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Feline extrauterine pregnancy (EUP) in Persian cat with fetal mummification: a case study

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KEYWORDS

Cat

Extrauterine Pregnancy

Ultrasound

Radiographic

HE staining

ABSTRACT

Extrauterine pregnancy (EUP) is caused by the implantation of the fetus outside the uterus. In this study, during a routine check-up of a 3-year-old non spayed female Persian cat, a mass on the abdomen was found on palpation, which later was diagnosed as an abdominal tumor. Clinical signs presented are pollakiuria and no lethargic. The radiographic examination revealed a well-defined circular mass with mineral opacity in the caudal abdomen. Ultrasound examination of this abdominal mass illustrated the presence of mummified fetus with an irregular arrangement of bones. Moreover, there was no heart movement, the fetal bones were hyperechoic. An exploratory laparotomy was performed for mass collection, and excised mass was dense. Histopathology investigation using HE staining results in bone, tongue, lung and pigmented skin. The fetal age was around 60 days old.

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1 Introduction

Extrauterine pregnancy (EUP) or ectopic pregnancy is a pregnancy that occurs when the fetus is found outside the uterus. There are two types, namely primary and secondary. Primary EUP is a pregnancy where fertilized egg enters the abdominal cavity instead of following its path through the tubal structures. The entire pregnancy occurs outside the uterus. While in secondary EUP, the developing embryo or fetus is dislodged into the abdominal cavity due to uterine rupture. The pregnancy formed in the uterus is then continued in the extrauterine environment (Nack 2000). In humans, it is associated with pathological conditions with an incidence rate of 20.7 cases per 1000 pregnancies as reported by Van Den Eeden et al. (2005). While it is rare in animals, detailed epidemiological studies have not been conducted (Corpa 2006; Mirsepehr et al. 2015). The current case study was carried out to diagnose extrauterine pregnancy in a 3-year-old non spayed female Persian cat through abdominal radiography or ultrasonography and an exploratory laparotomy surgery was performed to explore tissue and remove the fetal mass.

2 Materials and Methods

A 3-year-old female Persian cat that was not spayed was referred to Veterinary Hospital Universitas Brawijaya, Indonesia for a routine check-up due to a mass on the abdomen and increased urination. Physical examination of the cat was carried out by inspection, palpation, and auscultation. Subsequently, an

ultrasound examination was performed using a frequency of 7.5 MHz with an axial and sagittal plane (Honda-HS2200V). A study using x-rays (DR Tech®) with 60 kVP and 3 mAs on the left lateral and ventrodorsal views. Hematoxylin Eosin (HE) staining was confirmed for mass evaluation.

3 Results

Physical examination and auscultation showed no abnormalities; the cat was very active, palpation there was a mass in the caudal abdomen with a kidney-like consistency. The aim of radiographic study is to identification the location and the number of space occupying lesion. Radiographs of the left lateral view (Figure 1A) and ventrodorsal view (Figure 1B) showed one mass in the cranial bladder, circular in shape, smooth and clear margins, showing the presence of multiple fetuses. The space occupying lesion contain three fetuses with disorganized bone. Mass dimension are 7.25 cm in length and 4.74 cm in width. Two fetuses superimposition in one another (Figure 1C).

The sonogram (Figure 2) illustrate the formation of vertebrae; the fetal head and bones looked hyperechoic, which were protected by a thick layer of sac wall. The amniotic fluid area in fetus 1 (figure 2A) looks a mixture of hypoechoic and anechoic, while fetus 2 (figure 2B) is hypoechoic; there may be changes in amniotic fluid to solid material. In the reported fetal cardiac or extremity movements were not detected which led to the mummification. The fetus's gestational

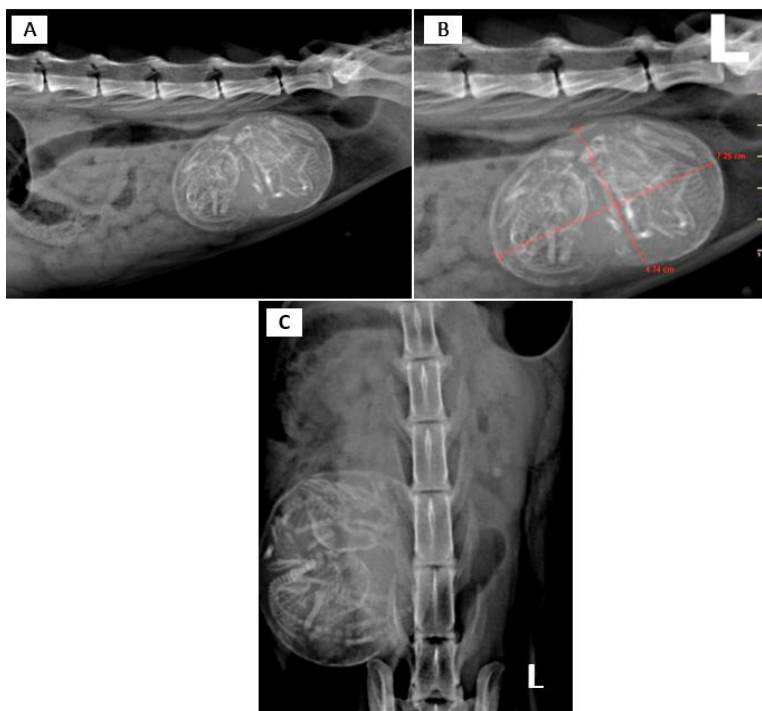


Figure 1 Radiographic examination of the abdomen. (A) left lateral view, a circular structure of the cranial bladder containing the fetus with irregular bony structure. The mass margin is clear and smooth (B) Mass dimensions are 7.25 cm long, 4.74 cm wide. (C) The ventrodorsal projection finding the mass on the right side of the abdomen and the arrangement of the fetal vertebrae

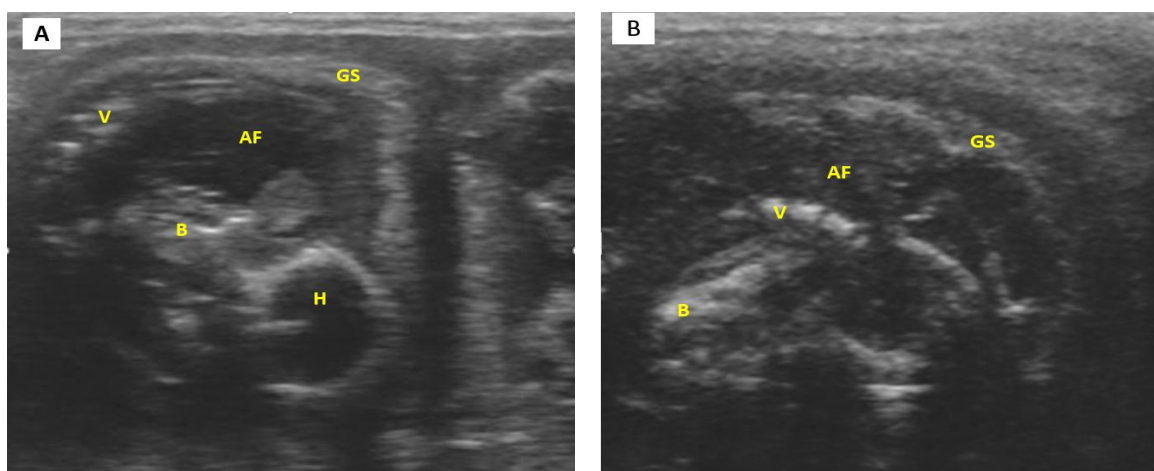


Figure 2 Ultrasound aspect of fetal structure in the sagittal plane. Hyperechoic structures were identified as vertebrae (V), bone (B), head (H), and gestational sac membrane (GS). There is a difference in the echogenicity of amniotic fluid (AF) in fetus 1 (A), a mixture of anechoic and hypoechoic, while in fetus 2 (B), it is only hypoechoic



Figure 3 Gross anatomy of a potato-like mass, round shape, smooth surface and hard consistency

age cannot be differentiated by ultrasound because the fetal's head and the body are ill-defined. Subsequently, the patient was referred for surgery. The results of exploratory laparotomy of the mass were outside the uterus and attached to the omentum. Normal uterine conditions do not show signs of rupture. Gross anatomy mass looks like a potato with a smooth surface and tough (Figure 3).

Histopathological results of HE staining revealed osteogenesis of compact bone structure formation in long bones and spinous processes (Figures 4A and 4B). The bones dominated by chondrocytes, while in the skin, there were melanin deposits and hair follicle growth (Figures 4C and 4D). The lumen of the pulmonary alveoli is cloudy with the surrounding bronchi

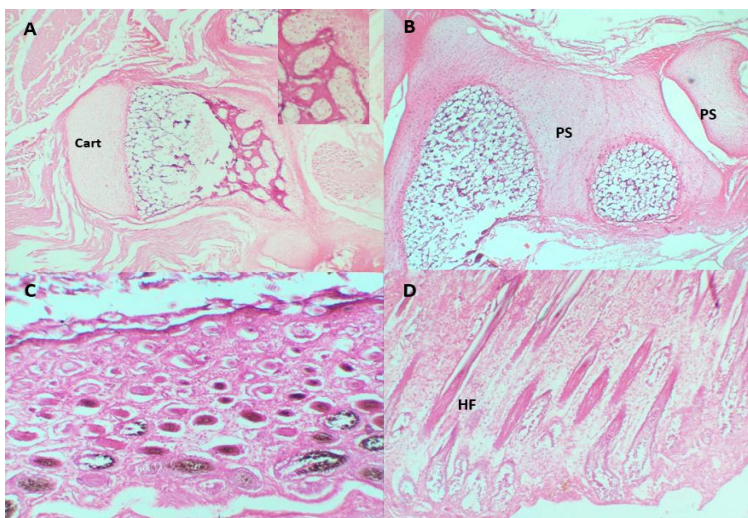


Figure 4 Histopathology of excised tissue mass staining with HE (A) Osteogenesis in long bones starting from cartilage (Cart) composed of chondrocytes magnification 40x to the formation of new bone (insert: magnification 100x); (B) Cartilage-dominated spinous process structure: magnification 40x; (C) The epidermis of the fetus is found with deposits of melanin (100x); (D) Fetal hair follicle growth (HF): magnification 100x

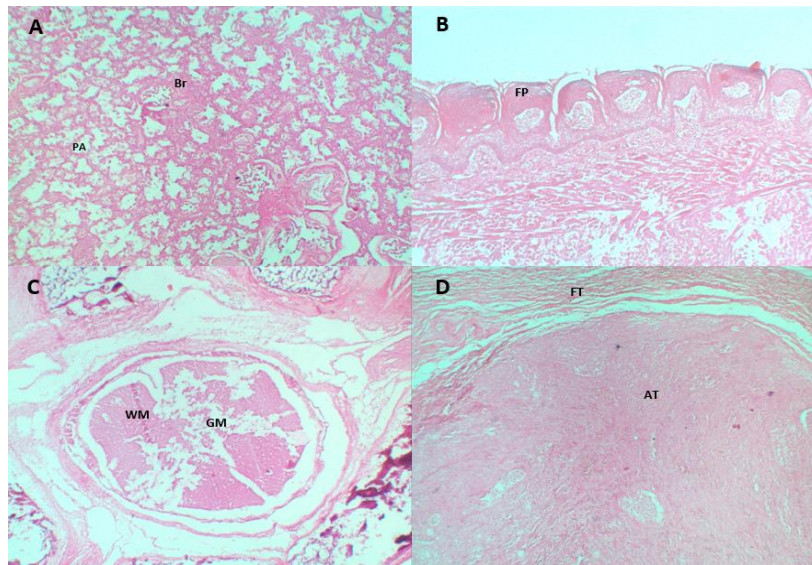


Figure 5 Microscopic examination of other fetal organ tissues (A) Partially pulmonary alveolar (PA) eosinophilic and bronchial (Br) magnification 40x; (B) Fungiform papillae (FP) fetal tongue magnification 100x; (C) The cross-sectional spinal cord shows rudimentary white matter (WM) and gray (GM) structures; (D) There is an atypical tissue (AT) resembling mesenchymal architecture encapsulated with fibrous layer (FT)

(Figure 5A). In the findings of the tongue that is seen are the fungi form papillae (Figure 5B) and spinal cord with areas of gray matter and rudimentary white matter (Figure 5C). The gestational sac is a typical tissue-lined externally with fibrous tissue (Figure 5D).

4 Discussions and Conclusion

According to the Rosset et al. (2011), primary EUP can be caused by a fertilized egg implanting outside the uterus, omentum, peritoneum, or fallopian tube while the secondary EUP is caused by the rupture of the uterine wall due to trauma and the subsequent ectopic fetal developed in the peritoneal cavity. The clinical symptoms in this case are pollakiuria leads to the FLUTD condition. Further, the presence of a hard mass in the caudal abdomen presses the bladder and correlates this with the frequent urination in the cat. These results are in agreement with the findings of Osenko and Torello (2014) those who reported high urination in the animals suffering from abdomen tumors. In general, the clinical condition of cats does not show any specific abnormalities. Extrauterine pregnancy is often an incidental finding because animals are generally asymptomatic and in good health and undetected for several months to several years (Nack 2000; Corpa 2006; Myung et al. 2016).

Radiography is one of the diagnostic tools that is used to determine the condition of ectopic pregnancy because it can see fetal bone mineralization and can calculate the number of gestational sacs (Osenko and Torello 2014; Myung et al. 2016). Furthermore, ultrasonography identifies heart rate and fetal movement

(Mirsepehr et al. 2015). Ectopic pregnancy is generally accompanied by fetal death; although primary abdominal pregnancy has been reported in domestic animals, no fetoplacental guarantees successful growth outside the uterus. This type of placentation in cats does not allow the development of extrauterine pregnancy (Corpa 2006). There were no abnormalities in the uterus and ovaries in exploratory laparotomy, It was suspected that this pregnancy was not a traumatic factor. Ivanova et al. (2019) reported that ectopic pregnancy could be triggered by a long period of gestation.

In the current study, the outer layer of the gestational sac formed by fibrous tissue was autolysis inside of fetal tissue and similar types of findings were reported by Myung et al. (2016). It is suspected that the absorption of amniotic fluid into solid tissue has no clear structure (atypical). All fetuses found in the current study have bone structure and osteogenesis appears to have occurred (Mirsepehr et al. 2015; Chong 2017; Ivanova et al., 2019). Other findings such as the structure of the tongue's papillae, melanin, and hair follicles in the skin, spinal cord, and lungs indicate the stages of fetal maturation at the end of gestational age around 60 days. According to Knospe (2002), at 60 days' gestation, pigmentation is possible on the skin, hair, pigmentation, and nails. Furthermore, the brain, neuron cells and bones ossification are present during this gestation period.

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