

## Blood and lymph vessels tumors

- Hemangioma
- Hemangiosarcoma (Malignant hemangioendothelioma)
- Hemangiopericytoma
- Lymphangioma - Lymphangiosarcoma
- Glomangioma (Glomus Tumor)

# Hemangioma

- It is a benign tumor of endothelial cells of blood vessel and classified as **cavernous hemangioma** and **capillary hemangioma** according to the size of the vessel lumen.

# Hemangioma

- It is most common **in dogs**,
- Less in cats, horses, cattle, sheep and pigs.
- There is no breed or sex disposition.
- It is usually subcutaneous, 0.5 to 3 cm in diameter, oval/medium and well-demarcated.
- It is red-black in color, with blood leaking from the cross-section and spongy in appearance.
- It may develop in the dermis, but it is smaller.

# Hemangioma

- Microscopic appearance;
  - The cavernous type has single row epithelium and wide lumen vessels. Thrombotic vessels can also be observed.
  - In capillary hemangioma, there are many veins of capillaries that are not open to the circulation.
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- Tumor can be removed by surgery. Generally, no recurrence occurs.

# Hemangiosarcoma

- It is a malignant tumor of endothelial cells of blood vessel.
- Hemangiosarcoma commonly presents as a **multicentric disease** involving the **spleen, liver, lungs, and right auricle of dogs.** (It can also be seen in the nervous system, liver, bone, muscle and gastrointestinal tract.)
- German shepherd, Golden retriever
- Male > female
- Less frequently in cats and rarely in large domestic animals.

# Hemangiosarcoma

- Macroscopically
- They are **red/brown** to black, soft to firm, and **exude blood when cut**.
- The veins that form in the tumor are very **fragile and easily rupture**, leading to bleeding.
- Hemorrhage and necrosis are the main findings of tumor.

# Hemangiosarcoma

- Microscopically
- **Atypical** vascular endothelial cells are observed that do not show differentiation, **some make lumen, vascular clefts, and even cavernous spaces.**
- Erythrocytes may be present in the vascular lumen.
- Tumor cells are variable, ranging from spindle shaped to polygonal to ovoid.
- **Mitotic figures are common** in the tumor.
- At varying degrees in the stroma, connective tissue, neutrophil leukocytes and hemosiderin-loaded macrophages may be present.

# Hemangiosarcoma

- It can **easily metastasize**.
- Hemangiosarcoma under skin can be operated, but they can recur.
- Splenectomy is performed when the tumor forms in spleen.
- Combined chemotherapy is also beneficial.



# Hemangiopericytoma

- Hemangiopericytomas are very common in middle-aged or older dogs (9-14 years old).
- Tumors are usually solitary, arise in the subcutis around joints of limbs.
- Rarely they are seen in head and tail.
- It is usually 2-10 cm (sometimes reaching 25 cm) in size and is firm and nodular. The cross-section surface is gray-pink and lobbed. The covering skin may ulcerate.

# Hemangiopericytoma

- Hemangiopericytomas have a characteristic "fingerprint pattern" appearance that is composed of multiple layers of spindle cells arranged in whorls that surrounds a central blood vessel.

# Lymphangioma - Lymphangiosarcoma

- Tumors **originating from lymph vessels** and are rarely seen in animals.
- Microscopically, tumor cells grow directly on bundles of collagen, dissecting them and forming numerous clefts and channels.
- Lymphangiosarcoma is very rare.

# Glomangioma (Glomus tumor)

- It is a benign tumor originating from small **arteriovenous anastomoses** called "**glomus body**" that control blood flow in the hands and toes.
- A small pinkish nodule-like tumor encapsulates but causes pain.
- Microscopically, tumor is composed of glomus cells and angiomatous spaces.
- Glomus cells are light-colored, round-oval nuclei and do not show pleomorphism and mitosis.

## Tumors originating from serous membranes

# Mesothelioma

- It is a tumor originating from mesothelial cells covering the surfaces such as peritoneum, pleura and pericardium, originates from mesoderm.
- It usually develops in calves (congenital)
- Rarely, in adults of ox, horse, dog, cat and pig
- The great majority of cases that occur **in humans** are related to **asbestosis** and develop in the **lungs**.

# Mesothelioma

- Macroscopically;
  - Tumor masses are multiple,
  - Nodules can be small and demarcated or wide and cauliflower in appearance.
  - The sizes of masses can be between 2 mm and 4 cm
  - White-gray, yellowish or pink
  - On cut surface, white area is seen at the centre.
  - Firm

# Mesothelioma

## Microscopically

- Mesothelial cells are generally single-row, cubic, columnar-shaped, with large vesicular nuclei and prominent nucleoli.
- Sometimes, vacuoles are found in the cytoplasm. The mitotic figures are few and multi-nucleated giant cells can be seen.
- Stroma is composed of loose connective tissue and large amount of vessels.

# Mesothelioma

- Rarely, it can metastasize through the blood and lymph vessels.
- It can be spread quickly by implantation metastasis .
- There is no effective treatment method.
- However, it is reported that chemotherapy is useful in limited cases.



# Histiocytoma

- It is a benign tumor, occurs especially in young dogs (under 2 years old), usually forms in skin.
- There is no gender predisposition.
- However it occurs in some pure breeds dogs (Boxer etc).
- It can be solitary or multiple.
- Seen in head, earbud, extremities
- Ulcerations can be seen.

# Histiocytoma

- Microscopically; **Uniform** cells **infiltrate** into the **dermis** and **subcutis** and are packaged in the lower parts of the dermis.
- In areas near the epidermis, cells become sparse and form a row. Cells are ovoid-round, have large-nucleus and pale-large cytoplasm.
- The most characteristic feature is that many mitotic figures are seen.
- The appearance varies depending on the age of lesion and the degree of necrosis and secondary inflammation.

# Mast cell tumor - Mastocytoma

- Since mast cells contain **heparin**, **histamine** and **serotonin**, **toluidine blue staining** is applied to mature cells and **PAS** method is applied to immature ones for the granules to be visible.
- The mast cells multiply both in the neoplastic response and reactive events (accompanied by an inflammatory reaction after an allergic event, "Reactive Mastocytosis").
- It is important in dogs, cats and horses.

# Mast cell tumor

- Occurs commonly in Terrier breed
- There is no sex predisposition.
- 80% of the dogs with tumors have **gastric duodenal ulcers**, 70% have **focal glomerulitis**, *decrease* in antibody production and *prolongation* of blood clotting.
- It develops generally in multiple, well-demarcated, encapsulated, 1-10 cm sized nodules, anywhere in the skin (especially in the inguinal region, femur and scrotum). The cut surface is gray-white and sometimes yellow-red.

# Mast cell tumor

Microscopically;

- It is divided into **mature type** and **anaplastic type** according to the differentiation degree.
- **In the mature type**, the cells are round-oval and in the same size. Cytoplasm boundaries are prominent and there are **large granules** inside. They show metachromasia with **toluidine blue**. Mitosis is rare. Cells are sparse.
- **In the anaplastic type**, cell **pleomorphism** is seen and nucleus is large-vesicular and irregular. Mitotic figures are common. In the tumor, a lot of cells are in contact and their borders are not clear.
- The presence of a large number of *eosinophil leucocytes* in the tumor is characteristic.
- Collagen degeneration and histiocyte infiltration, as well as fibrinoid degeneration in arterioles can be seen.

# Mast cell tumor

- **Malignant mast cell tumor**
  - It may metastasize to regional lymph nodes, spleen, kidneys, liver, lungs and heart.
  - If the tumor mass is limited on the skin, it should be taken with a minimum of 3 cm of solid tissue around it.
  - Amputations are made in regions that are not suitable for a large excision (such as extremities).
  - Radiotherapy can also be applied.

# MELANOCYTIC TUMORS

- Benign melanoma
  
- Malignant melanoma

Junctional

Dermal

# MELANOCYTIC TUMORS

- Mature pigment producing cells are referred to as melanocytes.
- Common in dogs, horses, and pigs
- Rarely in goats and cattle, less in sheep and cattle.
  - ❖ It usually develops in male dogs between 7 and 14 years of age.
  - ❖ It is formed in horses over 8 years old and usually in Arabian horses. There is no gender predisposition.
  - ❖ In cattle, it can be seen in young and even can be congenital. It is usually found in dark-colored cattle. There is no gender predisposition.



# MELANOCYTIC TUMORS

- Can occur in skin, mucous membranes and eyes.
- Although 90% of the tumors in the mouth are malignant, most of them are benign.
- In horses, it is located in the perineum and tail region
- In goats, it is located in the perineal region
- In cattles, it is located in subcutaneous region

# MELANOCYTIC TUMORS

- Tumors that contain much melanin pigment (**Melanotic Melanoma**) are **dark brown-gray, black** in color.
- Tumor pigmentless (**Amelanotic Melanoma**) are **light-colored**.

# MELANOCYTIC TUMORS

- According to one opinion: 1 cm or less is benign, 2.5 cm or more is malignant.
- Malignant melanomas can be in large, ulcerated, dark brown-black to light gray varying colors.

# MELANOCYTIC TUMORS

Microscopically;

## **BENIGN MELANOMA**

- Cells located in the upper parts of the dermis are oval, round and cuboidal and resemble epithelial cells.
- The cells in the deep parts of the dermis are usually fusiform and their nuclei are similar to the fibroblast's.
- The pigment loaded cells decrease in deeper parts of the dermis.

# MELANOCYTIC TUMORS

Microscopically;

## **MALIGNANT MELANOMA**

- **Epithelioid type**; It is similar to epithelial cells and sometimes shows trabecular pattern. Tumor cells contain less intracytoplasmic melanin.
- **Spindle cell type**; Consists of varying size of bipolar spindle-shaped cells and mitosis is more common than the other types.
- **Epithelioid and spindle cell type**; It is the most observed type in skin and mouth. The epithelioid and spindle shaped cells are dominant together.
- **Dendritic cell type**; Tumor cells display interwoven or whorled pattern. Dendritic cells contain pigment (melanin). Necrosis areas are common.

# MELANOCYTIC TUMORS

- Metastatic pathways in malignant melanoma are lymphogenous and hematogenous.
- It can usually metastasize to regional lymph nodes, to the lungs, and sometimes to the muscles, brain, heart, kidneys, spleen, liver and other internal organs.

# MELANOCYTIC TUMORS

- Surgical treatment is the most effective method.
- Since recurrence can often be seen, the tumor mass should be taken with at least 3 cm of solid tissue around it.
- Chemotherapy and radiotherapy can also be applied.