





LEYDIG CELL TUMOR IN A 2½ YEAR OLD YANKASA – BALAMI CROSS RAM: PARTIAL SCROTAL ABLATION AS A REMEDY

Japheth Joel Kalang ^{1*}, George Yilzem Gurumyen ², Richard Edem Antia³, Sunday Hena ⁴, Essienifiok Saturday Unanam¹ and Tanko Nwunuji Polycarp ²

¹Department of Veterinary Medicine, Surgery and Radiology University of Jos Nigeria; ²Department of Veterinary Microbiology and Pathology University of Jos Nigeria; ³Department of Veterinary Pathology University of Ibadan, Oyo State Nigeria; ⁴Department of Veterinary Anatomy University of Jos Nigeria

*Corresponding author: japhethjkalang@gmail.com

ABSTRACT

Leydigomas are generally observed within the testicles and documented extra-testicular occurrences in the pelvis, the epididymis, and the spermatic cord. Histologically, the tumor cells are large to polygonal with a round to oval nucleus and deeply acidophilic with granular cytoplasm. A 2½-year-old Yankasa-Balami cross-ram was presented at the Large Animal Clinic Unit of the Veterinary Teaching Hospital with the chief complaint of persistent (chronic) testicular swelling. The caretaker repeatedly aspirates the fluid within the testis without any progress, hence, the referral. To the best of our knowledge, this is the first report of a Leydig cell tumor in a small ruminant, and we recommend that blind drainage of orchitis with a syringe and needle should not be attempted.

Keywords: Leydig cell tumor: Orchidectomy: Pathology: Ram: Scrotal ablation

Article History (2022-5101) || Received: 13 Mar 2022 || Revised: 08 Apr 2022 || Accepted: 22 Apr 2022 || Published Online: 20 May 2022

1. INTRODUCTION

Leydig cell tumor (LCT) are rare clinical findings, with approximately 2.5% malignancy (Taylor et al. 2019). Leydigomas are generally observed within the testicles, but, extra-testicular occurrences were also documented (Mameli et al. 2016; Zeuschner et al. 2018; Daggett et al. 2020). Till to-date, due to its rare incidence, scientists are unable to establish metastasis frequency of the tumor and any evidence-based procedure for irrefutable management of the tumor (Tomoo et al. 2019). Since Franz von Leydig first reported it in 1895, the etiology is unknown, however, with new technology LCT can be studied (Al-Bayati and Al-Salhi 2018). LCT reveals as a well-circumscribed lesion in the testis, grossly as golden brown or homogeneous yellow to light brown appearance. Histologically, the tumor cells are large to polygonal with a round to oval nucleus and deeply acidophilic with granular cytoplasm. The cytoplasm are rod-shaped crystals referred to as "crystalloids of Reinke" (Julio et al. 2015; Zeuschner et al. 2018; Zhu et al. 2018). Orchidectomy with or without scrotal ablation is necessary in conditions involving testicular tumor (Abubakar et al. 2019). Orchidectomy is seldom carried out in ram in Nigeria, as they are economically more relevant when intact (Aslam 2019). The testis in the scrotal sac is attached to the scrotum by the scrotal ligament on the medial side. Most external on the testis is the tunica vaginalis, this enclosed the epididymis and the tunica albuginea. The epididymis is located on the medial aspect of the testis. Enclosing the stroma of the testis is the tunica albuginea, this is then followed by the seminiferous tubules and then the rete testis (Hendrickson and Baird 2018).

2. MATERIALS AND METHODS

2.1. History

A 2 ½ year old Yankasa-Balami cross ram was presented at the Large Animal Unit, Veterinary Teaching Hospital University of Jos (VTHUJ) with the chief complaint of persistent (chronic) testicular swelling (Fig. 1A). The client reported that the ram had the swelling, and that the caretaker aspirated the fluid with syringe and needle within the testis, this was repeated several times without any success, hence the decision to present the animal at the VTHUJ. The ram was reported to have normal appetite, with reduced activities.

2.2. Clinical Examination/diagnosis

The animal on clinical examination had ticks with unilaterally swollen right scrotum, was sent to the parasitology laboratory for diagnosis. On palpation the animal showed slight pain and the affected scrotum prevents the normal floating of the testicle within it, especially towards the medial side (scrotal septum) however, no visible wound was noticed on the scrotum. Our tentative diagnosis were babesiosis due to the presence of the ticks, orchitis due to the slight pain on palpation of the swollen scrotum, testicular hydrocele due to the enlarged testicle and Leydig cell tumor due to the unilaterally large size scrotum with absence of subcutical fluid though with similar hard consistencies as noticed in the normal testis. The swollen testicle had hard consistencies, with the inguinal ring not enlarged, hence scrotal hernia was rule out, scrotal tumor was queried from the history of fluid (not blood) been repeatedly drained with re-occurrence, hence, was also ruled out. From the parasitology laboratory result, the tick isolated was *Amblyoma variegatum*, while *Babesia ovis*, was reported in the blood. Clinical pathology results showed normal hemogram.

2.3. Case Management (Treatment)

The animal was prepared for surgery, with surgical site (right scrotum) aseptically prepared, sedation was achieved using xylazine (0.1mg/kg), physical restrain and animal was draped (Fig. 1B). Anesthesia was achieved at the neck of the affected scrotum as well as the spermatic cord using 2% lidocaine hydrochloride. A linear incision was made on the scrotum exposing the testis, the tunic was also incised (Fig. 1C; 1D), however, could not be easily separated from its visceral surface, due to adhesions., caused by testicular injury closed to the scrotal septum (Fig. 2A; 2B) The spermatic cord was exteriorized, ligated using double figure eight suture, with chromic catgut size-2.



Fig. 1: A: Normal scrotum (n), enlarged scrotum (e). B: Drape (d), anaesthesia (s). C: testis (t), scrotum (s). D: testis (t), scrotum (s).



Fig. 2: A: Exposed testis showing adhesion site (a). B: Showing site of suture placement(s) injured site of the testis identified (a). C: Stump of the spermatic cord (i) interlocking suture (s). D: Day 14 after stich removal, surgical site (a), scrotum (s).

The spermatic cord was then severed, the distal stump evaluated for bleeder as the tip of the suture material was held with a hemostat and dapped (Fig. 2C). Noticing the highly vascularized, distended, large, empty scrotal sac; scrotal ablation was carried out (Fig. 2D). An incision was made at an angle of about 45° distal to the neck of the scrotum, this was extended ventrally to the bifurcation of the scrotum, however, the scrotal septum wasn't touched, so as to avoid much influence on the second testicle. The scrotum was then apposed using interlocking suture because of the vascularity of the scrotum, this was further strengthened with an interrupted suture pattern. Post-surgically, the animal was placed on 20% oxytetracycline and oxytetracycline spray. Berenil was also administered to treat for the babesiosis. Sutures were removed 10 days post-surgery.

3. DISCUSSION

In view of the religious value of ram for annually sacrifice as stated by Aslam (2019), small ruminants reared by locals are basically meant to serve as a mobile bank for emergencies and eventualities (Abubakar et al. 2019). Rams in particular, are exceptionally priced animals during the Islamic religious festival (Eid-al-Adha) that is the Muslim meat festival where adult sheep are been slaughtered (Aslam 2019), hence, rams are rarely castrated. Common conditions that will require a farmer or a local to castrate a ram will include, scrotal hernia, automobile accident that affects the testicles and non-healing trauma to the scrotum, (Hendrickson and Baird 2018). Hence, conditions involving the scrotum usually becomes chronic before the final decision to castrate (Aslam 2019). In this clinical case report, the ram must have sustained an injury on its right testicle by a sharp penetrating object as two similar conditions were reported (Abubakar et al. 2019; Jasmer and Kuldeep 2017). Testicular fluid can be drained (Jasmer and Kuldeep 2017), however, in our opinion this will only lead to more injuries to the testicle, especially to the seminiferous tubules and rete testis, exposing germ cells into the blood circulation, consequently, leading to increased immunological response. The puncture wound was likely contaminated, though un-noticed, until orchitis had reached advance stage.

The blind centesis with needle and syringe must have caused more injury to the seminiferous tubules and rete testis, consequently, introducing microbes into the testicle (as the centesis employed was without proper aseptic procedure as reported by the client). The repeated centesis, traumatized the scrotum and the testis, leading to adhesions between the testis and the scrotal sac. The adhesions were also observed between the parietal vaginal tunic and the visceral vaginal tunic, with the tunica albuginea during the surgical procedure. This was obvious as shown by the thickened testicular tunics that apparently form a large cyst around the testis as shown in Fig. 3A; 3D, with smaller cysts observed within the testicular tunics Fig. 3C. The adhesions resulted in fibrotic nature of the scrotum and the affected testis, hence, the increased vascularization of the testis as well as the scrotum (Fig. 3B).



Fig. 3: A, Testis with large thickened cyst, caseous mass (m), with blood-tinged fluid (t); site of adhesion to the scrotum (asterisk). B, Scrotum having a reddish tissue (asterisk) site of adhesion to the testis; skin (s). C, Incised surface of cyst showing reddish tissue (asterisk); smaller cysts (a). D, Atrophic testis (b) with a non-uniform consistency (n)

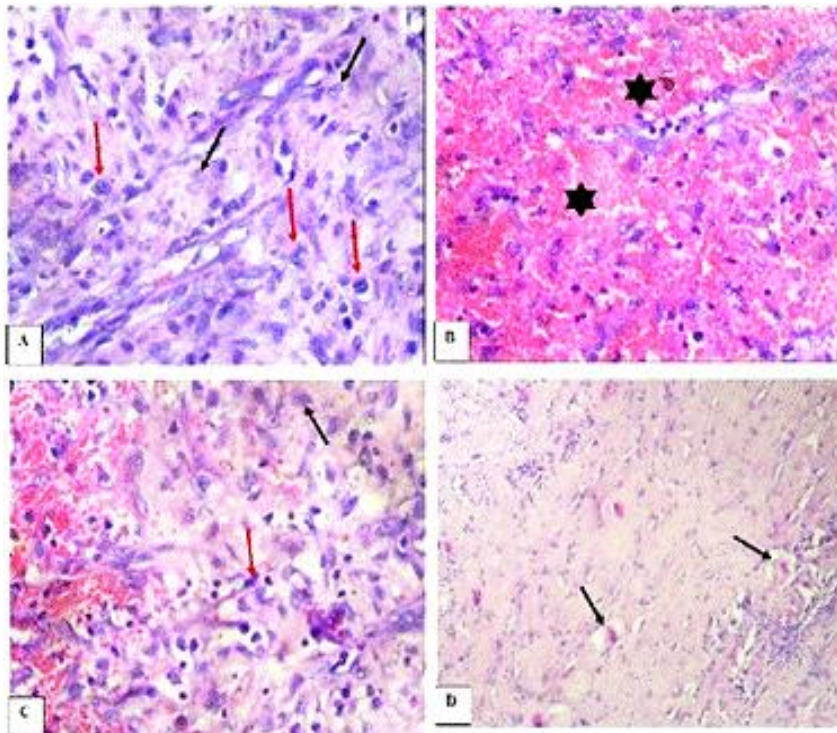


Fig. 4: Photomicrograph. A and C, presence of polygonal cells (red arrow) containing eosinophilic materials, vacuoles, and some cellular molding (black arrow). B, Cystic vascular spaces (asterisk) with anisopoikilocytosis. D, Cystic structures (arrowhead) surrounded by solid matrix. A, B& C $\times 40$ obj, D $\times 10$ obj

Generally, tumors are highly vascularized and as reported by Mameli et al. (2016) that, LCT induce oncogenesis, could be due to excessively stimulation of the structural changes of the luteinizing hormone receptors and guanine nucleotide binding proteins. Somatic activating mutation in the guanine nucleotide binding protein α gene may result in tumor development, noting that, LCTs are incidental finding of a testicular mass (Gheorghisan-Galateanu 2014).

Microscopic evaluation of the affected testis in the veterinary clinical pathology laboratory of the VTH mainly revealed inflammatory cells from fine needle aspirate. However, on histopathological evaluation, the laboratory result confirmed that the testicular enlargement was due to a LCT. As it is consistent with the proliferation of large polygonal tumor cells (Fig. A; C) with granular eosinophilic cytoplasm and prominent nucleoli arranged in sheets pattern as shown in Fig. 4A; 4B; 4D which was consistent with Zhu et al. (2018). On further analysis the LCT was observed to be composed of multiple lobules (cyst) separated by a fibrovascular connective tissue stroma within the tunica tunics as also reported by (Mennie et al. 2017; Tomoo et al. 2019). The neoplastic cells were oval-to-polyhedral and had variable amounts of granular or vacuolated eosinophilic cytoplasm with distinct cell borders. Nuclei were round-to-oval with finely to coarsely stippled chromatin furthermore, neoplastic cells had mild-to-moderate anisocytosis and anisokaryosis (Fig. 4B) as also observed by Khaleel et al. (2022).

In the present case, caseous mass was observed to be majorly restricted to the testicular tunics while the testicular stroma tends to atrophies without granuloma, Jasmer and Kuldeep (2017) reported that chronic orchitis due to puncture into the testis result in rupture of the seminiferous tubules and other structures, hence, the exposure of spermatocytogenic cells that stimulates immune and autoimmune response, precipitating into caseous mass, that is, spermatocytic granulomas in the testicular stroma. Hence, Blind drainage of orchitis with syringe and needle should not be attempted without image guided technique. After the orchidectomy in the present case, partial ablation of the scrotum was performed as superfluous skin was the remains of the affected scrotum which could form a large pocked, resulting in fluid accumulation. Consequently, partial scrotal ablation was performed to obliterate the death space and to evade the formation of edema which could result in post-surgical complications. Consequently, orchidectomy alone with scrotal ablation is the major management for this condition in ram. The skin was closed as recommended using simple continuous suture pattern, however, simple interrupted sutures were added to prevent total suture break with the continuous suture pattern. This was employed as the client admitted that the affected animal cannot be isolated until total healing but will have to remain in the herd. No sign of metastases was observed in terms of regrowth at the surgical site or enlarged inguinal lymphnode. LCT metastases is uncommon in the young and only few percentages develop within 12 months as most occurrence develop after 12 months of onset (Julio et al. 2015).

Conclusion

Scrotal evaluation should be a normal practice by care givers, especially for breeding stock. Any abnormality noticed should be promptly attended to. We recommend that, in testicular swelling, needle should not be used to drain the fluid, as this will traumatize the seminiferous tubules and or rete testis, except with an image guided technique. In case of swollen testis in the ruminants, clinician should use palliative medications (not unguided testicular centesis), orchidectomy and by extension, scrotal ablation where necessary, hence. Orchidectomy alone with scrotal ablation is the major management for this condition in small ruminants. To the best of our knowledge, this is the first report of naturally occurred LCT in a ram (small ruminant).

Author's Contribution

All authors contributed significantly to the write-up, surgery, clinical management and laboratory analysis.

ORCID

Japheth, Joel. Kalang <https://orcid.org/0000-0002-7139-3601>
George Yilzem Gurumyen <https://orcid.org/0000-0001-6389-8573>
Sunday Hena <https://orcid.org/0000-0002-5231-4947>
Tanko Nwunji Polycarp <https://orcid.org/0000-0003-1459-2564>

REFERENCES

- Abubakar N, Bodinga H, Sidi S, Yakubu A and Abubakar A, 2019. Management of scrotal hernia in 6 and 9 months old Oudah rams: A case report. *Asian Journal of Case Reports in Surgery* 2: 1-6.
- Al-Bayati MA and Al-Salhi LH, 2018. Attenuation of ifosfamide adverse effect on leydig, sertoli and spermatogonia cells of ram testis by liposome technique in vitro. *Kufa Journal of Veterinary Medical Sciences* 9: 101-120.
- Aslam S, 2019. Halal sheep meat in Norway: Muslims festivals – a new niche in the market. Master thesis, faculty of applied ecology, agricultural sciences and biotechnology. Inland Norway University of Applied Science, 2019; pp: 32-54.
- Daggett J, Hawkins S, Phair K, West G, Place NJ and Struthers JD, 2020. Pathology in Practice. *Journal of the American Veterinary Medical Association* 257: 599-600. <https://doi.org/10.2460/javma.257.6.599>
- Gheorghisan-Galateanu AA, 2014. Leydig cell tumors of the testis: a case report. *BMC Research Notes* 7: 656. <https://doi.org/10.1186/1756-0500-7-656>
- Hendrickson DA and Baird AN, 2018. Turner and McIlwraith's Techniques in Large Animal Surgery. 4th Ed, Wiley Blackwell, pp: 235-240.
- Jasmer DAK and Kuldeep G, 2017. Management of unilateral chronic orchitis and hydrocele in a Sahiwal bull. *Indian Veterinary Journal* 94: 68-69.
- Julio JG, Stephen DM, Tammy SH and Steven BB, 2015. Testicular Leydig cell tumor with metachronous lesions: Outcomes after metastasis resection and cryoablation. *Case Reports in Urology* 2015: 748495. <https://doi.org/10.1155/2015/748495>
- Khaleel AO, Idrees, MT, Abdulfatah E, Kunju LP, Wu A, Ulbright TM, 2022. Large cell calcifying Sertoli cell tumor: a clinicopathologic study of 18 cases with comprehensive review of the literature and reappraisal of prognostic features. *The American Journal of Surgical Pathology* 46: 688-700. <https://doi.org/10.1097/PAS.0000000000001849>
- Mameli C, Selvaggio G, Cerini C, Bulfamante G, Madia C, Riccipettoni G and Vincenzo GZ, 2016. Atypical leydig cell tumor in children: Report of 2 cases. *Pediatrics* 138: e20160151. <https://doi.org/10.1542/peds.2016-0151>
- Mennie N, King SK, Marulaiah M, Ferguson P, Heloury Y and Kimber C, 2017. Leydig cell hyperplasia in children: case series and review. *Journal of Pediatric Urology* 13: 158-163. <https://doi.org/10.1016/j.jpuro.2016.12.028>
- Taylor ML, Matthew D, Shengmei Z, Hao W, Nicholas GC, Lefkothea K and Rajkumar VA, 2019. multicenter retrospective review of pediatric Leydig cell tumor of the testis. *Journal of Pediatric Hematology/Oncology* 41: 74-76. <https://doi.org/10.1097/MPH.0000000000001124>
- Tomoo K, Junichi K, Naoyuki A, Masaki D, Ayumi S, Tetsuo O and Kinji S, 2019. Malignant Leydig cell tumor in dogs: two cases and a review of the literature. *Journal of Veterinary Diagnostic Investigation* 31: 557-561. <https://doi.org/10.1177/1040638719854791>
- Zeuschner P, Veith C, Linxweiler J, Stöckle M and Heinzlbecker J, 2018. Case report two years of gynecomastia caused by Leydig cell tumor. *Case Reports in Urology* 2018: 7202560. <https://doi.org/10.1155/2018/7202560>
- Zhu J, Luan Y and Li H, 2018. Management of testicular Leydig cell tumor: A case report. *Medicine* 97: 25. <https://doi.org/10.1097/MD.0000000000001158>