

CLINICOPATHOLOGICAL STUDY ON CUTANEOUS SQUAMOUS CELL CARCINOMA AND PAPILLOMA IN SHEEP

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SUMMARY

Twenty-two cases of skin tumours were diagnosed (eighteen ewes and four rams). Out of them squamous cell carcinoma of low-grade malignancy was detected in seventeen animals (77.3 %) and squamous cell papilloma in five animals (22.7 %). The first type was observed in white body coat ewes aged 5 - 10 years . They were mostly found at the ventrolateral border of abdomen, fatty tail, back and limbs. The gross and histopathological examinations for each type were described. Squamous cell papillomas were observed in young animals (1-2 years) at the head region and it was supposed to be precursor of squamous cell carcinoma.

INTRODUCTION

Squamous cell carcinoma is a malignant tumour of epithelial origin, deriving from keratinocytes

that is widely reported in all domestic animals (Hawkins et al., 1981 and Yager and Scott, 1993). It has been reported all over the world (Bastianello, 1982).

Adult and old sheep were most commonly affected. Moreover, most cases were seen in summer and autumn (Mendez et al., 1997). It was also seen in white-faced older ewes and rams and the majority of the lesions involved the eyelids (Steven and Stoops, 1988).

The etiology of the disease in sheep appears to be multifactorial, although several studies have highlighted two primary associations: poor skin pigmentation and prolonged exposure to ultra-violet radiation (Llyod, 1961; Theilen and Madewell, 1979; Daniel and Johnson, (1987) and Steven and Stoops, 1988). This may explain why such cases were commonly reported in arid or semi- arid regions.

The aim of the present clinicopathological work is to put on records two types of ovine skin neoplasms that were met with during the last two years.

MATERIALS AND METHODS

Twenty-two clinical sheep cases suffering from skin tumors that were distributed all over the body were studied. They were collected from Surgery clinic - Faculty of Veterinary Medicine - Cairo University, Quarantine of Cairo slaughter house and veterinary clinic at Fayoum province. The study continued from May 2002 to May 2004. All cases were subjected to thorough clinical examination. The size, shape, colour, site, condition of regional lymph node as well as the general condition of the animal were recorded.

Surgical intervention in most cases was performed under local anaesthesia using Lidocaine 2 % solution (Lidocaine 2 %- Bremer Pharma GmbH, Germany). Intramuscular premedication with 2 % Xylazine - Hcl (Rompun, Bayer, Germany) at a dose rate of 0.2% mg/kg body weight was administered. A thin layer from the adjacent healthy tissue was removed together with the tumour. In cases when the regional lymph node was swollen, it was excised. Postoperatively the animals were given systemic course of Neobiotic for five successive days and the skin stitches were removed after seven days.

The excised neoplasms were fixed in 10 % formalin; sections of 4 - 5 μ m thickness were prepared and stained with Hematoxylin and Eosin (Carleton, 1976). The diagnosed operated cases were photographed and tabulated with emphasis to animal age, tumour shape and site.

RESULTS

The results showed that Squamous cell carcinoma and Squamous cell papilloma represented 77.3% and 22.7 % respectively from all diagnosed tumours.

Clinical observations:

Squamous cell carcinoma was detected in seventeen sheep (Sixteen ewes and one ram) at different body regions (table 1). Their age ranged from 5 to 10 years and the colour of their body coat was white except in two black ones. The size of squamous cell carcinoma varied from that of small lemon to large orange. The lesions appeared as fleshy, reddish or blackish, ulcerating swellings and some of them were covered with black scab (dried clotted blood) that when removed left bloody uneven surface with offensive odour. Five cases were complicated with infection and secondary myiasis at the center of swelling. The pre-femoral lymph nodes of the affected animals were enlarged. The carcinomas were at the anterior aspect of carpal joint (one case- Fig. 1 A), two cauliflower swellings at the pastern region (one case- Fig. 1 B), at the non-wool surface of the fatty tail (three cases- Fig. 1 C & D) and near the back at the level of tuber coxae (two cases - Fig. 1 F). Ten carcinomas were found at ventrolateral border of the abdomen at the level of the stifle fold. On pal-

pation, the lesion was movable. Eight animals showed unilateral lesion (Fig. 2 A, B & C) and the other two had bilateral lesions (Fig. 2E). The tumour was either single large one or small multiple lesion at the level of stifle fold.

Squamous cell papillomas were diagnosed in five animals at the head region (table 2), their age ranged between 1 - 2 years and the colour of their

body coat was white with brown or black head. The lesion was either single or multiple appearing as grayish white nodules to small wart. The papillomas were found at the lateral aspect of the external ear (2 cases, one single and one multiple, Fig. 1 E), under medial canthus of right eye (one case) and at the nostril and around the mouth (two cases).

Table (1): The distribution of the diagnosed seventeen squamous cell carcinoma cases in sheep according to age, sex, coat colour and site.

Age		Age		Age		Site	
Less than 5 years	5-10 years	Male	Female	White	Black		
- (0%)	17 (100 %)	1 (6%)	16 (94 %)	15 (88.2 %)	2 (11.8 %)	Stifle fold	10 (58.8%)
						Fatty tail	3 (17.6%)
						Limb	2 (11.8%)
						Back	2 (11.8%)

Table (2): The distribution of the diagnosed five squamous cell papilloma cases in sheep according to age, sex, coat colour and site..

Age		Age		Age		Site	
1-2 years	5-10 years	Male	Female	White	Black		
5 (100 %)	- (0 %)	3 (60%)	2 (40 %)	5 (100 %)	- (0 %)	Ear	2 (40%)
						Under the eye	1 (20 %)
						Mouth & nostril	2 (40 %)

Histopathological examination:

The microscopical pattern of the examined specimens showed that squamous cell carcinoma was of low-grade malignancy that was well differentiated in all cases. The carcinoma cells were large polyhedral cells, similar to those of the stratum spinosum of the epidermis which infiltrating the underlying tissues, they appeared in large groups separated from one another by connective tissue stroma. Concentric laminations of keratin (cancer pearls or keratin pearls or cell nest) were found as unique characteristic of well-differentiated squamous cell carcinoma (Fig. 3 A & B). The cell nest has concentrically laminated red - staining keratin of the stratum corneum lie at the center of epithelial mass of anaplastic cells that could be recognized by their large size, large nucleolus and the presence of numerous mitotic figures (Fig. 3 C). The underlying stroma displayed a chronic inflammatory reaction rich in lymphocytes together

with extensive fibroplasia (Fig. 3 D) giving the growth of a schirrous appearance. Some tumours showed mucoid degeneration of the underlying fibrous stroma (Fig. 4B). Areas of ulceration, necrosis with calcification, haemorrhages and leucocytic cell infiltration mainly lymphocytes, neutrophils and eosinophils were also found (Fig. 4A, C & D).

Squamous cell carcinoma did not show metastasis in the regional lymph node. In the meantime, it showed histopathological alterations including neutrophilic cells infiltration, mitotic figure of lymphoblasts precursors accompanied by hyperplasia and hyperactivation of lymphoblasts (Fig. 5A). Cases of squamous cell papilloma were characterized by acanthosis (thickening of the stratum spinosum cell layer) and hyperkeratosis (thickening of stratum corneum or keratin layer) (Fig. 5B).

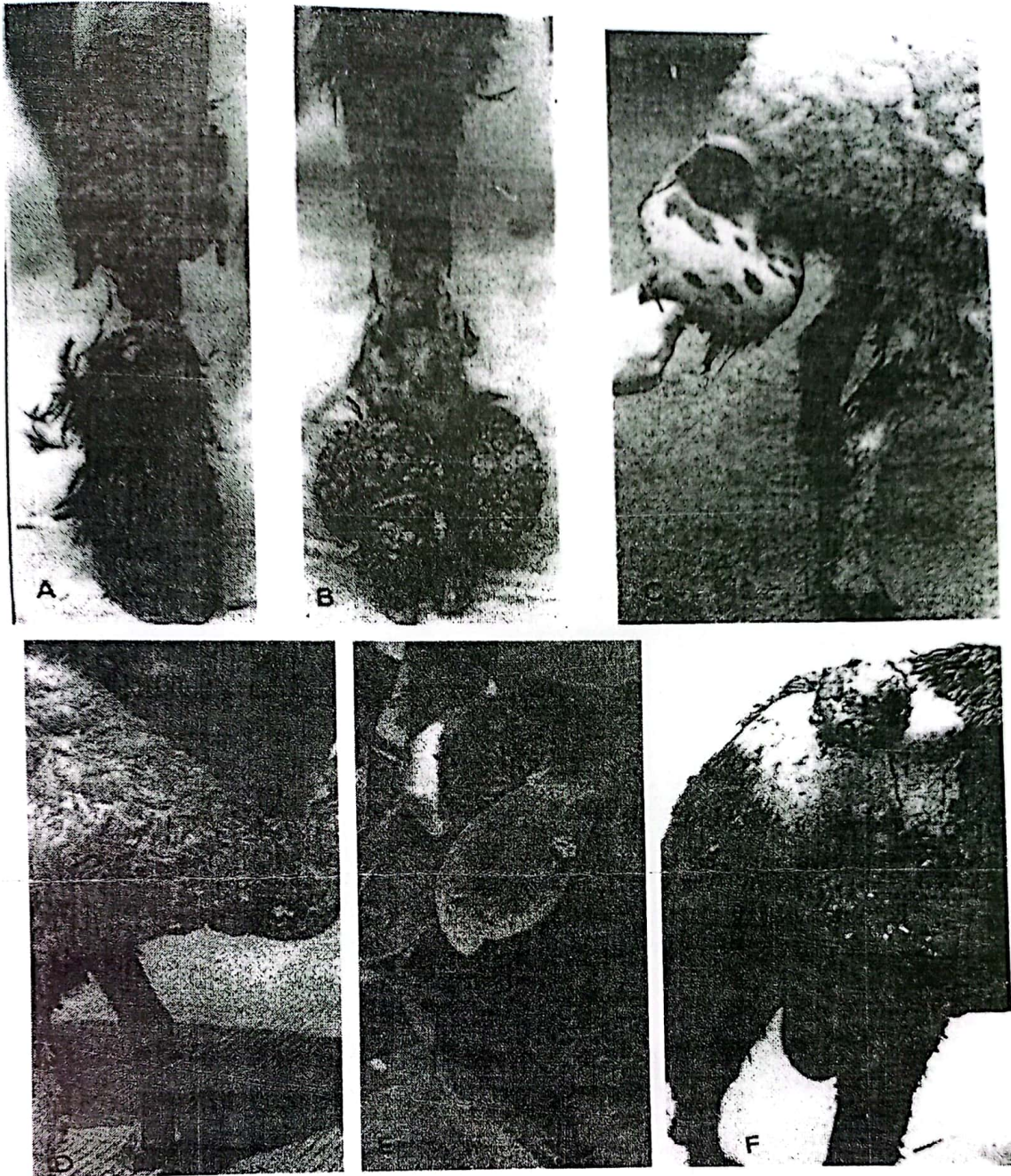


Fig. (1): Different sites of squamous cell carcinoma and papilloma in sheep.

- A: Large cauliflower squamous cell carcinoma at the anterior aspect of carpal joint in a six years old ewe.
- B: Two-cauliflower squamous cell carcinoma at the pastern region and covering the two claws in a seven years old ewe.
- C: Large blackish squamous cell carcinoma at the ventral aspect of fatty tail in a seven years old ewe.
- D: Squamous cell carcinoma at the lateral aspect of the fatty tail in a five years old ewe.
- E: Squamous cell papiloma at the lateral aspect of external ear in a two years old ewe.
- F: Large squamous cell carcinoma at the level of tuber coxae in an eight years old ewe

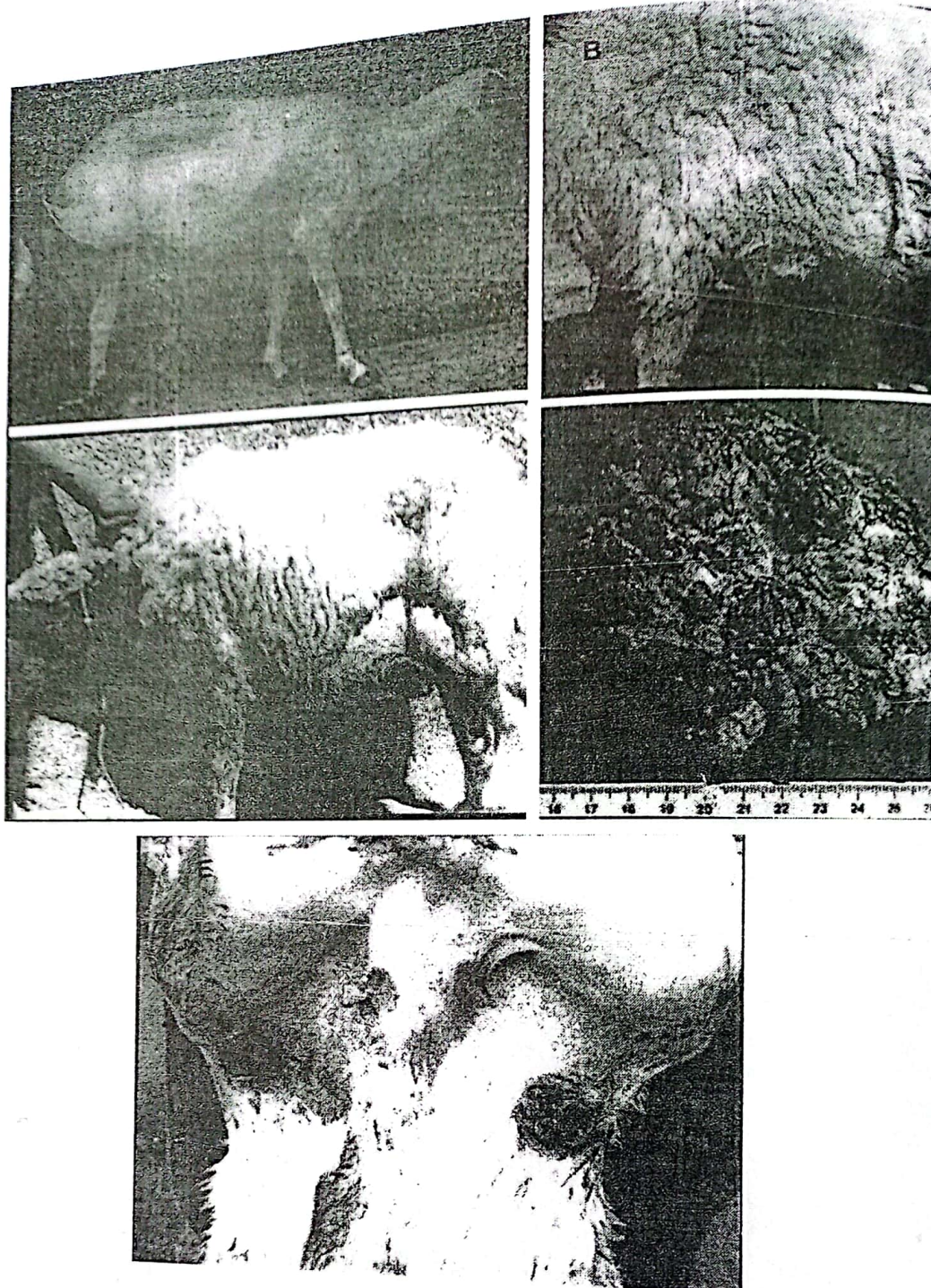


Fig. (2): squamous cell carcinoma at the ventrolateral border of the abdomen at the level of stifle fold.

- A: Unilateral squamous cell carcinoma in a 7 years old ewe.
- B: small unilateral squamous cell carcinoma in a 5 years old ewe.
- C: Large unilateral squamous cell carcinoma in an 8 years old ewe.
- D: An excised squamous cell carcinoma showing blackish discoloration and ulceration.
- E: Large bilateral squamous cell carcinomas in a nine years old ewe.

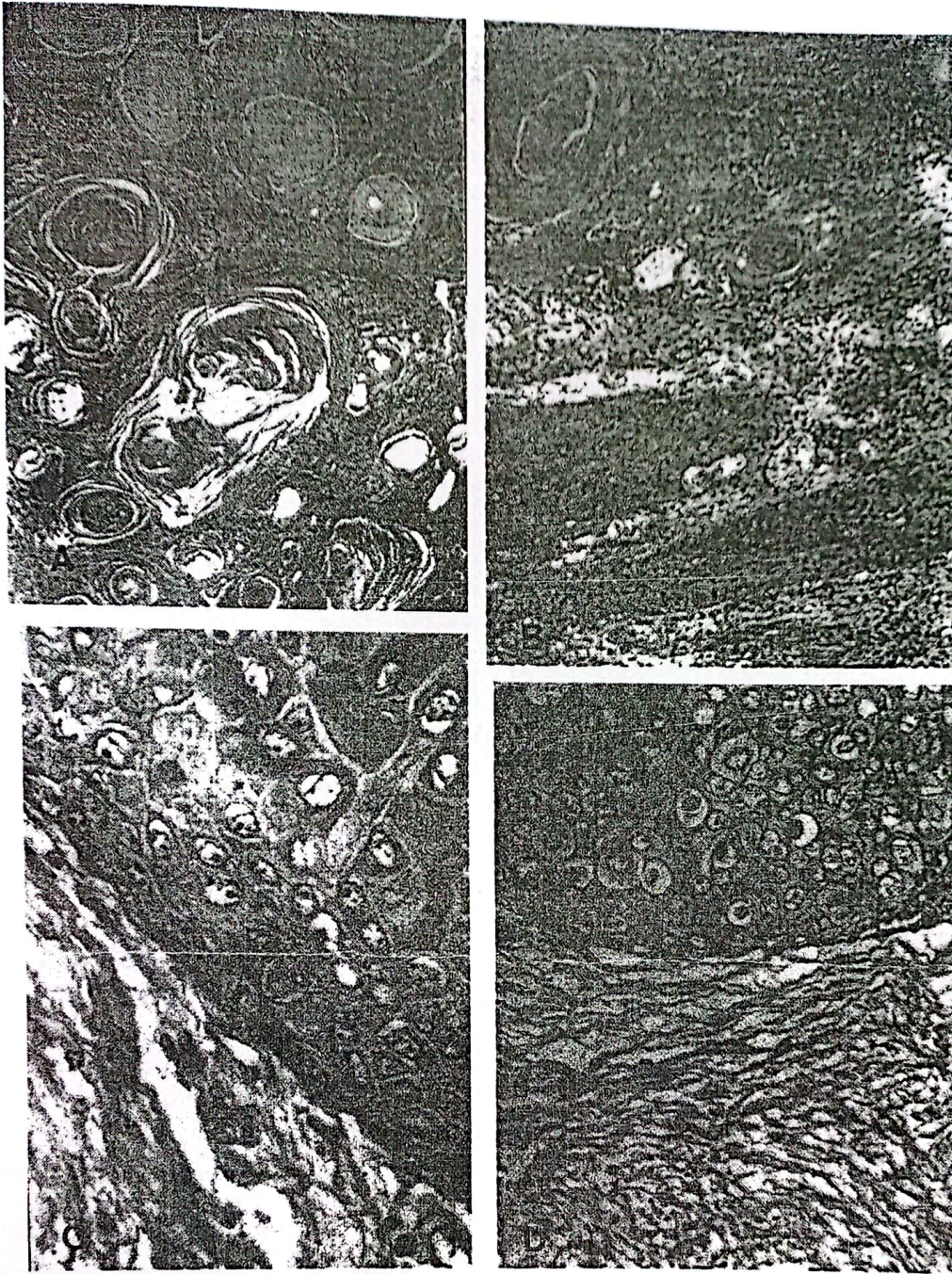


Fig. (3): Histopathological picture of squamous cell carcinoma.

- A: Pathognomonic keratin pearls of squamous cell carcinoma (arrows) (H & E, X 40).
- B: Keratin pearls associated with dilated blood vessels, haemorrhages and infiltration with large number of neutrophils (H & E, X 100).
- C: Groups of neoplastic epithelial cells showing mitotic figures (arrows) (H & E, X 400).
- D: Extensive fibrous stroma and leucocytic cells infiltration (H & E, X 200).

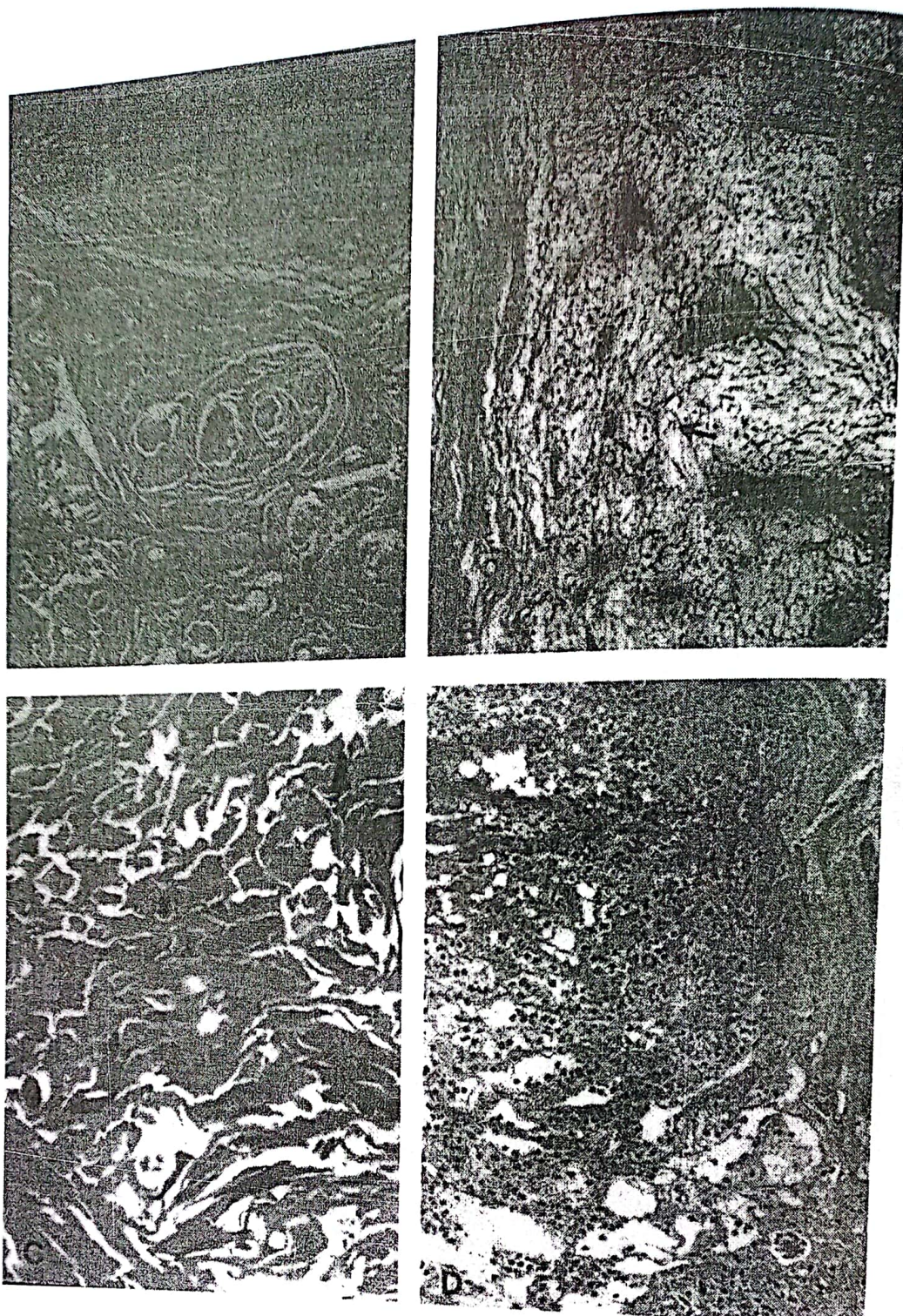


Fig. (4): Histopathological changes associated with squamous cell carcinoma.
 A: Extensive necrosis together with haemorrhages and fibroplasia of the stroma (arrow) (H & E, X 100).
 B: Islands of neoplastic epithelial cells associated with mucoid degeneration of the fibrous stroma (arrow) (H & E, X 100).
 C: Massive necrosis and calcification (H & E, X 200).
 D: Extensive necrosis with leucocytic cell infiltration mainly neutrophils and eosinophils (H & E, X200).

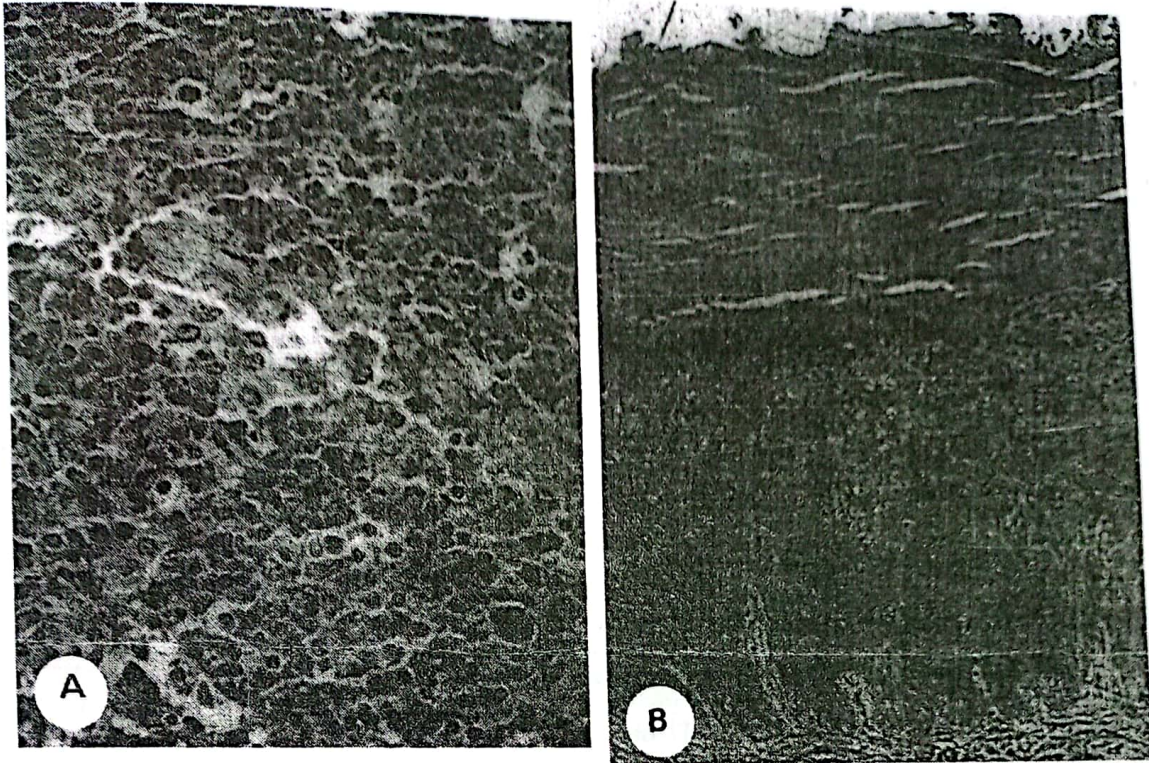


Fig. (5): A: The excised Lymph node showing lymphoblasts activation, mitotic figures and neutrophilic cell infiltration (H & E X 400).
 B: squamous cell papilloma, notice acanthosis and hyperkeratosis (H & E, X 100).

DISCUSSION

Cutaneous squamous cell carcinoma is of great economic importance in sheep producing countries as it affects the produced wool and hide grade. Reports of the tumour in sheep are sparse with little documentation of its prevalence and sites.

Squamous cell carcinoma was detected in older

white coat ewes. Theilen and Madewell, (1979); Steven and Stoops (1988) and Mendez et al., (1997) mentioned that animals at high risk were aged 5 years and older.

The most common site of squamous cell carcinoma was the ventrolateral border of the abdomen at the level of stifle fold (58.8 %) and non-wool surface of the fatty tail (17.6 %), similar findings were also recorded by Fouad et al., (2001) on the

other hand. The lesion was found at the head (Vanselow and spradbrow 1982 and Steven and Stoops, 1988) and at the eyelids (Mendez et al., 1997) and distributed in wool-bearing sites protected from sunlight (Crane et al., 1963). The aforementioned areas have no or little wool and continuously exposed to sunlight. Llyod, (1961) and Theilen and Madewell, (1979) mentioned that excessive exposure to sunlight, lack of melanin pigment, and razing in arid or semiarid regions of the world could be incriminated as predisposing causes for squamous cell carcinoma in sheep.

On the other hand, El-Shazly et al., (1991) found that the back of black sheep was the predilection seat for most tumours. Misk et al., (1984) mentioned that the most commonly affected areas were the back, udder, vulva, eyelids, orbital cavity, abdominal wall, forehead and frontal sinus.

Characteristic picture of squamous cell carcinoma included the presence of cell nest, large anaplastic cells with large nucleous and mitotic figures. Vanselow and Spradbrow (1982); Steven and Stoops (1988); El-Seddawy and Abdel Aal (1996) and Abu-Seida (1998) mentioned the same criteria. Moreover, the presence of concentric laminations of keratin (cancer pearls) is unique characteristic of squamous cell carcinoma indicating a differentiated type of neoplasms (Moulton, 1954).

Histopathological section from complicated cases revealed haemorrhages, leucocytic infiltration mainly lymphocytes, neutrophils and eosinophils, a finding that was mentioned also by Perez et al., (1997). In the meantime, the inflammatory reaction found in the dermis was considered as a reactive process against the invading tumour cells (Bolbol et al., 1991).

The regional lymph node was enlarged as a result of infection to carcinoma but not because of its metastasis. A finding that was confirmed by histopathological section that revealed the presence of inflammatory cells mainly neutrophil. Nuttall et al., (1990) also stated that regional lymph node had no influence on the growth of ovine squamous cell carcinoma, however, Steven and Stoops (1988) found metastatic lesion to the regional lymph node and lung.

Papillomas were seen in young animals and the non-wool areas of the face, similar results were recorded by Hayward et al., (1993). Histologically papillomas were characterized by acanthosis and hyperkeratosis. Vanselow and Spradbrow (1982) stated similar finding and added that squamous cell papillomas should be precursor lesions of squamous cell carcinomas whose cause is a complex one involving non-pigmented skin, exposure to sunlight and infection with papilloma virus.

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