Proceeding of the SEVC
Southern European Veterinary Conference

Oct. 2-4, 2009, Barcelona, Spain

http://www.sevc.info

Next conference:

October 1-3, 2010 - Barcelona, Spain

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The mammary gland is unquestionably the most overlooked of the reproductive system. Most of us believe (or believed) that the only thing that is useful for is to produce tumours to be removed. And it is not so, the mammary gland is a complex one, whose function is critical for breeding. And not all the "tumours" are neoplasms.

**ANATOMY Y PHYSIOLOGY OF THE BREAST**

Breast glands are modified skin glands, functionally related to the genital tract, following its sexual cycle and responsible for the nutrition of the pups in the early stages of their life. They are functionally exocrine glands but also endocrine and paracrine simultaneously. Each gland opens to the outside through a nipple or papilla. Their parenchyma is a tubular acinous gland, formed by numerous acini or glandular alveoli clustered in a fibrous capsule and structured on lobes, separated by thick conjunctive walls (stroma). The stroma consists of adipocytes, muscle cells, blood vessels, lymph vessels and nerve endings. The acini are composed of secretory cells surrounded by myoepithelial cells and grouped in clusters, whose contraction boost the secretion of milk into the collecting system. This collection system is made based lactiferous ducts of increasing size that result in the lactiferous sinus or tank milk just flows into the hole on the nipple.

We must distinguish three phases within the biology of this unique gland:

**Mamogenesis:** Formation of the breast that corresponds with the growth of epithelial tissue. It is already differentiated from the embryonic mammary ridge and continue its development until puberty in the female when the first oestrogen stimulation are produced that will determine the breast growth that will be followed by the growth of canalicular system and differentiation and evolution of the secretory tissue, the formation of alveoli and the final production of milk. Mamogenesis mainly occurs because under the combined action of oestrogen, progesterone, growth hormone, cortisol, insulin, thyroxine with the breast and extramammary growth factors such as GH Breast and Insulin Growth Factor 1 and 5. Prolactin is the hormone of lactation for excellence and lactogenic complex hormones are necessary for the complete development of the breast and lactation.

**Lactogenesis:** Onset of synthesis and secretion of milk. The onset of lactation coincides with the hormonal changes that occur during the pregnancy and birth. Thus oestrogens favour the canalicular development and sensitise the breast for the posterior action of progestagens, which are responsible for the maturation of the alveolar-lobe system. Falling levels of progesteronemia at the end of pregnancy, have a negative effect on the inhibiting factors of Prolactin (IFP) at pituitary level, and at similar level a drop of oestrogens have a negative effect on the prolactin releasing factor (PRF). It is because prolactin, a peptide hormone produced in the anterior pituitary, together with many other factors ("lactogenic complex") is responsible for lactation. It is necessary to associate the ovarian hormones to produce mamogenesis and also in the lactogenesis and the galactopoesis with oxytocin. The regulation of prolactin depends primarily on the IFP (dopamine) and the PRF (serotonin, melatonin, histamine, TRH, endorphins). The physiological dose of oestrogen stimulates the secretion of prolactin and at therapeutic doses they inhibit lactation. Glucocorticoids stimulate the synthesis of casein and at the same time amplify the activity of other hormones (e.g. prolactin).

**Galactopoesis:** Maintaining of the functionality of the mammary gland during lactation. Milk production and ejection are controlled by a neuro-endocrine reflex in which the afferent pathway is the nervous (nipple stimulation, conditioned stimuli such as odour or cry of the puppies, etc.) that produces the release of oxytocin by the posterior lobe of the pituitary gland. Oxytocin is the efferent pathway that reaches the breast through the blood, activating the excretion of milk by the action of the myoepithelial cells. This neuroendocrine stimulation promotes also the release of other anterior hypophysary hormones of the galactogenic complex: TSH, GH, ACTH and prolactin. The release of oxytocin is pulsatile and quick presentation (30-40 sec.) Although its effect is brief (5 minutes). The physical and psychological stress can inhibit the neuro-endocrine reflex by releasing adrenalin.

**EXPLORATION AND METHODS OF DIAGNOSIS**

Despite of the many problems in the mammary gland, the existing literature, articles review as well as new developments are scarce. In human medicine is a field where constant research and especially the preventive medicine has allowed early detection of many problems (not just the tumours) and its resolution. It is therefore essential that any female that comes to our clinic is always subject to an examination of their breasts with a general exam, to try to detect early any pathology that may exist.

First make a history which should include: how long ago that the problem exists, the rate of growth, the
Problems during lactation

1. Agalactia: The agalactia is as its name indicates the absence of milk in a pregnant bitch. It can be subdivided into true and temporary agalactia.

True agalactia: is defined as the persistent and almost total absence of milk production, is rare and its aetiology is poorly understood. Predisposition factors are suspected as an unfavourable environment, malnutrition, and mainly neurogenic problems with the inhibitors of prolactin secretion. It has also been associated with the presence of uterine infection, foetal retentions, etc. pathologies that should always be investigated and if found, give the appropriate solutions.

Transient agalactia: Usually occurs in primiparous, or females who have undergone a caesarean section and consists of de-synchronization between the appearance of the milk and the birth. This de-synchronization requires artificial feeding of puppies the first days-postpartum.

Treatment of agalactia is difficult and not always solve the problem. It consists in stimulating indirectly the prolactin secretion through the use of metoclopramide (Primperan®) or the veralipride (Agreal®, 1 capsule/20 kg) or sulpiride (Guastil®), all the products have antidopaminergic activity and that stimulate prolactin secretion through the use of metoclopramide (Primperan®) or the veralipride (Agreal®, 1 capsule/20 kg) or sulpiride (Guastil®), all the products have antidopaminergic activity and that stimulate the secretion of prolactin. We must also stimulate the sucking reflex -oxytocin release, placing the puppies to suck the mother even if we artificially feed them. It has also been described the use of ovine prolactin in pediatrics.

2. Lack of milk ejection: Not to be confused with either an agalactia or mastitis, since in this case there is production of milk but ejection does not occur satisfactorily. On examination we realize that breasts are congested, soft and often painful on palpation. Pressure over the breast does not achieve the passage of milk through the nipple. The origin of the problem is an excess of adrenaline by either stress or pain that negatively affects the ejection of milk. Treatment consists of administration of oxytocin (2 to 5 IU / every 6 hours or before breastfeeding the puppies) that can be helped with sedatives (diazepam, ansiolytics) for very nervous bitches. If the treatment does not work congestion of the breast may occur by the accumulation of milk secretion and mastitis subsequent with abscess formation.

3. Milk hyperproduction: Occurs in some dogs at the peak of lactation, a milk with excessive fat that can lead to osmotic diarrhoea of the pups that tend to be obese at that time. Besides, the capacity at the time of the puppies to digest lactose is clearly diminished. We can diagnose this problem doing a Sudan 3 stain in the faeces of small to will be coloured.

4. Mastitis: Is defined as inflammation of one or more mammary glands that usually occurs in the post or females with pseudopregnancy. There are several forms, acute mastitis, gangrene, the chronic mastitis and sub-clinical mastitis.

As cause it must be highlighted contamination of breast by ascending infections from the nipple, but haematogenous spread is also described. The main pathogens isolated were E. Coli, staphylococcus and streptococcus. Trauma during sucking by the pups and poor hygiene can contribute to the aetiology of the process.

Acute mastitis: Normally one of the caudal glands is hot, painful to palpation, swollen and redness. The female may present with fever and depression together with death of one of the puppies. Secretion of the
the administration of progestagens products. In its pathogenesis is suspected a hypersensitivity to physiological levels of endogenous progesteronemia or affects young cats after the first oestrus and bitches after the first heat.

proliferation of epithelial components of the ducts or the fibroglandular tissue of the breasts. It usually hypertrophy, mammary fibroadenomatosis and fibroglandular hypertrophy. It consists of a benign This disorder has received several names such as fibroadenomatous hyperplasia, juvenile mammary androgens in females with persistent galactorrhea as mibolerone or methyltestosterone.

the process tends to disappear. We can assist in the resolution process by withdrawing food and water to the composition of milk will always be poorer. In the case of gangrenous mastitis due to the role of milk or with antibiotics does not usually create problems for the puppies. We have to take into account that except in the case of the existence of abscesses or gangrenous mastitis because the ingestion of infected plasma from the milk is broken.

In the case of acute mastitis the choice of antibiotic is not very important as the barrier that separates the milk and facilitate infection. The dilemma of whether to remove the pups from the mother is always a controversial issue. It is generally recommended to continue with natural breastfeeding from the bitch in the milk regardless of its pH. Side effects that may produce these antibiotics (staining of the enamel, etc.) make their use is not recommended.

In the case of acute mastitis the choice of antibiotic is not very important as the barrier that separates the plasma from the milk is broken. Other adjuvant therapies that need to be applied are manual emptying of the milk to prevent accumulation and facilitate infection. The dilemma of whether to remove the pups from the mother is always a controversial issue. It is generally recommended to continue with natural breastfeeding from the bitch except in the case of the existence of abscesses or gangrenous mastitis because the ingestion of infected milk or with antibiotics does not usually create problems for the puppies. We have to take into account that the composition of milk will always be poorer. In the case of gangrenous mastitis due to the role of anaerobic microorganisms will be necessary an effective antibiotherapy, a surgical drainage and application of antiseptic towels. It can be applied through a cannula of povidone-iodine solution to 0.5-1% in the interior of the breast twice daily for 5 days. As a last result we should resort to mastectomy.

5.-GALACTOSTASIS: is defined as an excessive accumulation of milk along with a lack of excretion and may be associated or not with a sterile or septic mastitis. It is generally observed a thickening of the affected breast with milk, which causes inflammation, oedema and nervousness on the part of the female, with normally affecting females with pseudopregnancy or where there has been an abrupt weaning. In cats an increased incidence in cranial breasts have been observed. The general condition of the animal is not usually affected. Cytology of milk usually reveals the presence of an abnormal number of PMNN, macrophages and non degenerated PMNE. Macrophages phagocyting fat droplets are often observed. Treatment is aimed at reducing production of milk in the affected breast or breasts through the use of cold compresses for 10 to 15 minutes, use of diuretics and glucocorticoids for 2 to 5 days and anti-prolactins in the event that the pH of the milk is >7.4 using weak bases such as ampicillin (20 mg/kg/8h 21 days) or cephalaxin (30 mg/kg/12h 21days). Some antibiotics such as chloramphenicol, doxycycline and tetracycline appear in reasonable concentrations in the milk regardless of its pH. Side effects that may produce these antibiotics (staining of the enamel, etc.) make their use is not recommended.

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MAMMARY FIBROEPITHELIAL HYPERPLASIA

This disorder has received several names such as fibroadenomatous hyperplasia, juvenile mammary hypertrophy, mammary fibroadenomatosis and fibroglandular hypertrophy. It consists of a benign proliferation of epithelial components of the ducts or the fibroglandular tissue of the breasts. It usually affects young cats after the first oestrus and bitches after the first heat.

In its pathogenesis is suspected a hypersensitivity to physiological levels of endogenous progesteronemia or the administration of progestagens products. The lesions usually appear as numerous cysts of variable size, readily identifiable on palpation and can be emptied by puncture (but reappear again quickly).
At histological level have been distinguished two types of processes:

A.-Fibroepithelial diffuse hyperplasia: by the proliferation of fibroglandular elements, and which are the injuries typical of cats after season.

B.-Intraduct papillary hyperplasia that is caused by proliferation of mammary epithelium of mammary ducts which is typical of animals subjected to therapy with progestagens.

The clinical manifestations are variable, from females in which we can observe some isolated cyst in one breast, passing through multiple nodes in multiple glands to a really spectacular increase of the glands. In all cases, the breasts are not usually painful to palpation although when the increase in size of the gland is very intense, nervous manifestations may occur in females. These inflammations can occur slowly over days or even weeks or appear quickly.

The diagnosis is based on exploration, puncture of cysts, clinical history and ultimately in the biopsy. It was detected progesterone receptors in most cases and oestrogen receptors in the middle of them.

It is a pathology in the case of dogs, which usually does not require treatment because the process resolves spontaneously without therapy, in a few weeks when the hormonal values return to basal levels or after hormone treatment with progestagens is ceased.

In the case of the cat can be a fatal injury, causing tachycardia, skin ulcers, pain in breast gland, lethargy, anorexia and even death from acute thrombosis or ischemic necrosis. The recommended protocol for treatment in the cat is as follows:

- 20 mg / kg once a week, until the symptoms disappear
- Adjuvant treatments: Corticosteroids, atenolol, anti-prolactins

It has also been described the possibility of the appearance after castration in males, without knowing all its pathogenesis.

Failures in the treatment have been described because there are other sex hormones in the aetiology such as the presence of hyperprolactinemia in pituitary tumours.

In severely affected cats the ovariohysterectomy often assists in the speedy resolution of the process but it is not an easy surgery. Surgical excision with biopsy is indicated in those cases in which medical treatment was unsuccessful or when the size of the gland it becomes traumatized and may become infected. The use of diuretics, corticosteroids, and cold compresses can help in solving the problem. It is described also the use of androgen hormones.

**PSEUDO-PREGNANCY**

It is defined as those physical changes (presence of milk in the breast) and behaviour (nest building, adopting objects, etc.) that simulate a pregnancy in a female who is not. It is a very common problem in the everyday clinic for what has come to be regarded by some authors as a physiological process and not pathological. Is it consider that a bitch in 2 to 3 at the end of the lutheal phase expresses this process.

During diestrus the corpus luteum of non-pregnant females continues to produce progesterone in doses equal to the pregnant female. Thus all females have a period of about 40 to 50 days in which the pregnancy hormone is acting on their bodies. We could therefore say that all females suffer from a pseudopregnancy although not all show symptoms, therefore there are manifested pseudopregnancies and those which are not. By reducing the progesterone abruptly at the end of this period there is an increase of prolactin, which stimulates the mammary gland as well as post-parturition behaviour. The prolactinemia of pregnant females is 5 times higher than that of the bitches who are not. Besides studies seem to confirm that the prolactinemia of pseudopregnancy is higher in females than in females who are not and which are on the same stage of the cycle.

We will find a female between the month and a half and two and a half months after the season that shows mammary congestion, milk production, changes in behaviour (lethargy, aggressiveness) and even at the end of the process may have symptoms consistent with a birth as anorexia, maternal aggression, taking inanimate objects and lactation. The milk secreted may be normal or may have a more fluid and brownish aspect. As consequences from the process could occur a mastitis in the breasts that have been developed as a result of pseudociesis. We can also observe the same symptoms in neutered female at the end of diestrus.

The intensity of these symptoms varies greatly between animals and depends on environmental factors, the dependence of animal in their owners, their physical activity as well as their food.

The differential diagnosis more important it will be obviously the true pregnancy. The treatment will be necessary only in those females with a marked conduct or an excessive secretion of milk. In the past oestrogens were used (diethylstilbestrol) and progestagens (proligestone, medroxyprogesterone acetate) but because of its side effects and the appearance of anti-prolactins these protocols are not currently used.

Currently derived of ergotamine (anti-prolactins) are the products of choice for those females:

1.- Bromocriptine: 20 g/kg/24 h 10 days. It is a dopamine agonist (negative effect on prolactin) It is normally required to reformulate products from human medicine. As major side effects it has vomiting, anorexia and diarrhoea. We shall associate with the use of an anti-emetic. It is recommended that their use is required to reformulate products from human medicine. As major side effects it has vomiting, anorexia and diarrhoea. We shall associate with the use of an anti-emetic.

2.-Metergoline (Contralac®):. Its mode of action is anti-serotonergic. As side effects we have...
MAMMARY TUMOURS

ETIOLOGY

The aetiology is not known although there are a whole series of factors that influence the production of tumours in the bitch, not so well known in the cat.

Hormonal factors:

Season Control Products: The administration of progestational compounds to control the season is directly related to the appearance of benign nodules and mammary tumours. These tumours are usually benign, although high dose and repeated administration favours even more the appearance of these tumours and their possible transformation to malignancy. These products should therefore be used with caution and always at the minimum dose, avoiding their repetition.

Pseudopregnancies: Although no detailed statistical study, it appears that the pseudopregnancies may favour the appearance of mammary tumours. This risk would be due in part to the accumulation food-borne carcinogens products and on the other side to hypoxia by distension of the culinary, resulting in the appearance of mammary tumours. This risk would be due in part to the accumulation of free radicals in the mammary gland.

Ovariectomy: without doubt the number of oestrous cycles before sterilization is one of the best known factors in the case of mammary tumours. The risk of developing mammary tumours in neutered female is only 12% compared to females who are not. Females subjected to ovariectomy before the first heat have a relative risk of 0.05% after the first heat is 8% and after 2 cycles or more the relative risk becomes 26%. After two years of age or 4 reproductive cycles the protective effect of sterilization disappears. The ovariectomy works at 3 levels to avoid the appearance of neoplasias. First reducing the number of cells (most likely to generate a tumour).

The presence of hormone receptors: oestrogen and progesterone receptors have been detected in canine mammary tumours. Approximately 40 to 60% of all tumours examined were positive for these receptors. Receptors were found in 70% of benign tumours and increased number of receptors meant increased tumour differentiation. It has also been detected the glucocorticoid and prolactin hormone receptors, but studies in this regard are not entirely clarifier and especially the possibilities in everyday clinical practice. The most frequent positive tumours to receptors were positive for oestrogen and progesterone receptors in the benign ones and progesterone positive among the malignancies. In malignant tumours, those with greater numbers of receptors are those with more favourable prognosis.

Virus: The existence of a virus responsible for the mammary tumours has been demonstrated in other species and may not be entirely ruled out for the dog (Murine Mammary tumour virus)

Food: The obese dogs have a lower survival rate after surgical treatment, but the risk of developing breast cancer in females with respect to such females in good physical condition has not been fully demonstrated, as in human medicine. One study suggested that dogs fed diets low in fat (and high protein) had a
significantly better prognosis for survival with respect to females fed diets rich in fat (whatever the protein %) one year post-surgery.

Other factors: irregular oestrus, follicular cysts, corpus luteum persistent, size of previous litters, and fertility problems have not been documented through studies associated with an increased incidence at the clinical level although this relationship is well accepted.

**PHYSICAL EXAMINATION**

Often the female is presented to consultation with one or more variable-sized palpable mass on physical examination. The caudal glands are most commonly affected as discussed above. 65% of females are presented with multiple tumours at the time of their arrival to the consultation and benign and malignant tumours can coexist at the same time.

As bad prognosis factors are:
- Rapid growth: tumours that usually appear and evolve during the season or diestrus have poorer prognosis. Benign tumours can change into malignant rapidly during the season.
- Infiltrative growth to surrounding tissues and poor delineation of the mass which difficult surgical resection. Ulceration of the skin and muscle or skin adhesions are signs of poor prognosis.
- Evidence of inflammatory changes in the skin and adjacent tissues like lymphoedema of the extremities and vulva are factors of poor prognosis.
- Evidence of metastatic lesions in regional lymph nodes. The invasion of the lymphonodes is associated with a degree of post-surgical recurrence of 95%. Breast M4, M5 drain into the inguinal nodes, the M1 and M2 in the axillary nodes and the M3 shared drainage between the two. There are about 10% of cases in which the drainage does not meet this standard.
- Evidence of systemic metastases to lung, liver, bones, kidneys, etc.
- Size of the tumour: Those tumours less than 3 cm in diameter have a better prognosis than those with a bigger size, although the size factor is lost if there is metastasis to regional lymphonodes.

As factors which do not influence the prognosis are:
- Location of the primary tumour in the mammary chain (upstream or downstream, left or right).
- Location on one or more breast.
- Abnormal secretions unless these show evidence of anaplasia.
- Litters: more or less, or lack of them.

**DIAGNOSIS**

Diagnosis is clinical by palpation, any nodule larger than 1 millimetre can be palpated by the veterinarian. It will need to conduct a differential diagnosis with other pathologies such as breast mastitis, galactostasis and mammary hyperplasias and extramammary pathologies like skin tumours (Mastocytoma) or subcutaneous (lipomas, haemangiomas).

Within the diagnosis we should do a thorough exploration, including the following parameters:
1. Chest radiography: Making two projections : laterolateral and ventrodorsal. Assessment of lung parenchyma because the location of pulmonary metastases is 60 to 80% and tumours from 3 to 10 mm in diameter can be observed radiographically, assessment of cardiac silhouette (Geriatric animals). We also assess the cranial sternal lymph node that will be hypertrophic in case of metastasis.
3. Electrocardiographic examination before submitting to surgery a geriatric animal.

Within the diagnosis should always include histopathological examination of the breast or the resected tumour, because depending on the type of cancer the treatment will vary so much as the prognosis. The histopathological classification as well as the attempts to fit these tumours within a type (TNM classification) to this day are not entirely clear. We will attempt with two tables show two studies in which the type of tumour correlated with the degree of survival.
In the case of the cat the majority of tumours are malignant (80-90%), many of them adenocarcinomas that invade surrounding tissues. Those cats with big mammary carcinomas have recurrences and die within the first year.

Finally, as in all tumours a classification has been (Table III) of tumours within TNM system (Tumour-Nodes-Metastases), although this classification within the daily clinic is usually difficult. It is only useful in the classification of malignant tumours and seeks to be an indicator of the life expectancy of the animal as well as possible relapses.

<table>
<thead>
<tr>
<th>Histologic description</th>
<th>Invasive carcinoma</th>
<th>Non invasive carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary carcinoma</td>
<td>65</td>
<td>128</td>
</tr>
<tr>
<td>Tubular carcinoma</td>
<td>36</td>
<td>110</td>
</tr>
<tr>
<td>Solid carcinoma</td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td>Anaplastic carcinoma</td>
<td>11</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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| T1-Less than 3 cm in diameter |
| T2-3 to 5 cm in diameter      |
| T3-More than 5 cm in diameter |
| Subgroups: a) not attached to other tissues |
| b) attached to the skin       |
| c) attached to the muscle     |
| T4-Any size, inflammatory carcinoma (dermal infiltrate) |
| N0-No affection of the lymphatic nodes |
| N1a-Ipsilateral nodule affected, non attached |
| N1b-Ipsilateral nodule affected, attached |
| N2a-Bilateral nodules affected, non attached |
| N2b-Bilateral affected, attached nodules |
| M0-Without distant metastasis |
| M1-Distant metastasis         |
| ESTADIO I                      |
| T0, T1 a, b or c, N0, M0       |
| ESTADIO II                     |
| T0, T1 O T2 a, b or c, N0 or N1a, M0 |
| ESTADIO III                    |
| Any T tumour, with any N, and M0 or any T with Nb and M0 |
| ESTADIO IV                     |
| Any T, with any N and M1      |

**TREATMENT**

1. Surgical treatment:
   Yes it is true that breast surgery has a therapeutic purpose in almost 100% of cases, leaving the rest of the issues of aesthetics, nipple surgery, etc. that may be increasing in the future as our society is progressing. We will have to act in breast surgery in situations as diverse as mastitis, fibroadenomatosis, dysplasias, neoplasias. In other words we will find "mammary tumours", "no tumoural breast problems", "non mammary tumours" and "neither mammary nor tumoural problems". As a generality, for any surgical approach we should be familiar with the mammary structure: the bitch has five pairs of breasts, which may sometimes vary from four to six, located subcutaneously and distributed in two parallel chains, extending from the axillary region to the groin. They are denominated in different ways,
The cat has two chains with four mammary glands each. A nivel quirúrgico nos centramos en tres aspectos:

- "Normal" vascular patterns: In general, the blood supply is provided by the Internal Thoracic, Lateral Thoracic arteries and cutaneous branches of the intercostal arteries to the gland M1 and M2, the M3 is nurtured by the Cranial Epigastric artery and M4 and M5 of the Caudal Epigastric artery and External Pudendal artery. Venous return is symmetric and parallel. The lymphatic drainage of M1, M2 and M3 goes to the homolateral axillary lymphonodes, whereas M4 and M5 drain to the superficial homolateral inguinal lymphonode. There is inconstant lymphatic communication between the M3 and M4. On the same way lymphatic connections are produced between M1, M2 and M3 and between M4 and M5.
- Large individual variations in vascular patterns especially in the case of pathologies (never be too confident!).
- Large differences in the parenchyma between the bitch and the cat.

We cannot standardize a protocol but the clinician applies to each case what he or she sees fit. As possible surgical techniques to consider depending of the features we have:

- Nodulectomy / partial mastectomy: consists in excision of the lesion only, without the adjacent breast tissue. It is usually used when the tumour is small, encapsulated, non-invasive and requires minimal surgical excision.
- Simple mastectomy: Excision of a full breast, including all breast tissue, nipple and adjacent skin.
- Block mastectomy: resection of the tumour, glands, intermediate and regional lymphonodes.
- Mastectomy radical (unilateral o de ambas cadenas): consiste en la eliminación de toda la cadena, de las 5 glándulas mamarias y los ganglios linfáticos regionales.
- Removal of half chain: consists of the removal of the affected mammary glands and mammary glands that depend on it, both due to its anatomical position and its lymphatic drainage.
- Radical mastectomy (unilateral or both chains) is the elimination of the entire chain, all the 5 mammary glands and regional lymph nodes.

The most serious current trend explains that the more or less radical mastectomy would be the main reason to avoid a second surgery, but not to prolong the life of the animal. No longer has force the theory of vascular "brotherhood", as it is perfectly demonstrated the existence of communication between the vascular and lymphatic channels. There are multiple theories widely available, all with their share of reason. Here we provide our opinion. Particularly in some very specific points:

1. Routine palpation of breasts for detection as early as possible. Also important for the client.
2. Anamnesis of all aspects of reproduction, especially with regard to the relationship between pathology and season.
3. Chest radiography after surgery. Is it really useful or may have many false negatives? Differences between dog and cat, miliar or nodular patterns. Some studies show that radiology has little meaning, and even the author's experience is that it is better to make a radiography to assess not only the existence of pulmonary metastases but also the cardiac morphology and associated respiratory problems.
4. Cabergoline long before any breast surgery. According to a study by Dr. Verstegen and Dr. Oncin, treatment with a prolactin inhibitor such as cabergoline at doses of 5 micrograms / Kg. Once daily for 5 days before surgery reduces the inflammation of the breast tissue so that it can better differentiate the edges of the tumour and allows a better surgical resection of it.
5. Always simultaneous ovariohysterectomy, explaining to the owner the absence of menopause and consequent adverse effects of persistent ovarian activity. The OHT needs to be done before surgery to prevent tumour dissemination.

It is useful for:

6. 100% dysplasias, etc. are hormone-dependent.
7. Benign tumours 70% and 50% of carcinomas have hormone receptors in the bitch, the cat in only 10% of tumours exhibit oestrogen receptors. Recent studies that correlate receptor levels with the aggressiveness of the tumour, indicate that the more undifferentiated tumours and more aggressive, lose the expression of receptors. Neutering has been showed reducing the appearance of benign tumours, but not the incidence of malignant tumours or metastases of these. 8. Oncogenic influence of growth hormone linked to progesterone.: Levels of growth hormone and prolactin levels in plasma are not affected in animals with tumours of the mammary gland. However, progestagens in the lutheal phase and injections induce an increase of growth hormone at mammary epithelium, and may have a role in tumourgenesis.
9. It is already said by the Americans
10. Clinically, the vast majority of bitches with mammary pathologies are macroscopic ovarian abnormalities (polycystic ovaries, lutheal cysts, etc.).
11. It also avoids other problems associated with the heat.

-The surgery of the tumour should be atraumatic: haemostasis, early ligation without manipulating the tumour. When the surgical incision is made we must keep in mind the size of the mass to avoid excessive...
tension at the time of suturing, especially for surgery at thoracic level. We must avoid cut the breast tissue because it is highly vascularized and produce an intense bleeding and thus could spread the tumour.

- Try to incorporate the scar of the mastectomy with the one of the laparothomy.
- In inguinal breasts, remove the node.
- Careful suture of the different levels, it is preferable a good suture of the different levels, leaving no dead spaces and making a discharge approximation of the subcutaneous than placing a drainage, compression bandages ....
- In the cat, first chemotherapy in anaesthesia unless clear doubt. Feline mammary tumours are less common than in dogs, but 80% are malignant, the most common are carcinomas of poor prognosis due to its metastatic character, there may also be sarcomas but they are less frequent. The decision to use chemotherapy as a treatment depends on the type of tumour, the degree of malignancy, the patient's status and tumour’s response to chemotherapeutic agents. There should be a balance between the effectiveness of anti-neoplastic agent and toxicity on healthy cells. A good use of the chemotherapy protocol, usually has a remission of clinical signs with an increase in survival time.

- Pathology of all injuries and in case of mammary tumours can now conduct a study of hormone receptors. In the case of multiple mammary tumours send more than one sample since the same animal may present with different malignant tumours.

In short, it is preferable nodulectomy / mastectomy + OVH, than radical mastectomy alone

2.- Chemotherapy:
There are few studies in this field unlike in human medicine. Its main indicators would be those animals whose biopsies show a high probability of recurrence or metastasis (stage II or III and IV) and any cat with mammary tumours. It would also be indicated as a palliative treatment to reduce tumour size and increase the life expectancy of the animal. Always, we must speak with the owner before application of what we are trying to achieve as well as the cost and side effects that may result from its application. In the table there are several protocols described, and their side effects:

<table>
<thead>
<tr>
<th>Product</th>
<th>Dose</th>
<th>Secondary effects</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adriamustine</td>
<td>30 mg/m2 / every 3 weeks in the bitch</td>
<td>Histamine shock, digestive disorders, bone narrow suppression, renal failure alopecia (poodles) and especially cardotoxicity</td>
<td>Slow intravenous infusion. It would be convenient and ECG and echocardiography to monitor cardiac function</td>
</tr>
<tr>
<td>Fluorouracil</td>
<td>150 mg/m2 / every 5 weeks</td>
<td>Toxicity on the neurological system, from tremors to severe convulsions that can lead to death</td>
<td>Currently not in use due to the death cases</td>
</tr>
<tr>
<td>Cisplatin</td>
<td>60-70 mg/m2 / every 3 weeks</td>
<td>Renal toxicity, Vomiting, bone narrow suppression. It is necessary a fluidtherapy of 25 ml/kg/h 3 hours before Laboratory control of haemogram and renal administration function</td>
<td></td>
</tr>
<tr>
<td>Doxorubicin</td>
<td>30 mg/m2 every 3 weeks 4 to 8 cycles</td>
<td>Partial response</td>
<td></td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>Equal to the previous ones</td>
<td>Used in cats with advanced carcinomas and that showed some response to the treatment.</td>
<td></td>
</tr>
</tbody>
</table>

3.- Radiotherapy: For its implementation it is necessary to have adequate facilities, subjecting the animal to a general anaesthesia in each application and has high cost. It has been occasionally used as an adjunctive treatment to chemotherapy and surgery. There are no studies regarding its long-term effectiveness.

4.- Immunotherapy: It has been used to stimulate the immune reactions of the animal to try to combat
cancer cells. It can be used as adjuvant therapy to surgery. Specific immunotherapy involves the injection of vaccines based on autologous tumour cells derived from tumours of dogs and inactivated by mitomycin and amended by neuramidase. These treatments have shown a decrease of tumour volume and a significantly increased of life expectancy. Non-specific immunotherapy is the administration of immune response modifiers to enhance the rate of inactivation of tumour cells after surgical resection. Some of the immunostimulants that have been used are levamisole, Corynebacterium parvum and bacille Calmette-Guérin (BCG). They have not shown beneficial effects.

5.-Hormone-therapy: Because breast tumours have hormone receptor using anti-oestrogen products can lead to a reduction in tumour volume. Because they are benign tumours, those with a higher number of hormone receptors it would be in these cases where their use would be more beneficial. The most used is Tamoxifen, non steroidal anti-oestrogen compound that binds strongly to cytoplasmic oestrogen receptors. Due to the inability in veterinary medicine to perform routine studies of oestrogen and progesterone receptors in tissues such treatment has not been well established. The doses used were 0.4 to 0.8 mg / kg / day for 4 to 8 weeks orally. As main side effects include that of a more than secure pyometra in non-neutered females, urinary incontinence, vulvar enlargement, lethargy, alopecia, oestrogenic signs, urinary tract infections, etc. The application of aglepristone 1 week before surgery at doses of 20 mg / kg reduces the size of the tumour and facilitates surgery by interfering with progesterone receptors in breast tumours.

5.-Aromatase inhibitors:
In human medicine the aromatase inhibitors and GnRH agonists are used as second line of treatment after tamoxifen. The former inhibits the aromatase enzymes, increased in the mammary tumours and increased production of oestrogen inductors of mammary tumours. The second ones, GnRH agonists, block the production of oestrogen and progesterone and thus stimulating hormone receptors in the mammary gland.

6.-Adjuvant treatments:
Antibiotherapy must be applied in the case of secondary infections, hot cloths if we believe they are beneficial, and debridement of the ulcerated lesions. Use of corticosteroids reduced the inflammation as well as tumour metastasis and may increase the appetite and improve the attitude of greatly weakened animals. In case of metastatic lung disease we can apply antitussives and bronchodilators.

To summarize in Table V we outline the possible treatment based on what we find in the daily clinic.

| Any breast mass | Surgery with 2 cm margin and evaluation of regional lymphonodes |
| Neoplasia of any size | Surgical resection with 2 cm margin and evaluation of regional lymphonodes along with chest radiographs |
| Malign neoplasias > 3 cm | Same as above, and monthly check for local recurrences and bi-monthly radiographs for a year |
| Malign neoplasias of any size with lymphatic or venous invasion, or metastasis to lymphonodes | Same as before together. Tamoxifen in neutered females. |
| Metastatic disease | Surgery is not indicated unless palliative treatment in infected masses. Chemotherapy and tamoxifen as adjuvant treatment |
| Inflammatory carcinoma | Surgery not indicated. Chemotherapy, hormone therapy and radiotherapy as adjuvant therapy |

**MONITORING**
The prognosis as we have said will always be based on the histological classification of tumour. Those animals with high probability of recurrence should be examined every 2 or 3 months by chest radiographs together with a general exploration and in particular of the mammary glands. In the case of carcinoma in situ these checks should be performed every 6 months. Those animals that after 24 months did not show any signs of recurrence are unlikely to do so.

**ABSTRACT**
The aetiology of breast tumours is clearly a mystery to be discovered yet, although there are certain factors that favour their emergence as the repeated injection of progestagens or the existence of pseudo-pregnancy very obvious. The ovariohysterectomy before two years is undoubtedly the most effective method to prevent the onset of mammary tumours. Currently surgery is the method that most clinicians have at their disposal and should be able to use, leaving time to cases of sporadic implementation of chemotherapeutic or immune-modulator protocols. In any case, the attitude of "wait and see what happens, not carry out the histological study of tumours, no tumours removed immediately" attitudes are to be banished. In conclusion
any breast tumour whatever needs to be removed as quickly as possible and submitted to a histological study.

**Bibliography**


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