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Serous multicystic papillary adenoma of the ovaries and glandular cystic hyperplasia of uterus in a Guinea Pig (*Cavia porcellus*)

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Case report

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ABSTRACT

Cystic changes of ovarian tissue are crucial as they cause infertility in laboratory animals. A 4 years old, weighing approximately 500 g adult, intact guinea pig had pruritic progressive alopecia over the flanks at the dorsal area and abdomen symmetrically, bilaterally for a month. Beside, an abdominal enlargement was observed outside on the guinea pig. Large polycystic ovaries were detected behind the kidneys during ultrasonography. Also abdominal radiography revealed the cystic structures at the same region. Ovariohysterectomy was performed on the animal, multiple thin walled, fluctuant fluid-filled, large cysts measured as 3.9 x 2.5 and 4.5 x 2.8 cm diameter were detected at the left and right ovary, respectively. The uterine body was observed normal macroscopically. The guinea pig was died after the operation during reanimation because of the hypothermia. The organ pieces were submitted to pathology for histopathological examination after the operation. Histologic examination demonstrated a diagnosis of serous multicystic papillary adenoma of the ovaries and glandular cystic hyperplasia of uterus. In conclusion, this case report describes the necessity of not to ignore the ovarian pathologies with guinea pigs demonstrate symmetric, bilateral alopecia on the skin and indicates the importance of postoperative care in laboratory animals despite a successful anesthethic choice and operation.

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Introduction

Cystic changes of ovarian tissue are crucial as they cause infertility in laboratory animals (Keller et al., 1987; Eden and Warren, 1999). Ovarian and uterine diseases are very frequent in intact guinea pig females with an incidence of >75% (Capello, 2006). Polycystic ovarian syndrome (PCOS) is a disorder related with the hormonal variations in LH: FSH ratios, intraovarian concentrations of androgen to estrogen or follicular atresia (Barnes and Rosenfield, 1989). Ovarian cysts are usually organized from ovarian follicles, corpora lutea, ovarian surface epithelium, remnants of the mesonephric and paramesonephric ducts, or rete ovarii (Young et al., 1938; Nalbandov, 1952; Sauramo, 1954). There are 3 types of ovarian cysts seen in guinea pigs differentiated only by histopathology; 1) Serous cysts (cystic rete ovarii), 2) Follicular cysts, 3) Parovarian cysts. The response to medical therapy is important in these type of cysts (Pilny, 2014). Keller et

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al. (1987) reported various cystic structures on the ovaries between 0.5-7 cm diameter in guinea pigs in their study.

The most common detected cysts are serous cysts (cystic rete ovarii), which remain present throughout the estrus cycle of guinea pigs. Serous cysts are composed of a simple cuboidal-to-columnar epithelium composed of cells with solitary cilia or tufts of cilia. These cysts are incapable of steroidogenesis and do not respond to surges of luteinizing hormones (LHs) similar to follicular cysts (Pilny, 2014). Keller et al. (1987) reported cystic endometrial hyperplasia, mucometra, or endometritis in appropriate placental tissue, or leiomyofibroma in 21/54 guinea pigs with cystic ovaries, but in only 1/17 guinea pigs without cystic ovaries, these cysts were determined as cystic rete ovarii histopathologically. Follicular cysts are the second most observed cysts and are derived from preovulatory follicles that fail to ovulate. These structures reach ovulatory size, fails to ovulate, and alters normal ovarian cyclicity. The wall of these cysts is lined by granulosa cells in histopathological examinations (Pilny, 2014). Parovarian cysts are the rarest type of the cysts seen in the guinea pigs and are cysts of the parovarium. They are vestigial structures that is associated with the ovary and consists of mesonephric tubules and a portion of the mesonephric duct (Pilny, 2014). The aim of the present case report is to suggest the importance of the ovarian pathologies in guinea pigs demonstrate symmetric, bilateral alopecia on the skin and the postoperative care in laboratory animals despite a successful anesthethic choice and operation.

Case History

A 4 years old, weighing approximately 500 g adult, intact Guinea pig was presented to Department of Obstetrics and Gynecology clinic. The animal was housed in a stainless steel cage and was fed with pellet feed and grass, ad libitum water. Some nutritious and beneficial dietary sources for vitamin C such as; tomatoes, broccoli, kiwi, spinach, etc. were supplemented to the cavy's diet by the owner daily. The guinea pig had pruritic progressive alopecia over the flanks at the dorsal area and abdomen symmetrically and bilaterally for a month (Figure 1A). The owner complained about the anorexia. Because the patient demonstrated abdominal enlargement bilaterally at the caudal region of the kidneys, ultrasonography was performed. Large polycystic ovaries (Figure 1B) were detected behind the kidneys during ultrasonography (Easote MyLab Five Vet,

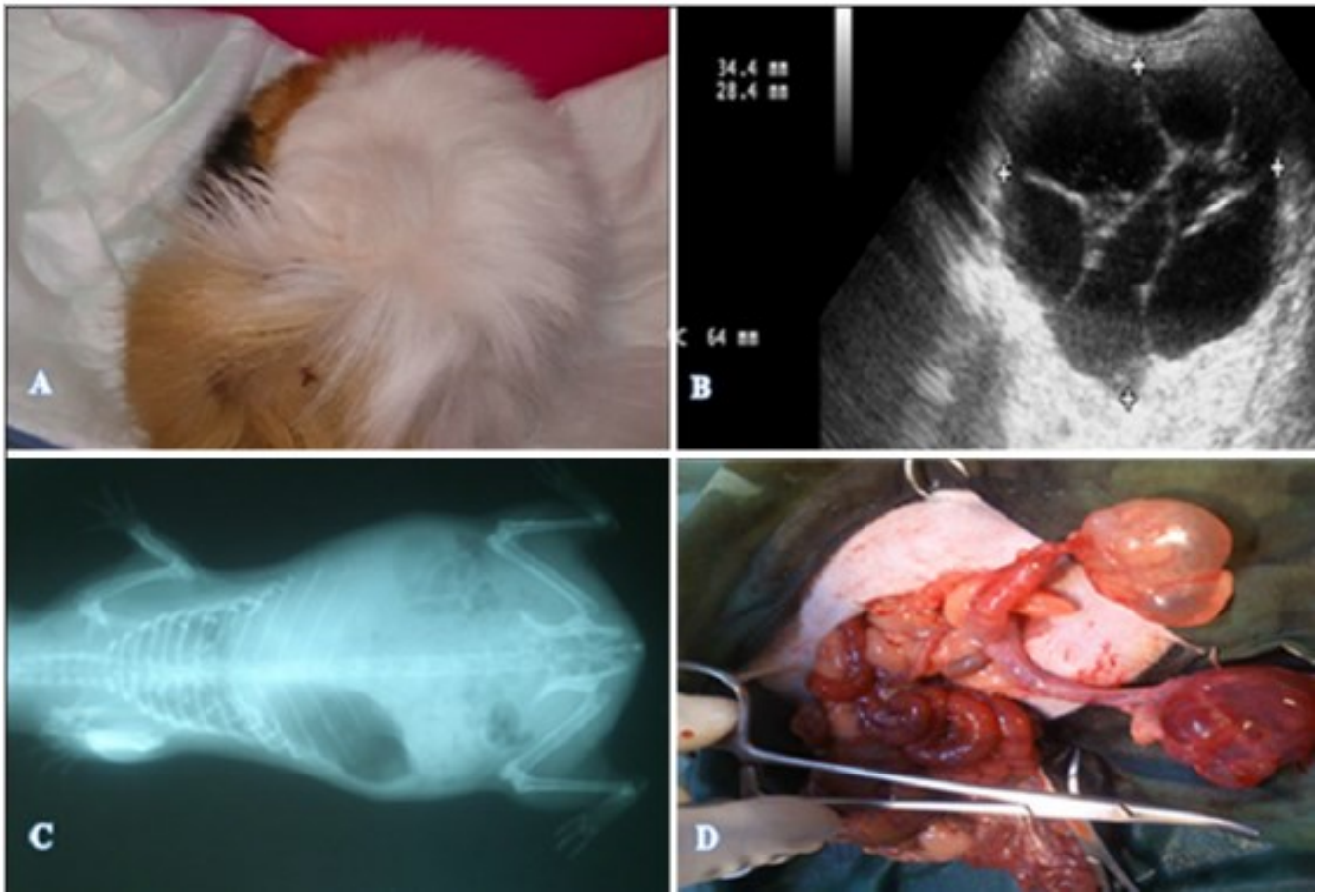

Figure 1. Symmetric, bilateral and pruritic alopecia on the skin (A), Polycystic right ovary of a guinea pig, ultrasonographically (B), Radiographic findings of the cysts (C), Cystic structures after the operation of the ovaries (D).

Milano, Italy). Also abdominal radiography revealed the cystic structures at the same region (Figure 1C). Ovariohysterectomy was recommended immediately. During the surgery procedure, the guinea pig was warmed with heating thermophores. The anesthesia was conducted with 50 mg/kg ketamine hydrochloride (Ketalar, Eczacıbaşı, Turkey) and 7.5 mg/kg xylazine hydrochloride (Rompun, Bayer, Germany) intraperitoneally on the animal. Median line through linea alba was preferred for the surgery. There were so many adhesions and fluid accumulation in the abdominal cavity due to the mass. The surgey was carried out very carefully, both of the ovaries contained multiple thin walled, fluctuant fluid filled, large cysts which were measured as 3.9 x 2.5 cm and 4.5 x 2.8 cm diameter at the left and right ovary (Figure 1D), after the surgery respectively, the uterine body was observed normal macroscopically. They were removed according to the three clamp procedure successfully, the abdominal cavity was closed with interrupted 3/0 absorbable suture material and the subcutaneous layer was closed with 4/0 absorbable suture material, the skin was closed with 3/0 non-absorbable suture material. The operation was completed in 30 minutes totally. Although the guinea pig was in the intensive care stall, she died after the operation during reanimation becuse of the hypothermia. The organ pieces were submitted to pathology for histopathological examination after the operation. The tissue samples were fixed in 10% buffered formalin, embedded in paraffin wax and sectioned at 2-3µm, stained with hematoxylin and eosin (HE) for histopathological evaluations.

Macroscopical and histological findings: On macroscopical examination, there were numerous cysts in varying sizes on the ovaries. Microscopic examination showed multiple serous cysts of varying sizes lined by a simple cuboidal-to-columnar epithelium with prominent papillary projections in some areas (Figure 2A and B). Ovarian tissue was compressed by the cyst formations (Figure 2C). In uterus, marked multifocal cystic degeneration of the mucosal glands and hyperplastic changes were seen in the endometrium (Figure 2D). Histologic examination demonstrated a diagnosis of serous multicystic papillary adenoma of the ovaries and glandular cystic hyperplasia of uterus.

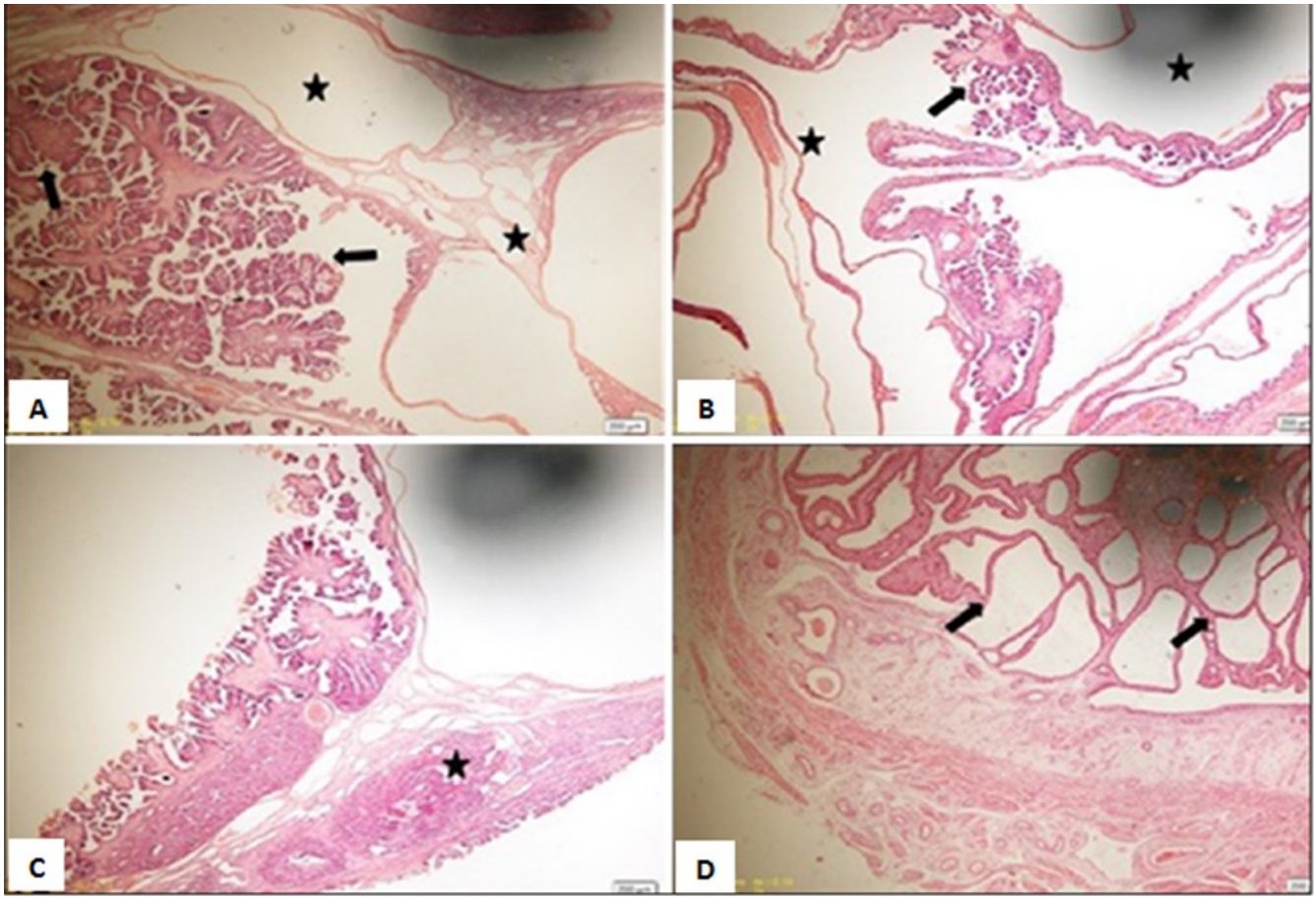

Figure 2. A and B: Cysts in varying sizes (stars), papillary projections (arrows), ovary (H&E), C: Compressed ovarian tissue (star), ovary (H&E), D: Cystic glands in endometrium (arrows), uterus (H&E).

Discussion and conclusion

Although cystic ovaries are common in guinea pigs, there are some reports about their treatment approaches. Quandt and Hutz (1993) treated the guinea pigs with cystic ovaries by estradiol 17-β (E2) for a duration of 48 hour and detected the induction of the cysts in all animals treated with this regimen in their study. They also has detected that exogenous E2 initiates an atresia-like process in the dominant follicle (Dierschke et al., 1985), and they reported that this increased incidence of atresia could reduce the adequate and healthy preovulatory follicles and this might lead to cystic degenaration again. In this case we did not use any hormonal compounds to treat the cystic ovaries becasue of the recurrence risk of the lesions. Keller et al. (1987) reported cystic ovaries in 76% (71/54) cases diagnosed during necropsy in guinea pigs. They reported that small sized cysts were noticed incidentally but larger cysts could be distinguished as an abdominal mass by palpation, like in this case report which the diagnose was supported by ultrasonography and radiography. Paterson (2006) reported the high incidence risk of cysts between 2-4 years in the guinea pigs, the animal in this case was 4 years old. Also the same researcher, Paterson (2006), implicated the reason for the cystic ovarian disease could be attributed to the estrogenic substances in the hay. We are not sure about the existence reason of these cystic structures on the ovaries might be related with the estrogenic effect caused by the possible food intake, further examinations are required to support this hypothesis. Ketamine/ xylazine combinations are the most commonly used injectable combinations for anesthesia of mice, rat, hamsters, guinea pigs (Van Pelt, 1977; Green et al., 1981; Branson, 2001). Dang et al. (2008), have compared the anesthesia protocols in their study such as; 30 mg/kg ketamine and 2.5 mg/kg xylazine subcutaneously, intramuscularly or intraperitoneally, 37 mg/kg sodium pentobarbital intraperitoneally and 0.5 mg/kg medetomidine intramuscularly. They recommended intraperitoneal 30 mg/kg ketamine and 2.5 mg/kg xylazine regimen as the best choice for time to recovery after the operation but they used the anesthesia for blood collection from anterior vena cava and they did not require long time for this procedure. Green et al. (1981) reported ketamine-xylazine combination in a single dose im injection at 60 mg/kg and 8 mg/kg, respectively in guinea pigs, and they developed maximum muscular relaxation. But they reported the existence of pain and corneal reflexes still. Gaertner et al. (1997) recommended ketamine/xylazine mixture given by intraperitoneal (IP) route to avoid muscle necrosis that may ocur given intramuscularly. Muscle necrosis is most likely due to the pH of 3 of the ketamine component. Brodbelt et al. (2008) reported the risk of animals dying because of anesthetics as 1/26 (3.8%) in guinea pigs. In present case we performed 50 mg/kg ketamine and 7.5 mg/kg xylazine intraperitoneally and there was no problem observed associated with the anesthesia and analgesia during the operation period. Olson and Bruce (1986) reported that rodents and rabbits could became hypothermic easily after the operations so heating pads, waterbottles or isothermic pads were all recommended by them for to avoid hypothermia but although the guinea pig was warmed with heating thermophores during the operation and was transferred to the intensive care stall in order to increase the body temperature after the operation in this case, we could not able to recover her and she died because of the hypothermia.

In conclusion, this case report describes the necessity of not to ignore the ovarian pathologies with guinea pigs demonstrate symmetric, bilateral alopecia on the skin and indicates the importance of postoperative care in laboratory animals despite a successful anesthethic choice and operation.

Conflict of interest

The authors have no conflicts of interest to declare.

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