TUMOR INCIDENCE IN SLAUGHTERED BOVINES

L. MAROSFOI, A. I. BABA *, C. CĂTOI *

DSV Harghita, Progresului Street No. 14, Miercurea Ciuc,
marosfoi@gmail.com
* Pathology Department, Faculty of Veterinary Medicine Cluj-Napoca,
Moților str., no. 5-7

Summary

There were examined 67 slaughtered bovines, 7 of them having different tumor types (10.44%), from this 6 were malignant tumors (85.71%). Squamous carcinoma with orbital localization was diagnosed in 5 cattle with the ages between 5-14 years old. Squamous carcinoma determined metastasis in 3 subjects, in the parotid, mediastinal and mesenteric lymph nodes. Microscopically all 5 squamous carcinoma presented a high malignity degree. Peritoneal epithelial type generalized mesothelioma was diagnosed in a 10 years old bovine. Microscopically were found metastasis in mediastinal and portal lymph nodes, in the liver and pancreas. Neurinoma or neurilemoma (schwanoma) was diagnosed in a 13 years old bovine, being localized between the right atrium and upper cava vein.

Tumor incidence in cattle is relatively increased, specialty literature indicating the second place, after dogs, for tumor incidence in bovines. Squamous carcinoma located mainly in ocular region is a tumor with an increased incidence in areas with ultraviolet radiations exposure. Squamous carcinoma in cattle could have other localizations too, such as: vulva, anus, perineum and the base of the horn(6, 9).

Mesothelioma, a tumor located on abdominal and thoracic serous is quite frequent in cattle and has a proven asbestosis etiology.

Materials and methods

There was made an extended study that followed the lesions encountered in slaughtered bovines as well as the incidence, anatomopathology and histopathology aspects from cattle neoplasms. Also, were noticed microscopically lesions associated with primary lesions that induced the sacrifice of the animals.

From 412 slaughtered bovines we selected 67 subjects that presented various anatomopathology changes. Samples for histopathology examination were harvested, fixed in 10% formalin, preceded by paraffin techniques and stained by usual methods, such as HE, tricrom Masson and PASS reaction. Depending on the case, other staining was used for the following organs too: myocardium, lungs, liver, spleen, kidney, central nervous system, lymph nodes, pancreas and mammary glands.
Results and discussions

Anatomopathology examination from 67 slaughtered cattle revealed that 7 animals presented neoplasms, representing a percentage of 10.44%, and from those, 6 animals had malign tumors, representing 85.7% from total tumors. The age of the animals varied from 5 to 14 years of age, with a mean value of 8 years.

Squamous carcinoma was diagnosed in 5 cattle and had localization in ocular region with peri orbital spreading, affecting the eyelids and in one case the tumor developed in the eyeball involving all his structures. The starting point of carcinoma was in all cases the third eyelid.

Macroscopically, the tumors had an irregular surface, a variable spreading, 1 to 10 cm diameter in general but in one case the tumor had 20 cm and covered the entire orbital region. The largest tumor diagnosed had several hemorrhagic and necrotic areas in gross section and the eyeball was atrophied in the orbital cavity.

In two cattle, gross examination revealed a parotid and mediastinal lymph nodes enlargement, and the presence in gross section of dense and grey foci that microscopically were diagnosed as squamous carcinoma.

Histopathology revealed spinous cell hyperplasia and proliferation that invaded derma and hypoderma and formed irregular areas with a pseudogland disposing, respectively cords and solid development. Some cells had a high differentiation degree, but there were also poorly differentiated cells that presented morphology anomalies regarding the size, shape and stain properties. Highly differentiated cells maintained all the characteristics of the polyhedral spinous cell attached one to each other by desmosomes, and at the periphery of those islands were disposed the basal cells. In other areas, the cells were poorly differentiated with enlarged intercellular spaces and vacuoles, small or absent desmosomes; the cells were rounded without adherence between them, and frequently were noticed single tumor cells.

The majority of the tumor cells had large nuclei, condensed chromatin that formed large granule by variable size and shape. The nuclei borders had an irregular aspect without aberrant forms. The nucleoli are in a variable number, about 1-8; some of them were very large disposed in all nuclear regions. Typical and atypical mitoses were frequent. Cells heterogeneity was evidenced by the presence of monstrous and multinucleated cells.

In tumor mass, respectively in the connective stroma, were noticed lymphocytes, lymphoblast, plasmocytes, macrophages and many eosinophils. The mastocytes were present especially at the periphery of the malignant proliferation. Between tumor cells apoptotic bodies were noticed.

Some tumor islands didn’t have any more basal membrane or this was interrupted, and tumor cells infiltrated the connective mass. In 2 cases were identified keratosic pearls and in the other 3 cases these structures weren’t identified. Keratosic pearls were associated to a marked cell desmosomes evidentiation and cell differentiation, comparatively with the other cases where
intercellular junctions were poorly visible or quite invisible and the cells were poorly differentiated.

The metastases were identified in mesenteric, mediastinal and parotid lymph nodes. The metastatic islands were localized in the cortical area of lymph nodes and had all the characteristics of the squamous carcinoma, in some cases the keratotic pearls.

There was diagnosed a metastasis in central nervous system in a cattle that had an ocular squamous carcinoma that filled the entire orbital cavity and extended to the orbital eyelid. In the cerebral cortex were identified metastatic microfoci and necrotic purulent foci.

In the sebaceous gland from the third eye was noticed the *Thelazia* spp. larva and in another case were identified sarcosporidia cysts in the ocular muscle.

Diffuse malign mesothelioma, epithelial type, localized in abdominal serous cavity, was encountered in a 10 year old cattle slaughtered because of a chronic mastitis. In the parietal and visceral serous and in the abdominal organs, respectively in the capsules, were encountered several nodular formations, by different sizes, some of them with a small pedicle or without it; in some regions was a fungus type proliferation. The formations had a small size, about some millimeters to 3-5 cm; some of the serous areas were covered by tumors that enlarge the respective serous.

Histopathology exam revealed that the tumor mass was formed by prismatic, cubical and fusiform cells disposed in an acinary, tubular, trabecular, palisade or chaotic structures. The cells were represented by a obvious cellular membrane, with the nuclei placed at the center of the cell or placed at the base of the cell, those having variable size and shape, some of them round and vacuolated, others small and picnotic; there were also odd monstrous nuclei too. The nucleoli were obvious, sometimes about 4-5 in a nucleus; typical and atypical mitoses were numerous.

In the acinary structures of the tumor cells, respectively in the center was observed necrotic material encapsulated into a PAS positive material. The tumor mass had hemorrhagic and/or necrotic foci.

Mesenteric lymph nodes did not presented macroscopical changes, and histopathology did not notice some metastases. Mediastinal lymph nodes were enlarged, with an irregular surface and in gross section appeared nodules with hemorrhagic necrotic foci. The thoracic cavity hadn’t had tumor proliferations. Histopathology revealed tumor cells identically with the primary tumor. Also, there were noticed several mastocytes in the connective stroma.

**Neurinoma, neurilemoma or schwannoma** were diagnosed in 13 year old cattle that had clinical diagnose of fibrinous salpingitis. The localization was in the heart, between right atrium and in the superior cava vein. It was noticed a nodular formation about 0.5 cm in size with a grey aspect and a dense-elastic consistence. Histopathology examination noticed a structure formed by cell nests disposed in wave or vortex. The cells were elongated, with an oval/elongated nuclei
and a fine chromatin. General aspect of the tumor, regarding cell disposition and closely packed nuclei with a wave or vortex disposition, induce the impression of a „shoal”. Special staining noticed the absence of the collagenous fibers. Established diagnose was of myocardic neurilemoma, Antony A type.

Our study was made on 67 bovines, with different macroscopic lesions selected from 412 slaughtered bovines. We find a tumor incidence of 10.44%, comparative with bibliography that mentioned 10-20%.

We have diagnosed 7 tumors, from this 6 were malignant, 5 of them squamous carcinoma, one generalized peritoneal mesothelioma, and one myocardic Antoni A type neurilemoma.

The squamous carcinoma in bovine are localized especially on third eyelid, rarely on vulva, perineum, perinea region and basis of the horn, or anatomical areas unexposed to ultraviolet radiation (5, 1, 2). Our diagnosed cases had periorbital localization, extended from third eyelid. The action of ultraviolet radiation on the studied bovines could be ignored as they originated from a mountain area where grazing season is short.

The diagnostic of a mesothelioma in abdominal cavity with portal lymph nodes metastasis; also, the necropsy revealed the presence of mediastinal lymph nodes metastasis without thoracic cavity affection. The bibliography showed metastasis in regional lymph nodes without distance metastasis. We think there is a possibility to diffuse tumor cells from abdominal cavity to thoracic cavity via lymphatic vessels. Only in one case mesothelioma was by asbestos, this etiology is confirmed by epidemiological and also experimental studies (5, 10).

Neurilemoma or schwanoma is more frequently encountered (7) in thoracic cavity nerves in bovine having the aspect of several tumors (4, 8). Neurinoma is a sporadic neoplasm, and we have diagnosed in one 13 year old cattle. The tumor had a localized aspect, between right auricular and upper vena cava. The histology description, including the absence of collagen fibers, established an Antoni A type neurinoma (3).

**Conclusions**

1. The pathology exam of 67 slaughtered bovines, diagnosed 7 tumors, representing 10.44%; from this 6 were malignant tumors representing 85.71%; age of animals was between 5-14 years.
2. The squamous carcinoma localized in orbital area was encountered in 5 bovines.
3. The squamous carcinoma metastasis was encountered in parotid (one case), mesenteric (1 case) and mediastinal (1 case) lymph nodes. In 1 case the tumor disseminated in all eye structures.
4. Macroscopic aspects (expansions and metastasis) but more importantly their microscopic feature, showed a high malignity in all 5 squamous carcinoma.
5. In 3 cases the squamous carcinoma presented cells with a low microscopical differentiation degree, monstrous cells and atypical metastasis without keratotic globes. In 2 subjects the cells were highly differentiated with many keratotic globes.

6. In 3 cases squamous carcinoma presented microscopically abundant infiltration with eosinophils cells and mastocytes in conjunctive tissue. One subject presented highly infestation with Sarcocystis in eye muscles, and in other bovines was identified Thelazia spp. in lacrimal ducts.

7. Epithelial type of peritoneal mesothelioma was diagnosed in one 10 year old bovine, the tumor extended in all visceral and parietal serous, in mesentery and epiploon, being generalized in the abdominal cavity.

8. Histologically was diagnosed epithelial invasion of the mesothelioma with metastasis in mediastinal and portal lymph nodes, as well as in liver and pancreas.

9. Neurinoma or neurilemoma was diagnosed in a 13 year old bovine, being localized between the right atrium and upper vena cava; histology description, cell disposition and the absence of the collagen fiber, lead to the diagnose of Antoni A type neurinoma.

References

1. Baba AL. I., C. Catoi, Comparative Oncology, 2007, Publishing House, Romanian Academy