

Mesenteric Tear (Rent), Jejunal Volvulus, Torsion and Entrapment in a Kalahari Red Nanny Goat: Post Mortem Case Report and Literature Review

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Abstract: The purpose of this report is to present a post-mortem case report of a fifth parity nanny goat which died from complications associated with a mesenteric rent (tear) of the small intestine. Such lesions have not been reported in the same animal. The cadaver was examined using the standard post-mortem procedure. Results showed that a defect of the mesentery was the initial lesion that was then followed by volvulus, torsion and then entrapment of the jejunum and part of the ileum. Anatomically and physiologically this sequence is plausible and expected more often in intestinal obstructive conditions at necropsy.

Key words: Necropsy • Obstruction • Condition • Goat

INTRODUCTION

Obstructive conditions of the small intestines can either be complete or incomplete obstructions [1]. Whether complete or otherwise, these lesions fundamentally involve interference with organ blood circulation by pressure arising from within as well or without the tubular organ resulting in occlusion of the lumen of the organ. Four types of small intestinal obstructions have been recognized. These obstructions normally lead to organ hyperemia/congestion leading to ischemic necrosis of the affected part. Such obstructive conditions include *volvulus*, *torsion*, *intussusception* and *entrapment* or *strangulation* or *incarceration* [2]. According to Zachary and McGavin [3] *volvulus* is the twisting of an organ along its longitudinal axis whereas *torsion* involves twisting of an organ about the axis of its mesentery and Radostits *et al.* [2] define *volvulus*, is the twisting of the intestine and *torsion* is the twisting of the mesentery. Martis *et al.* [4] define *intussusception* as the telescoping of a proximal part of a tubular organ into its more distal part, usually as a result of increased peristalsis in the more proximal part. Entrapment is the imbrication of an intestinal mass which attempt to pass

through a natural (foramen) or pathological rent in the mesentery. In all cases free flow of blood in the wall and within the lumen is compromised. Many authors have reported incidence of *torsion*, *volvulus*, *intussusception* and *entrapment* in different species including humans independently as simple uncomplicated lesions [5-7]. The conditions appear to be most common in horses [8], followed by cattle [5, 9] and then pigs [10], in that order, in large animals. The conditions are also prevalent in dogs and cats [11] and even in man. [4] Small intestinal obstructions have also been reported in cetaceans and in dugongs [6]. Several anatomical, physiological and dietary causes have been implicated in the aetiology of these conditions [7, 9, 12]. Laxity of the abdominal wall, absence of mesenteric fat, physical exercise, abdominal trauma, constipation or diarrhoea and pregnancy, parasites and genetic inheritance have all been pointed out as possible causes of *volvulus* [12]. Diagnoses of small intestinal obstructions in small ruminants are rare [1, 2]. While these lesions are frequently reported at post mortem, combinations of these lesions have only been, occasionally, reported [12]. *Torsion*, *volvulus* and *incarceration* have not been reported in the same necropsy case. Weygaerde *et al.* [8] have reported a case

of volvulus and intussusception and Catalano *et al.* [13] published a case report of entrapment, volvulus and intussusception in the horse. It is surprising that volvulus and torsion are not frequently reported together or in combination with incarceration or entrapment. Increased peristalsis is likely to cause more entanglement of the intestines [14]. According to Vaez-Zadeh *et al.* [12], increased peristalsis occurs just before and after volvulus has set in, as a response to pain. If this were the case, then a lot of simple torsions and volvulus should always progress to combinations of these lesions.

We report a case of complications of one form of lesion leading to another or other such lesions resulting in a combination of *volvulus*, *torsion* and *entrapment*. *Volvulus*, *torsion* and *strangulation* or *incarceration* or *entrapment* have neither been previously reported in a Kalahari Red goat nor was it in Namibia.

Case Presentation: A 4.5-year-old Kalahari Red nanny was presented to the post mortem hall for an autopsy after having died over the previous week end. A month earlier, the nanny had shown signs of acute illness including inappetence, grunting, rolling and kicking at the abdomen. After the initial bout, the signs seemed to have abated, but the nanny continued to lose weight until it fell ill again, became anorexic and died four days later. Its kid was foster fed because the nanny was not producing any milk.

The animal was taken to the post mortem hall for a necropsy. The cadaver was put in the standard right lateral recumbent position and a *necropsy* was performed following the standard head to tail procedure after external inspection as described by King *et al.* [15].

On external inspection, the cadaver showed a rough coat, with sunken eyes and dull mucous membranes. Examination of the head, neck and thorax did not yield any significant findings save for a slightly increased hydrothorax (50ml). In the abdomen, there was a definite ascites of up to 300 ml. Everything else seemed normal until *hyperemia* was observed from around the distal third of the jejunum to the *ileo-caecal* junction (the jejunal flange) (see plate 1). The hyperaemia was most pronounced on the right side of the mesentery. After turning the cadaver from right lateral to left lateral recumbency a more dramatic picture of the pathology emerged. The jejunal flange appeared like it was tied into a knot. The *prosector* noticed that the *jejunum* was tucked from the right to left through what looked like a rent in the wall of the *mesentery* (see plate 3). The jejunal flange was tightly tucked into the mesenteric rent (see plate 2) that was limited by a ring of *mesenteric* vessels. The distal part of the *jejunum* could be easily pulled out from the mesenteric defect for about 20cm until it became impossible to continue. From the distal end of the *ileum* it could only be pulled out for a centimetre then it was stuck. As a result, the ileum was only partly involved in the lesion.

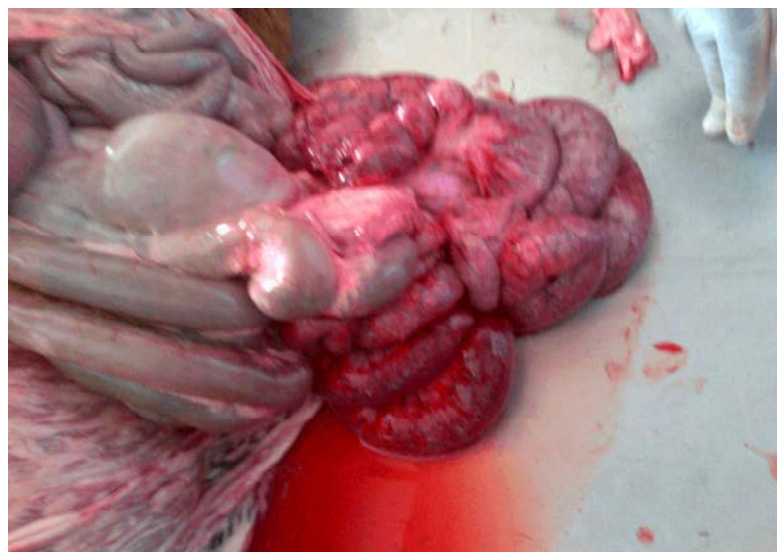


Plate 1: The hyperaemic small intestine mainly jejunum. Note: The reddening and engorgement of the jejunal veins is a result of congestion

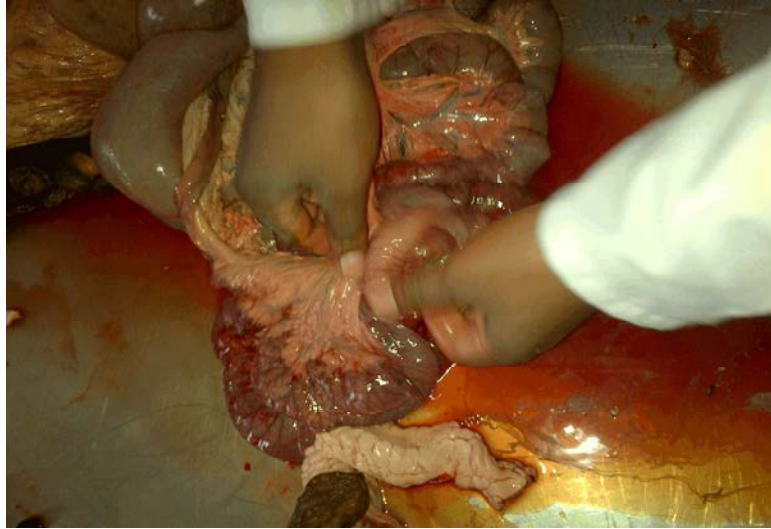


Plate 2. Prosector showing a piece of jejunum being pulled out of the rent (under right thumb)

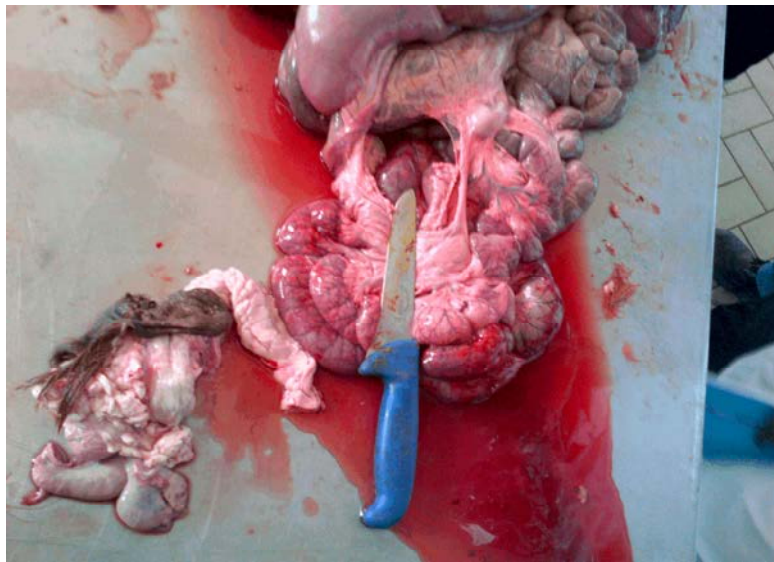


Plate 3: The tip of the knife shows the rent after the duodenum has been pulled out. The prominence of mesenteric veins is a sign of the entrapment occluding venous blood flow.

Then the animal returned to right lateral recumbency in order to re-examine the left side of the *mesentery*. A piece of the distal *jejunum* could be clearly seen twisted into a conical shape whose tip was on the left side of the *mesentery*. A diagnosis of mesenteric rent, *volvulus*, *torsion* and entrapment was reached.

DISCUSSIONS

In the present report the initial lesion was a rent of the mesentery into which a loop of distal jejunum had entered from the right side of the mesentery in the region

cranio-dorsal to the *ileo-cecal* fold. The piece of jejunum first underwent rotation of 180 degrees about its own longitudinal axis (*volvulus*) in order for it to enter the mesenteric rent. This *volvulus* was the second stage of the pathogenesis.

The piece of *jejunum* then started to twist itself in a clockwise direction (*corkscrew* motion). As more and more of the piece of intestine forced itself through and twisted itself in the clockwise direction, the defect increased in diameter until it was limited by large mesenteric vessels and it could not proceed further. As peristaltic waves passed down the affected portion of the intestine,

a cock-screw motion twisted the piece of intestinal loop and pushed it further through the rent, resulting in a third component of the pathology (torsion).

As more and more of the twisted loop was forced through the rent, the imbrication by the limits of the rent became tighter and hence the incarceration or strangulation or entrapment. A diagnosis of mesenteric rent, volvulus, torsion and entrapment (strangulation or incarceration) was made on the basis of the gross appearance of the lesions.

Our findings are of combinations of mesenteric tear, volvulus, torsion and incarceration in the goat intestine are novel and have not been described elsewhere. We hypothesise that, such findings should be common place, given that primary volvulus or torsion should cause pain which in turn should cause increased peristalsis [12].

According to Vaez-Zadeh [12], relaxation of the abdominal wall, reduced mesenteric fat, violence to the abdomen and consumption of bulky indigestible materials can lead to volvulus. Our goat had given birth a few weeks previously leading to a relaxed abdominal wall. Whether the straining during labour or butting in the abdomen by other goats or sheep could have resulted in a mesenteric tear is a matter of conjecture. Furthermore, poor rainfall around Neudamm can also explain the poor forage which may also independently lead to volvulus and the attendant complications. The goats were also fed hay and this particular goat was in poor body condition and hence reduced mesenteric fat; factors which in their own right, could also lead to volvulus. It is surprising; however, that only one animal has been reported so far.

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