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Surgical Excision of A Suspected Squamous Cell Carcinoma In The Prepuce of A 7-year Old Albino Stallion: A Case Report

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ABSTRACT

A 7-year old albino stallion weighing approximately 294.6 kilograms was presented to the Veterinary Teaching Hospital (VTH), University of Abuja (UA) with the chief complaint of a growth on the prepuce. Physical examination revealed the presence of a cauliflower-like growth with its base on the preputial skin and the adjoining preputial mucosa at the left ventral quadrant of the preputial ring. The growth was reported to have been much smaller when it was first observed about three months prior to presentation but kept increasing in size as the horse continued scratching and nibbling at it. There were signs of pain on palpation of the growth. The horse was sedated with Xylazine, anaesthesised with Ketamine and cast in a left lateral recumbency. The growth was excised at its base with a margin of healthy skin laterally and mucosa medially using two elliptical incisions. The incision on the preputial sub-cutaneous and sub-mucosal tissues was sutured with absorbable chromic catgut using a simple continuous suture pattern while the preputial skin was sutured to the preputial mucosa with silk in a simple interrupted suture pattern. The horse recovered uneventfully from anaesthesia 53 minutes post-surgery. Piroxicam, Procaine penicillin, Streptomycin and tetanus toxoid were administered during the peri-operative period. The skin-mucosal sutures were removed fourteen days post-surgery. Telephone calls and subsequent ambulatory visits revealed that there has not been a recurrence of the tumour three years after its excision. The outcome of this surgical management suggests that an en-block excision is a reliable surgical option for the management of adequately circumscribed preputial benign tumours such as Squamous Cell Carcinoma (SCC) in stallions.

Keywords: *Horse; Prepuce; Carcinoma; Local Excision; Albino; Stallion.*

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INTRODUCTION

Preputial growths which may be benign or malignant tumours are widely reported in horses [1, 2, 3]. Generally, tumours are most commonly reported in non-pigmented, sparsely haired areas of the skin near muco-cutaneous junctions of natural orifices of affected horses [1, 2, 4]. The Albino and Arab horses are the predominant species of horses found in Nigeria [1]. And of the two, Squamous Cell Carcinoma (SCC) appears to be more common in Albino than Arab horses [1, 5, 6].

Ultraviolet rays from intense sunshine have been incriminated as a cause of cutaneous tumours in horses [1, 3]. Other likely causes include abnormal accumulation of smegma and viral infection [7, 8]. In horses, the most common sites for tumours are the prepuce, penile shaft, periocular region, oral cavity, guttural pouch, stomach, urinary bladder, lips, nose and anus [9, 10, 11]. Such growths are usually diagnosed as SCC, sarcoids, melanoma, squamous cell papilloma, fibroma, fibrosarcoma or haemangioma based on their case histories, clinical signs, site of the growth, cytology and histological changes, including the predominant cell types found histopathologically [2, 10, 12, 13].

Squamous cell carcinoma is the second most common equine tumour and the most common tumour located at the male genitalia which themselves make up about 6-10 % of all neoplasms in the equine species [2, 14, 15, 16]. Periocular SCCs have been reported in both Arab and Albino horses in Nigeria [5, 12]. Bukar *et al.* [1] reported one case of genital SCC in an albino horse out of 314 (Arab and Albino) horses surveyed and histologically examined in Bornu State, Nigeria.

The relative frequency of penile and preputial SCCs in stallions and geldings aged 12 years and above is not certain [7, 17]. Although SCCs are conventionally classified as benign [18], they may occasionally metastasize to regional lymph nodes if not treated early and aggressively. The recurrence of both benign and malignant tumours following surgical excision has been put at 17–25% [19].

Long-standing SCCs can interfere with coitus by making protrusion and/or retraction of the penis difficult and/or painful. Local excision is indicated for the management of small, solitary tumours such as solitary dermal melanomas, focal SCCs, squamous papillomas and sarcoids, where there is no evidence of metastasis to regional lymph nodes or invasion of deeper tissues [2, 20]. Some malignant tumours have been treated by radical excision which involved the inclusion of other parts of the body to which they had metastasized, such as by partial or total phallectomy. Other recommended means of treatment of tumours are chemotherapy, cryosurgery, hyperthermia, and radio-therapy with or without adjuvant chemotherapy [1, 3]. Local excision has a favourable prognosis if the tumour mass is benign, solitary, pedunculate, and is excised together with adequate margin of normal tissues [21].

HISTORY AND OBSERVATION

A 7-year old albino stallion weighing approximately 294.6 kg was presented to the VTH, of UA with the chief complaint of the presence of a growth in its prepuce (Plate 1). The vaccination status of the horse was unknown. The growth was of a peanut size when it was first observed about three months previously. It kept increasing in size, and bled as the horse scratched and nibbled at it. On close physical examination, the growth was found to be pedunculated, cauliflower-like and dark red in colour with frank haemorrhage from its surface. It was located at the right ventral quadrant of the muco-cutaneous junction of the prepuce with its base being more on the mucosa than the preputial skin. The growth appeared hard, encapsulated and was painful on palpation.

The stallion which was the only one affected among the five saddle horses in the stable was alert, in good body condition and had an excellent appetite. The mucous membranes were pinkish in colour with a capillary refill time of less than two seconds, and the inguinal lymph nodes were normal to palpation. The extrusion and retraction of the penile shaft were unimpeded. The weight was estimated using body measurement with the formula; (Hearth girth)$^{-2}$-x length/300 + 50 [22] as 294.6kg. The rectal temperature, heart, pulse and respiratory rates were 37.7^{0C}, 38 beats, 36 beats and 14 cycles per minute respectively and were all adjudged normal. The haematologic parameters were as shown in table 1 below.

DIAGNOSIS AND TREATMENT

A tentative diagnosis of a benign preputial growth (probably a Squamous Cell Carcinoma) was made. It was decided to treat the case by an en-block sharp excision of the growth based on the pressing need to halt the dripping haemorrhage and other considerations such as cost and the time required for other treatment modules to be effective.

The horse was administered 3000µg of tetanus toxoid (Ghalkesar, India), deep intramuscularly and Praziquantel (Mumbai Concept Pharmaceutical Limited, India) at the dose of 2mg/kg orally. Oxytracycline spray (Pantex, Holand) and Charmil Multiaction Skin Gel (Ayurvet Limited, Delhi, India) were applied to the bleeding surface of the mass for general antibacterial coverage pre-surgically since the horse could not be operated upon immediately

Plate 1. A 7-years old albino stallion diagnosed of a suspected squamous cell carcinoma. Note the preputial growth (arrow)

Table 1. Haematology parameters of the 7-year old albino stallion diagnosed of a suspected Squamous Cell Carcinoma

PARAMETERS	VALUES	[23]
RBC(x10^6 µL)	7.0	6.43-11.16
PCV(%)	36.00	31.50-53.50
Hb(g/dl)	11.4	11.53-19.86
MCV(fL)	44.40	38.37-60.96
MCH(Pg)	15.70	13.41-26.34
MCHC(g/dL)	33.60	27.67-55.03
WBC (x10^3 µL)	7.20	5.40-13.93
Neutrophil (x10^3 µL)	3.70	2.05-8.83
Lymphocytes (x10^3 µL)	5.50	1.54-6.76
Monocytes (x10^3 µL)	0.06	0.00-0.15
Eosinophil (x10^3 µL)	0.00	0.00-0.85
Basophils (x10^3 µL)	0.00	0.00-0.20

Pre-operative preparation and anaesthesia
Food was withheld from the horse for 12 hours but water was provided *ad-libitum* prior to the surgical intervention. The horse was physically restrained in a standing position and the peri-scroto-preputial region was prepared routinely for surgery. It was then sedated with Xylazine hydrochloride (Arendouk, Belgium) at a dose of 1.0 mg/kg body weight intravenously and anaesthetised with Ketamine hydrochloride (Trittau, Germany) at a dose of 1.50 mg/kg body weight intramuscularly. It was eventually cast in a left lateral recumbency when it exhibited signs of drowsiness and incoordination (Plate 2).

The forelimbs were hobbled and the upper left hind limb was reflected laterally and fastened to an immobile stand. The surgical site was scrubbed again and draped in a circular fashion (Plate 3). Five 5 millilitres of a 20% Lignocaine hydrochloride (Amritsar, India) solution was infiltrated in a ring pattern around the base of the growth (Plate 4). Half the induction dose of the Ketamine was administered at 37 minutes intra-operatively to maintain a surgical plane of anaesthesia during the surgery.

Plate 2. A 7-years old albino stallion diagnosed of a suspected squamous cell carcinoma. Note the horse being restrained in left lateral recumbency with the forelimbs fastened together and the right hind limb laterally reflected and fastened to an immobile stand

Plate 3: A 7-years old albino stallion diagnosed of a suspected squamous cell carcinoma. Note the preputial mass

Plate 4: A 7-years old albino stallion diagnosed of a suspected Squamous Cell Carcinoma. Note the circumferential local infiltration with lignocaine hydrochloride around base of the lesion

Surgery

A double elliptical incision was made around the base of the mass, half to one inch away from its base on normal tissues such that one arm of the incision was on normal preputial skin laterally and the other, on normal mucosa medially (Plate 5). The caudal superficial epigastric arteries and superficial and deep veins were ligated using chromic catgut size 2/0 (Plate 6). The incision was extended deep into the sub-mucosal and sub- cutaneous tissues by blunt dissection. Minor bleeders were clamped and seeping haemorrhage was controlled with gauze pressure. The growth was excised using a combination of sharp and blunt dissections, which left a deep surgical wound. The excised mass (Plate 7) weighted 5.1gm

The wound was thoroughly examined to ensure that the growth was completely excised and was infiltrated with a mixed solution of Procaine penicillin (Shanxi Federal Pharmaceutical Company Limited, Shanxi, China) and Streptomycin (Shanxi Federal Pharmaceutical Company limited, Shanxi, China). The subcutaneous and sub-mucosal tissues were sutured using double rows of simple continuous sutures with size 2 chromic catgut (Life Care Medical, Anhui, India) while the skin was sutured to the mucosa with simple interrupted sutures (Plate 8) using size 2 silk (Agary Pharmaceuticals, Giangsu, China).

The horse recovered uneventfully from anaesthesia and regained its standing position 53 minutes after anaesthetic induction. It was administered another 1.0 ml of tetanus toxoid (Ghalkesar, India), Procaine penicillin and Streptomycin deep intramuscularly at 10000 iu/kg and 10mg/kg respectively for 5 days post-operatively. Piroxicam (Tiangao Pharmaceutical, Hubei, China) was administered at 0.3mg/kg for 3 days post-operatively. The muco-cutaneous sutures were removed 14 days post-operation (Plate 9).

Plate 5. The preputial area of a 7-years old albino stallion diagnosed of a suspected preputial squamous cell carcinoma. Note the double elliptical incisions at the base of the growth

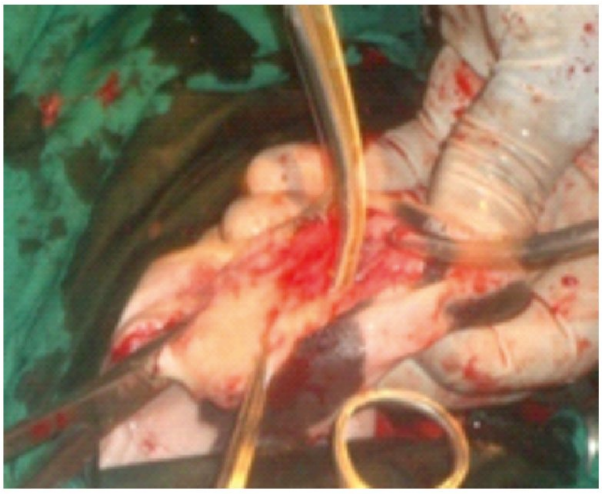

Plate 6. The preputial area of a 7-years old albino stallion diagnosed of a suspected preputial squamous cell carcinoma. Note the ligation of bleeding vessels

Plate 7. The excised tumour mass from a preputial area of a 7-years old albino stallion diagnosed of a suspected preputial squamous cell carcinoma

Plate 8. The preputial area of a 7-year old albino stallion diagnosed of a suspected

Plate 9: The preputial area of a 7-year old albino stallion diagnosed of a suspected preputial squamous cell carcinoma. Note the healed wound

DISCUSSION

The primary cause of the SCC in this particular horse in this report could not be established, although, SCC is reportedly more common in Albino horses when compared to other breeds of horses found in Nigeria [1]. This highlights the possible role of genetics in the incidence of SCCs in horses according to Knight [3] and Foster and Ladds [17]. The breed (Albino horse), sparse hair growth around the prepuce, absence of melanin, exposure to ultraviolet rays and possibly carcinogenic induction by papilloma virus type II [3, 18] may singly or in combination be the cause(s) of the SCC in horses [1, 8, 18], as may be in this case. This is because the occurrence of kin tumours is associated with exposure of melanin-deficient skin to intense ultraviolet rays that destroys and alters the tumour suppressor genes of the skin. However, the location of the tumour in a part of the body least exposed to ultra-violet rays suggests that this factor may not be the main or only cause of the SCC in this case. This notwithstanding, it is probable that the hairless and melanin-free prepuce was particularly sensitive to brief exposures to ultraviolet radiations such that it was sufficient to induce carcinogenesis as described by Knight [3] and Burney *et al.* [7].

It was not possible to make a definitive diagnosis of the growth on the basis of the clinical examination only; however, the epidemiology of equine cutaneous growths reported in Nigeria [5, 6] suggested that the growth was probably a SCC.

The choice of local excision for the management of the growth was based on the presumptive diagnosis of the growth being benign because there was no clinical evidence of metastasis; which alone though could not have been sufficient to enable making such a conclusive diagnosis without corroborative histopathological findings from biopsies of the growth or a draining lymph node or a thoracic radiograph [2]. However, the fact that there has not been any recurrence of the tumour over a three years period validates the clinical diagnosis of a suspected SCC.

The authors are not aware of any previous report of the management of tumours or SCC in horses in Nigeria. Treatment of the case with cytotoxic drugs was not explored in spite of favourable outcomes reported with use of chemotherapy in similar cases [24]. This was because there was an urgent need to halt further traumatisation of and subsequent haemorrhage from the tumour and because of the need to relieve the horse of the pain caused by same. Such cytotoxic drugs are very expensive and are not readily available locally. In addition, the horse would have had to be hospitalised for the full course of such treatment with the attendant need for more frequent hospital visits by the clients and the engagement of working hours of hospital staff if the medical option was adopted for the management of the case.

Benign neoplasms with pedunculated attachments to normal tissues have been treated successfully by en-block surgical excision [2, 4]. The uncomplicated outcome of the case reported may be attributed to the wide margins of normal tissues included in the excision of the mass 19, 21] and the fineness of the surgical procedure.

The administration of tetanus toxoid pre and post-operatively was aimed at and to prevent tetanus infection from the high concentration of tetanus spores in the faeces of even healthy horses [24, 25]. Where the tetanus toxoid is unavailable, such as in field practices, such horses may be protected against tetanus infection with Procaine penicillin [24, 26], hence our choice of the use of the same antibiotics along with streptomycin. This is also a broad spectrum antibiotic mixture against other secondary bacterial infections [26].

The combination of Xylazine sedation and Ketamine anaesthesia provided excellent operative conditions similar to those reported by Mama [27] and Lyon [28], and is recommended for use in horses. The usefulness of adequate pain management was exemplified in this case by the uniform level of analgesia all through the surgical procedure. The institution of a balanced anaesthesia through adequate analgesia, medium narcosis and moderate muscle relaxation may have resulted in the very smooth recovery of the horse from anaesthesia [29]. Such a gradual and positively progressive recovery from anaesthesia is particularly useful in horses handled in the field where there is usually inadequate bedding or cushioning against trashing.

In conclusion, local en-block excision is a reliable surgical option for the management of solitary/benign preputial growths in stallions.

REFERRENCES

1. Bukar, M. M., Sadiq, M. A. and Geidam, Y. A. (2007). A survey of cutaneous neoplasm among horses used for cultural festivals in Borno State , Nigeria. *Nigeria Veterinary Journal,* 28(1): 27-33.

2. Award, R., Esam, M., Gamal, K. and Mohamed, A. A. (2013). Surgical management of Penile and Preputial Neoplasms in equine with special reference to partial phallectomy. *Journal of Veterinary Medicine.* http: // dx.doi.org / 10.1155 / 2013/891413. Accessed 16th June, 2018.

3. Knight, C. G. (2015). The association between equine papilloma virus type-2 and equine squamous cell carcinoma. A Thesis presented in partial fulfilment for the award of Degree of Doctor of Philosophy in Veterinary Science at Massey University, Manawatu, New Zealand, 1-213.

4. Howarth, S., Lucke, V. M. and Pearson, H. (1991). Squamous cell carcinoma of the equine external genitalia: a review and assessment of penile amputation and urethrostomy as a surgical treatment. *Equine Veterinary Journal,* 23(1), 53–58.

5. Akirinmade, J. F., Oni, O and Anita, R. E. (1992). Cryosurgery of squamous cell carcinoma of eyelid in Horses. *Tropical Veterina, 10: 43-46.*

6. Rabo, J. S. Usman, H. S and Kolo, Y. M. (2000). Studies on ocular squamous cell carcinoma among horses in Borno State, Nigeria. *African Journal of Biomedical Research, 3:(1): 1129-130.*

7. Burney, D.P; Theisen, SK and Schmitz, D. G. (1992). Identifying and treating squamous cell carcinoma in horses. *Veterinary Medicine; 87: 588-594.*

8. Knight, C. G., Dunowska, M., Munday, J. S.,Peters-Kennedy, J. and Rosa, B. V. (2013). Comparison of the levels of Equuscaballus papillomavirus type 2 (EcPV-2) DNA in equine squamous cell carcinomas and non-cancerous tissues using quantitative PCR. *Veterinary Microbiology (Short communication), Elsevier: 166 257–262.*

9. Cotchin, E. (1977). A general survey of tumours in the horse. *Equine Veterinary Journal, 9 (1): 16–21.*

10. Brinsko, S. P. (1998). Neoplasia of the male reproductive tract. *The Veterinary Clinics of North America,* 14(3) 517–533.

11. Memon, M. A., McClure, J. J, and Usenik, E. A. (1987). Preputialhaematoma in a stallion. *Journal of American Veterinary Medical Association*; 191: 563-564.

12. Dugan, S. J; Curtis, C.R. Robert, S, M and Severin, G. A. (1991). Epidemiologic study of ocularadnexal squamous Cell carcinoma in horses, *Journal of American Veterinary Medical Association,* 198: 251-256.

13. Valentine, B. A. (2006). Survey of Equine cutaneous neoplasm in the pacific Northwest. *Journal of Veterinary Diagnostic Investigation*, 2(1): 123-126.

14. Foy, J. M; Rashmir-Raven, A. M; Brashier, M. K. (2002). Common Equine Skin Tumors. *Compendium for Continuoing Education Credit. Auburn University College of Veterinary Medicine, Mississippi State University* Vol. 24, 3. 242-255.

15. Last, R. (2017). Squamous Cell Carcinoma in Horses. Equine Health Update, 19(2).

16. Edwards, J. F. (2008). Pathologic conditions of the stallion reproductive tract. Animal. *Reproductive Sciences,* 107: 197-207.

17. Foster, R.A and Ladds, P. W. (2007). Neoplasm of penis and prepuce. In Jubb, Kenedy and Palmer's Pathology.

18. Knight, C. G., Munday, J. S., Peters, J. and Dunowska, M. (2011). Equine Penile Squamous Cell Carcinomas Are Associated with the Presence of Equine Papillomavirus Type 2 DNA Sequences, *Oncology Veterinary Pathology* 48(6): 1190-1194.

19. Van Den Top, J. G., Ensink, J. M., Gröne, A., Klein, W. R., Barneveld, A. and Van Weeren, P. R. (2010). Penile and preputial tumours in the horse: literature review and proposal of a standardised approach; *Equine Veterinary Journal*, 42 (8), 746–757.

20. Junge, R. E., Sundberg, J. P and Lancaster, W. D. (1984). Papillomas and squamous cell carcinomas of horses. *Journal of American Veterinary Medical Association*, 185: 656-659.

21. May, K. A., Kuebelbeck, K. L. and Johnson, C. M. (2008). Urinary bladder

rupture secondary to penile and preputial squamous cell carcinoma in a gelding. *Equine Veterinary Education*, 20(3), 135–139.

22. Carroll, C. L and Huntington, P. J. (1988). Body condition scoring and weight estimation of horses. *Equine Veterinary Journal*, 20 (1), 41-45.

23. Ihedioha, J. I. and Agina, A. O. (2014). Haematological profile of Nigerian horses in Obolloafor, Enugu State, *Journal of Veterinary and Applied Sciences, Vol. 4(1): 1-8*.

24. Gigi, K. (2006). How useful is tetanus antitoxin in the treatment of Equidae with tetanus? A comparison of three treatment protocols used in the management of 56 cases of equine tetanus presented to the Spana clinics in Morocco in 2003/2004. Proceedings of the 9th International Congress of World Equine Veterinary Association. www.ivis.org, 251-253.

25. Funcia, J. P., Goñi, J. I. and Guglielminetti, A. (2016). Preputial Hematoma in a 2 Years Old Horse; *Journal of Veterinary Sciences and Technology* 7:338.

26. Ball, M (1997). Equine tetanus: signs and treatment. *Equine Science*.

27. Mama, K. R. (2000). Anaesthetic management of the horse: Intravenous anaesthesia; *In:* Recent advances in anaesthetic management of large domestic animals, Steffey E.P. (Ed.). *International Veterinary Information Service*, 1-5.

28. Lyon. L. (2006). Equine anaesthesia; *Centre for Veterinary Health Sciences (Veterinary Surgery* 1). 7412(1), 1-15.

29. O'Hanlon, J. J; Muldoon T., Lowry D and McCleane G. (1996). Improved post-operative analgesia with preoperative piroxicam, *Canadian Journal of anaesthesia*, (43(2); 162-165.