

## GYNAECOLOGICAL PROBLEMS IN SHE DOGS

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### ABSTRACT

The common gynaecological problems occurring in she dogs include pseudo-pregnancy, fetal mummification, maceration, uterine inertia, eclampsia or hypocalcaemia, dystocia (maternal/fetal), pyometra, rupture of gravid uterine horn, uterine/vaginal prolapse, retention of fetal membranes or fetus, pyometra, sub involution of the placental sites and transmissible venereal tumours. Management of general clinical condition of the patient is of utmost significance for the animal's survival. The advent of X-rays and ultrasound has made the diagnostic procedures very helpful for timely implementation of therapeutic measures. The present review deals with common gynaecological problems of she dogs and their treatment/management.

**Key words:** Eclampsia, Fetal maceration, Gynaecological problems, Mummification, Pyometra, She dogs.

Dog is considered as a best companion to human beings and dog breeding has become a widely accepted hobby across the globe. The reproductive health of a she dog is very important for future fertility and to prevent whelping disorders e.g. dystocia. The knowledge of obstetrical problems is necessary so that more therapeutic measures can be taken to prevent obstetrical problems in canines (Ramsingh *et al.*, 2013). Canine breeding is a rapidly growing industry and there is influx of exotic breeds of dogs into India for breeding purposes. Various obstetrical problems occur in she dogs during the gestation period e.g. pseudo-pregnancy, uterine inertia, eclampsia or hypocalcaemia, dystocia (maternal/fetal), pyometra, rupture of gravid uterine horn, metritis, uterine/vaginal prolapse, retention of fetal membranes or fetus and sub involution of the placental sites (Roberts, 1971). The healthy dog is the key to safe and healthy pregnancy (Farstad, 2008). This should be carried out to diagnose and treat any clinical problems that may interfere with normal pregnancy such as vaginal strictures, stenosis of birth canal due to pelvic fracture and intravaginal and intrauterine tumours that can cause obstructive delivery problems. Birth canal abnormalities can also be detected and avoided by elective surgery (Farstad, 2008). The main peripartum complications in canines are described briefly as below:

### Maceration

Fetal maceration is characterized by fetal death and partially open cervix, therefore bacteria and other contagious infection can easily enter through the vagina into uterine lumen. After bacterial contamination, fetal emphysema develops within 24-48 hours and maceration occurs within 3-4 days. The fetuses are putrefied and autolyzed with different degrees according to the pathogenicity of the bacteria. If maceration occurs after bone formation, autolysis would continue until fetal soft tissues become autolyzed and only bones remain in the uterus. Bone fragments remaining in uterus could be

embedded into the uterine wall, which causes chronic metritis or severe damage to endometrium. However, the incidence is very low in the she dogs, possibly due to expulsion of foetus being the commonest sequel to foetal death (England, 1998; Johnston *et al.*, 2001).

### Mummification

Mummification is characterized by death of fetus and absorption of fetal fluid leading to contraction of uterus and fetal membranes adhered to the fetus (Roberts, 2004). Fetal mummification usually occurs when the fetus dies and having a fully mature skin which is resistant to autolysis, bacterial putrefaction is inhibited, tissues become desiccated, and the body shrivels to a dry leathery mass of skin, tendons, and bones. If mummification of one fetus occurs in a she dog, it does not interfere with the



Fig. 1 : Mummified fetus

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survival of other viable fetuses (Fig. 1). In dogs, the most common cause is canine herpes virus. The mummified and macerated fetus may be delivered with the normal fetus at full term; otherwise caesarean section is carried out. Although fetal mummification has been described in dogs, there are no accurate figures for incidence, although it is assumed to be very low.

### **Uterine rupture**

The rupture of the uterus in bitches is an acute, life-threatening condition observed by the end of pregnancy or during parturition that appears most commonly as a result of dystocia (Hajurka *et al.*, 2005) and is one of the rarely diagnosed clinical entities in canines. The main causes that could lead to uterine rupture are traumas, uterine torsion (Stone *et al.*, 1993; McEntee, 1990), pathological alterations of the uterine wall, inadequate obstetric care, application of high doses of oxytocin or prostaglandin  $F_{2\alpha}$  (Allcock and Penhale, 1952; Oelzner and Munnich, 1997; Jackson, 2004), consequence of dystocia or because of fragility of the uterine walls in pyometra (Johnston *et al.*, 2001) and forced extraction of an oversized fetus. In the bitch, rupture of the uterus during labour has also been commonly associated with very large litters, causing marked stretching and thinning of the uterine wall (Davidson, 2003). Uterine rupture is a catastrophic event and majority of cases are undiagnosed due to concurrent serious injury or fatality (Hayes, 2004) of which majority is caused by hypovolemic shock (Olu and Olamijulo, 1998). Ultrasonography or exploratory laparotomy (Niwas *et al.*, 2017) are suggested for proper diagnosis of the cases. Various workers have suggested ovariohysterectomy for treatment of uterine rupture in canine patients (Hayes, 2004) while others have recommended repair of uterine defect followed by abdominal lavage and postoperative broad spectrum antibiotics therapy (Thilagar *et al.*, 2004; Niwas *et al.*, 2017).

### **Eclampsia**

Eclampsia is an acute, life-threatening disease frequently observed in small, hyper excitable breeds caused by low blood calcium levels (hypocalcaemia) of dogs. Eclampsia may not be necessarily associated in dogs and more rarely in cats. Eclampsia is caused by hypocalcaemia in dogs. The lactating she dog is susceptible to blood calcium depletion because the body cannot keep up with the increased demand for calcium. This is because dogs lack the ability to quickly move calcium into their milk without depleting their own blood levels of this mineral. The disease has been reported to be more frequently observed in small, hyper excitable breeds of dogs (Pathan *et al.*, 2011). Milk fever is a very serious disorder; the signs are easy to recognise. The clinical signs include: stiff gait, inability to walk, stiff or rigid legs, muscle tremors seen, tachypnea, sometimes seizures may also occur and death can occur if treatment is delayed or not given. Normally the condition is diagnosed by careful investigation, recording proper history, correlating the

clinical signs, response to therapy in most cases and confirming the condition with laboratory diagnosis.

The females suffering of eclampsia have a history of whelping one to two weeks ago, sudden start of pacing and hesitation to nurse. Laboratory examination may be performed for the diagnosis of eclampsia by estimation of serum calcium, serum phosphorus and blood glucose levels (Pathan *et al.*, 2011). Eclampsia can be treated by a slow and careful intravenous injection of a calcium solution under the close supervision of the veterinarian. Generally, 5-10 ml of 10% calcium gluconate will provide sufficient calcium for a she dog weighing between 5 and 10 Kg. Calcium should be administered slowly to avoid ventricular fibrillation and cardiac arrest.

### **Pseudo-pregnancy**

Pseudopregnancy (Pseudocyesis/Phantom pregnancy) is a clinical phenomenon in which the non-pregnant female exhibits maternal behaviour and physical signs of pregnancy at the end of diestrus (luteal phase). It is thought to be caused by the declining serum progesterone concentrations associated with the end of the luteal phase, which in turn causes an increase in serum prolactin concentrations. Prolactin causes lactation and the maternal behavior of false pregnancy. Because the female dog ovulates spontaneously and always enters a long luteal phase, false pregnancy is a common phenomenon in cycling females (Razzaque *et al.*, 2008) and is considered a normal phenomenon. It is not associated with any reproductive abnormalities, including pyometra or infertility. Quite the contrary, the occurrence of the false pregnancy provides the evidence that ovulation took place during preceding cycle and that the hypothalamic-pituitary-gonadal axis is intact. Some females are more prone to developing clinical signs and why the severity of clinical signs varies from cycle to cycle is not known.

The syndrome usually begins with behavioural



Fig.2: Radiograph showing fetal skeletons



signs such as restlessness, decreased activity, nesting behaviour, aggression, licking of the abdomen and mothering inanimate objects. Later, pseudopregnant bitches show physical signs such as weight gain, mammary enlargement, even milk secretion and let-down and sometimes abdominal contractions that mimic those of parturition. Mammary hypertrophy is usually more evident in the most caudal pair of glands. Milk production during false pregnancy apparently results from the development of not only intra-acinar but also intracanalicular mammary secretion in predisposed she dogs.

Diagnosis can be done by history and clinical signs. In case of doubt, ultrasound or radiography should be used. In pregnant animal, fetal skeleton will be evident on radiography after 42 days of pregnancy (Fig.2). For the treatment of pseudopregnancy, Cabergoline @ 5 µg/kg body wt orally for 5-10 days or Bromocriptine @ 10-30 µg/kg body weight are advised orally for 5-10 days.

### Vaginal/Uterine prolapse

Vaginal fold prolapse is the protrusion of vaginal wall through the vulva during pro-oestrus and estrus phase of the estrous cycle and is characterized by protrusion of pear-shaped or doughnut shaped oedematous vaginal tissue through the valve (Fig. 3) (Sontas *et al.*, 2010). True vaginal prolapse may occur near parturition as the concentration of serum progesterone declines and the concentration of serum oestrogen increases. Vaginal prolapse occurs in several species but in she dogs, the true vaginal prolapse is a rare condition (Namara, 1997). Treatment depends on the extent of the fold prolapse, whether one is dealing with a breeding or non-breeding female and whether or not the prolapse is present during oestrus or at the end of pregnancy. If vaginal fold prolapse develops just prior to whelping, there is no need for treatment and parturition can take place without problems. In pro-oestrus or oestrus bitches, if a fold prolapse is barely outside the vulva or protrudes intermittently, the fold should be resected and the oedema will generally recede during the luteal phase and the bitch may be spayed, preferably during anestrus. Spaying during estrus enhances the risk for haemorrhages during surgery (Sontas *et al.*, 2010). In moderate to severe cases, and prior to, or in absence of surgical management, the mass, which protrudes from the vulva, must be kept clean and moist and self-mutilation must be prevented.

Uterine prolapse is a rare clinical condition in bitches with a reported incidence of <0.03% (Wood, 1986). It can happen in first pregnancy, but is most likely after a bitch has had several litters, with or without complications. The condition occurs due to prolonged labor, up to 48 hours after whelping, when the cervix is extremely dilated and may involve single or both uterine horns. Other possible causes include prolonged dystocia, oversized fetus, multiple pregnancies, laxity of uterine ligaments, excessive abdominal contractions, uterine atony and placental detachment (Wood, 1986). In the



Fig. 3: Vaginal Prolapse in a she dog

uterine prolapse, a uterine segment passes through the cervix and vagina, when the cervix is relaxed and protrudes at the vulva, in variable extension (Davidson, 2009). As uterine prolapse occurring early in parturition could impair its normal progress and may promote foetal retention with posterior presentation. If uterine rupture coexists, the foetus may escape into the abdominal cavity resulting in peritonitis or granuloma formation. Hence, it is important to ascertain the presence of foetus in the uterus and the patency of the birth canal (Payan-Carreira *et al.*, 2012).

### Sub involution of placental sites

Sub-involution of placental sites (SIPS) is a disorder which generally occurs in she dogs of younger than 3 years of age after the first whelping when normal healing of site of placenta where fetuses attached to the endometrium does not occur and is characterised by freshly discharged blood from the vulva from several weeks to months post partum (Kumar *et al.*, 2018). The exact pathogenesis of SIPS is not known. However, premature parturition, uterine inertia, abortion, infection, mineral and vitamin deficiencies were incriminated as predisposing to retention of placenta in cattle. Diagnosis exclusively can be done by history and clinical signs. Some other diagnostic tool such as vaginal smear, abdominal ultrasound and uterine biopsy have been considered however presence of trophoblast like cells in vaginal smear upto 84 days post whelping can be considered normal (Orfanou *et al.*, 2009). So, vaginal smear is not a good diagnostic approach for SIPS. A conclusive diagnosis can only be obtained by biopsy and further histopathological studies of affected uterus. Treatment with different antibiotics have had no results in bitches with SIPS. Seven-days course with methylethergometrine hydrogen maleate @ 8 µg/kg orally twice resulted in no improvement in clinical signs (Sontas *et al.*, 2011). Medical treatment with oxytocin or careful

use of megestrolacetate can be given, however, no further information on results with this treatment is available (Arbeiter, 1993).

### **Dystocia**

Dystocia is defined as difficult birth when second stage of whelping is prolonged and female dog is unable to expel the fetus through the birth canal without external assistance. Dystocia is a common emergency in dogs and can be life threatening to both mother and fetus. Incidences of dystocia of about 4.03 % were reported in canine by Shwetha (2012), however, others observed higher incidence ranging 16-42% (Bergstorm *et al.*, 2006). The causes of dystocia in dogs are divided into fetal or maternal in origin. If a she dog has been straining for more than 24 hour and body temperature remains low, and without the commencement of fetus, the dam should be examined for any obstetrical problems. There is incidence of maternal causes of dystocia much higher as compared to fetal dystocia (Narasimha, 2011). However, the clinician identifies the stage of labour and determines whether veterinary aid is required or not. Clinician should examine the she dog by using various procedures such as physical examination, vaginal examination, abdominal radiography, abdominal ultrasonography and fetal heart rates, that will help in diagnosing the causes of dystocia and choosing the appropriate line of treatment for correction of dystocia.

Clinical examination of the female dog should be carried out before handling to check pulse, temperature, evaluation of mucosal membranes, vaginal examination to explore cervical dilatation, udder examination for milk secretion, ultrasonographic examination for viability of fetuses (live and dead) and radiograph for number of fetal skeleton. Breed of the dog has significant effect on the course of whelping in the female dog (Chatdarong *et al.*, 2007). The dystocia mainly occurred in the miniature breeds because their fetuses are bigger size as compared medium and large breeds (Christiansen 1984). The cases of dystocia increase with increasing age of the she dog from four years of age. Older primiparous she dogs of more than 6 years of age have higher risk to have special obstetric conditions and stillbirths as compared to young primiparous female dogs (Catharina and Gunilla, 2007). The incidence of dystocia is comparatively higher in primiparous as compared to pluriparous. In large breeds, the fetus is large whereas in small breeds the birth canal is narrow. In both the breeds, there is development of fetopelvic disproportion. Chaves *et al.* (2001) reported 66.66 per cent of dystocia cases in small breed, 23.33 per cent in medium breed and 10 per cent in large breed of dogs.

There are two types of causes of dystocia e.g. basic and immediate causes. The handling of dystocia is mainly concerned with correcting the immediate cause, which have been divided into fetal or maternal in origin and fetal dystocia were more common than maternal (Arthur *et al.*, 1989). The commonly encountered

maternal causes include inadequate pelvis, incomplete dilatation of cervix (Arthur *et al.*, 1989), congenital malformation of the birth canal and rarely the uterine torsion (Prabhakar *et al.*, 1995). Fetal malformations such as monsters, fetal anasarca, hydrocephalus and incomplete development of skull and brain have been reported as a cause of dystocia in canines. Dystocia due to absolute fetal oversize was generally found in dogs carrying single fetus or due to fetopelvic disproportion (often seen in small or brachycephalic breeds or in breeds showing great disparity in fetal size or due to maldisposition. The most common reasons for fetal dystocia were fetal oversize, fetal malpresentation, litter size (single fetus pregnancies, hyperfotation), fetal monstrosities, breech presentation of an oversized fetus (Mehrotra and Dutt, 2009) and fetal death (Oluwatoyin and Fayemi, 2011).

An obstetrician has three techniques at his disposal for relieving dystocia due to fetal causes. Correction of the abnormal presentation, position and posture by digital manipulation will be his first technique of choice, particularly when live fetuses are encountered. Sometimes, digital manipulation along with the use of forceps may be preferred particularly when death of the fetus is confirmed. Caesarean section will be the ultimate choice when either digital manipulation or forceps delivery not feasible or it fails to relieve dystocia.

### **Uterine inertia**

It is lack of ability of the uterine muscles (myometrium) to contract sufficiently to expel the fetus right from onset of whelping. Dystocia has conveniently been described as being maternal or foetal in origin and there is overwhelming evidence that in the bitch, maternal dystocia is encountered more frequently (Darvelid and Linde-Forsberg, 1994). The most common cause of maternal dystocia is uterine inertia, accounting for 40 per cent (Gaudet, 1985) to 75.3 per cent (Darvelid and Linde-Forsberg, 1994) of all dystocia attributed to the dam. In complete primary uterine inertia, the bitch does not start labour. In partial primary uterine inertia, the bitch starts to deliver her puppies, but the labour ends prematurely, despite the presence of a patent birth canal (Bergstrom *et al.*, 2006). The suggested causes for primary uterine inertia include a deficiency of oxytocin, serum calcium and blood glucose (Linde-Forsberg and Eneroth, 2000). Uterine contractions are present in initial stages of whelping but cease later. Uterine muscles become exhausted after prolonged contraction against an obstructing or oversized fetus or during birth of a large size litter. This secondary uterine inertia is result of dystocia, not the cause.

Therefore, many of the medical protocols used for treatment of primary uterine inertia have centered on intravenous infusion of oxytocin, glucose and calcium, either alone or in combination should be administered slow intravenously. Further, when obstetrician decides to



try medical therapy in cases of complete primary uterine inertia, he/she should keep in mind that a high percentage of animals may have to be subjected for caesarean section. Further, in trying medical therapy, an obstetrician may be losing valuable time in terms of life of the puppy as oxytocin injections may induce enough contractions of the uterus to cause separation of the foetal membranes, but not the expulsion of the foetus, it therefore seems reasonable to suggest that caesarean section should be the first line of treatment for all cases of complete uterine inertia to maximize the foetal survival rate (Prashantkumar *et al.*, 2018).

### Endometritis and pyometra

Endometritis-pyometra is the most frequent and complex pathology in domestic she dogs. The cystic endometrial hyperplasia-pyometra complex (CEH/P), earlier called the endometritis-pyometra complex (EPC), is one of the most serious and most common uterine diseases in she dogs (Kida *et al.*, 2006), usually occurs in a diestrous phase of estrous cycle. In the mid-1980s a disease entity was described, called the endometritis-pyometra complex, which consisted of three clinical forms: (a) pyometra, (b) chronic endometritis, and (c) cystic glandular endometrial hyperplasia (Zdunczyk *et al.*, 2006). The estrogen therapy used to prevent implantation also contributes in development of pyometra through over proliferation of endometrium and lengthening the period in which the uterine cervix remains open. The use of progestagens for oestrus and ovulation synchronisation in bitches can also be a cause of

pyometra. Hormonal aberrations and bacterial infections are the underlying causes of this complex. Therefore, hormonal imbalance is thought to be the first cause of CEH/P complex and the secondary factor of this disease is bacterial infection. From surgically removed uteri in most cases (70–80%) *E. coli* was isolated, in some cases *Staphylococci*, *Streptococci* and *Pseudomonas aeruginosa* (Arora *et al.*, 2006) has also been reported.

Hyperplasia of the endometrium is accompanied by a light red or brownish secretion from the reproductive tract of the bitch. The presence of this secretion is a characteristic sign of endometritis, but it depends on the extent of opening in the uterine cervix, and it may not appear in every case. In pyometra the secretion is thick, purulent, and yellow to reddish brown in colour, of a fetid odour or without any particular smell. This discharge from the reproductive tract can be observed in 80% of cases (Kempisty *et al.*, 2013). Accumulation of pus in uterus is known as pyometra which can be of two types e.g. open and closed. If the cervix is open (Open cervix pyometra), then mucopurulent discharge comes through vagina and the condition is not a clinical emergency. The animal may die because of toxemia if left untreated or treatment is delayed. The most obvious symptom of open pyometra is a discharge of pus from the vulva in a female. The treatment includes administration of broad spectrum antibiotics, fluid therapy, antihistaminics, non-steroidal anti-inflammatory drugs and Vitamin- B complex. PGF<sub>2α</sub> have been used successfully for treatment of pyometra. Natural prostaglandin @ 10-50 mg, 3-5 times daily for 3-7 days have been used. One should start with lower dosage to avoid side effects and then slowly increase the dosage to reach higher dosage. Initially, the bitch may be restless, may begin pacing, hypersalivation, panting, emesis and defaecation may occur. The side effects usually subside within 20-60 minutes, but this treatment is not recommended for severely affected (close pyometra) she dogs. However, in case of closed pyometra, the pus accumulates in the uterus (Fig. 4) and there is no discharge from the vagina and vulva. The case presentation is a clinical emergency. The clinical signs and symptoms include such anorexia, weakness, polydipsia, polyuria, vomiting, increased body temperature, leucocytosis, tachycardia and tachypnea. Radiological and ultrasonographic examinations reveal a fluid-filled uterus in a “closed” form of pyometra. The treatment of choice is ovariohysterectomy.

### Canine transmissible venereal tumour

Canine transmissible venereal tumour (CTVT) is a neoplasm transmitted by the physical transfer of viable tumor cells by direct contact with injured skin and/or mucous tissue. The disease is mostly seen in dogs that are in close contact with one another, or in stray and wild dogs that exhibit unrestrained sexual activity. In India, it is the most common tumour of dogs owing to uncontrolled breeding practices (Singh *et al.*, 1991). In India TVT is known to be the most frequently reported tumor in dogs ranging from 23-43 % of the total number of tumors in

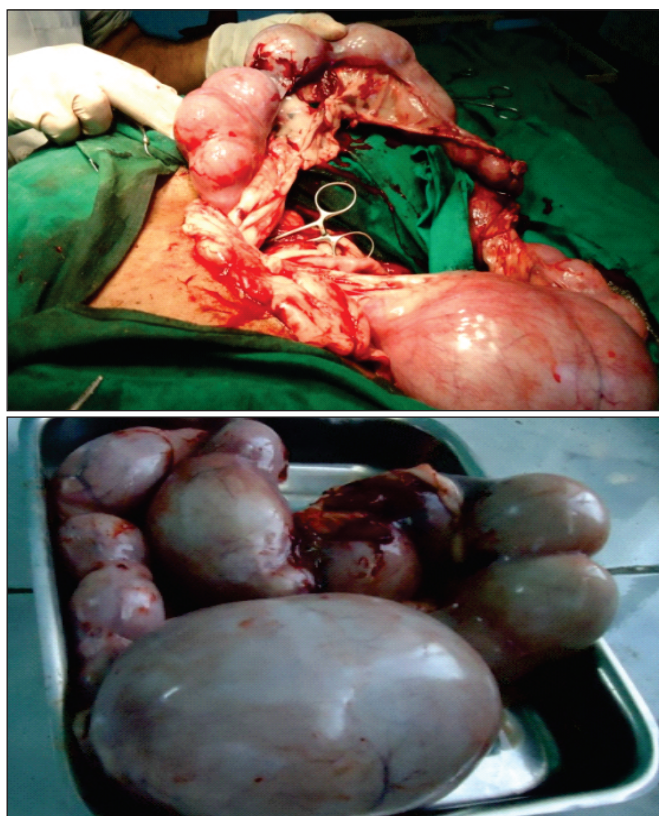


Fig.4: Pyometra in she-dog and surgical management

canine population (Gandotra *et al.*, 1993). Due to the unique nature of transmission by sexual contact, naturally occurring CTVT generally develops in enabling transposition of the tissue to a healthy the external genitalia and less commonly, the tumor may also be transmitted to extra-genital sites like nasal or oral cavities, skin and conjunctive and the rectum by sniffing or licking (Amaral *et al.*, 2007). The tumour is cauliflower-like, pedunculated, nodular, papillary or multilobulated. The tumor oozes serosanguinous vaginal or preputial discharge and becomes ulcerated with necrotic appearance. The peculiar odour of the neoplastic lesions discharge, which after secondary bacterial infection became particularly unpleasant and hetero-transplantation to the skin, cervix, uterus and the excessive licking of the genitalia (Hoque, 2002). The clinical findings are less striking in male dogs and the disease is consequently less easily perceptible than in females.

Diagnosis is established based on anamnesis, clinical findings, cytology, histology cytogenetic and molecular techniques. CTVT cells may be collected by fine-needle aspiration of the tumour mass and have very distinct appearance. They are round to oval in shape and often contain mitotic figures, with chromatin clumping and one or two prominent nucleoli. The most striking cytological finding is the presence of multiple clear cytoplasmic vacuoles. Vacuolation increases during early stages of regression as CTVT cells undergo degeneration. Cytology provides a better evidence of CTVT as compared with histology. The histologic appearance of transmissible venereal tumour may be difficult to distinguish from other round cell tumours such as histiocytoma, lymphosarcoma or mast cell tumours; especially when the tumours involve extra-genital locations. Upon reticulin staining, TVT cells show invasion of the inter-alveolar spaces by reticulum fibres characteristic of alveolar soft-part sarcoma (Das *et al.*, 1990).

Treatment can be attempted by excisional surgery, chemotherapy, radiotherapy, immunotherapy or a combination thereof. Chemotherapy gives more promising results and up to 100% remission can be achieved. An array of chemotherapeutic agents has been tried against CTVT such as cyclophosphamide, methotrexate, and cyclophosphamide with prednisone, vinblastine with cyclophosphamide or methotrexate and vincristine. The intravenous administration of vincristine sulphate @ 0.025 mg/kg of body weight or @ 0.5 to 0.7 mg/m<sup>2</sup> of body surface area, once a week, for 2-8 weeks beyond the complete resolution of the gross tumour mass, is the treatment of choice irrespective of the neoplasm size and extent (Singh *et al.*, 1996). Control of this disease is difficult because stray dogs serve as a reservoir. Dog owners and breeders should carefully examine all males and females before mating and should also prevent mingling of valued dogs with strays ones.

Therefore, the care and management of pregnant and non-pregnant she dogs under with humane environment is essential for better litter size and their survival. The timely reporting of problematic animals to the veterinarian determines the recovery and prognosis of the case. The diagnostic aids like ultrasonography, radiography and haematology have become methods of routine investigation and the clinical interpretation decides the line of treatment.

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