



# Successful open-chest cardiopulmonary resuscitation in a dog with pyothorax

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## Introduction

Cardiopulmonary arrest (CPA) is the sudden cessation of spontaneous and effective circulation and ventilation. Cardiopulmonary resuscitation (CPR) is the treatment to establish effective perfusion to the heart and the brain with the goal of achieving return of spontaneous circulation (ROSC). Open Chest CPR (OCCPR) is described in human and veterinary literature as an effective way to provide greater cardiac output with improved cerebral and myocardial perfusion compared with closed chest CPR. This case report describes successful ROSC and discharge from the hospital of a dog with pyothorax that underwent OCCPR in the intensive care unit.

## Case summary

A 5-year-old neutered male German hound was referred for management of a pyothorax. The pleural effusion had been removed via needle thoracocentesis, after which the dog was anesthetized and intubated for computed tomography.

A paraoesophageal abscess and consolidated lung region were identified.

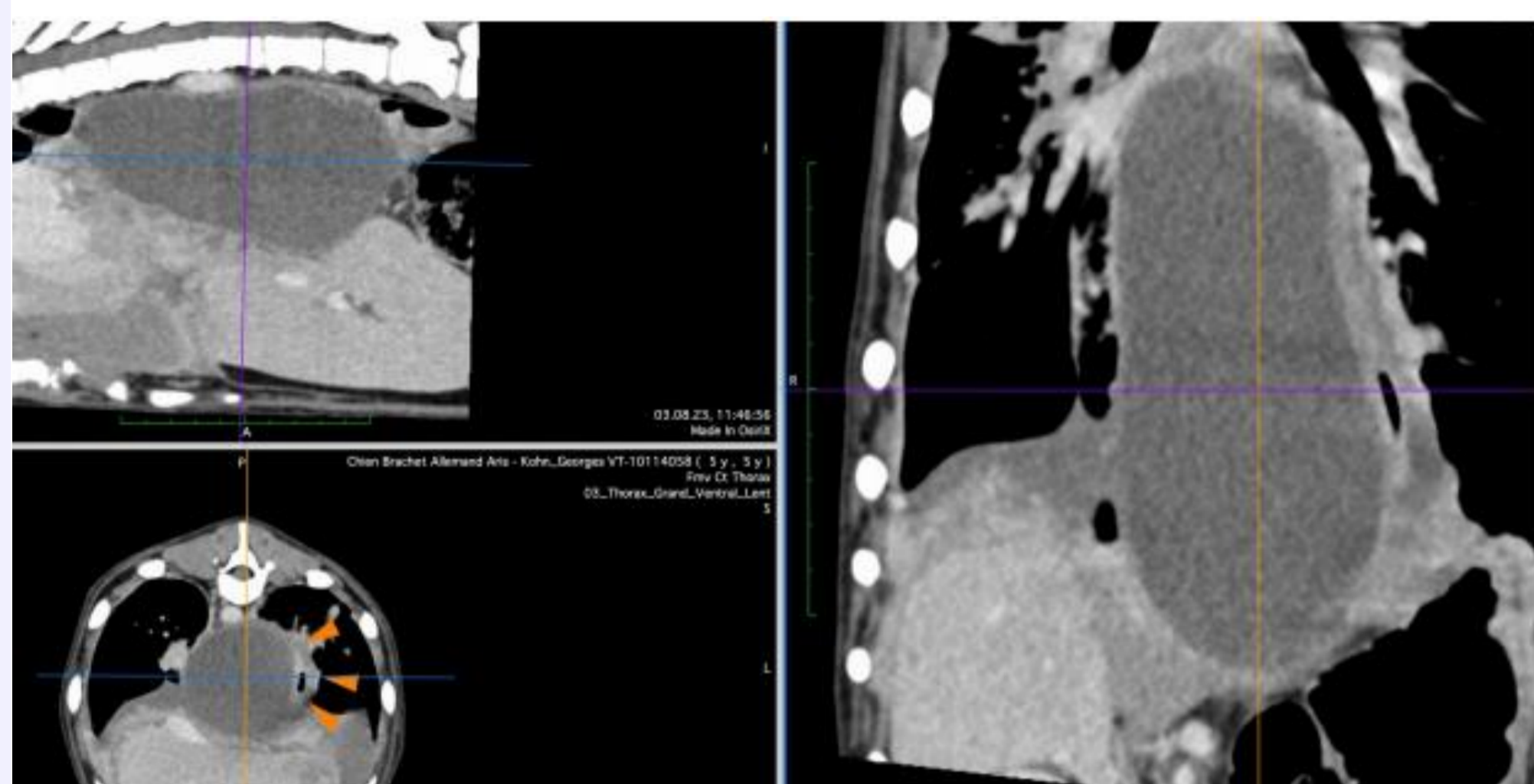


Fig. 1 - Computed tomography of the thorax.  
Credit : Diagnostic imaging service – Clinique Vétérinaire Universitaire

Upon return to the intensive care unit, the dog quickly experienced a CPA, suspected to be secondary to a tension pneumothorax, during the chest tube placement procedure. Per-acute sinus bradycardia occurred, followed within 60 seconds by asystole and loss of a palpable pulse.

OCCPR through a right-sided thoracotomy was immediately initiated without removal of the pericardium.



Fig. 2 – Picture of the patient, one month after discharge.

The team performed direct cardiac compressions, continued manual ventilation and administered atropine and epinephrine, according to RECOVER guidelines. ROSC was achieved within 6 minutes from asystole.

The dog was transferred to surgery for exploratory sternotomy, where the paraoesophageal abscess was drained and removed, the thoracic cavity was lavaged, and the sternotomy and emergency thoracotomy wounds were routinely closed after placement of a chest tube.

Postoperatively, the dog was severely hypoxemic, anemic, hypotensive and hypovolemic. It was managed with high flow nasal oxygen, packed red cell transfusions, fresh frozen plasma and isotonic crystalloid infusions. Critical care echocardiography was used to optimize fluid management.

The dog completely recovered over the next six days: being fully ambulatory and voluntarily eating on discharge.

## Discussion

RECOVER guidelines suggest that promptly performing OCCPR in dogs with pleural space disease may be advisable. Initiating OCCPR earlier might be associated with a better outcome compared with after 20 minutes in dogs.

Guidelines for OCCPR recommend a left-sided thoracotomy as the cardiothoracic structures are described to be more accessible via this approach in dogs and humans. In our patient, a right-sided thoracotomy was performed because the dog was already positioned in left-lateral recumbency and prepped for a right-sided chest tube. Access to the heart was quick and easy and ROSC was achieved quickly, suggesting a right-sided thoracotomy is a valid option to perform OCCPR.

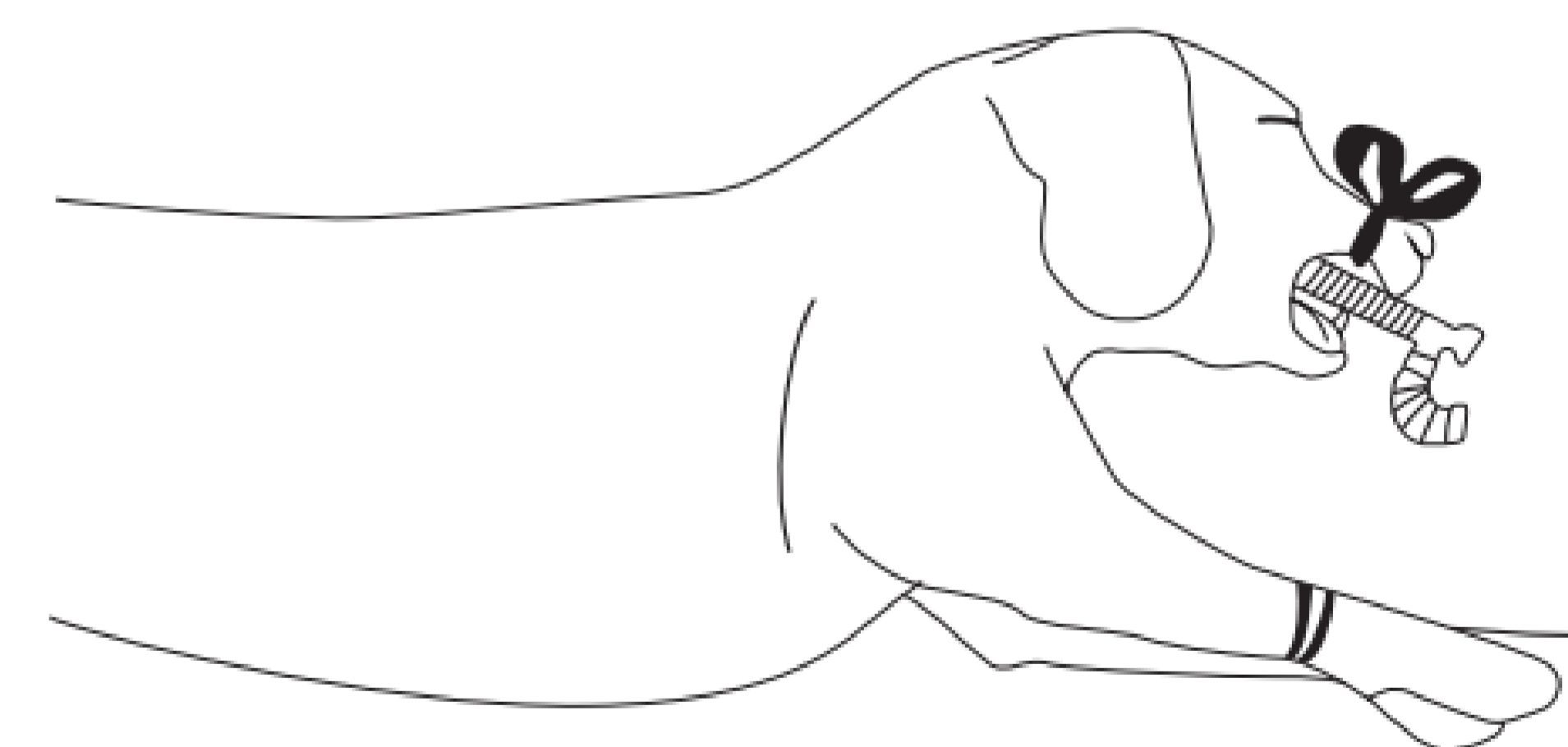


Fig. 3 - Placement of patient and location of incision for emergency thoracotomy to perform internal cardiac massage.  
Credit : Arlene Coulson and Noreen Lewis, An Atlas of Interpretative Radiographic Anatomy of the Dog and Cat, 2nd edition, 2008 (figure 407, page 282).

## Conclusion

This case suggests OCCPR should be considered in dogs undergoing CPA with suspicion of pleural space disease. We recommend that the thoracotomy be performed as quickly as possible in such cases and that a right-sided approach is acceptable, which can avoid delays in repositioning the patient into left-lateral recumbency.