pISSN 1598-298X
J Vet Clin 31(6) : 544-546 (2014)

Journal of Veterinary Clinics
www.ksvc.or.kr

Uterine Torsion Associated with Hydrometra and Pyometra in a Domestic Rabbit

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(Accepted: September 29, 2014)

Abstract : A 1.5-year-old, female domestic rabbit was diagnosed with uterine torsion accompanying hydrometra of the right uterine horn and pyometra of the left horn. The exploratory laparotomy revealed the torsion of bilateral uterine horns in the region of the uterine cervix. No growth was detected in fluid collected from the right horn of the uterus; however, Gram-positive micrococcus and bacilli were cultured from the left horn. The pathophysiology of the simultaneous occurrence of these disorders was suspected considering that abdominal distension progressed over 4 months and the rabbit's condition deteriorated abruptly within 2 days, hydrometra was the initial disease and then infection to the left uterine horn and torsion developed later due to the large volume of fluid within the uterus. This report is the first case showing uterine torsion accompanying hydrometra and pyometra in each uterine horn.

Key words **:** rabbit, uterine torsion, hydrometra, pyometra.

Introduction

The reproductive organs of female rabbits are primitive (5). The uterus consists of two independent horns each of which has its own cervix. Disorders related to the reproductive tract are common in rabbits, including uterine adenocarcinoma, uterine torsion, pyometra, hydrometra, endometrial venous aneurysm, and abortion (1,4,6,8,9).

The most common underlying cause for uterine torsion is pregnancy (7); otherwise, uterine torsion is rare in most species (3,7). Three cases of uterine torsion have been reported in rabbits as a sole disorder or concomitant with hydrometra or metritis (3). Uterine torsion has a poor prognosis because of ischemia and tearing of the uterine wall. The external symptoms of this disorder vary widely from vaginal discharge to shock (3,7). In addition, hydrometra or pyometra also show vague clinical signs such as abdominal distension, anorexia, and weakness. Therefore, it is difficult to distinguish reproductive disorders based on the clinical manifestations.

This report describes a pet rabbit with uterine torsion concomitant with hydrometra and pyometra separately in each uterine horn. This rabbit had never been bred. This case is the first report of the development of uterine torsion accompanying hydrometra and pyometra.

Case

A 1.5-year-old, female domestic rabbit was presented with intermittent anorexia and severe abdominal distension over a 4 month period. The rabbit was a pet animal housed alone. The rabbit had no history of breeding.

Thoracic radiographs were within normal limits. Abdominal radiographs revealed severe abdominal distension with decreased abdominal detail (Fig 1). In the lateral view, a large, multi-lobulated mass with distinct soft tissue opacity occupied the middle to caudal abdomen and displaced the stomach and small intestine cranially and the colon dorsally. The multi-lobulated mass was located bilaterally in the periphery on the ventrodorsal view. The mass was suspected to have originated from the uterus, considering its location. Anechoic fluid was contained within well-defined walls of the multi-lobulated mass on ultrasonography. Because the cystic mass was very large and other abdominal organs were located in the cranial abdomen, detailed scanning could not be performed. A complete blood count and serum chemistry values were within normal limits except a moderately elevated glucose (275 mg/dl; reference range, 74-145 mg/dl).

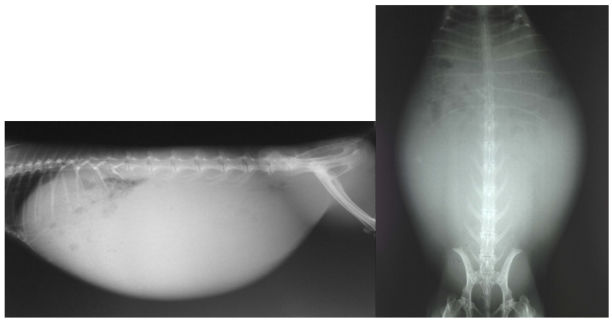

Fig 1. Radiography of the rabbit. Note severe abdominal distension with a large multilobulated mass and decreased abdominal detail. The mass displaced the stomach and small intestine cranially.

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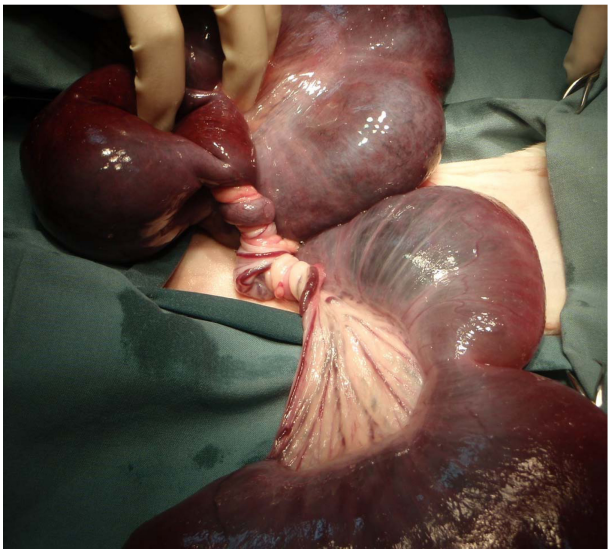

Fig 2. Gross examination. Severely dilated and congested left and right horns of the uterus. Note the uterine torsion at cervix.

Based on the blood test and diagnostic imaging results, the cystic mass was suspected to have originated from the uterus. Hydrometra or pyometra was tentatively diagnosed, and exploratory surgery was planned. However, the owner refused additional examinations and therapy.

The rabbit was presented as an emergency 2 days later due to acute severe depression, lethargy, and shock. A physical examination disclosed severe cachexia, abdominal distension, and increased respiratory rate. Fluid thrill was evident on abdominal palpation. Uterine centesis was not attempted preoperatively, because the risk of uterine rupture could not be ruled out. Extensive infusion of fluid, an intravenous injection of 15 mg/kg metronidazole (Metrynal inj, Daihan Pham, Ansan, Korea), and an intramuscular injection of 10 mg/kg trimethoprim-sulfamethoxazole (Kingvaline, Samyang Anypharm, Pocheon, Korea) were performed preoperatively. Anesthesia was induced and maintained with an intramuscular injection of 5 mg/kg xylazine (Rompun 2% inj. Bayer, Ansan, Korea) and 35 mg/kg ketamine (Ketamine HCl, Yuhan, Cheongwon, Korea). An extremely enlarged uterus occupied most of the entire abdomen during the exploratory laparotomy. The bilateral horns of the uterus were filled with a large volume of fluid and were congested. They were also rotated in the region of the uterine cervix; the left horn about 540° and the right horn about 180° in the ventral direction, respectively. The serosal surface of the left horn of the uterus was darker than the right horn. No evidence of a uterine wall tear or rupture of the uterine ligaments was detected. Bilateral ovaries were normal in appearance. An ovariohysterectomy was performed.

The resected uterus contained 380 ml of yellowish serosanguinous fluid in the right horn. The content of the right horn of the uterus was approximately 450 ml of dark red, inspissated, exudated material encircled by the uterine wall of variable thickness. The fluid collected from each uterine horn was cultured. No growth was detected in fluid collected from the right horn of the uterus; however, Gram-positive micrococcus and bacilli were cultured from the left horn. Finally, uterine torsion associated with hydrometra of the right uterine horn and pyometra of the left horn was diagnosed. The rabbit failed to recover from the anesthetic. A uterine tumor was ruled out histopathologically.

Discussion

Uterine torsion is a rare reproductive disease, and only three cases have been reported in rabbits, which were associated with pregnancy, hydrometra, or metritis (3,7). In the present case, the bilateral horns of the uterus were rotated in a ventral direction at the uterine cervix with the left horn at about 540° and the right horn at about 180°. This result was compatible with the laparotomy or necropsy findings of previous uterine torsion cases; the left uterine horn twists in a wider range than the right horn which is less mobile (7). The uterine ligaments of rabbits have a narrow and pendulous nature and this anatomical characteristic allows for uterine torsion (7). Uterine torsion can develop during sudden movement of the animal and it can readily occur due an enlarged uterus such as during pregnancy. Uterine torsion can also be caused by contraction of the uterus during parturition (7). Therefore, pregnancy is the most common underlying cause of uterine torsion and except that the uterine torsion is rarely reported.

Other concomitant disorders in rabbits with uterine torsion are hydrometra and metritis (2,3,5). The pathophysiology of hydrometra in rabbits is unclear (2,5). Pseudo-pregnancy can occur in rabbits after self-induced ovulation (2). Abnormal elevated progesterone concentrations during pseudo-pregnancy may be an underlying factor because this hormone stimulates secretion from the endometrial glands with cervical closure (5). However, in previous cases (2,5) plasma progesterone concentrations were low and similar to unmated rabbits or ovarian histology disclosed no persistent corpus luteum. In addition, many rabbits that develop hydrometra including this case have not been mated. Therefore, this hypothesis did not explain the underlying cause of hydrometra.

The most common bacteria associated with pyometra and metritis in rabbits is Pasteurella multocida, although Chlamydia, Listeria monocytogenes, Staphylococcus aureus, Moraxella bovis, Brucella melitensis, and Salmonella have also been reported (4). In this case, Gram-positive micrococcus and bacilli were isolated from the left uterine horn. In a previous rabbit (3) with hydrometra and uterine torsion, inflammation was not present; however, the authors considered that it was possible that pyometra may have been present at one time and that the causative organism was eliminated. However, in our case, the characteristics of fluid obtained from each uterine horn were quite different, and there was no evidence of inflammation from the right uterine horn.

Uterine torsion concurrent with hydrometra and pyometra in each horn of the uterus was identified in our case and is the first report. The pathophysiology of the simultaneous occurrence of these disorders is unknown. Rabbits have separate uterine horns and a uterine body; therefore, infection to only one side of the uterus can develop. Considering that abdominal distension progressed over 4 months and the rabbit's condition deteriorated abruptly within 2 days, hydrome-

tra was the initial disease and then infection to the left uterine horn and torsion developed later due to the large volume of fluid within the uterus. Mummification or incomplete resorption of feti due to abortion can cause pyometra of a one-sided uterine horn but this rabbit had never been bred.

Clinical signs caused by uterine disorders vary. Bright red blood staining the vagina was the only external sign in a previous uterine torsion case (7). Hydrometra usually produces no clinical signs. However, if the uterus is too large to cause ischemia of the uterine wall or compress the adjacent organs, abdominal distension and decreased appetite are observed (2). These animals frequently die or must be euthanized. Hydrometra is fatal in about 50% of affected rabbits. The clinical signs of the present case were similar to the previous cases of uterine torsion and hydrometra or metritis and also to cases with only hydrometra (2,3,5,7). Based on the clinical manifestations, it was impossible to distinguish the reproductive disorders and determine the case's prognosis.

Uterine diseases can be ambiguous on diagnostic imaging. Most uterine disorders usually show a soft tissue mass at the caudal abdomen on radiography. Ultrasonography can provide more useful information to distinguish uterine disorders including the features of the wall and contents of the uterus and to identify the presence of a uterine mass. However, the uterus usually contains a large volume of fluid in a severely dilated uterus under torsion, so it is difficult to identify the presence of torsion. Ultrasonographic differences in uterine contents can be present or absent in hydrometra and pyometra. Pyometra usually contains more hyperechoic sludge than hydrometra, but this may not be noticeable in many cases. Thus, an exploratory laparotomy is necessary to confirm the final diagnosis as in this case.

Diuresis with furosemide can be attempted to relieve the clinical signs of hydrometra, but it only improves condition over the short term (2). Uterine size can be reduced by withdrawing fluid; however, there is a risk of uterine rupture. Therefore, ovariohysterectomy should be performed. Moreover, a definitive diagnosis can be made through an exploratory laparotomy in most cases, as conservative therapy using diuretics and intravenous fluid infusion is not suitable for rabbits with uterine disorders.

Conclusion

We reported a pet rabbit with uterine torsion concomitant with hydrometra and pyometra in each uterine horn. The progesterone concentration was not measured in this case; thus, the relationship between a hormone effect and the development of hydrometra or pyometra could not be estimated. In addition, the order of the incidence among uterine torsion, hydrometra, and pyometra in this case could not be explained. However, considering the uterine structure in rabbits, an isolated infection on one side of a uterine horn due to uterine torsion occurs rarely, particularly in a closed uterus.

Acknowledgement

This study was supported, in part, by the Animal Medical Institute of Chonnam National University.

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애완 토끼에서 자궁수종, 자궁축농증, 자궁염전의 병발 증례

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요 약 : 식욕 부진과 복부 팽만을 보인 1.5살령의 암컷 토끼가 방사선 검사와 초음파 검사에서 자궁 확장 소견이 확인되었고, 이틀 후 쇼크로 응급 내원하여 탐색적 개복술을 실시하였다. 양측 자궁각이 자궁 경부에서 염전되어 있었고, 양측 자궁각의 내용물에 대한 배양 검사 결과 우측 자궁각은 자궁수종, 좌측 자궁각은 자궁축농증이 발생한 것으로 진단되었다. 질병의 발생 기전에 대해 정확하게 설명하기 어렵지만, 복부 팽만이 4개월간 지속되다가 갑자기 토끼 상태가 악화되어 쇼크로 진행된 점으로 미루어 초기에 자궁수종이 발생하였다가 감염 및 자궁 내 다량의 내용물로 인한 자궁염전이 급성으로 발생한 것으로 판단되었다. 본 증례는 각각의 자궁각에 자궁수종과 자궁축농증이 별도로 발생하고 염전이 동반된 매우 드문 예이다.

주요어 : 토끼, 자궁염전, 자궁수종, 자궁축농증