

INCIDENCE OF MULTIPLE MAMMARY TUMORS IN SUDANESE CAMEL

Abstract:

Aims of the Study: to evaluating the occurrence and report the different types of tumors in the udder of camel (*Camelus dromedaries*).

Place and Duration of Study: the study was undertaken in the department of pathology, veterinary research institute, ministry of animal resource and fisheries, Khartoum, Sudan in 2009.

Study Design: 150 samples were obtained from Tumbool abattoir in Al-Gazeera State, gross, histopathological and immunohistochemistry study were done in the udder tissue of 9-year-old Butana heavy weight ecotype, early pregnant, non-lactating she camel.

Methodology: The macroscopic picture of two masses in the udder tissue were seen and described then histopathological lesions on tissues were studied using H & Estain. Lastly Immunohistochemical staining was done using estrogen and progesterone antibodies.

Result: out of 150 samples were studied, 45(30%) tissue showed neoplastic masses, 23(51.11%) were benign and 22 (48.89%) were malignant. only one showed multiple mammary neoplasms contain papillary carcinoma and fibroadenoma [fibroadenomatous hyperplasia].

Conclusion: mammary tumors were detected for the first time in Sudanese camel and completely confirm by using histopathological methods.

Keywords: cancer, tumor, udder, Immunohistochemistry, histopathology, papillary carcinoma, camel, Sudan.

1. Introduction:

Camels in Sudan are multipurpose animals representing an important source of food (milk and meat), clothing, shelter and transportation for bedwins. Camels' milk and urine have proven to have therapeutic effects against certain diseases[1,2,3]. Mammary glands masses are common in bitch and cat, but are rare in other domestic animal species[4]. Such lesions were commonly detected in bitches and described as benign tumors was: adenoma, papillary adenoma and benign mixed tumors; or malignant tumors such as acinar or ductal Adenocarcinoma, papillary Adenocarcinoma, medially Adenocarcinoma, squamous cell carcinoma and malignant mixed tumors [5,6].

A mammary gland neoplasm was detected at necropsy in a 9-year-old ovariectomized Holstein cow with a history for one year of an enlarged left hindquarter that contained multiple cysts[7].

The histological diagnosis was multicentric papillary cystadenoma was reported [7, 8] it was also reported in ewes [9, 10], nanny goats [11] and in zoo animals [12].

Mammary neoplasia is rare in Camelids, it was first reported as carcinoma in mixed mammary tumor in a 13-year-old female *llama*. Histopathological examination revealed tubulopapillary acinar or solid nest-like clusters of neoplastic epithelial cells surrounded by whorls and sheets of proliferation of epithelial cells and classified as a mixed tumor. Positive confirmed diagnosis is by Immunohistochemical staining of neoplastic epithelial cells with anti-cytokeratin antibodies, metastasis to regional lymph nodes was not reported [13].

In Sudan choroid plexus papilloma was diagnosed during investigation in to dromedary herds owned by nomadic pastoralist, Northern Darfur State, western Sudan for neurological diseases in 2010 [14].

Four types of mammary neoplasia in the dromedary camel were reported. These include: Fibrosclerosis, Intraductal fibroma which composed of papillary overgrowth protruding into the duct lumen, adenocarcinoma consisting of tubular arrangement as well as solid and/or squamous structure. Pleomorphism and mitotic activity were common. Plasma cells and lymphocytes were present in varying numbers around the tumor cells. The stroma was moderate and in some areas sclerotic [15].

2. Materials and methods:

Case history:

During survey of udder affection 150 samples of slaughtered she-camel with age of 5-15 years old at Tumbool slaughter house from January to December /2009, Tumbool town, Al-Gazeera State, Sudan. Tumbool is about 130 km southeast of Khartoum. From the total number of samples (N=150) of she-camel udder tissues, one was showed tumor masses it was a 9-year-old Butana heavy weight ecotype, an early pregnant, non lactating she camel was slaughtered. Tissue specimens from tumor were fixed in 10% formalin, processed routinely in paraffin wax and 5-6 μ sections were prepared and stained with haematoxylin and eosin (H&E).

For two types of tumor Immunohistochemistry using dextranepolymer_hrp for estrogen and progesterone receptor was done.

3. Results:

3.1 Gross lesions:

Out of 150 samples of udder gross examined, one was showing multiple mammary gland tumors.

The udder of the one she-camel was slightly swollen and hard in consistency. One quarter of the udder was markedly distended approximately 2 cm above the base of the teat. On cut surface, the udder presented two reddish fleshy masses. The larger one composed of hard non-encapsulated well circumscribed, hard on cut surface, bulging mass attached to the inner surface of the udder and communicated with stalk to other nodules at the base of teat which blocked the teat cannal. The second mass was 1.6×2cm diameter, cauliflower-like and loose in teat cannal.

3.2 Histopathological lesions:

The most striking change was complete distortion and destruction of normal udder architecture and the normal udder tissue was replaced by invasive of tumor tissue. Though, the microscopic picture of two masses were variable, but the predominant change of the small nodule at the base of teat present of arboriform papillary fronds, with a core of fibrovascular tissue heaving complex secondary and tertiary branches (fig 1).

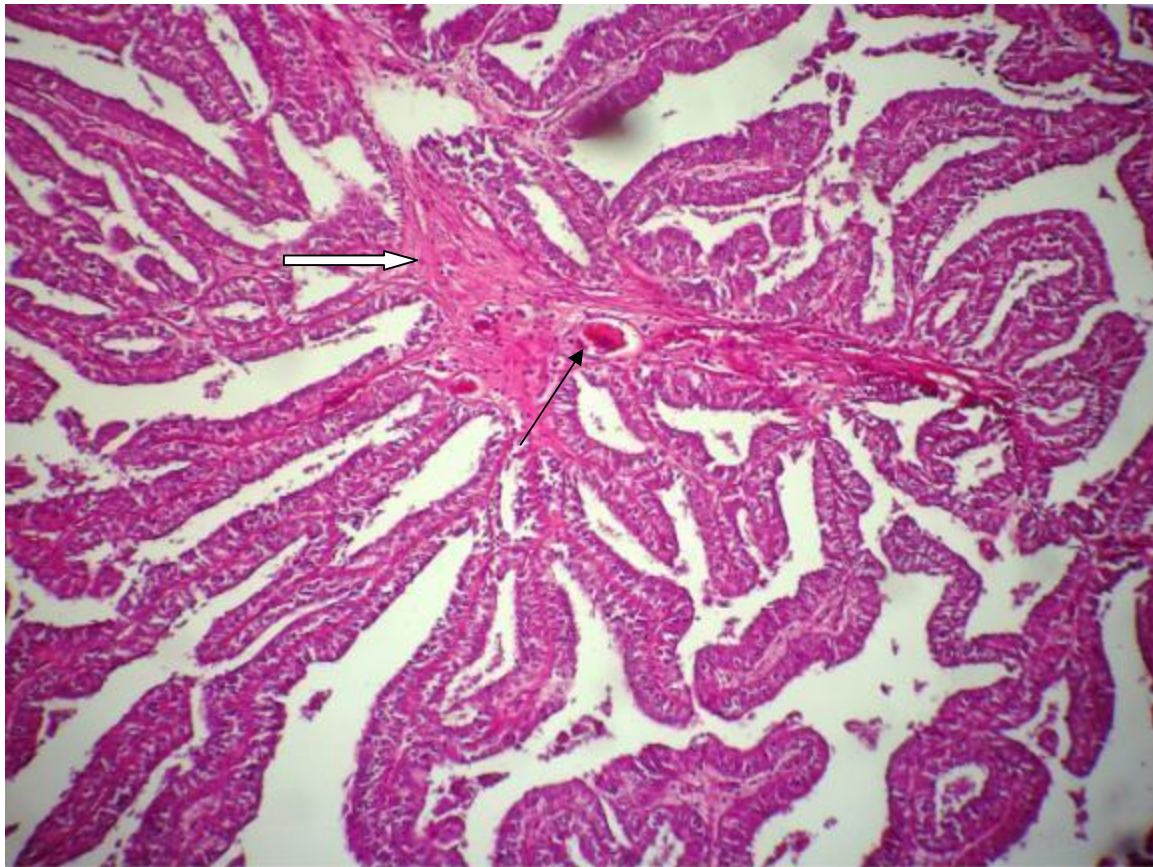


Fig 1:
udder of she-camel with papillary carcinoma. Note, large fibrovascular core with congested blood vessels and complex branches, (H&E X10).

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77 The fronds were covered with single or multi-layers of pleomorphic poorly orientated overlapping
78 cells that appeared as pseudostratification. Bullring and necrosis of the papilliferous growth
79 stratification of the nuclei and leucocytes infiltration were frequently observed. The nuclei were
80 vesicular forming the empty look appearance and some with marginated chromatin (fig 2).

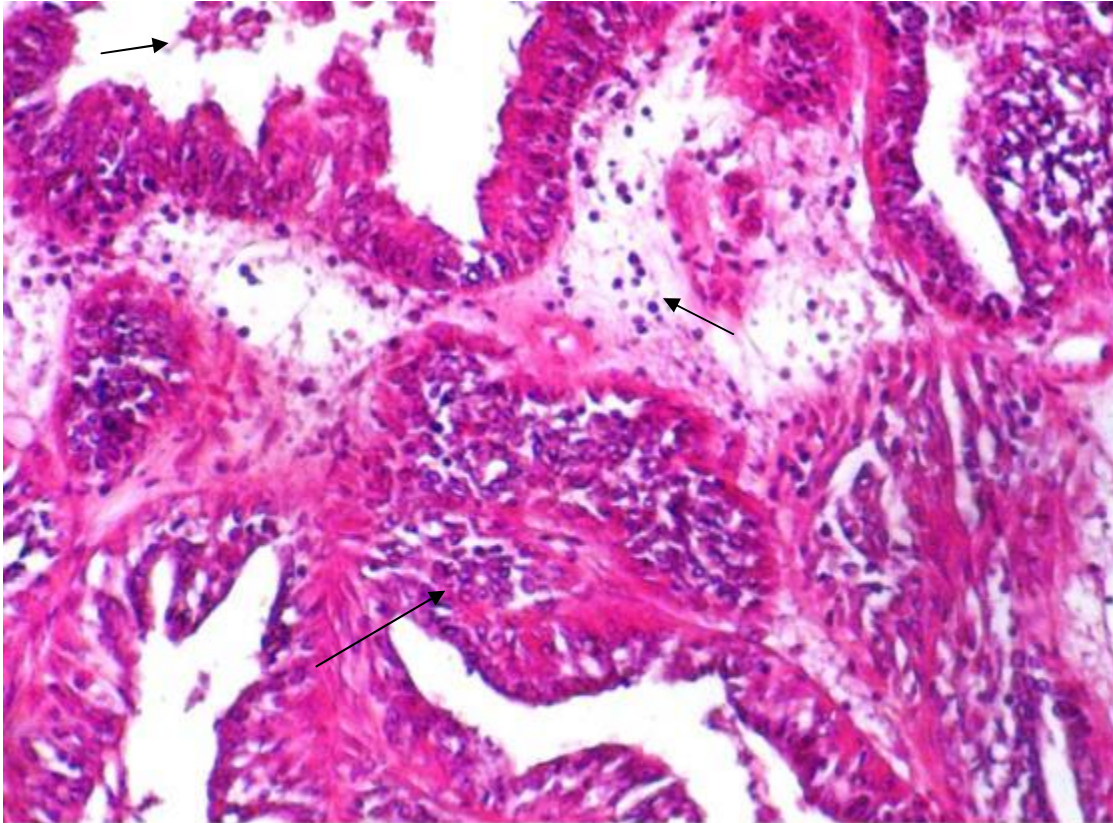


Fig 2:
udder os she-camel with papillary carcinoma, Note, pleomorphic poorly oriented
overlapping with vescicular nucleus, bulling and necrosis of neoplastic cells and
infiltration of leucocytes (H&E x40).

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83 Focally micropapillary pattern with prominent papillary tufts were often observed. In some areas
84 the fibrovascular core was covered with single layer of flatten end epithelial and in other areas
85 covered with cuboidal to low columnar cells. The stromal connective tissue was variable in some
86 areas dense diffuse and in other showed myxomatous feature. The tumor displayed
87 fibroadenomatous hyperplasia. These areas composed of numerous irregular branching tubular

88 or ducts embedded in fibrous tissue stroma which varied from myxomatous with mild fibrotic
89 reaction to extensive fibrosis (fig 3).

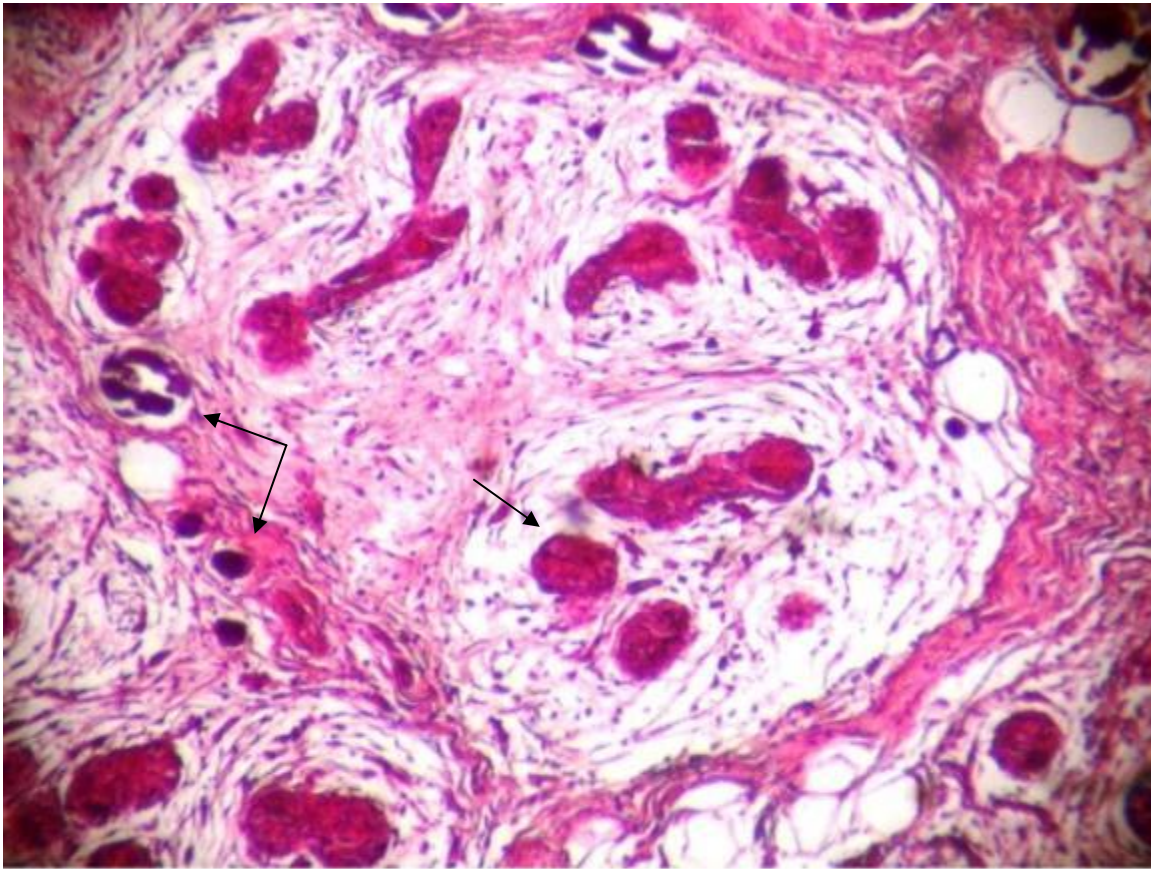


Fig 3:
udder of she-camel with fibroma, Note, irregular ducts entrapped in
fibrous tissue and calcium deposition (H&E x10).

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92 These tubules were lined with multilayers of cuboidal epithelial cells (fig 4).

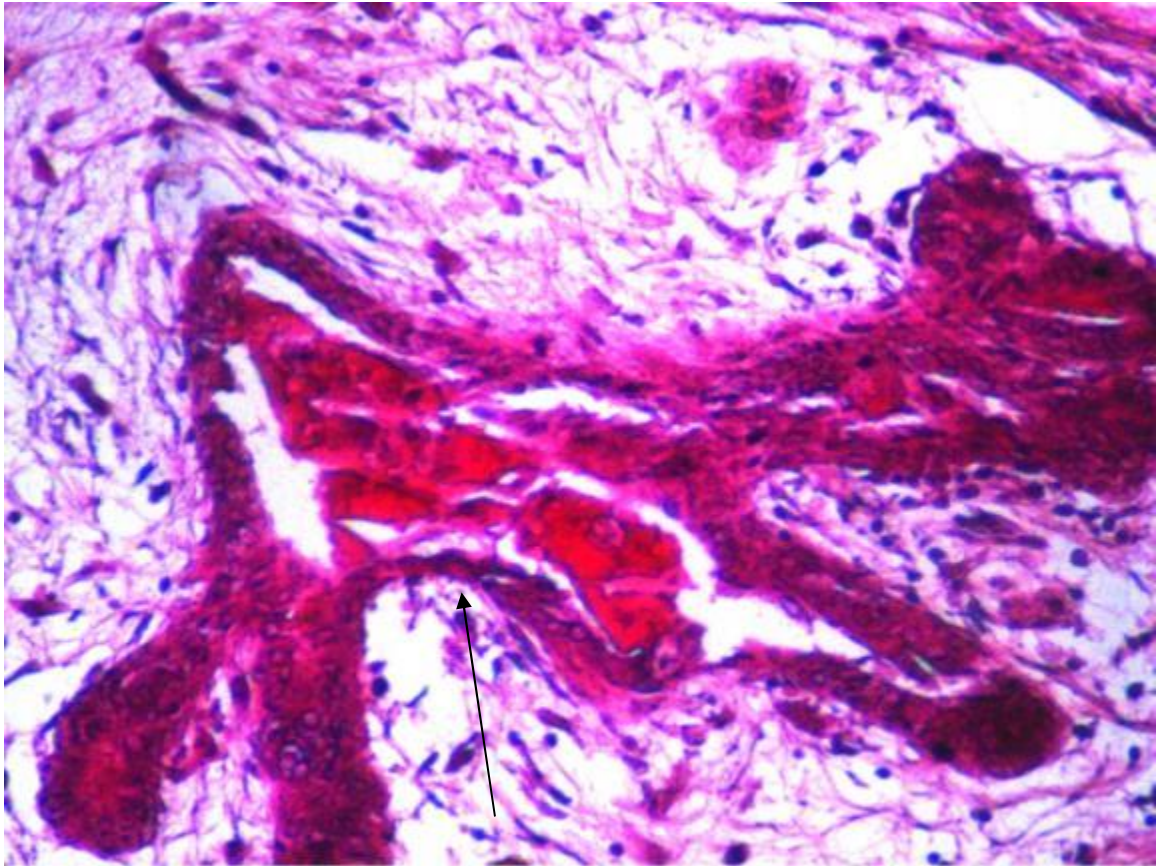


Fig 4:
udder of she-camel showed fibro adenoma (H&E x40).

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94 The arrangement of the layers was disorganized and revealed anisoytosis and anisokaryosis of
 95 cells and nuclei, respectively. In both the fibroadenoma and papilliferous growth calcospherites
 96 was observed in tubular, papillary component, fibrovascular core and epithelial lining. The tumor
 97 was metastasized in lymphatic vessels (fig 5).

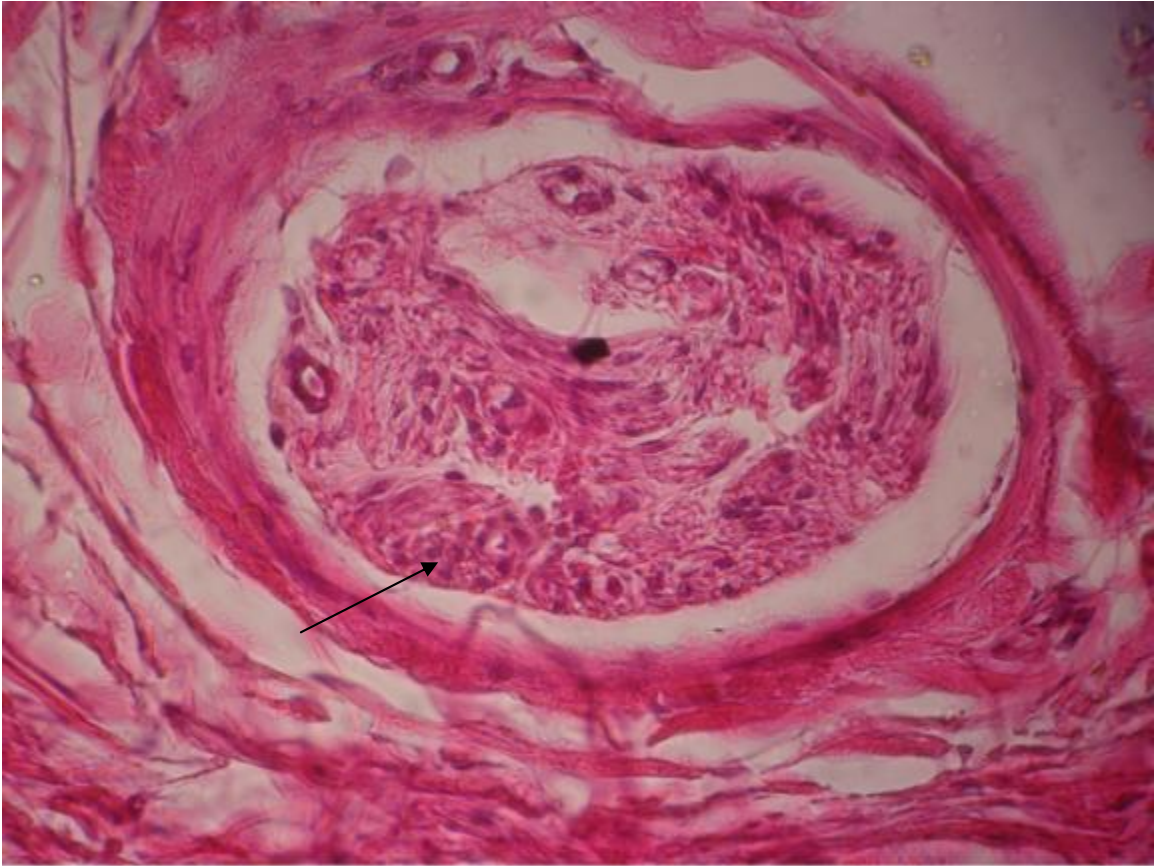


Fig 5:
udder of she-camel show metastize, tumor cell inside lymphatic vessel (H&E x40).

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99 3.3 Immunohistochemistry:

100 The papillary section showed moderate positive result for estrogen receptor and negative
101 progesterone (fig 6, 7) while the fibroadenoma section was negative for both receptors.

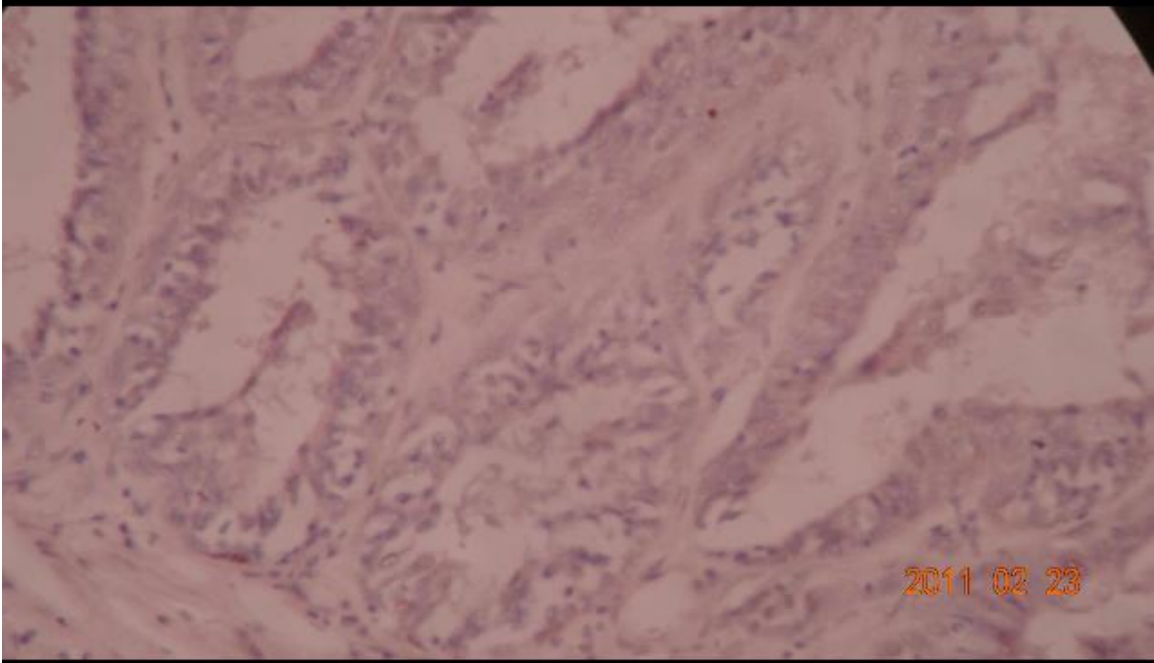


Fig 6:
udder of she camel with papillary carcinoma and negative for estrogen receptor,
immunostaining x40.

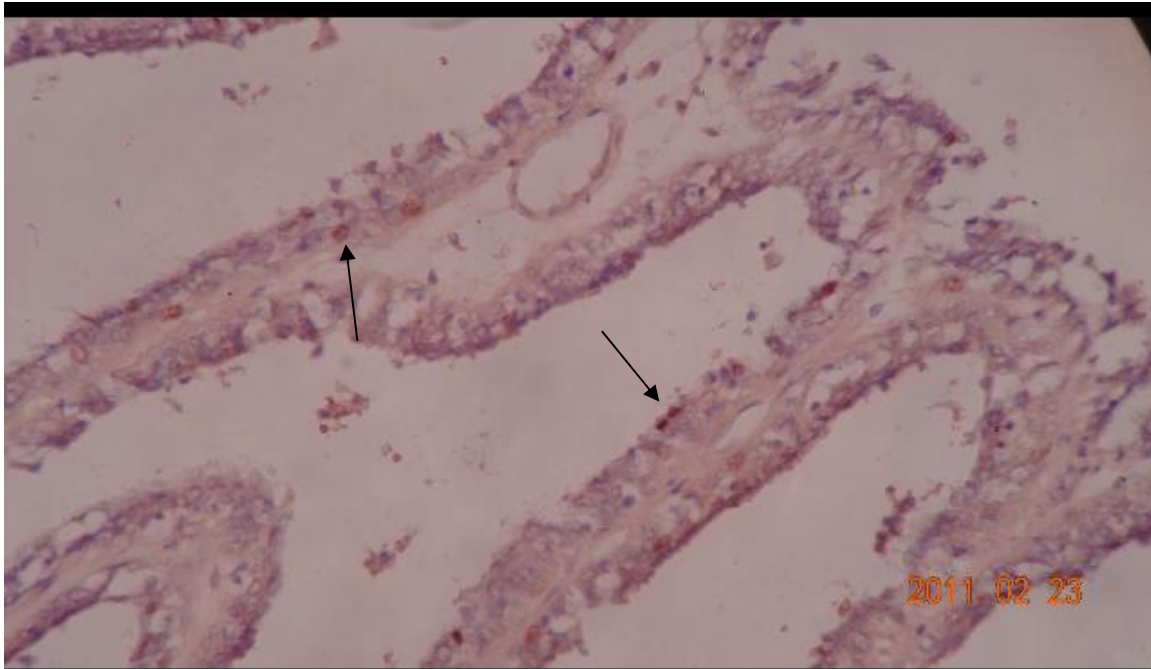


Fig 7:
udder of she camel with papillary carcinoma and positive
for estrogen receptor. Note, variable nuclear stain brown
in color, immunostain x40.

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104 **4. Discussion:**

105 Multiple mammary neoplasms were detected in the udders of she-camel. One was diagnosed as
 106 a papillary carcinoma and the second as fibroadenomatous hyperplasia. The occurrence of
 107 multiple primary mammary tumors in an individual animal is common and well documented in
 108 bitches [16,17,18,19], This phenomenon is rare in other animal species and was even less
 109 frequently in camel. The available literature included a single report of simultaneous seminoma
 110 and cholangiocarcinoma in an 18-year-old male camel [20]. Camiline papillary carcinoma of the
 111 mammary glands is meager [15]. This neoplasia, however, has been well documented in bitches
 112 and queens [16, 21] and in horse [22,23].

113 **In this study fibroadenoma was diagnosed in camel,** in feline it was known as cynonymous feline
 114 mammary hypertrophy or fibroepithelial hypertrophy. **It was** relatively common in dog and cat, but
 115 it is rare in herbivores [24]. A few individual cases, however, have been reported in a nanny goat
 116 [25]; a cow [26] and a lamb [27].

In this study benign neoplastic lesions were diagnosed as fibroadenomatous mammary hyperplasia according to the histological feature[21,16] The microscopic changes observed herein for fibroadenomatous hyperplasia were indistinguishable from those reported by other investigators [28,29,24,27].

In camel no previous report available in literature. The relationship between these two neoplasms was not established. Immunologic and low enzymatic defects predispose some breed of dogs to multiple tumors [30]. In human, irradiation or drugs used in the treatment of primary tumor may enhance the development of another neoplasm [31].

Negative immunostaining for the progesterone receptors may have resulted from a lack of cross-reactivity to the camel species with antibodies used in this study and that agree with other researcher [27] in addition to impregnation in formalin for long time.

Immunohistochemistry revealed the ductal epithelium to be positive for pan cytokeratin (AE1/AE3) and loose fibrovascularstroma was positive for vimentin and basal cells covered the ductal epithelium of alpha-smooth-muscle actin. Immunostaining for the estrogen and progesterone receptors was negative may have resulted from a lack of cross reactivity the ovine species of antibodies used. A diagnosis of mammaryfibroadenoma was made based on the histological and immunohistochemical findings [27].

The benign and malignant mammary tumors are positive for estrogen, progesterone or prolactin receptors to varying degrees [4].

From a comparative perspective, canine mammary mixed tumors and human pleomorphic adenomas of the salivary gland exhibit morphological and molecular similarities, suggesting a similarity in the pathogenic mechanisms involved in malignant transformation and histogenesis [32].

The lack of sufficient report of multiple neoplasm particularly in dromedary camel, make it difficult to draw conclusion about the interaction of these tumor. It is probable that, multiple neoplasm such as in the present case may represent a coincidence.

Conclusions:

Mammary tumors were detected for the first time in Sudanese camel and completely confirm by using histopathological methods

Histopathology represent an important tool to detect and confirm different types of tumors.

Immunohistochemistry consider confirmative methods beside the histopathological picture.

The lack of sufficient report of multiple neoplasm particularly in dromedary camel, make it difficult to draw conclusion about the interaction of these tumor.

It is probable that multiple neoplasms such as in the present case may represent a coincidence.

Recommendation:

More studies are needed to check the available of different types of tumors in camels.

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