

Histopathological finding about different type of tumor that affected skin of sheep

H.B. Al-Sabaawy¹ and A.A. Al-Sultan²

¹Department of Pathology and Poultry Diseases, College of Veterinary Medicine, University of Mosul, Mosul, ²Department of Pathology and Poultry Diseases, College of Veterinary Medicine, University of Tikrit, Tikrit, Iraq

Article information

Article history:

Received February 10, 2021
Accepted April 16, 2021
Available online November 22, 2021

Keywords:

Skin tumors
Sheep
Squamous cell carcinoma

Correspondence:

H.B. Al-Sabaawy
hadeelbasim2006@gmail.com

Abstract

The current study was undertaken to record and describe various neoplasms that affect sheep's skin and to determine the relationship between tumor occurrences, age, and sex of the animals. A total number of 12 sheep were examined for abnormal masses in different skin areas including head, eye, ear, udder, teat, the animals age was ranged between 2-6 years. Three different types of cancer were diagnosed in sheep as squamous cell carcinoma, fibroma and papilloma with incidence rates 41.6, 25.1, 33.3% respectively. Neoplasms were recurrent in females more than males and in old ages more than young animals. It can be concluded that the malignant neoplasm especially squamous cell carcinoma was the predominant tumor found in sheep.

DOI: [10.33899/ijvs.2021.129532.1657](https://doi.org/10.33899/ijvs.2021.129532.1657), ©Authors, 2022, College of Veterinary Medicine, University of Mosul.
This is an open access article under the CC BY 4.0 license (<http://creativecommons.org/licenses/by/4.0/>).

Introduction

The importance of tumors in domestic animals was early studied by (1). There are multiple types of skin tumors such as fibroma, papillomatosis (1), squamous cell carcinoma (2). The most noticeable etiological factor for skin cancer is prolonged and continuous exposure to sunlight. However, there is a cross link between skin cancer and the effects of sunlight that has been determined in different types of domestic animals (3). Moreover, the genetic factors may play important roles in causation of skin cancer in animals, animal tumors appear at any interval of life, but mostly occurs in old age and at puberty. The peak age of occurrences in domestic animals has not been clearly identified (1). Pathologically the neoplasm nature is classified either benign or malignant. The histopathological findings depended on the following characterization such as growth pattern, histological varieties, mitotic index and finally the degree of differentiation (4). In farm animals, the clinical descriptions

of the neoplastic diseases are scarce such as ovine pulmonary carcinoma (5). Skin tumor may appear in any part of animal's body but usually seem in area lack of wool. In sheep, skin cancer most frequently occurs on eyelids, muzzle, pinnae and vulva (6). The objective of the present study was to record, classify and diagnosis cancer of skin through application of histopathological technique, and therapeutic surgery as an available technique for the radical therapy.

Materials and methods

Sheep of the present study were obtained from private farms and others were brought for slaughtering. The intended animals were suspected to be affected by cancer after clinical examination. The work took up over six months January-June during 2019. The total number of affected sheep at the current work was 12 cases, 9 of them was old age females. Each case of affected animals was carefully viewed

including case history, number of tumor, and type of housing. All infected cases were visually examined for determining the gross characteristics of tumor involving shape of tumor, size of tumor, tint of tumor, surface of tumor and finally their nexus with underneath tissues

Surgical removal

The complete eradication of neoplasm was carried out at the lateral recumbency under the influence of the xylazine 2% and analgesic ring block penetration around the masses with 2% HCl lidocaine.

At last the specimens were taken from different depth of tissue and fixed in buffered formalin.

Histopathological study

Gross lesions of neoplasm sample have been collected from affected sheep, then tissue biopsy is fixed in neutral buffered formalin, dehydrated with ascending concentration of ethyl alcohol 80, 90, 100%. Later the specimens were passed in purified xylene and embedded in paraffin wax.

After series of subsequent steps, the specimens were cut at 4-5 µm thickness by rotary microtome. Finally, the sample were stained with Harris hematoxylin and alcoholic eosin (7).

Histopathological examination was made with light microscope and the section were photographed using digital camera.

Results

Squamous cell carcinoma (SCC)

SCC were grossly suspected in one male and four female sheep. Grossly, the lesion was appeared as irregular masses inside the eye or in the superior eyelid (Figure 1 and 2).

These masses were up to 18 cm in size and the consistency of these masses was soft to hard, also in some cases of SCC it was noticed fetid odor, and the mass shape was irregular, rounded with different size according to the duration of development. SCC formed 41.66% of the observed tumors. Microscopically in some regions there was keratin nest formation, some of these nests show mitotic figures, inflammatory cells (neutrophil) were also observed (Figure 3-5).

Fibroma

Fibroma was the second case of tumors observed during this study grossly suspected in three female formed 25.1% of the observed tumors (Figure 6 and 7). Grossly the fibroma appeared as capsulated tumor in sub cutis and in the dermis of old age female. woven collagen fibers bundles that running in different directions leading to formation of whorls around blood vessels. The collagen fibers are repetitive and generally coordinated in interwoven fascicles, the development of fibroma is slowly (Figure 8-10), (Table 1).

Papilloma

The papilloma was grossly suspected in two males and two female formed 33.33% and appeared as a solid tumor, pedunculated, with finger like shape. Microscopically, it appears as papillary projection with thickening and a distinctive fibrous core in addition to sever hyperkeratosis (Figure 11).

Table 1: Site, type of tumor and their percentage in both sex of examined sheep

| Sit | Type | Sex | | Age (year) | | % | Total |
|----------|-----------|-----|---|------------|-----|------|-------|
| | | M | F | M | F | | |
| Head/eye | SCC | 1 | 4 | 3 | 2-3 | 41.6 | 5 |
| Udders | fibroma | 0 | 3 | 0 | 2 | 25.1 | 3 |
| ear | papilloma | 2 | 2 | 5 | 2-6 | 33.3 | 4 |



Figure 1: Photograph of ovine infected with tumor mass squamous cell carcinoma in eyelid and supraorbital (arrow).

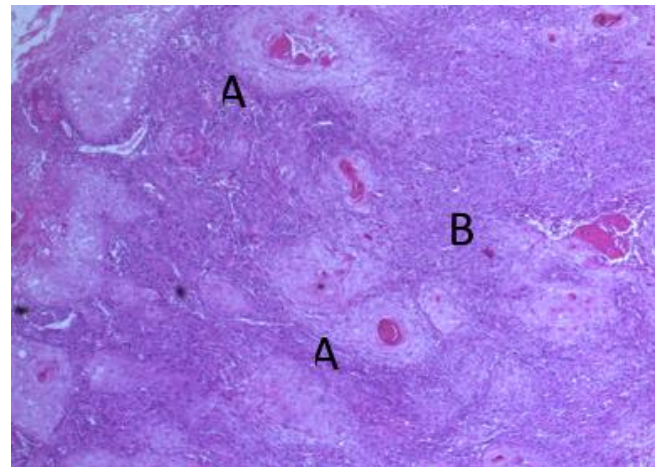


Figure 2: microphotograph of squamous cell carcinoma showing different size and shapes of cell nests (keratin pearls) (A), with keratinized (b), in addition to diffused keratin between the neoplastic cells. H&E. 10x.

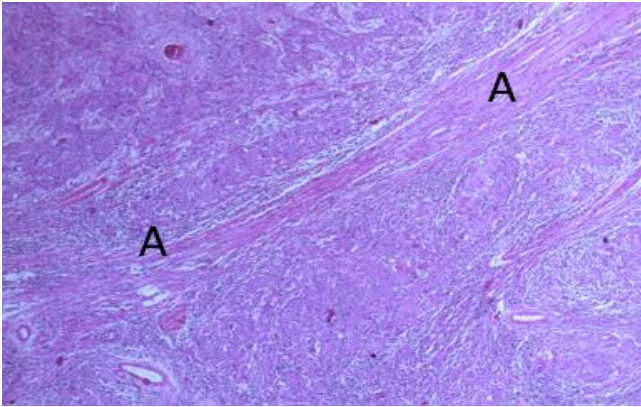


Figure 3: microphotograph of squamous cell carcinoma showing massive layer of keratins (A). H&E. 10x.



Figure 6: Photograph of sheep infected with tumor mass (fibroma) in udders region before surgical removal (arrow).

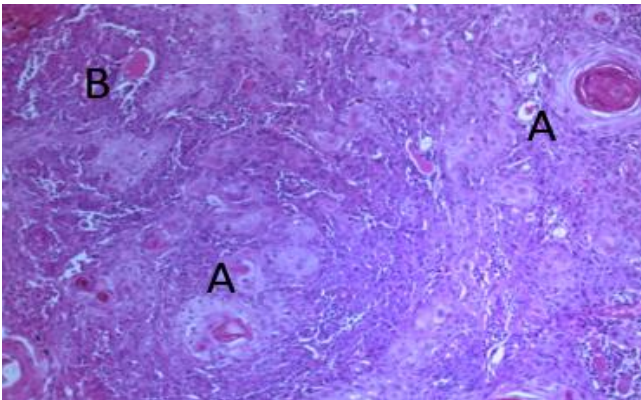


Figure 4: microphotograph of squamous cell carcinoma showing different size and shape of cell nest (keratin pearls) (A), diffused keratin between the neoplastic cell (B). H&E. 40x.



Figure 7: Photograph of sheep infected with benign tumors (fibroma) on udders region.

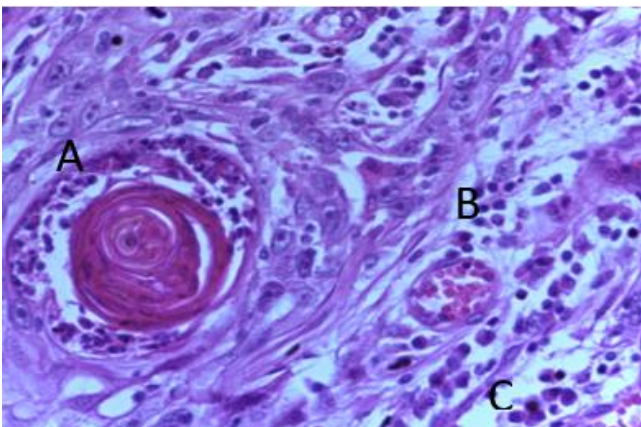


Figure 5: Microphotograph showing different size and shape of cell nest (keratin pearls) (A), congestion of blood vessels (b), poly morphism mitotic figure (c). H&E. 100x.

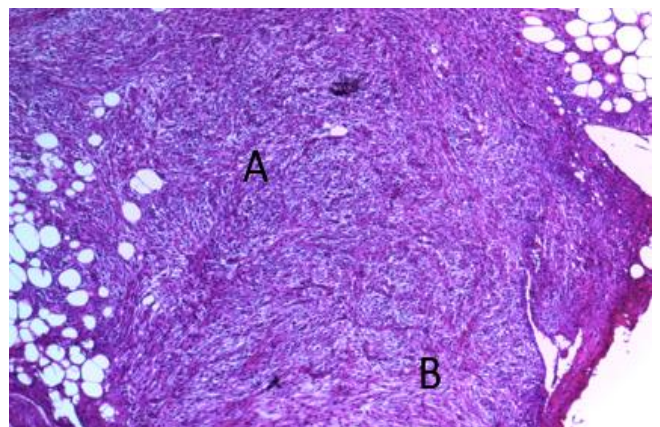


Figure 8: Microphotograph of tumor mass (fibroma) showing woven collagen bundles (whorls) in different direction (A), neoplastic fibroblasts cell (B) H&E. 10x.

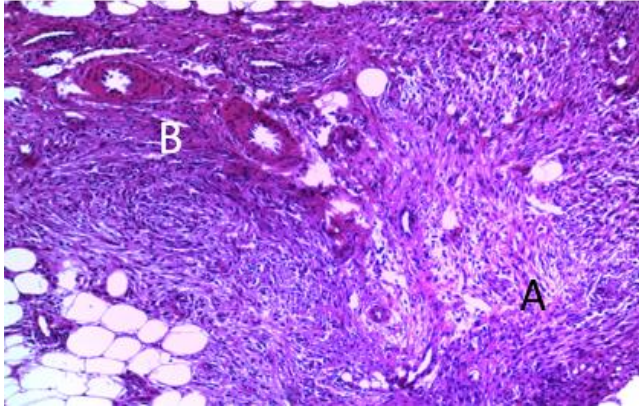


Figure 9: Microphotograph of tumor mass (fibroma) showing collagen fibers in different directions that leads to formation of whorls (A), congestion of blood vessels (B). H&E. 40x.

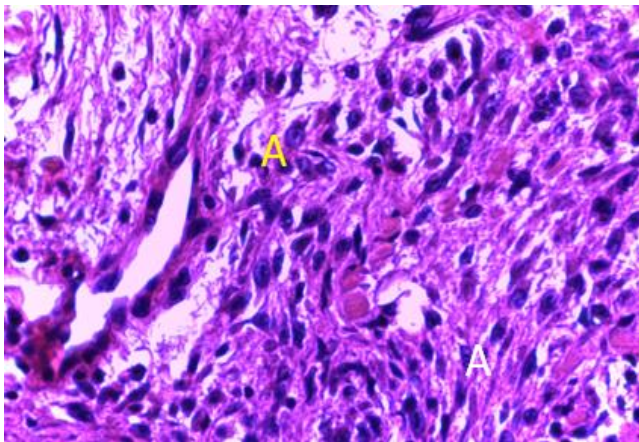


Figure 10: Microphotograph of tumor mass (fibroma) showing fibroblast and collagen fibers. H&E. 100x.

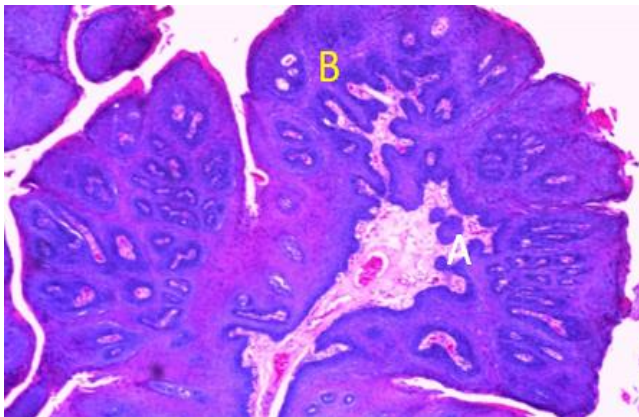


Figure 11: Microphotograph of tumor section showing papilloma projection (A), thickening of epidermal layers (B), H&E. 20x.

Discussion

The current study aimed to investigate the presence of neoplasm in grazing sheep in Mosul area, which were brought for slaughter at Mosul abattoir. The finding revealed that their three types of neoplasms were identified and those included squamous cell carcinoma, fibroma, and papilloma. Generally ovine neoplasms of the present work were more recurrent in females than males which may be related to slaughtering of males for consumption of meat at a young age prior to growth and development of neoplasm. These results are similar to (8). Our results showed that the mean age of cancer was between 4-6 years and these results agree with the results of (9) but disagree with others researchers (10) how noted that most tumors commonly affected middle-old age. The results also showed that the malignant neoplasms number is higher than benign neoplasm. These results were in contrast with other researchers (11) who mentioned that benign neoplasm was more commonly observed than malignant one. The obtained result revealed that ocular and cutaneous squamous cell carcinoma appear in an increased percentage in sheep if compared to other type of. This observation is agreeing with (12), squamous cell carcinoma is found in various locations of animal's skin. Possibly the most predisposing factor for incidence of squamous cell carcinoma is the exposure to photosensitizing plant and ultraviolet light (13). Also, carcinogens may be present in soot, coal tar, tobacco are human-made contaminants which were recorded to causes SCC, as well epidemiological or experimental studies and others factor may involve papillomaviruses and genetic agent. The impacts of epidermal harm per se in the inception of neoplasm is still unsettled, but there is prop for this notion in the increasing risk of SCC at different sites of head caused by application of description and identification marks on sheep's head, burns, branding, firing, tattooing and deep-seated inflammation (14). Fibroma is the second types of neoplasm at the present work. The biological behavior and the risk factor for mammary fibroma are unknown. However, some investigations refer to the roles of sexual hormones in development of this type of tumor (15,16). Estrogen is critical for growth of epithelial cell, while progesterone improve differentiation of lobule-alveolar during period of pregnancy and lactation. In domestic animals the low rates of mammary tumor may be due to high demands of lactation, increased rate of gestation period, and increased other reproductive parameters, shortens exposure to estrogen all these factor may give protection against mammary cancer (17). In domestic animals, some types of skin tumors have been identified to be caused by viral infections, like DNA viruses of papovaviridae family causing benign tumor in mucous membranes and causing papillomas of skin in most animals. Some cases of ocular tumor in domestic animals are caused by herpes viruses and Epstein - Barr virus (13). Ovine papilloma is a benign neoplasm caused by ovine papilloma

virus. The most pathognomonic locations causing pathological lesion is on muzzle, ears, teat and legs, but the information about epidemiological aspects of this lesion in ovine nevertheless of the current study is non-existent but at the present study may have been caused by cross species infection of papilloma virus. Papilloma viruses formed a number of neoplastic and hyperplastic lesions, as well as papilloma which are believed to be precursor lesions for SCC in human (14), and cattle (15). Although surgery was efficient in eradication tumor like papilloma, fibroma, and squamous cell carcinoma it is impossible to estimate the sequel of treatment since many of the domestic animals were neither followed -up closely nor for long enough.

Conclusions

It was concluded from the results of the present study that skin cancer was considerably observed in farm animals. The differences in distribution of neoplasm may be due to several factor such as duration, period of study, number of cases, age of animals and the geographical variation. It was found that the incidence of both benign and malignant tumors in females more than the male.

Acknowledgements

The authors wish to express their thank to College of Veterinary Medicine, University of Mosul to support current study.

Conflict of interest

No conflict

References

1. Goldschmidt MH, Hendrick MJ. Tumors of the skin and soft tissues. In: Molten RT. Tumors in domestic animals. Iowa: Iowa State Press; 2008. 14:45-117 p. DOI: [10.1002/9780470376928.ch2](https://doi.org/10.1002/9780470376928.ch2)
2. Jelínek F, Tachezy R. Cutaneous papillomatosis in cattle. J Comp Pathol. 2005;132 (1):70-81. DOI: [10.1016/j.jcpa.2004.07.001](https://doi.org/10.1016/j.jcpa.2004.07.001)
3. Valentine BA. Survey of equine cutaneous neoplasia in the pacific northwest. J Vet Diagnost Invest. 2006;18(1):123-6. DOI: [10.1177/104063870601800121](https://doi.org/10.1177/104063870601800121)
4. McGavin MD, Zachary JF. Pathological basis of veterinary disease. 6th ed. New York: Mosby Elsevier; 2017. DOI: [10.1016/b978-0-323-35775-3.00026-6](https://doi.org/10.1016/b978-0-323-35775-3.00026-6)
5. Hudachek SF, Kraft SL, Thamm DH, Bielefeldt OH, DeMartini JC, Miller AD. Lung tumor development and spontaneous regression in lambs co-infected with jaagsiekte sheep retrovirus and ovine lentivirus. Vet Pathol. 2010;47(1):148-62. DOI: [10.1177/0300985809352787](https://doi.org/10.1177/0300985809352787)
6. Mauldin EA, Peters KJ. Integumentary System. In: Jubb LT, Kennedy MY. Palmer's pathology of domestic animals. New York: CRC Press; 2016. 509-736 p. DOI: [10.1016/b978-0-7020-5317-7.00006-0](https://doi.org/10.1016/b978-0-7020-5317-7.00006-0)
7. Bancroft JD, Gamble M. Theory and practice of histological techniques. New York: Blackwell Press; 2008. DOI: [10.1016/b978-0-443-10279-0.50006-3](https://doi.org/10.1016/b978-0-443-10279-0.50006-3)
8. Ahmed AF, Hassanein KMA. Ovine and caprine cutaneous and ocular neoplasms. Small Ruminant Res. 2012;106(2-3):189-200. DOI: [10.1016/j.smallrumres.2012.03.007](https://doi.org/10.1016/j.smallrumres.2012.03.007)
9. Garcia JA, Quinteros C, Romero A, Dutra F. Occurrence of squamous cell carcinoma in Milchschaf sheep in Uruguay. Ciencia Rural. 2017;48(1):48. DOI: [10.1590/0103-8478cr20170406](https://doi.org/10.1590/0103-8478cr20170406)
10. Scott PR. Sheep Medicine. New York: CRC Press; 2015. 24 p. DOI: [10.1201/b18182](https://doi.org/10.1201/b18182)
11. Hassanein KMA, Mahmoud AZ. Pathological studies on tumor incidence in farm animals. Alex J Vet Med. 2009;28(1):105-117. [\[available at\]](#)
12. Kohlim EW, Mashadi AG. Squamous cell carcinoma in an Iranian buffalo. Indian Vet J. 2008;85:555-556. [\[available at\]](#)
13. Powari M, Simpson A, Quinn A, McCullagh P, Sarsfield P. An unusual case of Epstein-Barr virus driven lymphoproliferative disorder of the conjunctiva which mimicked a high grade lymphoma: A sheep in wolf's clothing. J Clin Pathol. 2009;62(7):656-8. DOI: [10.1136/jcp.2008.063818](https://doi.org/10.1136/jcp.2008.063818)
14. Zur H, De Villiers EM. Human Papilloma Viruses. Ann Rev Microbiol. 1994;48(1):427-47. DOI: [10.1146/annurev.mi.48.100194.002235](https://doi.org/10.1146/annurev.mi.48.100194.002235)
15. Campo R. Imagining unmanaging Health Care. J Med Human. 1997;18(2):85-97. DOI: [10.1023/a:1025680032331](https://doi.org/10.1023/a:1025680032331)
16. Tanos T, Rojo LJ, Echeverria P, Brisken C. ER and PR signaling nodes during mammary gland development. Breast Cancer Res. 2012;14 (4):19. DOI: [10.1186/bcr3166](https://doi.org/10.1186/bcr3166)
17. Prpar MS, Dovc P. Mammary tumors in ruminants. Acta Agri Slovenica. 2013;102(2):1. DOI: [10.2478/acas-2013-0031](https://doi.org/10.2478/acas-2013-0031)

المكتشفات النسجية المرضية حول أنواع مختلفة من الأورام التي تؤثر على جلد الأغنام

هديل باسم السبعوي و أحمد عبدالله السلطان

أفرع الأمراض وأمراض الدواجن، كلية الطب البيطري، جامعة الموصل، الموصل، أفرع الأمراض وأمراض الدواجن، كلية الطب البيطري، جامعة تكريت، تكريت، العراق

الخلاصة

أجريت الدراسة الحالية لتسجيل ووصف الأورام التي تصيب جلد الأغنام ولتحديد العلاقة بين حدوث الورم والعمر وجنس الحيوانات. تم فحص ١٢ رأساً من الأغنام التي أظهرت كتلة غير طبيعية في منطقة الجلد الرأس، العين، الأذن، الضرع، الحلمة ويعمر ٢-٦ سنوات، تم تشخيص ثلاثة أنواع مختلفة من الأورام في الأغنام وهي سرطان الخلايا الحرشفية، الورم الليفي والورم الحليمي. مع معدلات الإصابة ٤١.٦، ٢٥.١، ٣٣.٣٪. كانت الأورام متكررة في الإناث أكثر من الذكور وفي الأعمار الأكبر سناً أكثر من الحيوانات الأصغر سناً، ونستنتج من الدراسة الحالية أن الورم الخبيث وخاصة سرطانه الخلايا الحرشفية كان الورم السائد الموجود في الأغنام.