



Serum biochemistry and hematological profile of a cat with three mummified fetuses

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ABSTRACT

Serum biochemistry and hematological values are used to determine the outcome of diseases in both animals and humans. In the presented scientific report, hematological and biochemical findings were defined in the cat, which was shaped as three mummified fetuses. A 12-month-old cat, which was mated 38 days ago, was brought to the Kastamonu University Veterinary Faculty Obstetrics and Gynecology Clinic with complaints of vomiting, anorexia, and polydipsia. After the preliminary clinical examination, it was observed in the ultrasonographic examination that the fetus had no heartbeat and the hyperechoic areas increased. The mummified fetus was diagnosed. Fetal mummification is occasional in cats and has been reported. Blood samples were taken for serum biochemistry and hematological analysis. Considering that serum biochemistry and hematological analyzes are important in cases of mummified fetuses in cats, this case report is presented. However, both hematological and biochemical parameters were within the reference ranges. Ovariohysterectomy was performed under general anesthesia. Seven days after the surgery, the wound from the operation was completely healed.

Keywords: Mummification; ovariohysterectomy; queen; serum amyloid A (*Source: CAB*).

RESUMEN

Los valores bioquímicos y hematológicos del suero se utilizan para determinar el resultado de enfermedades tanto en animales como en humanos. En el informe científico presentado, se definieron hallazgos hematológicos y bioquímicos en la gata, que fue formada como tres fetos momificados. Una gata de 12 meses - que fue apareado hace 38 días - con quejas de vómitos, anorexia y polidipsia fue llevado a la Clínica de Obstetricia y Ginecología de la Facultad de Veterinaria de la Universidad de Kastamonu. Después del examen clínico preliminar, se observó en el examen ultrasonográfico que el feto no tenía latidos cardíacos y las áreas hiperecoicas estaban aumentadas. El feto momificado fue diagnosticado. La momificación fetal es ocasional en las gatas y ha sido reportada. Se tomaron muestras de sangre para bioquímica sérica y análisis hematológico. Este informe de caso se presenta teniendo en cuenta que la bioquímica sérica y los análisis hematológicos son importantes en casos de fetos momificados en gatas. Sin embargo, tanto los parámetros hematológicos como bioquímicos se encontraban dentro de los rangos de referencia. La ovariohisterectomía se realizó bajo anestesia general. La herida de la operación estaba completamente curada siete días después de la cirugía.

Palabras clave: Momificación; ovariohisterectomía; reina; amiloide sérico A (*Fuente: CAB*).

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INTRODUCTION

Pregnancy loss can occur at any stage of pregnancy in dogs and cats. Fetal/embryonic resorption, abortion of a dead or live fetus, stillbirth or fetal death, mummification, and remaining in the uterus cavity longer than normal delivery time is seen. Whether the fetus is absorbed, aborted, retained as stillbirth or mummified tissue depends on the cause of pregnancy loss, the gestational stage at which death occurs, and maternal and fetal responses (1). A series of morphological alterations that occurs to a fetus that dies and is retained in the uterus is called fetal mummification. After the death of the fetus the fetal fluid will be reabsorbed by the uterus with the persistence of corpus luteum is called fetal mummification. Without abortion, it is an undesirable sequel to fetal death often after complete ossification of bones. The fetus appears dry, shrunken, and its skin wrinkled (2). Although fetal mummification is occasionally diagnosed in many domesticated species such as cows, goats, horses, sheep, cats, and dogs, its incidence in pigs is higher than in other species (3).

Serum biochemistry and hematological values are used to determine the outcome of diseases in animals (4). The acute phase response occurs shortly after any tissue damage in humans and animals and refers to a complex and nonspecific reaction. The source of the response depends on infection, traumatic, immunological, neoplastic, or other causes, and the purpose of the response is to regulate homeostasis and eliminate the cause of its disorder. Acute phase proteins (APPs) are known to include fibrinogen, C-reactive protein (CRP), haptoglobin, alfa- 1 acid glycoprotein, and serum amyloid A (SAA) (5,6).

Fetal mummification is occasional in cats and has been reported. The objectives of this report are the en-block ovariohysterectomy approach (I), hematological evaluation (II), measurement of SAA, which is one of the APPs (III), and evaluation of some serum biochemical parameters (IV) in the fetal mummification case.

CASE REPORT

Thirty-eight days after mating, a 12-month-old female cat weighing 3.60 kg was taken to a Kastamonu University Veterinary Faculty Obstetrics and Gynecology Clinic with the

complaint of vaginal discharge that continued for seven days.

It was reported that the cat had lost its appetite and that it had thrown up. A cachectic state together with significant wasting was noticed during the clinical evaluation.

To analyze the blood profile, a sample of the patient's blood was taken. Analyses of the patient's blood were carried out with the assistance of an automatic hematology analyzer system (MS4Se, France). Hematology profile was as follows; white blood cells (WBC) 7.78 uL (5.00- 15.00), red blood cell (RBC) 8.11 uL (5.00- 10.00), hematocrit (HCT) 40.30% (24.00- 45.00), mean cell volume (MCV) 49.80 fl (39.00- 55.00), mean cell hemoglobin (MCH) 13.30 pg (13.00- 21.00), mean cell hemoglobin concentration (MCHC) 24.80 g/dl (28.00-40.00).

To conduct the biochemical study on the serum, blood samples were drawn into vacutainers that did not include any anticoagulants. After being separated by centrifugation at 5,000 rpm for 8 minutes, the serum was stored in a freezer at -18°C until it was required. Serum amyloid A was performed using the FINECARE-VET device (Guangzhou, P.R. China). Serum biochemical analyses were performed with the automatic biochemistry analyzer device (Gesam Chem 200, Italy). The findings of the serum biochemistry tests are summarized in Table 1.

Table 1. Serum amyloid A and biochemical results Wycislo et al (7).

Parameter (Unit)	Result	Reference range
SAA (ng/L)	9.70	*
ALP (IU/L)	45.00	5-149
ALT (IU/L)	61.00	6-96
GGT (IU/L)	6.00	*
AST (IU/L)	44.80	16-79
Albumin (g/dl)	2.80	2.7-4.3
Total bilirubine (mg/dl)	0.07	0.1-0.3
Direct bilirubin (mg/dl)	0.05	*
Creatinine (mg/dl)	1.18	0.4-1.3
Total protein (g/dl)	5.70	5.8-9.4
Urea (mg/dl)	33.00	*
Glucose (mg/dl)	82.00	*
Triglycerides (mg/dl)	50.00	*
Cholesterol (mg/dl)	106.00	65-180

SAA: serum amyloid A, ALP: alkaline phosphatase, ALT: alanine aminotransferase, GGT: γ -glutamyltransferase, AST: aspartate aminotransferase. *: not valued

In the USG examination performed by transabdominal ultrasonography using a 5 MHz convex probe in M-mode (Ultrasound scanner, SIUI CTS-5500V PLUS, China), it was determined that the hyperechogenic area in the uterus was concentrated, the amnion and allantois disappeared, and without the fetal heartbeat (Figure 1).



Figure 1. Ultrasonography imaging of the uterus, red arrow: mummified fetus

Laparotomy was performed under general anesthesia. The patient was premedicated with atropine sulfate (0.02mg/kg). The general anesthesia protocol was performed by applying the combination of Xylazine hydrochloride and Ketamine hydrochloride as described by Safak et al (8). A ventral midline was preferred for the surgery. A flat incision was given between the umbilicus to the pelvis in the linea alba. After laparotomy, uterine horns were carefully pulled out of the incision line (Figure 2A.) It was below each ovary to ligate the ovarian blood vessels using absorbable PGLA (USP:2/0, Medeks, Turkey), and then an En-block ovariohysterectomy was performed (Figure 2B). The abdominal wall and skin were closed with an absorbable PGLA (USP:2/0, Medeks, Turkey) suture.

Postoperatively, the uterine wall was opened (Figure 2C) and three mummified fetuses with brown mud color were detected (Figure 2D). The cat recovered completely from anesthesia without any complications approximately 2 hours after the operation. Post-operatively, enrofloxacin (5 mg/kg) and meloxicam (0.25 mg/kg) were administered subcutaneously for five days. During the time after surgery, the patient was checked on about once every seven days for about a month. After 7 days, the wound from the surgery was completely healed. But it was seen that his health in general got better without any problems. She went back to being healthy.

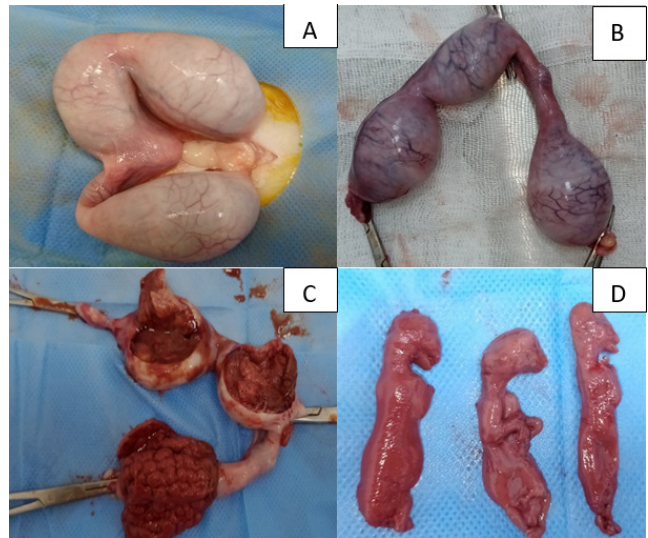


Figure 2. A: Uterine horns were pulled out of the incision line, B: En-block ovariohysterectomy was performed, C: The uterine wall was opened, D: The three mummified fetuses that were obtained after the surgery.

DISCUSSION

Ovariohysterectomy is successfully applied in mummified fetus cases in cats (9) and dogs (10). In this study, we investigated the hematological and serum chemistry class in the cat with three mummified fetuses. This case report details a successful en-block ovariohysterectomy performed under general anesthesia on a cat that was extremely emaciated and weak. Following ovariohysterectomy, a total of three mummified fetuses were extracted from both of the horns; nonetheless, there was neither fluid nor a foul odor present.

Clinically, the SAA concentration is the most sensitive and useful APP for cats because it rises early in the process of inflammation and at a faster rate than other APPs like CRP and AGP (11). It is known to be elevated in immune-mediated illnesses, inflammatory malignancies, and infections caused by *Hemoplasma* species (12). Moreover, post-surgery (11), pancreatitis (13), renal disease, (14), lymphoma (15), mammary tumors (16), feline infectious peritonitis (17), pyometra (18), sepsis (19), and is reported to be useful as a diagnostic aid. These studies often include endocrine disorders not associated with inflammation, such as hyperthyroidism and diabetes. Yuki et al (20) reported that Serum amyloid A concentration was higher in cats diagnosed with diseases such as pneumonia, feline infectious peritonitis, and pyometra than in healthy cats. However, on the other hand, there was no increase in SAA concentration in diseases such as cardiomyopathy, diabetes mellitus, and hyperthyroidism without systemic infection. In this study, SAA was found at a concentration of 9.7 ng/L in non-infective mummification. There are limited data describing the concentrations of SAA that are considered 'normal' in healthy cats. Those data that are available show variation in the expected normal ranges of SAA (21).

An increase in liver enzymes is possible with the occurrence of damage. In addition, factors such as chronic stress, malnutrition, and/or poor liver function cause differences in liver enzyme activities (22). It is seen in serum biochemical changes as well as hematological changes in lymphosarcoma. There are studies indicating that serum biochemical abnormalities are a sensitive measure of the extent of lymphosarcoma and are nonspecific as diagnostic indicators in cats (4,23). In this study, both hematological and biochemical parameters were within the reference ranges.

Overall, to the best of the authors' knowledge, it was found that such a case report (SAA and biochemistry findings in a mummified fetus case) had not been published before in cats. No change in biochemical values was detected. No studies of this type are yet available; therefore, the results cannot be compared with other studies. However, an en-block ovariohysterectomy can be performed successfully. In the future, the efficacy of SAA concentration measurement in the diagnosis of the mummified fetus should be further examined.

Conflict of interest

The authors declare that there are no conflicts of interest.

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