



## HISTOPATHOLOGY OUTCOMES ASSOCIATED WITH SURGICALLY AMPUTATED TOE TUMOR IN ARABIAN CAMEL (*CAMELUS DROMEDARIUS*).

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**ABSTRACT** In the literature, there is little information on the types of toe tumors among camels. Accordingly, the present study was designed to investigate the prevalence, histological types and to describe the best procedure of surgical intervention for treatment. A total of 150 cases with toe tumors were clinically identified from 37493 camels of different camel breeds (Majaheem (Hazmi), Maghateer (Omani), Asail (Local), and Sudani) examined at Al-Tiba Veterinary Hospital. Toe tumors were surgically excised with safe margins. Surgical specimens were washed with iced-phosphate buffer saline and fixed with 10% buffer formalin. Representative tissue specimens were taken from excised tumors, fixed in 10% neutral buffered formalin, dehydrated in increasing concentrations of ethanol, cleared with xylene and embedded in paraffin. Three- $\mu$ m sections were prepared from paraffin blocks and stained with haematoxylin and eosin. In total, overall prevalence of toe tumors was 0.4%. SCC is the most common type of toe tumor (67%) followed by fibroma (21%) and spiny keratoderma (3%). In SCC, The predominant fraction were ulcerated, large-sized, poorly differentiated and medially located in forelimb. In conclusion, We believe that constant irritation that results in ulceration of the sole and overgrown of toe nails, and prolonged exposure to sun light are considered to be possible causes. SCC is the predominant histologic type of toe tumors. Fore limb and medial site are the most common sites of SCC. Surgery is the gold standard in the treatment of Toe tumors.

**KEYWORDS :** Arabian camel, Toe tumor, Squamous cell carcinoma

### Introduction

The camel, which is known as the "ship of the desert", is an old inhabitant of the desert where water and food are scarce and ambient temperature is high.<sup>1</sup> The one humped camel (*Camelus dromedarius*) or Arabian camel is extremely well adapted to hot and arid environments owing to its unique anatomical, physiological and behavioural features.<sup>2</sup> Dromedaries do not only survive where other domestic species do not, but they also carry out work and produce valuable food products for the benefit of people.<sup>3</sup> Camelids (llamas and camels) are unique among wild mammals in their regular usage of a pacing gait. They also have a unique foot morphology, assumed to be an adaptation for this mode of locomotion.<sup>3,7</sup> Camelids are modified digitigrades with a small, non-weight bearing nail which is similar to a human nail and is located at the extremity of each digit. The nail is closely attached to the third phalanx via the corium.<sup>8,9</sup> The pectoral limb is the weight bearing axis of the body and there is a slight difference in the anatomical configuration between the lateral and medial metacarpal bones and the digits in camels.<sup>9</sup> The camel's foot resembles a tyre filled with fat instead of air.<sup>10</sup> It is well designed to accommodate with the loose sandy soils of the desert.<sup>11</sup> The foot affections in camels represented 46.9 % of the surgical affections causing lameness in camels.<sup>12</sup> Foot growths may be seen at the skin pad junction and on the pad itself.<sup>13,14</sup> In the UAE, toe tumor is the most common tumor in camel.<sup>19,15</sup> The higher incidence has been recorded in the medial toes of the fore limbs.<sup>5</sup> Constant irritation that results in ulceration of the sole and overgrown of toe nails are considered to be possible causes.<sup>9</sup> In the literature there is little information on the types

of toe tumors among camels. Accordingly, the present study was taken in a view to investigate the prevalence, histological types and to describe the best procedure of surgical intervention for treatment.

### Material and Method

#### Experimental animals

A total of 150 cases with toe tumors were selected from 37493 camels of different camel breeds (Majaheem (Hazmi), Maghateer (Omani), Asail (Local), and Sudani) examined at Al-Tiba Veterinary Hospital. The study was conducted at Al-Tiba Veterinary Hospital, Abu Dhabi Emirate, the United Arab Emirates (UAE) during the period of 2013-2015. Outpatient cases were diagnosed after planing work up for clinical and pathological investigations. Affected animals were carefully examined for clinical signs, type, severity and location of lesions and as well as general body condition. Camels with toe tumors were suffering from varying degrees of lameness, loss of appetite and weight with the presence of abnormal growth in the foot. Camels were allowed to graze freely for a limited period in the desert, but were also supplemented concentrated food. Housing and management, concurrent disease, body weight, age, season, duration of tumor, previous tumor history, feed intake and medication were recorded. Toe tumor cases were diagnosed on the basis of clinical and pathological criteria.

#### Anesthesia and Surgical Preparation

all surgical procedures on camels were done safely, painlessly and with minimal physical restraint by using regional or general

anesthesia. Therefore, food was withheld for at least 24 hours, while water was withheld for 12 hours prior surgery. Xyalzine (2%) was given to camels as a sedative in dose of 0.1-0.2 mg/kg by intravenously or intramuscularly.<sup>16</sup> Bradycardia and salivation are reduced in camels by giving atropine 0.1 mg/kg intramuscularly ten minutes prior to injection of Xyalzine. For immobilization, a dose of 0.5 mg/kg Xyalzine (2%) intramuscularly can be given. The general anesthesia is usually given by injection of a mixing of Ketamine 2.2mg/kg and Xyalzine (2%) 0.2mg/kg in the same syringe and injecting it intravenously.

### Surgical Techniques

The front and hind limbs were controlled by ropes in Sternal recumbency before anesthesia. Sedation was done by combination of Xyalzine and ketamine. The animal was shifted to lateral recumbence and the affected foot was adjusted down toward the surgeon. A local anesthetic Lidocaine KCL 2% (20ml/animal) was injected into a Lateral dorsal metacarpal artery or Medial and Lateral Palmar metacarpal artery in the affected foot. The surgical site was prepared by clipping and scrubbed with soap and 20 ml Hexisrub (4% Chlorhexidine gluconate) for two minutes. Lesions will be dried by sterilized bandage, followed by another wash with povidol (10% povidone iodine) solution. The lesion was then debrided carefully from fresh blood oozes out (Figure 1-A). The process of removing the tumor was different according to the severity, size and location of tumor lesions on the affected feet. In some cases the surgical incision was made between the end of the distal phalanx and nail (Figure 1-B). While in large and extended lesion, the surgical incision start between middle phalanx and the distal phalanx (Figure 1-C) and some time started from the fetlock joint unilateral or bilateral (Figure 1-D). The wound is then packed locally with Dermisol antibiotic cream 100gm or Neocort cream 50g. The foot was bandaged up to the middle of the metacarpal or metatarsal region (Figure 1-E). The dressing is preferably changed every week till complete healing occurs (Figure 1-F). Systemic intramuscular antibiotic was given (20% Oxytetracycline or Ampidexalone or Penstrep-400 or Betamox) for 5-7 days postoperatively. All operated animals were rested for 2-4 months following surgery.

### Histopathology processing

Surgical specimens were washed with iced-phosphate buffer saline and fixed with 10% buffer formalin for 24 hours at room temperature. Representative tissue specimens were taken from excised tumors, fixed in 10% neutral buffered formalin, dehydrated in increasing concentrations of ethanol, cleared with xylene and embedded in paraffin. Three- $\mu$ m sections were prepared from paraffin blocks and stained with haematoxylin and eosin.

The stained sections were evaluated by the histopathologist that participates in this project using light microscopy.<sup>17</sup> Squamous cell carcinomas were graded according to their histologic appearance in haematoxylin and eosin (H&E)-stained sections; Well Differentiated Squamous Cell Carcinoma (WDSCC), Moderately Differentiated Squamous Cell Carcinoma (MDSCC), and Poorly Differentiated Squamous Cell Carcinoma (PDSCC). The grading system was based on the World Health Organization classification of tumors.<sup>18, 19</sup> The species type, tumor size, tumor location, and degree of differentiation were all recorded.

### Statistical method

Prevalence and incidence among different classes were calculated and tested by  $\chi^2$  using Freq procedure of SAS.<sup>20</sup>

### Results

During the period of 2012-2015, 37493 camels were examined for the presence of toe tumors. In total, 150 cases of toe tumors in camels were diagnosed from different camel breeds (Majaheem (Hazmi), Maghateer (Omani), Asail (Local), Sudani). The Outpatient cases were diagnosed after planing work up for clinical and pathological investigations. The overall prevalence rate of toe tumor in the present study was 0.4%. The prevalence of toe tumors in Sudani, Local, Omani and Hazmi breed was 1.87%, 0.51%, 0.34 and 0.3%, respectively (Table 1). The prevalence rate of toe tumor in Sudani breed is significantly higher than other breeds ( $p < 0.0001$ ).

### Clinical observations

In the present study, camels affected by SCC of the toe were suffering from varying degrees of lameness (Figure 2-A), loss of appetite and weight with the presence of abnormal growth in the foot, mostly

cauliflower-like appearance (Figure 2-B). Some Affected camels show hemorrhagic and necrotic masses (Figure 2-C), in addition to the different degrees of ulceration in SCC, the size of these ulcers were large (Figure 2-C), medium (Figure 2-D) or small (Figure 2-E). Hyperkeratinized, turgid, hemorrhagic masses are also seen (Figure 2-C). Masses infected with myiasis were also noticed. The clinical examination of diseased camels showed normal range body temperature, heart rate, respiratory rate and rumen motility. X-ray examination of toe tumor cases in camels showed abnormal soft tissue, calcification associated with bone (Figure 2-F). All tumors were treated by surgical excision depending on the severity, duration, location and histologic type of the tumor.

### Gross pathologic assessment

The gross appearance of SCC specimens are varied in shape and size according to the severity and duration of the cases. Generally, it showed variable size from 5 to 15 cm in diameter with irregular outline (oval to round). The lesion appeared firm, poorly demarcated and most of the masses are ulcerated with raised edges and streaked with red, rough-surfaced.

While fibromas and spiny keratoderma appeared round-ovoid, rough, mostly soft with variable sizes (2-5cm) and rarely ulcerated.

### Histopathologic assessment

Basically, SCC was recognized microscopically by identifying malignant epithelial cells, demonstrating various degrees of differentiation towards keratinocytes. The cytoplasm was abundant and eosinophilic. Several degrees of keratinization were observed through tumor cells. The invading cells are formed of concentric layers of squamous cells showing gradually increasing keratinization toward the center in the form of horn pearls. The centers showed either incomplete or complete keratinization, the tumor cells were infiltrating the underlying tissue at random directions (Figure 3-A,B,C,D). The tumor cells mostly resembled those of normal stratum spinosum, but have vesicular nuclei with one or multiple very prominent nucleoli (Figure 3- B). Mitotic figures were observed in sections (Figure 3-B&D, arrowed). Generally, SCC in the toe share the typical features of the neoplasm seen elsewhere in the body. If the tumor was ulcerated, there was usually an extensive inflammatory reaction. In WDSCC, there are many squamous pearls (Figure 3-A&B). The neoplastic cells were atypical with pleomorphic nuclei, and prominent nucleoli and mitoses (Figure 3A&B). PDSCC, of the toe tumor camels, showed pleomorphism, hyperchromatism of the neoplastic cells, poor spinous differentiation and vacillation of neoplastic cells, large, prominent nucleoli, mitotic figures and individually keratinized cells are evident (Figure 3 C&D). Necrosis, ulceration, hemorrhage and inflammatory cell infiltration of tumors were also observed. Plasma cells were the most common inflammatory cells in SCC as well as eosinophils.

While spiny keratoderma revealed epidermal hyperplasia, acanthosis and hyperkeratosis along with elongated growth of papillary projections extending into dermis and thickened, irregular epidermis covered by a layer of keratin. The spiny keratoderma in toe tumor camel showed degenerative changes of the cells of the retepeges and marked cytoplasmic vacuolation of the rest of the cells and finger like projection with excessive cornification (Figure 4 A&B).

Fibroma consisted of fibroblast running in different directions. Their nuclei were long, narrow and densely stained with scanty cytoplasm. Bundles of collagen separated the cells (Figure 4- C&D).

### Histopathologic types of toe tumors

Three different types of toe tumors; SCC, fibroma and spiny keratoderma, were identified in the present study (Table 2.). SCC is the most common type of toe tumors 114 (76.0 %) ( $p < 0.0001$ ), followed by Fibroma 32 (21 %) and spiny keratoderma 4 (3 %).

The frequency of each type of toe tumors in different camel breeds is shown in table 3. There was no significant differences in the frequency of toe tumor types between different camel breeds.

### Fibroma and Spiny keratoma

The size, site and ulceration distribution of fibroma and spiny keratoma are shown in (Table 4).

There are no significant differences in the frequencies of tumors sizes, ulcerations, and sites between fibroma and spiny keratoma. In general,

fibromas and spiny keratomas have small sizes than SCC and are less likely to be ulcerated.

### Squamous cell carcinoma

In total 114 cases of SCC were diagnosed. The prevalence of SCC is 0.3% in all examined camels. Three sizes of SCC have been identified (Table 5). An overall Large size tumors are more common than small and medium size tumors (Table 5). Ulcerated tumors are more common than non-ulcerated tumors (Table 5). SCCs are more commonly seen in the medial aspect of fore limb than hind limb and lateral sites of the limb (Table 5). An overall PDSCCs are more common than WDSCCs (Table 6).

The tumor size, ulceration, grade, and site distribution of SCC among different Arabian camel breeds are shown in (Table 6). PDSCCs are more common than WDSCCs in all breeds, however there is no significant differences between different breeds (Table 6).

Small size tumors are more common than medium and large size tumors in Hamzi, local and Omani breeds, while medium size tumors are more common in Sudani breed than small and large sizes (Table 6).

Ulcerated tumors are more common than non-ulcerated tumors in all breeds (Table 6).

### Discussion

In the literature there is little information on toe tumors in camels worldwide. Siddiqui and Tellfah,<sup>21</sup> and Al-Juboori<sup>1</sup> in the UAE have been reported that toe tumors are the most common tumor in camel. The overall prevalence rate of toe tumor in the present study was lower than Siddiqui et al.<sup>9</sup> who found prevalence rate of toe tumor of 29.09%. However, Al-Juboori<sup>22</sup> reported foot tumor prevalence rate of 0.47% which is close to our finding. In Saudi Arabia, AlSobayil et al.<sup>23</sup> reported a higher prevalence rate of foot tumors (34.6%). The reason behind this variation in the prevalence of toe tumors is mainly related to the sample size of toe tumors and the number of family breeds in the examined area. Our study is a prospective study, where 150 cases of toe tumors were diagnosed from 37493 camels which were examined in Al-Tiba hospital.

Constant irritation that results in ulcerative wound of sole and overgrowth of toe nails are considered as possible causes of toe tumors in camels.<sup>1</sup> Moreover, prolonged and continuous exposure to sunlight is well known etiologic factor in the development of SCC. Role of Sunlight in the development of SCC has been documented in several domestic species.<sup>24</sup> Ultraviolet radiation is the major etiologic factor in skin cancer development,<sup>25</sup> especially SCC in cows, goats, sheep, cats and dogs.<sup>26</sup> In our place, the climate is almost always sunny all over the year, and this makes camels heavily exposed to sun rays, especially ultraviolet light, which might predispose to the development of SCC. Moreover, continuous irritation to the foot by hot sands predisposes to skin ulceration. Theoretically, Repeated cycles of ulceration-repair increases the chance of transcriptional errors in growth signaling genes, which are activated during the process of epithelial regeneration as well as associated with the local production of cytokines and growth factors which might also promote the progression of initiated cells with fixed gene mutation. The presence of adjacent SCC in situ to the main invasive carcinoma suggests that the development of SCC passes through multiple stages of carcinoma from mild dysplasia to SCC in situ and then to invasive SCC.

The prevalence rate of toe tumor in Sudani breed was higher as compared with other camel breeds. This probably due to the fact that Sudani breed is considered high breed racing camel that characterized by long limbs and wide chest. Such characterizations exposed this breed to more limbs trauma and injuries. However, AlSobayil et al.<sup>23</sup> reported that Maghateer breed was more susceptible to skin tumors as compared to Majaheem and Sofr breed. In the present study, we show three types of toe tumors; SCC, fibroma and spiny keratoderma. SCC is the predominant type of toe tumor comprising 76% of toe tumor as compared to other types of tumors (fibroma 21% and spiny keratoderma 3%). Siddiqui et al.,<sup>9</sup> who studied 50 tumor-like growth in the toenail of Arabian camels, identifies SCC (70%), spiny keratoderma (22%) and fibroma (8%). While AlSobayil et al.<sup>23</sup> categorizes neoplasms in camels into four different types; SCC (n=13, 50%), fibroma (n=10, 38.6%), lipoma (n=1, 3.8%) and fibromyxosarcoma (n=2, 7.6%). An incidence rate of squamous cell carcinoma of 2.88% has been reported in camels and appears as an exuberant spongy, fragile tissue of 5 cm in diameter with tendency to bleed; on the fore or hind foot on the surface of sole.<sup>14</sup> Gahlot et al.,

<sup>27</sup> has reported SCC in the sole of camels, while Tageldin et al. has reported SCC in interdigital space.<sup>25</sup> SCC is a relatively common, locally invasive, and occasionally metastatic neoplasm in most domestic species.<sup>28</sup> The size of SCC in camels depends on the susceptibility of camel breed, duration of the tumor and tumor grade. In the present study, the majority of SCC sizes are large in size. This probably due to the late diagnosis and treatment of the case. In addition, PDSCCs are more than WDSCCs which may support higher frequency of large SCCs. Malignant cells in PDSCC have a higher proliferating rate than WDSCC which affects tumor size and make it bigger in PDSCC. The overall frequency of toe tumor cases was higher in the fore limbs and medial side as compared to hind limbs and lateral side. We also show SCCs are higher in fore limbs than hind limbs. In addition, the frequency of SCC in medial side of limbs is higher than lateral position. These findings are in accordance with the observations of Siddiqui et al.<sup>9</sup> The fact that fore limbs are the weight bearing axis of the body along with their unique anatomic configuration from the knee to the foot may explain the higher incidence of tumors in the medial toes of the forelimbs.<sup>9,21,29</sup>

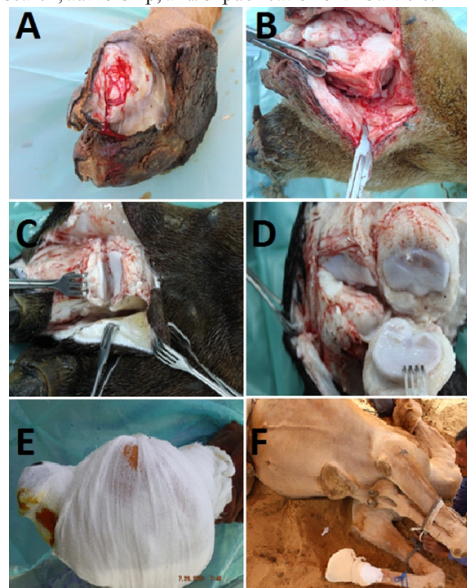
We also show SCCs to be more aggressive than fibroma and spiny keratoderma. These findings are in accordance with Al-Juboori<sup>1</sup> who investigated toe tumor in camels and Donald et al.<sup>30</sup> and Goldschmidt et al.<sup>31</sup> in dogs. Siddiqui et al.<sup>9</sup> also reported swollen toe with or without lameness in their studied lesions and tumor masses were fragile, quite painful and bled easily on manipulation.<sup>32</sup>

The surgical techniques have been performed according to the site and severity of the tumors. None of the surgical wounds healed through first intention. Considering the anatomic location of the lesions and the type of surgical manipulations required, first intention healing of the wounds in such cases is not likely.<sup>9,15,21,33</sup> Complete surgical excision of the tumor along with the surrounding healthy tissue most likely minimized the probability of tumor recurrence.<sup>25,27</sup> A timely surgical excision of the tumor mass completely alleviates this afflictive condition in camels.<sup>9</sup> In the present study, all types of tumors were treated by surgical excision. All removed tumors were followed by successful healing of the wound. Surgery has been reported as the gold standard in treating toe tumors.<sup>34-36</sup> Although, surgery was effective in excising SCCs, fibromas and spiny keratoderma, it was not possible to evaluate the result of treatment since many animals were not followed-up closely or there was limited time following surgery.

In conclusion, We believe that constant irritation that results in ulceration of the sole and overgrown of toe nails, and prolong exposure to sun light are considered to be possible causes toe tumors. SCC is the predominant histologic type of toe tumors. Fore limb and medial site are the most common sites of SCC. Large, ulcerated, PDSCCs are the predominate types of SCC. Surgery is the gold standard in the treatment of Toe tumors.

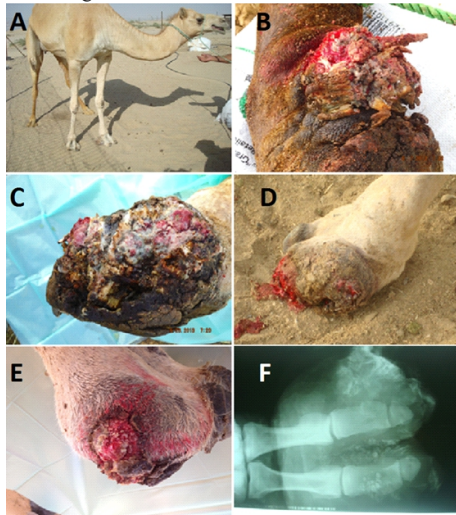
### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

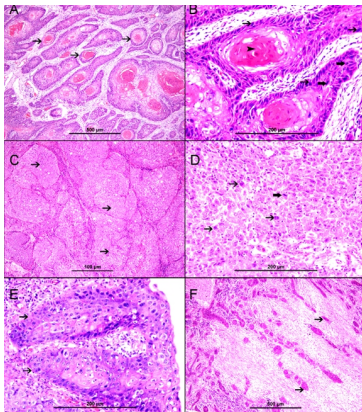




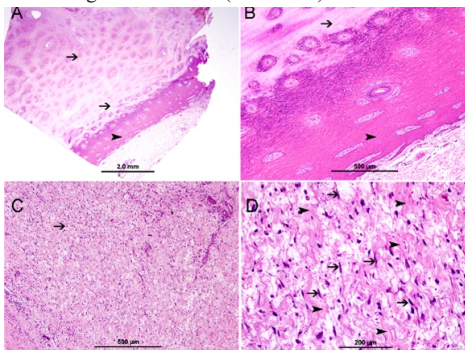
**Figure 1.** Surgical procedure in Excision of Toe tumor. A. The lesion was then debrided carefully from fresh blood oozes out. B. Surgical incision sometimes was made between the end of the distal phalanx and nail. C. In large and extended lesion, the surgical incision start between middle phalanx and the distal phalanx. D. The surgical incision some time started from the fetlock joint unilateral or bilateral. E. The foot was bandaged up to the middle of the metacarpal or metatarsal region. F. The dressing is preferably changed every week till complete healing occurs.



**Figure 2.** Clinical presentation of toe tumor. A. Affected camel with SCC is suffering from varying degrees of lameness. B. Cauliflower-like appearance of SCC. C, D, E. SCC with hemorrhagic and necrotic masses. D. F. X-ray examination of toe tumor cases in camels shows abnormal soft tissue, calcification associated with bone.



**Figure 3.** Histopathology of SCC. A&B. WDSCC showing invading keratin pearls (thin arrow) formed of cells with hyperchromatic pleomorphic nuclei and mitosis (thick arrow) containing central keratin (arrow head). C&D. PDSCC showing sheets of poorly differentiated cells with hyperchromatic pleomorphic nuclei (thin arrow) and mitoses (thick arrow). E. Squamous cell carcinoma in situ (thin arrow) were seen adjacent to invasive carcinoma. F. Clusters of PDSCC invading fibrous stroma (thin arrow).



**Figure 4.** A&B. Spiny keratoma with thick keratinous layer (thin arrow) and acanthotic epidermis (arrow head). C&D. Fibroma with

fibroblastic proliferation (thin arrow) and intervening collagen fibers (arrow head).

**Tables**

**Table 1.** Prevalence of toe tumor in different breeds of camels.

Camel breed	No. of camels examined	No. of camels showed toe tumor	Incidence %
Hazmi	7783	23	0.3%
Local	8979	46	0.51%
Omani	20037	68	0.34%
Sudani	694	13	1.87%
Total	37493	150	0.40%
P value for $\chi^2$			< 0.0001

**Table.2:** Incidence of toe tumor types in camels

Tumor type	No. of camels showed toe tumor	Frequency %
Fibroma	32	21%
Spiny Keratoderma	4	3%
Squamous cell carcinoma	114	76.00%
Total	150	100.00%
P value for $\chi^2$		
< 0.0001		

**Table 3:** Frequency of Toe tumors among different camel breeds.

Tumor Type	Hazmi		Local		Omani		Sudani		Total	
	No	%	No	%	No	%	No	%	No	%
Fibroma	5	21.74%	9	19.57%	16	23.53%	2	15.38%	32	21%
Spiny Keratoderma	0	0%	3	6.52%	0	00.00%	1	07.69%	4	3%
Squamous cell carcinoma	18	78.26%	34	73.91%	52	76.47%	10	76.92%	114	76.00%
Total	23	15.33%	46	30.67%	68	45.33%	13	08.67%	150	100.00%
P value for $\chi^2$										0.34

**Table 4.** The size, site and ulceration distribution of fibroma and spiny keratoma

Characteristics	Spiny keratoma		Fibroma	
	Number	%	Number	%
Tumor size				
Large (> 5 cm)	2	50.00%	8	25.00%
Medium (2-4cm)	1	25.00%	4	12.50%
Small (1-2 cm)	1	25.00%	20	62.50%
Total	4	100.00%	32	100.00%
P value for $\chi^2$			Non-significant	0.3575
Tumor ulceration				
Ulceration	1	25.00%	19	59.38%
No Ulceration	3	75.00%	13	40.62%
Total	4	100.00%	32	100.00%
P value for $\chi^2$			Non-significant	0.1921
Tumor site				
Fore limb	2	50.00%	19	59.38%
Hind limb	2	50.00%	13	40.62%
Total	4	100.00%	32	100.00%
P value for $\chi^2$				0.7199
Lateral	0	00.00	0	00.00
Medial	4	100.00%	32	100.00%
Total	4	100.00%	32	100.00%
P value for $\chi^2$			Non-significant	

**Table 5.** The size, site and ulceration distribution of Squamous cell carcinoma parameter

Characteristics	Squamous cell carcinoma	
	Number	%
Large (> 5 cm)	58	51.75%
Medium (2-4cm)	26	21.93%

Small (1-2 cm)	30	26.32%
Total	114	100.00%
P value for $\chi^2$		
Tumor ulceration		
Ulceration	93	81.58%
No Ulceration	21	18.42%
Total	114	100.00%
P value for $\chi^2$		
Tumor site		
Fore limb	80	70.18%
Hind limb	34	29.82%
Total	114	100.00%
P value for $\chi^2$		
Lateral	5	04.39%
Medial	109	95.61%
Total	114	100.00%
P value for $\chi^2$		

**Table 6:** The distribution Squamous cell carcinoma relationship to Arabian Camels breeds

Characteristics	Hazmi		Local		Omani		Sudani		Total	
	No	%	No	%	No	%	No	%	No	%
<b>Tumor differentiation</b>										
PDSCC	14	77.7 8 %	21	61.1 1 %	35	67.3 1 %	5	50.0 0 %	75	65.5 2 %
WDSCC	4	22.2 2 %	13	38.8 9 %	17	32.6 9 %	5	50.0 0 %	39	34.4 8 %
Total	18	15.5 2 %	34	31.0 3 %	52	44.8 3 %	10	08.6 2 %	114	100.00%
P value for 2	(Nn-significant)									0.44 94
<b>Tumor size</b>										
Large (> 5 cm)	4	17.3 9 %	18	39.1 3 %	16	23.5 3 %	2	15.3 8 %	40	26.6 7 %
Medium (2-4cm)	6	26.0 9 %	5	10.8 7 %	13	19.1 2 %	7	53.8 5 %	31	20.6 7 %
Small (1-2 cm)	13	56.5 2 %	23	50.0 0 %	39	57.3 5 %	4	30.7 7 %	79	52.6 7 %
Total	23	15.3 3 %	46	30.6 7 %	68	45.3 3 %	13	8.68 %	150	100.00%
P value for 2	statistically significant									0.01 77
<b>Tumor ulceration</b>										
Ulceration	15	65.2 2 %	38	82.6 1 %	54	79.4 1 %	6	46.1 5 %	113	75.3 3 %
No Ulceration	8	34.7 8 %	8	17.3 9 %	14	20.5 9 %	7	53.8 5 %	37	24.6 7 %
Total	23	15.3 3 %	46	30.6 7 %	68	45.3 3 %	13	08.6 7 %	150	100.00%
P value for 2	Statistically significant									0.02 78

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