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Abattoir survey for genital abnormalities of female camels (*Camelus dromedarius*) in Sokoto, Nigeria

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ABSTRACT

Camels are pseudo ruminants that have low reproductive efficiency which is a constraint to their productivity. This study was designed to survey the genital abnormalities encountered in female camels slaughtered at the Sokoto modern abattoir, Nigeria. The genitalia of 242 female camels were examined from the ovaries to the vulva for abnormalities. A detection rate of 4 (1.65 %) genital abnormalities in female camels was observed in this study. The abnormalities were follicular cyst 2 (0.83 %), uterine nodule 1 (0.41 %) and cervical agenesis 1 (0.41 %). Histologically, the uterine nodule was diagnosed as fibrosarcoma, while in the camel with cervical agenesis, an opening on the uterus suggests a failure of the paramesonephric ducts to fully form the cervix. The study revealed a low occurrence rate of genital abnormalities in female camels slaughtered at the Sokoto modern abattoir. However, the abnormalities seen are capable of causing infertility that will reduce overall camel productivity.

Keywords: Cervical agenesis; fibrosarcoma; follicular cyst; uterine nodules

INTRODUCTION

The camel (*Camelus dromedarius*) is an even-toed ungulate, usually called pseudo ruminant because of its ruminating habit (Allen, 2013). They serve as a means of transportation, a source of meat, and milk (Blench, 1999) where they are herded together with donkeys, cattle, sheep and goats (Markemann and Zarate, 2010). Camels are resilient animals and more resistant to diseases compared to other animals and are increasingly being slaughtered for meat in the country (Ukashatu *et al*, 2012). However, low reproductive performance has been a hindrance to their productivity (Khalifalla *et al*., 2017).

Abnormalities of the female reproductive tract have been reported to be a major cause of infertility in female dromedary (Deen, 2013; Adeyeye *et al*., 2021). These abnormalities have been reported in Egypt (El-Wishy, 1989), Saudi Arabia (Khalifalla *et al*., 2017) and Ethiopia (Melaku *et al*., 2015). These studies revealed abnormalities in the ovary, uterus, cervix, vagina and vulva ranging from cyst, aplasia, hypoplasia and inflammation, which are capable of lowering reproductive performance in the camel. Few studies have been designed to assess the prevalence and types of reproductive disorders of camels in Nigeria. Apart from the reports of Ribadu *et al*. (1991) and Ribadu *et al*. (1998) who described female genital abnormalities in Kano and Maiduguri, Nigeria, respectively, no other study is available to

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the best of our knowledge. Information obtained from this study will therefore help understand the pattern of reproductive abnormalities in female camels.

MATERIALS AND METHODS

Study Area

The study area was the Sokoto modern abattoir Sokoto, Sokoto State, Nigeria. The state is situated at 308 m above sea level and between 5º and 6º E and between 13 and 14º N. Cattle, camel, goats and occasionally sheep are slaughtered at the abattoir.

Study Design

It was a prospective study involving 242 female camels slaughtered at the Sokoto modern abattoir Sokoto, Nigeria from January to July 2016.

Genital Examination

The examination was carried out as described by Ribadu *et al*. (1991) and Ribadu *et al*. (1998). Briefly, at the abattoir, an average number of 16 camels are slaughtered per day with females ranging from 4 to 6. After slaughter, the consent of the camel owners was obtained to examine the whole genitalia from the ovaries to the vulva. Consent was also obtained to incise the lumen from the vagina to the oviduct for examination. A gross examination was performed to determine the existence or otherwise of genital abnormality and its location. Genital abnormalities (where present) were noted, and samples were collected in Bouins solution for histological examination. They samples were taken to the Theriogenology Laboratory, Usmanu Danfodiyo University, Sokoto for further analysis. Data obtained were analysed using descriptive statistics and presented in tables.

RESULTS

The detection rate of genital abnormalities is presented in Table 1. Out of 242 genitals examined during the study, 4 genital abnormalities were seen representing a prevalence of 1.65 %. Two (0.83%) of the abnormalities were follicular cysts, while 1 (0.41%) each was uterine nodule and cervical agenesis. Plate 1A shows a nodule attached to the proximal part of the left horn and a fibrosarcoma from the uterine nodule (Plate 1B and C).

Table 1: Genital abnormalities of female camels (*Camelus dromedarius*) in Sokoto, Nigeria (n = 242)

Organ	Lesion	Frequency	Percentage (%)
Ovaries	Follicular cyst	2	0.83
Uterus	Uterine nodule	1	0.41
Cervix	Cervical agenesis	1	0.41
	Total	4	1.65

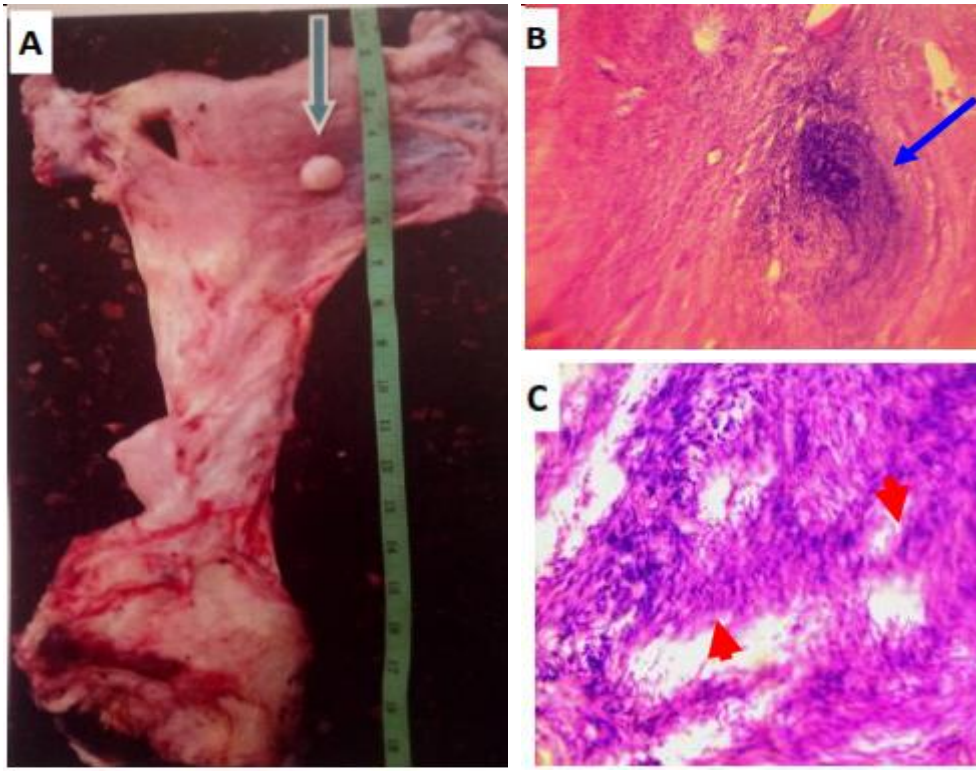

Plate 1: Photo showing (A) nodule (arrow) of about 5mm diameter attached to proximal part of the left horn (B) micrograph of fibrosarcoma from the uterine nodule showing an interlacing pattern of spindle-shaped fibroblasts in a collagen background (blue arrow) H & E. x100 (C) micrograph of fibrosarcoma from the uterine nodule showing sheets of spindle-shaped fibroblasts in a herringbone patterns (arrow heads) H & E. x400

DISCUSSION

A detection rate of 1.65 % of genital abnormalities was seen in this present study. This is lower than the 4.49 % and 12.0 % reported by Ribadu *et al.* (1991) and Ribadu *et al.* (1998) in Kano, Nigeria and Maiduguri, Nigeria, respectively. It is also lower than the 20.0 % reported in Algeria (Gherissi *et al*., 2019), 26.0 % in Egypt (Moustafa *et al*., 2004) and 19.9 % in Ethiopia (Melaku *et al*., 2015). Higher prevalence has also been reported outside Africa. For example, Wajid (2015) reported 32.5% in Iraq. The low detection rate of genital abnormalities in the present study may be attributed to a new status of camels in Nigeria. Camels are moving from being "desert sheep" to being "food animals" (Abubakar *et al*., 2011). This has encouraged breeders to adopt improved management systems for them such that more interest is now been placed on their health and productivity. In addition, our sample size was small compared to these other studies thereby reducing the chances of obtaining camels with genital abnormalities, although, daily slaughter at the abattoir was also small.

The abnormalities encountered were follicular cyst, uterine nodule and cervical agenesis. There were no abnormalities in the oviduct, vagina and vulva. More abnormalities were present in the ovaries than in other parts of the genitalia. This is similar to the reports of Ribadu *et al*. (1991) and Ribadu *et al*. (1998), although they reported a higher number of vulvar tick infestations than ovarian abnormalities. We consider vulvar tick infestation as lesions and not abnormalities capable of seriously disrupting reproduction. Our finding is also similar to the reports of El-Wishy (1989) and Gherissi *et al*. (2019) in Egypt and Algeria, respectively. However, our report contradicts the findings of Moustafa *et al*. (2004), Melaku *et al*. (2015), Wajid (2015) and Khalafalla *et al*. (2017), who all reported higher uterine abnormalities than other parts of the genitalia. Uterine abnormalities are believed to be more than other abnormality in camel (Tibary *et al*., 2001). The reason our findings are at variance with other studies is unknown but may be associated with the study location of Sokoto particularly the low number of slaughters at the Sokoto abattoir. All earlier studies of female genital abnormalities of camel in Nigeria suggest that ovarian abnormalities were the most common. Similar higher ovarian abnormalities have been reported in cattle in Nigeria (Olaniyi *et al*., 2013).

The follicular cyst was the only ovarian abnormality seen in this study. Previous studies have also reported follicular cysts as the most common abnormality of the ovary (El-Wishy, 1989; Ribadu *et al*., 1991; Melaku *et al*., 2015). The absence of other ovarian abnormalities such as luteal cysts may be associated with the induced nature of ovulation in camels (El-Wishy, 1989). The ovary is the primary organ in the female that produces hormones and oocytes. The presence of cysts on the ovary will alter the reproductive function of the animal thus rendering the camel unable to produce oocytes. During examination of one genitalia, the cervix was not found. However, its opening into the uterus was traced into the floor of the rectum signifying failure of the paramesonephric ducts to form the cervix. A similar case of a congenital abnormality of the uterus has been reported in camels in Algeria (Gherissi *et al*., 2020). The implication of this on camel reproduction is infertility due to its inability to conceive. In the genitalia with uterine abnormalities, the nodule was attached to the proximal part of the left uterine horn. This was histologically diagnosed to be a fibrosarcoma one of the common tumours found in camel (Alsobayil *et al*., 2018). Fibrosarcoma is a poorly circumscribed infiltrative spindle soft tissue sarcoma characterized by local growth although it has the tendency for local recurrence (Bodner-Adler *et al*. 2001). The presence of this in the uterus may lead to repeat breeder syndrome due to the failure to become pregnant. Although the reproductive history of the camel was not available at the time of slaughter, infertility may have been partly the reason for slaughter.

CONCLUSION

The study shows a low prevalence of genital abnormalities in camel cows slaughtered at the Sokoto modern abattoir, with more abnormalities in the ovary encountered than any other part of the genitalia. The genital abnormalities encountered during the study were capable of compromising the reproductive efficiency of camels.

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