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## An Anomaly in the Cat

Fae M. Shawhan  
*Drake University*

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## AN ANOMALY IN THE CAT

F<sup>A</sup>E M. SHAWHAN

The purpose of this paper is to report a case of diaphragmatic hernia which was observed in the study of an embalmed cat received by the Zoology Department of Drake University.

There is no attachment of the diaphragm to any portion of the ventral body wall, although the diaphragm is apparently fully formed and attached both laterally and dorsally. Most of the alimentary canal lies in the thoracic cavity. This includes all of the ileum, all but a small portion of the duodenal loop, and an inch of the large intestine beyond the caecum. All of the pyloric and a portion of the cardiac stomach is anterior to the diaphragm.

The great omentum, normally covering the intestine ventrally, is located in the thoracic cavity between the misplaced intestine and the heart. The gastroph hepatic or lesser omentum, normally extending caudad from the liver to the pyloric portion of the stomach and the duodenum, lies primarily anterior to the diaphragm. Since a large part of the spleen is anterior to the diaphragm the gastro-lineal ligament, between the spleen and cardiac division of the stomach, largely lies in the thoracic cavity.

The heart is reduced in size and is situated definitely in the left half of the thoracic cavity, rather than in the usual median position. It is about an inch posterior to the normal location.

Three lobes of the liver are anterior to the diaphragm and two posterior to it. Those in the thorax are much reduced in size. One lobe extends far enough anteriorly to cover ventrally, the entire posterior portion of the heart. The gall bladder is situated anterior to the diaphragm, and both the bile and pancreatic ducts enter that portion of the duodenum which is in the thoracic cavity.

The lungs are very much crowded and reduced in size, but otherwise appear to be normal. The right lung is pushed into a more median position, with one of the right lobes of the liver occupying part of the space normally occupied by the lung. Aside from a general reduction in size, the ovaries, kidneys and their ducts appear to be normal in structure and position.

The ventral portion of the diaphragm, which is the region where this hernia has occurred, is formed embryologically from the septum transversum. The lateral regions are formed from the pleuro-

peritoneal membrane, and derivatives from the body wall. The dorsal median area comes from the dorsal mesentery. From the standpoint of embryonic development, it seems possible that the ventral portion of the diaphragm may not have developed normally from the septum transversum.

Summarizing: There is no connection in this cat of the ventral side of the diaphragm with the ventral body wall. There is no spread or opening in the diaphragmatic muscles fibers themselves. With the exception of the urogenital organs and a portion of the large intestine, all the abdominal viscera have migrated to the thoracic cavity.

Three possibilities present themselves: First, the possibility of force, perhaps through accidental rupturing of this portion of the diaphragm, this force pushing these organs into the thoracic cavity; Second, the possibility that the unusual position of these organs has been brought about through freak embryonic development; Third, force, perhaps through accident, exerted against a weak or improperly formed ventral portion of the diaphragm in its embryonic development from the septum transversum.

DRAKE UNIVERSITY,  
DES MOINES, IOWA