P-ISSN: 2304-3075; E-ISSN: 2305-4360
International Journal of Veterinary Science
www.ijvets.com; editor@ijvets.com

Case Report https://doi.org/10.47278/journal.ijvs/2023.114

Abdominal Pedunculated Leiomyoma in a Male Dromedary Camel: Clinical, Hematobiochemical, Ultrasonographic and Pathologic Findings

Madeh Sadan[1,2,*], Mohamed Tharwat[1], Saleh Alkhedhairi[1], Walid Refaai[3,4], Hazem M EL Moghazy[3,5], Mostafa M Khodier[6,7], Abdullah S. Alkhamiss[6] and Ahmed Ghallab[8,9]

[1]Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, P.O. Box 6622, Buraidah, 51452, Saudi Arabia
[2]Department of Surgery, Anesthesiology and Radiology, Faculty of Veterinary Medicine, South Valley University, Qena 83523, Egypt
[3]University Veterinary Hospital, Qassim University, P.O. Box 6622, Buraidah, 51452, Saudi Arabia
[4]Department of Surgery, Anesthesiology and Radiology, Faculty of Veterinary Medicine, Zagazig University, Zagazig-city, El Sharkia 44519, Egypt
[5]Veterinary Teaching Hospital, Faculty of Veterinary Medicine, Benha University, 13511, Benha, Egypt
[6]Department of Pathology, College of Medicine, Qassim University, Qassim, Saudi Arabia
[7]Department of Pathology, Faculty of Medicine, Cairo University, Cairo, Egypt
[8]Leibniz Research Centre for Working Environment and Human Factors, Technical University Dortmund, Dortmund, Germany
[9]Department of Forensic Medicine and Toxicology, Faculty of Veterinary Medicine, South Valley University, Qena, Egypt
***Corresponding author:** m.sadan@qu.edu.sa

Article History: 23-340 Received: 26-Oct-23 Revised: 11-Nov-23 Accepted: 15-Nov-23

ABSTRACT

This clinical report describes the clinical, ultrasonographical, hematological, biochemical, and pathological findings in a 2-year-old male dromedary camel (*Camelus dromedaries*) with abdominal pedunculated leiomyoma. Case history included a decreased appetite and gradual loss of body weight. Ultrasonography of left abdomen revealed echogenic deposits with anechoic areas among the left kidney, spleen, and abdominal wall. A large hypoechoic highly vascularized mass was detected directly below the left kidney and spleen. Exploratory laparotomy revealed tumor masses affecting the wall of left abdomen. Histopathological findings revealed torsade pedunculated leiomyoma with hemorrhagic infarction, thick-walled blood vessels and wide areas of hemorrhage and necrosis. To the authors' knowledge, this is the first clinical report describing an abdominal pedunculated leiomyoma in dromedary camels.

Key words: Animals; Camels; Diagnostic imaging; Pathology; Ultrasound.

INTRODUCTION

Leiomyoma is commonly reported as a benign tumor of the digestive system, originating from the smooth muscle layer (Myers and Penninck 1994). In a slaughterhouse investigation, leiomyomas were found to have a low prevalence of occurrence as it represented only 1-2% of all tumors in cattle, sheep and pigs (Moulton 1978). Examination of 9576 dromedary camels in Saudi Arabia in a Veterinary Teaching Hospital revealed 59(0.006%) animals suffering from various types of neoplasia. These tumors were classified histologically to fibroma, squamous cell carcinoma, fibromyxosarcoma, adenocarcinoma, angiosarcoma, leiomyoma, lipoma, schwannoma, renal cell carcinoma, microcystic adnexal carcinoma, granulosa cell tumor and sertoli-leydig cell tumor. Locations of these tumors were found at the limbs, vagina, abdominal wall, head, sacrum, neck, intraoral, cervix, ovary, rectum, uterus, soft palate and kidney (Alsobayil et al. 2018; Ali et al. 2019). Separate reports including granulosa cell tumor (Ali et al. 2013), renal cell carcinoma (Tharwat et al. 2017); genital adenocarcinoma (Ali et al. 2018) and omasoabomasal adenocarcinoma (Tharwat et al. 2018b) was also reported in camels.

Cite This Article as: Sadan M, Tharwat M, Alkhedhairi S, Refaai W, Moghazy HMEL, Khodier MM, Alkhamiss AS and Ghallab A, 2024. Abdominal pedunculated leiomyoma in a male dromedary camel: Clinical, hematobiochemical, ultrasonographic and pathologic findings. International Journal of Veterinary Science 13(4): 458-462. https://doi.org/10.47278/journal.ijvs/2023.114

Additionally, sixteen type of neoplasms were reported by (El-Shafaey et al. 2020) in one study at different body areas in dromedary camels, including fibrosarcoma, fibromas, papilloma, myxopapilloma, fibropapilloma, osteosarcoma, pyogranuloma, squamous cell carcinomas, and lymphosarcoma. However, leiomyoma is rare in domestic animals; 2 reported cases of pulmonary leiomyoma were found in 8 and 10 years old male camels. The first tumor masses were detected in the visceral pleura of a camel and while the second were found in the pulmonary tissue of the other camel (Wareth and Moustafa 2013).

Ultrasonography was proved to be effective unique, non-invasive diagnostic imaging tool in examining camels either in diagnosis and prognosis of different camel diseases (Tharwat et al. 2012a;b; Tharwat et al. 2012d; Tharwat 2013; Tharwat et al. 2017; Tharwat et al. 2018b; Tharwat 2019; 2020a;b;c; 2021a;b; Tharwat and El-Omar 2021). In camel neoplasia, ultrasonography was reported to be useful in suspicion of neoplasm activity until histopathological reports arrive (Tharwat et al. 2017; Tharwat et al. 2018b). Present clinical report describes the clinical, ultrasonographical, hematological, biochemical, and pathological results in a male Arabian camel (*Camelus dromedaries*) confirmed with pedunculated leiomyoma affecting the abdominal cavity.

MATERIALS AND METHODS

Case Report

A 2-year-old male dromedary camel *(Camelus dromedaries)* was admitted to the University Veterinary Hospital of Qassim University, Saudi Arabia, with a history of chronic weight loss. The owner stated that the camel was previously treated with different medications including broad spectrum antibiotics, analgesics, anti-inflammatories, and appetizers; however, with no response. Thorough clinical examination of the camel was carried out including general condition, auscultation of the lungs, rumen, heart, and intestines, together with percussion auscultation of both sides of the abdomen, swinging auscultation, and recording of the respiratory and heart rates and estimating rectal temperature as well as rectal palpation (Tharwat et al. 2018a).

Determination of the Hematobiochemical and Blood Gas Variables

The erythrocyte count, total and differential leukocytic count, hemoglobin, hematocrit, and the red blood cells indices including mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC) were measured in the EDTA blood sample (VetScan HM5, Abaxis, California, USA). An automated biochemical veterinary analyzer (VetScan VS2, Abaxis, California, USA) was used to assess the serum values of albumin, total protein, globulin, blood urea nitrogen (BUN), creatinine, glucose, sodium, total bilirubin and potassium.

Ultrasonographic and Surgical Interference

The camel was examined by ultrasonography in a sitting position. Both thoracic and abdominal sides were clipped and the skin shaved. The procedure was performed out using 3.5 MHz sector transducer (SonoScape, Sonoscape Medical Corp., China). The thoracic and abdominal organs were thoroughly examined as previously reported (Tharwat et al. 2012c;b; Tharwat 2020a;b;c;2021a;2024). Based on the owner's request, the camel underwent left flank exploratory laparotomy. At surgery, tumor masses were detected affecting the wall of the abdomen just cranial to the rumen. Immediately after being taken from the operating theater, a tumor specimen was fixed in 10% neutral buffered formalin for 24h before being routinely processed and embedded in paraffin. For histopathological diagnosis, consecutive 5-µm-thick sections were cut with a microtome and stained with hematoxylin and eosin (Bancroft and Gamble 2019).

RESULTS

The main owner complaint consisted of chronic weight loss, constipation and fits of abdominal pain (rolling) during the last 6 months. Physical examination revealed that camel had emaciation with a body condition score of 2.0 (scale 1 to 5) (Fig. 1). Hematological examination revealed hematocrit 20.13% (normal value 28.9±2.7%), RBCs 9.14×10^6/µL (normal value $11.3\pm1.4\times10^6$/µL), hemoglobin 12.4g/dL (normal value 16.0±2.3 g/dL), MCV 22fL (normal value 25.5±1.5fL), MCH 13.5pg (normal value 14.7±2.4pg), MCHC 61.4g/dL (normal value 57.6±9.0g/dL), white blood cell count 21640/µL (normal value $16.9\pm2.7\times10^9$/L), neutrophils 17250/µL (normal value $9.8\pm3.0\times10^9$/L), and lymphocytes 3060/µL (normal value $5.9\pm2.4\times10^9$/L).

Blood chemistry panel showed albumin 3.3g/dL (normal value 4.2±0.4g/dL), total protein 6.4 g/dL (reference range 7.9±0.4g/dL), globulin 3.2g/dL (normal value 3.7±0.5g/dL), BUN 5mg/dL (normal value 17±10.0mg/dL), glucose 127mg/dL (normal value 61±19 mg/dL), calcium 10.1mg/dL (normal value 8.6±0.7mg/dL), creatinine 1.2mg/dL (normal value 1.3±0.2mg/dL), sodium 155mmol/L (normal value 163±2.0mmol/L), potassium 5.6mmol/L (normal value 3.8±0.2mmol/L), and total bilirubin 0.3mg/dL (normal value 0.8±0.3mg/dL). Reference values for hematological and serum biochemistry were taken from previous reports (Tharwat 2012; Tharwat et al. 2013; Tharwat 2015).

On the right side, transabdominal ultrasonography revealed nothing abnormal. However, on the left side, ultrasound scanning revealed echogenic deposits (21.03mm thickness) with anechoic areas among the left kidney, spleen and left abdominal wall (Fig. 2A). A large hypoechoic highly vascularized mass was detected directly below the left kidney and spleen (Fig. 2B). Furthermore, at the ventral abdomen, widely invaded hyperechoic deposits were imaged distributed between the rumen and left abdominal wall (Fig. 2C).

Left flank exploratory laparotomy revealed presence of huge firm expanded mass attached to the wall of the left abdomen just lateral to the rumen. Exteriorization of the mass was extensively difficult, so trials for obtaining a specimen for histopathology were carried out. The operated camel had a grave prognosis.

Histopathological examination of the prepared specimen revealed Thick-walled vessels at the pedicle with multiple infarct necrosis areas with hemorrhages, with focal rim of viable smooth muscle tissue (Fig. 3 and 4).

Fig. 1: A 2-year-old emaciated male dromedary camel with pedunculated abdominal leiomyoma. It was admitted with a history of chronic weight loss, constipation, and fits of abdominal pain.

DISCUSSION

According to Al-Sobayil et al. (2018), out of 59 reported tumors, only 2 cases (3.4%) of vaginal leiomyoma were found. The widely detected tumors in camels were squamous cell carcinoma (37.3%), adenocarcinoma (22%) and fibroma (22%). In this investigation, neoplasia was detected incidentally during routine transabdominal ultrasonography of a male camel suffered from chronic weight loss and fits of abdominal pain. It was confirmed histologically to be pedunculated leiomyoma. To our knowledge, the present clinical article is the first that describes pedunculated leiomyoma in dromedary camels. The clinical signs were not indicative and included chronic weight loss, constipation, and abdominal pain. In addition, the blood picture and serum chemistry panel were nonspecific and provided little aid in obtaining a diagnosis of the leiomyoma.

On the other side, ultrasound examination was helpful in providing information on the detection and the extent of the tumor masses on the left side of the body and involvement of surrounding structures especially the left kidney, spleen, and rumen. In this report, it was interesting to detect the tumor mass was unilateral and involving only the left side of the abdomen. Ultrasound examination although routinely performed is therefore the best rewarding imaging procedure. There are no ultrasonographic features that reliably allow differentiation of smooth muscle tumors from gastrointestinal stromal tumors (Segarra et al. 2022). However, histopathological examination of a tumor specimen remains the confirmatory diagnosis.

A pedunculated leiomyoma is prone to torsion, especially if the pedicle is thin and long enough to cause excess motility, facilitating torsion. Those with an enlarged leiomyoma will also be at increased risk for torsion (Tsai et al. 2006). The mass in our case was large, more than 10cm. When the torsion is left untreated, there may be hemorrhagic infarction and infection of the lesioned leiomyoma (Roy et al. 2004).

Peritoneal tumors including leiomyoma are usually discovered incidentally during ultrasonographic examinations or exploratory laparotomy. Surgical excision may be successful in early stages (Filianoti et al. 2018). However, treatment is considered hopeless in later stages where many organs were involved, and adhesions occurred.

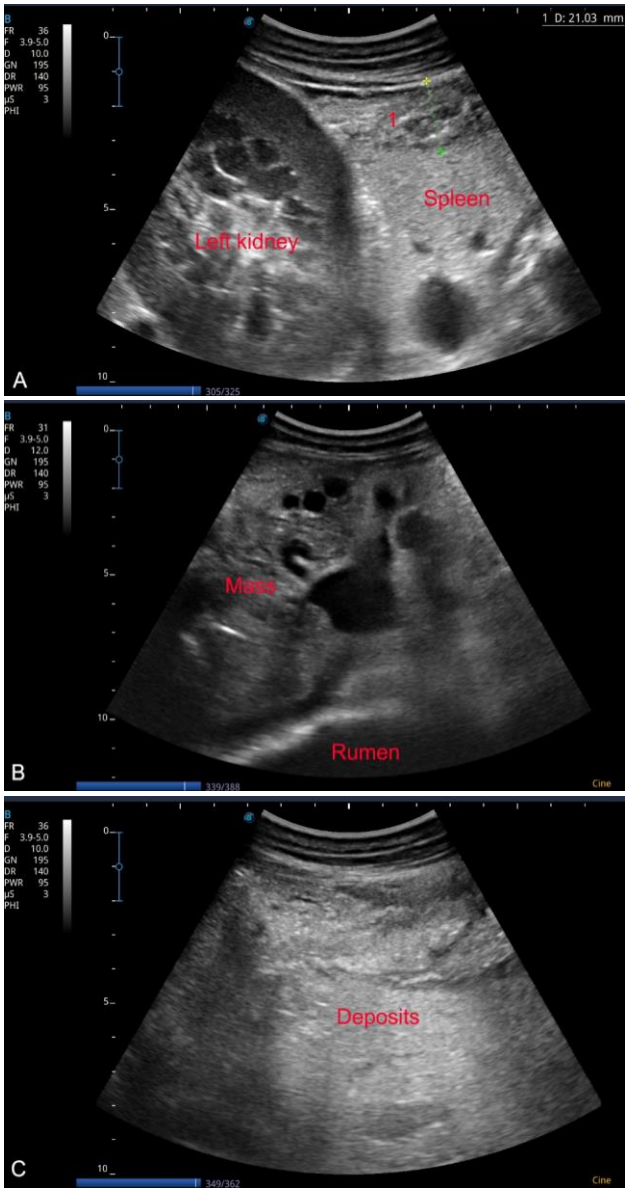

Fig. 2: Ultrasonographic findings in a 2-year-old emaciated male dromedary camel with pedunculated abdominal leiomyoma. Echogenic deposits with anechoic areas (1) were scanned among the left kidney, spleen and left abdominal wall (A). A large hypoechoic highly vascularized mass was imaged directly below the left kidney and spleen (B). Widely invaded hyperechoic deposits were detected between the rumen and left abdominal wall (C).

Conclusion

The low number of cases of leiomyoma in veterinary literature may be due to its asymptomatic nature or non-specific clinical presentation, as apparent in our case, which makes its detection and diagnosis difficult. Routine ultrasonography is strongly recommended as a noninvasive modality for scanning abdomen in animals suffering from general nonspecific signs. It enables prompt, noninvasive verification of neoplasia. The definitive diagnosis in this case was based on excisional biopsies obtained at surgery.

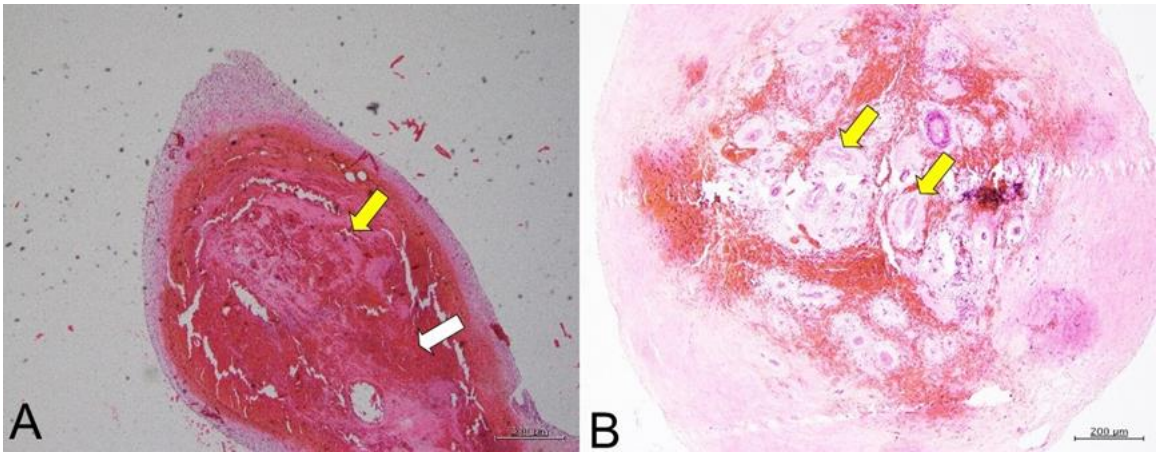

Fig. 3: Histopathology of pedunculated leiomyoma in a male camel showing A) marked hemorrhage (white arrow) and necrosis (yellow arrow), and the pedicle of leiomyoma showed thick-walled blood vessels (yellow arrows) and hemorrhage and necrosis. H & E. A=60X; B=100X.

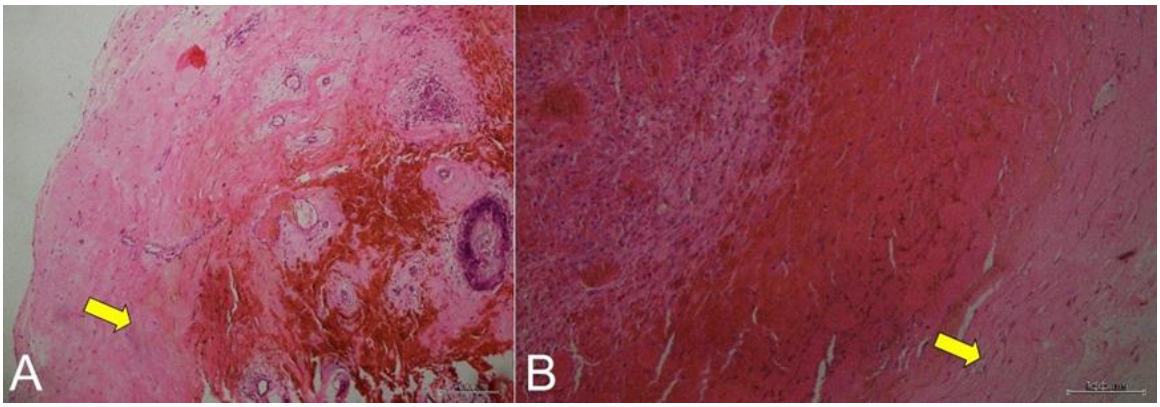

Fig. 4: Sections of the tumorous tissue showed A) thick-walled blood vessels and wide areas of hemorrhage and necrosis areas of hyaline degeneration seen at periphery (arrow), and B wide areas of hemorrhage and necrosis (infarction) with thin rim of remnant viable smooth muscle tissue (arrow). H & E. A=200X; B=400X.

Acknowledgment: The researcher would like to thank the Deanship of Scientific Research, Qassim University for funding the publication of this project.

Conflicts of Interest: The authors have no conflicts of interest to disclose.

Author Contributions

M.S., M.T.: provided concept and design the proposal. M.S., M.T., W.R., H.E., M.K.H, A.A., and A.G.: performed the experimental section. M.K.H., A.A.: performed and evaluated the histopathological examinations. M.T. and H.E.: performed the laboratory analysis. M.S., M.T., W.R and S.A.: analyzed and interpretate the data. All authors revised and approved the final manuscript.

REFERENCES

Ali A, Al-Sobayil F, Tharwat M, Mehana A and Al-Hawas, A, 2013. Granulosa cell tumour in a female dromedary camel. Comparative Clinical Pathology 22: 1251-1254. https://doi.org/10.007/s00580-013-1755-z

Ali A, Derar R, Al Sobayil F, Tharwat M, Fathy A and Khodeir M, 2018. Adenocarcinoma in the genital tract of infertile female dromedary camels. Journal of Camel Practice and Research 25: 181-187. http://dx.doi.org/10.5958/2277-8934.2018.00025.5

Ali A, Derar D, Hassanein K, Al-Howas A, Sadan M, El-Shafaey E-S and Al-Sobyil FA, 2019. Sertoli-leydig cell tumour in a female dromedary camel. Journal of Camel Practice and Research 26: 287-290. http://dx.doi.org/10.5958/2277-8934.2019.00046.8

Al-Sobayil F, Ali A, Derar D, Tharwat M, Ahmed A and Khodeir M, 2018. Tumours in dromedary camels: prevalence, types and locations. Journal of Camel Practice and Research 25: 189-197. http://dx.doi.org/10.5958/2277-8934.2018.00026.7

Bancroft JD and Gamble M, 2019. Theory and Practice of Histological Techniques. Elsevier health sciences, China.

El-Shafaey E-S, Sadan M and Refaai W, 2020. Superficial swellings in camels (*Camelus dromedarius*): Clinical and ultrasonographic findings. Journal of Veterinary Medical Science 82: 1346-1353. https://doi.org/10.292%2Fjvms.20-0163

Filianoti A, Paganelli A, Bassi P, Simone G and Ranieri A, 2018. Leiomyoma of the renal capsule: case report and literature review. Urologia Journal 85: 34-35. https://doi.org/10.5301/uro.5000218

Moulton JE, 1978. Tumors in Domestic Animals. Univ of California Press

Myers III NC and Penninck DG, 1994. Ultrasonographic diagnosis of gastrointestinal smooth muscle tumors in the dog. Veterinary Radiology and Ultrasound 35: 391-397.

https://doi.org/10.1111/j.740-8261.1994.tb02059.x

Roy C, Bierry G, Ghali SE, Buy X and Rossini A, 2004. Acute torsion of uterine leiomyoma: CT features. Abdominal Imaging 30: 120-123. https://doi.org/10.1007/s00261-004-02430-1

Segarra A, Herrtage ME and Salgüero R, 2022. Diagnostic imaging appearance of canine gastric leiomyomas: Four cases. Veterinary Record Case Reports 10: e357. https://doi.org/10.1002/vrc2.357

Tharwat M, 2012. The cardiac biomarker troponin I and other haematological and biochemical variables in downer camels (*Camelus dromedarius*). Journal of Camel Practice and Research 19: 123-128.

Tharwat M, 2013. Ultrasonographic findings in camels (*Camelus dromedarius*) with trypanosomiasis. Journal of Camel Practice and Research 20: 283-287.

Tharwat M, 2015. Haematology, biochemistry and blood gas analysis in healthy female dromedary camels, their calves and umbilical cord blood at spontaneous parturition. Journal of Camel Practice and Research 22: 239-245. http://dx.doi.org/10.5958/2277-8934.2015.00039.9

Tharwat M, 2019. Chronic peritonitis in dromedary camels: clinical, ultrasonographic and pathologic findings. Journal of Camel Practice and Research 26: 169-172. http://dx.doi.org/10.5958/2277-8934.2019.00026.2

Tharwat M, 2020a. Ultrasonography of the abdomen in healthy and diseased camels (*Camelus dromedaries*)–a review. Journal of Applied Animal Research 48: 300-312. https://doi.org/10.1080/09712119.2020.1788035

Tharwat M, 2020b. Ultrasonography of the liver in healthy and diseased camels (*Camelus dromedaries*). Journal of Veterinary Medical Science 82: 399-407. https://doi.org/10.1292/jvms.19-0690

Tharwat M, 2020c. Ultrasonography of the kidneys in healthy and diseased camels (*Camelus dromedarius*). Veterinary Medicine International 2020: 7814927. https://doi.org/10.1155/2020/7814927

Tharwat M, 2021a. Ultrasonography of the thorax in healthy and diseased camels (*Camelus dromedarius*)–An overview. Journal of Camel Practice and Research 28: 313-318. http://dx.doi.org/10.5958/2277-8934.2021.00048.5

Tharwat M, 2021b. Obstructive urolithiasis in dromedary camels: Clinical, ultrasonographic and postmortem findings. Journal of Camel Practice and Research 28: 85-93. http://dx.doi.org/10.5958/2277-8934.2021.00013.8

Tharwat M, 2024. Fundamentals of diagnostic ultrasound in dromedary camel medicine. International Journal of Veterinary Science 13: 1-6. https://doi.org/10.47278/journal.ijvs/2023.057

Tharwat M and El-Omar T, 2021. Ocular ultrasonography in camels (*Camelus dromedarius*): A review. Journal of Camel Practice and Research 28: 185-190. http://dx.doi.org/10.5958/2277-8934.2021.00031.X

Tharwat M, Al-Sobayil F and El-Magawry S, 2013. Clinicobiochemical and postmortem investigations in 60 camels (*Camelus dromedarius*) with johne's disease. Journal of Camel Practice and Research 20: 145-149.

Tharwat M, Al-Sobayil F, Ali A and Buczinski S, 2012a. Ultrasonographic evaluation of abdominal distension in 52 camels (*Camelus dromedarius*). Research in Veterinary Science 93: 448-456. https://doi.org/10.1016/j.rvsc.2011.07.009

Tharwat M, Al-Sobayil F, Ali A and Buczinski S, 2012b. Echocardiography of the normal camel (*Camelus dromedaries*) heart: technique and cardiac dimensions. BMC Veterinary Research 8: 1-8. https://doi.org/10.1186/746-6148-8-130

Tharwat M, Al-Sobayil F, Ali A and Buczinski S, 2012c. Transabdominal ultrasonographic appearance of the gastrointestinal viscera of healthy camels (Camelus dromedaries). Research in Veterinary Science 93: 1015-1020. https://doi.org/10.6/j.rvsc.2011.12.003

Tharwat M, Al-Sobayil F, Ali A, Hashad M and Buczinski S, 2012d. Clinical, ultrasonographic, and pathologic findings in 70 camels (*Camelus dromedarius*) with Johne's disease. The Canadian Veterinary Journal 53: 543.

Tharwat M, Al-Sobayil F, Ali A, Derar D and Khodeir M, 2017. Renal cell carcinoma in a female Arabian camel. Journal of Camel Practice and Research 24: 61-66. http://dx.doi.org/10.5958/2277-8934.2017.00009.1

Tharwat M, Sadan M, El-Shafaey E-S, Saeed E-H and Al-Hawas A, 2018a. Bilateral renal abscessation and chronic active pyelonephritis in a male camel (*Camelus dromedarius*) caused by *Escherichia coli*. Journal of Veterinary Medical Science 80: 778-783. https://doi.org/10.1292/jvms.17-0484

Tharwat M, El-Shafaey E-S, Sadan M, Ali A, Al-Sobayil F and Al-Hawas A, 2018b. Omaso-abomasal adenocarcinoma in a female Arabian camel (*Camelus dromedarius*). Journal of Applied Animal Research 46: 1268-1271. https://doi.org/10.080/09712119.2018.1495644

Tsai Y-J, Yeat S-K, Jeng C-J and Chen S-C, 2006. Torsion of a uterine leiomyoma. Taiwanese Journal of Obstetrics and Gynecology 45: 333-335. https://doi.org/10.1016/S28-4559(09)60254-0

Wareth G and Moustafa SA, 2013. Pulmonary Leiomyoma in a Dromedary Camel (*Camelus Dromedarius*). International Journal of Veterinary Medicine: Research and Reports 2013: 773813. https://doi.org/10.5171/2013.773813