

# Ultrasonographic and histopathological findings of mammary fibroadenoma in a buffalo heifer (*Bubalus bubalis*) with special reference to surgical treatment: a case report.

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## Case Report

The present study describes the ultrasonographic and histopathological evaluation of a rare mammary fibroadenoma in 11 month-old buffalo heifer. A homogenous large mammary mass approximately 17 cm was developed in the left rear quarter. The buffalo was assigned for curative surgical removal of the mass. The lesion was well demarcated smooth encapsulated lobular structure, which had a solid consistency. Microscopically, the mass consisted of a proliferation of the mammary epithelium with numerous well-differentiated

pleomorphic acini and their associated ducts with proliferation of inter and intralobular fibrous stroma. Based on history, clinical, ultrasonographic and histopathological evaluations the case was precisely diagnosed to be a mammary fibroadenoma. In conclusion, collaboration between physical, ultrasonographic and histopathological evaluation initiate a constant approach for a precise diagnosis and preoperative planning for surgical intervention of mammary fibroadenoma in a buffalo heifer.

**Keywords:** Buffalo, Fibroadenoma, Mammary, Surgical, Ultrasonography.

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## Introduction

The frequency of mammary neoplasia in different species of animals varies tremendously. The dogs and cats are by far the most frequently affected domestic species [1,2]. While, mammary tumors appearing extremely sporadically in mares, cows, buffalo, goats, ewes and sows [3-9]. Mammary epithelial hyperplasia can be classified into 4 distinct types: ductal, lobular, adenosis and fibroadenoma [1,7]. Mammary fibroadenoma may be a localized or diffuse hyperplasia, which is characterized by prominent hyperplasia of the epithelial elements and multifocal proliferation of the interlobular fibrous stroma [10,11]. Diagnosis of mammary neoplasia is challenging as several different types of swellings share similar clinical characteristics and require differential management. A combination of different diagnostic techniques such as clinical, ultrasonographic and histopathological examinations can precisely diagnose mammary fibroadenoma, when physical examination tool is inconclusive. Therefore, the present study was designed to report the outcomes of the clinical, ultrasonographic and histopathological examinations for evaluation and subsequent decision making in surgical treatment of a rare cases mammary diffuse fibroadenoma in a buffalo heifer.

## Body of the Case

An eleven-month-old buffalo heifer, weighting 200 kg, was investigated at Mansoura Veterinary Teaching Hospital, Faculty of Veterinary Medicine-Mansoura University, Egypt due to a 3-months history of diffuse swelling with large movable mass in the left rear quarter. The swelling was first noticed approximately three months earlier and had continued to

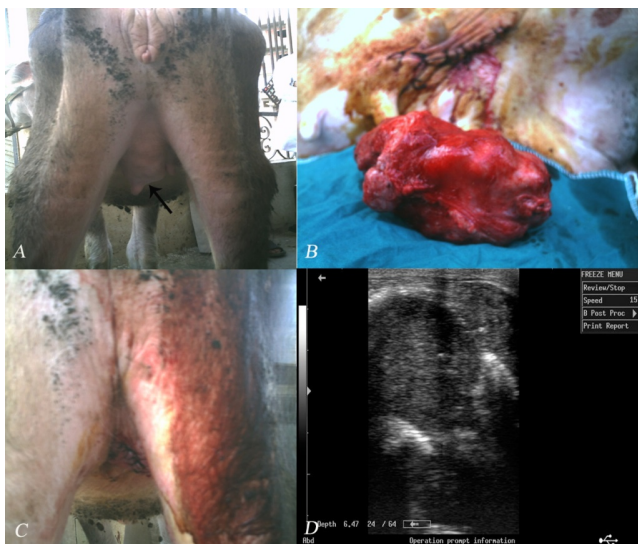
enlarge since then. On presentation, the buffalo heifer admitted with a mammary mass underwent a thorough clinical examination in standing and recumbent positions. Subsequently, the superficial regional lymph nodes were examined for exclusion of metastasis. The mass site was assessed for pain signs by firm digital pressure and size measuring using a measured tape. Ultrasonographic examination was carried out in the standing position using 7.0 to 10.0 MHz mechanical linear (Mindray DP-2200Vet., PR China). For this purpose, buffalo's mammary gland was prepared by clipping and shaving of the hair at the examined area and application of coupling gel (Ultragel, Medilab, Egypt) over the mass and the surrounding area. The transducer was moved laterally and craniocaudally starting from the normal wall of the affected quarter towards the mass. Ultrasonographic images of the mass were evaluated by echogenicity of the contents, size, and the relation of the swelling to the tissues surrounding.

The buffalo heifer underwent surgical treatment; feed was withheld for 12-18 hours prior to surgery. Preoperative antibiotic, cefotaxim (Cefotax-EIPICO, Egypt) at a dose rate of 2 mg/kg and flunixin meglumine at 1.1 mg/kg were administered IV for the buffalo. Sedation was conducted via intravenous (IV) injection of xylazine Hcl (Xylaject 2% - ADWIA Co., Egypt) at 0.1 mg/kg. Then, the incision site was anaesthetized with linear infiltration local analgesia (IVRA) using 15 mL lidocaine Hcl (Debocaine 2.5% - Al Debeiky Pharmaceutical Co., Egypt). The anaesthetized buffalo was positioned in lateral recumbency with the affected quarter uppermost located. The mammary region was aseptically prepared for surgery. When the appropriate depth of anesthesia had been achieved, A 15 cm caudal skin incision was made at

the site of mammary mass. The incision was continued down with a combination of blunt and sharp dissection as required to gain access to the abnormal mass. The mass was excised and the wound was thoroughly flushed with saline solution containing 1 mg/mL penicillin G sodium (Aqua-pen, CID, Egypt). Subsequently, the mammary tissue, subcutaneous tissue and skin were closed properly with simple interrupted sutures using 2/0 polygalactin 910 suture (Vicryl, Ethicon INC, UK) and 0 silk (Silk, Ethicon INC, UK) for the skin. Operation wound was drained and the drain was cleaned with sterile saline once daily until its removal 48 hour after surgery. The preoperative antibiotic and anti-inflammatory were continued for five successive days in addition to intramuscular (IM) injection of 10 mL vitamin AD3E (DEVEDRY MED, ARABCOMED, Egypt). The buffalo was confined in a stall rest for three weeks and monitored daily for healing progress. Specimen from mammary mass was immediately fixed in 10% neutral-buffered formalin. Following paraffin wax embedding by using standard histological processing methods, all sections cut at 4  $\mu$ m were stained with hematoxylin and eosin (H&E) to be examined under a light microscope.

## Results

On clinical examination the buffalo was bright, alert and showed normal appetite, rectal temperature (38.7°C), respiratory rate (31 breaths/ minute) and pulse rate (66 bpm). On palpation, the affected quarter was markedly enlarged with the tumor mass that had a homogenous solid consistency (Figure 1A) without any abnormalities of the mammary lymph node.



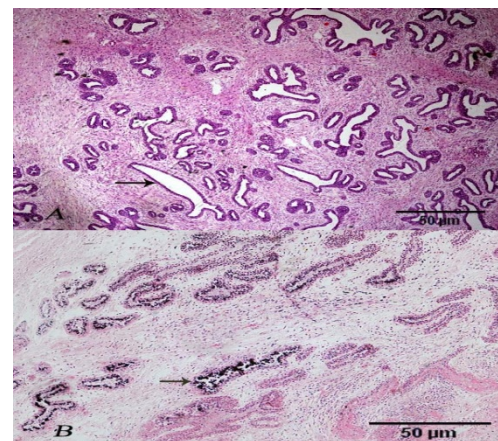
**Figure 1.** (A) A 17 cm-sized fibroadenoma (arrow) in the left rear quarter of an 11-month-old buffalo heifer. (B) Gross appearance of the tumor showed a smooth homogenous encapsulated lobular cauliflower-like mass. (C) Closure of the mammary wound after removal of the tumor. (D) Ultrasonographic image of the mass showing a round hypoechoic mass.

In addition, signs of swelling and mild diffuse pain were elicited in response to palpation of the involved quarter. Ultrasonographic evaluation of the abnormal mammary swelling revealed a round mass with an intensely hyperechoic

acoustic shadow and of a diameter approximately 170 mm (Figure 1D).

Based on clinical and ultrasonographic examinations, radical excision of the tumor was applied as a curative decision (Figure 1B,C). Postoperative follow-up for the surgically treated buffalo showed complete recovery without any recurrence or complications. The owner of this buffalo was contacted at least 6 months post-surgery and reported a good functional outcome and cosmetic appearance. At gross examination, the mammary mass was 17 cm diameter, smooth homogenous encapsulated lobular cauliflower-like and loose in mammary tissue, which had a homogenous solid consistency. The cut surface of the mass revealed dry whitish lobules separated with fibrous septa.

Histopathological examinations confirmed the mass as a fibroadenoma. The tumor composed of numerous irregular branching and dilated tubules, the acini are well-differentiated and mildly pleomorphic. The tubules and acini were lined with single or multilayers of cuboidal epithelial cells that were confined in place by the basement membrane, the nucleus was normal, scanty mitoses and no any cellular atypia was seen. There was a marked proliferation of intra and inter lobular fibrous tissue (Figure 2A) with extensive necrosis and mineralization of the glandular epithelium (Figure 2B).



**Figure 2.** (A). Histopathological longitudinal section of the tumor showed proliferation of well differentiated acini lined by single or multilayers of cuboidal epithelium. In addition, the ducts are branched with prominent dilation (arrow) with abundant fibrous stroma. (HE, x 50). (B) Longitudinal section of the same tumor showed extensive necrosis and mineralization in acini and tubules (arrow) with proliferation of inter and intra lobular fibrous stroma and inflammatory cells infiltration. (HE, x 50).

## Discussion

The reported incidence of mammary tumors in bovine was 1/270,000 [8]. While, mammary fibroadenoma in buffalo accounted for 0.25-0.5% of bovine tumors in previous studies [3,5,12]. Based on the present study findings, this mammary mass in a buffalo heifer was identified as a fibroadenoma. The extremely low incidence of mammary tumors in ruminants in comparison with other mammals is a phenomenon poorly understood which deserves attention also from the medical prospective. This low rate of mammary tumors may be due to

increased parity which shortens exposure to estrogen and high lactation demands give protection against mammary neoplasia. In addition, the dietary factor of low fat and high vegetable fibers diet is beneficial in protecting against mammary neoplasia [5,8,13].

Diagnosis of mammary swellings through case history and clinical examination more difficult and necessitates the use of additional diagnostic techniques to confirm the tentative diagnosis. Early and proper identification of the swelling is essential for successful management and return to function. Therefore, the present study aimed to evaluate the feasibility of ultrasonography, histopathology combined with the clinical and gross features for definitive diagnosis of mammary fibroadenoma in a buffalo.

Ultrasonography is a relatively unique imaging modality for soft tissue structures of the buffalo's body [14]. In comparison to physical examination of mammary diffuse fibroadenoma in the included buffalo, ultrasonography provided reliable diagnostic and prognostic information. Ultrasonographic examination of the fore-mentioned tumor revealed a 170 mm diameter round mass with an intensely hyperechoic acoustic shadow.

In this case study, histopathological investigation represents an important tool to detect and confirm mammary diffuse fibroadenoma in a buffalo. The tumor showed severe proliferation of the mammary epithelium with the formation of numerous, well-differentiated, and pleomorphic acini and their associated ducts. These findings are in accordance with ref. [12]. In contrast to ref. [13], there's no accumulation of secretion in the acini and tubules that reflect this heifer not going to active production. Moreover, there's extensive necrosis and mineralization in acinar and tubules epithelium may be due to pressure of neoplastic masses or trauma. These results are not in accordance with [7,12], who mentioned that, there's no necrosis/focal necrosis of mammary glandular epithelium.

Open excision of mammary tumors is the best treatment of choice in food animals as a curative, economically feasible and safe interference without any hazardous consequences regarding food safety [7,11]. Therefore, in this case of mammary fibroadenoma, surgical lumpectomy was the favored intervention for treatment.

## Conclusion

In conclusion, collaboration between physical, ultrasonographic and histopathological evaluation initiate a constant approach for a precise diagnosis and preoperative planning for surgical intervention of mammary fibroadenoma in a buffalo heifer. Despite few reports in buffalo, mammary fibroadenoma should be part of the differential diagnosis of mammary masses in buffalo.

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