HISTOPATHOLOGY OF CANINE MAMMARY TUMOURS
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Abstract: Clinical evaluation of canine mammary tumour cases to the Small Animal Surgical Out Patient Ward of the Madras Veterinary College Teaching Hospital, Department of Clinics, Chennai – 600 007 between September 2005 and June 2006 was done. During the study period of 10 months, out of 100 dogs screened for mammary gland involvement, 88 showed mammary neoplasms and 12 were non-neoplastic. The tissue samples were also collected from the dogs which were brought for necropsy to the Department of Veterinary Pathology, Madras Veterinary College, Chennai – 600 007. Out of 88 tumour bearing dogs, 39 were surgically excised. From 39 dogs, 57 glands were mammectomized and six glands were obtained from two necropsy cases. Histopathology of all the 63 samples was carried out and 60.32% were found carcinomas, 23.81% carcinosarcomas, 6.35% benign, 3.17% mesenchymal, and 6.35% benign mixed tumours. Amongst the malignant tumours tubular adenocarcinoma were the most common tumour, whereas, cystadenomas was common among the benign tumours.

Keywords: Canine, Tumours, mammary tumours

I. Introduction
Mammary gland tumours represented approximately 42 percent of all tumours and 82 percent of those arising on the female reproductive organs (Cotchin, 1954). Mammary gland tumours were among the most common neoplasms of female dogs. Misdroop and Hart (1976) reported that a behavior of the mammary tumour was determined by the histological type, degree of invasiveness, amount of differentiation of cellular elements and mitotic index. Management of canine mammary neoplasms is the most challenging aspects of companion animal practice which depends upon early detection and early initiation of treatment and the role of histopathology is essential to find out the type of tumour and its prognosis (Jain et al., 2011).

II. Materials and Methods
Study included 39 clinical cases of dogs affected with mammary tumours presented to the the Small Animal Surgical Out Patient Ward of the Madras Veterinary College Teaching Hospital, Department of Clinics, Chennai. From 39 dogs, 57 glands were mammectomized and six glands were obtained from two necropsy cases. Sixty three samples of mammary tumours were collected and preserved in 10 percent neutral buffered formalin, processed through alcohol and xylol and embedded in paraffin. Sections were cut at 5µ thickness and stained by haematoxylin and eosin (Bancroft et al., 1996). The tumours were classified as per WHO Classification (Hampe and Misdroop, 2005).

III. Results and Discussion
Out of 63 samples of canine mammary tumours examined histologically, 38 samples (60.32 percent) were diagnosed as carcinomas, 15 (23.81 per cent) carcinosarcomas, 4 (6.35 percent) each benign tumours, and benign mixed tumours and 2 (3.17 percent) mesenchymal tumours. Histopathologically, 60.32 percent tumours were carcinomas followed by carcinosarcomas (23.81%). The histological features for various benign and malignant tumours were in accordance with Misdroop (2002), Vaseudevan (2003), Thangathurai (2004) and Priya (2005). In the present study, amongst the malignant tumours, adenocarcinoma were the most common tumours (n=29) followed by carcinosarcomas (n=15), and spindle cell carcinoma (n=4). This is in concurrence with the findings of Ravikumar et al., (1999) who reported that adenocarcinomas were more common followed by mixed mammary tumours. In contrast, many workers have reported mixed mammary tumours to be more common followed by adenocarcinoma (Jain et al., 2011, Moulton et al., 1970). Whereas, the equal incidence of mammary adenocarcinoma and mixed mammary tumours have been observed by some workers (Karayannopoulou et al., 1990).

The histopathology of tubular adenocarcinoma simplex showed varying sized tubules lined by single to multiple cuboidal to short columnar cells, eosinophilic cytoplasm, vesicular nucleus, hyperchromatic nucleus with prominent nucleoli, lumina contained eosinophilic secretions, scanty to moderate stroma, mitosis,
multinucleate cells, breaking of basement membrane, stromal and muscle invasion, lymphatic emboli, focal squamous metaplasia with keratinisation, vacuolar degeneration, focal to scattered lymphocyte and plasma cell infiltration, focal necrosis occasionally neutrophilic infiltration in alveoli (figure 1). Complex tubular adenocarcinoma had neoplastic tubules surrounded by spindle cells. Cystic tubular adenocarcinoma showed large variable sized cystic areas containing eosinophilic secretion. Cystic papillary adenocarcinoma showed cystic spaces with eosinophilic secretions in the lumina, (figure 2). Inguinal lymph node enlarged metastatic foci observed. Solid carcinoma had solid sheets of spindle cells, elongated and arranged in whorls, hyperchromatic nuclei, moderate stroma, megakaryocytes, mitotic figures, multinucleate cells. Squamous cell carcinoma had squamoid neoplastic cells with vesicular nuclei and prominent nucleoli, keratin pearls, abrupt keratinization; one tumour showed basaloid cells, lymph node metastasis containing squamous cell nests (figure 3). Carcinosarcomas showed osteo-chondro-myxo-fibro adenocarcinoma, lymph node metastasis (figure 4). Spindle cell carcinomas showed Solid sheets of spindle cells, elongated and arranged in whorls, hyperchromatic nuclei, moderate stroma, megakaryocytes, mitotic figures, multinucleate cells (figure 5).

Amongst the benign group, cystadenoma and mixed tumour were the most common tumour followed by lipoma. Histologically, cystadenoma showed variable sized acini filled with eosinophilic secretion, lined by flattened cuboidal epithelial cells some areas showed papillary cystic spaces, ducts also showed such lesions (figure 6). Chondroadenoma had variable size tubules, cartilage cystic adenomatous areas and abundant stroma. Lipoma showed neoplastic variable sized lipocytes with clear cytoplasm peripherally compressed nuclei, lobulated.

**Fig 1. TUBULAR ADENOCARCINOMA SIMPLEX – STROMAL INVASION H&E X 200**

**Fig.2.CYSTIC PAPILLARY ADENOCARCINOMA H&E X 100**

**Fig.3.SQUAMOUS CELL CARCINOMA – KERATIN PEARLS H&E X200**
HISTOLOGICAL TYPES OF CANINE MAMMARY TUMOURS

Sixty three tumour samples were obtained from 41 dogs involving one recurrent sample. The tumours were categorized based on WHO Classification as given below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Carcinoma</td>
<td></td>
<td>38 (60.32%)</td>
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<tr>
<td>i. Tubular adenocarcinoma</td>
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<td></td>
</tr>
<tr>
<td>a. Simplex</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>b. Complex</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ii. Cystic tubular adenocarcinoma</td>
<td></td>
<td>1</td>
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<tr>
<td>iii. Papillary tubular adenocarcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Simplex</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>b. Complex</td>
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<td>1</td>
</tr>
<tr>
<td>iv. Cystic papillary adenocarcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Simplex</td>
<td></td>
<td>4</td>
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<tr>
<td>b. Complex</td>
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<td>2</td>
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<tr>
<td>v. Solid carcinoma</td>
<td></td>
<td>2</td>
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<tr>
<td>vi. Spindle cell carcinoma</td>
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<td>4</td>
</tr>
<tr>
<td>vii. Squamous cell carcinoma</td>
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</tr>
<tr>
<td>a. Simplex</td>
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<tr>
<td>b. Complex</td>
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</table>
II. Carcinosarcoma 15 (23.81%)
III. Benign tumours Cystadenoma 4 (6.35%)
IV. Mesenchymal tumours Lipoma 2 (3.17%)
V. Benign mixed tumours Cystic fibroadenoma 1
Cystic fibroadenoma 1
Chondro-adenoma 3
Total 63

IV. References


V. Acknowledgments

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