

Inflammatory Mammary Carcinoma in a Dog

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(Accepted: August 14, 2008)

Abstract : A 13-year old female miniature Poodle was presented with ventro-abdominal skin purpura. All mammary glands were included, but right side mammary glands and left thoracic gland were mild while left abdominal and inguinal glands were moderately changed. Overlying skin of mammary glands was purple colored, thickened, and firm. Yellowish brown colored mammary discharge was noticed from every teats except cranial thoracic gland. On histologic finding, dermal lymphatic vessels were filled with tumor emboli that stained positively with cytokeratin. This case was diagnosed as inflammatory mammary carcinoma by clinical examination and histopathologic finding.

Key words : lymphatic vessel, emboli, inflammatory mammary carcinoma

Introduction

Inflammatory mammary carcinoma (IMC) is a rare mammary gland cancer which is associated with particularly aggressive behavior and poor prognosis in the dog (6,7,9,11). Also inflammatory breast carcinoma (IBC) is a relatively rare disease accounting for 1~5% of all breast cancer in woman (1,3,12). Clinically, IMC and IBC typically present with a rapid onset of symptoms overlying skin characterized by diffuse involvement of multiple glands with or without nodules, firmness, warmth, edema, erythema, thickening, and signs of pain. The pathologic diagnosis of IMC and IBC is based on the presence of tumor emboli in dermal lymphatic vessels (1,3,6,7,11,12).

This case report describes multiple mammary gland affected by inflammatory carcinoma presented with edema, thickened, firm overlying skin of mammary gland. To our knowledge, this is the first case report of canine inflammatory mammary carcinoma in Korea.

Case Report

A 13-year-old, intact female, miniature Poodle was presented with ventro-abdominal skin purpura, anorexia and collapse (Fig 1). Grade III heart murmur and muffled heart sound were noticed on thoracic auscultation. Radiograph showed fluid in thorax and abdomen, heartworm infection was detected on antigen test. On physical examination, she was obese and her overlying skin of multiple mammary glands was thickened, firm, and discolored without nodule. Yellowish brown discharge was noticed from multiple teats

except cranial thoracic glands (Fig 1). But no microorganism was isolated from mammary gland discharge. Her owner said that they found her sign 2~3 days ago incidentally, fed her with home made food and commercial diet and she had no experience of parturition. Ultrasonogram showed dilated dermal lymphatic vessel (Fig 2). And this change was manifested rapidly, finally she died after 2 days from caval syndrome.

For histologic examination, skin and mammary gland tissue were processed with 10% buffered formalin. 3 µm serial sections stained with hematoxylin and eosin and immunohistochemistry was done on deparaffined sections of skin and mammary gland tissue using the streptavidin-biotin-complex peroxidase labelling kit (Dako, Denmark) after a high temperature antigen unmasking protocol. The primary antibodies used were: mouse monoclonal antibody anti-human cytokeratin (AE1/AE3, Dako, Denmark), mouse monoclonal antibody anti-human vimentin (V9, Dako, Denmark), mouse monoclonal antibody anti-human estrogen receptor (1D5, Dako, Denmark), mouse monoclonal antibody anti-human progesterone receptor (PgR636, Dako, USA), mouse monoclonal antibody anti-human E-cadherin (NCH-38, Dako, Denmark). Positive and negative controls were included in each assay.

On histopathologic findings, dermal lymphatic vessels were dilated and filled with tumor emboli (Fig 3A), and these embolies were stained with cytokeratin (Fig 3B). Also mammary duct was dilated, and some dilated mammary ducts appeared as empty spaces lined by epithelium, and neutrophils and macrophages were noticed in some mammary ducts. Other part of sections revealed solid carcinoma in mammary gland tissue. The results of immunohistochemical study for estrogen receptor, progesterone receptor, vimentin and E-cadherin were negative. Based on clinical and histo-

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pathologic evaluation, this case was diagnosed as inflammatory mammary carcinoma.

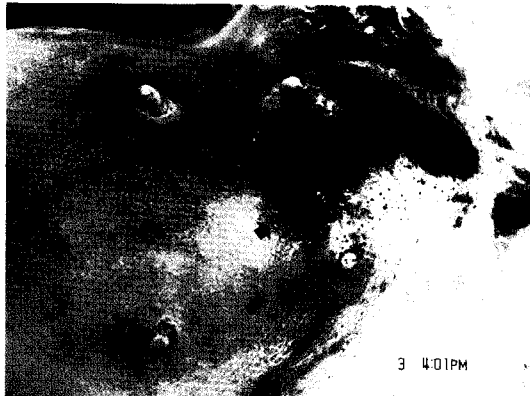


Fig 1. Photograph of the gross appearance of a case of inflammatory mammary carcinoma demonstrating bilateral multiple gland involvement. Overlying skin of mammary gland is purple, thickened, and firm. Yellowish brown discharge (black arrow) is noticed.

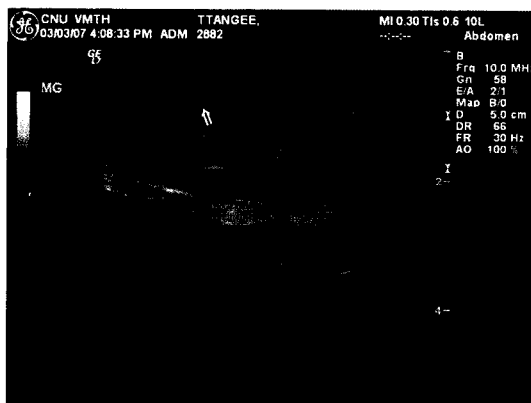


Fig 2. Ultrasonogram of mammary gland. Dilated lymphatic vessels can be seen (open arrow).

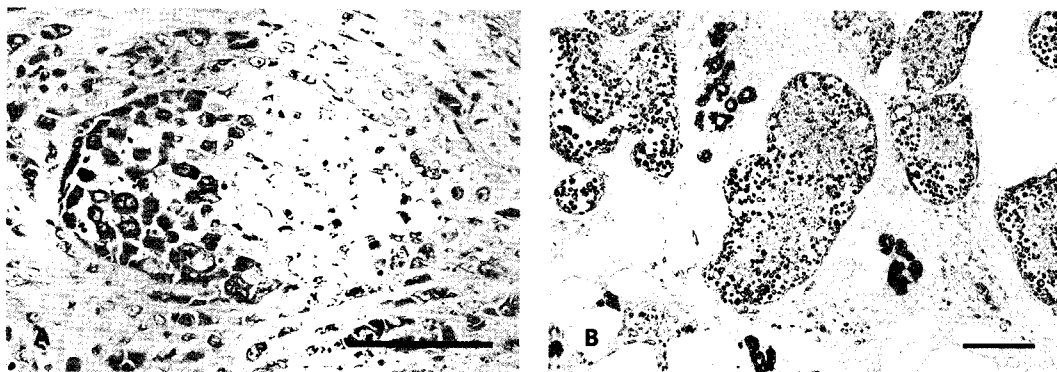


Fig 3. Dermal lymphatic vessel. Dermal lymphatics were dilated and obstructed by tumor cells. H&E (A), Bar = 50 μ m and immunohistochemistry with cytokeratin (B), Bar = 100 μ m.

Discussion

Inflammatory mammary carcinoma (IMC) is a rare type of mammary cancer that clinically resembles a mastitis or dermatitis, with a very poor prognosis both in dogs (IMC) and in humans (inflammatory breast carcinoma, IBC) (1,2,3,7,11). Little is known about the etiology and pathogenic mechanisms involved in the apparition and development of this type of neoplasm (1). IBC is accounting for 1-6% of human breast cancer and the dog is the animal species similar to human in which spontaneous inflammatory mammary carcinoma has been reported (1,3,12). The clinical manifestations of IBC include breast pain and a tender, firm, and rapidly enlarged breast similar to an acute inflammation. The breast area has the 'peau d'orange' (skin of an orange) appearance with red, warm, and thick skin but may have no palpable mass (1,2,3,12,13). The discoloration of the breast varies from a pinkish blush to a fiery red to dusky purple (11). In this case, affected mammary gland area was purple, warm, thickened, firm, absence of subjacent mammary nodules, and those were presented by a rapid onset.

By histopathologic examination, tumor cell emboli was noticed on dermal lymphatic vessel and solid carcinoma on other part of section. The only distinctive feature for a histological diagnosis is massive invasion of dermal lymph nodes by neoplastic cell, which block the drainage of lymph leading to the characteristic edema (2,4,6).

In this case lymphatic dilatation was noticed by color flow imaging and measuring distance skin to dilated duct on ultrasonogram, added in measuring distance skin to dilated lymphatic duct on stained slides. Lymphatic dilatation was found on ultrasonography in patients whom tumor emboli were proven pathologically to be in the dermal lymphatics. So lymphatic dilatation may be a useful finding in the diagnosis of IBC (3).

Expression of estrogen receptor (ER) and progesterone receptor (PgR) correlates with breast cancer survival and clinical outcome (2,5,6). ER and PgR contents of breast cancer gradually became negative during the progression of malignancy and lack of their expression on cancer was less

sensitive for chemotherapy (5). In IBC, usually expression of estrogen receptor (ER) and progesterone receptor (PgR) were lack (2,6,13). While in IMC, a relative high proportion of IMC studied were PgR-positive and ER-negative (6). But this case was ER and PgR-negative in immunohistochemistry. E-cadherin is a calcium-dependent adhesion molecules, mediating epithelial cell-cell adhesion (8,10). Many researches reported correlation of E-cadherin and metastasis or prognosis that loss of E-cadherin expression was associated with lymph node metastasis and poor prognosis (8,10). In this case E-cadherin was hardly noticed.

Inflammatory mammary carcinoma is the most malignant type of mammary carcinoma with a fulminant clinical course and extremely poor survival rate. The dog is the animal species similar to human in which spontaneous inflammatory mammary carcinoma has been reported. The distinctive diagnosis of IMC is clinical change of skin overlying mammary gland and lymphatic vessel dilatation with tumor cell on histopathology.

Conclusion

A 13-year old female Poodle was presented ventroabdominal purpura. Overlying skin of mammary gland was thickened, firm, warm and purple colored, and yellowish-brown discharge was noticed multiple mammary gland teat. On histopathologic examination, dilatation of dermal lymphatic vessel and mammary gland solid carcinoma were noticed. This case was diagnosed as inflammatory mammary carcinoma by clinical and histopathologic evaluation.

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개에서 발생한 Inflammatory Mammary Carcinoma

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요약 : 13세의 miniature Poodle이 복부 피부의 자반을 주증으로 내원하였다. 자반은 전체 유선에 걸쳐 관찰되었으나 특히 복부유선과 서혜부 유선에서 심하게 관찰되었다. 유선을 덮고 있는 피부는 자줏빛으로 변해있었으며 비후되었고 황갈색의 분비물이 전흉부유선을 제외한 모든 유선에서 분비되었다. 조직학적 검사에서는 피부측 림프관들이 Cytokeratin에 양성반응을 보이는 중앙세포 색전들로 차있었다. 본 증례는 임상검사와 조직학적 검사를 통해 inflammatory mammary carcinoma로 진단되었다.

주요어 : 림프관, 색전, inflammatory mammary carcinoma