

**CASE REPORT: SURGICAL TREATMENT OF PARAMEDIAN VENTRAL
HERNIA IN MIXED BREED DOGS****Laporan Kasus: Penanganan Bedah Hernia Ventralis Paramedian Pada Anjing Ras
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of paramedian ventral hernia in mixed breed dogs. *Bul. Vet. Udayana*. 18(4): 1012-1022.DOI: <https://doi.org/10.24843/bulvet.2026.v18.i04.p25>**Abstract**

A paramedian ventral hernia is a condition in which an organ or intraabdominal tissue is exited through a ring on the ventral abdominal wall located on the paramedian side adjacent to the mammary area. This case study aims to find out how to diagnose and treat cases of paramedian ventral hernia in female dogs. A white mixed-breed female dog, 5 years old and weighing 4.9 kg with clinical signs of a lump in the ventral paramedian abdomen after 6 months of labor. A radiographic examination (X-ray) to support the diagnosis shows a radiolucent image of the lump area. The dog was diagnosed with a paramedian ventral hernia with a fausta prognosis that was suspected to contain fatty tissue (omentum). Treatment was carried out with herniorrhaphy surgery to reposition the contents of the hernia into the abdominal cavity by induction of a combination of xylazine (1 mg/kg BW) and ketamine (5 mg/kg BW). The closure of the hernia ring is performed with a simple broken suture pattern, followed by subcutaneous suture with a subcutaneous suture pattern, and the skin is sutured with a simple broken suture pattern using a 2-0 Polyglycolic acid thread. Postoperatively, the antibiotic cefotaxime sodium (20 mg/kg BW, IV, q12h) was given for 3 consecutive days and continued with Cefixime (10 mg/kg BW, PO, q12h) for 5 days, and mefenamic acid analgesics (75 mg/kg BW, q8h, PO) for 3 days. In addition, dogs are also given antibiotic ointments containing neomycin sulfate and bacitracin zinc. On the 14th day, the dog was declared cured with a fused surgical wound and completely dried, normal appetite and drinking, defecation and fluent urination. It is recommended for owners not to underestimate this condition and immediately do tanning so as not to interfere with the dog's activities.

Keywords: paramedian ventral hernia, dog, herniorrhaphy

Abstrak

Hernia ventralis paramedian merupakan kondisi keluarnya organ atau jaringan intraabdomen melalui cincin pada dinding abdomen bagian ventral yang terletak di sisi paramedian berdekatan dengan daerah mammae. Studi kasus ini bertujuan untuk mengetahui cara mendiagnosa dan penanganan kasus hernia ventralis paramedian pada anjing betina. Seekor anjing betina ras campuran berwarna putih, berumur 5 tahun dan bobot badan 4,9 kg dengan tanda klinis adanya benjolan pada ventral paramedian abdomen pasca melahirkan sejak 6 bulan. Pemeriksaan radiografi (X-ray) untuk mendukung diagnosa, menunjukkan adanya gambaran radiolucen pada daerah benjolan. Anjing didiagnosis menderita hernia ventralis paramedian dengan prognosis fausta yang diduga berisi jaringan lemak (omentum). Penanganan dilakukan dengan pembedahan herniorafi untuk mereposisi isi hernia ke dalam rongga abdomen dengan induksi anestesi umum kombinasi xylazin (1 mg/kg BB) dan ketamin (5 mg/kg BB). Penutupan cincin hernia dilakukan dengan pola jahitan sederhana terputus, dilanjutkan dengan menjahit subkutan dengan pola jahitan subkutikuler, dan kulit dijahit dengan pola jahitan sederhana terputus menggunakan benang *Polyglycolic acid* 2-0. Pascaoperasi diberikan antibiotik cefotaxime sodium (20 mg/kg BB, IV, q12h) selama 3 hari berturut-turut dan dilanjutkan dengan pemberian Cefixime (10 mg/kg BB, PO, q12h) selama 5 hari, serta analgesik asam mefenamat (75 mg/kg BB, q8h, PO) selama 3 hari. Selain itu, anjing juga diberikan antibiotik salep yang mengandung neomisin sulfat dan bacitracin zinc. Pada hari ke-14, anjing dinyatakan sembuh dengan luka operasi menyatu dan mengering sempurna, nafsu makan dan minum normal, defekasi dan urinasi lancar. Disarankan bagi pemilik untuk tidak menyepelekan kondisi ini dan segera melakukan penanganan sehingga tidak mengganggu aktivitas anjing.

Kata kunci: hernia ventralis paramedian, anjing, herniorafi

INTRODUCTION

Dogs are one of the most popular pets kept for their roles as companions, guard dogs, and working animals; therefore, their health and well-being are a major concern in veterinary medicine (Andini *et al.*, 2019). Diseases in dogs can be hereditary or acquired from external sources, such as those caused by viruses, bacteria, and fungi, or those resulting from trauma (Slatter, 2003). One such disease that can occur in dogs and is caused by trauma is a hernia.

A hernia is an abnormal condition caused by the protrusion of a visceral organ from its normal location through a gap or opening into another body cavity (Rizk & Samy, 2016). Hernias can be caused by trauma or congenital (inborn) anatomical factors (Wandira *et al.*, 2026). A hernia has three main components: the hernia ring or opening, the hernia sac, and the hernia contents. Organ tissue or fat can protrude through the hernia ring and enter the hernia sac when pressure is applied, with the size of the ring varying from millimeters to centimeters (Hassen *et al.*, 2017). Generally, hernias are divided into two groups: true hernias and false hernias (Sasmita *et al.*, 2019). True hernias are characterized by a protrusion visible from the outside, with the following criteria: the presence of an opening or ring, a sac, and hernia contents (visceral/abdominal organs), such as in umbilical hernias, ventral hernias, scrotal hernias, and inguinal hernias. In pseudohermias, the protrusion is not visible from the outside, and the hernial opening is located within the abdominal cavity, as seen in diaphragmatic hernias and hernias of the nucleus pulposus (HNP) (Safitri *et al.*, 2025). Hernias can be classified based on their location and the contents of the hernia itself. Based on location, hernias are classified as diaphragmatic, ventral or lateral abdominal, inguinal or scrotal, umbilical, perineal, pelvic, and femoral hernias, while based on their contents, hernias include enteroceles, epiploceles/omentoceles, enteroepiploceles, gastroceles, vesicoceles, hepatoceles, and

hysteroceles (Hassen *et al.*, 2017). The occurrence of a hernia can cause other organs, such as the large intestine, urinary bladder, or nerves, to become trapped, resulting in constipation, urinary disorders, or sexual dysfunction (Vidiastuti, 2017).

A ventral hernia is an abnormality in the ventral part of the abdomen characterized by a bulge resulting from incomplete closure of the abdominal wall, leading to the formation of a hernia opening or ring. Ventral hernias can occur in the anterior and lateral parts of the abdominal wall, as well as in the paramedian region (Shannen *et al.*, 2021). The paramedian ventral hernia in this case is located on the lateral side of the linea alba and is adjacent to the mammary region. This condition can result from increased intra-abdominal pressure, one of the causes of which is pregnancy and childbirth. The postpartum period, particularly when accompanied by excessive stretching of the abdominal wall, incomplete tissue involution (shrinkage), or unnoticed minor trauma, can lead to abdominal wall weakness and ultimately result in a hernia several months later. Postpartum hernias are often reported to develop gradually and are not detected until the hernia enlarges or causes discomfort in the animal (Fossum, 2019).

A diagnosis of paramedian ventral hernia in dogs is generally established through a medical history, a physical examination involving palpation of a soft, reducible mass, and observation of changes in the hernia's size. A physical examination is necessary to detect the presence of a hernial ring, and diagnostic tests such as radiography or ultrasonography may also be performed (Wandira *et al.*, 2026). Diagnostic tests such as radiography may also be performed to assess the contents of the hernia, confirm organ viability, and aid in surgical planning (Spencer & Tobias, 2018). The surgical procedure performed in this case was herniorrhaphy. Herniorrhaphy is a surgical technique aimed at returning the hernia contents to their normal anatomical position and closing the ring or opening in the abdominal wall using primary sutures or reinforcing materials such as mesh in certain cases (Fossum, 2019).

Based on this background, this case report will discuss the management of postpartum paramedian ventral hernia in a mixed-breed dog, including herniorrhaphy surgery and postoperative care. This case report aims to contribute to the body of knowledge regarding the diagnosis, surgical procedures, and postoperative management of paramedian ventral hernias in female dogs resulting from postpartum trauma. Additionally, it is hoped that this case report will serve as a source of information and provide education to pet owners about paramedian ventral hernias, as well as the appropriate management and care following surgery.

RESEARCH METHODS

Signalment and Anamnesis

The dog in this case is a 4-year-old female Maltese mix who has not been spayed, weighs 4.9 kg, and has white hair. The dog was brought in with a complaint of a lump on the left side of the abdomen near the nipple, as shown in Figure 1. According to the owner, the lump had been noticed 6 months after giving birth. Initially, the lump appeared small, but it gradually grew larger over time. At one point, the lump could be pushed back into the body, and a hollow space was felt. The dog showed no signs of pain; it appeared active and agile, with a good appetite and thirst, and normal defecation and urination. The dog had also received a complete vaccination series and regular deworming treatments. The dog was kept in a semi-indoor environment.

Physical Examination

A thorough physical examination was conducted to determine whether the dog exhibited any clinical signs. The examination involved inspection, palpation, and auscultation. The inspection was aimed at identifying any abnormalities on the dog's body through the five

senses. Palpation, performed by hand, was used to detect changes or abnormalities across the dog's entire body—such as the presence of masses or lumps—and to assess their consistency. Auscultation was performed on the thoracic and abdominal cavities to gather information regarding the case dog's respiratory, circulatory, and digestive systems.

Auxiliary Test

The diagnostic tests performed in this case to confirm the diagnosis and prognosis of the disease were radiography (X-ray). In addition, routine hematological tests were conducted to assess the dog's health status prior to surgery.

Radiographic Examination (X-Ray)

The radiographic examination was performed at the Udayana University Veterinary Teaching Hospital. X-rays were taken of the abdominal region with the dog positioned in the right lateral recumbent position, using a beam setting of 46 kilovolts (kV) and 10 milliamperere-seconds (mAs).

Routine Hematology Examination

The routine hematology examination for the case dog was performed by drawing a 3-ml blood sample from the cephalic vein, placing it in an EDTA tube, and analyzing it using a blood hematology analyzer at the Tridatu Animal Clinic in Denpasar.

RESULTS AND DISCUSSION

Physical Examination

The pre-examination findings for the case dog revealed a body temperature of 38.6 °C, a heart rate of 108 beats per minute, a respiratory rate of 30 breaths per minute, a pulse rate of 104 beats per minute, a capillary refill time of < 2 seconds, and normal skin turgor. Other examination findings showed normal oral mucosa and conjunctiva, normal cranial and caudal extremities, and normal skin, feces, urine, respiratory system, circulatory system, and reproductive system. However, during the physical examination—conducted via both inspection and palpation of the abdominal area—a mass was found in the left abdominal region of the case dog, located in the ventral paramedian area. Upon palpation, the mass was soft in consistency, could be pushed back in and popped back out, and a hernial ring was identified.

Radiographic (X-ray) Examination

The X-ray revealed a mass in the ventral abdomen suspected to consist of fatty tissue, along with a hernial ring, indicating that the mass was a hernia (Figure 2A).

Routine Hematology Examination

The results of the routine hematology examination indicate that the animal has mild lymphocytosis and mild normocytic normochromic anemia. The mild lymphocytosis is caused by mechanical trauma (inflammation) to the intestine or trapped omentum, which triggers the release of cytokines that stimulate lymphocyte proliferation. The parameters of particular concern regarding the surgical procedure are white blood cells (WBC), red blood cells (RBC), and platelets. The results of the routine hematology examination indicate that the animal has mild lymphocytosis and mild normocytic normochromic anemia. Based on these results, the changes in the values obtained were not significant enough to preclude the dog from undergoing surgery. The results of the routine hematology examination are shown in Table 1.

Diagnosis and Prognosis

Based on clinical signs, medical history, physical examination findings, and supporting tests, the dog was diagnosed with a paramedian ventral hernia with a good prognosis.

Treatment

Management treatment of the case dog involved performing a herniorrhaphy to reposition the hernia contents into the abdominal cavity. The case dog was fasted from food for 12 hours and from water for 8 hours prior to surgery to reduce the gag reflex and urination during the surgical procedure. The surgical site was prepared by thoroughly shaving the hair with clippers. Next, a sodium solution was administered via a 24G IV catheter inserted into the anterior cephalic vein. Next, the dog was administered atropine sulfate at a dose of 0.02 mg/kg BW subcutaneously (SC). After 10–15 minutes, general anesthesia was induced using a combination of xylazine at a dose of 1 mg/kg BW and ketamine at a dose of 5 mg/kg BW, administered intravenously (IV). Once the dog was anesthetized, it was placed on an operating table lined with a sterile underpad in the dorsal recumbent position. The shaved surgical site was disinfected using chlorhexidine to remove dirt and dust, followed by application of 70% alcohol, then povidone-iodine, and the placement of surgical drapes to minimize contamination during the procedure.

The herniorrhaphy procedure was performed by carefully making an incision in the skin and subcutaneous tissue directly above the hernia to avoid damaging the hernia contents. In this case, the hernia contents consisted of fat (omentum) that had protruded and adhered to the hernial ring; therefore, a portion of the omentum was excised, followed by the identification of the hernial orifice (Figure 2B). The hernia orifice that was successfully located had a diameter of approximately 2 cm. Subsequently, a portion of the omentum was debrided, and the omentum was repositioned back into the abdominal cavity. Before closing the hernia orifice, a new wound was created at the edges of the orifice by excising the surrounding tissue. This was done to accelerate wound healing. The hernia orifice was then closed using simple interrupted sutures with 2-0 polyglycolic acid suture material. The subcutaneous layer was sutured using subcutaneous sutures with 2-0 polyglycolic acid suture material, followed by verification that no gaps remained, and the skin was closed with simple interrupted sutures. The area around the surgical site is cleaned with 0.9% saline solution, and the suture site is treated with povidone-iodine, then covered with sterile gauze and a bandage (Hypafix®, BSN Medical GmbH, Hamburg, Germany).

Postoperative Care

Postoperatively, the dog in this case was administered the antibiotic cefotaxime sodium at a dose of 20 mg/kg BW intravenously twice daily (IV, q12h) for 3 days (day 0 through day 2), the analgesic mefenamic acid at 75 mg/kg BW orally three times a day (PO, q8h) for 3 days (day 0 through day 2), followed by the antibiotic cefixime at 10 mg/kg BW orally twice a day (PO, q12h) for 5 days (day 3 through day 7). Postoperative wound care was performed by applying povidone-iodine and a topical antibiotic ointment containing neomycin sulfate and zinc bacitracin 5 mg (Enbatik®, Erela, Semarang, Indonesia) once daily.

Evaluation

In this case, the dog was observed for 14 days postoperatively. The dog's condition on day 0 postoperatively showed that appetite, thirst, urination, and defecation had not yet returned to normal. Therefore, supportive therapy with NaCl intravenous fluids was administered. Appetite and thirst began to normalize on day 1 postoperatively, while the surgical incision site appeared swollen, had not yet dried, and was red. Observations over the 14-day period showed

that inflammation in the surgical wound area was observed from day 1 through day 3; the inflammation began to subside from day 4 through day 6; and from day 7 through day 13, the wound gradually began to close and dry out. The area around the incision site was no longer swollen, and the redness had disappeared. On the 14th day, the wound had healed well, as indicated by the absence of swelling and redness, and the dog was in good health with a normal appetite and thirst. The results of the postoperative wound observation are shown in Figure 3.

Discussion

The dog in this case was diagnosed with a paramedian ventral hernia containing fatty tissue (omentum) that developed 6 months after giving birth. A paramedian ventral hernia is one type of ventral hernia classified based on the location of the defect (Shannen *et al.*, 2021). This condition arises as a result of a traumatic event that causes the abdominal wall to rupture and the contents of the abdominal cavity—such as the intestines and omentum—to protrude (Safitri *et al.*, 2025). In this case, the protruding abdominal contents consisted of fatty tissue because the hernia opening was very small; however, it is possible that the hernia opening could enlarge, allowing the intestines to protrude through it.

Clinically, a hernia is characterized by the presence of a soft lump in the abdominal region that generally does not cause pain and can be reduced (Fossum, 2019). Hernias are also classified based on the ability of the hernia contents to return to the abdominal cavity, namely reducible and irreducible. A reducible hernia is characterized by hernia contents that can be pushed back into the abdominal cavity, whereas an irreducible hernia is characterized by hernia contents that cannot be returned to their normal position, which can lead to strangulation, ischemia, and, in severe cases, gangrene (Wandira *et al.*, 2026). In this case, the hernia was reducible. Although the hernial opening was quite small and required partial excision of the protruding omentum, the remaining omentum could still be repositioned back into the abdominal cavity.

In cases of paramedian ventral hernias, one of the contributing factors is traumatic injury (Shannen *et al.*, 2021). In this case, a key predisposing factor was postpartum trauma in the affected dog. During pregnancy and lactation, the abdominal wall and tissues surrounding the mammary glands undergo stretching due to increased intra-abdominal pressure and hormonal changes (Slatter, 2003). This condition can cause weakness in the abdominal muscles, particularly the rectus abdominis muscle and the surrounding fascia, leading to the formation of a hernia in the abdominal wall that may appear several months after childbirth (Spencer & Tobias, 2018).

Management of this condition involves herniorrhaphy surgery. The herniorrhaphy surgical technique is a procedure that involves making an incision directly at the hernia site or along the midline of the body to reduce the protruding organ (Wandira *et al.*, 2026). In this case, the incision was made for a paramedian ventral hernia, specifically directly above the hernia site. This was done to reposition the hernia contents back into the abdominal cavity and to suture the hernia opening or ring, thereby preventing the abdominal contents from protruding again. Additionally, because the hernia is located in the paramedian region, the incision site was chosen to be directly above the hernia. Possible complications of the surgical procedure include infection at the incision site, reopening of the incision, hematoma, seroma, excessive swelling, recurrent hernia, as well as the risk of sepsis, peritonitis, and mortality (Kan *et al.*, 2022; Maxwell *et al.*, 2021).

Before performing surgery, the procedure begins with the administration of premedication using subcutaneous atropine sulfate. Atropine sulfate is a parasympatholytic or anticholinergic drug that works by blocking muscarinic cholinergic receptors, thereby inhibiting the muscarinic effects of acetylcholine and the muscarinic effects resulting from cholinergic nerve

stimulation, particularly in the postganglionic fibers of the parasympathetic system (Robaj *et al.*, 2014). Additionally, the use of atropine sulfate as premedication aims to facilitate induction, maintenance, and recovery from anesthesia (Sudisma, 2016). General anesthesia in this case was administered using a ketamine-xylazine combination. Ketamine has a strong analgesic effect but provides poor muscle relaxation, which can lead to seizures and mild depression of the respiratory tract (Utami *et al.*, 2024). Xylazine has sedative, analgesic, and muscle-relaxing effects. Therefore, the administration of the ketamine-xylazine combination aims to provide better anesthetic effects (Yudaniayanti *et al.*, 2010). However, the use of this combination in small animals requires caution, as it can cause side effects such as bradycardia, vomiting, tremors, and reduced intestinal motility (Wandira *et al.*, 2026). Once the animal was fully anesthetized, herniorrhaphy surgery was performed. This surgical procedure is performed to make the animal more comfortable during daily activities, as the hernia contents are trapped by the hernia ring or opening, and to improve the animal's appearance (Sasmita *et al.*, 2019).

Postoperative management for the dog in this case involved the administration of antibiotics and analgesics. The antibiotics administered were cefotaxime sodium and cefixime. The administration of antibiotics postoperatively aims to prevent bacterial infections that could lead to secondary infections. Both of these drugs are third-generation bactericidal antibiotics in the cephalosporin β -lactam class. These antibiotics work by inhibiting the synthesis of the bacterial cell wall, thereby reducing the strength and rigidity of the cell wall and disrupting the cell division process (Allerton, 2020). These antibiotics have a broad spectrum of activity against both Gram-negative and Gram-positive bacteria (Sumano *et al.*, 2004). In addition to systemic antibiotics, a topical antibiotic in the form of Enbatik[®] (PT Erlangga Edi Laboratories, Semarang, Indonesia), which contains neomycin sulfate—an aminoglycoside antibiotic used to treat Gram-negative and Gram-positive bacterial infections—and zinc bacitracin, which suppresses bacterial cell wall formation by inhibiting protein synthesis (Mercer, 2022). In addition to antibiotics, the patient was also given the analgesic mefenamic acid. Mefenamic acid belongs to the nonsteroidal anti-inflammatory drug (NSAID) class, which works by inhibiting the cyclooxygenase enzyme, thereby producing analgesic, anti-inflammatory, and antipyretic effects (Andini *et al.*, 2019).

The wound healing process involves both local and systemic cellular and biochemical responses that comprise dynamic and complex processes (Safitri *et al.*, 2025). Several important phases occur during this process. These phases include the inflammatory phase, the proliferation phase, and the remodeling phase (Masir *et al.*, 2012). The inflammatory phase is characterized by tumor (swelling), dolor (pain), rubor (redness), calor (heat), and functiolaesa (impaired function in the inflamed tissue) (Berata *et al.*, 2011). Redness and swelling are associated with the inflammatory phase in the wound healing process. By the end of the inflammatory process, stagnation gradually subsides, fluid circulation resumes, lymphatic circulation becomes active again, and the fibrin formed as a result of the inflammatory process gradually disappears (Sudisma *et al.*, 2006). In this case, inflammation in the surgical wound area was observed from day 1 through day 3. Subsequently, the inflammation began to subside from day 4 through day 7; by day 10, the swelling and redness had disappeared, and the wound appeared to be drying out and closing completely. By day 14, the wound had healed well, as indicated by the absence of swelling and redness at the incision site. According to Bale & Jones (2000), the healing process is not limited to regeneration but is also influenced by endogenous factors, such as age, immunology, medication use, metabolic conditions, and nutrition. In addition, proper wound care, activity restrictions, and adherence to medication therapy are critical to successful healing (Fossum, 2019). In this case, the surgical wound, which had healed by day 14, indicates that postoperative wound care was performed properly.

CONCLUSION AND SUGGESTIONS

Conclusion

Based on the medical history, physical examination, and supportive tests, the dog was diagnosed with a paramedian ventral hernia containing fatty tissue (omentum). Treatment involved herniorrhaphy to reposition the hernia contents back into the abdominal cavity. On day 14, the dog was declared recovered, with the surgical wound fully healed and dry, normal appetite and water intake, and normal urination and defecation..

Suggestions

It is recommended that dogs suffering from paramedian ventral hernia receive prompt treatment to prevent disruption of their daily activities. In addition, proper wound care, monitoring of feeding, and medication therapy are necessary to support a smooth recovery and ensure a favorable prognosis.

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Table

Table 1. Results of Routine Hematology Tests for a Dog with a Specific Condition

Parameters	Result	Reference	Note
White Blood Cell (10^3 /uL)	13.4	6.0-17.0	
Lymphocyte Count (10^3 /uL)	5.6	0.8-5.1	High
Midle Count (10^3 /uL)	0.7	0.0-1.8	
Granulocytes Percentage (10^3 /uL)	6.3	4.0-12.6	
Red Blood Cell (10^6 /uL)	5.18	5.50-8.50	Low
Hemoglobin (g/dL)	10.2	11.0-19.0	Low
Hematocrit (%)	34.1	39.0-56.0	Low
Mean Corpuscular Volume (fL)	66.0	62.0-72.0	
Mean Corpuscular Hemoglobin (pg)	20.5	20.0-25.0	
Mean Corpuscular Hemoglobin Concentration (g/dL)	31.4	30.0-38.0	
Platelet Count (10^3 /uL)	118	117-460	
Mean Platelet Volume (fL)	9.5	7.0-12.9	
Platelet Distribution Width (fL)	11.9	5.0-20.0	
Procalcitonin (%)	0.112	0.100-0.500	

Figures



Figure 1. Paramedian ventral hernia, characterized by a bulge on the left side of the dog's mammary region (yellow arrow)

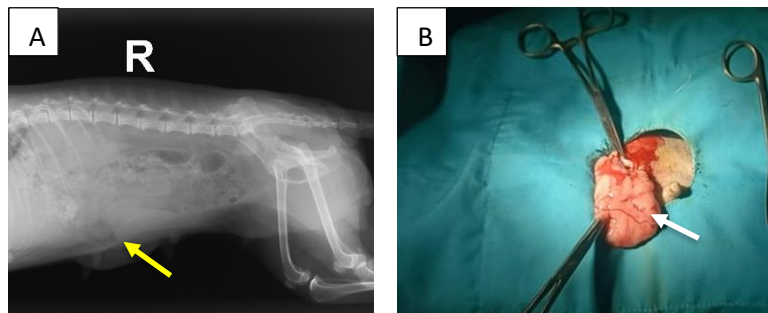


Figure 2. (A) Radiographic findings in the right lateral recumbent position show a hernial ring in the abdomen with a mass consisting of the omentum (yellow arrow); (B) The hernial contents consist of the omentum (white arrow)

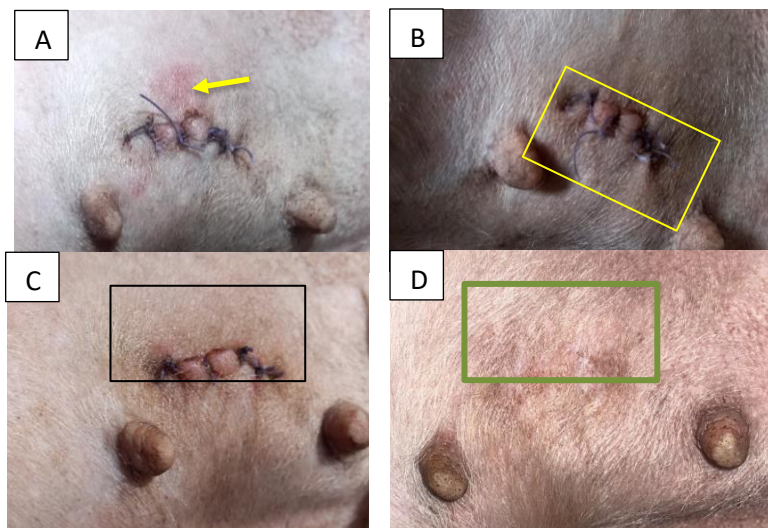


Figure 3. Results of postoperative wound observations; (A) On Day 1, swelling and redness were visible (yellow arrow); (B) On Day 4, the swelling and redness began to subside (yellow box); (C) On Day 10, the wound had dried, and the swelling and redness had disappeared (black box); (D) On Day 14, the wound has healed (green box)