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Surgical management of horn cancer in ten buffaloes

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Abstract
Ten buffaloes aged 6 - 8 years were presented to the clinic with horn cancer, involving the right horn in six animals and the left horn in four. The affected horns showed foul-smelling discharge, swelling at the horn base, and noticeable tilting of the horn. Clinical examination, along with signs such as persistent head shaking, supported a diagnosis of horn cancer. Hematological analysis revealed neutrophilia and lymphopenia. Eight animals were restrained in standing position, while two were positioned in lateral recumbency with the affected horn uppermost. Sedation was achieved using xylazine at 0.03 mg/kg body weight for standing restraint and 0.01 mg/kg for recumbent animals. Cornual nerve block and ring block with 2% lignocaine hydrochloride were administered before horn amputation. Surgical removal of the horn tumor was performed at the horn base, and all animals recovered uneventfully. Histopathological examination of the excised tissue confirmed the tumor as squamous cell carcinoma.

Keywords: Buffalo, horn cancer, horn amputation, keratin pearls, squamous cell carcinoma

1. Introduction
The horn is an extension of the cornual process of the frontal bone (Kumar, 2005) and serves as an important defensive structure in ruminants (Prasad, 2016), although Verma and Kumar (1999) [12] noted that its protective significance may be limited. Horn cancer is a well-documented condition in bullocks (Giri *et al*., 2011; Veena *et al*., 2011) [1, 11], whereas its occurrence in buffaloes is considered rare. Kumar and Thilagar (2000) [3] reported a bilateral case in a buffalo, highlighting its uncommon nature in this species. According to Tyagi and Singh (2006) [9], horn cancer is generally unilateral and most frequently encountered in animals between 5 and 10 years of age.
Several factors have been implicated in the development of horn cancer, including horn painting, exposure to ultraviolet radiation, and chronic irritation at the horn base (Sastry, 2001) [7]. Clinically, affected animals typically exhibit persistent head shaking, tilting of the head toward the affected side, bending of the diseased horn, and foul-smelling nasal discharge from the corresponding nostril (Joshi *et al*., 2009) [5]. Management options include horn amputation alone or in combination with chemotherapeutic agents such as vincristine (Udharwar *et al*., 2008) [10].
The present study describes the clinical presentation and successful surgical management of horn cancer in buffaloes.

2. Materials and Methods
2.1 Study Location and Period
The study was conducted at the Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Sardarkrushinagar, from January 2025 to August 2025.

2.2 Animal History & Clinical Examination
A total of ten buffaloes, aged between 6 and 8 years, presented with a history of swelling at the

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horn base and gradual tilting of the horn over time in Mahesani (Figure 1) and Jaffarabadi (Figure 2). Clinical signs included persistent head shaking, lateral head tilt, and, in some animals, chronic nasal discharge originating from the horn base accompanied by a foul odor (Figure 3). Percussion of the affected horn produced a dull sound. Blood samples were collected for hematological evaluation, and postoperative horn tissue samples were obtained for histopathological examination.

Based on the clinical signs and histopathological findings, the animals were diagnosed with horn cancer and were managed through horn amputation.

Fig 1: Horn tilting in Mahesani buffaloes

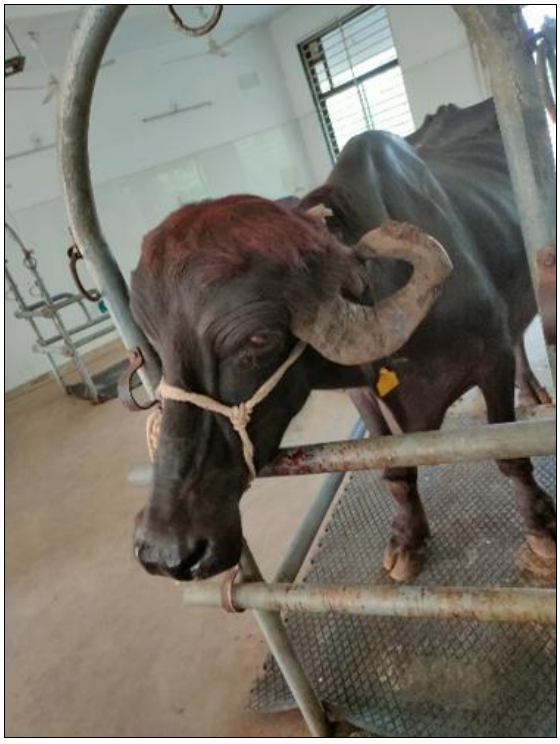

Fig 2: Horn tilting in Jaffarabadi buffaloes

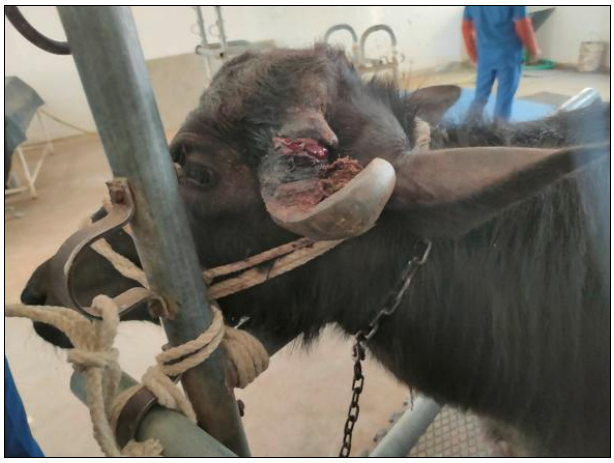

Fig 3: Horn was broken and purulent discharge in horn cancer

3. Surgical technique

3.1 Pre-operative Preparations and Anesthesia

Food and water were withheld for 24 hours prior to surgery. Eight buffaloes were restrained in a standing position with their heads secured in a Travis, while two were positioned in lateral recumbency with the affected horn uppermost on padded mattresses. The surgical site was aseptically prepared by shaving and scrubbing with 7.5% povidone iodine (Figure 4).

All buffaloes were adequately sedated with intramuscular XYLAZINE® (Xylazine hydrochloride, Indian Immunologicals Ltd.) at a dose of 0.03 mg/kg body weight for standing restraint and 0.1 mg/kg body weight for lateral recumbency due to their aggressive nature. Additionally, all animals received a cornual nerve block and a ring block using XYNOVA® 2% (Lignocaine hydrochloride 2%, Troikaa Pharmaceuticals Ltd.) to desensitize the horn base.

Fig 4: Aseptically prepared horn site

3.2 Surgical approaches

Flap method, two cutaneous incisions were made at the base of the horn-one approximately 1 cm above the frontal crest and the other along the nuchal crest. These incisions were then connected dorsally with a circular incision at the junction between the skin and the horn base. Full-thickness skin flaps were elevated over both the dorsal and ventral aspects of the

horn (Figure 5). The cornual artery was ligated using chromic catgut No. 1, after which the exposed bony horn was removed with a chisel and hammer. The dorsal and ventral skin flaps were then apposed and secured with horizontal mattress sutures using Silk or Nylon No. 2 (Figure 6). Tincture benzoin seal was applied, followed by bandaging.

Fig 5: Exposed horn core after removing horn using chiseling

Fig 6: Closure of skin flap by horizontal mattress sutures using Silk No. 2

3.3 Postoperative care and follow-up

All buffaloes received intramuscular injections of Strepto-penicillin at 10,000 IU/kg body weight, Meloxicam at 0.5 mg/kg body weight, and Chlorpheniramine maleate (15 mL) for five consecutive days. Owners were instructed to perform daily dressing of the suture line using 5% povidone iodine solution and to apply Himax ointment to the wound. Skin sutures were removed on the 12th postoperative day. A long-term follow-up period of one month was undertaken to monitor wound healing and check for any recurrence.

4. Results and Discussion

A total of ten buffaloes suffering from horn cancer, aged between 6 and 8 years, were included in the study. Of these, one was a Jaffarabadi buffalo, while the remaining nine were Mahesani buffaloes). Six animals exhibited cancer in the right horn and four in the left horn, with the mean duration of clinical signs being 3 - 4 weeks. Animals older than five years are more susceptible to horn cancer (Mahida *et al*., 2009) [5].

Hematological analysis revealed hemoglobin levels of 8.61 ± 2.14 g/dL, hematocrit of 32.8 ± 2.14%, RBC count of 5.2 ± 1.9 million/µL, and WBC count of 8.1 ± 1.4 thousand/µL, along with neutrophilia (72.1 ± 3.2%) and lymphopenia (25.6 ± 4.7%) in all cases. Histopathology showed intracytoplasmic, eosinophilic keratin arranged in fibrillar structures with distinct keratin “pearls” (Figure 7). Preoperative histopathology confirmed squamous cell carcinoma (SCC) in all animals.

All buffaloes demonstrated uneventful recovery, and no recurrence was observed during follow-up (Figure 8), consistent with findings reported by Giri *et al*. (2011) [1], Jaiswal *et al*. (2014) [2], Sharma and Singh (2014) [2], and Pitlawar *et al*. (2016) [6].

Although radiation therapy and chemotherapy have been used for SCC in companion animals, their application in large ruminants is limited due to availability and cost constraints. As a result, specific antineoplastic chemotherapy could not be administered in the present cases, similar to the observations of Veena *et al*. (2011) [11]. However, Kumar *et al*. (2013) [4] reported the use of vincristine sulphate at 0.025 mg/kg IV, administered three times at seven-day intervals, for postoperative SCC management.

Postoperative complications in the present series were manageable. Prognosis largely depends on tumor size, depth, degree of bone invasion, and the presence of regional metastasis. Although regional lymph node involvement and distant metastasis are uncommon in typical cutaneous SCC of the horn base, their presence is associated with a poorer prognosis.

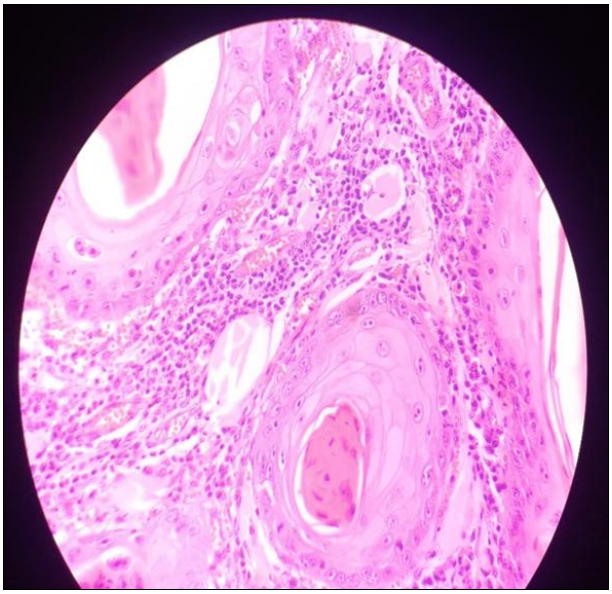

Fig 7: Histopathological image of SCC (keratine pearls)

Fig 8: Recovery image of buffalo

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Conflict of Interest: The authors declare that there is no conflict of interest.

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