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Evaluation of the clinical, hematological, biochemical and histopathological findings in bitches suffering from cystic endometrial hyperplasia/pyometra

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Abstract

Pyometra is one of the most common diseases of the genital system in the female dogs. The aim of the present survey is to investigate the dogs suffering from cystic endometrial hyperplasia or pyometra from clinical, hematological, biochemical and histopathological aspects. For this, a total of sixty dogs were studied. At first thirty dogs of small and large breeds with an average age of 5.57±2.04 years, affected by cystic endometrial hyperplasia or pyometra and another thirty healthy dogs were selected. Blood samples were taken from all dogs and hematological factors (counting white blood cells, red blood cells and platelets) and biochemical factors (ALP, AST, ALT, globulin, Albumin to Globulin ratio, total protein, BUN, creatinine, cholesterol and lactate) and histopathological findings were also investigated. Nine dogs were identified with cystic endometrial hyperplasia and twenty-one dogs were affected by pyometra. The most important clinical signs were included lethargy, abnormal discharge from the vagina, anorexia, dilation of the uterus, polyuria/polydipsia, dehydration, fever, pale mucus membranes and vomiting. The results of the hematology test showed leukocytosis (mean: 32.16±5.54), neutrophilia with left shift deviation, and normochromic-normocytic anemia in the affected dogs by pyometra. Histopathological evaluation confirmed the thickness of the uterine wall due to significant endometrial hyperplasia, the increase in the number of cystic glands, and the accumulation of pus in the uterine canal and horns. In the biochemical test, the levels of ALP, total protein and globulin were significantly higher in the pyometra group than healthy group. Besides, the ratio of albumin to globulin (0.37±0.06) was significantly decreased in the pyometra group. BUN (52.3±14.2 mg/dl), creatinine (2.1±0.34 mg/dl) and lactate (3.65±0.38 mmol/l) concentrations were also significantly higher in the affected dogs to pyometra. It can be concluded that the survey of hematological (such as leukocytosis, neutrophilia and anemia) and biochemical indices (increase of ALP, total protein, globulin and plasma hyperlactatemia) can significantly help with the diagnosis and prognosis of pyometra in dogs.

Key words: Cystic Endometrial Hyperplasia/Pyometra, Clinical, Hematological, Biochemical, Histopathology, Dog

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Refrences

Anjos, M. S., Bittencourt, R. F., Biscarde, C. E., de Andrade Silva, M. A., dos Santos, E. S., Junior, L. D., & da Silva Cavalcante, A. K. (2021). Canine pyometra: interferences of age and type in blood count and serum biochemistry. *Brazilian Journal of Veterinary Science*, *28*(3), 167-173.

Arora, N., Sandford, J., Browning, G. F., Sandy, J. R., & Wright, P. J. (2006). A model for cystic endometrial hyperplasia/pyometra complex in the bitch. *Theriogenology*, *66*(6-7), 1530-1536.

Ashrafi Helan, J., Hashemi Asal, M. M., Vajhi, A., Shirani, D., Fatahian,H. R., Mohit Mafi, S., & Alinejad, A. (2002). Clinical report of a case of endometrial cystic hyperplasia/ pyometra grade III in a dog. *Iranian Journal of Veterinary Research*, *4*(1), 94-101.

Ahuja, A. K., Honparkhe, M., Sethi, G. S., Singh, N., Jan, F., & Chauhan, P. (2019). Association of canine pyometra with systemic inflammatory response syndrome. *Journal of Entomology and Zoology Studies*, *7*(1), 1409-1412.

Ettinger, S.J., & Feldman, E.C. (2010). Textbook of Veterinary Internal Medicine. Diseases of the dog and cat. Vol. 2. Sixth edition. Saunders Elsevier, St. Louis, Missouri, pp: 1646-1690.

Hadiya, H. D., Patel, D. M., Ghodasara, D., & Bhanderi, B. B. (2021). Canine Pyometra: Clinico-diagnostic, Microbial, Gross and Histopathological Evaluation. *The Indian Journal of Veterinary Sciences and Biotechnology*, *17*(3), 41-46.

Groppetti, D., Pecile, A., Arrighi, S., Di Giancamillo, A., & Cremonesi, F. (2010). Endometrial cytology and computerized morphometric analysis of epithelial nuclei: a useful tool for reproductive diagnosis in the bitch. *Theriogenology*, *73*(7), 927-941.

Egenvall, A., Hagman, R., Bonnet, B., Hedhammar, A., Olsson, P., & Lagerstedt, A. (2001). Breed risk of pyometra in insured dogs in Sweden. *Journal of Veterinary Internal Medicine*, *15*(6), 530–538.

Hagman, R., Reezigt, B. J., Bergström Ledin, H., & Karlstam, E. (2009). Blood lactate levels in 31 female dogs with pyometra. *Acta Veterinaria Scandinavica*, *51*(1), 1-9.

Hamm, B. L., & Dennis, J. (2012). Canine pyometra: early recognition and diagnosis. *Veterinary Medicine*, *107*(5), 226-230.

Holahan, M. L., Brown, A. J., & Drobatz, K. J. (2010). Retrospective Study: The association of blood lactate concentration with outcome in dogs with idiopathic immune-mediated hemolytic anemia: 173 cases (2003–2006). *Journal of Veterinary Emergency and Critical Care*, *20*(4), 413-420.

Kalantari-Hesari, A., Morovvati, H., Babaei, M., Nourian, A. R., Esfandiari, K., Elmi, T., & Soltan, S. (2022). Modified methods to simplification histochemical, immunohistochemical, and hematoxylin-eosin staining. *Iranian Veterinary Journal*, *18*(3), 63-73.

Kuplulu, S., Vural, M. R., Demirel, A., Polat, M., & Akçay, A. Y. T. A. Ç. (2009). The comparative evaluation of serum biochemical, haematological, bacteriological and clinical findings of dead and recovered bitches with pyometra in the postoperative process. *Acta Veterinaria*, *59*(2-3), 193-204.

Llazani, M., Qoku, A., & Dhaskali, L. (2021). Laboratory Findings, Vaginal Cytology and Histopathology in Bitches with Cystic Endometrial Hyperplasia–Pyometra Complex. *European Journal of Biology and Biotechnology*, *2*(3), 61-63.

Maya-Pulgarin, D., Gonzalez-Dominguez, M. S., Aranzazu-Taborda, D., Mendoza, N., & Maldonado-Estrada, J.G. (2017). Histopathologic findings in uteri and ovaries collected from clinically healthy dogs at elective ovariohysterectomy: A cross-sectional study. *Journal of Veterinary Science*, *18*(3), 407-414.

Mojtahedzadeh, S. M., Ali Mohammadi, Z., & Yousefi, Z. (2014). Clinical introduction and new treatment methods for cystic hyperplasia of the endometrium and pyometrium in dogs. *Pejvad*, *3*(1), 37-43.

Moxon, R., Whiteside, H., & England, G. C. W. (2016). Prevalence of ultrasound-determined cystic endometrial hyperplasia and the relationship with age in dogs. *Theriogenology*, *86*(4), 976-980.

Nayana, D., Becha, B. B., Jayakumar, C., Unnikrishnan, M. P., & Venugopal, S. K. (2021). Haemato-biochemical studies in medically managed open and closed-cervix pyometra in dogs. *Journal of Veterinary and Animal Sciences*, 52(3), 281-285.

Nel, M., Lobetti, R. G., Keller, N., & Thompson, P. N. (2004). Prognostic value of blood lactate, blood glucose, and hematocrit in canine babesiosis. *Journal of Veterinary Internal Medicine*, *18*(4), 471-476.

Ortega-Pacheco, A., Gutiérrez-Blanco, E., & Jiménez-Coello, M. (2012). Common lesions in the female reproductive tract of dogs and cats. *Veterinary Clinical North American Small Animal Practice*, *42*, 547-559.

Patil, A. R., Swamy, M., Chandra, A., & Jawre, S. (2013). Clinico-haematological and serum biochemical alterations in pyometra affected bitches. *African Journal of Biotechnology*, *12*(13), 564-1570.

Sant'Anna, M. C., Giordano, L. G. P., Flaiban, K. K. M. C., Muller, E. E., & Martins, M. I. M. (2014). Prognostic markers of canine pyometra. *Arquivo Brasileiro de Medicina Veterinária Zootecnia*, *66*(6), 1711-1717.

Shah, S. A., Sood, N. K., Wani, B. M., Rather, M. A., Beigh, A. B., & Amin, U. (2017). Haemato-biochemical studies in canine pyometra. *Journal of Pharmacognosy and Phytochemistry*, *6*(4), 14-17.

Sleeckx, N., de Rooster, H., Veldhuis Koreze, E. J. B., Van Ginneken, C., &Van Brantegen, L. (2011). Canine Mammary tumours, an overview. *Reproduction in Domestic Animals*, *46*(6): 1112-1131.

Stevenson, C. K., Kidney, B. A., Duke, T., Snead, E. C., Mainar-Jaime, R. C., & Jackson, M. L. (2007). Serial blood lactate concentrations in systemically ill dogs. *Veterinary Clinical Pathology*, *36*(3), 234-239.

Veiga, G. A. L., Miziara, R. H., Angrimani, D. S. R., Papa, P. C., Cogliati, B., & Vannucchi, C. I. (2017). Cystic endometrial hyperplasia–pyometra syndrome in bitches: identification of hemodynamic, inflammatory, and cell proliferation changes. *Biology of Reproduction*, *96*(1), 58-69.