Papilloma and granulomatous tumors of the oral cavity mucosa of sheep in Mosul area

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Abstract: This study was undertaken to investigate the prevalence of papilloma virus and granulomatous reaction which occur naturally in sheep in Mosul area, Iraq. These lesion were diagnosed in 10 cases out of a total 325(3%) examined cases, papilloma percentage was 1.23% and granulomatous infection percentage was 1.84%. The gross and microscopic features of papilloma showed a red tissue nodule hanging from the inner surface (mucosa) of the lower lip. Microscopically, the mass was formed from multiple papillary protrusions of fibrous connective tissue with marked increase in the number and size of inflammatory cell. The macro and micro examination of granulomatous reaction showed a subcutaneous and neoplastic mass of tissue which were connected to the jaw bone at the level of seventh and eighth cheek teeth and upon opening the skin. A white mass was observed while the microscopic exam showed the presence of a severe fibrous reaction in the form of inflammation and neoplasm granuloma. Finally, this research determined the type of papilloma and granulomatous reaction in local sheep and their prevalence rates, with accurate description of gross and microscopic lesions.

1. Introduction

Oral cavity lesions of domestic animals could accompany many systemic disease such as bluetongue, foot and mouth disease, and ulceration. Other lesions are limited to the oral cavity like tooth discoloration, malocclusion, bacterial and viral infection and tumors[1]. Oral tumors are rare in sheep[2]. Papillomaviruses are a diverse group of small, non-enveloped, circular, double-stranded DNA viruses that are known to infect human or domestic animals in which they cause proliferation of the stratified squamous epithelium of the skin or mucosa[3]. Papillomaviruses cause benign proliferative lesion.

Granulomatous disease of the oral cavity are commonly observed due to a large range of infection. Granuloma reaction can be defined as a firm, tumor-like granulation with a collection of inflammatory cells and epithelioid cells as a reaction to chronic inflammation. Granuloma reaction can be caused by bacteria infection, fungi, and viral infections or even due to foreign bodies. Oral cavity granuloma may result from genetic factor, environmental agent, infectious organism, or may also be idiopathic[4] therefor. The aim of the present investigation is to provide information regarding the histology and oral manifestation of Papilloma and granulomatous reaction that commonly affect the oral cavity of sheep.
2. Materials and methods
The oral cavity was examined in 325 randomly selected sheep from four different flocks of sheep, butcheries and from the private farms during the academic year 2018. Information formats was prepared in which a complete history of each case is recorded (date, case number, breed, age, animals sex, results of gross examination).

2.1 Clinical examination and surgical manipulation
The oral cavity of each sheep was examined grossly in order to recorded any abnormal mass inside the oral cavity. Total excisions for any abnormal mass were performed, then specimens were fixed immediately in 10% neutral formalin solution for 24-72h, washed under tap water, dehydrated in ascending grades of alcohol, cleared in xylol and embedded in paraffin wax until the time of diagnostic application. Sections were cut at 5 μm thickness and stained with Harries hematoxylin and eosin. Special stains were also used in some cases and including the Grams stain, trichrome stain [5].

3. Results and Discussion

3.1. Prevalence of Papilloma and granulomatous tumors
The results of the present study showed that the total prevalence of papilloma and granulomatous lesions were 3%(10/325)(table 1).

Table 1 shows the types of oral cavity lesions and their percentage

| Pathological condition       | % of infection | NO of lesion |
|------------------------------|----------------|-------------|
| Papilloma                    | 1.23           | 4           |
| Granulomatous reaction       | 1.84           | 6           |
| **Total**                    | **3%**         | **10**      |

3.2. Histopathological examination of the lesion:
The histopathological examination of granulomatous reactions showed the presences of subcutaneous tissue tumor masses which was connected to the jawbone at the level of the seventh and eightths cheek teeth. When the skin was opened a white tissue mass with 4 cm in diameters was observed, connected to the skin on one side and with the jawbone on the other side. Fig[1] A red to black fistula was also observed between the skin and the center of tissue mass and bone Fig[2]. Inside the bone, a bone growth was seen from the jawbone, connected with the elastic tissue mass and measuring 6 cm in diameter Fig[3]. When the head bones were removed from the elastic tissue by boiling with water, a hole was observed in the body of the lower right jaw (the center of the bony lesion) and a bone growth extending from the mass to the space between the seventh and eight cheek teeth Fig[4]. Bone growth and its anatomical relationship were evident when it examined radiographically Fig[5]. Microscopically, no germs were observed in the tissue mass (Gram stain), and by examining the stained tissue sections with hematoxylin and eosin and Trichrome stain it became clear that there was a severe fibrous tissue reaction and in the form of granulomatous reaction Fig[6,7,8,9,10]
Figure (1): A tumor mass in the lower right jaw of sheep heads

Figure (2): A fibrous mass located directly above the bone mass and a fistula that connects the skin, subcutaneous tissue, the fibrous mass and the bone mass is noted

Figure (3): A sheep's mouth showed a fistula opening and a bony growth at the level of the seventh and eighth cheeks.
Figure (4): The same previous condition after removing the soft tissue, where the fistula opening and the bone mass are clearly visible.

Figure (5): A higher enlargement of one of the local growths in the previous figure and the excessive proliferation of the squamous epithelium is observed and its emergence in the form of papillary extensions, H&E stain ×450.
Figure (6): A section of the right jaw of sheep showed an intense infiltration of mononuclear inflammatory cell in the dermis with large amount of fibrous tissue H&E stain x115.

Figure (7): A section of the right jaw of sheep showed an intense infiltration of mononuclear inflammatory cell in the dermis with large amount of fibrous tissue H&E stain x115.

Figure (8): A cross section of granuloma mass in the subcutaneous tissue of the jaw area with large amount of mature fibrous tissue, Trichrome stain x 90.

The histopathological examination of papilloma was showed as a single tissue node, its length was 1.5cm with a smooth pale color, hanging from the inner (mucosal) surface of the lower lip. The nodule was characterized by firm consistency, and it has a strong contact with lip tissue and has a well-formed stalk Fig [10]. Microscopically, the mass formed from multiple papillary projection of fibrous vascular connective tissue covered by applied squamous epithelium that was severely keratinized and well dispersed. The tumors of the fibrous stroma was an extension of normal or lamina properia, the
thickness of the epithelial layer increased significantly as a result of the increased in the size of the cell that make up this layer, and the nuclei of these cells were deeply stained Fig [11]

Figure (9): sheep oral cavity showed the presence of a tissue mass haning from the lower gingival mucosa.

Figure (10): The section showed a tissue mass hanging from the mucous surface of the lower lip ,it noticed that the tumor mass consists from applied squamous epithelium that suffers from hyperplasia ,spines and proliferation of stromal tissue ,and these changes lead to the formation of protrusions and folds .

Congenital tumors occur sporadically in farm animals[10] the diagnosis of tumors in the oral cavity of the sheep was based on clinical history, epidemiological data and on pathological findings .The infectious granuloma diagnosed in local sheep in this paper were identical macroscopically and microscopically with the infectious lesions of *Actinomyces bovis*. This bacterium is considered to reside together in the mouth of ruminants .The disease occurs mainly in cows ,but in rare cases it affects sheep or goat By the time, the infection has extended from the bone to the soft tissue and skin to form a fistula or drain for the lesion. The involved parts of the jaws may be enlarged 2 or 3 times,
sometimes fistula is formed abscesses of the head bones which extend inward and discharge in to the mouth or pharynx[6]. The germ enters the tissue through oral abrasions, opening and stinging wounds associated with dental disease and by the action of hard plant thorns. The lesions are sporadic and occurs mainly in the jaw to a lesser degree in the sore[7]. Due to the frequent occurrence of jaw lesions and appearances of new periosteal bone and presence of fibrosis the disease was called a lumpy jaw. Rarely, the bacterium causes abscesses and granuloma in the elastic tissue of the head and other areas of the body[8]. The current research, the germs that causes these lesions have not been isolated, but there is a group of germs that must be taken into consideration when differentiating the germs that cause neoplastic infections and from these germs (Actinobacillus lignieresii, Nocardia asteroides, Staphylococcus aureus)[9].

Papilloma have been identified in cattle at birth [11]. A viral origin has been suggested for this type of congenital tumors, but has not been proven [12] and these lesion are widely regarded to be more likely haematotamous rather than infection [12]. The microscopic patterns of the oral cavity suggested diagnoses of oral papilloma and epidermal hyperplasia respectively. The infection with BPV seems most likely to have been vertically transmitted. The concordance between BPV genotypes detected in the blood of the dams and the oral cavity, the pathological sample of their offspring support a vertical hematogenous transmission pathway, rather than ascending ewe infection or an infection at the time of birth. Therefor ovine placenta plays an important role in the transmission of BPVS. Vertical transmission of PVs is well recognized and it has been found that the presence of HPV in placenta or in the cord blood increased the risk of the newborn to carry HPV in the oral cavity mucosa[13,14].

4. Conclusion

Tumors of the oral cavity have adverse effects on the productive function of sheep. The papilloma percentage was 1.23% and granulomatous infection percentage was 1.84%, these effects are more pronounced with the increasing size of tumor.

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