# Clinical Technique: Ferret Thoracocentesis

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*Abstract*

**Respiratory distress due to pneumothorax and/or pleural effusion is an emergency situation that must be quickly resolved. Thoracocentesis can be an invaluable lifesaving technique in these patients. This article describes how to perform thoracocentesis in ferrets for therapeutic and diagnostic purposes, with an emphasis on the unique thoracic anatomical differences between ferrets and other domestic species and on potential complications of thoracocentesis. Copyright 2005 Elsevier Inc. All rights reserved.**

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Thoracocentesis—aspiration of air or fluid from the pleural space—may have both therapeutic and diagnostic functions. This procedure may be therapeutic in removing excessive pleural air or fluid that impairs lung expansion. This process also may be diagnostic when a small volume of fluid is sampled for cytologic analysis and culture and sensitivity testing.

Fluid can fill the pleural space from increased hydrostatic pressure, low oncotic pressure, vascular/lymphatic abnormalities, traumatic hemorrhage,coagulopathies, and infectious/inflammatory diseases.[1] More specifically in ferrets, thoracocentesis to remove pleural effusion has been performed in cases of pyothorax[2] and intrathoracic neoplasia.[3] Thoracocentesis also may be implemented to remove pleural fluid in cases of cardiac disease, pneumonia, and heartworm disease. In addition, thoracocentesis may be performed in ferrets to relieve pneumothorax secondary to trauma.[4]

This presentation describes removal of air or fluid from a ferret's pleural space by using a butterfly catheter, three-way stopcock, and syringe. Sterile needles, syringes, and gloves are always used, and the thoracocentesis site is sterilely prepared; however, the site does not need to be draped off.

## Thoracocentesis Sites

Thoracocentesis in dogs or cats involves placing a needle in the seventh to ninth intercostal space caudal to the heart.[5] However, ferrets have a very different thoracic anatomy from dogs, cats, and other small mammals, and it is imperative to be aware of these anatomical differences when performing ferret thoracocentesis. Ferrets have 14 ribs versus 13 in dogs and cats. Additionally, the ferret's heart sits much more caudally in the thorax than in other small mammals, usually extending from the sixth rib to the caudal border of the seventh or eighth rib, with the apex only 1 cm from the diaphragm (Fig 1). This unique anatomy makes thoracocentesis in ferrets generally more difficult than in cats and dogs. Therefore, it is es-

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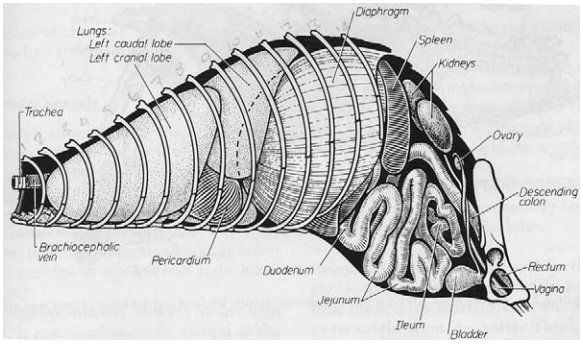


**Figure 1.** Unique anatomy of the ferret thorax. Note the 14 ribs, caudal placement of the heart, and small distance between the apex of the heart and the diaphragm. Reprinted with permission.[6]

sential in ferrets to use thoracic radiography (Fig 2) or thoracic ultrasonography as a guide in choosing a proper thoracocentesis site (Fig 3). As in dogs and cats, in ferrets, the needle is inserted at the junction of the mid- and dorsal third of the thorax to remove air with pneumothorax and at the ventral third of the thorax to remove fluid with pleural effusion.[5]

## Complications of Thoracocentesis

As in dogs and cats, in ferrets, the intercostal artery, vein, and nerve run on the caudal aspect of the ribs. Therefore, the needle must be inserted along the cranial border of the ribs to avoid laceration of these vessels and nerves. Potential complications with thoracocentesis include iatrogenic hemothorax, neuritis, paralysis of the intercostal muscles, iatrogenic pneumothorax from lung laceration, and creation of a hole in the intercostal muscles and skin. Inserting the needle at an oblique angle to the pleural space and advancing the needle parallel to the body wall, with the bevel pointing toward the lungs, minimizes these risks. Additionally, utilizing an over-the-needle styleted catheter in the same fashion as the butterfly catheter reduces the likelihood of lung laceration. However, over-the-needle catheters may kink more easily, necessitating multiple puncture attempts. Less commonly reported complications with thoracocentesis include cardiac and gastric puncture.

## How to Perfom Thoracocentesis

### What You Will Need (Fig 4):

1. A 23- or 25-gauge, ¾ inch long butterfly catheter (SURFLO® Winged Infusion Set, TERUMO®, Terumo Medical Corporation, Tokyo, Japan).
2. Three-way stopcock (Argyle®, Sherwood Medical, St. Louis, MO).

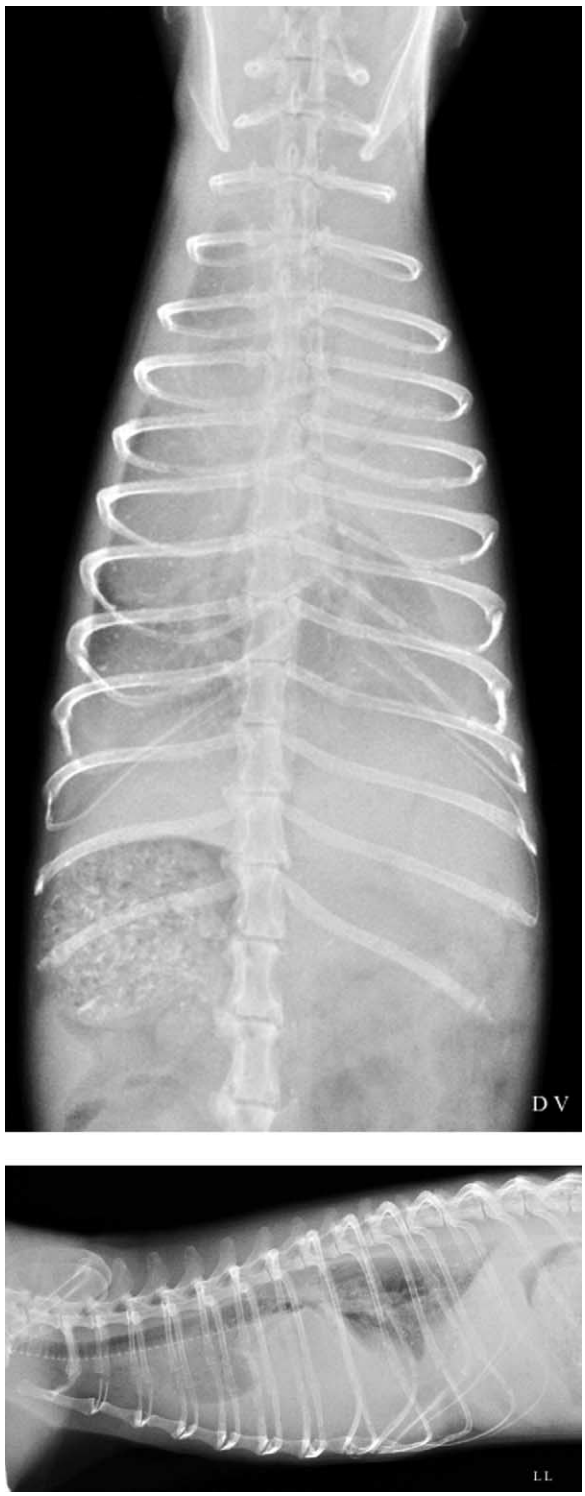


**Figure 2.** Dorsoventral (DV) and lateral (LL) radiographs of a 6-year-old male ferret with a liquothorax due to severe cardiac failure.