

62 (994)

Notes on surgical pathology in the dog.By **W. HOWARD BARBER** and **JOHN W. DRAPER.**

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I. DIAPHRAGMATIC HERNIA INTO THE PERICARDIAL CAVITY AS CAUSE OF SUDDEN DEATH.

A French poodle, fully grown and bred to extreme fineness, was noticed by his owner, a highly trained observer, to "save himself" in play and for this reason was suspected of having heart-disease. Except for these periods of rest, taken at unexpected and unusual times, the animal appeared physically perfect.

On January 12, 1915, the dog developed general convulsions which lasted one half hour, at the end of which he died. The autopsy, performed the following morning, revealed the following:

1. "*Thorax-Lungs.*—Right slightly congested posteriorly. Left deeply congested throughout.

"*Heart.*—Pericardial sac large. Right heart compressed by three lobes of liver, gall bladder, and great omentum, 7 by 15 cm. Liver and omentum congested. Gall bladder empty and connected with liver remaining within the abdomen by elongated adhesive band. Deficiency in pericardium measured 3 cm. in diameter and reinforced by fibrous tissue. Deficiency of equal size in central tendon of diaphragm. No hernial sac found.

2. "*Liver.*—Portion within pericardial sac shows extreme passive congestion and fibrosis, indicating that the circulatory obstruction caused by its position has been of long duration. Free portion shows moderate fat infiltration.

"*Edge of Diaphragmatic Opening.*—Appears well rounded and is covered by endothelium,—evidently a congenital defect."

Many phrenic hernias in man have been reported to date.¹ Grosser and Thoma, alone, have collected 433 cases. Leaming's radiograms of Freeman's case² showed ante-mortem practically

¹ Keen's "Surg.," Vol. 4, p. 93.

² Lockwood, Diseases of Stomach, plate XI, p. 406.

the entire colon in the chest. It entered the mediastinum in front of the heart curving backward over that organ. The liver was transposed. The hernia was through the right side. Besides the true and the false varieties, there is the analogous condition of eventration of the diaphragm. This is defined,¹ as a dislocation cephalad of the abdominal viscera, particularly of the stomach, on the left side under an abnormally high position of the left vault of the diaphragm. The hernia herewith reported is believed to be a congenital true diaphragmatic one, unique, in that part of the liver as well as the gall bladder and the omentum were found within the pericardial cavity.

Respecting the mechanism of such a hernia,² Cunningham says: "The diaphragm is occasionally deficient in the human subject producing hernia either through the central tendon into the pericardial cavity or through the lateral portions of the muscle into the thoracic cavity."³ Keibel and Mall, describing the developments of the body cavities holds, "In the rabbit the pericardial coelom ends in two dorsal and two ventral recesses, all four of which connect subsequently with the peritoneal coelom. However, only the dorsal recesses break into the peritoneal coelom in the human embryo, and it is this recess or canal which later on encircles the lung and probably forms the main anlage of the pleural coelom."

2. BILATERAL NEPHROLITHIASIS AND RIGHT URETERAL CALCULUS.

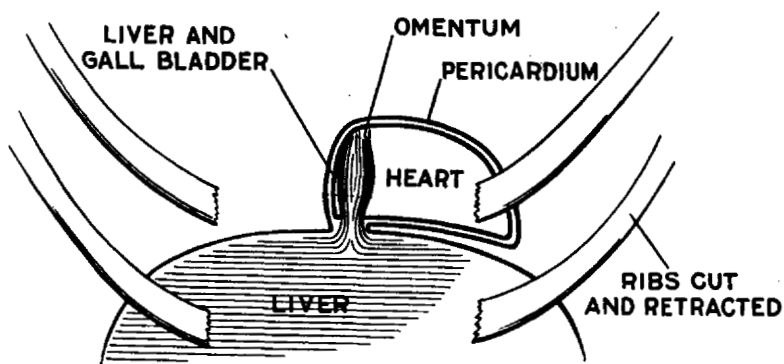
A Dalmatian hound (187 B 2), female, and medium sized had had both ureters transplanted into the sigmoid. The animal lived nine days. At autopsy on the right side a dilated kidney pelvis and a dilated ureter were found. The pelvis contained many small rounded calculi and the ureter a larger elongated stone cephalad to the uretero-colonic anastomosis. On the left side, also, was found a hydronephrosis with a pelvic cast. The ureter on the left side was dilated cephalad only.

This selective ureteral dilatation has been noted several times in a series of uretero-sigmoidal transplantations. An attempt

¹ Sailer and Rhein, *Am. Jr. Med. Sci.*, Vol. CXXIX, p. 688.

² D. J. Cunningham, "Text-Book Anat.," Ed. 2, p. 426.

³ Keibel and Mall, "Human Embryology," Vol. I, p. 526.

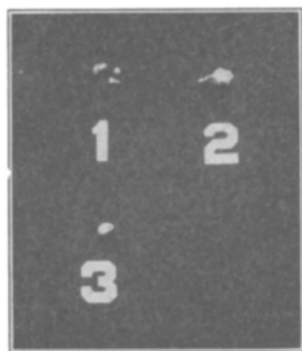


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DIAGRAM SHOWING HERNIAL OPENING IN DIAPHRAGM AND PERICARDIUM THROUGH WHICH PROTRUDED OMENTUM, LIVER, AND GALL-BLADDER. The right heart was deeply grooved by the liver lobes, which had compressed it during growth.



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3

MUSCLE THINNED OUT, LEAVING DELICATE EDGE OF TISSUE FORMING PART OF BORDER OF HERNIAL OPENING IN DIAPHRAGM. Microscopical findings of remaining border: "Edge of *diaphragmatic opening* appears well rounded and is covered by endothelium, evidently a congenital defect."

CALCULI FROM KIDNEYS AND URETER OF DOG WITH TRANSPLANTED URETER: (1) From right pelvis. (2) From left pelvis. (3) From right ureter. ($\frac{1}{4}$ actual size.)

has been made to reduce the inevitable resistance at the point of anastomosis to within the physiological limit for the necessarily impaired ureter. When this resistance is too great the first evidence of physiological strain appears as a dilatation of the cephalad ureter. This dilatation has been noted at varying dis-

tances from the kidney pelvis. Other factors being constant, it seems that the length of the hydroureter from the uretero-pelvic junction varies directly with the duration of the terminal overload.

63 (995)

The resistance to mechanical injury of the erythrocytes of different species.

By **PEYTON ROUS** and **J. R. TURNER.**

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As the first step in an analysis of the conditions under which red cells will survive *in vitro*, we have studied the effects of handling them, as in washing. That this may entail injury is suggested by the work of Meltzer,¹ who noted that a few minutes' shaking of whole blood hastens considerably the disintegration of the erythrocytes.

Our experiments show that in citrated plasma the red cells of the dog, rabbit, sheep and man withstand well the handling incident to ordinary washing. They may be centrifugalized and suspended again and again without hemolysis. The case is entirely different when cells in salt solution are repeatedly washed and suspended. Except in the case of human cells this entails marked injury, which expresses itself either in an immediate slight hemolysis, or more often in a shortening of the time during which the cells remain intact.

The protective action of plasma, even when dilute, is well shown when washed cells are suspended in it and in isotonic salt solution, and shaken. Hemolysis occurs much sooner in the salt solution. The experiments have brought out striking differences in the fragility of the red cells of different species—and, to a less degree, of different individuals. Dog cells shaken in the salt solution undergo a marked and almost immediate hemolysis. Rabbit corpuscles are somewhat less sensitive, and sheep corpuscles even less so, while the red cells of man are markedly

¹ Meltzer, S. J., *Johns Hopkins Hosp. Bull.*, 1900, IX, 134.