Benign Cartilaginous Tumor in a Sheep: Clinical and Histopathological Findings

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Abstract. A benign cartilaginous tumor, chondroma, occurred in a 3.5 year-old ewe that was presented to the Veterinary Teaching Hospital, College of Agriculture and Veterinary Medicine, Qassim University. The tumor mass was in the form of a massive hard swelling at the right shoulder region. The ewe was not able to bear weight on the right forelimb that was abducted laterally. Exploration of that swelling revealed blood tinged serous fluid. The ewe was euthanized on owner’s request. At necropsy, the swelling measured approximately 53cm in length, 37cm in width and 25cm in depth and extending from the right forelimb to the thoracic cage. The contoured borders were covered by fibrous tissue capsule and the tumor was difficult to cut through. On cut surface, the tumor was yellowish in color with small cartilaginous multilobular structure and contained one compartment filled with blood tinged serous fluid. The case was diagnosed histopathologically as a chondroma.

Key Words: Benign, Tumor, Chondroma, Sheep
Introduction
Contrary to skin tumors, neoplasia of the musculoskeletal system is extremely rare in sheep and goats (Bastianello, 1982 and Valentine 2004). A study of 673 ovine neoplasms submitted to a veterinary laboratory in South Africa (1935-1974) has revealed that 21 of them were of connective tissue origin. Types of tumors included were chondroma, chondrosarcoma, fibroma, fibrosarcoma, osteoma, rhabdomyosarcoma, leiomyoma and fibroma (Bastianello, 1982). Another study in Turkey has reported that only three cases were diagnosed as chondroma over the last 72 years (Rifki, et al., 2007). However, chondromas have been reported in mature and aged dogs (Moulton, 1990; Patterson-Kane et al., 2004 and Rifki, et al., 2007), and as a case report in sheep (Anderson, et al., 1969 and Van Schaik, et al., 1986).

Chondroma is a benign tumor, characterized by the formation of mature cartilage but lacking the histological characteristics of chondrosarcoma (high cellularity, pleomorphism, and the presence of large cells with double or plump nuclei or mitoses) (Misdorp and Van Der Heul, 1976). Chondromas usually affect flat bones and demonstrate slow growth and deform the affected bone. The clinical signs are related to the size and location of the tumor (Moulton, 1990). Primary chondromas of bone are divided into enchondromas and eechondromas. The former type originates from the medullary cavity of the bone (Poll, et al., 1990; Silverman, et al., 1994 and Thompson, et al., 2002), while the latter arises from cartilage anywhere in the skeleton (Poll, et al., 1990; Thompson, et al., 2002).

The localization of the enchondroma reported in animal species was the proximal phalanx (Thompson, et al., 2002) and thoracic vertebrae (Yutaka, et al., 1980) of a dog; the distal tibia and distal fifth metatarsal (Silverman, et al., 1994) of a rhesus monkey. The case discussed below is a huge chondroma in the right shoulder region of an ewe.

Materials and Method
A 3.5-year-old, 55 kg body weight, non-pregnant, Najdi breed ewe was presented to the Veterinary Teaching Hospital, College of Agriculture and Veterinary Medicine, Qassim University with a massive hard swelling at the right shoulder region (Fig. 1-A). The ewe was not able to bear weight on the right forelimb that was abducted laterally. Exploration of that swelling at the most soft site by a 10-cm long and 14-gauge needle revealed blood tinged serous fluid (Fig. 1-B). The ewe was euthanized on owner’s request.

A specimen was taken and placed in 10% neutral-buffered formalin for histopathological examination. Paraffin sections, 4µm thick, were prepared and stained with hematoxylin and eosin (H&E).

Results
At necropsy, the swelling measured 53cm length, 37cm width and 25cm depth, was extending from the right forelimb to the thoracic cage originating from the scapula (Fig. 1-C). The contoured borders were covered by fibrous tissue capsule and the tumor was difficult to cut through. On cut surface, the tumor was yellowish in color.
with small cartilaginous multilobular structures and contained one compartment filled with blood tinged serous fluid.

Histopathologically, the tumor was composed of lobulated masses of proliferating chondrocytes of variable shapes and sizes that were separated with very thin fibrous stroma. The periphery of each lobule contained clusters of closely packed young chondrocytes while the center contained mature chondrocytes which were arranged individually or in groups. No inflammatory changes were seen in the vicinity of the tumor (Fig. 1-D). The case was diagnosed as chondroma.

![Image](image_url)

Figure (1). A 3.5 year-old Najdi ewe with the shoulder chondroma (A), blood-tinged serous fluid at exploratory puncture (B), small cartilaginous multilobular structures on the cut surface of the tumor (C), and an H&E-stained section of the chondroma showing proliferating chondrocytes of variable shapes and sizes that were separated by very thin fibrous connective tissue (D)(H&E) x125.

**Discussion**

Chondromas are benign neoplasms of cartilage (Moulton, 1990) and are rarely seen in domestic animals (Hamilton, et al., 1973; Silverman, et al., 1994 and Doige, et al., 1995). Sullivan (1960) described chondromas in domestic animals, especially in older dogs and sheep. It has been reported that there is no breed nor sex predilections (Poll, et al., 1990 and Thomson, et al., 2002). On the other hand, chondrosarcoma in sheep has been considered to occur more frequently than osteosarcoma (Sullivan 1960), and in aged ewes, but it still remains a rare tumor in this species (Thompson et al., 2002).

It has not been yet determined if malignant transformation of chondroma occurs in animals, and it is currently believed that most chondrosarcomas of dog arise
de novo rather than from malignant change in pre-existing benign cartilage tumor (Brodey, et al., 1974). However, secondary chondrosarcomas of the periosteum occasionally arise by malignant change in osteochondromas of animals (Thompson, et al., 2002).

Grossly, bony enlargement, lameness, and radiographic evidence of lysis or proliferation may suggest a diagnosis of neoplasia, especially in an older animal (Pugh, 2002) but an accurate diagnosis of neoplasia is based ultimately on histopathological findings. Microscopically, it is not easy to differentiate chondromas from trauma or degenerative alterations and chondrosarcomas. However, abundance of cellularity, presence of cells with large or double nucleuses in chondrosarcomas and the observation of pleomorphism and mitosis are differentiating factors in both cases (Thompson, et al., 2002 and Rifki, et al., 2007).

Observation of these findings in the current case defends the exactness of the chondroma diagnosis. It has also been found that echondroma occurs in flat bones more often than in long bones (Thompson, et al., 2002, and Hamilton, et al., 1973). In the present case, the tumor was found to originate from the scapula. This finding adds up to confirm the diagnosis. Successful treatment of connective tissue tumors has not been reported (Pugh, 2002).

In conclusion, despite the rare occurrence, chondroma can occasionally be seen in sheep.

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References


ورم غضروف حميد في الأغناة: نتائج سيربية ونسجية

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ملخص البحث: تم توصيف ورم غضروف حميد في نعجة عمرها ثلاث سنوات نصف والتي أتى بها للمستشفى البيطري التعليمي التابع لجامعة القصيم. كان الورم قاسي وكبير الحجم في منطقة الكتف الأيمن، وقد لوحظ أن النعجة لا تستطيع التحميل على القائمة المصابة مع إبعادها وخشها عن الجسم، وإجراء البذل الاستكشافي عند أكثر الأماكن طروة في الورم لوحظ خروج سائل مصلي معدم، ثم نجح النعجة بناءً علي طلب مالكها، وعند فحص الحلة وجد الورم بلغ 35 سم طولاً و37 سم عرضاً و35 سم عمداً، وكان الورم متنداً من القائمة اليمنى وحتى القفص الصدري، ولم يلاحظ أن الورم يحتوي باقية من النسيج الليفي مع صعوبة قطعه بالمشرط، وقد عمل قطع في الورم وجد أن لوحة مصنوعية مع وجود تركيب غضروفية متعددة القصصات، وكان هناك غرفة وحيدة بها سائل مصلي معدم، والفضاح النسيجي - مرضاً - تم تشخيص النورم على أنه ورم غضروف حميد والذي يعد نادر الحدوث في الأغناة.

الكلمات المفتاحية: أورام حميدة، غضروف، الأغنم.