

Spay/neuter – what's the evidence?

Should we still be routinely recommending gonadectomy in all of our patients, asks Laura C Cuddy MVB MS DACVS-SA DECVS DACVSMR MRCVS, specialist in small animal surgery, sports medicine and rehabilitation, Veterinary Specialists, Summerhill, Co Meath

In many countries, gonadectomy is recommended routinely before the first heat cycle or at six to nine months of age. Advocates for gonadectomy refer to the advantages of population control, decreased undesirable behaviours and rates of relinquishment, as well as reduced incidence of certain diseases. In June 2016, the Association of Shelter Veterinarians issued guidelines that gonadectomy should be performed prior to sexual maturity, and as early as six weeks of age (Griffin et al, 2016). The rationale behind early gonadectomy is that only 60% of animals that are rehomed intact will go on to be spayed or neutered at a subsequent date (Alexander and Shane, 1994).

However, gonadectomy is not performed routinely in all countries, for example, in Scandinavia and continental Europe, primarily for cultural reasons. In Norway, it is only permitted when there is a specific medical reason. Furthermore, recent evidence indicates that gonadectomy in dogs, and specifically early gonadectomy, may lead to an increased incidence of orthopaedic conditions, obesity, and certain neoplasms. In light of this new evidence, is it time for us to reconsider our recommendations?

WHAT ARE THE HEALTH BENEFITS OF GONADECTOMY?

Aside from societal benefits, both spay and neuter result in a mild increase in longevity, potentially due to a lower risk of trauma (Hoffman et al, 2013). In females, the incidence of reproductive neoplasms (mammary, uterine, ovarian and vaginal) and pyometra is markedly reduced or removed. In male dogs, the risk of perineal hernia and perianal gland tumours decreases, with the risk for benign prostatic hyperplasia and testicular tumours removed.

It is important to recognise that the positive effects of gonadectomy are more time-sensitive in females than in males; that is to say male dogs can typically be treated effectively for reproductive conditions by gonadectomy later in life, whereas in females late gonadectomy may not alter the course of the disease, the prime example being mammary carcinoma.

ARE THERE DISADVANTAGES?

Gonadectomy is associated with a moderate increase in obesity (Lefebvre et al, 2013). Sex hormones affect many tissues, including physes. Dogs that are gonadectomised prior to skeletal maturity anecdotally appear taller and less well-muscled. Gonadectomy has been reported to increase the risk of cranial cruciate ligament disease by two to three times (see Figure 1), with early neuter (less than six months) further increasing the risk in males (Witsberger et al, 2008; Torres de la Riva et al, 2013). Early neuter doubles the risk of hip dysplasia to 10% in males whereas spaying does not

appear to alter the risk (Torres de la Riva et al, 2013). These effects appear to be breed-dependent (Hart et al, 2014).

Spaying, particularly when performed early, increases the risk of urethral sphincter mechanism incompetence and cystitis. Gonadectomy appears to be associated with a mild increased risk of certain malignant neoplasms, including lymphoma, mast cell tumour, haemangiosarcoma, osteosarcoma, transitional cell carcinoma and prostatic carcinoma (Ru et al, 1998; Villamil et al, 2009).

Neutered dogs are reported to be 1.4-1.9 times more likely to develop osteosarcoma, with Rottweilers three to four times more likely if neutered less than 12 months of age (Ru et al, 1998; Cooley et al, 2002).

IS THERE HARD EVIDENCE?

The question remains whether these associations are real or simply a result of cause and effect. Most of this research has been performed in the US where 'responsible' pet owners are more likely to spay and neuter. Are responsible pet owners more likely to present their pet for investigation and treatment of orthopaedic and oncologic conditions and pursue referral to centres where many of these studies are performed? Do gonadectomised pets live longer and are they therefore, more likely to develop neoplasia?

Most of the available literature is retrospective with conflicting results and likely significant selection bias. Prospective lifetime studies in dogs and cats are vital for us to determine the true health effects of gonadectomy and age at gonadectomy in our pets before any firm recommendations can be made.

OVARIECTOMY OR OVARIOHYSTERECTOMY?

Traditionally, ovariectomy (OVH) has been taught in the US, UK and Ireland. In continental Europe, ovariectomy (OVE) is routinely performed. As long as the source of hormonal stimulation (ie. the ovary) is removed in its entirety during OVE, there is no increased risk of pyometra



Figure 1: Post-operative radiograph following left tibial plateau levelling osteotomy (TPLO) performed in a nine-month-old spayed Golden Retriever with bilateral cranial cruciate ligament insufficiency.

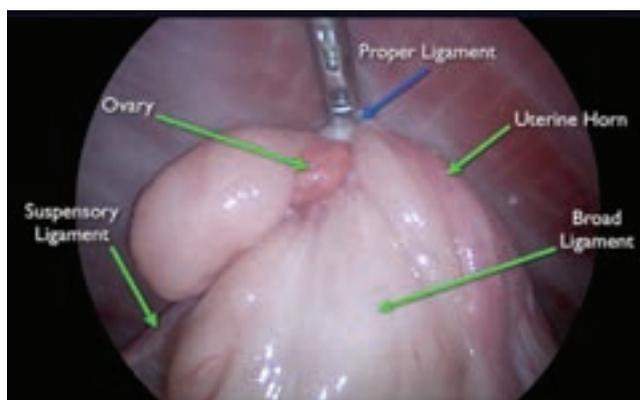


Figure 2: Laparoscopic ovariectomy in a dog. Photo: Dr Brad Case, University of Florida.

compared with OVH as hormonal stimulation is required for this to occur.

Uterine tumours are very rare in dogs, and if they occur, are typically benign. To date, there are no reports of a uterine tumour in a dog or cat previously ovariectomised.

OVE may be performed open or laparoscopically in any size patient (see Figure 2). Open OVE has a shorter skin incision than OVH, with similar surgery times and wound scores (Peeters and Kirpensteijn, 2011).

Ovarian remnant syndrome may be less likely following OVE due to improved ovarian exposure. OVH should be performed if any uterine abnormality is identified. It is important to inform the owners of the pros and cons of OVE versus OVH and document on the medical record if OVE was performed in case any future investigations become confused by the presence of the uterus in a 'spayed' dog.

WHAT ABOUT GONAD-SPARING SURGERY?

To balance the need to control the pet population versus the health of the individual pet, gonad-sparing surgery has been proposed. Hysterectomy and vasectomy may be options where preservation of sex hormones without the ability to reproduce is desired.

Hysterectomy may be performed open or laparoscopically and requires a precise technique (Fransson, 2016) As there will be continued oestrous cycles, these patients are at similar risk for mammary carcinoma as intact females and, if performed incorrectly, the risk of pyometra persists.

To date, hysterectomy is not widely accepted due to a paucity of scientific evidence and the potential health risks associated with continued oestrous cycles.

CONCLUSIONS

Although there are conflicting results, current scientific literature indicates that gonadectomy, and specifically early gonadectomy, may increase the incidence of specific orthopaedic diseases in large and giant-breed dogs. These effects appear to be breed-dependent. There also appears to be an association between gonadectomy and the development of certain neoplasms.

Prospective lifetime studies in both dogs and cats are necessary to characterise fully the effect of gonadectomy on general health before firm recommendations can be made.

In light of the continued need for population control, animals in a shelter situation should be treated as a whole; gonadectomy is performed prior to re-homing and perhaps even as young as six weeks of age.

An educated conversation should take place with owners regarding the pros and cons of gonadectomy specific to their individual pet. In large and giant-breed dogs, consider performing gonadectomy between the first and second oestrous cycle in females and after skeletal maturity in males.

Ovariectomy is a recognised alternative to ovariohysterectomy; minimally-invasive techniques are becoming more widespread.

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