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CLINICAL ARTICLE

Pneumothorax: chest tube placement and outcomes in a Doberman dog

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A 9-year-old intact male Dobermann dog weighing 28.5 kg was presented with acute onset of respiratory distress. The dog was previously healthy with no history of trauma, surgery, or pulmonary disease. Clinical signs included restlessness, exercise intolerance, difficulty in recumbency, and dark discolouration of the tongue suggestive of severe hypoxemia. On clinical examination, the dog showed marked dyspnoea with open-mouth breathing, tachypnoea, tachycardia, and cyanotic mucous membranes. Thoracic auscultation revealed unilaterally diminished lung sounds on the right side and muffled heart sounds, while percussion produced hyper-resonance, indicating intrapleural air. Right lateral and ventrodorsal thoracic radiography confirmed free air within the pleural cavity along with partial rupture and collapse of right middle lung (Figs. 1A & B). Sequential thoracic focused assessment with sonography for trauma (T-FAST) from 10th to 5thintercostal spaces (ICS) showed absence of lung sliding with A-lines; suggestive of pneumothorax. T-FAST cranial to 4th ICS showed presence of lung sliding and B-lines, suggestive of lung intact lobes and delineating its cranio-caudal extent of pneumothorax (Figs. 1C & D).

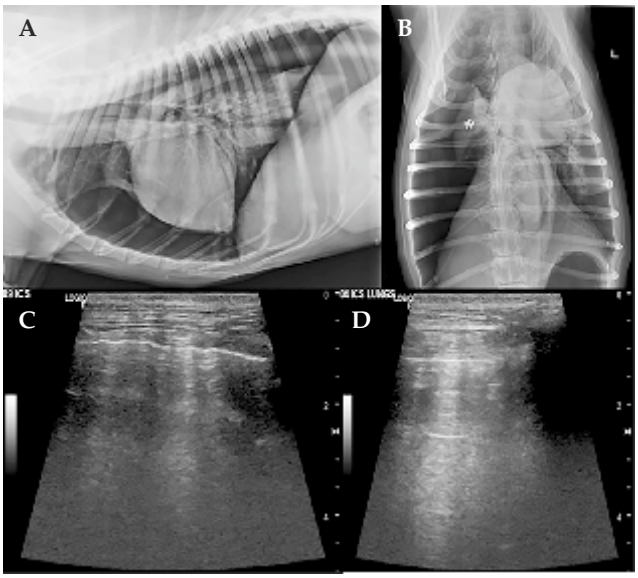

Fig. 1: *(A) Right lateral thoracic radiograph showing pneumothorax with lung retraction and increased radiolucency; (B) Ventro-dorsal thoracic radiograph showing collapse of right middle lung lobe '*'; (C) T-FAST revealed the presence of A-lines, indicative of air within the pleural space, at the 5th to 10th ICS confirming pneumothorax; and (D) T-FAST image showing lung sliding and B-lines, indicative of normal lung.*

Initial stabilization was achieved by repeated air aspiration using a 7 French Gauge (FG) central venous catheter (CVC) placed with a J-wire in the right 7th intercostal space (Seldinger Technique). The patient was preoxygenated for 5 min using 100% oxygen delivered via a face mask prior to induction, followed by pre-operative analgesia with meloxicam (0.2 mg/kg, s.c.) and premedication with butorphanol tartrate (0.2 mg/kg, s.c.). After 15 min, general anaesthesia was induced using midazolam (0.5 mg/kg) and ketamine HCl (5 mg/kg) administered intravenously, followed by endotracheal intubation and maintenance of anaesthesia with isoflurane (0.5–2%) (Figs. 2A to D). Air was aspirated through the catheter twice daily, providing initial relief and partial stabilization (Fig. 2E); however, recurrence of dyspnoea, cyanosis, and blackened tongue was observed after three days (Fig. 2F). Recurrence of clinical signs necessitated definitive management. Under similar anaesthetic protocol mentioned above, a 32 FG thoracic drainage catheter (TDC) was placed via subcutaneous tunnelling from the 10th to 8th intercostal space and connected to a suction apparatus (Figs. 2G to I). Immediate evacuation of intrapleural air resulted in marked clinical improvement, with normalization of oxygen saturation, improved respiratory pattern, and restoration of normal tongue colour. Post-evacuation radiographs confirmed re-expansion of the lung fields, and the patient remained stable with progressive clinical recovery (Figs. 2J and K).

Postoperatively, the patient was maintained on oxygen support with intermittent suction of pleural air twice daily through the thoracic drainage catheter. Fluid therapy was continued as required, along with analgesia using gabapentin (15 mg/kg, t.i.d.) and antibiotic coverage with amoxiclav (12.5 mg/kg, b.i.d.). The catheter site was regularly monitored and aseptically managed, and strict cage rest was advised. Progressive reduction in air accumulation and improvement in respiratory parameters were observed, and the thoracic drainage catheter was removed after 10 days upon complete clinical recovery. Follow-up at 45 days revealed a stable respiratory pattern and normal activity, indicating successful outcome (Fig. 2L).

In canine spontaneous pneumothorax, the Seldinger technique is a minimally invasive and

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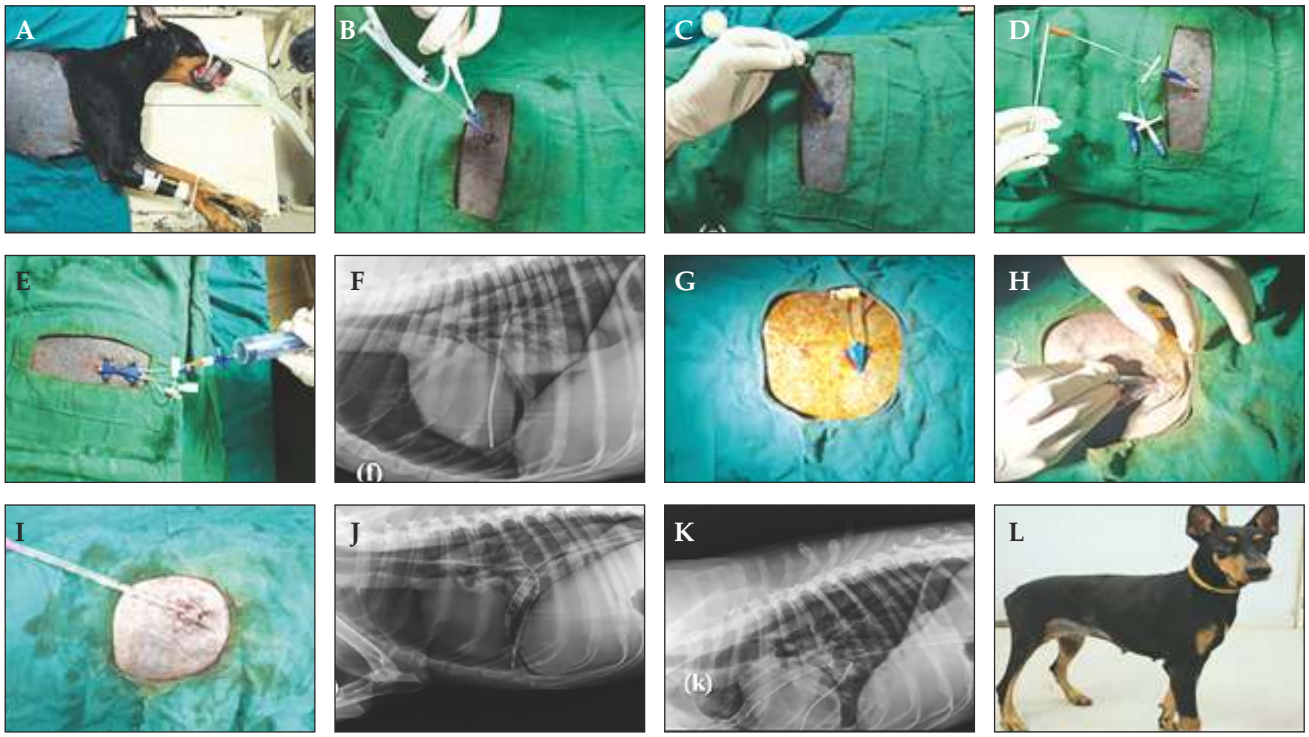

Fig. 2: *(A) Induction, intubation and site preparation for 7FG CVC placement (Seldinger Technique); (B) Percutaneous puncture of 7th ICS; (C) Insertion of 'J'-tipped guidewire; (D) Placement and fixation of CVC; (E) Aspiration of air from pleural space; (F) Post-CVC radiograph showing mild pneumothorax improvement; (G) Aseptic preparation of thoracic wall; (H) Subcutaneous tunnelling for 32 FG TDC insertion; (I) TDC secured using Chinese finger trap technique; (J) Post-placement radiograph showing effective pleural air evacuation; (K) Day 1 radiograph showing TDC in situ with pneumothorax resolved; (L) 45-day follow-up showing complete clinical recovery.*

effective option for low-volume air accumulation. However, in high-volume idiopathic cases, continuous thoracic drainage is more appropriate for sustained evacuation. Although a 16 FG CVC is commonly recommended, it proved insufficient in this case due to the severity of pneumothorax. In the absence of an ideal 20 FG tube, a 32 FG thoracic drain was successfully employed, resulting in effective and sustained resolution.

In canine spontaneous pneumothorax, rupture of pulmonary blebs or bullae is considered the most common underlying cause, particularly in large deep-chested breeds such as Dobermanns (Pawloski and Broaddus, 2010). In the present case, thoracic radiography and T-FAST findings including absent lung sliding and presence of A-lines enabled rapid diagnosis and assessment of the extent of pneumothorax. Initial stabilization using a small-bore central venous catheter placed through the Seldinger technique provided temporary relief; however, recurrence of dyspnoea indicated persistent intrapleural air leakage requiring continuous thoracic drainage. Small-bore wire-guided thoracostomy tubes are considered minimally invasive and effective for pleural drainage in dogs and cats (Boullhesen Williams *et al*., 2022), although in the present case a 32 FG thoracic drainage catheter resulted in successful sustained pleural evacuation and complete clinical recovery.

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