

Traumatic pneumothorax due to iron rod injury in a mare



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SUMMARY

The study reports the successful management of life-threatening pneumothorax in a 10-year-old mare. The mare was presented with the history of iron rod penetration on the ventro-lateral aspect of the left chest, at the level of 10th ICS on the preceding night. The skin wound was sutured by local veterinarian. There was low grade emphysema and mild breathlessness at presentation which increased to severe respiratory distress and whole upper body emphysema within 3 hrs. The pneumothorax was managed with intermittent suctioning of air every 3-4 hrs through a foley's catheter placed as chest tube. The suction interval was gradually increased as the mare showed improvement. The mare showed marked improvement by day 10, both clinically and radiographically. Five month follow up revealed the mare to be healthy with no respiratory distress while walking or running and was doing her regular draft work.

KEY WORDS

Distress, iron rod, injury, pneumothorax, suction.

INTRODUCTION

Horses are predisposed to multiple type of chest trauma due to their agile nature. The aetiology behind these chest traumas are mostly iron rods, wires and angles, to which they ran into or fall on¹. Such traumatic injuries can often lead to pneumothorax which can further develop into subcutaneous emphysema². Such traumatic injuries are life threatening if not addressed on time. The present case report describes the management of a life-threatening pneumothorax and subcutaneous emphysema in a mare due to iron rod injury on the ventro-lateral aspect of the chest.

CASE HISTORY AND PRESENTATION

A 10-year-old non-gravid mare was presented with the history of iron rod penetration on the ventro-lateral aspect of the left chest, at the level of 10th ICS (Figure 1) on the preceding night. The mare fell on the iron rod to which she was tied while sleeping. The local Veterinary Officer has sutured the skin wound but the mare showed development of localized low grade emphysema and mild breathlessness at presentation. The

mare was taking mild feed and water.

TREATMENT

The mare was administered anti-tetanus shot, antibiotic inj. ceftriaxone + tazobactam, at the rate of 20mg/Kg body weight, Intravenous and pain relief with inj. flunixin meglumine, at the rate of 1.1mg/Kg body weight, Intravenous, soon after presentation and was kept under observation. On Auscultation, decreased lung sounds were heard in dorsal lung fields on the left side, while frictional rubs were heard ventrally. Within 3 hrs, the mare started developing subcutaneous emphysema in the chest, neck and flank regions with rapid and shallow respiration. The air suction from chest was done with a 16g needle (Figure 2a) but it was slow with simultaneous development again.

A foley's catheter of 16F was placed in the dorsal region in 10th ICS after aseptic preparation and local infiltration of anaesthesia (inj. lignocaine HCl 2%, 2ml) and by tunnelling method. The air suctioning from foley's catheter was fast. The mare was developing respiratory distress and severe subcutaneous emphysema every 3-4 hrs (Figure 2b). The suction was continued every 4 hrs for the first 3 days and then the period was increased to every 6 hrs followed by every 8 hrs, 12 hrs and once a day. Antibiotics and analgesic were continued for 6 days along with normal saline solution for the first 3 days till the mare started taking feed. The mare showed marked improvement by day 10, both

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clinically and radiographically. The foley's catheter was removed and a stitch was applied at that site and the mare was discharged.

FOLLOW UP AND OUTCOME

Further follow up at four months revealed the mare to be healthy with no respiratory distress while walking or running and was doing her regular draft job (Figure 2c).

RADIOGRAPHY

The lateral chest radiograph showed bilateral pneumothorax with collapsing of dorso-caudal lungs and loss of pulmonary vascular shading in dorsal part of thorax on the day of presentation. The left side (Figure 3a) of thorax was more affected than right side (Figure 3b). The radiograph showed improvement in the amount of lung inflation on day 5 (Figure 3c) and 8 (Figure 3d) but fluid opacity was seen in the ventral chest, masking the heart.

DISCUSSION

Horses are often subjected to chest trauma due to sharp iron objects. When presented, the horse should be thoroughly observed for any respiratory distress, paradoxical movement of chest, rib fractures or subcutaneous emphysema³. Sometimes, the clinical signs appear few hours later when the air start accumulating in the pleural cavity and hinder the lung expansion. Full thickness, chest injuries should also be monitored for arterial blood gas analysis and pulse oximetry to assess the treatment response³, though this was not possible in the present case. Pulse oximetry and arterial blood gas measurements may reveal decreased oxygen saturation (SpO₂) and hypoxemia⁴. The free air in the pleura compresses the lungs and leads to airway closure and is the main cause of V/Q (Ventilation perfusion) imbalance in pneumothorax⁵.

Lateral thoracic radiography is indicated to assess pneumothorax, pneumo-mediastinum, or concurrent pulmonary or pleural complications³. The improvement in the extent of pneumothorax can also be assessed by repeating the radiograph. Once, the external wound is sutured, pneumothorax and sub-

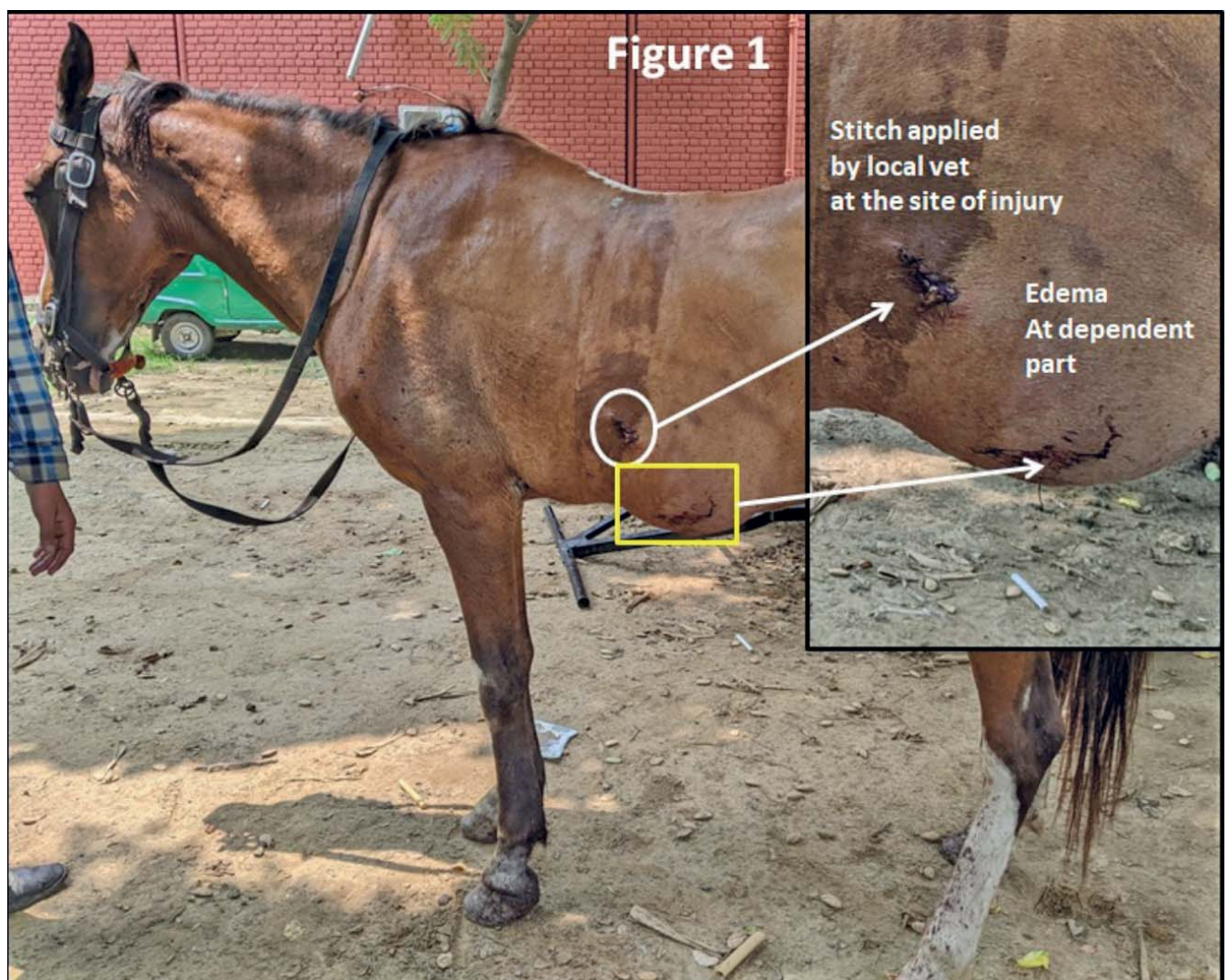


Figure 1 - Photograph of a 10-year-old non-gravid mare presented with the history of iron rod penetration on the ventro-lateral aspect of the left chest, at the level of 10th ICS (white circle). Development of odema ventral to wound is seen (yellow box).

cutaneous emphysema develops. Early placement of a dorsal chest tube or a 10-14 gauge intravenous catheter in the 12th Intercostal space and suctioning of air using a 3 way stop cock is required to relieve the equine⁴.

In the present study, chest tube was not available and needle suction was not sufficient so a foley's catheter was placed at 10th ICS (dorsally) for air suctioning and was managed by blocking it with needle cap when not in use. While, placing

the chest tube or alternate, care should be taken to puncture the chest above the rib and not in between the ribs to avoid damaging the nerves and blood vessels passing beneath the rib⁶. Regular suctioning of air help in relieving pneumothorax and emphysema till the lung wound heals and leakage of air stops.

Proper antimicrobial therapy is indicated in case of penetrating wounds to avoid development of pleurisy^{1,7}.

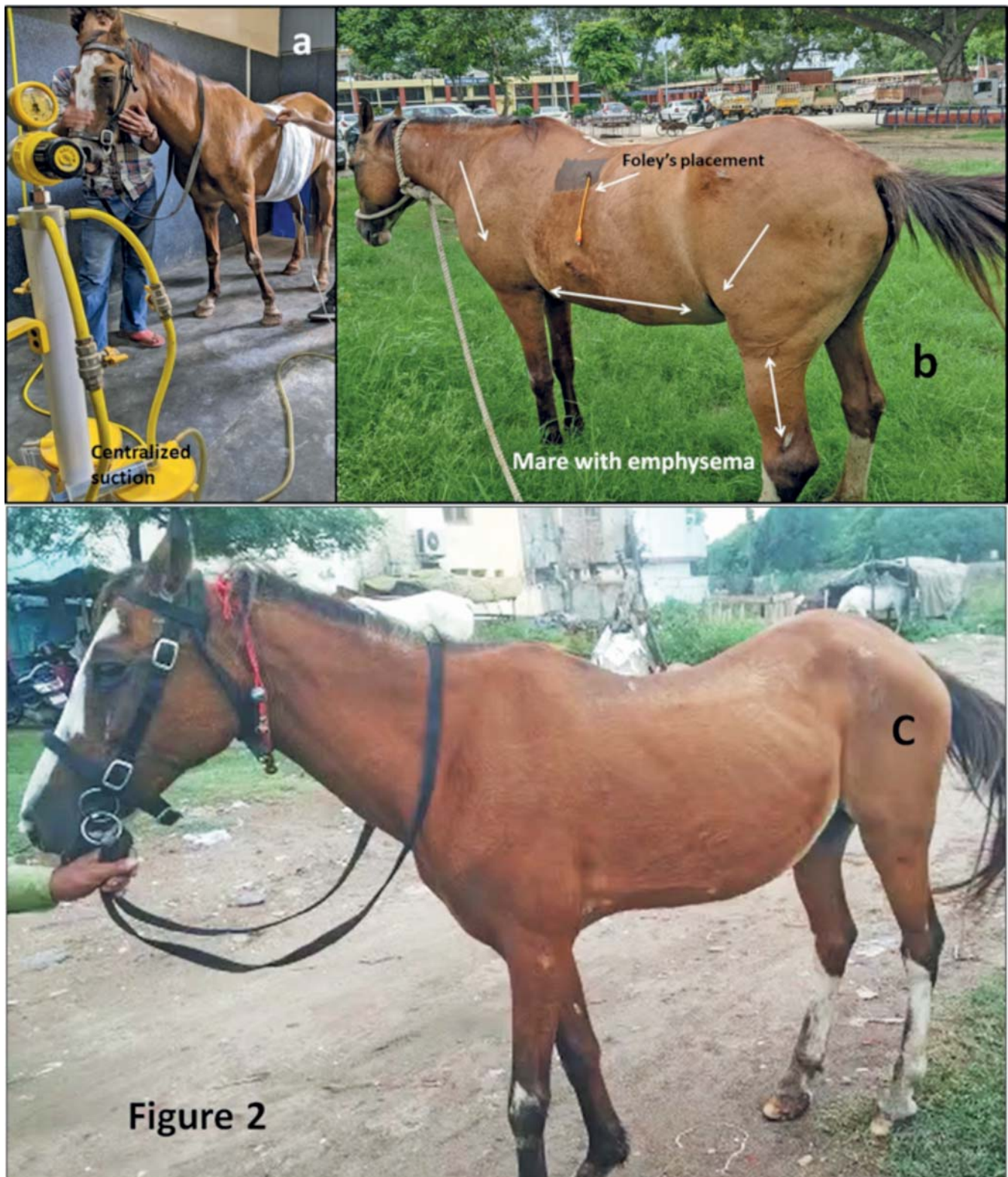


Figure 2 - Photograph of the mare while needle suctioning (a), photograph with severe subcutaneous emphysema (white arrows) (b) and healthy mare at 4 month of follow up (c).

CONCLUSION

A penetrating chest injury may lead to development of pneumothorax and subcutaneous emphysema which need to be monitored and managed timely to save the life of the equine.

CONFLICTS OF INTEREST

The authors have no conflicts of interest with anyone.

AUTHORS CONTRIBUTION

Author SA and HK primarily took care of the mare on regular intervals, Author VS was the radiologist and wrote the manuscript, Author AA placed the chest tube/Foley’s catheter.

ACKNOWLEDGEMENT

The authors are thankful to Rashtriya Krishi Vikas Yojana (RKVY) and Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana, Punjab, India for their support and cooperation in carrying out the study.

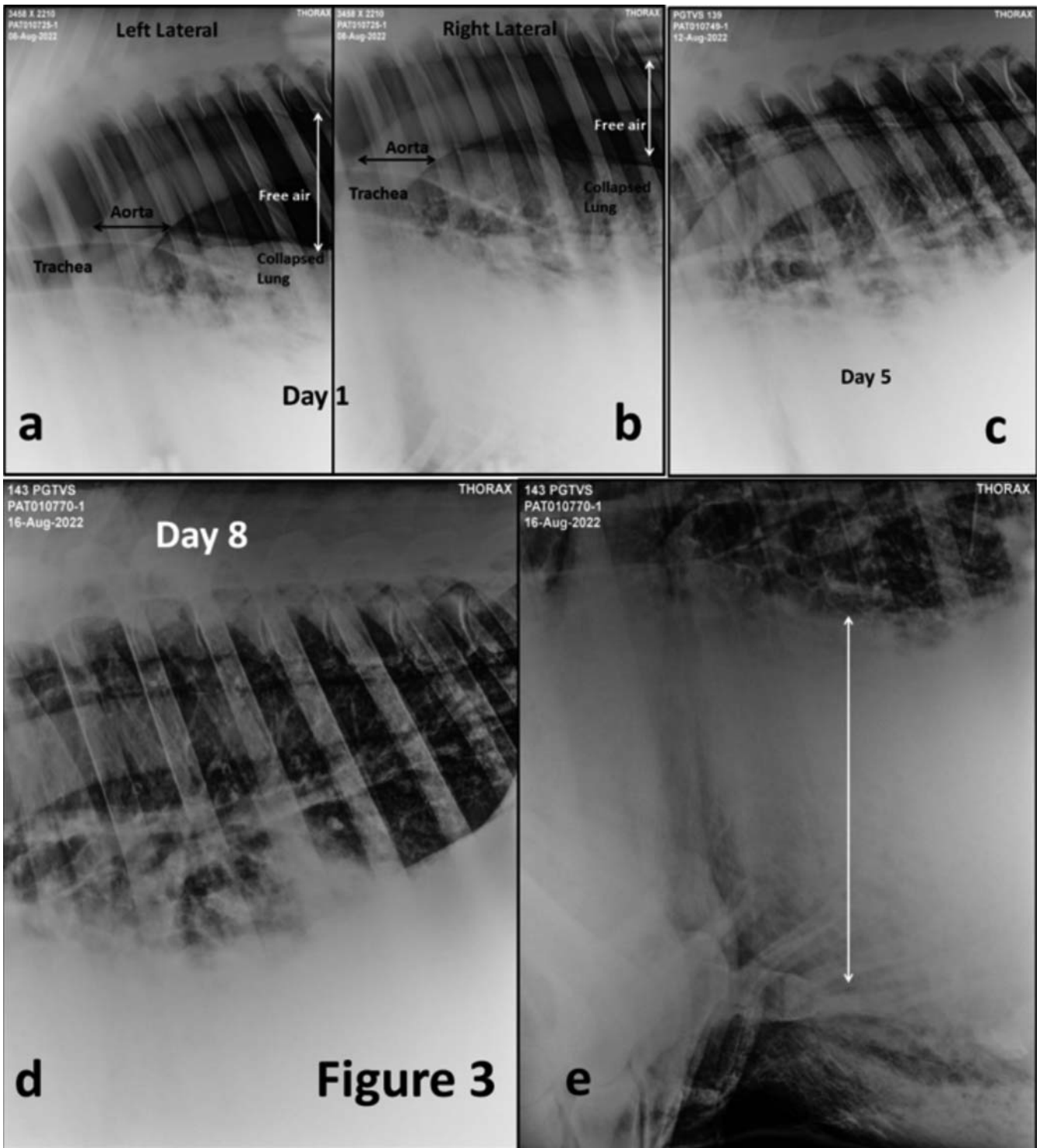


Figure 3 - The lateral chest radiographs (a and b) showing bilateral pneumothorax (black line) with collapsing of dorso-caudal lungs and loss of pulmonary vascular shading in dorsal part of thorax on the day of presentation. The left side (a) of thorax was more affected than right side (b). The radiograph showed improvement in the amount of lung inflation on day 5 (c) and day 8 (d) but fluid opacity (white line) was seen in the ventral chest, masking the heart (e).

References

1. Anand A., Singh K., Sangwan V., Mahajan S. K., Kumar A., Saini N. S. (2011). Surgical management of unilateral open thoracic trauma with multiple rib fractures in a mare. *Ind J Vet Surg*, 32(2); 139-140.
2. Hance S.R., Robertson J.T. (1992). Subcutaneous emphysema from an axillary wound that resulted in pneumomediastinum and bilateral pneumothorax in a horse. *J Am Vet Med Assoc*, 200; 1107-1110.
3. Moore E.E., Feliciano D.V., Mattox K. L. (2003). *Trauma manual*. 4th edition. New York: McGrawHill Medical Pub. Division; 2003.
4. Hassel D.M. (2007). Thoracic Trauma in Horses. *Vet Clin Equine*, 23; 67-80.
5. Stefanik E., Drewnowska O., Lisowska B., Turek B. (2021). Causes, Effects and Methods of Monitoring Gas Exchange Disturbances during Equine General Anaesthesia. *Animals*, 11, 2049. <https://doi.org/10.3390/ani11072049>
6. Kwiatt M., Tarbox A., Seamon M.J., Swaroop M., Cipolla J., Allen C., Hallenbeck S., Davido H. T., Lindsey D. E., Doraiswamy V. A., Galwankar S., Tulman D., Latchana N., Papadimos T. J, Cook C. H., Stawicki S. P. (2014). Thoracostomy tubes: A comprehensive review of complications and related topics. *Int J Crit Illn Inj Sci*, 4 (2); 143-155. DOI: 10.4103/2229-5151.134182
7. Collins M. B., Hodgson D. R., Hutchins D. R. (1994). Pleural effusion associated with acute and chronic pleuropneumonia and pleuritis secondary to thoracic wounds in horses: 43 cases (1982- 1992). *J Am Vet Med Assoc*, 205(12); 1753-1758.