

# Successful Management of Oral Papillomatosis in a Goat Using an Autogenous Vaccine: A Case Report



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## SUMMARY

Caprine papillomatosis is a contagious disease caused by caprine papillomavirus (CPV), characterized by benign tumors or warts primarily affecting the mouth, lips, udder, head, and neck, especially in young animals. Transmission occurs through skin disruptions, with more severe manifestations observed in immunocompromised animals. This case report presents the successful treatment of a case of papillomatosis in a goat using an autogenous vaccine. In this case report, a 9-month-old male crossbred goat with papillomas of varying sizes around the mouth, as well as on the abdomen, caudal region of the scapula, right and left sides of the anus, ear, and scrotum was described. It was determined that vital signs and complete blood count (CBC) analysis results were unremarkable. Therefore, a biopsy was recommended for further analysis. Therefore, for diagnostic purposes, biopsies were obtained from papilloma lesions and examined histopathologically, revealing significant epidermal hyperkeratosis, papillary projections, and intense inflammatory cell infiltration. Histopathological examination of the sample confirmed the presence of papilloma tissue. The biopsy was taken from the relevant papilloma in the same animal, and an autogenous vaccine was prepared. The autogenous vaccine was prepared from the patient's papillomatous tissue (approximately the size of a chickpea), inactivated with formaldehyde, and filtered with the addition of antibiotics. After sterility control, it was stored at +4°C for use. The vaccine was administered subcutaneously (SC) at a dose of 5 ml once a week for 4 weeks. During the 4-week autogenous vaccination treatment period, papillomas began to regress and heal by the second week. Approximately half of the papillomas had healed by the third week, and they were completely healed and had clinically disappeared by the seventh week follow-up. No adverse effects were observed during the treatment process, and no recurrence was detected during the post-treatment follow-up. Autogenous vaccination may be a good alternative for treating papillomas, which are rarely reported in goats, as it is inexpensive, easily available, effective, and provides a complete cure. It also provides a practical treatment option for cases in which surgical removal of papillomas is not feasible due to the risks associated with their distribution and anatomical location.

## KEY WORDS

Autogenous vaccine, Caprine Papillomatosis, Oral Papillomatosis, Treatment, warts.

## INTRODUCTION

Caprine papillomatosis (including papillomas and fibropapillomas) is a viral illness that affects the oral cavity, lips, udder, head, and neck of young goats. It is characterized by benign tumors or warts caused by caprine papillomavirus (CPV), which has multiple serotypes (1, 2). Cutaneous warts or papillomatosis in cattle, horses, sheep, and goats are benign tumors caused by host-specific papillomaviruses (3, 4). Papillomatosis in goats is a neoplastic infectious disease characterized by the presence of numerous papillomas that emerge

as exophytic growths, causing papillary lesions with finger-like projections (5). Papillomatosis in sheep occurs as a result of direct contact with the skin or other mucosal surfaces of an infected animal, or contamination through materials such as nutrients, ear tag forceps, or rectal palpation equipment (1). Papillomaviruses (PVs) cannot actively penetrate the skin of their host. Therefore, disruption of tissue integrity is a prerequisite for PV infection (6). Immunosuppressive factors can influence the occurrence and severity of skin warts. It is important to note that the use of immunosuppressive agents may cause latent infections to progress into clinical presentations (3). Papillomas typically occur on the mucous membranes of the head, neck, udder, nipple, abdomen, digestive tract, and genital tract (7, 8). PVs can cause both malignant and benign proliferation of host skin and mucous membranes. PVs associated with clinical symptoms have been found in many vertebrate species. They primarily cause benign proliferation of mucosal and cutaneous

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stratified squamous cells (9). Laboratory diagnosis is rarely necessary, as the clinical manifestations of papillomatosis are characteristic (7). Likewise, Bovine papillomavirus (BPV) can be diagnosed through clinical examination of affected animals and histopathological analysis of the growing tumor (10-12). However, when clinical diagnosis is challenging, laboratory methods such as polymerase chain reaction (PCR), dot blot, Southern blot, immunohistochemistry, and electron microscopy may be utilized (7, 13, 14).

## CASE PRESENTATION

This case report involves a 9-month-old male crossbred goat weighing 25 kg, admitted to the Animal Hospital for diagnosis and treatment. Physical examination revealed that the lymph nodes, mucous membranes, rectal temperature, respiratory and heart rates were within the reference ranges. To differentiate from ecthyma, the gums and mouth were carefully examined for the presence of papules, vesicles, pustules, or ulcers covered with yellowish exudate (15) and no such lesions were observed. Papillomatous formations were observed around the mouth area (Figure 1/A), in the ear (inner auricle), on various parts of the skin (back, abdomen (Figure 1/E)), around the anal area (Figure 1/F), and on the scrotum (Figure 1/G).

## Diagnostic Methods

A skin sample measuring 0.3 x 0.4 x 0.1 cm was taken for histopathological analysis. The biopsy samples were stored in 10% buffered formaldehyde for pathological examination and analyzed according to a previously described procedure (4).

## Histopathological Examination

Histopathological examination revealed a marked increase in the stratum corneum, thickening in certain areas, and the presence of keratin islands in the epidermis. The epidermis exhibited numerous finger-like protrusions extending into the dermis, with a central keratin layer (Figure 2). In the dermis, these papillary projections were accompanied by islets of stratum spinosum cells, each containing a central keratin layer, along with numerous sebaceous glands (Figure 3). Hyalinization of the connective tissue and intense infiltration of inflammatory cells, including lymphocytes, macrophages, and neutrophils, were also detected in the dermis (Figure 3).

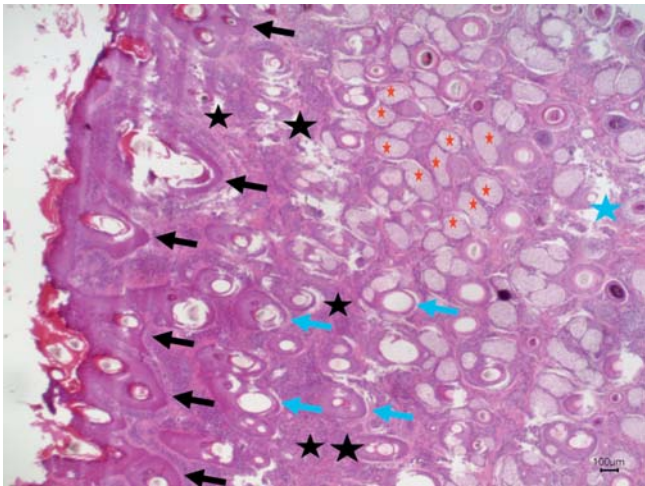
## Preparation and Administration of the Autogenous Vaccine

Approximately 4-5 g of live papilloma tissue was collected from the goat, crushed with sterile sand in a mortar, and then mixed with a 1/10 saline solution. The resulting liquid was transferred to a separate container and inactivated by adding formaldehyde



**Figure 1** - (A) Papillomatous formations around the mouth. (B) Partial regression of papillomas around the mouth by the 3<sup>rd</sup> week. (C) Complete healing of papillomas around the mouth by the 7<sup>th</sup> week. (D) Complete healing of papillomas on the skin by the 7<sup>th</sup> week. (E) Papillomatous formations on the abdomen. (F) Papillomatous formations around the anal area. (G) Papillomatous formations on the scrotum. (H) Partial regression of papillomas on the right and left sides of the anus by the 3<sup>rd</sup> week. (I) Complete healing of papillomas around the anal area by the 7<sup>th</sup> week.





**Figure 2** - In the tissue section, papillary extensions with keratin at the center (black arrows), an increased number of sebaceous glands (red stars), numerous islands of stratum spinosum cells with keratin in the center (blue arrows), and inflammatory cell infiltration in the dermis (black stars) were observed. HE staining, 40x magnification.

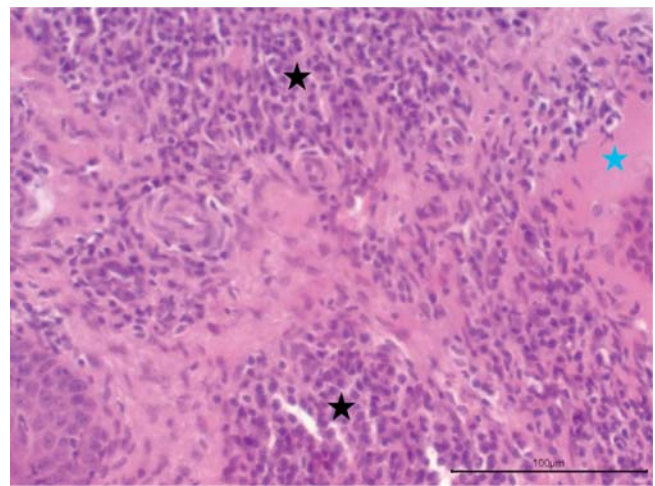
to a final concentration of 0.5%. After 24 hours of incubation at room temperature, crystalline penicillin (200,000 IU/10 ml) and streptomycin (250 mg/10 ml) were added to the solution, which was then filtered through filter paper. The filtered solution was inoculated onto 7% sheep blood agar (Oxoid) for sterility testing, incubated at 37 °C, and stored at +4 °C until no microbial growth was observed (16). Since autogenous vaccines are typically administered to sheep and goats at half the dose used in cattle (17), the vaccine in this case was administered subcutaneously in four doses of 5 mL, given one week apart. The vaccines were stored at +4°C during the treatment period.

## DISCUSSION

Although PV infection is well-documented in humans and various animal species, it is rarely reported in goats (18). Various methods are used to treat papillomatosis in animals, including cell culture inoculation, autogenous vaccination, immunomodulation, autohemotherapy, homeopathy, azithromycin, and surgical interventions such as electrocautery, ligation, and cryotherapy (19,20).

Effective control of papillomatosis presents a significant challenge for veterinarians in the field. While several methods, as mentioned above, are available, commercial vaccines are often less effective than autogenous vaccines, as papillomatosis is typically caused by a strain specific to a particular location or farm (12). Surgical removal may not be feasible when a large number of animals are affected, papillomas have spread over a vast area of the body, their shape and size hinder excision, or the patient's condition worsens or becomes life-threatening. In these cases, the preparation and use of an autogenous vaccine are appropriate (12). In the present case, surgical removal was not feasible due to the large area around the mouth and the potential for restricting nutrition post-surgery. Therefore, treatment with an autogenous vaccine was preferred.

It has been stated that papillomas in cattle are not self-limiting and can persist for months, often with multiple papillomas present. Although most cases of caprine oral papillomas heal spontaneously, several new treatment options, including au-



**Figure 3** - Dense inflammatory cell infiltration (black arrows) and hyalinization (blue arrow) in the dermis. HE staining, 400x magnification.

tohemotherapy and autogenous vaccination, have also been introduced (21, 22). Autogenous vaccines, also known as emergency, herd-specific, or custom-made vaccines, are used globally, including in the European Union, United States of America, Canada, Brazil, China, Indonesia, Australia, and Egypt. Despite varying legal frameworks and definitions across countries, they have a long history of application (23). Autogenous vaccines stimulate the host's immune system. The duration of treatment depends on factors such as the virus type, the stage of papilloma development, the vaccine preparation, the administration schedule, and the patient's immune response. This method is a practical treatment for papillomavirus-infected cattle, promoting lesion regression by triggering interleukin-6 (IL-6) and lymphocyte production (20, 24). A study conducted in cows found that autogenous vaccination increased leukocyte, lymphocyte, and IL-6 levels. In another study, gasoline was used for the treatment of bovine skin papillomatosis, with 90% of patients showing improvement after 50 days of observation (24, 25).

In this case report, approximately half of the papillomas regressed within 3 weeks (Figure 1/B, H) and completely healed by the end of the 7<sup>th</sup> week (Figure 1/C, D, I). No adverse effects, such as inflammatory changes at the injection site, tissue necrosis, or allergic reactions, were observed. Complete clinical resolution of papillomas in the anal area (Figure 1/I), skin, and scrotum occurred within the first weeks of treatment, while healing around the mouth was observed after the 7<sup>th</sup> week. No recurrence was noted by the end of the treatment period.

It was reported that flunixin meglumine, procaine penicillin, dihydrostreptomycin sulfate, and vitamins A, D<sub>3</sub> and B12 were used to treat oral papillomatosis in a 2-week-old calf, with complete recovery observed after 3 weeks (21). A recent study tested various treatment methods for goats with cutaneous papillomatosis. The control group, which received no treatment, showed spontaneous recovery in only 10% of cases, highlighting the need for medical intervention. The study also reported recovery rates of 40% with levamisole, 30% with *Tarantula cubensis* extract, and 60% with the combined levamisole and *Tarantula cubensis* group. However, it is important to consider the sensitivity of goats to levamisole (19, 26). Another study reported an overall efficacy of 84.61% in treating bovine papillomato-

sis with autogenous vaccination. By the fourth week, 76.92% of the animals had shown regression, with an additional 7.69% regressing by the fifth week. Complete regression was achieved in 61.53% of the animals by the fifth week and in 23.07% by the sixth week (27). In comparison to our case, papillomas began to regress by the second week, with approximately half resolving by the third week. Complete clinical remission was observed by the seventh week. These findings support the effectiveness of autogenous vaccination as a viable treatment for caprine papillomatosis, and possibly for bovine papillomatosis. However, further studies are needed for both species.

## CONCLUSION

This case report demonstrates the potential of autogenous vaccines as a viable treatment for caprine papillomatosis. Since papillomatosis is typically caused by a strain specific to a particular location or farm (12), commercial vaccines may not be effective. In such cases, autogenous vaccination is a safe, accessible, and cost-effective alternative. However, it is important to note that autogenous vaccines are tailored to specific pathogens identified within a herd, so costs can vary depending on the pathogen and the laboratory's pricing structure (28). This report concludes that autogenous vaccination is an effective treatment for goat papillomatosis, particularly when surgical removal of papillomas is not feasible. While autogenous vaccines offer a valuable treatment option, larger studies are needed to fully assess their effectiveness and potential side effects.

## Conflict of Interest Statement

The authors declared that there are no conflicts of interest.

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