Chronic diaphragmatic hernia with herniation of the gravid uterus in a female dog – A case report and a review

J.Y. DESCHAMPS1*, H. KOLB1, C. DESCOL1, F.A. ROUX1

1LUNAM University, ONIRIS, Nantes-Atlantic College of Veterinary Medicine, Food Science and Engineering, Emergency and Critical Care Unit – La Chantrerie - BP 40706, 44 307 NANTES Cedex 3 - FRANCE.

*Corresponding author: jack.deschamps@oniris-nantes.fr

SUMMARY

In a near-term pregnant female dog presented for severe dyspnoea, radiographs showed two well-mineralized foetal skeletons in the thoracic cavity, which revealed the presence of a previously subclinical diaphragmatic hernia. The dog had been hit by a car one year previously. Chronic diaphragmatic hernia with herniation of the gravid uterus is a very uncommon cause of dyspnoea. This case was compared with the six other cases reported in the veterinary literature and with two cases concerning a peritoneopericardial diaphragmatic hernia.

Keywords: Diaphragmatic hernia, pregnancy, dog.

Case history

A 4-year-old female mixed-breed dog weighing 20 kg presented for difficulty breathing of two weeks’ duration. Physical examination confirmed severe inspiratory dyspnoea. Auscultation revealed that the area of respiratory sounds was shifted caudally and dorsally, with augmented pulmonary sounds on the right, without crackles. Heart sounds were inaudible on the left. The owner reported a probable advanced pregnancy, near term (heat and mismating had been observed eight weeks earlier), but a gravid uterus was not palpable. The dog had been hit by a car one year previously. The clinical diagnosis was severe respiratory distress with compromised function of the diaphragm. The differential diagnosis included diaphragmatic hernia, a mass compressing the diaphragm (uterus, neoplasia), pleural effusion, pneumothorax, and pericardial effusion.

A lateral thoracic radiograph (Fig 1.) showed the trachea to be deviated dorsally, and revealed two foetal skeletons located in the thorax, as cranial as the level of the second rib. The ventrodorsal view (Fig 2.) showed the trachea to be markedly deviated to the right, and that the left lung was not visible. Two well-mineralized foetal skeletons were visible in the left hemithorax, as was one skeleton on the right side of the abdominal cavity, along with gas-filled bowel loops. On both views, the cardiac silhouette was obscured by a structure of tissue density. Reproductive status, clinical signs and radiography pointed to a diagnosis of diaphragmatic hernia with herniation of the gravid uterus into the thorax. No biological analysis was performed because it was not necessary for the diagnosis or treatment.

Because of the severity of the dyspnoea and in order to prevent a worsening of respiratory impairment during parturition, immediate surgical treatment of the diaphragmatic hernia was elected. Induction of anesthesia was performed with a fentanyl/propofol combination and maintained with isofluran and...
assisted ventilation. Because the puppies were unwanted, despite ultrasonography showing that they were alive, an en bloc ovariohysterectomy was decided upon, without caesarean section.

Laparotomy confirmed a large circumferential, ventral, diaphragmatic tears with passage of the left horn of the gravid uterus (containing 2 puppies) into the thorax, as well as the stomach, omentum, duodenum, the median lobe of the liver and the spleen. The right uterine horn, containing one puppy, did not extend into the thoracic cavity; it was located under the caudal ribs, explaining why the puppy was not detected by palpation. The uterus had a normal appearance for a pregnant dog, there were no adhesions or effusion. The herniated organs were removed from the thoracic cavity through the rent in the diaphragm without difficulty. The diaphragmatic tear was circumflex-shaped, located on the left. It was sutured in standard fashion with a simple continuous pattern using 3-0 synthetic absorbable monofilament suture material, then the ovariohysterectomy was performed, without prior hysterotomy. There were no complications during hospitalization. The dog was discharged 2 days later with a complete resolution of clinical signs.

Discussion

The discovery of a chronic diaphragmatic hernia because of the herniation of a gravid uterus into the thorax has rarely been reported. To our knowledge, there have been only six cases reported in the past fifty years [1, 2, 3, 4, 5, 6]; some others are probably described in textbooks.

The first case [1] was reported in India in 1967. It concerns a 5-year-old female dog in advanced pregnancy presented for severe dyspnoea. Because of the absence of fetal hearts beats, hysterectomy was elected, but the dog died at the beginning of the surgery. Postmortem exploration of the abdominal cavity revealed a 10 cm diaphragmatic tear with herniation of a portion of both uterine horns containing 3 of the 6 foetuses. No illustrations of this case are included.

The second case [2] concerns a 2-year-old Maltese female dog with dyspnoea and cyanosis, in which one gravid horn had herniated into the thoracic cavity. The dog made a complete recovery after the diaphragmatic hernia was repaired, but there is no information about the outcome for the foetuses.

The third case [3] concerns a 17-month-old female Afghan dog mated 59 days previously. An accident occurred 23 days after mating. After several attacks of acute respiratory distress with cyanosis, a lateral radiograph showed a fetal skeleton in the chest. The head of the foetus was at the level of the third rib. After a caesarean section, one live puppy was removed, and the diaphragm was repaired. The puppy attempted to suckle within an hour following surgery, but it was euthanized shortly thereafter because of a large cleft in its palate. The mother made a complete recovery.

The fourth case [4] concerns a 1-year-old mixed-breed female dog in late pregnancy presented for respiratory distress, in which radiographs revealed a thoracic cavity filled with 2 mature foetuses, while 4 more were in the abdominal cavity; the dog died shortly after admission.

The fifth case [5] concerns a 4-year-old Chihuahua at 64 days’ gestation with dyspnoea and cyanosis. Radiography identified a diaphragmatic hernia. Three well-ossified foetuses were visible in the abdominal cavity, but no foetus was present in the thoracic cavity. A caesarean section produced 3 live foetuses, then the diaphragmatic hernia was repaired. A previous uneventful pregnancy had resulted in three naturally-delivery puppies; for that case, there was no history of congenital defect or traumatic injury.

The sixth [6] and most recently-published case concerns a 15-kg mixed-breed pregnant female dog presented for a 10-day duration of breathing effort. Thoracic radiography showed the skeletons of 7 fetuses, 4 in the thoracic cavity and 3 in the abdominal cavity. Three hours after admission, a herniorraphy was performed; seven puppies were delivered but one died. In that case, the release of adhesions between the herniated organs and the lungs lead to a pneumothorax, which was successfully treated by a blood pleurodesis.

To our knowledge, there is no description in the cat. A case has been reported in a guinea pig [7].

There are 2 reports of a pregnant female dog diagnosed with a peritoneopericardial diaphragmatic hernia (PPDH).

In the first case [8], a 3-year-old pregnant Pointer observed in oestrus one month before, very impressive thoracic radiographs showed a PPDH with herniation of two mineralized...
foetal skeletons into the pericardial sac; the dog and the puppies died shortly after diagnosis.

In the second case [9], the PPDH was diagnosed in a 3-year-old pregnant Golden retriever; an abdominal ultrasound showed 4 live foetuses with an estimated age of approximately 50 days. Unlike all previously cited reports except the fifth case, none of the foetuses was engaged into the hernia. During the surgical correction of the PPDH, the uterus was exteriorized, the entrapped liver and omentum were released from the pericardium and the rent in the diaphragm was closed. On day 61 of gestation, 7 days after the initial surgery, a caesarean section followed by a hysterectomy was performed, delivering 7 live puppies.

Traumatic diaphragmatic hernias may be accompanied by few or no symptoms, explaining why about 20% are not diagnosed around the time of the incident [10]. In a clinical series on chronic diaphragmatic hernias [10], in those animals with a known history of trauma, time to surgical correction ranged from 2 weeks to 84 months (mean, 14.5 months). In the present report, the traumatic event occurred 1 year before; clinical signs appeared only after the development of an inciting factor: the growth of the uterine horns.

Thoracic radiographs reveal chronic diaphragmatic hernia in only 70% of cases [10]; in the present case, the presence of foetal skeletons in the thoracic cavity makes the diagnosis obvious. The passage of two whole foetuses near term explains the severity of the respiratory symptoms. Because of the dam’s breath sounds, foetal heart sounds were not audible at auscultation.

In all reported cases, the female dog was presented for severe, even life-threatening dyspnoea. In that situation, it is preferable to treat the diaphragmatic hernia surgically to avoid the risk of a worsening of the symptoms during parturition and causing a dystocia. Theoretically, once the diaphragm has been repaired, the dog may proceed uneventfully to term of her pregnancy and nothing precludes a natural delivery.

Conclusion

Pregnancy may reveal a subclinical chronic diaphragmatic hernia. In all reported cases, severe respiratory distress was reported, and this eventuality should be borne in mind in the pregnant female dogs with dyspnoea. The growth of the foetuses and the passage of a gravid uterine horn through the diaphragmatic rent provide original radiographic images showing mineralized skeletons in the thoracic cavity.

References