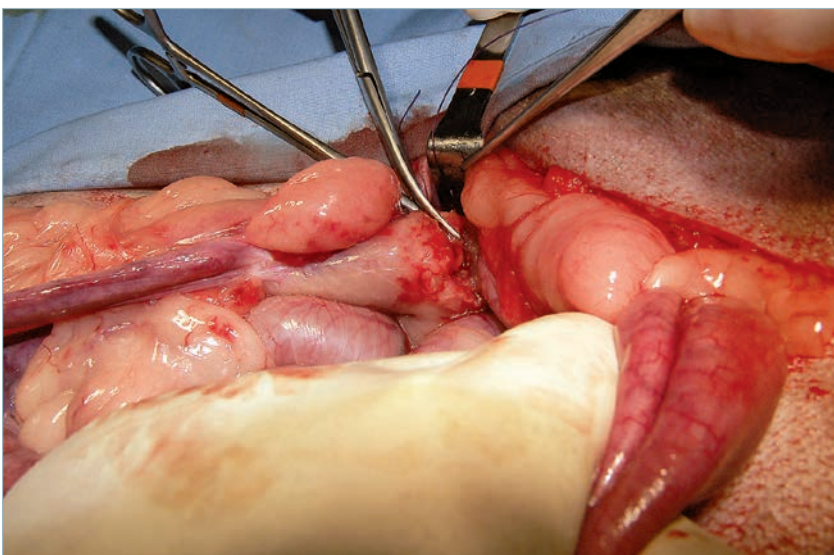


Fig. 4. Using a blunt dissection, a window is made in the mesovarium next to the suspensory ligament. Through this hole, a monofilament absorbable ligature is passed around the suspensory ligament.



Some surgeons prefer to tear off the ligament without any ligature. Remember that this may cause hemorrhage, in particular in large patients.

Fig. 5. After tying the ligature, the ligament is cut between the ligature and the mosquito clamp that has been placed distally in order to avoid hemorrhage of the vessel that accompanies the suspensory ligament.

Surgical techniques in small animals

Next, the cranial and caudal sides of the PDA are dissected free in preparation for the placement of two ligatures of a non-absorbable multifilament material around the ductus (Figs. 3-5).

Fig. 3. After ventral retraction of the vagus nerve and dissection of the PDA, two ligatures of a non-absorbable multifilament material are placed.

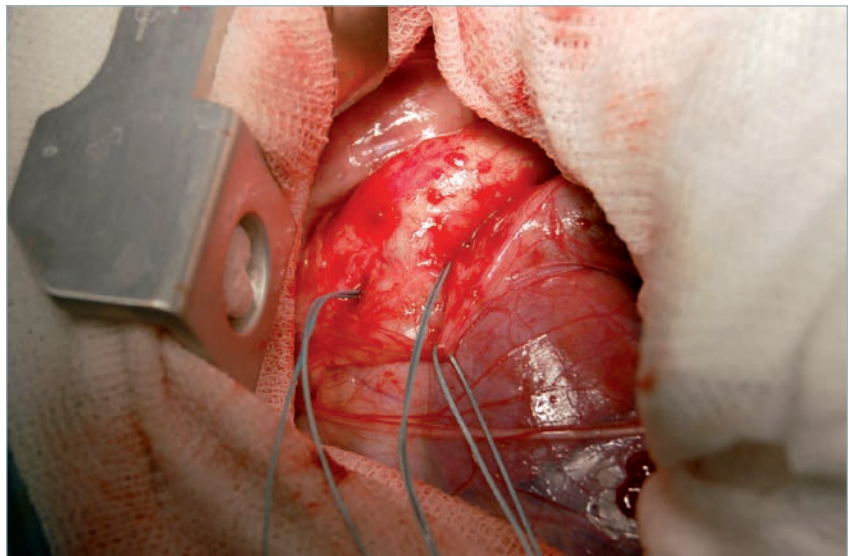


Fig. 4. The ligatures should be kept apart and not cross on the right side of the PDA. They should remain independent and as far from each other as possible.

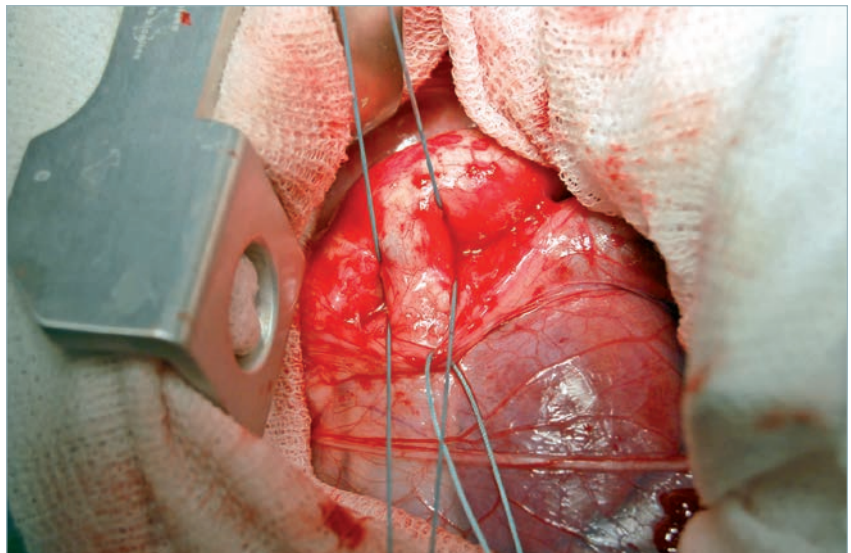
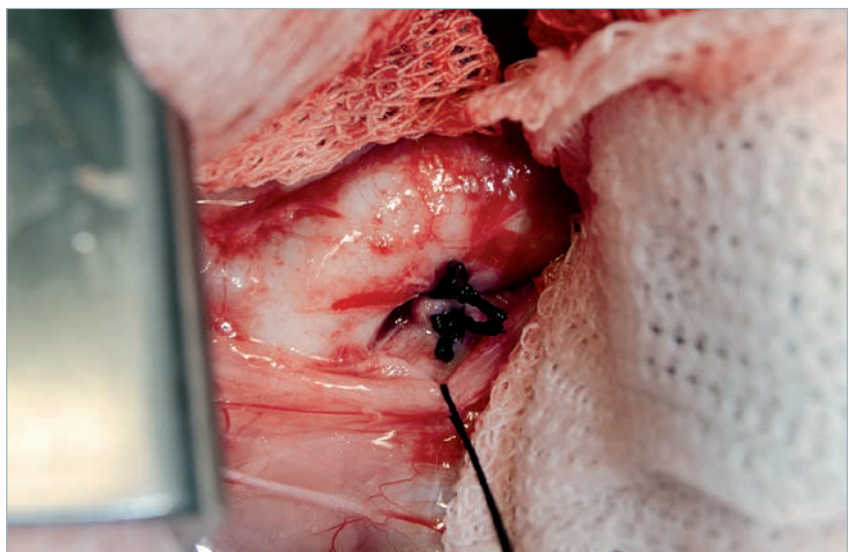
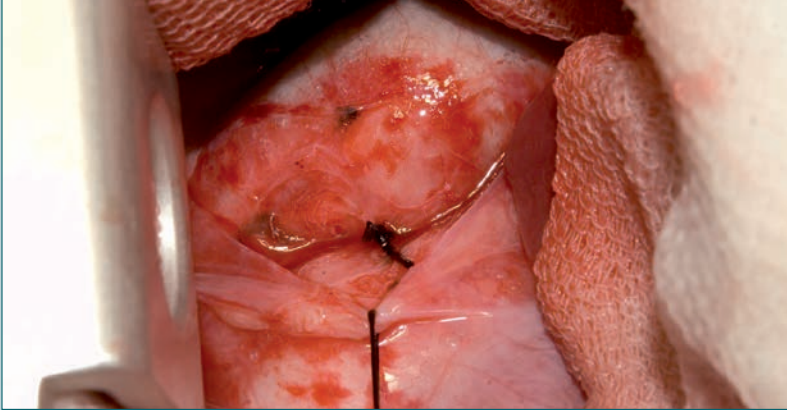


Fig. 5. Ligated ductus. The ligature closest to the aorta is tied first, and the second ligature is tied as far away as possible from the first.



Advanced surgical techniques / Patent ductus arteriosus (PDA)

In some patients, the ductus is very short and only a single ligature can be placed. In this case, the surgeon should be extremely careful, because the vascular structures are very fragile.



If the ligature provokes a Branham reflex, it should be loosened, then re-tied more gradually. An alternative is the use of atraumatic forceps to clamp the PDA prior to tying the ligature.

To place ligatures around the PDA, either of the techniques that will be described below may be chosen. They both have advantages and disadvantages that the surgeon should understand and assess for each case.

Circumferential ligature

Without opening the pericardial sac, the cranial side of the PDA between the aorta and the pulmonary trunk, and the caudal side between the aorta and the left pulmonary artery are dissected (Figs. 6 and 7).

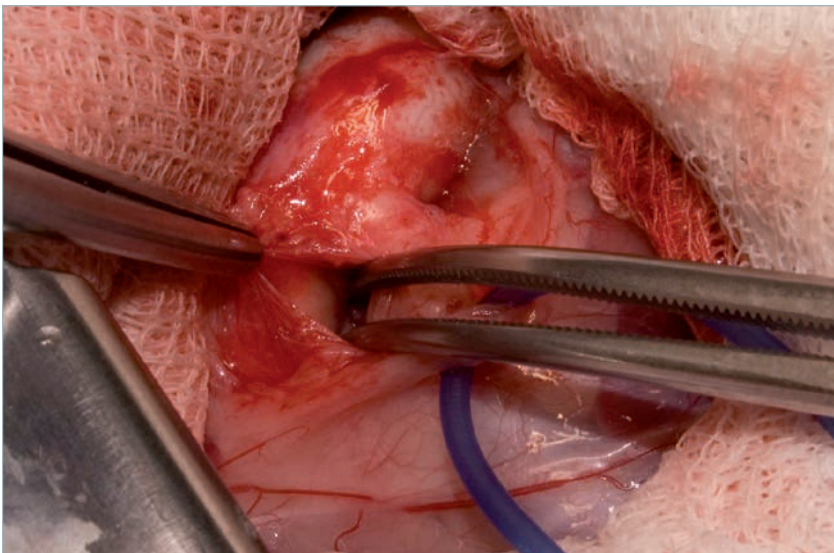


Fig. 6. Cranial dissection of the PDA with right-angle forceps. From this position, the cranial aspect of the ductus is dissected, angling the forceps over 45° in a caudal direction.

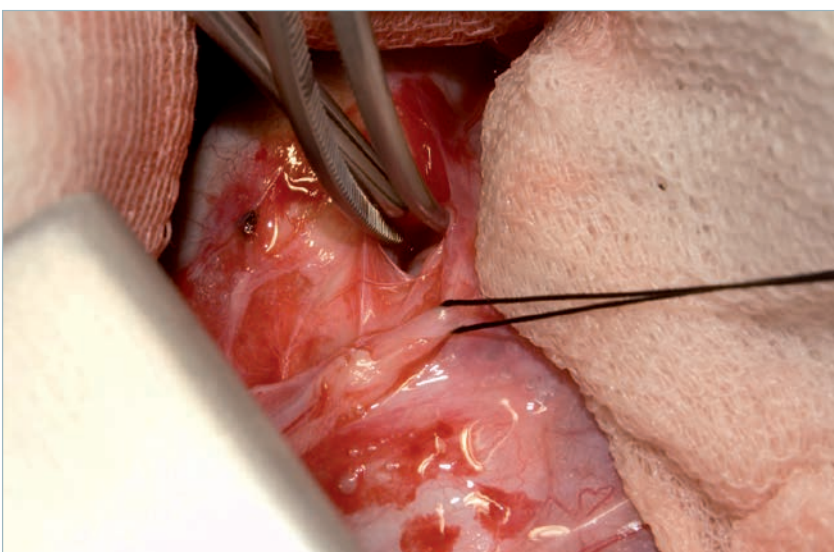


Fig. 7. A careful dissection between the PDA and the pulmonary artery is performed, with special attention so as not to damage the left recurrent laryngeal nerve that runs behind the PDA, or the right pulmonary artery (not visible in this figure).

Surgical techniques in small animals

As much as possible of the fibrous tissue that surrounds the ductus should be dissected away to ensure ligature stability and complete closure of the PDA.

Using angled forceps, the PDA is dissected carefully and gradually from the caudal side towards the cranial side, until the tip of the forceps can be palpated and observed on the cranial side (Fig. 8). Dissection is achieved by opening the jaws of the forceps no more than a few millimeters (2 or 3 mm) in order to avoid tearing the wall of the PDA, the aorta or the right pulmonary artery.

Great care should be taken when dissecting the right side of the PDA, because it is done blindly around vessels that may have weakened walls that rupture easily.

Next, the suture is picked up with the forceps and passed behind the PDA; this should be done slowly to avoid the sawing effect of multifilament material (Figs. 3 and 4).

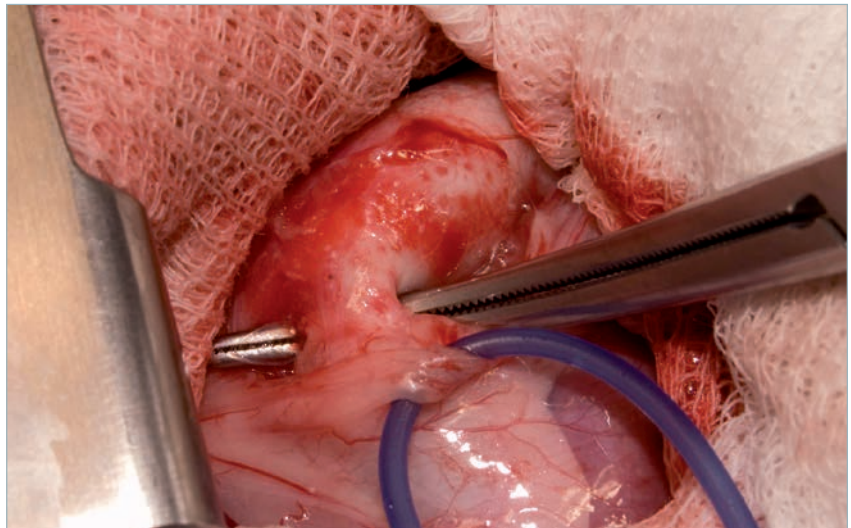


To avoid the sawing effect of multifilament thread, it should be moistened in saline or impregnated with coagulated blood.

If the forceps do not pass smoothly through the tissue, the mediastinum has been clamped; do not use force or pull, but open the jaws and repeat the procedure as many times as necessary until the forceps slide through correctly.

The same procedure is used to pass a second ligature. As an alternative, a loop of suture material may be passed that is then cut to obtain two sutures (Fig. 4).

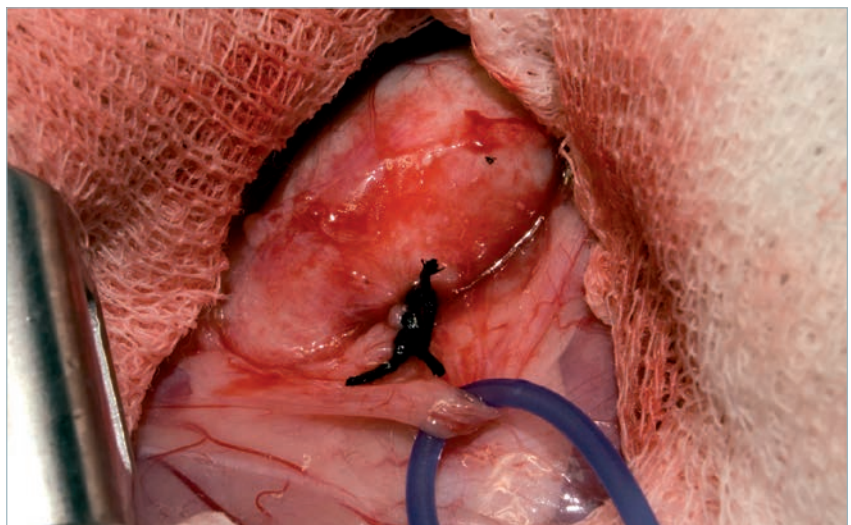
Fig. 8. The medial side of the PDA is dissected slowly and carefully, passing the forceps from caudal to cranial. This should be done with extreme care to avoid tearing the walls of the vessels.



The ligatures should be independent; they should not cross on the medial side of the PDA.

The ligature closest to the aorta should be tightened slowly and carefully, but firmly, followed by the ligature close to the pulmonary artery (Fig. 9).

Fig. 9. The PDA has been occluded with two ligatures of 0 silk.



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