# Remarkable Case of Volvulus in a Calf, due to Aplasia of the Mesentery.

By WERNER STECK, Dr.Med.Vet., Research Officer, Onderstepoort.

THE pathological condition described in these pages is such a rare occurrence that it seemed worth being recorded. In the literature accessible here no similar cases have been described.

## HISTORY.

Bull-calf, born in the experimental herd on 6th December, 1923. It has never been reported as sick, and from the 6th February, 1924, to the 9th March, 1924, when the temperature was taken daily in order to test the pathogenicity of some material injected intravenously, no fever nor other signs of illness were recorded.

In the early morning of the 10th March, 1924, the animal was found dead in the stable.

## POST-MORTEM EXAMINATION.

Bull-calf: three months, red and white.
Interim: two hours.
Rigor mortis present.
Condition: good.
Abdomen: sunken.
Integument: nothing unusual.
Natural openings: eyes slightly sunken, conjunctiva yellowish red.
M.M. of mouth and nose cyanotic.
Blood: dark red, stains well.
Flesh: pale reddish brown, moist.
Subcutis contains normal fat tissue.
Peritoneal cavity contains a large amount of a red turbid liquid. A portion of the small intestine shows a deep red colour. A volvulus is suspected and the small intestine carefully examined *in situ*. A peculiar knot is detected in the small intestine and at the same time the absence of a long mesentery from a considerable part of the small intestine.

As soon as the inspection led to suspect an extraordinary condition, I fixed the small intestine in different places by means of strings and exenterated the whole of the small intestine plus stomachs plus part of the large intestine together, in order to prevent changes of position of the different parts involved. The stomachs were found normal and removed from the preparation. The rest was immediately transferred to Jores fixation fluid in order to render possible a careful examination at a later date.

* I am indebted to my colleague Dr. Robinson, who carried out the autopsy, for directing my attention to the case and allowing me to use his report on the organs apart from the intestinal tract.

Diaphragm: nothing unusual.
Thoracic cavity: nothing unusual.
Salivary glands: moist.
Thyroids: nothing unusual.
Mandibular lymph glands: moist on cut surface.
Suprapharyngeal lymph glands: slightly enlarged, bluish red, and moist on cut surface.
Mediastinal and bronchial lymph glands: bluish red, moist, and slightly enlarged.
Tongue: nothing unusual.
Pharynx: pale bluish red.
Oesophagus: nothing unusual.
Larynx: contains a small amount of greenish transparent mucus. Vessels slightly injected.
Trachea: vessels slightly injected.
Lungs: not collapsed. Pleura smooth, glistening, and transparent; surface bluish red, cut surface brick red, consistence as usual.
Pericardium: nothing unusual.
Heart: normal size and shape. Few red spots on epicard. Left ventricle in systole. Right ventricle partly dilated. Left ventricle contains a small red blood-clot, the right ventricle a large red blood-clot. Both endocards nothing unusual. Valves nothing unusual. Myocard measures 2 cm. on left, 1 cm. on right side; it is pale brown, transparent, and of normal consistence.
Liver: normal size. Capsule nothing unusual. Surface bluish brown. On cut surface lobulation distinct.
Spleen: 37 by 11 by 1 cm. Capsule nothing unusual. On cut surface trabeculae and follicles not distinct. Pulp pale brownish red, consistence normal.
Adrenals: nothing unusual.
Kidneys: fat-capsule well developed. Fibrous-capsule strips easily; surface pale brown. On cut surface the cortex appears light brown and shows a distinct radiary striation. Medulla bluish red, both transparent; consistence normal.
Stomach: 1 to 4, nothing unusual.
Small and large intestine removed.
Urinary bladder contains a small amount of pale yellow urine.
Sexual organs: nothing unusual.
Brain: nothing unusual.

*Pathological Diagnosis.*

Slight hyperaemia of lungs.
Ecchymoses on epicard.
Slight hyperaemia of kidneys.
Volvulus of small intestine.
Haemoperitoneum.
Cause of death: volvulus.

The intestines, having been exenterated and fixed with the precautions mentioned, were examined later, with the following result:—

(1) The last portion of the small intestine measuring 2 metres is not suspended by the mesentery, but was lying free in the abdominal cavity. The mesentery in this part is reduced to a free seam of about 2 cm. breadth, and entirely covered by the serosa. It contains

artery, veins, and mesenterial lymph glands. The veins are enormously distended with blood. The mesenteric serosa which is of course continuous with the serous coat of the intestine, appears glistening and perfectly smooth. Nowhere are any adhesions to be detected with the serosa of the neighbouring viscera. Fig. 2 gives a cross-section through this part of the affected viscus.

(2) The knot in the small intestine when examined without untying it is found to have come about in the following way. See fig. 1).

The first change must have been a torsion of 180° of a loop formed by the abnormally (by reduction of the mesentery) free intestine (fig. 3, I, II). The loop thus formed was fixed by a neighbouring part entering the opening thus presented. Once a large portion of the small intestine had slipped through, its weight pulled on the parts forming the first loop and the knot got tied tightly.

The part of the small intestine which finally had entered the loop, measured 4 metres, of which a little more than 2 metres dragged the mesentery with them. (See fig. 1.) The wall shows a deep red colour and on incision the lumen is found filled with a dark red, now coagulated, material.

Although the complete absence of adhesions or free filaments suggested, already on macroscopical examination, that the reduction of the mesentery could not have had occurred recently, a careful histological examination was carried out.

The material being fixed in Jores I was partly embedded in paraffin, partly in celloidine, and partly cut on the freezing microtome. The sections were stained with haematoxyline-eosine, haematoxyline-Van Gieson, Weigert's fibrin stain, and Helly's modification of Giemsa's stain. Fig. 3 gives the general topography.

Two cylindric bodies are joined by an isthmus of loose connective tissue. They are covered by a common serous coat which, besides a thin fibrinous covering, does not present any alterations. One of these cylindrical bodies is the intestinal canal; the other contains the organs which under normal conditions are found in the mesentery.

The intestinal lumen is filled with a granular material staining red with eosine, yellow with Van Gieson, and containing but a few débris which take basic stains. It seems that it consists mainly of the fragments of red blood corpuscles.

The innermost layer of the mucosa has lost its structure completely. A large number of erythrocytes, few neutrophiles, are thrown together with epithelial débris.

In the depths of the mucous membrane the epithelial crypts are separated and deformed by the dense infiltration of the propria with red cells.

The central portion of the propria (towards the lumen) and the lumina of the epithelial crypts in the peripheral portion are teeming with bacteria of varying size and shape, chiefly rods. In many places they are found in dense colony-like masses. In the sub-mucosa the blood-vessels are distended with blood. The same marked vascular injection can be seen in serosa and sub-serosa. Not infrequently haemorrhages are met with alongside the blood-vessels.

In the mesenterial portion we find the sections of three lymph glands, a large vein, a large artery, and a few smaller blood-vessels, all embedded in fat-tissue. The vein is much distended with blood,

the arteries are not contracted. The three lymph nodes resemble each other: they all show enormous distention of the small blood-vessels with blood. Numerous erythrocytes are found outside the blood-vessels, in the marginal and medullary sinuses, together with numerous neutrophile leucocytes and a few cells of the habitus of macrophages.

In many places these macrophages are found in considerable number, and packed with phagocyted red cells.

There are no indications of any previous inflammatory or reparatory activity.

## Summary.

(1) A three-month-old bull-calf dies suddenly as a result of a complicated volvulus.

(2) This volvulus is due to a reduction of the mesentery (probably congenital) in a part of the small intestine, which allows a part to slip through the loop formed by a torsion of 180 degrees of the neighbouring loop and so to fix that loop.

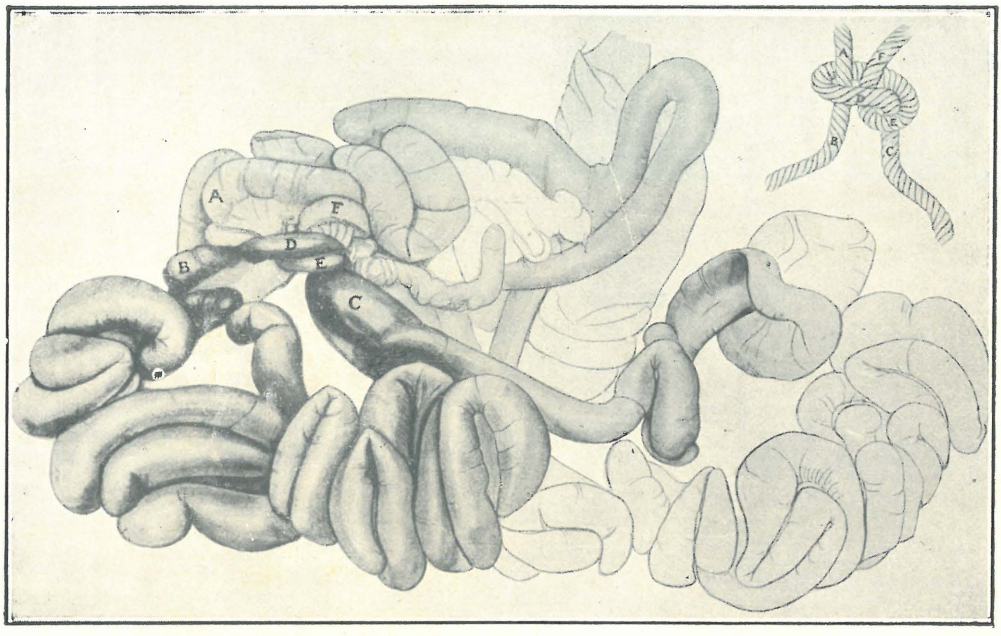


Fig. 1.

*Volvulus in Calf.*] [*Werner Steck.*

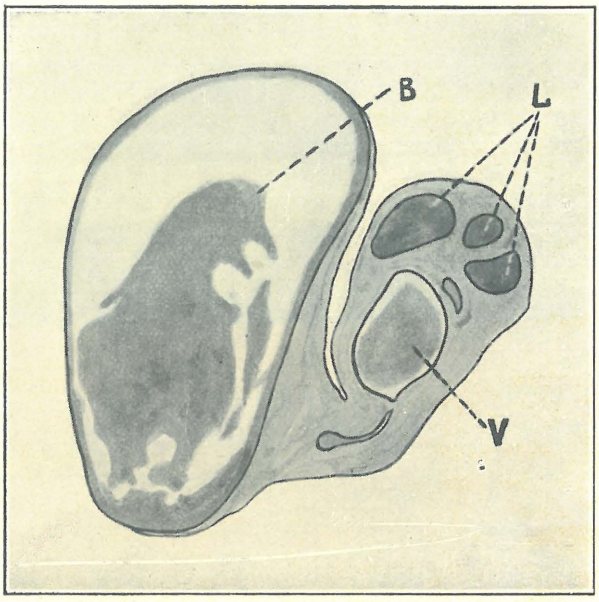


Fig. 2.

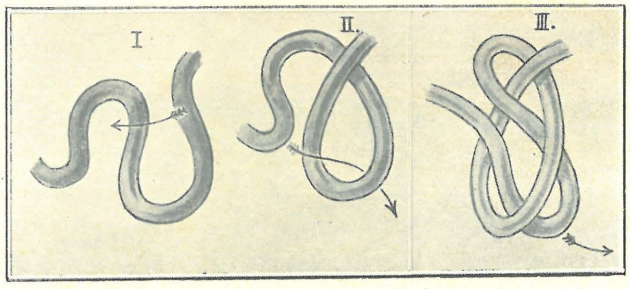


Fig. 3.

*Volvulus in Calf.*] [*Werner Steck.*