

PSEUDOHERMAPHRODITISM IN A CAPTIVE MALE GREATER CANE RAT (*THRIONOMYS SWINDERIANUS*, TEMMINCK 1827): FIRST CASE REPORT¹IGBOKWE, Casmir Onwuaso, ²ONOJA, Remigius Ibe and ¹NWAOGU, Innocent Chima¹Department of Veterinary Anatomy, Faculty of Veterinary Medicine, University of Nigeria, Nsukka, Enugu State, Nigeria.²Department of Veterinary Pathology and Microbiology, Faculty of Veterinary Medicine, University of Nigeria, Nsukka, Enugu State, Nigeria.

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ABSTRACT

An adult captive male grasscutter weighing 8.50 kg was presented for dissection and research. At necropsy, uterus bicornis was present and well developed testes were found in the abdominal cavity. The uterine tubes, uterine horns, cervix and cranial vagina contained a yellowish-brown cheesy fluid. There was no evidence that ovaries were present in the specimen. Histologically, the testes showed a well-developed histo-architecture while the uterus had thin myometrium, atypical endometrial mucosa and lacked coiled uterine glands. The epithelium in the cranial vagina was also hypoplastic, while the smooth muscle layers of the muscularis were scanty. This is the first reported case of pseudohermaphroditism in the greater cane rat.

Keywords: Pseudohermaphrodite, Morphology, Greater cane rat, *Thryonomys swinderianus*

INTRODUCTION

Hermaphroditism is a disorder of sex development which is a generic definition encompassing any problem of ambiguous sex genitalia noticed at birth in any individual. It is also known as intersex, hermaphrodite and pseudohermaphrodite (Hughes, 2008). Disorders of sex developments (DSDs) have been well studied and reported in humans and domestic species but very little information exist in wildlife species (Alam *et al.*, 2007; Rubes *et al.*, 2008). Broadly, the potential causative factors of DSDs are sex chromosome mediated, gene mediated or environmental chemical exposure (Mastromonaco *et al.*, 2012). Disorders of sex development are detrimental to the reproductive potential of wildlife population and their conservation due to partial or complete reduction in fertility. The wild grasscutter or greater cane rat (*Thryonomys*

swinderianus Temminck 1827, Rodentia: Thryonomyidae) is a hystricomorphic rodent widely distributed in Africa and hunted in most areas as a source of animal protein (NRC, 1991). However, they are now domesticated both for research and as source of meat in West Africa. This article reports a disorder of sexual development in a phenotypic male *T. swinderianus* with unknown chromosomal type and testicular gonadal sex.

MATERIALS AND METHODS

Case History: An adult captive male grasscutter weighing 8.50 kg presented at the Department of Veterinary Anatomy, University of Nigeria for dissection and research was euthanized with pentobarbital sodium.

Physical and Postmortem Examination: Gross examinations of the animal were done,

after which relevant organs were fixed in 10 % neutral buffered formalin for 48 hours. They were then dehydrated in graded concentrations of ethanol, cleared in xylene, and embedded in paraffin wax. Five-micrometer thick sections were cut, mounted on glass slides, and stained with Haematoxylin and Eosin for light microscopy (Bancroft and Gamble, 2008). The photomicrographs were taken using a Motic 9.0 Megapixels Microscope Camera at x400 magnifications.

RESULTS AND DISCUSSION

At necropsy, uterus bicornis was present and well developed testes were found in the abdominal cavity. The uterine tubes, uterine horns, cervix and cranial vagina contained a yellowish-brown cheesy fluid. There was no evidence of ovaries in the specimens. The overall impression of the external genitalia was that the animal was a normal male as shown by the presence of penis and scrotal sac without descended testes (Figure 1a). Nothing suggestive of vulva or clitoris was present. The penis looked normal in size and structure with urinary orifice located in the normal position in the glans at the distal end of the organ. The internal genitalia seen in the animal included left and right testis and uterus (Figure 1b). The uterus had observable tubes, horns and body (Figure 1c). Histological sections of the testes showed a well-developed histo-architecture with normal seminiferous tubules lined by typical spermatogenic germinal epithelium and the sertoli cells (Figure 1d). Sections of the uterine tubes showed eroded and epithelium without blood vessels (Figure 1e). The epithelium in the cranial vagina was cornified with hypoplastic smooth muscle layers (Figure 1f). DSDs in wild rodents are rarely described. In this greater cane rat, both testes were found in the abdominal cavity. This finding appeared to be the normal position of testes in captive wild rodents which are usually under great fright and retracts the testes into the abdominal cavity. Rodents and rabbits do not have a narrow (essentially closed) inguinal canal after completion of testicular descent, thus, the testes can move freely into the abdominal cavity

by retraction along with inversion of scrotum (Amann and Veeramachaneni, 2007). Histological features of the testes of the animal showed normal morphological features consistent with the observations in the testes of the normal greater cane rat (Olukole and Obayemi, 2010). Morphologically, the case was diagnosed as male pseudohermaphrodite of the greater cane rat. This condition is presently called XY disorder of sex development (XY DSD) although karyotyping is needed for definitive diagnosis. Observations of disorder of sex development in wild animals, free-ranging or captive, are usually done opportunistically through population management or conservation programmes that involve capture and release, euthanasia and necropsy for research, moribund or dead animal examination, general health and breeding management programmes. Thus, in most reported cases of DSDs in wildlife, evidence of cytogenetics, genetics or exposure to environmental chemicals are not readily available, making the definitive characterisation of the DSDs difficult. However, morphologic evidence of ambiguous reproductive systems is usually the sole factor available in describing the abnormalities in DSDs in wildlife (Mastromonaco *et al.*, 2012). In male pseudohermaphroditism the gonads are exclusively testes, but the genital ducts and/or the external genitalia lack full masculinization and display some phenotypically female characteristics (Wensing, 1980). To the best of our knowledge, this is the first reported case of hermaphroditism in the greater cane rat.

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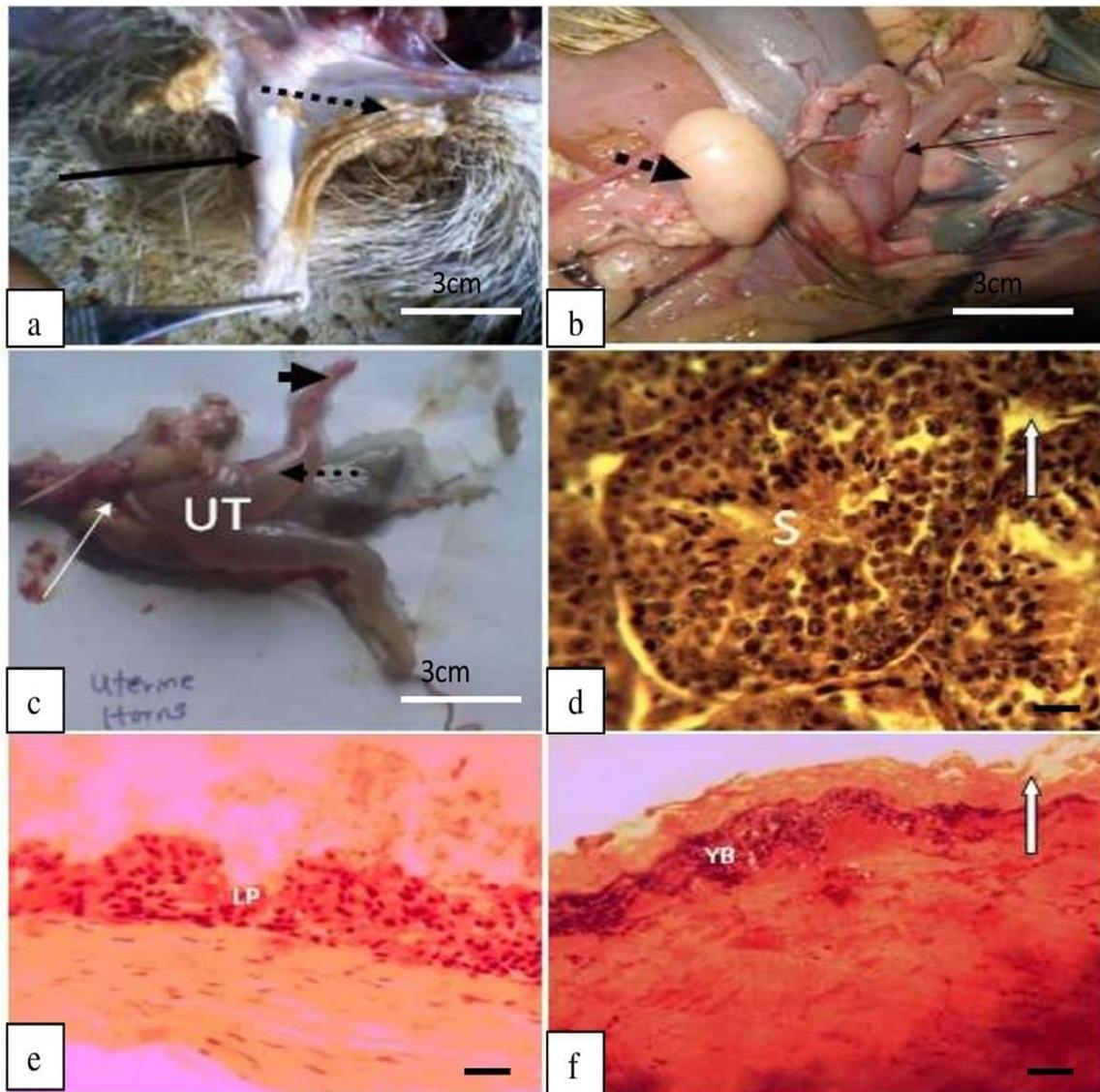


Figure 1: Microphotograph of male reproductive system of male greater cane rat. (a) External genitalia of greater cane rat showing penis (long arrow) and scrotum (broken arrow), (b) internal genitalia showing the testis (broken arrow) and uterus (thin arrow), (c) uterine tubes (arrowhead), uterine horns (broken arrow), uterine body (UT) and cervix/cranial vagina (long arrow), (d) testicular histology showing normal germinal epithelium of the seminiferous tubules (S) and interstitium (arrow), (e) section of the uterine body showing eroded epithelium (LP) without endometrial glands, (f) Section of the cranial aspect of the vagina showing highly cornified epithelium (arrow) with yellowish eosinophilic secretions (YB). (Scale bar = 100µm)

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