

Diseases of the lower respiratory tract are frequent in horses of all ages. Clinical signs that point to lower respiratory involvement include cough, nasal discharge, increased respiratory rate and/or effort and exercise intolerance along with non-specific signs such as fever, inappetance, lethargy and weight loss. Thoracic auscultation and clinicopathologic findings coupled with clinical signs allow the clinician to suspect pneumonia. With appropriate diagnostics and therapy, horses can recover from pneumonia.

Key Points

- History of **extended transportation** or **exposure to large number of horses** may predispose horses to develop pneumonia.
- Pleuropneumonia occurs in conjunction with pneumonia and may result in significant accumulation of fluid within the thoracic cavity.
- Clinical signs, particularly **cough, fever and increased respiratory rate/effort**, are highly suggestive of pneumonia.
- Diagnostics such as thoracic radiography and ultrasonography allow confirmation of pneumonia; definitive identification of specific pathogens requires bacterial or fungal culture or viral identification.
- Treatment may be prolonged and extensive, but many horses recover from pneumonia.

General Information

Pathogenesis

- Bacterial pneumonia commonly follows viral respiratory infection or another stressful event such as prolonged transport, general anesthesia, intense training or overcrowding. Viral infection may damage respiratory epithelial cells, decrease mucociliary clearance and impair immune function.
- Pleuropneumonia most often occurs in conjunction with pneumonia and results in **significant accumulation of fluid and fibrin in the pleural cavity**.
- Aspiration pneumonia may occur with pharyngeal dysfunction, dysphagia or esophageal obstruction (choke).

Causes

- **Bacterial:** Mixed bacterial infections occur frequently and can include:
 - a. Gram Positive Bacteria: *Streptococcus zooepidemicus*
 - b. Gram Negative Bacteria: *E. coli*, *Pasteurella*, *Klebsiella*
 - c. Anaerobic Bacteria: *Bacteroides fragilis*, *Clostridium sp.*
- **Viral:** Viruses may set the stage for bacteria to invade the lung, thus leading to bacterial pneumonia. Potential viruses that attack the respiratory system include:
 - a. Equine Herpes Virus
 - b. Equine Influenza
 - c. Equine Viral Arteritis Virus
- **Fungal:** Primary fungal pneumonia is rare but may occur, especially in immune-compromised horses. Potential fungi include:
 - d. *Coccidioides*, *Cryptococcus*, *Histoplasma*, and *Aspergillus*

Clinical Signs & Clinicopathologic Abnormalities

- Clinical signs:
 - a. Intermittent fever/lethargy/depression
 - b. Tachypnea
 - c. Nasal discharge
 - d. Cough
 - e. Anorexia/inappetance
 - f. Weight loss (chronic; Figure 1)
 - g. Pleurodynia
 - h. Exercise intolerance
 - i. Abnormal thoracic auscultation (crackles, wheezes)
- **Clinicopathologic Abnormalities**
 - a. Leukopenia (acute) to leukocytosis (chronic)
 - b. Hyperfibrinogenemia
 - c. Hyperglobulinemia
 - d. Hypoproteinemia/Hypoalbuminemia
 - e. Anemia

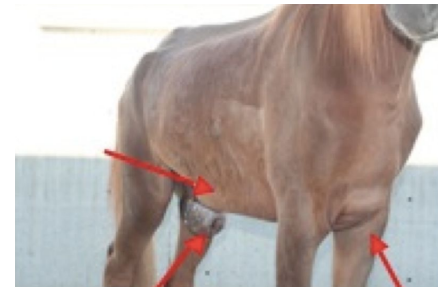


Figure 1: 5 year old gelding demonstrating chronic manifestations of pleuropneumonia. Note the severe weight loss, pectoral edema, ventral edema and preputial edema (See arrows).

Further Diagnostics

- Additional diagnostics to consider in cases of equine pneumonia/pleuropneumonia include:
 - a. **Thoracic Radiography:** Radiopacity of the cranial-ventral and or caudal-ventral thorax is common (Figure 2). Fluid line(s) may also be detected if pleuropneumonia is present. Pulmonary abscesses may be detected in chronic cases of pneumonia.
- **Thoracic Ultrasonography:** May detect free fluid within the pleural space, pleural thickening, fibrin deposition, lung consolidation and pulmonary abscesses (Figure 3).
- **Transtracheal Wash (TTW) with Bacterial culture**
- Gram stain of TTW fluid
- **Collection of pleural fluid (if present)**
 - a. Bacterial culture of fluid
 - b. Gram stain of fluid
 - c. Cell count of fluid
 - d. Total protein concentration of fluid
- **CBC, Serum Biochemistry Profile and Arterial Blood Gas analysis** may guide therapy

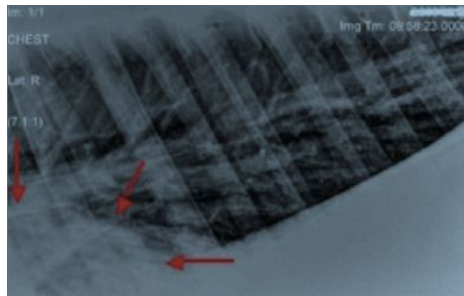


Figure 2: Thoracic radiograph of a horse with pneumonia. Note the radiopacity (severe interstitial to alveolar pattern) of the caudal aspect of the lungs. The dorsal lung fields are normal.

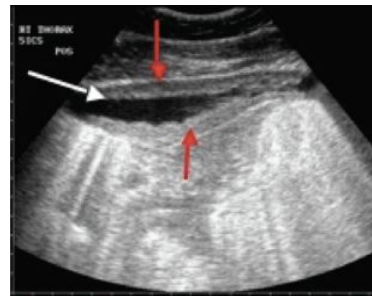


Figure 3: Ultrasonographic appearance of a horse with pleuropneumonia. Note the free fluid within the chest cavity (white arrow) along with the deposition of fibrin on the thoracic wall and lung surface (red arrow).

Treatment

- **Treatment** involves antimicrobial therapy, anti-inflammatory drugs, thoracic drainage (if necessary), and general supportive care (fluid therapy, oxygen supplementation, nutritional support).
 - a. Antimicrobial therapy: ideally based on culture and sensitivity testing. May include penicillin or a cephalosporin coupled with an aminoglycoside; consider metronidazole for anaerobes.
 - b. Anti-inflammatory drugs: judicious use of flunixin meglumine may help with fever, pain, inflammation and general attitude and appetite.
 - c. General supportive care such as maintaining hydration and oxygenation and providing a high calorie, palatable diet are necessary.
 - d. Laminitis can occur as a result of endotoxemia; measures to “prevent” laminitis should be considered.
 - e. Thoracocentesis and indwelling chest tube may be indicated when large amounts of pleural fluid are noted (Figure 4).



Figure 4: Insertion of a thoracic drain into the right hemithorax of a horse with bilateral pleuropneumonia..

Prognosis

- Prompt and aggressive therapy aids in recovery. In general, the prognosis for horses with pneumonia is **fair to good if appropriate therapy is instituted immediately**. Variables such as bacteria involved (anaerobic infections tend to be worse than aerobic infections) and development of complications (laminitis, coagulopathy, hypoproteinemia) may impact prognosis. Prognosis for pleuropneumonia may be guarded to fair; expect long-term therapy and recovery with these cases and be prepared for complications such as laminitis.

Suggested Reviews

- Lower airway diseases of the adult horse. Wilkins PA. Vet Clin North America Equine Pract 2003; 19(1):101-121.
- Bacterial infection of the lower respiratory tract in 34 horses. Racklyeft DJ, Love DN. Aust Vet J 2000;78(8):549-59.
- Aerobic and anaerobic bacterial isolates from horses with pneumonia or pleuropneumonia and antimicrobial susceptibility patterns of the aerobes. Sweeney CR, Colcombe SJ, Barningham SC, Beech J. J Am Vet Med Assoc 1991;198(5):839-42.