

Gross and histopathological lesions of reproductive disorders in Does: an abattoir-based study

*¹Oke, B. E., ¹Ijabo, H. M., ²Num-Adom, S. M., ¹Annakar, F. A., ¹Igwe, F. N. & ²Terfa, A. J.

¹Department of Theriogenology ²Department of Veterinary Pathology, College of Veterinary Medicine, Joseph Sarwuan Tarka University Makurdi-Nigeria

*Correspondence: oke.brenda@uam.edu.ng, +2347033227982

ABSTRACT

Reproduction plays a pivotal role in livestock productivity, and efficient reproductive performance is essential for sustainable goat farming. This study aimed to investigate the prevalence and characterize the gross and histopathological lesions of the reproductive tracts in does slaughtered at Wurukum Abattoir, Makurdi, Benue State, Nigeria. A total of 100 reproductive tracts were collected and examined for pathological abnormalities. The specimens were processed using standard histological techniques, and lesions were identified and quantified based on their prevalence. Out of 100 reproductive tracts examined, 18% exhibited gross reproductive abnormalities, with ovarian cysts (5%), metritis (3%), and pyometra (2%) being the most prevalent. Histopathological examination revealed a 14% prevalence of lesions, with ovarian cysts (5%), uterine lesions (6%), and vaginal abnormalities (2%) documented. Notably, 18% of the does were slaughtered while pregnant, indicating potential issues with reproductive management and pregnancy detection techniques. The findings underscore the importance of regular monitoring and effective management practices to mitigate reproductive losses and enhance productivity in goat farming. Future studies should focus on identifying specific pathogens responsible for these reproductive tract lesions to implement targeted control measures and improve overall reproductive health in small ruminants.

Keyword: Abattoir, Does, gross abnormalities, histopathological lesions, reproductive performance

INTRODUCTION

Reproduction is vital for efficient livestock production, while productivity is usually determined by reproductive performance (Gatahun et al., 2021). Female livestock are often culled due to chronic or reproductive diseases, making abattoirs valuable sources for studying severe pathological lesions of reproductive organs (Fathella et al., 2000). Despite limited reports on genital disorders in goats compared to cattle and ewes (Garba et al., 2019; Baker et al., 2020), understanding the prevalence of female genital abnormalities is crucial for improving reproductive performance and addressing limitations to goat production (Ibrahim et al., 2019). Reproductive efficiency is crucial for livestock productivity which involves various conditions, such as hormonal imbalances and infectious diseases which can disrupt normal reproductive functions, causing infertility and sterility (Abalti et al., 2021; Beena et al., 2015). Studies have shown that genital pathologies can significantly affect reproductive performance in goats as reported by Francis, 2009 and Butswat et al., 2001. Understanding the gross and

histopathological lesions of the reproductive organs in does is essential for successful diagnosis, treatment and prevention of reproductive diseases, thereby enhancing the productivity of goat farming (Hoffman et al., 2019; Mutebi, 2009). This study investigates the prevalence and type of genital tract abnormalities in female goats (does) using abattoir specimens. This study aims to identify the gross and histopathological lesions of the reproductive disorders of does slaughtered at Wurukum Abattoir, Makurdi, Benue State.

MATERIALS AND METHODS

The study was carried out at the Theriogenology and Pathology Laboratories, Veterinary Teaching Hospital Annex, Joseph Sarwuan Tarka University, Makurdi, Benue State. Makurdi is located in East Central Nigeria, with a tropical climate, annual rainfall of 1090 mm, and distinct rainy (April-October) and dry (November-March) seasons (BNARDA, 2010). Assuming a normal distribution of genital lesions in the caprine population, the sample size was calculated using

Thrusfield's (2007) formula, resulting in a total of 100 samples being collected and analysed. The genital organs of does were sourced after the Halal Slaughter from Wurukum abattoir in Makurdi, Benue State. After evisceration, the organs were collected, labeled, placed in sterile containers, packed in ice, and transported to the Theriogenology Laboratory and Histopathology Laboratory for further processing and histopathological examination. Ethical approval for the research was obtained from the Faculty of Veterinary Medicine, Federal University of Agriculture, Makurdi. Systematic examination of genital organs involved visual appraisal, palpation, and incision, with lesions described by size, consistency, color, shape, smell, and location as described by Kissin et al., 2007. Abnormalities were measured using a meter rule, follicles larger than 1.2 cm in diameter were considered cystic (Mutebi, 2009). Tissues were processed using the paraffin wax according to the method described by Avwioro, 2011 and stained with Hematoxylin and Eosin (H&E) for microscopic examination (Kiernan, 1990).

Prevalence of abnormalities expressed in percentage was determined using the relationship:

$$\text{Prevalence rate} = \frac{\text{Number of identified lesions}}{\text{Total number of reproductive organs collected}} \times 100$$

DATA ANALYSES

Data were analyzed using Microsoft Excel 2010 and Stata version 13 statistical software. Descriptive summary statistics were computed for pathological lesions and described quantitatively

RESULT

Prevalence of Gross and Histopathological Lesions

Out of the 100 samples collected the most common gross lesions observed were ovarian cysts (5%), followed by metritis (3%), pyometra (2%), hydrometra (1%), follicular cysts (1%), ovarian hypoplasia (1%), paraovarian cysts (1%), pyosalpinx (1%), cervicitis (1%), necrotizing vaginitis (1%), and vaginal abscesses (1%) (Table 1). The prevalence of lesions in the ovaries and uterus was 6 % each. Vaginal lesions were present in 2 % of the samples (Table 1).

OVARIAN LESIONS

Gross morphological abnormalities of the ovary observed in this study constitute 7% of the total reproductive organs as presented in Table 1. Other pathology observed were ovarian cysts (5%) (Figure 1 and 2) was the commonest ovarian lesion observed, followed by 1% of follicular cyst and, ovarian hypoplasia.

SALPHINGEAL LESIONS

Out of the 2 lesions observed in the salphinx, Paraovarian cyst

(50%) and pyosalpinx (50%) were the only types of gross abnormalities in the fallopian tubes. Pyosalpinx was observed to be associated with pyometra (Table II). Paraovarian cyst (Figure III) observed was a round fluid-filled structure with thin wall, (unilaterally) attached to ovarian bursa

UTERINE LESIONS

The uterus exhibited high frequency of lesions among all the organs studied as presented in Table 1 Out of the 100 reproductive studies. The gross lesions observed were uterine (6%) metritis 3 % while 2 % of the cases associated with granulomatous lesions as seen in Figure 4b. Hydrometra was observed in 1 % does, it was indicated by accumulation of clear fluid in the uterus without fetal membrane in the presence of corpora lutea and associated cervical closure. Pyometra was observed in 2 % of does. Grossly, it presented with bilateral uterine distention with pus. The color of the pus was creamy in appearance as shown in Figure IVc.

Table 1: Prevalence of gross and histopathologies of the reproductive organs

Pathologies	Lesions (number)	Percentage (%)
Ovarian cyst	5	5
Metritis	3	3
pyometra	2	2
Hydrometra	1	1
Follicular cyst	1	1
Ovarian hypoplasia	1	1
Paraovarian cyst	1	1
Pyosalpinx	1	1
Cervicitis	1	1
Necrotizing Vaginitis	1	1
Vagina abscess	1	1
Total	18	18

Note: Total number of collected samples 100

Number of samples with gross and histopathological lesions 18

Table II: Prevalence of salpingeal lesions in does.

Nature of abnormality	Percentage (%)
Paraovarian cyst	50
Salpingitis	Nil
Pysalpinx	50
Total	100

Table III: Prevalence of uterine disease condition in does

Nature of abnormality	Gross lesion (%)	Histopathologies (%)
Pyometra	2	2
Metritis	3	2
Hydrometra	1	nil
Endometritis	nil	2
Total	6	6



Figure 1: Unilateral cyst on the right ovary (a), note the fluid filled cyst (arrow): Hypoplasia of the left ovary (b), note the reduced size of the ovary (arrow): Ovarian cyst (c). note the ovary up to 2cm (arrow)

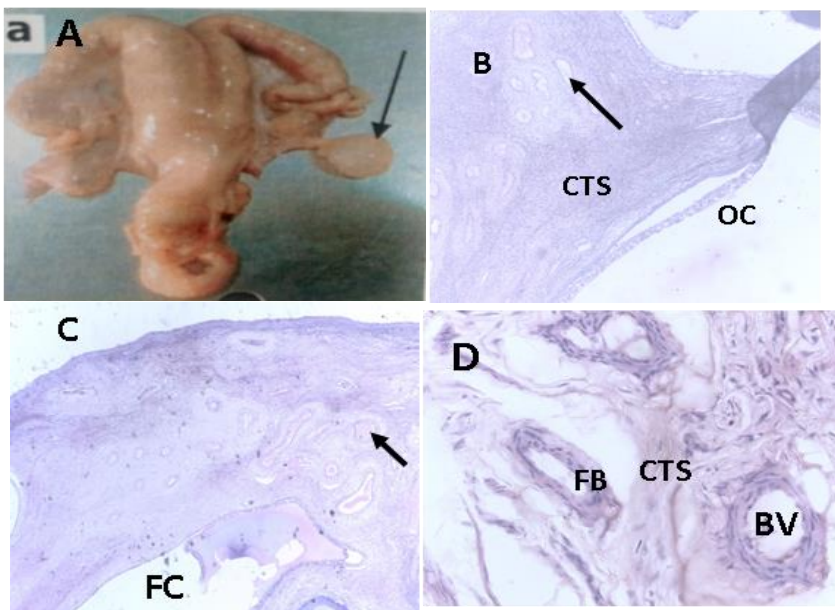


Figure 2: Photomicrograph showing ovarian lesions (A)Gross Ovarian cyst (arrow head), (B) Ovarian Cyst (OC) with Connective Tissue Stroma (CTS), and blood vessels (arrow head) at x 4. (C)Follicular Cyst (FC) with thick-walled blood vessels (arrow head) (D) Ovarian Hypoplasia with Connective Tissue stroma with sheets of Fibroblast (FB) and thick-walled blood vessels (BV).



Figure 3: Arrow showing Paraovarian cyst on the left ovarian bursa

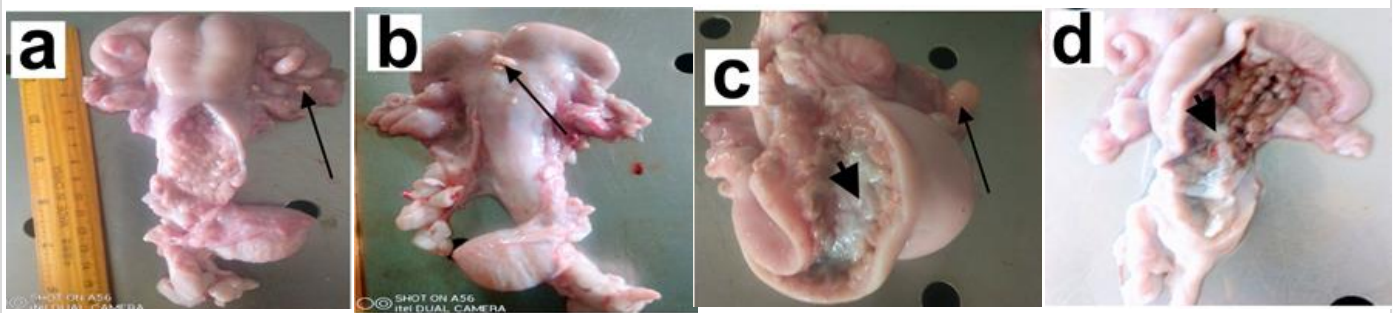


Figure IV: Metritis (a), note the granulomatous lesions on the broad ligament(arrow); Granulomatous lesions on the body of the uterus (b)(arrow); Pyometra involving the uterine body and the horns, note the cream-coloured pus in the uterus (arrow head) and ovarian cyst on the left (arrow); Catarrhal exudate in the uterus (arrow head).

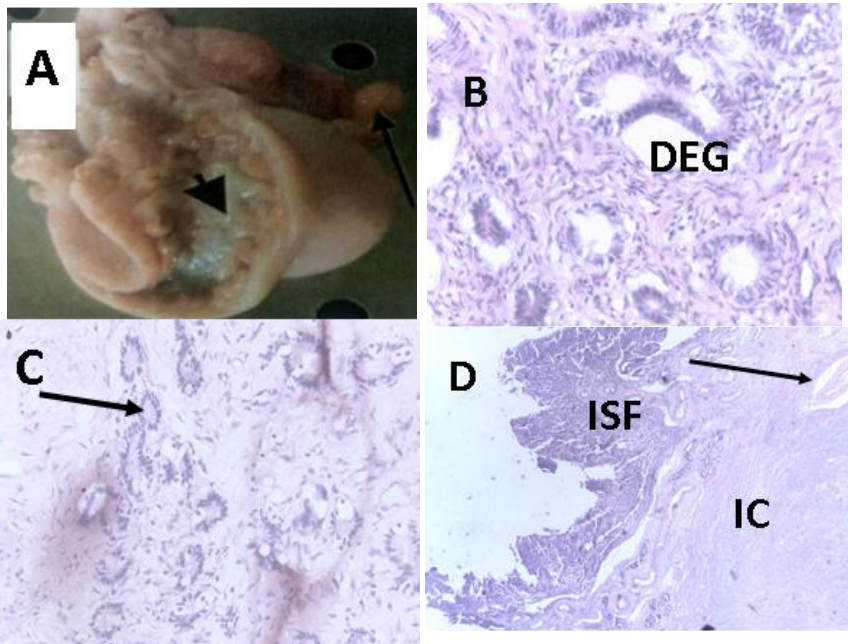


Figure V: Uterine Lesions: (A) Gross representation of the abnormal uterus (arrow head) (B)Chronic Endometritis (x4) with Dilated Endometrial gland (DEG), Normal endometrial gland with surface columnar epithelium and several endometrial glands. (C)Endometritis (x10) with Loosed Connective Tissue Stroma (LCT) lined with spindle or scattered lymphocytes, endometrial glands lined by columnar cells (arrow head). (D) Pyometra showing endometrial glands, endometrial stroma cells, irregular stroma fibrosis (ISF), thick blood vessels (arrow head), necrosis and mixture of inflammatory cells (IC) including lymphocytes, neutrophils

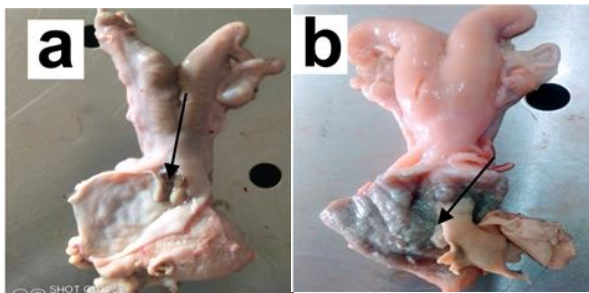


Figure VI: Showing cervical and vagina lesions: Cervicitis associated with pyometra(a), note the accumulated pus in the cervix (arrow); Necrotizing Vaginitis associated with hydrometra (b), note the necrotizing mucosa peeling off (arrow),

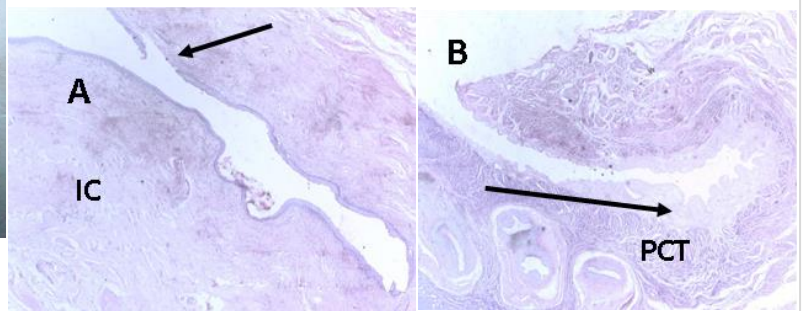


Figure VII: Showing Vaginal Lesions: (A) Chronic vaginitis (x4): Note infiltration of the connective tissue with inflammatory cells including lymphocytes and neutrophils (IC), Necrosis of the nonkeratinized stratified squamous epithelium (arrow head). (B) Vaginal Abscess (x10). Extensive necrosis and sloughing off of the surface epithelium (arrow head). The connective tissue stroma becomes pales (PCT) and edematous.

CERVICAL AND VAGINA LESIONS.

Out of the 100 samples collected, Cervicitis (1%) was observed (Figure VI) to be associated with vaginitis and pyometra, while the necrotizing vaginitis was seen with metritis (Table IV).

Table 4. Prevalence of cervical/vagina lesions in does.

Nature of abnormality	Percentage
Cervicitis	1%
Necrotizing vaginitis	1%
Vagina abscess	1%
Total	100%

DISCUSSION

The present study provides a comprehensive assessment of gross and histopathological findings of the reproductive tracts collected from does for slaughter at the Wurukum abattoir. The observed prevalence of 18.0% for genital tract lesions in these does underscores the importance of understanding reproductive health in small ruminants. While higher than some previous reports (Borden *et al.*, 2013), this prevalence rate remains lower than the remarkably high rates reported by Fahad *et al.*, (2019). Ibrahim *et al.* (2019) who reported 49.3 in Red Sokoto and 43.3 in West African Dwarf does respectively. Disparities in the prevalence rates among studies are often attributed to variations in sample sizes, geographical locations, management practices, and possibly breed-specific susceptibilities to reproductive tract disorders.

Among the pathological conditions identified, ovarian cysts emerged as the most prevalent lesion (5.0%), although lower than rates reported by previous studies (Mutebi, 2009; Archana *et al.*, 2015). This condition is primarily associated with anovulation, where follicles fail to regress and instead continue to enlarge. The incidence of follicular cysts (1.0%) aligns closely with some previous findings (Timurkaan & Karadas, 2000), highlighting consistency in diagnostic criteria for this condition based on follicular size. Endometritis, metritis, and pyometra collectively accounted for uterine lesions observed in 6.0% of the does, with varying prevalence rates compared to previous studies (Mutebi, 2009; Justin *et al.*, 2019). These conditions are often linked to infectious agents, including bacterial pathogens such as *Staphylococcus aureus* and *Escherichia coli*, underscoring the significance of hygiene and management practices in preventing reproductive tract infections (Ababneh & Degefa, 2006). The lower prevalence of

vaginal abnormalities (2.0%) in this study compared to ovarian and uterine lesions might reflect the protective mechanisms of the vaginal mucosa, including its stratified squamous epithelium and local production of lactic acid, which enhance resistance to infections (Getahum *et al.*, 2021). Interestingly, a notable finding was the relatively high proportion (18%) of does slaughtered while pregnant. This finding suggests potential issues with reproductive management, such as inadequate pregnancy detection techniques or unintentional slaughter of pregnant animals due to their market appeal and body condition.

CONCLUSION

The study highlighted the substantial impact of reproductive pathologies on the fertility of does, emphasizing the need for regular monitoring and prompt treatment to mitigate reproductive losses and improve goat farming profitability. In conclusion, this study contributes valuable insights into the histopathological profile of reproductive tract lesions in slaughtered does, emphasizing the need for improved reproductive health management practices. Future research should focus on elucidating the specific pathogens responsible for reproductive tract infections in order to implement targeted prevention and control measures, thereby enhancing the overall reproductive efficiency and welfare of small ruminants.

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CONFLICT OF INTEREST

No conflict of interest.

REFERENCES

- Ababneh, M., and Degefa, A. (2006). Major causes of postpartum uterine infections among Balady goats in Irbid, Jordan. *Journal of Advanced Veterinary Research*, 6(3), 101-105.
- Abalti, K., Gatahun, A., Mutebi, J., and Ibrahim, H. (2021). Impact of hormonal imbalance on reproductive efficiency in goats. *Journal of Animal Science*, 99(Supplement 1), 200.
- Archana, M., Borden, J., Fahad, K., and Francis, D. (2015). Pathological studies of cystic ovaries in goats. *Indian Journal of Veterinary Pathology*, 39(2), 183-187.
- Avwioro, O. G. (2011). Staining Reactions of Microwave Processed Tissues Compared with Conventional Paraffin Wax Processed Tissues. *European Journal of Experimental Biology*, 1: P. 57-62
- Baker, R., Thompson, J. and Lee, M. (2020). Ovarian and reproductive tract disorders in small ruminants: A review. *Journal of Veterinary Medicine*, 45(3), 123-130.
- Beena, V., Abalti, K., and Mutebi, J. (2015). Reproductive disorders in goats and their management. *Veterinary World*, 8(7), 911-916.

- BNARDA, (2010). Benue Agricultural and Rural Development Authority. The impact of BNARDA on Agricultural and Rural Development in Benue State. BNARDA Bulletin. p 2-6.
- Borden, J., Fahad, K., and Ibrahim, H. (2013). Reproductive tract lesions in slaughtered does. *Journal of Veterinary Pathology*, 42(4), 521-527.
- Butswat, I., Beena, V., and Francis, D. (2001). Impact of genital pathologies on reproductive performance in goats. *Journal of Reproduction and Development*, 47(3), 275-281.
- Fahad, K., Ibrahim, H., and Abalti, K. (2019). High prevalence of genital tract lesions in goats. *Animal Reproduction Science*, 207, 105-112.
- Francis, D. (2009). Impact of reproductive disorders on goat farming. *Livestock Research for Rural Development*, 21(2), 34-40.
- Garba, I., Dawuda, P., Ate, I. and Abenga, J. (2019) Genital Tract Morphopathology of Red Sokoto and West African Dwarf Does in Makurdi. *Open Journal of Veterinary Medicine*, 9, 21-44.
- Gatahun, A., Mutebi, J., and Getahum, A. (2021). Role of reproduction in livestock production. *Journal of Animal Reproduction*, 98(6), 1001-1008.
- Getahum, A., Mutebi, J., and Francis, D. (2021). Protective mechanisms of vaginal mucosa in small ruminants. *Journal of Veterinary Medicine*, 45(3), 400-405.
- Hoffman, A., Garcia, A., and Wilson, T. (2019). Prevalence and types of ovarian lesions in domestic goats: A retrospective study. *Veterinary Pathology*, 56(2), 245-250.
- Ibrahim, H., Fahad, K., and Abalti, K. (2019). Genital abnormalities in goats compared to cattle and ewes. *Journal of Comparative Pathology*, 134(2), 201-207.
- Kiernan, J. A. (1990). *Histological and Histochemical Methods: Theory and Practice*. Pergamon Press.
- Kissin, M., Gatahun, A., and Mutebi, J. (2007). Techniques for examining reproductive organs. *Veterinary Techniques*, 23(4), 450-455.
- Mutebi, J. (2009). Histopathological findings in reproductive organs of does. *Journal of Veterinary Medicine and Animal Health*, 1(1), 10-15.
- Thrusfield, M. (2007). *Veterinary Epidemiology*. 3rd Edition. Blackwell Science Ltd.