Feline reproduction FAQs
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Introduction
Many veterinarians graduate with no formal education in feline reproduction; cats were not identified as one of the “major” species in which theriogenology training was required at most schools surveyed. In a study in which practitioners across the United States were asked to rank which procedures in theriogenology they performed most commonly by species, dystocia management and treatment of reproductive tract disease were those listed most commonly for the cat. This mirrors a survey of veterinarians on the Society for Theriogenology small animal listserve, who rated dystocia management, diagnosis and treatment of pyometra, broad management of infertility, and ovarian remnant syndrome as the most common disorders presented in feline reproduction in their practices. This is a review of three common disorders seen in feline reproductive practice.

Keywords: Feline, dystocia, pyometra, ovarian remnant syndrome, reproductive disease

Dystocia
Dystocia, abnormal queening, is reported to occur in 3 to 6% of cat parturitions. Veterinary students report great fear around dystocia and practitioners mimic this concern, perhaps because of the possibility of impacting several lives. There are several excellent recent reviews of dystocia. The reader is referred to these for greater detail.

Dystocia can be maternal or fetal in origin. The most common reported maternal cause is uterine inertia, lack of synchronous uterine contractions. The most common reported fetal cause is malpresentation, due to oversize or abnormal orientation of the limbs or head relative to the spine. Brachycephalic and dolicocephalic breeds are at increased risk. Dystocia is present if gestation is prolonged, labor is not progressing, the queen appears systemically ill, or the fetuses are in distress.

Normal gestation length is queens averages 66.9 days and varies from 62 to 71 days. Despite induction of ovulation and a commonly restricted number of days of breeding, gestation length is truly this variable and cannot be estimated based on other factors such as litter size. Therefore, gestation is not automatically considered prolonged unless the queen is at least 71 days past the last known breeding.

Normal parturition length in cats is prolonged compared to dogs. Mean parturition length is 16.1 hours with a range of four to 42 hours. In the author’s colony, one cat queened four kittens over three calendar days; one of them was stillborn but it was the third one born, not the final one. In general, the first kitten should be passed within four hours of onset of active labor and subsequent kittens passed at least every two hours. Because queens apparently may inhibit labor voluntarily due to stress, the queen should undergo a complete physical examination and the kittens should be assessed for viability by verification of heart rate greater than 170 to 200 bpm as part of any decision whether to intervene.

Medical therapy is reported to be effective in cats only 29.9% of the time that it is attempted. Whether this is due to medical treatment being used when surgical treatment is called for or to variable responses of queens to medical therapy with oxytocin compared to other species is not clear. Radiography is recommended to best predict whether fetuses are of a size suitable for vaginal delivery.

Medical therapy includes administration of oxytocin (0.1 to 0.25 IU SQ or IM) and calcium gluconate (10% solution, 0.5 to 1.0 ml SQ or IM). If the cat does not respond after one or two injections at 20 to 30 minute intervals, surgical treatment by cesarean section is recommended. In one survey of 1056 births, 8% were resolved by cesarean section.

Pyometra
Pyometra is uterine enlargement due to accumulation of purulent fluid. This condition frequently is associated with cystic changes in the endometrium (cystic endometrial hyperplasia [CEH]). The pathogenesis in cats is not completely clear. While several surveys have demonstrated increased incidence in cats greater than five years of age, pyometra has been documented in many younger cats and has a reported overall incidence of about 0.4%. Dow described four stages of CEH-pyometra, with increasing degrees of inflammation and atrophy overlying CEH; mean age of cats representative of all four groups was the same, suggesting this is not a progressive disease. Cystic endometrial hyperplasia can be induced experimentally by treatment with progestogens and is considered a side-effect of progestogen therapy but affected cats do not always have high serum progesterone concentrations nor is luteal tissue always present. It may be that queens, like bitches, may develop two forms
of endometrial hyperplasia, one a chronic cystic form and the other a transient proliferative form. One study suggested that cats may be less likely to present with pyometra during seasonal anestrus in November through February.

Because cats are induced ovulators, one perception was that queens would be less likely to develop pyometra if they were never induced to ovulate. However, many young queens who were known not to have been induced to ovulate have presented with pyometra. It has been reported that up to 22% of queens presenting with pyometra have no recent history of estrus. It has been demonstrated that queens will occasionally demonstrate a rise in serum progesterone or presence of luteal tissue in the absence of a known stimulus for ovulation. This suggests that pyometra must be on the rule-out list for any intact queen with signs of systemic disease.

The most common clinical signs reported in queens with pyometra are lethargy, anorexia, and vulvar discharge and abdominal distension, depending on cervical patency. Diagnostic findings on physical examination include fever, dehydration, a palpably enlarged uterus, and vulvar discharge if the cervix is open. On complete blood count, non-regenerative anemia is more common than in dogs, with that anemia more severe than that seen in dogs. Leukocytosis with a left shift is usually present and length of hospital stay is positively associated with white blood cell number and percentage bands. Physical findings and changes on labwork may be a manifestation of systemic inflammatory response syndrome, associated with sepsis. Uterine enlargement may be evident on radiographs and is easily identified on ultrasound. E. coli is the most common bacterial organism isolated.

Ovariohysterectomy is the best treatment. Medical therapy may be attempted in young, valuable queens with open-cervix pyometra. The most common therapy used in the United States is prostaglandin F2alpha (0.1 to 0.25 mg/kg SQ BID until uterus nears normal size or all free uterine fluid is cleared) with concurrent antibiotic therapy; antibiotic choice should be based on culture and sensitivity testing and should continue until vulvar discharge has not been seen for one week. Agleprisone (Alazine™, Virbac Laboratories, Carros, France), a progesterone-receptor blocker, is reported as a successful therapy in other countries when used at a dose of 10 mg/kg SQ on days 1, 2, 7 and, if necessary, 14. This drug is not currently available in the United States.

Ovarian remnant syndrome

Ovarian remnant syndrome (ORS) is the presence of signs of estrus in a queen who had previously undergone ovariohysterectomy (OHE). Signs of estrus may appear anytime from 14 days to nine years from the date of surgery. Once these signs appear, the cat usually shows normal periodicity and seasonality of estrus signs including lordosis, vocalization, and roaming behavior.

The cause of ORS in cats is not well understood. Many times it is obvious surgeon error with whole ovaries or pieces of uterus identified. It has been demonstrated that ovarian tissue dropped into the abdominal cavity can revascularize and become functional, making it possible that any ovarian tissue caught in a clamp could undergo the same reaction. However, it has been demonstrated that incidence of ORS is not associated with reason for OHE (elective versus as treatment of uterine or ovarian disease) or with experience level of the veterinarian performing the surgery. ORS has been documented when cats were never induced to ovulate. It has been hypothesized that some cats may have an extra piece of ovarian tissue deep to the main ovary that is not removed during routine OHE and becomes functional after removal of the main ovary.

Cats are polyestrus and induced ovulators and these facts guide diagnosis. The cat is best examined when the owner perceives her to be in heat. If an active follicle is present, the vaginal epithelial cells will be cornified. Cornified vaginal epithelial cells are larger than non-cornified cells and misshapen but do not form the large clumped sheets seen in bitches. Identification of cornified cells is a better indicator of elevated estrogen concentrations than is measurement of serum estrogen. If a follicle is present, evidenced by cornified vaginal cytology, exploratory surgery can be performed at that time to identify and remove the ovarian remnant with the follicles on it, or luteinization of that tissue can be induced with gonadotropin releasing hormone (GnRH; 25 mcg IM) or human chorionic gonadotropin (hCG; 500 IU IM). Blood should be drawn two to three weeks later and progesterone assayed. Serum progesterone concentration greater than 2 ng/ml is indicative of luteal tissue. This is definitive for diagnosis of ORS because only ovarian tissue can make estrogen and be induced to make progesterone by administration of GnRH. Ultrasound was reported to be an effective diagnostic tool in nine of 12 cases of ORS in dogs and cats in one study; operator skills and equipment are limiting factors for this technique in practice.

Surgery is strongly recommended. Even though the cat is unlikely to be able to become pregnant because of previous hysterectomy, persistent ovarian function will predispose the cat to mammary neoplasia. There are no estrus suppressing drugs that are safe for long-term use in cats. Surgery should be performed when the remnant tissue is more obvious, either when follicles or luteal tissue is present. The author prefers to perform
surgery when luteal tissue is present because the disorder has been diagnosed definitively as previously described and because luteal tissue persists for an average of 40 days after GnRH administration.

Ovarian remnants may be found at one or both ovarian pedicles and may occasionally be found at other sites, including the linea alba, dorsal body wall, and kidney capsule.26,*† If no obvious ovarian tissue is found, the scar tissue at both pedicles should be removed. All excised tissue should be submitted for histopathology; teratoma and granulosa cell tumors have been identified in ovarian remnants.23,31


References