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Surgical Management of Abortion in a Rat

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Abstract: The gestation period of rats is on average 21 to 23 days. Conceptus can be detected by ultrasonography after the 8-9th days of the pregnancy. The total number of fetuses per pregnancy is 1 to 20. In some cases, abortion occurs depending on many etiological factors, and it is the most common complication of pregnancy. The subject of the present case report was the surgical management of spontaneous abortion using inhalation anesthesia in a rat. The material of the case report was a female albino 2-year- old rat weighing about 450 gr. The rat was admitted with vaginal bleeding and abortion in to the clinic. In anamnesis, it was reported that a pup was stillborn about three hours ago and then no other pup was delivered. Furthermore, it was informed that there was ongoing vaginal bleeding since the last 4-5 hours. Upon physical examination and ultrasonography, the case was diagnosed as abortion. It was decided to intervene with the abortion by surgery. The rat was premedicated subcutaneously with atropine sulphate and general anesthesia was induced with isoflurane through inhalation. Then, celiotomy was performed at cauda umbilicus. In total, 13 non viable fetuses were removed from both uterine horns. Incision wounds were sutured and the rat was evenly awakened from anesthesia and discharged. In conclusion, surgical management of the abortion case using inhalation anesthesia was successfully performed on the rat.
***Keywords**: Abortion, Fetus, Rat, Surgery*.

Bir Sıçanda Abortusun Cerrahi Yönetimi

Özet: Sıçanlarda gebelik süresi ortalama 21 ila 23 gün arasındadır. Konseptus gebeliğin 8-9. günlerinden sonra ultrasonografi ile tespit edilebilir. Gebelik başına toplam fetüs sayısı 1 ile 20'dir. Bazı durumlarda, birçok nedene bağlı olarak abort meydana gelir ve gebeliğin en sık görülen komplikasyonudur. Bu olgu sunumunun konusu, bir sıçanda spontan abortusun inhalasyon anestezisi ile cerrahi yönetimiydi. Olgu sunumunun materyali, 2 yaşında ve 450 gr ağırlığında dişi bir albino sıçandı. Sıçan vajinal kanama ve abort şikayeti ile kliniğe getirildi. Anamnezde, bir yavrunun yaklaşık üç saat önce ölü doğduğu ve ardından başka yavrunun doğmadığı bildirildi. Ayrıca son 4-5 saattir devam eden vajinal kanama olduğu bilgisi verildi. Fiziksel ve ultrasonografi muayenesinde olguya abortus tanısı kondu. Cerrahi müdahaleye karar verildi. Sıçana premedikasyon olarak deri altı yolla atropin sülfat uygulandı ve genel anestezi inhalasyon yoluyla izofluran ile indüklendi. Daha sonra göbek deliğinin gerisinden ensizyon yapıldı. Uterusun iki kornusundan toplam 13 ölü fetüs çıkarıldı. Ensizyon hattı dikildi ve sıçan anesteziden sorunsuz şekilde uyandırılarak taburcu edildi. Sonuç olarak, sıçanda abort olgusunun inhalasyon anestezisi ile cerrahi yönetimi başarıyla gerçekleştirildi.
***Anahtar sözcükler**: Abort, Cerrahi, Fetüs, Sıçan*.

Introduction

It is known that the gestation period of rats averages 21 to 23 days (Kazerooni et al., 2006). Pregnancy can be determined by abdominal palpation, nipple enlargement, mammary development, increased body weight in the second week of the pregnancy. Embryo can be detected by ultrasonography after the 9th days of the pregnancy (Ypsilantis et al., 2009). The total number of fetuses per pregnancy can be about 9 (1 to 20) (Bekyürek, 2002). Abortion occurs depending on many aetiological factors (He and Sun, 2018; Zhang et al., 2016) and is known to be the most common complication of pregnancy. It was reported that miscarriage could occur in one-fifth of all pregnancies (Barrington et al., 1996). Abortion is a situation that should be treated. The aim of this study was the surgical management of spontaneous abortion using inhalation anesthesia in a rat.

Case History

The material of the case report was a 2-year-old female albino rat weighing about 450 gr. The rat was admitted with vaginal bleeding and abortion to Clinic of Obstetrics and Gynecology, Faculty of Veterinary Medicine, Ankara University, Turkey. In anamnesis of the rat owner, it was reported that a pup was stillborn about three hours ago and then no other pup was delivered. Furthermore, it was

informed that there was ongoing vaginal bleeding for the last 4-5 hours. Upon physical examination of the rat, it was found that its pulse and respiratory rates were high and rectal temperature was low. Additionally, vaginal discharge and bleeding were detected. And then, transabdominal ultrasonography was performed to determine if there were other pups unborn in the uterus. Thus, unborn pups were found. Heartbeats, however, could not be determined in any of them. It was thought that all the pups dead. The case was diagnosed as abortion according to findings obtained from examination and anamnesis. After these procedures, it was decided to intervene with the abortion by surgery. First, the mid-ventral region of abdomen was prepared for operation. The rat was premedicated subcutaneously with atropine sulphate (0.045 mg/kg body weight). General anesthesia was induced with isoflurane through inhalation without pre-anesthesia. Moreover, anesthesia was performed with a mask without intubation (Figure 1).

Figure 1. Uterus horns exteriorized from abdominal cavity and exanimate pups.

For this purpose, 0.3-liter oxygen and isoflurane as much as 3% of oxygen per minute was performed. After providing general anesthesia, an approximately 2 cm long celiotomy was performed in the cauda umbilicus. And then, the left and right uterine horns were identified and were exteriorized from the abdominal cavity. An incision was performed to the right horn near bifurcation of the uterine. Subsequently, a total of 13 exanimate pups were removed from both uterine horns (Figure 1). The uterine was sutured with the utrecht method and incisions of skin and muscles were closed by simple single suture.The surgical wound was managed with povidone iodine without a bandage. The rat was evenly awakened from anesthesia and discharged alive and well.

Conclusion and Discussion

The case was diagnosed as abortion because pups weren't completely developed. The animal owner's anamnesis also confirmed this diagnose, as normal delivery time would be 3-4 days later. So, the abortion occurred on the 18th day after mating. But, the cause of abort was unknown. Causes of abortion generally are things such as chromosomal abnormalities, immune responses (He and Sun, 2018), disruption of the neuroendocrine mechanism (Narotsky et al., 2000), malnutrition or any diseases (Barrington et al., 1996) and levels of some hormones (Zhang et al., 2016). The cause of abortion was not investigated in this case report. Inhalation anesthesia was chosen for the surgery because it has the adjustable anesthesia depth and concentration. Due to this reason it safer than injectable anesthetics (Brunson, 1997). There were no complications during and after the operation. In conclusion, no similar research reported could be found, but surgical management was successfully performed in this abortion case. We think that periodic follow-up of the pregnancy process in rats would be beneficial for the health of the fetuses and the mother, and inhalation anesthesia can be used safely in cases requiring surgical intervention in the delivery process.

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