



## CASE REPORT

### Gastric Osteoma in a Dog

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#### ABSTRACT

An eight year old female dog was referred with anorexia, nervousness and emaciation. At the point of time, severe lifelessness was the only symptom. Then euthanasia was done according to the owner's decision. As a result of postmortem examination, thin white matters were found on the gastric mucosa of the greater curvature and there were no other significant gross findings. Tissue specimens were collected from the gastric wall, esophagus, gall bladder, aorta, heart, kidneys, liver, mesenteric lymph node, lungs, urinary bladder and spleen and processed for histopathology. Microscopically, the masses of stomach were consisted of well-differentiated osteoid tissues, the compact bone-osteocytes and the matured lamellated bone with Haversian system. It was diagnosed as osteoma of the stomach. Other organs were free on such histological findings.

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#### INTRODUCTION

Osteomas are uncommon benign neoplasms that usually arise from bones of the head. They occur as a single, dense mass that projects from the surface of the bone. They do not invade or destroy adjacent bones; their growth is slow and progressive but not necessarily continuous. Microscopically, osteomas are covered by the periosteum and are composed of the cancellous bone that becomes denser with time. Trabeculae are lined by well-differentiated osteoblasts and osteoclasts. The intertrabecular spaces contain delicate fibrous tissue, adipocytes, and hemopoietic tissue (McGavin and Zachary, 2007). In this case, we report a gastric osteoma which developed in a dog and extremely rare.

#### CASE PRESENTATION

An eight year old, female, German shepherd was referred to Veterinary Medical Teaching Hospital, Kyungpook National University with anorexia, nervousness, and emaciation. Values on a complete blood cell count, blood chemistry and electrolyte were within normal limits. At a point of time, lifelessness is the only symptom. Owner's consent was acquired for euthanasia. Under the supervision of veterinary officer, euthanasia and post-mortem examination were carried out. Thin white matters were founded on the gastric mucosa of the greater curvature and there were no other significant gross

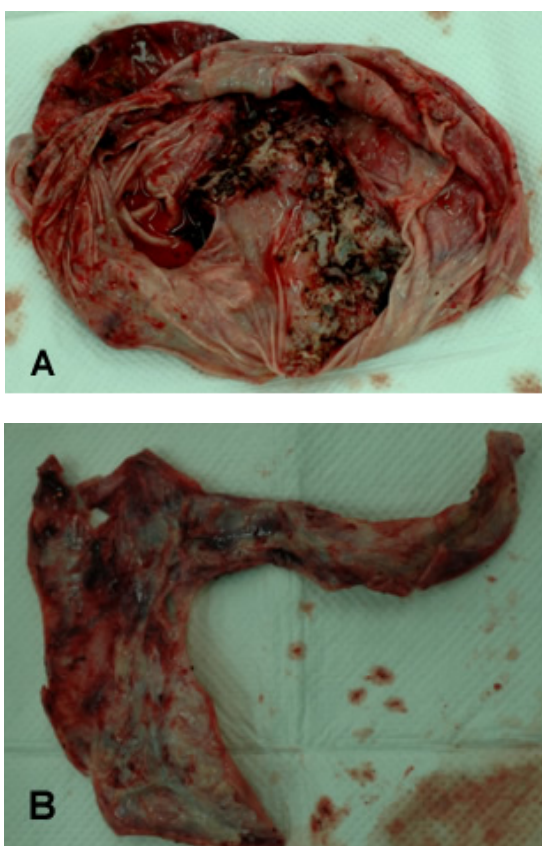
findings (Fig. 1). Grossly, esophagus, gall bladder, aorta, heart, kidneys, liver, mesenteric lymph node, lungs, urinary bladder and spleen were examined for gross but no change was detected, however, tissues from these organs were collected for histopathological examination.

Necropsy samples were fixed in 10% neutral buffered formalin, then embedded in paraffin, sectioned (3~4µm) and stained with hematoxylin and eosin (H&E) for general histopathology. In the case of stomach masses, fixed tissues were decalcified using decalcifying solution (24.4% formic acid, and 0.5N sodium hydroxide) for 5 days (mixed decalcifying solution was changed once a day for 5 days). The histopathological profiles of each sample were observed under light microscope (Nikon, Japan) and photographed using automated image analysis (DMI-300 Image Processing; DMI, Korea).

Microscopically, the gastric mucosa masses consisted of well-differentiated osteoid tissues, the compact bone – osteocytes and the matured lamellated bone with Haversian system (Fig. 2a). Mitotic figures, invasive growth to surround tissues, tumour necrosis, and vascularity were not observed (Fig. 2b). Therefore, it may be considered as osteoma of the stomach. No other abnormalities were detected in the other organs.

#### DISCUSSION

Osteoma is one of benign tumors consisted of compact bones or cancellous bones and they primarily

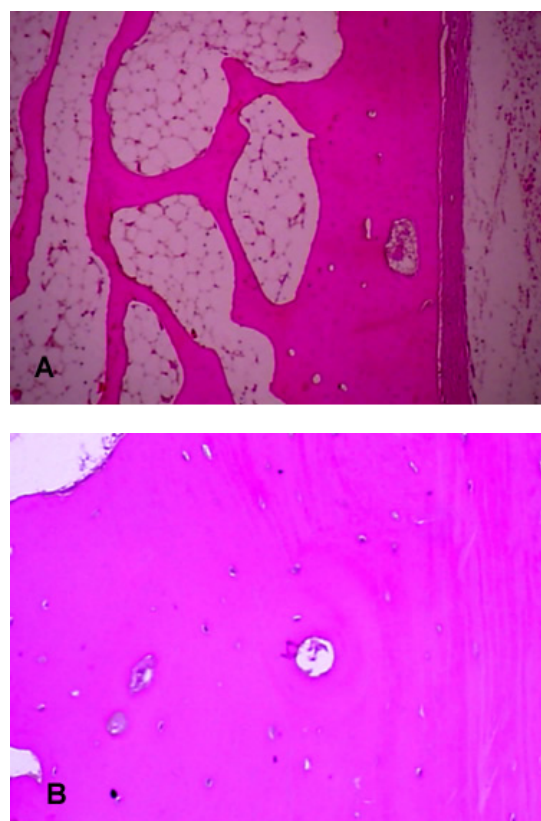


**Fig. 1:** Thin white matters were founded on the gastric mucosa of an 8 year-old, female, German shepherd. Thin white matters were diffused throughout the stomach (a), particularly greater curvature of the stomach (b).

observed in the bone, paranasal sinus, maxilla and mandibular bones, and external auditory meatus. However, the osteoma in the extraskelatal soft tissues was so rare except for osteoma cutis. Osteoma cutis is defined as the formation of bone in dermal or subcutaneous tissues and is usually classified as primary or secondary. Primary osteoma cutis occurs in normal skin with no evidence of underlying lesions, whereas secondary osteoma cutis occurs in damaged or disrupted skin, like that which occurs in humans with inflammatory disorders, such as acne vulgaris or solitary morphea profunda, or certain forms of neoplasia, like basal cell carcinoma. Primary and secondary forms may be further characterized, based on their distribution, into solitary or miliary osteoma cutis (Gfesser *et al.*, 1998; Davis *et al.*, 2002; Martin *et al.*, 2006).

Gastric neoplasia, although uncommon, manifests in different ways in domestic animals. Leiomyoma and more rarely leiomyosarcoma arise from the tunica muscularis. Lymphosarcoma can be primary, metastatic, or multicentric in origin. Glandular neoplasms, adenomas, and adenocarcinomas occur in all species but are seen most often in dogs and cats (McGavin and Zachary, 2007).

Osteoma in the stomach or intestinal organ can cause the animal to die. For example, heterotopic bone can necrose the intestine if that organ is obstructed by adhesion surrounding the bone, if the bone perforates the intestine, or if it interferes with intestinal movement,



**Fig. 2:** Histopathological profiles of mass in the stomach. The mass consisted of well-differentiated osteoid tissues, the compact bone-osteocytes and the matured lamellated bone with haversian system (a). Mitotic figures, invasive growth to surround tissues, and tumor necrosis, vascularity were rare or not observed (b), All H&E stain; Scale bars = 40µm.

causing intractable constipation. It is considered that this dog had suffered several episodes of gastric dilation, gastrointestinal twisting or complete torsion in the past (Forsyth, 1987; Sanford and Rehmtulla, 1994).

The diagnosis may be suspected by the clinical history and physical examination (Boschert and Puckett, 2000). Generally, plain radiography is insufficient to diagnose osteomas although CT scans and MR images are of great value for both diagnostic and therapeutic considerations (Saccomanni, 2009). CT scanning has been shown to be very helpful for precisely defining the location of the tumor and extent of osseous involvement (Gangi *et al.*, 1998).

MR imaging modality is surely the best to reveal the effects of tumor, as well as the extensive intra- and extra-osseous reactive changes and the infiltration of adjacent soft tissues. However, definitive diagnosis is obtained with the histopathology study of the ossified lesion (Herrlin *et al.*, 1982; Bartolozzi and Floris, 1988; Nasr *et al.*, 1992).

Gastric tumors and soft tissue osteomas are uncommon in animals. This histopathological diagnosis of the osteoma in the canine stomach was considered as extremely rare, and it has not yet been reported this kind of gastric osteoma in the dog. The further studies are needed to elucidate the more exact pathophysiological cause of gastric osteoma.

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