

Parasternal thoracotomy, review of 25 cases



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Objectives

Pericardiectomy is the surgical procedure of choice in the treatment of recurrent cardiac effusions and tamponade. Several surgical techniques are reported in the literature, the most widely used being subtotal intercostal pericardiectomy. Other less invasive procedures have allowed a significant reduction of morbidity. Currently, the minimally invasive thoracoscopic approach is the preferred one, despite the long learning curve and the relatively expensive surgical instrumentation. Aim of this paper is to assess the validity of our new minimally invasive access to the pericardium in selected patients. Our hypothesis is that the morbidity of the approach is similar to other minimally invasive procedures but potentially faster and easier to perform.

Methods

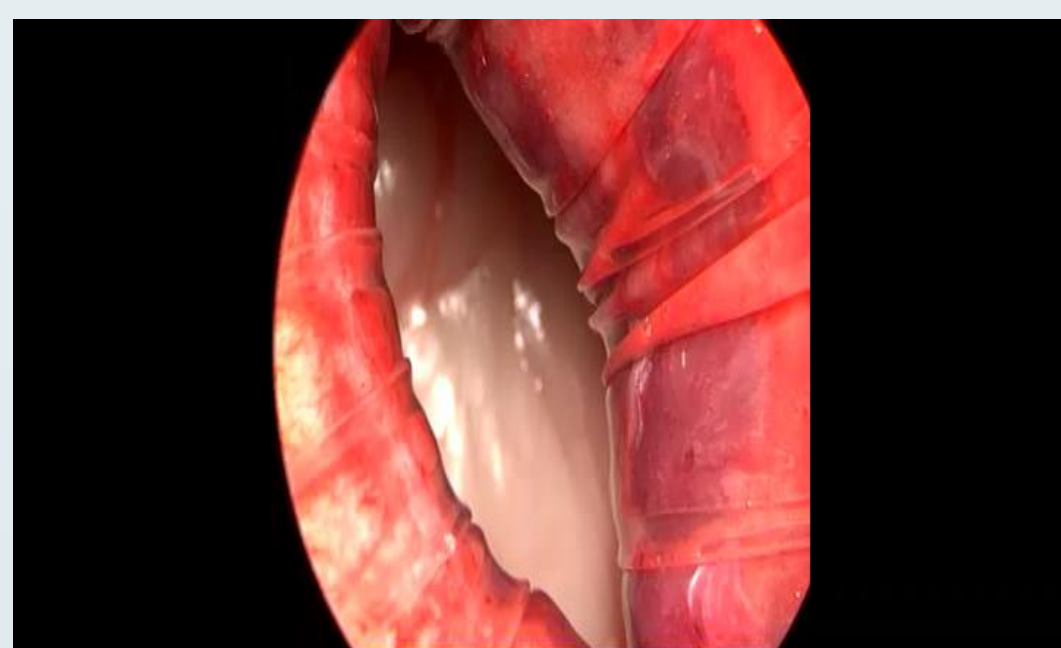
Twenty-five dogs of different breeds and age were referred to our clinic for relapsing pericardial effusion and cardiac tamponade. All patients underwent complete blood and urine tests, echocardiographic examination with pericardiocentesis, abdominal ultrasound examination and abdominocentesis. After resolution of the acute signs all the dogs underwent a full body CT scan. Subsequently a pericardiectomy was performed in all of the patients. A new surgical approach was proposed. A careful selection of the patient was performed, based on the following inclusion criteria:

- presence of symptomatic relapsing pericardial effusion;
- need for a minimally invasive approach, a short duration of the anaesthesia and avoid potential risk from iatrogenic pneumothorax caused by thoracoscopic procedures;
- presence of non-resectable neoplastic mass;
- thoracic exploration and/or pleural biopsies judged unnecessary

The time required for the entire procedure was recorded. All the surgeries were performed by the same surgeon. The parasternal approach was performed through the seventh left intercostal space, with the patient in dorsal decubitus. Due to the breed variations, it was possible that the incision site varied from the seventh to the eighth intercostal space. However, taking the penultimate sternebra as a reference, it was possible to avoid mistakes. The length of the incision was between 2 and 3 cm, depending on the size of the subject. After surgery, a chest X-ray examination with two views was taken in all the patients. The removed portions of pericardial tissue were measured in their full extension and histologically examined.



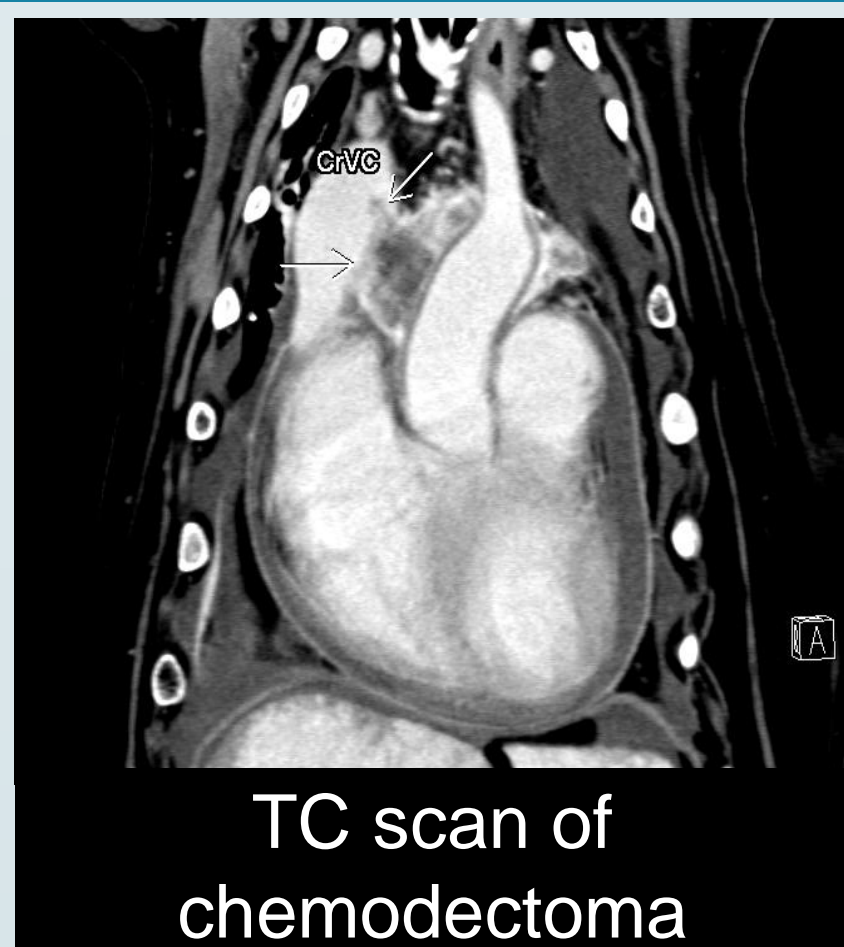
Skin incision



Pericardium fenestration

Results

In all the cases CT confirmed the presence of a mass at the base of the heart. CT scans also allowed a more specific characterisation of the type of neoplasm: in nine cases the suspicion was of haemangiosarcoma of the right atrium; in fifteen cases the findings were suggestive of a chemodectoma; in one case the images suggested the presence of a primary neoplasm of the pericardium.

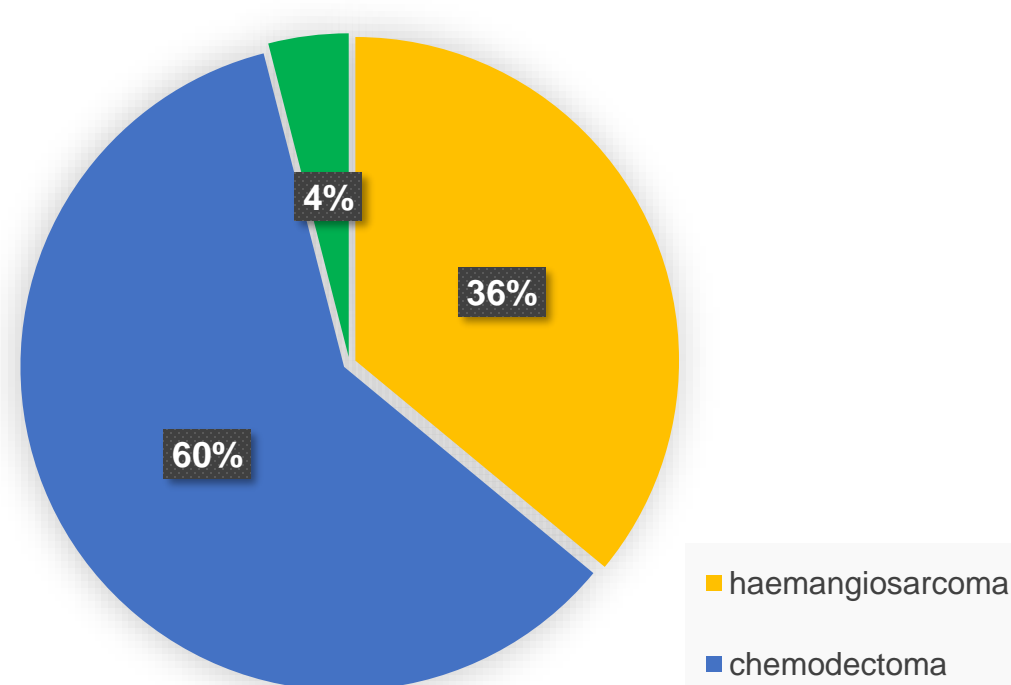


TC scan of chemodectoma



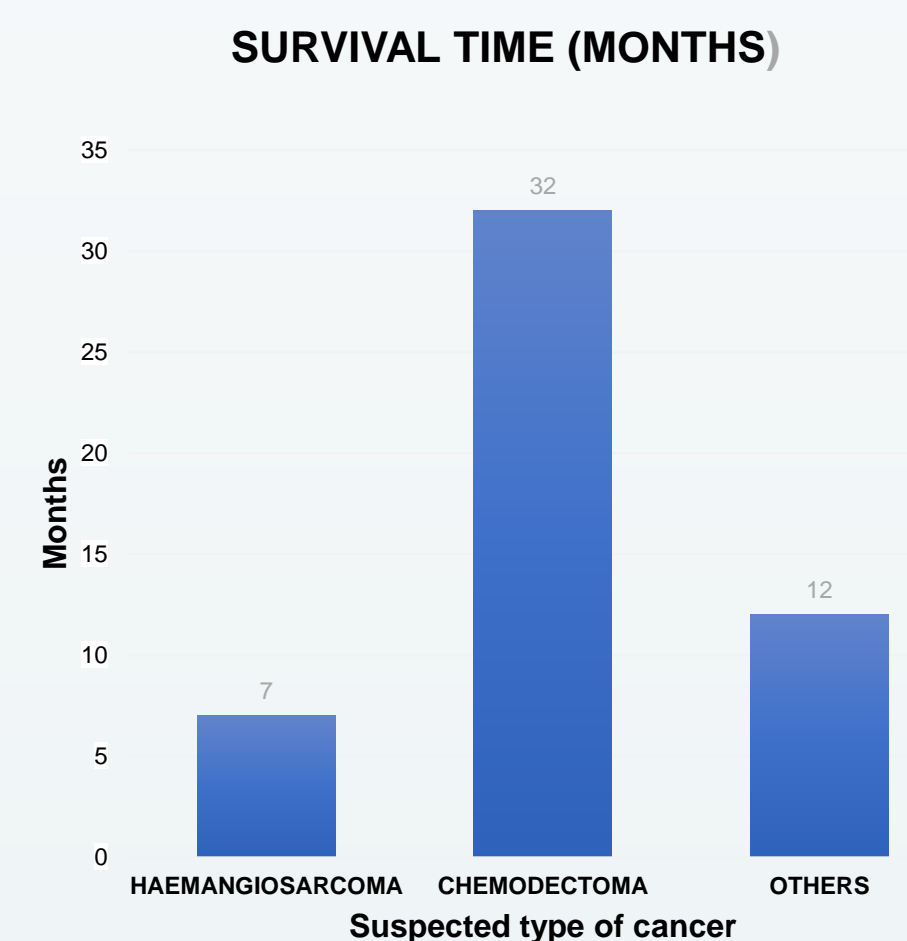
Post.op. ventral pneumomediastinum

Suspected type of cancer



In one case there was bleeding from the internal thoracic artery, controlled by cauterization with electrosurgical units. Only one patient had pneumothorax after surgery, resolved with a single thoracentesis. In five cases there was a mild ventral pneumomediastinum, which did not require any treatment. In one case there was dehiscence of the skin wound, which require revision surgery. The mean duration of surgery was of 22 minutes. Recurrence of the pericardial effusion was absent in all the dogs. The mean surface area of the resected pericardial membrane was of 28.50 cm². In all the subjects the histological diagnosis was of lymphoplasmacellular pericarditis with low/medium grade fibrosis.

The average survival time of subjects with suspected haemangiosarcoma was 7 months (range 1-14 months) while that of subjects with suspected chemodectoma was 2 years and 8 months (range 5 months-4 years). In three of the nine cases with hemangiosarcoma the death is due to sudden rupture of the mass with acute bleeding (post mortem necropsy).



Discussion

The mean duration of this new surgical procedure resulted to be lower compared to thoracoscopic fenestration. Hospitalization time and postoperative pain were comparable to thoracoscopic procedures. Although the use of pleural drainage after thoracic surgery is recommended in the literature, based on our previous experience, we decided to standardize the surgery without applying thoracic drainage. The survival time of patients with neoplastic disease was comparable to the literature for the same type of cancer. The mean surface area of pericardium removed was higher compared to other fenestration techniques, lower compared to open surgical techniques and similar to transdiaphragmatic pericardiectomy. In three deceased subjects (haemangiosarcoma rupture) necropsy allowed a subjective evaluation of the percentage of removed pericardium as approximately 40% (a value comparable to transdiaphragmatic pericardiectomy).

Study limitations

The execution of the procedure by a single surgeon may be a limitation of the study, as the results may have been influenced by the experience of the surgeon who ideated the procedure and hence may have not shown the real difficulties of the technique. Do without applying thoracic drainage may have had a significant impact on both the short duration of hospitalization and on the post-surgical pain, giving the impression that the low morbidity is due solely to the procedure itself. The absence of complications during the procedures is probably related to the small number of cases and should therefore be considered with caution.

Clinical relevance

Parasternal intercostal pericardiectomy can be considered a valid alternative to thoracoscopic fenestration procedures. The technique is potentially fast and easy to learn and execute; it presents low risks of complications and does not require dedicated instrumentation. A careful selection of the patient is advisable, based on the previous reported inclusion criteria.

References

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