Asymptomatic Pectus Excavatum in Old dog

Pectus excavatum is a congenital disease characterized by deformations in the rib cage due to the anomalous development of the sternum and costal cartilages. An 18-year-old poodle dog was referred for preoperative cardiac evaluation and in the results of the complementary exams cardiac dextroposition was observed due to the abnormal growth of the medial-cranial portion of the sternum, forming a pectus excavatum frame.

Key words: Dilated breast, Congenital anomaly, Chest
Introduction

Pectus Excavatum (PE) or “Chest Excavated” is a disease that affects dogs and cats, being characterized by conformational changes of the rib cage due to abnormal growth of the sternum and costal cartilages. A dorsoventral flattening and increased thoracic width are observed as a consequence of chondrosternal depression\textsuperscript{1,2,3}.

The disease is rare and does not have a well-defined etiology, however, theories claim that such changes result from inheritable genomic expression acquired in intrauterine life, or by shortening of the central tendon of the diaphragm, abnormalities in the diaphragmatic muscles, and variations in intrauterine pressure. A high prevalence of PE manifestation is observed in brachycephalic dogs, contributing to the hereditary theory of the disease, however, it has no sexual predisposition\textsuperscript{1,2}.

In veterinary medicine, PE is more frequently reported than Pectus carinatum, a condition characterized by protrusion of the sternum. PE is often confused with Swimmer’s Syndrome, a condition characterized by hyperextension of the tibiofemoral and tibio-tarsal joints, as well as bilateral hyperflexion of the hip joint. Such changes keep the limbs of the patients in an elevated position and the attempt of locomotion results in a rowing movement, rendering them incapable of staying in season or of moving around, remaining in the sternal decubitus\textsuperscript{3,4}.

Although the two conditions provide similar signs, the characteristic differences of each one should be considered, allowing the correct diagnosis, since the treatments are different and some dogs may present the two alterations\textsuperscript{4}.

Some patients do not present clinical signs, however, when they are present as a consequence of chest flattening, some signs such as exercise intolerance, cough, dyspnea and cyanosis may be present, as well as anatomical and functional abnormalities such as left or right cardiac position deviation and blows. In addition to these, lateralization of the thoracic limbs may be present, which makes it impossible for the patient to remain in the station, late body development, apathy and...
reluctance to feed. Concomitantly, many of the affected animals present tracheal hypoplasia \(^1,3\).

The diagnosis is based on the association of anamnesis with the results of the clinical and complementary exams. Therefore, the sternal deformity is palpable, adding the alterations visualized in the chest radiographs, in which it is possible to visualize the decrease in the minimum distance between the vertebral column and the dorsal aspect of the sternum, due to the bone depression responsible for producing an aspect the caudal portion of the thorax. Cardiac silhouette deviation and associated lung disease can also be observed \(^1,3,4\).

The degree of flattening of the thoracic cavity and the resulting cardiopulmonary consequences are variable, and there are reports of spontaneous resolution. Several techniques of making splints responsible for the mid-lateral compression of the chest wall for consequent correction of the defect are described. In addition, tutors should be encouraged to promote mid-lateral compressions in young animals and to take other clinical measures if necessary, such as oxygen therapy for very dyspnea patients and treatment of associated respiratory infections \(^1,2,3\).

Surgical treatment is indicated for patients with marked degrees of sternal deformity. The most used technique is the fixation of an external splint on the ventral thoracic face, through sutures around the sternum, providing bone and cartilage traction and consequent anatomical correction of the defect \(^3,5\).

The present article aims to describe an asymptomatic case of PE in elderly canine, as well as to discuss the characteristic changes observed in the complementary exams and the possibilities of treatment to be established.

**Case report**

An 18-year-old female poodle was referred for preoperative evaluation at VetCor, Campos dos Goytacazes-RJ. The patient needed periodontal treatment, and due to age, preoperative cardiovascular evaluation was requested.

During physical examination, there were no changes in vital parameters, typically assessed. However, during palpation of the
ventral aspect of the patient’s chest, depression was observed in the mid-cranial region and mild dorsoventral flattening of the thoracic cavity.

Initially, the veterinarian, who was responsible for the evaluation, suspected that the anatomical abnormality of the sternum had occurred secondary to some trauma. However, the guardian discarded this possibility, since she had custody of the patient since she was a child.

Cardiorespiratory auscultation revealed rhythmic and normophonetic sounds, and lungs without auscultable changes.

For the measurement of systemic arterial pressure, an indirect method, Doppler method, was used, and a protocol was used to measure systemic arterial pressure in a manner already established by Brown et al. 2007. The mean systolic blood pressure measured was 146 mmHg.

Other hematologic exams, chest radiography, electrocardiogram and echocardiogram were requested in order to complement the preoperative evaluation of the patient. Based on the changes found during anamnesis, physical examination and complementary exams PE was suspected.

Results

In the electrocardiogram, sinus arrhythmia with presence of migratory pacemaker and sinus arrest were visualized, in addition to a second-degree ventricular block episode.

In the Doppler echocardiography, changes compatible with the initial phase of myxomatous mitral valve degeneration and dextrocardia were observed.

In the radiographic examination, suggestive alterations of the inflammatory / infectious process in the left caudal lobe, displacement of the second to sixth sternum, slight morphological alteration of the fourth fetus and sclerosis of the fifth sternum were visualized. The other hematological examinations were within the physiological parameters stipulated for the species.
Figure 1 Thoracic radiographs of an 18 year old asymptomatic female poodle dog, presenting pectus excavatum. A - Ventrodorsal thoracic radiograph showing dextroposition of the cardiac silhouette. B - Left lateral radiograph showing deformation of the sternum (arrow). C – Right lateral radiograph showing deformation of the sternum (arrow).

Discussion

In the present report an 18-year-old female poodle was evaluated for preoperative evaluation, since it would be submitted to periodontal treatment. During clinical evaluation, sternal depression was observed in the mid-cranial region, a change compatible with PE. This change is more commonly reported in brachycephalic dogs, however, as in the present case, there are reports of dolichocephalic and mesocephalic dogs with the same anomaly.1,5

Clinical signs associated with PE frames are generally observed in younger animals, especially shortly after birth, such as dyspnea and cyanosis. However, some patients
are asymptomatic and the sternal anomaly can be diagnosed later. Therefore, the patient in question was diagnosed as an elderly patient, and according to a previously performed anamnesis, she never presented clinical signs inherent to the PE, and therefore a case of asymptomatic PE2,3,5.

During anamnesis, the guardian reported the presence of a discreet cough, which was accentuated at times of greater euphoria. However, as already defined periodontal disease can generate systemic effects, since the biofilm formed by bacteria is a constant source of infection and may be associated with cardiac, pulmonary, joint, renal and hepatic affections. The patient presented an inflammatory / infectious focus in the left caudal lung lobe, in addition to a possible tracheitis responsible for coughing, both consequences of the migration of bacteria from the mouth, a hypothesis confirmed because there was a notable improvement in clinical signs after periodontal treatment7.

The presence of mitral valve disease with no cardiac remodeling was already expected. Since the occurrence of this disease is common in small dogs from middle age to the elderly. One of the theories that justifies this high incidence is the fact that valvular leaflets are one of the main tissues of the organism to undergo mechanical stress throughout the life of the patient8.

It is worth mentioning that the identification of dextrocardia is an anomaly secondary to PE. Since, the sternal abnormality can cause a displacement of the thoracic organs, this being an abnormality reported since 1973 in a dog with PE of the Pekingese race9,10.

In the radiographic report, the dorsal displacement of the sternules was visualized, confirming the diagnosis of PE. The images highlight the degree of depression in the sternum and the decrease of the minimum distance between the spine and the dorsal aspect of the sternules3.

The veterinarian chose not to undergo surgical intervention because the patient had no clinical signs secondary to the defect that explained the procedure and although the surgical treatment obtained good results in young animals, recovery and correction in elderly patients did not has been
satisfactory, considering the less malleability of the sternum. In addition, the surgical procedure includes risks such as the rupture of soft tissues pulled together with the sternum or the perforation of important organs in the passage of the needle of the suture wires.

**Conclusion**

Patients with PE present the anatomical changes soon after birth. However, depending on the degree of defect, the animals may live with the congenital anomaly for long periods and present asymptomatic throughout life. Thus, noninvasive intervention or surgical treatment is not a rule, and the evaluation of individual conditions is necessary, since subjecting a healthy patient to unnecessary surgical procedures and anesthetics could lead to more risk.

**Bibliographic references**


