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Right lateral paracosto-abdominal hernia in a cat

Mustafa Barış Akgül[1] Onur Yıldırım[1] Sevdet Kılıç[1]
Kezban Kaçak[1] Gülşah Akgül[2] Ali Gülaydın[1]

[1] *Department of Surgery, Faculty of Veterinary Medicine, Siirt University, Siirt, Türkiye*
[2] *Department of Internal Medicine, Faculty of Veterinary Medicine, Siirt University, Siirt, Türkiye.*

Correspondence: *Sevdet Kılıç (sevdet.kilic@siirt.edu.tr)*

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ABSTRACT

A 2-years-old, 2.4 kg – male crossbred cat was brought to Siirt University, Faculty of Veterinary Medicine, Clinic of Surgery Department, due to a traffic accident. A diffuse, palpable, painless swelling was detected under the skin starting from the right cranio-lateral abdomen to the right cranio-lateral thorax. In the orthopedic examination, there was a pain in the pelvic region and asymmetry at the right coxa-femoral joint. In the radiological examination of the thorax and abdomen, there was damage to the right lateral thoracoabdominal muscle in the abdominal region. There were also fractures in the sternum and pelvis, a diffuse interstitial lung pattern in the lungs and right coxa-femoral luxation. In the ultrasonographic examination, bloated bowel segments at the line of the right lateral thorax were monitored. Ventral median laparotomy was performed under general anesthesia. Herniated intestines at the right paracostal region were placed back into the abdominal cavity, and herniorrhaphy was performed. The abdominal cavity was closed according to the routine technique. As a result, paracostal hernia is a pathology that is rarely seen in cats after being hit by a car. Many operative techniques have been defined in hernia treatment. Median laparotomy was preferred for our patient and the hernia was treated successfully. This case report was prepared in order to contribute to our colleagues.

Keywords: *Cat, Paracostal, Hernia*

INTRODUCTION

Hernia can be defined as the protrusion of an internal organ through a tear in the wall surrounding it (Pavletic, 2005). The abdominal wall, diaphragm, and perineal hernias are the most encountered in small animals (Pratschke, 2002). The most common causes of traumatic abdominal wall hernias are traffic accidents and animal fights. The regions affected the most due to these traumas are the caudo-ventral abdominal wall and paracostal region (Langley-Hobbs et al. 2013). Injuries to the thoracoabdominal region, such as paracostal hernia, are often accompanied by diaphragm rupture. Traumatic paracostal hernia is a type of abdominal hernia and formed by the protrusion of organs into a space that is not anatomically present between the outer surface of the ribs and the abdominal muscles. In this case, the trauma affecting the patient causes a tear on the inner surface of the thoracoabdominal muscles, indirectly causing a hernia (Trindade et al., 2013). In some cases, the clinical findings are unclear and the desired results cannot be obtained from radiographic examinations. As a result, the diagnosis cannot be made, or the diagnosis is significantly delayed in many cases. Small hernia lesions may not be diagnosed even after months or even years. In such cases, a hernia is suspected

when significant dyspnea occurs or herniated intra-abdominal organs are strangulated (Lenot et al., 1990). The classical clinical findings of hernias manifest as painless swellings that suddenly occur in the region. Hernias are diagnosed with detailed clinical examination (inspection, palpation, etc.) and imaging techniques (CT, X-ray, Ultrasonography, etc.) (Hassen et al., 2017). Sometimes, intraoperative hernias are encountered during laparotomy performed for organ damage in animals with multiple traumas (e.g., liver rupture) and the diagnosis is made in the meantime (Soldá, 2002). Many interventions such as herniorrhaphy or hernioplasty have been defined in the operative treatment of hernias. However, an excellent surgical intervention in hernia cases is directly associated with the success shown in the postoperative period. This report describes the diagnosis and treatment of a traumatic paracostal hernia in a cat.

CASE HISTORY

A 2-years-old, 2.4 kg - male crossbred cat was brought to Siirt University, Faculty of Veterinary Medicine, Clinic of Surgery Department, due to a traffic accident. In routine clinical examinations, the patient's mucous membranes were anemic; the submandibular lymph nodes were hypertrophic; the body temperature was low (34.4°C). No abnormality was found in other routine clinical examination findings (respiration rate, pulse rate, heart rate). A diffuse, palpable, painless swelling was detected under the skin, starting from the right cranio-lateral abdomen to the right cranio-lateral thorax. On palpation, this swelling was soft and had limited movement in different directions under the skin with the pressure. In the orthopedic examination, a mild bilateral lameness was observed in the hindlimbs, and the patient was reluctant to move. Palpation revealed pain in the pelvic region and asymmetry at the right coxofemoral joint. In ventro-dorsal (V/D) and latero-lateral (L/L) radiographs of the thorax and abdomen, there was damage to the right lateral thoracoabdominal muscle in the abdominal region. Although no pathology was observed in the ribs, there was a fracture in the sternum and a diffuse interstitial lung pattern in the lungs. In the positive contrast radiographs of the gastrointestinal tract, a large number of intestinal segments were detected starting from the cranial of the right lateral abdominal wall to the right lateral cranial of the thorax (Figure 1). In ventro-dorsal (V/D) and latero-lateral (L/L) radiographs of the pelvis, there were fractures in tuber ischii at many different points and luxation in the right coxa-femoral joint. In the ultrasonographic examination, bloated intestines were monitored at the right lateral thorax.

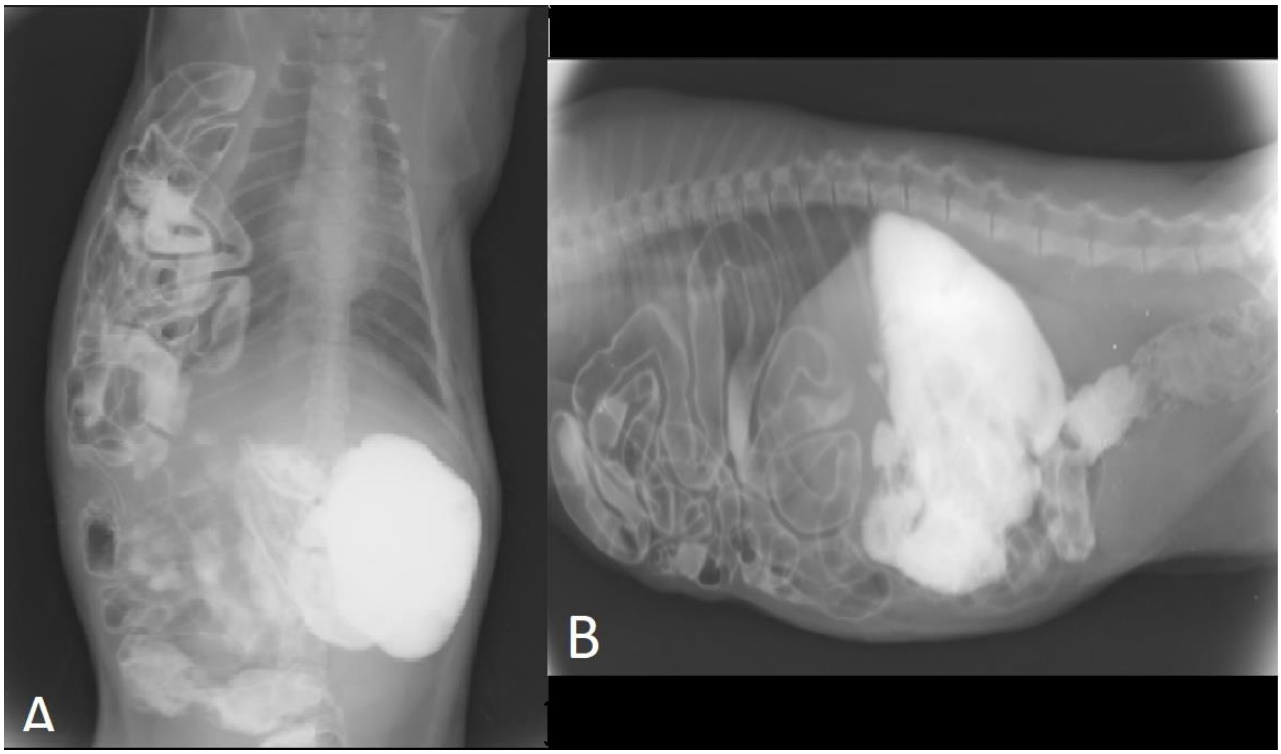

Figure 1. The ventro-dorsal (V/D) (A) and latero-lateral (L/L) (B) positive contrast radiographs of the patient. Herniated intestinal segments are observed on the right lateral thorax.

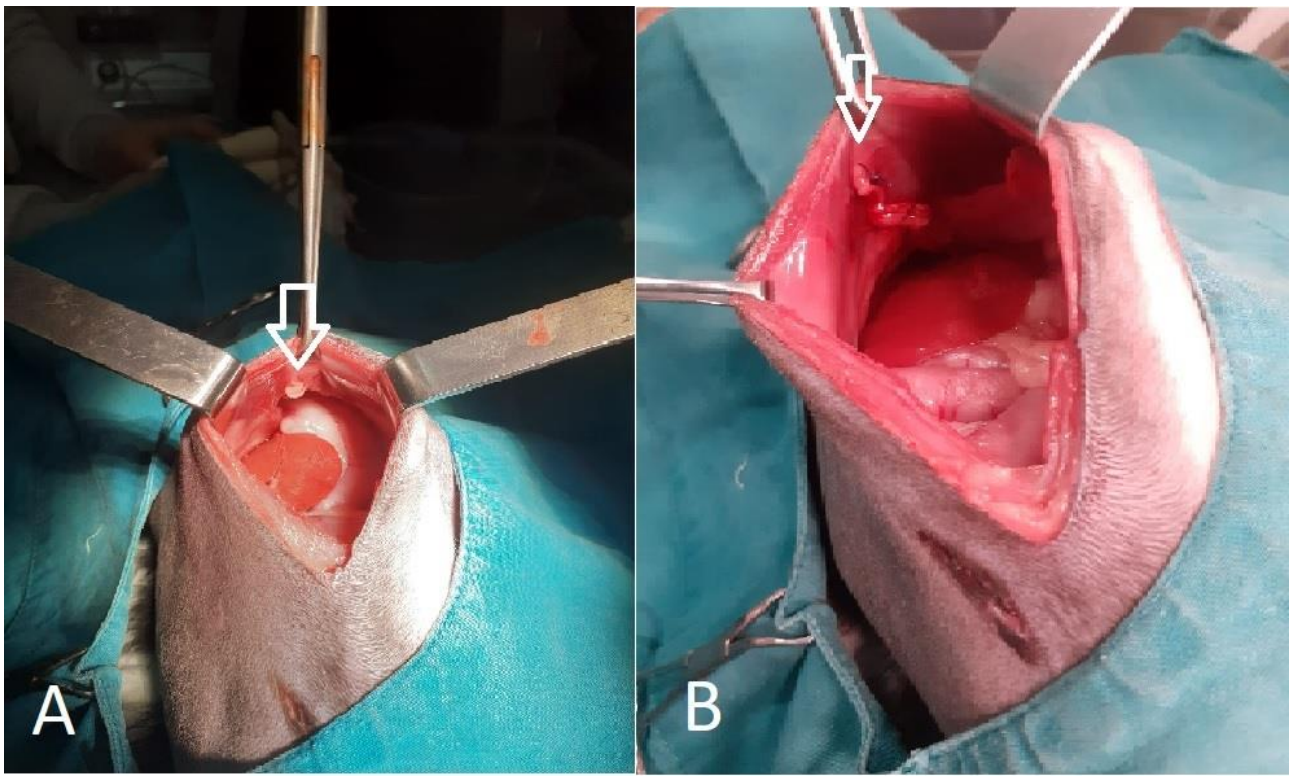

Figure 2. Intraoperative intestinal segments herniated from the paracostal region (A, White arrow). Hernia passage repaired with simple continuous suturing (B, White arrow)

The hematological examination revealed that leukocytosis (20.7 x 109/L) suggesting the onset of an infection. Although the hematocrit value was 27%, anemia onset was detected because dehydration was 8% in the patient in the clinical examination and it was thought that the cat might have suppressed anemia. A thrombocytopenia (174 x 109/L) was also detected.

The case was evaluated as a traumatic paracostal hernia and the operation was decided. The patient was sedated with 2 mg/kg, intramuscular xylazine HCL (Xylazınbio 2%, Intermed, Ankara), and 8 mg/kg intramuscular Ketamine HCL (Ketasol 10%, Interhas, Ankara) were administered. Maintenance of the anesthesia of the intubated patient was carried out with 2% sevoflurane (Sevorane Liquid Abbvie, Istanbul). Intravenous fluid therapy (0.9% isotonic saline; 10 ml/kg/hour) was provided to patient during operation. Preoperative 20 mg/kg intravenous ceftriaxone disodium (Unacefin® 1000 mg, Yavuz Drug, Istanbul) was applied.

The animal was placed in dorsal recumbency and the ventral abdominal area was prepared for aseptic surgery. We performed a ventral midline abdominal incision to allow the entire abdomen to be explored. In the examination of the right abdominal wall through the abdomen, it was observed that the muscle tissue was torn approximately 4 cm in the right paracostal line. A large segment of the small intestine was herniated into this tear. No other pathology was found in the abdominal exploration. Herniated small intestine segments were easily placed into the abdominal cavity with gentle manipulations (Figure 2). There was no incarceration or strangulation. The hernia hole was closed using the simple continuous suture technique with polydioxanone (USP: 2/0). Subcuticular suturing was done with polyglycolic acid (USP: 2/0), and the skin was closed in a simple interrupted suture pattern using polyglycolic acid (USP: 2/0).

After the hernia operation, a closed reduction procedure was performed to the luxation of the right coxa-femoral joint under general anesthesia. However, the joint was luxated again when abduction and adduction movements were performed on the extremity. Therefore, it was decided to delay the open reduction to another date. Considering the patient's general condition we preferred conservative treatment with cage confinement for hip fractures. Postoperative medical treatment with 20 mg/kg ceftriaxone disodium, i.v, twice daily (Unacefin® 1000 mg, Yavuz Drug, Istanbul) was applied for 5 days. 16 mg/kg Vitamin-C, i.v, once daily (Tekno-C® 250 mg, Teknovet, Istanbul) was applied for 5 days. 0,2

mg/kg, Meloxicam, s.c (Maxicam, Sanovel, Istanbul) was administered to reduce postoperative inflammation and pain for 3 days. Medical treatment and oxygen therapy were administered for lung contusion. The patient's anemia progressed and his general condition worsened. The patient died on the postoperative 6th day.

DISCUSSION

A hernia is the protrusion of an organ or an organ's part through a tear that is not anatomically normal. Hernias can be congenital or may occur later. They are named as true or false hernias according to the presence or absence of a hernia sac (Smeak, 2007). In small animals, abdominal, diaphragmatic, and perineal hernias are generally seen. Hernias are named lateral, ventral, prepubic, umbilical, intercostal, paracostal, diaphragmatic, and perineal according to their regions (Soldá, 2002). Paracostal and intercostal hernias are less common than other hernias (Pavletic, 2005). This case report in a cat, describes a traumatic paracostal hernia which is etiologically and clinically rare incident.

Traumatic body wall hernias can be defined as the protrusion of visceral organs from a traumatic defect in the thoracic or abdominal wall. Traumatic hernias can be classified as false hernias since they have no hernia sac (Kraus, 1990). Hernias in the lateral abdominal wall are the most common among traumatic hernias considering the region (Smeak, 2007). The size and location of a traumatic hernia may vary according to the severity of the trauma as well as to the anatomical characteristics of the patient (Pavletic, 2005). Considering the patient's body structure and weight (2.4 kg), his condition was within normal limits. From this point of view, the car hit, which can be considered a high-energy traumatic factor, created an approximate 4 cm hernia hole in the patient's right paracostal region. Traumatic hernias can occur as a result of blunt traumas to the abdomen such as traffic accidents, falls, kicks, bites, stab wounds, and gunshot wounds. When exposed to these forces, a large surface area of the patient is affected. Since the skin tissue is relatively more elastic, it may not be injured due to these forces, but defects may occur in the muscles and fascias since they are not as elastic as the skin tissue (Perez et al., 1998). In the examination of the patient's right lateral thoracic and abdominal region, no injury was observed on the skin. Despite this, there was a rupture in the right lateral thoracoabdominal muscles and a hernia hole was formed. An important point that should not be forgotten in traumatic hernias is that skin injury may not always occur. In such cases, the most prominent clinical finding is the varying degrees of swelling under the skin. Since anamnesis information is lacking, especially in street animals, the patient should be carefully examined and it should be considered that a traumatic hernia may occur even if there is no injury on the skin. Even in small-scale hernia cases in which the diagnosis is overlooked, organs may be herniated or strangulated in the advancing processes (Lenot et al., 1990). A sizeable swelling spread over a wide area was detected in the patient's right lateral thorax region and soft tissue structures were palpated on palpation. No strangulation was observed in the intestines during the operative intervention. This was interpreted as proof that the hernia was newly formed. Although the clinical findings vary according to the region of the hernia in hernia cases, weight loss and weakness are generally seen and, in some cases, abdominal breathing, restlessness, and swelling in the hernia region are observed. The most frequently herniated structures include the omentum, mesenterium, and intestines whereas stomach, spleen, and liver herniation rarely occur (Kumar, 2020). Since the patient had more than one pathology, the patient's general state of health was evaluated as moderate. In general, it was observed that the patient's interest in the environment was low and fatigue.

In some cases, the hernia sac may continuously expand as a result of the protrusion of more organs such as the omentum or intestine from the hernia hole. In addition, the herniated organ may adhere to the surrounding soft tissues in undiagnosed or untreated hernias. When the differential diagnosis is examined, traumatic hernias can also be confused with other diseases such as abscess, phlegmon, cyst, hematoma, and soft tissue tumors (Pavletic, 2005). During the operation, it was determined that a large part of the intestinal segment was herniated. The fact that the herniated intestine was larger than the size of the hole explains the excessive swelling observed in the preoperative examinations. The easy placement of herniated contents into the abdominal cavity during the operation was interpreted as an indicator of the lack of adhesion.

In paracostal hernias, abdominal organs may herniate along the thorax wall. In rare cases, abdominal organs may protrude from a defect between the intercostal muscles into the chest cavity. Studies have shown that many different pathologies such as orthopedic problems (eg,

pelvis) and soft tissue injuries may occur in half of the animals with traumatic abdominal wall hernia. For this reason, it is crucial to perform a detailed clinical examination of the affected animals (Fossum, 2013). The right coxa-femoral luxation, the paracostal hernia, and the fractures in tuber ischii detected in the patient support the literature. Paracostal hernia has been associated with diaphragmatic rupture in people and it has been suggested that it is more common in cats than in dogs. Traumatic abdominal wall hernia (TAWH) associated with pelvic fracture gaps has occasionally been reported in dogs but not cats (Dubois et al., 1981; Dorn et al., 1976; Mann et al., 1989). In one report of traumatic abdominal hernias only 18% of feline hernias were due to dog-bite wounds; however, a subsequent report identified a 40% incidence (Shaw et al., 2003; Waldron et al., 1986). This difference may merely be a reflection of the different patient populations seen by the two centers in question. TAWH is thought to have a relatively low incidence overall, with one report of 600 vehicular accidents documenting only two TAWH, and another of 123 cats with high rise syndrome injuries again identifying only two (Kolata et al., 1975; Whitney et al., 1987). Due to the genus of the patient (cat) and the fact that the case was etiologically (car crash) rare, we thought that this case report should be shared with veterinarians.

Muscle defect reconstruction is recommended in the operative treatment of paracostal hernias (Smeak, 2007). Depending on the size and tension of the defect, muscle flaps or synthetic meshes can be used (Pavletic, 2005). In some cases, herniated organs have been tried to be approached over the swelling; however, in our case, there was a need for an abdominal exploration since the patient had multiple traumas. For this reason, laparotomy was performed through the median line and muscle defects could easily be repaired without any mesh application.

CONCLUSION

In conclusion, paracostal hernia is a rare pathology in cats after being hit by a car. Even if there is no injury on the skin, it is important to clinically examine the patient in detail in terms of traumatic abdominal wall hernias and, if necessary, confirm the diagnosis using auxiliary examination methods such as radiography and ultrasonography. Many operative methods have been defined in the treatment of hernias. Median laparotomy was preferred in our patient and the hernia was repaired successfully. This case report was prepared in order to contribute to our colleagues.

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