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IN VETERINARY SCIENCES & TECHNICS

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ICAVST2022 Proceedings Book

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Dear Scientist,

The seventh International Congress on Advances in Veterinary Sciences & Technics (ICAVST) was hybrid organized in Aksaray, TÜRKİYE. We are very happy for organizing this congress in such a beautiful city and country that we have strong historical ties.

We wanted to make this conference little bit special by bringing scientist together from different disciplines of veterinary area and to open new research and cooperation fields for them. In this sense, we desired to bring the distinguished scientist together to get know each other and to develop and implement new joint projects.

The scientist joined the congress was from different country and mostly from Turkey. Total over the one hundred scientists were registered in the congress. The total number of submissions were 52 and after a careful evaluation 45 submissions were accepted by our scientific committee and 9 of them were accepted as poster presentation and 36 of them were accepted as oral presentation and all those presentations was taken place in the conference booklet.

We would like to send our special thanks to the International University of Sarajevo, Universiti Teknologi Malaysia, and Prof Hesham El Enshasy, Kyrgyzstan-Turkey Manas University, and Prof İsmail Şen for their contributions. Also, we would like to express our special thanks to the organization team especially Mr. Musa Köse and Mr. İsmet Uzun, ZENITH Group workers, and the scientific committee. And finally, most importantly we thank all the participants individually to join this conference.

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Abbreviation

FVM: Faculty of Veterinary Medicine



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INVITED SPEAKERS

THE FUTURE OF ANTI-INFECTIVES: BEYOND CONVENTIONAL ANTIBIOTICS

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Nowadays, antibiotics are widely used worldwide with many therapeutic applications. Since the initial commercial production of antibiotics in 1930s starting with successful commercialization of penicillin's (as model β -lactam antibiotic) followed by the discovery of tetracyclines group (tetracycline, oxytetracycline, and chlorotetracycline), many antibiotics have been discovered by different groups of researches worldwide. For more almost 100 years for now antibiotics saved life of many people worldwide. It was estimated that if antibiotics were not existed in treatment protocol, the number of deaths could be tripled. However, with the extensive use of antibiotics with miss-use and miss-dose problems in addition of the extensive uses of antibiotics in non-medical fields such agriculture, aquaculture, and animal feeding many problems have been created. Continuous exposure of human body to subclinical doses of antibiotics, lead to the development of new generation of microbes which are resist to many known antibiotics. In addition, extensive uses of antibiotics in human body can lead to the significant reduction of natural human microbiomes (probiotics) which play significant role in general human health. Therefore, the need of applying other natural anti-infectives which cannot lead to microbial resistance over time without inhibition of nautral microbiota is needed. In this lecture, the new trends of anti-infective development will be presented, providing a futuristic view of novel antimicrobial bioactives of the future.

Keywords: Antibiotics, Anti-infective, Future

BIOPROCESSING AND BIOCATALYSIS FOR A POST COVID WORLD

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Current climate change concerns and our post COVID world continue to change the way we used to live, sometimes opening opportunities for sustainable societies by deploying better human creations. For instance, biotechnology approaches are mentioned as key option in several worldwide initiatives, including the UN Sustainable Development Goals, COP26 and more. Bioprocessing and biocatalysis are major parts of biotechnology for materials transformation. Biomass instead of petroleum, coal or controversial food feedstocks can produce cheaper, safer, faster and environmentally friendlier products and services. For instance, advanced biofuels, bioplastics, biooil, sugars, biofertilizers, proteins and foods to cite a few. In the current bioeconomy, the global biotechnology market grew 2.9% in 2022 and could be US\$2.44 Trillion in 2028. The biotechnology market contributes 2.7% to the GDP in OECD countries. By 2030, the biotechnology market could be greater in non-OECD countries; more than 50% of total world agricultural output and 35% of chemicals and related output would depend on biotechnology. Over 40 countries have a national strategy related to bioeconomy and 13 have a dedicated bioeconomy strategy. Bioprocessing and biocatalysis are key players to build up a more sustainable future offering a better quality of life to people worldwide.

Keywords: Bioprocessing, biocatalysis, COVID

ORAL PRESENTATIONS

THE INHIBITORY EFFECTS OF TYROSOL ON CLINICAL CANDIDA GLABRATA PLANKTONIC AND BIOFILM CELLS

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Biofilm formation is an important problem in the healthcare industry and veterinary medicine and is very common in natural, industrial or hospital environments. Microorganisms can become very resistant to antimicrobials and environmental factors by biofilm forming on biotic or abiotic surfaces. There is a need to develop new, effective and specific antimicrobials that can reduce pathogenicity in biofilm formation that threatens public health due to their role in medical device-related or infectious diseases. *Candida* species are opportunistic pathogenic yeasts and can cause superficial or disseminated infections. Especially *C. glabrata* is one of the most common microorganisms causing fungal infections in immunocompromised patients and drug resistance is observed when associated with biofilm. Tyrosol (2-[4-hydroxyphenyl] ethanol) can act as both a quorum sensing molecule and an exogenous agent on *Candida* species. In this study, the antifungal activity of tyrosol against a clinical *C. glabrata* isolate was investigated on both planktonic and biofilm forms. Broth microdilution test results demonstrated the inhibitory effect of tyrosol on *C. glabrata*. Transmission electron microscopic findings showed that tyrosol affected the planktonic *C. glabrata* cells in a multi targeted manner, and in the groups treated with tyrosol, significant damage was observed in the cell wall, cell membrane, cytoplasm, nucleus and mitochondria. Also, scanning electron microscopic images confirmed biofilm reduction in pre-/post-biofilm applications as a result of tyrosol treatment. In conclusion, tyrosol may be a potential alternative candidate for reducing the *C. glabrata* biofilm.

Key words: *Candida Glabrata*, Tyrosol, TEM, SEM, Mic

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THE EFFECTS OF POMEGRANATE PEEL EXTRACT, N-ACETYLCYSTEINE, AND THEIR COMBINATION WITH ORNIPURAL AGAINST CADMIUM INDUCED TOXICITY IN RATS

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Cadmium, one of the important environmental pollutants, is one of the highly toxic metals. It was hypothesized to determine the effects of pomegranate peel extract, N-acetyl cysteine alone and along with Ornipural on Cadmium-induced toxicity. Forty-six Wistar Albino male rats were divided into 6 groups and the groups were formed into healthy control, Cadmium group (5 mg/kg/day), Cadmium + Pomegranate peel extract (500 mg/kg), Cadmium + N-acetyl cysteine (100 mg/kg), Cadmium + Pomegranate peel extract (500 mg/kg) + Ornipural (1 mL/kg) and Cadmium + N-acetyl cysteine (100 mg/kg) + Ornipural (1 mL/kg). Cadmium highly accumulated in both liver and kidney tissue. While N-acetyl cysteine and Pomegranate peel extract alone administration reduced Cadmium levels in both tissues. N-acetyl cysteine treatment prevented the increase in ALT and MDA levels by Cadmium damage. Cadmium partially increased liver TNF- α levels, its level decreased in the treatment groups. N-acetyl cysteine+Ornipural treatment inhibited the increase in liver 8-OHdG level. N-acetyl cysteine and N-acetyl cysteine + Ornipural treatments prevented the reduced serum MMP2 level. N-acetyl cysteine and Pomegranate peel extract + Ornipural treatments significantly reduced the increased liver iNOS level.

In conclusion, N-acetyl cysteine and Pomegranate peel extract alone can reduce cadmium-induced damage with different mechanisms of action although Orn combinations may not be enough. In future studies, these treatment options should be tested in different doses and with chelators in cadmium toxicity.

Key words: Cadmium, Pomegranate, N-Acetylcysteine, Heavy Metal, Toxicity

Support / sponsor note: This study was supported by Scientific Activities Support Program of Selcuk University Scientific Research Project

DETERMINATION OF HEMATOLOGICAL VALUES OF CARP (CYPRINUS CARPIO) CAUGHT IN LAKE MAMASIN

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The aquaculture sector is among the fastest growing sectors in the world and in Turkey. While aquaculture in the world has decreased over the years, a continuous increase is observed in the amount of products obtained through aquaculture. According to TUIK data, aquaculture in our country increased by 1.8% in 2021 compared to the previous year. Despite the negative impact of Covid-19 on the growth of almost all sectors, the increasing continuation of aquaculture production shows its importance in terms of its contribution to our country's economy. In our study, the carp fish caught in the Mamasin lake in Aksaray province, where our university is located, were obtained from the hunters in the region. The fish were brought to the embryo transfer center under cold chain. During the blood collection procedure, the tail vein (caudalis vein) was taken into 2 ml vacuum EDTA tubes under anesthesia. Blood samples taken into tubes were analyzed in MS4S hemogram device. As a result of the analysis, the values of the blood samples are as follows; WBC (10⁹ /L) 7.836, RBC (10¹² /L) 1.62, HGB (g/dL) 9.02, Hct (%) 38.49333, MCV (fL) 240.2, MCH (pg) 56.884, MCHC (g/dL) 23,952, RDW (%) 8.05, MPV (fL) 5.98, PCT (%) 1.118, PDW 9.14. This study is important because it will pioneer different studies on carp in the region and will bring these values to the literature.

Keywords: Mamasin Lake, Carp Fish, Hematology,

EFFECT OF PARAOXANASE - 1 ON PREGNANCY IN HAIR GOATS

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Small ruminants are animals that bring unproductive pastures with poor vegetation to the economy with products such as meat, milk leaf/mohair and create employment. Although the transportation and management of Hair Goats is difficult compared to sheep, they make better use of unproductive pastures than sheep. The birth rate of Hair Goats is high, but the multiple birth rate in most cases (1%) is quite low. This study aimed to determine relationship between antioxidant paraoxonase -1, and the offspring yield in the Hair Goats. In a private enterprise, 100 head of female goats with a live weight (CA) of 45-50 kg at the age of 2-6 years and 20 heads of male goats with a live weight (CA) of 60-70 kg CA were used. In the second week of September, 100 females were randomly selected and blood samples were taken 15 days before the introduction of male goats to the herd from both males and females. Blood was taken from the same animals again before starting milking in May. Paraoxonase-1 PON - 1) values were found to be low and significant in both sexes in October compared to May. It was determined that there was a statistical difference ($p \leq 0.05$) at PON - 1 level in terms of genders and birth type. It was observed that the PON -1 level of twin-breeding hair goats was like that of male goats and single-breeders, while it was insignificant between single-breeders and non-breeders. It was found that a low value of Paraoxonase-1 was associated with low fertility whereas twin births were closely related to high value of Paraoxonase-1. Paraoxonase-1 value was found to be important for multiple births ($p \leq 0.05$). As a result, it was concluded that the PON - 1 level increased the birth rate and offspring yield in hair goats during the goat breeding season.

Keywords: Hair Goats, Paraoxanase - 1, Pregnancy, twinning, infertility

CLINICAL OUTCOME OF OVSYNCH APPLICATION IN A BITCH

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A 2-year-old, 35 kg Malaklı crossbreed dog was brought to Aksaray University Veterinary Faculty Animal Hospital with the complaint of swelling in the right 5th mammary gland. According to the anamnesis taken from the owner, it was learned that a hormone was administered to the patient to get her pregnant, and an abnormally large mass was formed in the mammary gland a few weeks later. The general condition of the patient was good. Infection findings in the blood analysis and pyometra (closed pyometra) were detected in the ultrasonographic examination. No metastases were found in the lung on thorax radiographs.

After induction of general anesthesia with Propofol, the patient was orotracheally intubated. Anesthesia was maintained with isoflurane. Median laparotomy was preferred, and it was observed that there was no uterine corpus but only uterine cornu, and this was interpreted as a congenital defect. Numerous cysts were found in the ovaries, due to the hormones applied. Mammary tumor extirpation was performed after both uterine cornu and ovaries were carefully removed during the operation. The histopathological examination revealed that the mass was adenocarcinoma. *E. coli* was detected in the microbiological analysis of both mammary gland and uterine contents.

As a result; mammary tumors are a pathological condition mostly encountered in older dogs. It has been reported that it develops as a result of genetic reasons or hormone applications to increase fertility in young bitches. It is known that ovarian hormones (Estrogen and P4) play a role in the formation of mammary tumors. Surgery is the primary choice in the treatment of mammary tumors in female dogs. Concomitant OHE with total or local mastectomy is considered a standard procedure. Thus, if ovarian steroid hormones are responsible for the development of the tumor, the related hormone is eliminated. Estrus synchronization programs used in farm animals to increase fertility in dogs have very low success rates and a high risk of CEH-pyometra complex formation.

Keywords: Ovsynch, Mammary Tumor, Bitch

EFFECT OF CARBON QUANTUM DOTS ON MALE RAT REPRODUCTIVE SYSTEM: EVIDENCE FROM TESTICULAR HISTOLOGY AND SPERMATOLOGY SCREENS

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Carbon quantum dots (CQDs), carbon-based nanomaterials having a diameter of less than 10 nm, have gained great interest recently regarding their unique bioactivities. This study was implemented to examine the effect of CQDs on testicular tissue and epididymal sperms characteristics in rats. Twenty adult male Wistar rats were categorized into four equal groups including control (0.50 mL normal saline; intra-peritoneally (IP), single dose), CQD1 (2.50 mg k⁻¹; IP, single dose), CQD2 (10 mg k⁻¹; IP, single dose) and CQD3 (40 mg k⁻¹; IP, single dose). All animals were euthanized after 35 days and testicular histo-architecture and epididymal sperms characteristics were studied. As a result, CQDs not only didn't exhibit any toxic effects on rats testicular tissue and epididymal sperms, but also at the highest studied dosage (40 mg k⁻¹) caused improvement in testicular histo-architecture as well as epididymal sperms characteristics. These findings suggest CQDs as safe and repro-protector nanoparticles in rats.

Keywords: Carbon Quantum Dots, Rat, Sperm, Testis

Support / sponsor note: This study is supported by Scientific Activities Support Program of Urmia University.

THE EFFECT OF PERIPARTURIENT PERIOD PROBLEMS AND NEGATIVE ENERGY BALANCE ON UDDER HEALTH IN COWS

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In this study, it was aimed to evaluate the effects of periparturient period problems and negative energy balance periparturient period in dairy cows on udder health at the end of the voluntary waiting period in dairy cows. The animal material of the study consisted of 44 Holstein and 59 Simmental cows. In the periparturient period, animals that experienced dystocia, retention of the placenta, uterine prolapse, metritis, ketosis, hypocalcemia, lameness were determined as the Group-I (n=48), and healthy animals without any problems were determined as the Group-II (n=55). Blood and milk samples were collected on ≤42 and 43-80 days in milk. Negative energy balance was determined by β-hydroxybutyric acid (BHBA) and non-esterified fatty acids (NEFA) analyzes in blood samples. In milk samples, udder health was evaluated by somatic cell count (SCC) and microbiological analysis. Mastitis was observed in 32 (30,8%) of 103 cows in the study. In the study, eleven (22,9%) of 48 animals in the Group-I, and 21 (38,1%) of 55 animals in the Group-II were detected as mastitis. Microbiological analysis results were positive in only 14 of 33 animals with mastitis. When the udder health status of 48 animals with pathology in the periparturient period was evaluated, no significant difference was found in which udder health was negatively affected. As a result, there was no significant difference in terms of adverse effects on udder health in cows with metabolic and reproductive diseases compared to healthy cows (p>0.05). However, it was concluded that more comprehensive udder health evaluation studies, which would be planned specifically for each disease or by increasing the number of samples with these reproductive and metabolic diseases, would be productive.

Keywords: Cattle, Mastitis, Negative Energy Balance, Periparturient Period, Somatic Cell Count

Support/ sponsor note: This thesis work; supported by Afyon Kocatepe University Scientific Research Projects Coordination Unit (BAPK).(20.SAG.BİL.17)

RESEARCH OF EFFECTIVENESS OF HYPOCHLOROUS ACID IN CATS WITH BACTERIAL CYSTITIS

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This study, it was aimed to reveal the efficacy of hypochlorous acid in cats with bacterial cystitis. The animal material of the study consisted of 14 cats who were brought to Afyon Kocatepe University Veterinary Health Application and Research Center Internal Diseases Clinic a private veterinary clinic in Balıkesir and diagnosed with bacterial cystitis as a result of the examinations. After the diagnosis of bacterial cystitis, the cats were divided into two groups fluid therapy+enrofloxacin+vitamin C+nitrofurantoin (Group I, n=7) and fluid therapy+enrofloxacin+hypochlorous acid (Group II, n=7). Both groups were treated for 7 days. It was observed that clinical recovery was faster according to the clinical scoring table created in the cats in Group II, and bacterial growth in the urine was eliminated more quickly and effectively as a result of urine cultures. As a result, it was concluded that hypochlorous acid is effective in clinical improvement and elimination of bacteriuria in cats with bacterial cystitis.

Keywords: Cystitis, Hypochlorous Acid, Cat, Fic

Support / sponsor note: This study is supported by Afyon Kocatepe University Scientific Research Projects Coordination Unit (20.SAĞ.BİL.15)

INFLAMMATORY BOWEL DISEASE AND INTUSSUSCEPTION AFTER PARVOVIRAL ENTERITIS IN A ROTTWEILER

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A 7-month-old Rottweiler female dog was brought to Afyon Kocatepe University Animal Hospital with a history of bloody diarrhea, vomiting, loss of appetite, and weight loss that lasted for 1 month after parvoviral enteritis. Clinical examination revealed the body temperature was 38.4°C, the heart rate was 130, the respiratory rate was 28, the pallor of mucous membranes, and depression. Inflammatory bowel disease was diagnosed as a result of C-CRP measurement, esophagogastroduodenoscopy, and colonoscopic examination. Fluid-electrolyte therapy, cefazolin, dexamethasone, sucralfate, famotidine, mesalazine, maropitant treatment, and nutritional supplements were administered to the patient as therapy. After the treatment, stool consistency returned to normal, the amount of blood in the stool decreased, and the general condition of the patient improve. On the 14th day of the treatment, the patient was brought back to Afyon Kocatepe University Animal Hospital with complaints of small bloody diarrhea, abdominal pain and prolapse of the rectum due to the owner's disruption of the treatment. As a result of the examination, the patient was referred to the department of surgery with the suspicion of invagination. The patient died during the pre-op process. Inflammatory bowel disease and invagination were confirmed by necropsy. In conclusion, this case report revealed that inflammatory bowel disease may occur as a complication after parvoviral enteritis and that this complication may have an important role in the mortality of parvoviral enteritis by demonstrating its similarity with Crohn's disease in humans.

Keywords: Inflammatory Bowel Disease, Parvoviral Enteritis, Intussusception

MINERAL BOLUS USED DURING PERIPARTURIENT PERIOD IN WATER BUFFALOES METABOLIC PROFILE AND ITS EFFECTS ON THE IMMUNE SYSTEM OF BORN BUFFALO CALVES

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In the presented study, it is planned to prevent yield and animal losses in buffalo and trowel by investigating the effects of long-release mineral boluses on the metabolic profile of buffaloes used as breeding, as well as the effects of born malach on the immune system. The study was conducted on 20 healthy buffaloes (10 controls, 10 studies) who gave birth at least once and were in the periparturient period. The buffaloes in the study group were given long-term slow-release mineral boluses at the beginning of the dry period. Only blood was drawn from 10 buffaloes in the control group. Blood was drawn from water buffaloes at -60, -45, -30, -15, -7, 0 (birth), 7, 15, 30, 45, 60th days, serum BHBA, NEFA, ALT, AST, GGT, Glucose, Total Cholesterol, Triglyceride, HDL, LDL measurements were made. After the malachs are born, colostrum is drunk and blood is drawn 24 hours after birth, and Ig G levels are measured with ELISA kits. Differences were detected between groups in ALT, AST, GGT, Chol, HDL and Glu values from blood samples taken.

Keywords: Water Buffalo, Ketosis, Liver, Hepatic Lipidosis, Mineral

Support / sponsor note: This Study is Supported by Afyon Kocatepe University Scientific Research Projects Unit (16.KARİYER.133).

THE INVESTIGATION OF PREANTRAL FOLLICLE POPULATION AND THE EFFECT OF ESTROUS CYCLE ON ANTRAL FOLLICLES IN ANATOLIAN WATER BUFFALOES: MORPHOMETRIC STUDY

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This study aimed to investigate preantral follicle population and morphological changes in antral follicles during luteal and follicular phases of estrous cycle in Anatolian Water Buffaloes. The materials of this study were the ovaries of ten nonpregnant, healthy, aged between two to five years Anatolian Water Buffaloes slaughtered in different slaughterhouses in Afyonkarahisar. Ovaries were transported to the laboratory, and the estrous cycle stage was classified as luteal phase or follicular phase. The preantral follicle populations of Anatolian Water Buffaloes were varied between 3.905 and 43.136, and significant individual differences were observed between animals about preantral follicle populations. Ultrastructural characterization revealed that theca internal and granulosa cells showed different activities during luteal and follicular phases. In conclusion, it was demonstrated that there were significant individual differences in preantral follicle populations between animals and ultrastructural changes in the antral follicles during estrous cycles. The theca cells were more active than the granulosa cells in the luteal phase, and the granulosa cells were more active in the follicular phase of the estrous cycle.

Keywords: Anatolian Water Buffalo, Preantral Follicle Population, Antral Follicle, Estrous Cycle

Support / sponsor note: This study was supported by Afyon Kocatepe University BAPK (Project Number: 10.VF.06)

ANTIBIOGRAM RESULTS OF ESCHERICHIA COLI IN CALF DIARRHEA AND ESCHERICHIA COLI FACTOR IN AKSARAY PROVINCE IN THE LAST THREE MONTHS

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Enterotoxigenic Escherichia coli (ETEC) colonizing the small intestine, enterotoxin-producing, neonatal calves 0-30. It is a contagious bacterial disease that occurs between days of birth and causes neonatal diarrhea. *ETEC* is shed into the environment by infected animals and causes disease by infecting newborn calves with contaminated food or tools-equipment soon after birth. Innate immunity to *ETEC* may not be protective in calves born and raised in modern livestock conditions. For this reason, neonatal calves are vaccinated to protect them from diseases and passive immunity is provided through colostrum.

In this study, a total of 20 visceral samples were taken from calf death cases in 20 different dairy farms in Aksaray city center and its districts. *E.coli* was isolated in 12 (60%) of the samples. According to the antibiogram results of the samples, 50% of the isolates were Amoxicillin and Erythromycin, 33.3% Tetracycline, 58.3% Trimethoprine-sulfamethoxazola, 66.6% Streptomycin, 75% Flofenicol, Gentamycin and Enrofloxacin, and 83.3% Cefloxacin and Cefloxacinium. was found to be sensitive.

Keywords: Neonatal Calf, Diarrhea, *E.coli*, Antibiogram

INVESTIGATION OF VIRAL SHEDDING DURATION OF EHV-1 IN AN INFECTED HORSE

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Equine Herpes Virus 1 (EHV-1) infection is one of the most important horse diseases worldwide. Horses infected with EHV become lifelong carriers of the virus due to latent infection. EHV-1 is activated after stress and causes clinical symptoms as well as infection in healthy horses. The clinical findings contain abortion, respiratory system symptoms, and neurological findings. In particular, the abortion storm caused by EHV-1 could affect the equine industry. The EHV-1-related respiratory symptoms and abortion storm could be prevented by vaccinations. However, short-term virus shedding may occur in vaccinated animals in some cases, and this may cause infection in healthy horses. Therefore, the duration of EHV-1 shedding in infected horses is critical. Even if the horses are given supportive care after showing clinical signs, transmission can occur. In this study, it was aimed to investigate the viral shedding duration of EHV-1 in an infected horse. For this purpose, nasal swab samples were collected from a horse with clinical signs on the day of clinical symptom beginning (day 0). After the detection of EHV-1 by real-time PCR, nasal swab samples were collected on the days of the 12th, 18th, and 28th days. According to the real-time PCR analysis results, it was detected the amount of virus nucleic acid decreased gradually and did not remain on the 28th day. The result of this study will guide establishments and veterinarians to implement the required biosecurity precautions and the duration of quarantine in order to prevent the transmission of the viruses to healthy horses.

Keywords: Equine, Abortion, Equine Herpesvirus 1, Transmission

SEROLOGICAL INVESTIGATION OF AVIAN HEPATITIS E VIRUS INFECTION IN POULTRY ENTERPRISES IN AEGEAN REGION

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Avian Hepatitis E Virus causes Big Liver and Spleen Disease (Hepatitis – splenomegaly syndrome) in poultry. This infection has a serious economic impact in poultry industry as a result of a severe drop in egg production and elevated mortality rates in chickens. Although the infection has been recognized and studied in the world since the early 2000s, there is not much information about the disease. AHEV infection is occasionally encountered in the field with similar findings and samples sent for diagnosis to laboratories, there is not any substantial information about the presence and prevalence of the infection or any epizootiologic report.

This research, as far as known, is the first scientific report on the presence and prevalence of aHEV infection in poultry industry in Turkey.

In this study, 1821 serum samples from 948 broiler breeder, 490 broiler, 20 layer breeder and 363 layer, in Aydın, Manisa, Muğla, İzmir, Uşak and Denizli, were screened for the presence of anti aHEV antibodies by using a commercial BLS Enzyme Linked Immunosorbent Assay (ELISA) The Big Liver and Spleen Disease Antibody Test Kit (BioChek, Berkshire, UK).

As a result of the study, 7.80% (142/1821) seropositivity was detected in all the chicken. Seropositivity rates were found as 5.31% (26/490) in broiler chickens, 5.38% (51/948) in broiler breeders, 17.91% (65/363) in layers and 0.00% (0/20) in layer breeders. Although poultry HEV infection is reported as a disease of broiler breeder and layers in the literature; in this study, high seropositivity was detected also in broiler chickens in Aegean Region. The seroprevalence was also increased with increasing age range. The increase of seropositivity was observed along with age increase.

Keywords: Antibody, Avian Hepatitis E Virus, Chicken, ELISA, Seropositivity

SEROLOGICAL INVESTIGATION OF SCHMALLEMBERG VIRUS INFECTION IN AYDIN, DENİZLİ, MANİSA PROVINCES

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Schmallenberg virus (SBV), transmitted through stinging flies and first identified in Europe in 2011, infects cattle, sheep and goats. Clinical symptoms of the infection include reduced milk yield, abortion, mummified fetus, preterm birth, stillbirth and congenital anomalies, leading to an epidemic disease and consequently causing economic losses. There are no scientific data on the presence and/or prevalence of the infection in our region. The aim of this study was to investigate the presence and prevalence of SBV infection in Aydın, Manisa, and Denizli provinces. Blood serum samples were obtained from 464 goats, sheep, and cattle housed in breeding farms in Aydın, Denizli, and Manisa provinces. Samples were tested for the presence of antibodies against SBV with a commercial indirect Enzyme Linked Immunosorbent Assay (ELISA). Overall, SBV-specific antibodies were found in 25.86% (120/464) of all animals. Seropositivity rates in all animals were 42.86% (66/154) in Aydın, 22.73% (35/154) in Denizli and 12.18% (19/156) in Manisa. Seropositivity was 27.85% (44/158) in goats, 21.15% (33/156) in sheep and 28.67% (43/150) in cattle. Effects of geographical location, age, and breed, but not species and gender, on seropositivity rates were statistically significant. In the study, it was concluded that SBV infection is common in the Western Aegean Region and may cause economic losses. The results of the study draw attention to the necessity of developing and taking precautions in combating, protection, and control against the SBV infection.

Keywords: Antibody, Elisa, Ruminant, Schmallenberg Virus, Seropositivity

Support / sponsor note: This study is supported by Scientific Research Projects Unit of Adnan Menderes University

THE EVALUATION OF THE EFFECT OF HYPOCHLOROUS ACID, 0.1% RIVANOL AND IODINE SOLUTIONS AT THE RAT MODEL .

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In this study, 64 Whistar rats were used. Rats were divided into 4 groups with 16 subjects in each group. Subjects in group I hypochlorous acid, Subjects in group II is povidone iodine, subjects in group III. subjects in group rivanol and IV. group was determined as the control group.

3rd day: It was observed that fibrosis proliferation and neovascularization did not form at all in the group I, and mild hyperplasia with epithelialization. Severe inflammation was observed in the group II. In the group III, on the other hand, fibrosis proliferation and neovascularization were not formed. There was no significant difference between the group IV and the others.

5th day: Group I showed a significant similarity with the groups II and III for fibrosis proliferation, epithelialization and neovascularization formation. Group II, inflammation and edema were found to regress, and fibrous proliferation observed. It was observed that edema was severe in the group III and IV.

7th day: It was observed that edema and inflammation in the group I were severe. It was noted that edema and inflammation in the group II were similar to the rats which groups in the 5th day. It was thought that there was a positive development in terms of recovery in the acute phase in the group III. It was evaluated that the process progressed in the direction of improvement in the group IV.

On the 10th day, although edematous changes were severe in the group I, it was observed that the inflammatory changes regressed. Group II, the inflammation and edema regressed, and it was found to be severe to moderate. Group III It is similar to the animals in the other groups, with edematous changes in the group and noticeable regression in inflammation. Findings in the group IV were positive for improvement.

Keywords: Hypochlorous Acid, Povidone Iode, Rivanol, Control,Rats, Inflammation, Fibrosis, Edema, Wound

RESEARCH ON FREE-LIVING POTENTIALLY PATHOGENIC AMOEBAE THAT CAN INFECT HUMANS AND ANIMALS AND THEIR PREVALENCE IN THE WORLD

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Acanthamoeba, Naegleria, Balamuthia mandrillaris and Sappinia spp. are free-living Amoeba, but also aerobic, eukaryotic and protist species. Free-Living Potentially Pathogenic Amoebae (FLPPA) can cause potentially opportunistic infections in humans and animals worldwide. They can be found in soil, dust, air, sea water, drinking water, swimming pools, sewage, eye wash solutions, contact lenses, dental treatment units and dialysis units. Because these amoeba are capable of existing in nature as free-living organisms and only occasionally invade a host and live as parasites within the host tissue, they are also called amoebae. The FLA taxonomy has been revised several times based on recent data from genomic sequencing studies by zoologists and morphological, biochemical and molecular approaches. So far, all four amoeba species are known to cause central nervous system (CNS) infections. Various species of Acanthamoeba (*A. castellanii*, *A. culbertsoni*, *A. hatchetti*, *A. polyphaga*, *A. rhysodes*), the only known Balamuthia species, *B. mandrillaris*, two species of Sappinia, *S. diploidea* and *S. pedata*, and only one Naegleria species, *N. fowleri*. known to cause disease in humans and other animals. Sappinia sp. agents have not been reported to be fatal in humans and animals. One survivor of an immunocompetent young person with encephalitis has been reported. Under dry conditions, the trophozoites can become resistant cysts that allow survival as well as dispersal in the air, and the cysts may also be resistant to chlorination. Most of the species are thermophilic, and may cause the etiology of symptoms such as fever, allergic alveolitis, shortness of breath, and cough. Some bacteria, such as Legionella and Parachlamydia, can be resistant to Acanthamoebae lysosomal enzymes and can live symbiotically in these amoebae permanently in the phagosome.

In this paper, information about potential opportunistic infections of Free-Living Potential Pathogenic Amoeba (SYPPA) in humans and animals, including studies and reports available within the scope of research, and visual presentations about the prevalence of infection in the world will be given.

Keywords:Free-Living Potentially Pathogenic Amoeba, Acanthamoeba Spp., Naegleria Fowleri, Balamuthia Mandrillaris

ASSESSMENT OF SYSTEMIC INFLAMMATORY AND OXIDATIVE STRESS MARKERS IN NATURALLY OVERWEIGHT CATS

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Being naturally overweight in cats, is one of the growing problems as it can cause a variety of health problems. In this study, it was aimed to evaluate the parameters related to systemic inflammation, oxidative stress and liver in naturally overweight cats. In the study, a total of 20 cats, including 10 naturally overweight (BCS=7) cats and 10 cats that were evaluated as having the ideal BCS score (BCS=4-5) considering breed characteristics and age, were used. Systematic clinical examinations of the cats were performed, and blood samples were drawn from the cephalic vein into tubes without anticoagulant. C reactive protein (CRP), total protein, albumin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), triglyceride, cholesterol, high density lipoprotein (HDL), total antioxidant, total oxidant and paraoxanase-1/arylesterase (PON-1) and MDA levels were determined in these blood samples. In comparison with the values found in cats with the ideal BCS score, AST ($p=0.02$), CRP ($p<0.001$) and MDA ($p=0.024$) values measured in naturally overweight cats were statistically significantly higher, but triglyceride ($p<0.001$) and PON-1 ($p<0.001$) values were found to be statistically significantly lower. It was concluded that the level of AST, which is one of the enzymes related to the liver, and the levels of CRP, MDA and PON-1, which are the parameters of systemic inflammation and oxidative stress. These are very valuable parameters for the evaluation of metabolic and physiopathological changes in naturally overweight cats.

Keywords: Naturally Overweight Cats, Systemic Inflammation, Oxidative Stress, Liver-Related Parameters

Support/ sponsor note: This study supported by TUBITAK 2209 Scientific Activities Support Program. (Project no: 1919B012107505)

NATIONAL ANATOLIAN BUFFALO BREEDING PROJECT IMPLEMENTED IN TURKEY; KÜTAHYA SUBPROJECT

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It has become one of the essential livestock sectors in Turkey in recent years due to the valuable products obtained from Anatolian buffalo meat and especially from its milk. As of 2021, there are approximately 185 thousand Anatolian buffaloes in Turkey. With this number, Turkey ranks second in Europe after Italy. The province of Kütahya, where is National Anatolian Buffalo Breeding Project is implemented, is located in the Inner West Anatolian Section of the Aegean Region. The project was initiated in 2012 by the Ministry of Agriculture and Forestry (TOB), General Directorate of Agricultural Research and Policies, in order to increase the number of buffaloes in the region and the incomes of the breeders, and to produce breeding buffalo bulls.

The project implemented in Kütahya province is carried out in 3 districts (Altıntaş, Tavşanlı, Merkez) and 25 villages. There are 174 breeders and approximately 949 Anatolian buffaloes in the project. Production systems are generally family-type enterprises and the number of buffaloes per enterprise is approximately 5 heads. The buffaloes in the project are supported by TOB every year. The technical staff working on the project goes to the enterprises and keeps the productivity records of the buffaloes. For growth characteristics, live weights of buffalo calves at birth, 6 and 12 months are taken. In order to increase milk yield, milk yield measurements are taken for at least 5 control days, once a month during a lactation period. All received data are recorded in the database named 'Manda Yıldızı' developed for the project. The project leader makes use of this database in the selection and selection of breeders in herds. The aim of this study is to introduce the practices for the breeding project applied in breeder conditions in Kütahya province and to share information with Anatolian buffalo breeders.

Keywords: Anatolian Buffalo, Breeding Project, Kütahya, Turkey

Support / sponsor note: This project is financed by the Ministry of Agriculture and Forestry, General Directorate of Agricultural Research.

THE PROTECTIVE EFFECTS OF ORAL *L. PLANTARUM* ADMINISTRATION ON SERUM AND TISSUE ANTI-MULLERIAN (AMH) HORMONE LEVELS IN FEMALE RATS EXPOSED TO CHRONIC CADMIUM (CD) TOXICITY

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The aim of the present study was to investigate the effects of oral *Lactobacillus plantarum* (*L. Plantarum*) administration on serum and tissue Anti-Mullerian (AMH) hormone levels in female rats exposed to chronic cadmium (Cd) toxicity. For this reason, rats (n=32) were randomly divided into 4 equal groups as control (C), cadmium (Cd), *L. Plantarum* (Lp), and Cd+Lp after the adaptation period (2 weeks). All animals were kept in individual cages throughout the trials. In the Cd group, a dose of 2.04 mg/ml cadmium chloride (CdCl₂) was administered orally (dissolved in water) to animals for 28 days. Besides, an active-live *L. plantarum* (in skim milk powder medium at 10⁹ cfu /ml) was given orally to rats for 28 days. In the Cd + Lp group, both applications mentioned above were applied together in the same way and time. No application was performed to rats in the C group except fresh water and standart pellets. At the end of the twenty-eight-days trial period, the rats were euthanized and blood (serum) / tissue (uterus) samples were collected for the analysis. Although serum AMH levels were dedected the lowest in Cd group, it was not found any statistical changes among the experimental groups according to serum AMH levels (p>0,05). Tissue AMH levels was determined the highest in the Lp group compared to other experimental groups (p<0,05). Besides, tissue AMH levels were higher in Cd+Lp group when compared to Cd group (p<0,05). In conclusion, oral Lp administration exhibits potential protective effects on tissue (uterus) AMH levels in rats exposed to Cd.

Keywords: Cadmium, Anti-Mullerian Hormone, Rat, Serum, Uterus

Support / sponsor note: This study founded by TAGEM, Project No: TAGEM/HSGYAD/B/20/A3/P1/2085

IDENTIFICATION OF OVINE ADENOVIRUSES IN LUNG SAMPLES FROM SMALL RUMINANTS

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Adenoviruses (AdVs) are non-enveloped viruses with icosahedral capsid containing a linear dsDNA genome. They have been detected in a wide variety of animals. So far, eight types of AdVs from sheep and two types of AdVs from goats have been described, belonging to two distinct genus Mastadenovirus and Atadenovirus. Usually, pneumo-enteritis is a term used to describe adenovirus-induced disease in small ruminants, which has been associated with both enteric and respiratory symptoms of varying severity. The aim of this study was to detect and identify AdVs in the Mastadenovirus genus of small ruminants. For this purpose a total of 47 lung samples from small ruminants were used in this study. Following the viral DNA extraction, PCR was carried out by using the primers targeting hexon gene in order to detect mastadenoviruses. Four of the samples produced the expected size amplicons of the hexon gene fragment. Following the sequencing of the amplified fragments, the data revealed the presence of two types of OAdV, OAdV-3 and OAdV-4. Specifically, OAdV-3 was detected in two sheep and a goat while OAdV-4 was found in only a sheep. There is still limited data on the genetic diversity of adenovirus, especially in small ruminants. In our country, previous reports showed that OAdV-3 and OAdV-5 had been isolated and also seroprevalence studies revealed a high seroprevalence to a number of different AdV serotypes in both sheep and goats. However, no molecular characterization data of these viruses has been reported yet. In conclusion, the detection of AdVs in lung tissues of small ruminants in this study suggests that these viruses may have contributed to the disease and/or predisposed to other respiratory agents. This study revealing the molecular identification of two different OAdV types in sheep and a goat provides valuable data understanding of the prevalence and genetic evolution of OAdVs.

Keywords: Mastadenovirus, Ovine Adenovirus, PCR, Sheep, Goat

BOVINE ABORTION ASSOCIATED WITH LEPTOSPIRA SPP

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Leptospirosis is recognized as a common global zoonotic disease of both human and all livestock species. Meanwhile, it causes economic losses in ruminants by leading to abortion and a decrease in milk production. This study aimed to investigate the molecular prevalences of the *Leptospira* spp in abortive cattle cases using the bacterium-specific PCR method. For this purpose, 206 abortive materials were analyzed which were encountered in all three geographic areas of Turkey (need to specify these regions). The samples include 112 vaginal swabs of aborted cattle and 94 stomach contents of aborted calves. As the result, 8 (3.8 %) of the stomach contents and 26 (12.6 %) of the vaginal swabs samples were found to be positive for *Leptospira* spp. According to the results, we obtained with this study, it was observed that abortions caused by leptospirosis in cattle were not negligible. As a consequence, it was recommended that leptospirosis should be included in the differential diagnosis of cattle abortions as well as other abortive bacterial agents.

Keywords: Cattle, Leptospirosis, Pcr

A CASE OF CHRONIC CONSTIPATION RELATED TO NUTRITIONAL SECONDARY HYPERPARATHYROIDISM IN A CAT

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Nutritional secondary hyperparathyroidism (NSHPT) is a metabolic disease. This study aimed to report clinical findings, especially constipation, and serum biochemical changes related to NSHPT in a cat. The Material of the study consist of a 5-month-old female domestic British shorthair cat which had been eating beef and liver for a long time, and included chronic constipation, abdominal pain, severe tenesmus, growth retardation, and lameness. On the physical examination growth retardation, abdominal pain, abdominal tension and irritated anal area detected. An enlarged colon was detected on radiographic examination. It was determineted that there was an increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value. The typical clinical signs of NSHPT in kittens include anorexia, weight loss, depression, hyperesthesia, constipation, joint pain and lameness. Researchers report various clinical and radiographical findings related to NSHPT. In the present study chronic constipation, abdominal pain, severe tenesmus, growth retardation, lameness, abdominal tension, irritated anal area and enlarged colon was detected. The clinical and radiological findings reported in this study were consistent with what the researchers have reported. It is thought that constipation is caused by hypocalcemia and hyperphosphatemia leading to intestinal motility. Common laboratory findings associated with NSHPT are increased serum PTH, P, ALP and decreased Ca:P ratio. In the present study, it was detected that there was an increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value. In conclusion, this case demonstrates that NSHPT can leads to constipations in cats and, if enlarged or megacolon present, prognosis is poor.

Keywords: Cat, Constipation, Hyperparathyroidism, Nutritional

EFFECT OF WHOLE SAFFLOWER SUPPLEMENTATION ON CONCEPTION RATE OF HUNGARIAN-MERINO EWES DURING SHORT-TERM MEDROXYPROGESTERONE ACETATE ADMINISTRATION

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The present study was aimed to investigate effect of safflower seed which is rich of linoleic acid, supplementation on conception rate in Hungarian Merino ewes during the nonbreeding season. In the study, 44 adult Hungarian Merino ewes were allotted into two homogenous treatment groups with respect to their live weight and parity. Ewes were treated with vaginal sponge containing progestagens (60 mg medroxyprogesterone acetate, Esponjavet®, Hipra, Spain) for 7 days during the season (April) (day 0). PMSG 500 IU (Oviser®, Hipra) was injected intramuscularly on the day of removal of the sponge (day 7). Ewes in oestrus were mated with a proven fertile Merino rams (ewe:ram ratio of 5:1). Ewes in control group (n = 22) were not given any oilseeds. Ewes in safflower group (n =22) were fed with daily 75 g /ewe whole safflower seeds in addition to the standard ration during the 7-day sponge period. In all ewes, transabdominal ultrasound examination (Hitachi EUB-405, 3.5 MHz convex probe) was performed to diagnose pregnancy on day 50 post mating. The results obtained in the experiment showed that oestrus rates were same (90.9%, 20/22) within both of group However, conception rates were 70% (14/20) in control group and 50% (10/20) in safflower group. These results revealed no significant differences between the groups (P>0.05). In conclusion, during the non-breeding season, whole safflower seeds decreased conception rate of Merino ewes. However, this decrease was not found statistical importance. Conducting the present study in herds with more animals would clarify the effect of linoleic acid on reproduction.

Key words Safflower, Ewe, Medroxyprogesterone Acetate, Conception Rate, Linoleic Acid

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EFFECT OF WHOLE OIL SEEDS SUPPLEMENTATION ON COLOSTRUM IMMUNOGLOBULIN G AND SERUM TOTAL PROTEIN AND ALBUMIN CONCENTRATIONS IN DOES

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In the present study, the effect of supplemented whole oilseeds (safflower, linseed, sesame) in diet, starting 3 weeks before kidding, on colostrum IgG and serum total protein and albumin levels was investigated. A total of 42 German Fawn x Hair cross (75% German Fawn and 25% Hair) goats in the second lactation were used in the study. At the beginning of the experiment, the goats were divided into 4 groups with similar body weight and body condition scores, which were the control group (n=10), safflower group (n=10), linseed group (n=11) and sesame group (n=11). Oilseed groups received 100 g oilseeds (safflower, linseed, sesame) in addition to the control group ration until kidding. In order to determine the colostrum IgG level, colostrum samples were taken into 50 ml tubes immediately after birth, and the Brix value was determined with a refractometer. In addition, blood samples were taken from all does and total protein and albumin levels were determined. Total protein and albumin concentrations of the groups were similar ($P > 0.05$ for both parameters). Oilseed supplementation increased the colostrum IgG level ($P=0.049$) and the highest IgG concentration (68.8 g/L) was found in the linseed group. This group was followed by sesame (63.4 mg/L), control (62.7 g/L) and safflower (62.4 g/L), respectively. In conclusion, linseed supplementation during the prepartum period increases colostrum IgG concentration, but does not affect serum total protein and albumin levels.

Keywords: Safflower, Linseed, Sesame, Igg, Goat

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RISK AREAS AND SEASONAL DISTRIBUTION OF PESTE DES PETITS RUMINANTS (PPR) DISEASE

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Peste des petits ruminants (PPR) is a viral disease affecting small ruminants and causes significant agricultural damage. The World Organization for Animal Health (OIE) has classified PPR as an animal disease that must be reported immediately. In this study was aimed to understand of spatial and seasonal epidemiology of PPR in Türkiye and provide information by using Geographical Information Systems (GIS). Descriptive and analytical statistics were used in the study, logistic regression analysis was applied to assess the effect of season and species factors on PPR outbreaks occurring in Türkiye. Data were obtained from the World Animal Health Information System (WAHIS) database of OIE. Between 2017-2019, 337 outbreaks, 18467 cases and 11526 deaths were reported 57 provinces of Türkiye and the highest number of PPR outbreaks, cases and deaths were reported in The Central Anatolia Region. On time-wise examination, the PPR risk-areas revealed changes with different levels of endemicity. The Central Anatolia Region were the top outbreaks reported region during 2017-2018, whereas The Marmara Region reported more outbreaks during 2019. PPR outbreaks occurred throughout the year in all seasons, but were most frequently encountered during the winter season (December to February) and the results showed that seasonal and species factors are important in the spread of the disease. PPR has widely distributed throughout the country, and the epidemiological picture suggests that the disease has become an endemic infection in the country. The spatial and seasonal distribution of PPR in Türkiye gives useful information on hotspot areas, allowing managers to make informed decisions about prevention and control in different parts of the country. In accordance with the PPR Global Control and Eradication Strategy, the study also outlines when and where extensive surveillance, vaccination, and biosecurity measures are required for the control and eradication of the disease in Türkiye.

Keywords: Epidemiology, Peste Des Petits Ruminants (PPR), Risk, Spatial Analysis, Türkiye.

REASONS FOR THE INADEQUACY IN THE FIGHT AGAINST BOVINE TUBERCULOSIS IN TÜRKİYE

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A national epidemiological research project was carried out to define the dynamics affecting the epidemiology of bovine tuberculosis (bTB) infection in Türkiye. Official Veterinarian (OV) and breeder original questionnaires were produced separately as part of this study to collect thorough data regarding the disease from the field. The number of questionnaires that needed to be filled out was decided by 95% confidence interval and 5% margin of error. 371 OVs from 72 provinces across Türkiye and 317 breeders from a total of 61 provinces, 59 from designated provinces and 2 from other provinces answered the questionnaires. 74.1% of OVs stated that they didn't find the program implemented by Ministry of Agriculture and Forestry (MoAF) in the fight against bTB disease insufficient or partially sufficient. When we asked what OVs thought about the reasons for this situation, they were in the first three ranks of the graph; Inability to fully control animal movements(181), failure to implement a long-term and effective program as a state policy to fight the disease(165) and not to apply disease tests while implementing social projects(135). 46.3% of breeders stated that they didn't find the program implemented by MoAF in the fight against bTB disease insufficient or partially sufficient. When we asked what breeders thought about the reasons for this situation, they were in the first three rows of the graph; breeders' not to timely report suspected bTB cases in their premises(76), the program applied to fight the disease isn't effective(70) and failure to detect all diseased animals with the applied test(69). It has been determined that the main reasons for the inadequacy in the fight against bTB are the inability to control animal movements, the lack of state policy, the lack of timely reporting of suspicious cases and the inadequacy of diagnostic tests.

Keywords: Bovine Tuberculosis, Epidemiology, Fight Disease, Mycobacterium Bovis, Questionnaire

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DETERMINATION OF D-DIMER AND FIBRINOGEN RATIO IN DOGS COINFECTED WITH MONOCYCTIC EHRlichIOSIS AND VISCERAL LEISHMANIASIS

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In cases hemostatic dysfunction which originated from coagulopathy, mortality may be significantly elevated. Visceral Leishmaniasis (VL) and Monocytic Ehrlichiosis (ME) are caused similar coagulopathy disorders in dogs. Renal and/or hepatic damage or autoimmune platelet disorders are caused vasculitis that trigger to thrombocytopenia and thrombocytopathy. D-dimer is a biomarker that product of fibrin degradation with low sensitivity. Fibrinogen is an acute phase reactant which has been influenced from haemodynamic disorders, infections and neoplastic masses. On account of this, D-dimer/Fibrinogen ratio (DFO) is more spesific than D-dimer in case of coagulopathy. In literature research carried out by us, there is no research on DFO value in dogs coinfectd with VL and ME. In this research, its aimed to detection of DFO value in dogs coinfectd with VL and ME. Within the scope of the study, dogs are included (n=10) which clinical sings compatible with VL and ME such as epistaxis, lymphadenopathy and loss of appetite and determined VL and ME via rapid tests (SNAP 4Dx+, SNAP Leish). Dogs are included (n=10) which brought to routine check and/or vaccine application and applicated same clinical and laboratory procedure with coinfected group for determination of healthful. In the results of resarch, DFO value of the coinfectd group (7.33±1.24) was found to be statistically significantly higher (p<0.003) when compared to the healthy control group (4.18±0.369). Hence, DFO value may be considered as diagnosis of coagulopathy diseases in dogs such as coinfectd with VL and ME. Additionally, it was concluded that longitudinal studies are needed for prognostic value of DFO in dogs coinfectd with VL an ME.

Keywords: Coagulation, Coinfectd, D-Dimer, Ehrlichiosis, Fibrinogen, Leishmaniasis, Ratio

IMMUNOLOCALIZATION OF DESMIN AND VIMENTIN FILAMENTS IN THE HEART OF BOVINES DURING PREGNANCY

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Intermediate filaments, a sub-member of cytoskeletal proteins are the main proteins of the nucleus and cytoplasm that provide cellular organization and cytoplasmic integrity. These proteins are; It has critical roles in the regulation of many cellular activities, especially cell movements, by taking part in providing intracellular signals and bringing microtubules together. The desmin and vimentin proteins involved in the intermediate filament classification are also one of the main components involved in these cellular events, ensuring the alignment and contraction of myofibrils. In addition to these, it is known that vimentin and desmin have many effects on heart and skeletal muscles during early development. Based on this information, our study; The aim of this study was to immunohistochemically reveal the distributions of vimentin and desmin in bovine fetal heart during pregnancy and to determine their roles in possible physiological processes. In the study, 27 clinically healthy fetuses belonging to the first, second and third periods of pregnancy were used. Heart tissue samples taken from each period were detected in 10% formol-alcohol solution for 18 hours, and then subjected to routine histological procedures and immunohistochemistry technique. As a result of staining, it was determined that desmin caused an intense cytoplasmic immunoreactivity in heart muscle cells and Purkinje cells at every stage of pregnancy, and the intensity of this immunoreactivity in cardiac muscle cells has decreased slightly in the last period. On the other hand, it was observed that vimentin caused a strong immune reaction in the nuclei of some heart muscle cells, endothelium and vessel walls in every period of pregnancy, but it was negative in Purkinje cells. As a result; the heart, which plays a key role in the maintenance of life in all living things; It was determined that desmin and vimentin may have critical roles in the development, growth and continuation of the functions of the heart during pregnancy in bovine. It was also thought that desmin might have a greater effect on these processes in bovine.

Keywords: Bovine, Desmin, Vimentin, Fetal Heart, Immunohistochemistry

EVALUATION OF ¹H NMR SPECTROSCOPY OF CEREBROSPINAL FLUID IN DOGS WITH TICK PARALYSIS

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Introduction: The damage caused by ticks, both directly and indirectly, causes important diseases in both human and veterinary practice. The most important toxic phenomenon among indirect damages is tick paralysis, which is characterized by sudden onset of lower motor neuron weakness and respiratory failure. In terms of pathophysiology, tick paralysis is similar to other acute flaccid paralysis such as Guillain-Barre syndrome, Myasthenia gravis, botulism and lyme borreliosis.

Hypothesis: Although the presence of ticks in the patient's body in typical cases facilitates the diagnosis, atypical cases in which the tick cannot be detected are difficult due to the lack of a specific test for tick paralysis. Therefore, nuclear magnetic resonance (NMR) evaluation of cerebrospinal fluid (CSF) samples from dogs with tick paralysis may reveal new potential diagnostic markers and help forming a differential diagnosis list.

Material and Methods: CSF samples were obtained from 2 dogs of similar size and weight with typical tick paralysis (presence of engorged ticks, regurgitation, respiratory distress and quadriplegia) with the appropriate method. The samples were prepared for NMR evaluation (Samples frozen at -80 °C were thawed on ice at 4 °C, 100 µL sample was taken, extracted in 650 µL (DMSO) extraction solvent, vortexed, centrifuged at 13,200 rpm for 5 minutes at 4 °C. After mixing with 100 µL of NMR buffer stock solution containing 550 mM sodium phosphate buffer, 100 mM sodium phosphate buffer (pH 7.0), 2 mM trimethylsilyl-propionic acid (TSP) and 10% D₂O were added) and measured on a 400 MHz ¹H NMR device and profiled with Bruker topspin 3.1 (Bruker GmbH, Germany).

Results: As a result of the ¹H NMR spectroscopy, differences were detected in the expressions of glutamine, pyruvate, glucose, valine-isoleucine-leucine in the CSF samples of dogs with typical tick paralysis.

Conclusion: Evaluation of metabolomics detected by NMR spectroscopy of CSF samples taken from dogs with tick paralysis may facilitate the diagnosis of acute flaccid paralysis cases that are difficult to distinguish clinically, and may help to establish new treatment protocols by correcting impaired metabolite and pathway expressions.

Keywords: Tick, Flaccid Paralysis, NMR, Metabolomics, Dog

Support / sponsor note: This study is supported by Scientific Research Projects Department of Harran University

EVALUATION OF THE EFFICACY OF SOME BLOOD AND ECHOCARDIOGRAPHIC PARAMETERS IN CASES OF VISCERAL LEISHMANIASIS

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Introduction: Visceral Leishmaniasis (VL) is a vector-borne zoonotic disease caused by *Leishmania infantum* in Türkiye. There is no curative or effective treatment for *Leishmania infantum*, which is transmitted to dogs by Phlebotom flies, and the disease course is progressive. Death is usually due to multiple organ dysfunction syndrome (MODS) and disseminated intravascular coagulopathy (DIC).

Hypothesis: Clinical staging protocols have been developed to facilitate the initiation of an appropriate therapy and monitoring the prognosis in dogs with VL. Stage 1 is clinically characterized by mild papular dermatitis, localized lymphadenopathy, and laboratory evidence of creatinine <1.4 mg/dL, urine protein/creatinine ratio <0.5 and negative or low positive antibody titer. However, in Stage 1, which does not have sufficient clinical findings to suspect VL, the investigation of some vasculitis-related parameters together with the routine hematological parameters may be helpful in demonstrating the presence of pathological changes.

Material and Method: A total of 7 dogs with Stage 1 of VL whose lymph node aspirate examination was negative for the causative agent, had alopecia and lymphadenopathy as clinical findings; creatinine <1.4 mg/dL and urine protein/creatinine ratio <0.5 as laboratory findings consisted the *Leishmania* Group. 7 healthy dogs with similar age ($p < 0.811$) and body weight ($p < 0.240$) to the diseased dogs consisted the Control Group. Venous blood samples were taken from all dogs and echocardiographic examinations were performed using a 7.5 MHz sector probe from the right parasternal region with short axis M mode. APTT, PT, fibrinogen, NT-ProBNP, D-Dimer, cTnI, EF, FS, WBC, lymphocyte, monocyte, granulocyte, RBC, Hb, Hct, MCV, MCH, MCHC, RDW, Plt parameters were evaluated.

Results: Compared to the Control Group, the *Leishmania* Group had higher levels of APTT, fibrinogen, NT-ProBNP, granulocyte, MCHC, RDW, Plt ($p < 0.032$) and lower lymphocyte, RBC and Hct levels ($p < 0.038$). ROC analysis revealed that the diagnostic performances of lymphocytes, RBC and Hct were insufficient (AUC < 0.204).

Conclusion: Based on the evaluated parameters, it was concluded that pathological changes may occur in dogs with Stage 1 of VL with clinical findings that cannot clinically differentiate VL and by evaluating the present parameters, appropriate treatment protocols can be initiated in the early period.

Keywords: Leishmaniasis, Dog, Coagulation, Hemogram, Diagnosis

THE EFFECT OF DISTANCE OF PRE-SLAUGHTER TRANSPORT ON THE TEXTURE AND COOKING LOSSES OF CHICKEN FILLETS

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When evaluating meat quality, texture characteristics and cooking losses are two significant parameters. One of the most important factors affecting these parameters is stress. Unusual factors (heat, vibration, noise, transport distance, etc.) that occur during transportation from poultry houses to slaughterhouses cause stress to animals and negatively affect meat quality.

The purpose of this study is to examine some textural characteristics and cooking loss values in broilers (Ross 308; 42 days old) from various distances transported to the slaughterhouse.

In the study, analyses were started in breast meat 24 hours after slaughter from animals brought from poultry houses located at a long distance (4 hours 20 minutes) and a close distance (1 hour 35 minutes). The samples (chosen at random) were moved to the lab under cold chain conditions. During the analysis, the samples were kept at a temperature of +4 °C. On the 1st, 3rd and 6th days after slaughter, some texture profile analyses (Hardness, Adhesiveness, Springiness, Chewiness) and cooking losses were determined on the left pectoralis major (PM) in each group (n = 12). At a confidence level of 0.05, Repeated Measure ANOVA analysis was employed to compare means. At the end of the study, it was determined that while the cooking loss value increased over time (P<0.05), the hardness, adhesiveness, and springiness values decreased (P<0.05). The distance to the slaughterhouse did not differ between the groups in cooking loss and springiness values. It was determined that the hardness value (P<0.05) in long-distance meat samples and the adhesiveness value in close-distance meat samples were higher (P<0.05). It was determined that the chewiness value decreased over time in close-distance meat samples (P<0.05).

This study may contribute to the information about texture studies and cooking loss, which are important in consumer preference.

Keywords: Broiler, Cooking Loss, Meat, Texture Analysis

Oral Presentation

EVALUATION OF P WAVE DISPERSION IN DOGS COINFECTED WITH VISCERAL LEISHMANIASIS AND MONOCYTTIC EHRlichIOSIS

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Canine Visceral Leishmaniasis (CVL) is a multisystemic disease that considered among the alarming zoonotic diseases by the World Health Organization and causing deadly disturbance such as cardiovascular system disorders. Therewithal, Canine Monocytic Ehrlichiosis (CME) is a vector-borne disease that causing cardiovascular system disorders as in CVL. P wave dispersion (Pd) is a electrocardiographic (ECG) marker that used as an indicator of atrial fibrillation, especially with atrial arrhythmias. It could not be detected data on P wave dispersion in dogs co-infected with these diseases known to cause cardiovascular disorders in the literature research carried out. In this research, it aimed to determine Pd which is an important indicator of atrial electrical conduction disorders for revealing the risk of atrial fibrillation that may occur in dogs coinfecting with CVL and CME. In the study, rapid test kits (Snap Leish, Snap 4Dx Plus) were applied for diagnosis of co-infection and free from other diseases that can causing similar disorders in dogs (n=10) brought which compatible with CVL and CME. Additionally, same test and clinical examination were applied to healthy dogs (n=10) brought rutin check and/or vaccination application. Pd values of coinfecting and healthy dogs were determined with 12 channel ECG. As a result of research, there was a statistically significant difference (p=0.000) between coinfecting (24,1±7,75) and healthy (10,8±3,46) dogs. In line with these results, atrial fibrillation and atrial arrhythmias risk has been identified in coinfecting dogs with CVL and CME. It is suggested that antiarrhythmic application and monitoring for cardiac arrest should be included in the therapeutic and monitoring approach of coinfecting dogs with CVL and CME.

Keywords: Coinfecting, Dispersion, Dog, Ehrlichiosis, Electrocardiography, Leishmaniasis, P Wave

RED ALARM: HEAT STRESS, ZONULIN/LACTATE LEVELS AND CALVES

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Contemporary climatic alterations influence incidence/spatial distribution and vigour of heat stress (heSt) conditions. As a reverberation of heSt, disfigurement of intestinal epithelial barrier integrity in relationship with hyperthermia/hypoxia due to blood repartition, might take place. The latter conditions might participate within a leaky gut accompanied by transfer/penetration of luminal pathogenic bacteria, endotoxins and probable antigens. Given heSt is capable of changing intestinal permeability, the purpose of this prospective field trial was to determine the gastrointestinal permeability of calves exposed to heSt at 2 different time points. Apparently healthy (otherwise) 27 calves were subjected to blood sampling and circulating serum zonulin levels were detected in March 2021 and August 2021. Inter-group and intra-group comparison showed statistically significant differences ($p < 0.05$) among circulating mean serum zonulin levels (ng/mL) in August Group (26.07 ± 11.41) analytes in comparison to March Group (14.58 ± 9.32) (self control). Hyper-L-lactatemia (plasma L-Lac > 2.2 mmol/L) was evident in 50 % of calves. Given existing heat-health warning systems in Europe along with red alarm for humans, available results in this study should be cautiously taken into consideration, in which heSt influence intestinal integrity and gastrointestinal disturbances are at the gate endangering intestinal health of calves. May be it is time for red alarm against heSt for calves.

Keywords: Heat Stress, Calves, Zonulin, Lactate

CHANGES IN EXPRESSION LEVELS OF ENDOPLASMIC RETICULUM STRESS PATHWAY-RELATED GENES IN SPERM OF DIFFERENT BREEDS OF FROZEN-THAWED MICE

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The endoplasmic reticulum (ER) is the organelle responsible for protein folding and post-translational regulation. During the cryopreservation of sperm, structural and functional damages in sperm cause the protein folding capacity of the ER to be exceeded and ER homeostasis to be impaired. In this study, the effects of freezing-thawing on sperm quality parameters and gene expression levels of sperm in inbred (BALB/c) and outbred (CD1) mouse strains were investigated. Progressive sperm motility and plasma membrane integrity were found to be significantly higher in CD1 frozen-thawed (CD1-FT) group (35%±3.7 and 60.4%±4.2, respectively) compared to the BALB/c-FT group (17%±3 and 38.8%±5.3, respectively) (p<0.001). Sperm viability was found to be significantly higher in the CD1-FT group (58.4%±5.7) compared to the BALB/c-FT group (37.6%±4.4) (p<0.05). Then, the expression levels of genes in the ER stress (CHOP, IRE1, XBP1, and GRP78), apoptosis pathway (Bax and Bcl-2), and cryopreservation sensitive (TCP11 and PDIA3) genes were analyzed. The expression levels of IRE1, XBP1 and GRP78 genes in the BALB/c-FT group were found to be significantly higher compared to the CD1-FT group (p<0.001). Meanwhile there were no significant difference between CD1-F, CD1-FT, BALB/c-F, and BALB/c-FT groups in the CHOP gene (p>0.05). Bax and Bcl-2 gene expression levels were not found to be different in the BALB/c-FT group compared to the CD1-FT group (p>0.05). Although, there was no significant difference in the TCP11 gene expression level in the CD1-FT group compared to the BALB/c-FT group (p>0.05), PDIA3 gene expression level significantly increased (p<0.001) after frozen-thawed. These results show that ER stress is more induced in the inbred mouse strain compared to the outbred mouse strain during the freezing-thawing process, the expression levels of apoptosis-related genes did not differ by mouse strain in the freezing-thawing process, and the cryopreservation sensitive gene was more expressed in the outbred mouse strain.

Keywords: Endoplasmic Reticulum, Mouse, Sperm, Motility, Cryopreservation

Support / sponsor note: Supported by HMKU BAP

DETERMINATION OF RADIAL STRAIN AND STRAIN RATES BY SPECKLE TRACKING ECHOCARDIOGRAPHY IN DOGS WITH HEART FAILURE

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It is aimed to assess radial systolic myocardial function with speckle tracking echocardiography in healthy dogs and in dogs diagnosed with hearth failure. Twenty one client-owned dogs were included in the study: 10 healthy (CHg) and 11 diagnosed with heart failure (HFg). Speckle tracking echocardiography analysis of radial strain and strain rate in systole was performed at the level of papillary muscle of the left ventricle. Raw records obtained and were evaluated retrospectively by using computer software. The difference between the two groups in terms of total peak systolic strain was statistically significant according to the results of the two-way ANOVA test ($p<0.001$). The introduction of the speckle tracking echocardiography technique into routine clinical practice for evaluating left ventricular systolic and diastolic functions will benefit early diagnosis in veterinary cardiology cases.

Keywords: Dog, Speckle Tracking Echocardiography, Hearth Failure

POSTER PRESENTATIONS

OCCURRENCE OF FIBROMA IN WHITE SKIRT TETRA (GYMNOCORYMBUS TERNETZI): A CASE STUDY WITH LITERATURE REVIEW

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In fishes, neoplasia is generally a benign condition. However, few malignant diseases have been reported previously. Fibromas are benign and non-functional tumors composed of bundles of spindle-shaped cells having fibroblastic appearance arranged in a whorling or storiform pattern along with abundant collagen. A surgically removed mass from second dorsal fin of white skirt tetra (*Gymnocorymbus ternetzi*) with the history of unbalance swimming was referred to the Diagnostic Pathology Laboratory, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran. Light microscopy revealed the presence of abundant collagen fibers in repetitive interwoven patterns along with spindle-shaped fibrocytes arranged in a whorling pattern presenting the histopathological feature of fibroma. Since carcinogenic compounds, viruses, irritants and parasites can be involved in fish benign tumors development, predisposing factors should be monitored carefully to promote animal welfare.

Keywords: *Gymnocorymbus Ternetzi*; Fibroma; Fin; Histopathology; Animal Welfare

Support/ sponsor note: This study is supported by Scientific Activities Support Program of Urmia University.

DETECTION OF HUMORAL AND CELLULAR IMMUNITY ON B. ABORTUS S19 VACCINATED COWS WITH CONJUNCTIVAL ROUTE AND MONITORING OF THE IMMUNE RESPONSE

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Brucellosis is a contagious, chronic, necrotic and inflammatory disease that causes abortion and infertility in animals such as cattle, sheep, goats, rams, pigs and dogs, especially by localizing in genital organs such as testicles, breasts and uterus. As it is known, Brucella agents are intracellular and immune response development is both humoral and cellular. The main cytokine that causes cellular immune response stimulation is interferon gamma (IFN gamma). Lipopolysaccharide (LPS) and oligopolysaccharide (OPS) are widely used as diagnostic antigens in serological tests. For use in this study, blood was collected from 60 cattle conjunctivally vaccinated with B. abortus S-19. Blood was collected from 30 calves (3-5 months old) who were vaccinated for the first time before vaccination and on the 46th, 85th and 169th days following vaccination to obtain serum and plasma. Blood was collected from 30 cattle vaccinated a year ago, aged 15-17 months, before the second vaccination and on the 46th, 85th and 169th days following the second vaccination. While the data obtained as a result of the study show that the humoral immune response based on the antigens used for vaccine follow-up is not sufficient for long-term follow-up of immunity, the detection of IgG response at the rate of 100% in young people and 96.6% in adults on the 46th day indicates that the first 46-day period of the study may be important in terms of monitoring immunity. In the study, it was determined that the IFN γ results were not significant between the groups in terms of monitoring the immune response.

Key words Brucellosis, Immune Response, Vaccine

Support / sponsor note: This study is supported by Scientific Research Projects Program of 19 May University

COMPARISON OF THE SPECIFICITY AND SENSITIVITY OF THE SALMONELLA INVA GENE WITH LAMP AND CONVENTIONAL PCR METHODS

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Salmonellosis is an infectious disease characterized by diarrhea and systemic infections in humans and animals caused by Salmonella bacteria. Although the disease affects all types of pets; young, pregnant and lactating animals are most susceptible.

The Loop Mediated Isothermal Amplification (LAMP) technique is a diagnostic method characterized by its simplicity, in which the reaction components are subjected to isothermal conditions and all amplification and detection are performed in a single step. The LAMP method is based on the isothermal strand-displacement activity of the Bsm (Bacillus subtilis) or Bst (Bacillus stearothermophilus) polymerase enzyme. This enzyme, when combined with four target-specific primers, allows a single temperature amplification of a highly specific fragment from a DNA template to be obtained in larger quantities than in an equivalent PCR. Moreover, this high amplification efficiency can also be directly detected visually by colorimetric methods.

LAMP requires less specialized equipment than traditional PCR technologies and has therefore become a powerful alternative to PCR for pathogen detection in clinical samples and food matrices. In addition, it is an easily accessible method for laboratories in developing countries.

In our study, it was aimed to diagnose the Salmonella invA gene with the LAMP method and to compare the sensitivity and specificity of this method with the classical conventional PCR test. As a result, it was determined that invA gene diagnosis using LAMP method is faster and more sensitive than PCR test.

Key words Salmonellosis, LAMP, PCR

Support/ sponsor note: This study is supported by Scientific Research Projects Program of 19 May University

EVALUATION OF SOME BLOOD VALUES IN TERMS OF KIDNEY FUNCTIONS AND PROTECTIVE EFFICACY OF OLIVE OIL IN MALE RATS EXPOSED TO HIGH DOSES OF BPA FOR A LONG TIME ORALLY.

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The effect of Bisphenol A on kidneys and the protective effect of olive oil were evaluated. Adult male rats grouped (n=10) as follows: 0.5 mL olive oil, high dose (25mg/kg/day) Bisphenol A dissolved in olive oil and control groups. Olive oil and BPA was applied by oral gavage for 30 days. Urea, creatinine and BUN levels in blood serum were evaluated using colorimetical method. In the group only olive oil was applied via oral gavage; urea, creatinine and BUN levels in blood serum were evaluated much lower than the other two groups. In the group which BPA dissolved in olive oil and administered by oral gavage same parameters showed lower amounts compared to the control group but higher from the olive oil group. The results may speculate that the olive oil addition to the daily diet can lower the toxicity on kidneys caused by BPA.

Keywords: Böbrek, BPA, Oral, Rat, Serum (Kidney, BPA, Oral, Rat, Serum)

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REGIONAL EPIDEMIOLOGY OF ANIMAL RABIES

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Rabies is important viral infection with an acute course and results in death that transmissible to all mammals. Rabies virus is classified in the genus *Lyssavirus* (neurotropic virus) of the family *Rhabdoviridae*. All lyssaviruses a bullet-like virion morphology with an envelope. The lyssavirus genome a single negative stranded (-) RNA molecule and encode 5 viral proteins; nucleocapsid (N), phosphoprotein (P), matrix (M), glycoprotein (G) and large (L) polymerase protein. Lyssavirus genus that seven distinct genetic lineages can be distinguished within by cross-protection tests and molecular biological analysis; classical rabies virus (RABV, genotype 1, serotype 1), Lagos bat virus (LBV, genotype 2, serotype 2), Mokola virus (MOKV, genotype 3, serotype 3), Duvenhage virus (DUVV, genotype 4, serotype 4). The European bat lyssaviruses (EBLV1, genotype 5 and EBLV2, genotype 6) and the Australian bat lyssavirus (ABLV, genotype 7). Rabies is zoonoses and infection causes nervous system disease that ends in death. Dogs are the main reservoirs in tropical developing countries where all most of all human cases occur. Vampire bats especially important where transmit rabies to cattle, horses, and other domestic animals, and humans.

In this review, the epidemiological study of suspected rabies samples (cat, dog, fox, cattle) in the last 7 years in Samsun Veterinary Control Institute in the area of responsibility (Samsun, Sinop, Amasya, Tokat, Sivas, Ordu, Giresun, Trabzon and Rize). For this purpose, 503 samples were applied with FAT and MIT tests and %21,6 positive %78,4 negative results were found.

As a result, the decrease in the rate of samples and positive results, especially after 2017, may lead to the conclusion that the oral vaccination campaign is effective in wildlife.

Keywords: Rabies, Virus

INFLAMMATION AND CYTOKINE STORM

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The cells of the natural immune system are the first line of defense against pathogens. These cells recognize pathogens and produce cytokines to destroy them through phagocytosis. Cytokines are peptide or glycoprotein substances that are synthesized by some somatic cells, lymphocytes, monocytes, macrophages to increase the activity of immune cells. Cytokines act in the formation and arrangement of inflammatory responses as well as provide natural and specific immunity. The change in activation-inhibition balance in the steps stimulated by cytokines in inflammatory events causes uncontrolled inflammation response, as well as abnormal cell deaths and excessive increase of immune cells. This hyperactive immune response is called a cytokine storm. Cytokine storm consists of an increase in circulatory amounts of pro-inflammatory cytokines, including IL-1, IL-6, TNF- α and interferons. Although the term of the cytokine storm was first used in 1993 for Graft Versus Host (GVHD) disease; viral hemorrhagic fever, influenza, flower, SARS, malaria, African tripanosomia, visceral laysmanyazis, systemic inflammatory response syndrome (SIRS), acute respiratory failure syndrome (ARDS) can be seen during many diseases. The term cytokine storm has recently been used for COVID-19 patients who have caused social and economic problems worldwide. It has been stated that the cytokine storm seen in Covid-19 causes damage to the vascular barrier, capillaries and alveoli together with the imbalance in intercellular interaction, causing dysfunction in many organs and ultimately death. In this review, inflammation, the physiopathology of inflammation, cytokines and the pathophysiology of cytokine storm are discussed.

Keywords: Inflammation, Covid-19, Cytokines, Cytokines Storm

BREED AND AGE DISTRIBUTION ON DOGS AND CATS REFERRED TO CLINIC DUE TO MAMMARY TUMOR IN AFYONKARAHISAR

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The present study investigated the breed and age distribution of mammary tumor cases in dogs and cats in Afyonkarahisar province. The materials of this study were the dogs and cats brought to Animal Hospital of Afyon Kocatepe University and private veterinary clinics with mammary masses. History of cases including breed and age information were recorded during a clinical examination. Totally 23 dogs and 8 cats with mammary tumors were evaluated in the study. The most frequent breed was Terrier (34.8%), mixed breed (21.7%), Pointer (17.4%), Cocker (13%), Golden Retriever (4.3%), German Shepard (4.3%), and Belgium Malinois (4.3%), respectively in dogs. In the cats, Tabby cat (87.5%) and a mixed breed (12.5%) were detected with mammary tumors. The age distribution was 8.08 ± 3.46 as the mean age in dogs and 11.12 ± 1.72 in cats. The results of this study revealed that dogs are at risk of mammary tumors at early ages as two years old. Nonetheless, the mammary tumors seen in cats are usually older. In conclusion, the mammary tumor is a common pathology in dogs and cats. Animal owners should give detailed information about this pathology, and they should immediately seek medical advice and treatment.

Keywords: Dog, Cat, Mammary Tumor, Breed, Age

Support / sponsor note: This study was supported by Afyon Kocatepe University BAPK (Project Number: 17.KARİYER.146)

A RETROSPECTIVE STUDY ON RUMINANT DISEASES OCCURRED IN SAMSUN VETERINARY CONTROL INSTITUTE PATHOLOGY LABORATORY BETWEEN 2015-2021

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In this study, it was aimed to retrospectively examine the histopathological findings of ruminant samples sent to Samsun Veterinary Control Institute Pathology Laboratory between 2015-2021. Diseases identified in the organ and tissue samples of cattle, sheep and goats sent from 9 provinces (Amasya, Samsun, Tokat, Sivas, Giresun, Sinop, Trabzon, Ordu, Rize) registered in the laboratory archive and within the responsibility area of the Institute Directorate were emphasized. Pathology laboratory results regarding bacterial, viral, parasitic or undetermined diseases of ruminants are important as they serve to obtain general information about the diseases observed in our region, to develop regional and national control programs and to take necessary precautions.

MATERIAL AND METHOD

Carcass, necropsy and biopsy samples of cattle, sheep and goats sent from the provinces within the scope of our institute were used as material. The distribution of cases by years on the basis of provinces was classified as histopathologically specific and nonspecific diseases. The results obtained were evaluated by performing classifications and statistical analyzes of the lesions detected in the necropsy and histopathological examinations, according to the organ they were located or anatomical pathological characters, taking into account the anamnesis and suspected disease information provided by the veterinarian who sent the sample in accordance with the protocol.

RESULTS

As a result of the examination of the records, it was determined that 978 (51.3%) cattle, 765 (40.1%) sheep and 160 (8.4%) goats out of a total of 1903 samples belonging to various enterprises in a 7-year period. In these samples, 378 specific diseases, 1525 organ diseases, nonspecific diseases and 233 parasitic infestations of sarcocystosis were detected.

- The most common diseases diagnosed in our laboratory are shown in Table-3. Among them, it was determined that Sheep Goat Pox Disease came first.
- It has been revealed that the numbers of Sheep Peste des Petits Ruminants and Sheep Goat Pox Diseases increased in 2018 and 2019.
- In addition to these diseases, White Muscle Disease, Nodular Exanthema of Bovines, Listeriosis, Leptospirosis, Mycoplasmosis, Pasteurellosis, Mannheimiosis, Pulmonary Adenomatosis, Leiomyosarcoma, Fibropapilloma, Coenurus Cerebralis, Dicrocoeliasis, Coccidiosis are the other diseases diagnosed.
- Nonspecific organ diseases classified histopathologically are shown in Table-4. Accordingly, it was determined that Pneumonia cases due to various reasons were the leading ones.

Keywords: *Pathology *Regional Diseases *Medical Statistics *Regional Disease Prevalance

ANTIBIOTIC RESISTANCE PROFILES OF PSEUDOMONAS AERUGINOSA STRAINS ISOLATED FROM DOGS

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P. aeruginosa is a pathogenic Gram-negative bacterium that is frequently isolated in canine otitis externa cases. It is known that it is resistant to many antibiotics from different antibiotic groups and can easily develop multi-drug resistance. The aim of this study is to determine the antibiotic resistance profiles of *P. aeruginosa* strains isolated from dogs with otitis externa symptoms. All 20 isolated *P. aeruginosa* strains were subjected to disk diffusion susceptibility testing. The resistance profiles of *P. aeruginosa* strains against the antibiotics tested in the antibiotic susceptibility test were as follows: 100% to oxytetracycline, 4.76% to ciprofloxacin, 14.28% to enrofloxacin, 19.04% to gentamicin, 100% to neomycin, 4.76% to amikacin, 0% to polymyxin B found. Multi-drug resistance was detected in a total of 2 (10%) *P. aeruginosa* strains. As a result, it was observed that isolated *P. aeruginosa* strains showed low resistance to aminoglycoside and fluoroquinolone group antibiotics, which are frequently used in veterinary medicine. In addition, it was determined that the sensitivity to polymyxin B was highest and the sensitivity to oxytetracycline and neomycin the lowest.

Keywords: Antibiotic Resistance, Dog, Otitis Externa, *Pseudomonas Aeruginosa*.

FULL TEXTS

Immunolocalization of desmin and vimentin filaments in the heart of bovines during pregnancy

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ABSTRACT

Intermediate filaments, a sub-member of cytoskeletal proteins, are the main proteins of the nucleus and cytoplasm that are tasked with providing cellular organization and cytoplasmic integrity. These proteins undertake critical roles in the regulation of numerous cellular activities, particularly regarding cell movements, by participating in intracellular signaling and microtubule assembly. Desmin and vimentin proteins, which are classified as intermediate filaments, are the main components that take part in these cellular events. These proteins ensure the alignment and contraction of myofibrils. In addition to these, it is known that vimentin and desmin have many effects on heart and skeletal muscles during early development. The aim of this study was to immunohistochemically reveal the distribution of vimentin and desmin in bovine fetal heart during pregnancy, and to determine their potential roles in physiological processes. In the study, 27 clinically healthy fetuses belonging to the first, second, and third periods of pregnancy were used. Heart tissue samples taken from each period groups were fixed in 10% formol-alcohol solution for 18 hours, and then subjected to routine histological procedures and immunohistochemistry techniques. As a result of staining, it was determined that desmin caused an intense cytoplasmic immunoreactivity in heart muscle cells and purkinje cells at every stage of pregnancy. The intensity of this immunoreactivity was found to decrease slightly for the cardiac muscle cells in the last period of the pregnancy. On the other hand, it was observed that vimentin caused a strong immunoreaction in the nuclei of certain heart muscle cells, endothelium, and vessel walls in every period of pregnancy. However, vimentin reaction was negative in purkinje cells for all periods. As a result, it was determined that desmin and vimentin may have critical roles in the development, growth, and maintenance of physiological functions in bovines during pregnancy due to their roles in the fetal hearts.

Key words: Bovine, desmin, fetal heart, vimentin

INTRODUCTION

Intermediate filaments, a sub-member of cytoskeletal proteins, are the main proteins of the nucleus and cytoplasm that provide cellular organization and cytoplasmic integrity. These proteins undertake critical roles in the regulation of numerous cellular activities, particularly regarding cell movements, by participating in intracellular signaling and microtubule assembly (García-Pelagio et al., 2019; Li et al., 1996). Intermediate filaments show tissue-specific and developmental-specific distributions within themselves. Based on their deviations, these filaments are classified as epithelial cells (keratins), neuronal cells (nesin, peripheralin and α -internexin), muscle cells (desmin), and (vimentin) endothelial and mesenchymal cells (Capetanaki, 2000; Fuchs and Weber, 1994).

Desmin has been defined as the constitutive subcomponent of intermediate filaments seen in skeletal, cardiac and smooth muscles. Early research revealed that the primary function of this protein was to provide structural and mechanical support. However, it was later determined that desmin, in addition to these functions, affects many biological processes including myogenesis, muscle contraction, and mitochondrial functioning (Fuchs et al., 2016; Paulin and Li, 2004; Agnetti et al., 2022). Mutations that may occur in Desmin have been reported to cause mechanical integrity deterioration as a result of misalignment of myofibrils, mitochondrial dysfunction, and myopathy in the heart and skeletal muscles (Agnetti et al., 2022). Desmin has also been reported to have a critical function in heart muscle development and contraction mechanism of muscle cells at the embryonic stage (Yamamoto et al., 2011).

Unlike other intermediate filaments, vimentin is formed by polymerization of a single protein (Herrmann and Aebi, 2000). In vertebrates, vimentin is expressed primarily in mesenchymal cells as in connective and adipose tissues, but has also been expressed in early development or in other disease-related conditions such as injuries and malignant transformation of epithelial cells (Gard and Lazarides, 1980). In general, vimentin has many diverse roles, including signal transduction, mediating the sequestration or activation of proteins and nucleic acids, and acting as cell surface co-factor for the binding of certain pathogens (Patteson et al., 2021).

The heart is known as the first organ to develop and function in mammalian embryos. Cardiomyocytes (heart muscle cells) differentiate from the progenitor cells in the primitive line, and then endothelial cells differentiate to form the heart tube, and thus the first heartbeat begins (Savolainen et al., 2009).

The heart is an important organ that keeps blood circulating throughout the body. Thus, the blood carried by the heart not only carries nutrients and oxygen throughout the body, but also collects waste products and sends them back to the liver and kidney. As a result, it makes an important contribution to the physiology of many tissues and organs. Histological examination of the heart reveals that it has three layers; the pericardium (epicardium), myocardium, and endocardium (Eroschenko and Mariano, 2008). The endocardium forms the luminal surface of the heart and consists of simple squamous epithelium. Deep within the endocardium is the subendocardial tissue containing loosely vascularized connective tissue. This tissue also contains purkinje cells (fibers) and nerves. Myocardium is the middle layer of the heart that contains a large amount of muscle cells. In this highly vascularized layer, cardiomyocytes contain glycogen granules as an additional energy source. The pericardium is a fibrous, double-layered connective tissue sheath that surrounds the heart in the mediastinum and is rich in adipocyte and neurovascular tissue (Crumbie, 2022).

Desmin and vimentin filaments are important proteins that play a role in the regulation of many cellular activities, especially in the provision of intracellular signals and cell movements. In particular, it has been stated that desmin is the main protein of the muscles and also has a critical function in the development of the heart muscle, in addition to the contraction mechanism of the muscle cells at the embryonic stage. During the literature survey performed as part of this study, no research was found regarding the localization and distribution of these proteins in bovine fetal heart development during pregnancy. Thus, this

study aims to determine the localization and expression intensity of desmin and vimentin filaments at different periods of pregnancy in bovine fetal heart, and to reveal their possible physiological roles in heart development.

MATERIALS and METHODS

In this study, 27 clinically healthy fetuses were obtained from private slaughterhouses in Diyarbakır province to be used as tissue samples. These fetuses were then subjected to crown-rump length (CRL) measurement; their age assignments were determined according to the equation “ $y:54.6 \text{ cm}+2.46(x) \text{ cm}$ ”. According to this formulation, “ x ” is the crown-rump length, and “ y ” is constant and represents the fetal age (x). Fetuses, whose ages were determined, were grouped as the first (69-89 days / 9 fetuses), second (99-178 / 9 fetuses) and third (190-269 / 9 fetuses) trimesters of pregnancy. Then, the heart tissue samples from the fetuses in all groups were collected, followed by the liver tissue samples. Samples taken were then exposed to 10% formol-alcohol solution for 18 hours for fixing. Afterwards, they were made into paraffin blocks by routine histological tissue follow-up. Serial sections of 5 micrometer thickness were taken from the prepared paraffin blocks. Sections were taken on slides previously coated with APES (3 amino propyl triethoxysilan; Sigma-Aldrich Chemicals, St.Louis, MO, USA) for immunohistochemistry staining.

Immunohistochemistry

Immunohistochemical staining was performed using the streptavidin-biotin-peroxidase complex method. Serial sections taken on APES-coated slides were washed in distilled water after deparaffinization and rehydration. Afterwards, the sections were treated with 3% H₂O₂ prepared in distilled water for 20 minutes to remove endogenous peroxidase activity. Following this, the sections were washed. Washing procedures after each application were performed in 0.01 M phosphate buffered saline (PBS) for 3x5 min. After washing, the samples were boiled in citrate buffer (0.01 M, pH 6) to prepare for antigen retrieval process at 95 °C for 15 minutes, and then were left to cooling. After washing, the sections were incubated for 15 minutes at room temperature in protein blocking solution (Ultra V Block, Thermo Fisher Scientific, Lab Vision Corporation) to block non-specific binding in tissues. The sections were then cut at +4°C with 1/100 antibody (Mouse MonoclonalAntibody, Desmin, Thermo Scientific, cat no: MS-376-S1, Mouse MonoclonalAntibody, Vimentin, Thermo Scientific, cat no: MS-129-R7) and incubated for 1 night. For the specificity of the immunohistochemical procedure, some sections were incubated with PBS instead of antibodies, and were considered as negative controls. At the end of this period, the sections were washed 3x5 with 0.01M PBS. Afterwards, the sections were incubated with biotinylated secondary antibody (Histostain Plus Bulk Kit, Zymed) and streptavidin-peroxidase (HRP) for 20 minutes at 24 °C, respectively. Between and after these procedures, the sections were washed in the same way with 0.01M PBS for 3x5 minutes.

In order to show the antigen-antibody reactions that will occur in the sections following these procedures, diaminobenzidine (DAP) was kept in chromogen for 5-10 minutes according to the reaction time, and the sections were washed. Then, the sections were counterstained in Mayer's hematoxylin for 2-3 minutes and washed under running water until

they turned blue. After this washing process, the sections were passed through alcohol and xylol series and closed with entellan (Merck, Darmstadt, Germany, Cat. No: 107960). After staining, the preparations were examined, evaluated, and photographed under a research microscope with Nikon-Eclipse 400 DSRI Nikon digital camera (NIS Elements Imaging Software (version 3.10)).

RESULTS

As a result of immunohistochemistry staining, it was determined that desmin and vimentin intermediate filaments had different intensities of immunoreaction in different cells of bovine heart during pregnancy.

It was observed that Desmin protein caused a strong cytoplasmic localized immunoreaction in Purkinje cells and heart muscle cells (myocytes) located in the myocardium at every stage of pregnancy. However, it was determined that there was a slight decrease in the severity of this reaction in the last period of pregnancy (Figure 1A, Figure 2A, Figure 3A). Likewise, it was determined that Vimentin intermediate filament protein formed a strong immune reaction located in the nucleus in some heart muscle cells (myocytes) during pregnancy. However, while vimentin was strongly localized in endothelial cells and some vessel walls, it was negative in Purkinje cells throughout pregnancy (Figure 1B, Figure 2B, Figure 3B).

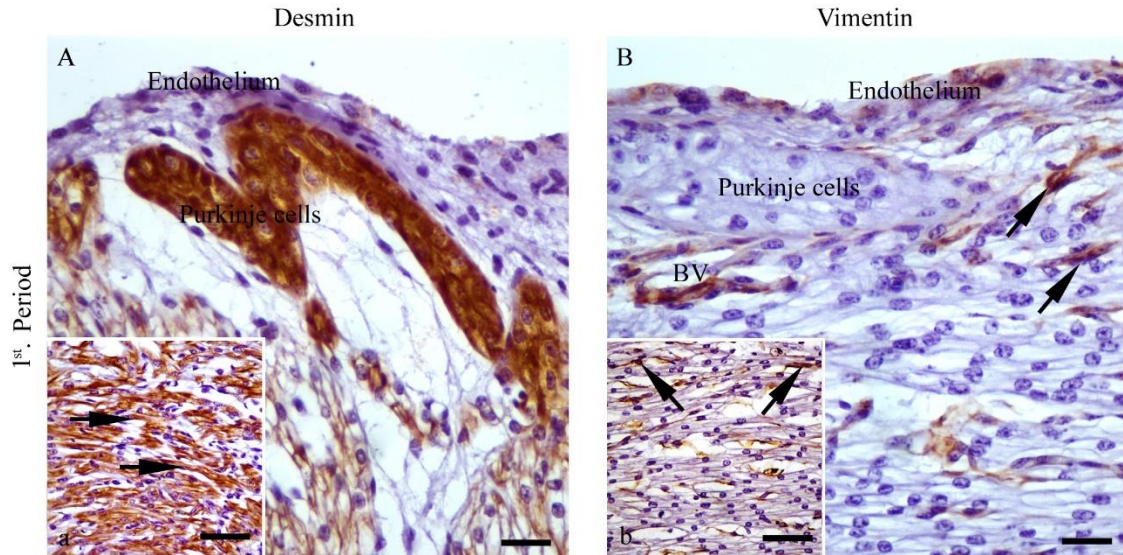


Figure 1. Immunolocalization of desmin and vimentin in the 1st period of pregnancy. Arrow: heart muscle cells, Endothelium, Purkinje cells, BV: Blood Vessel. Scale Bar; 25 μ m.

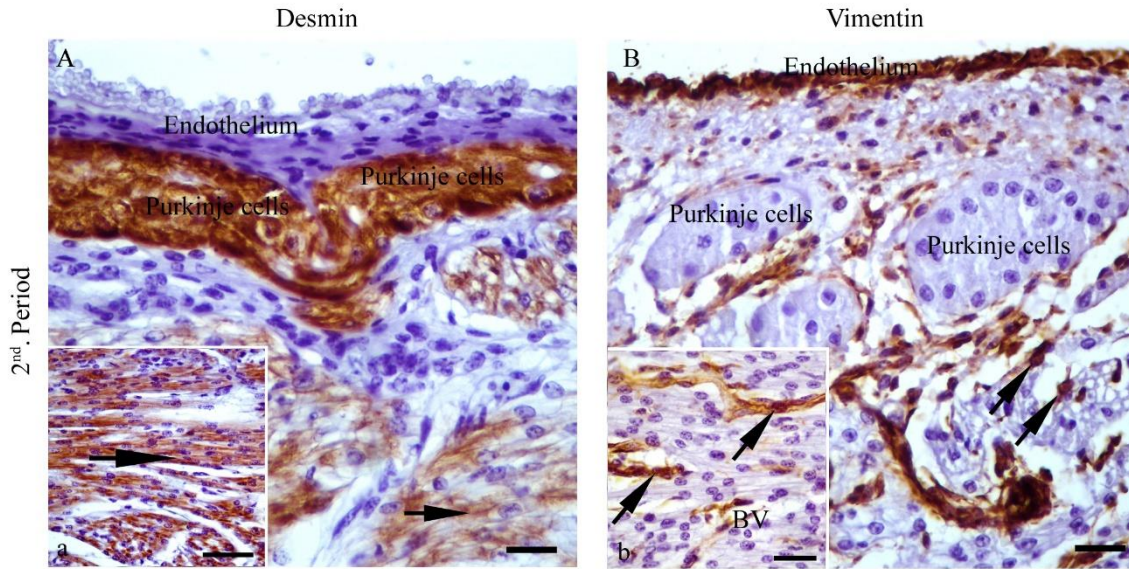


Figure 2. Immunolocalization of desmin and vimentin in the 2nd period of pregnancy. Arrow: heart muscle cells, Endothelium, Purkinje cells, BV: Blood Vessel. Scale Bar; 25 µm (A, a, b), 50 µm (B).

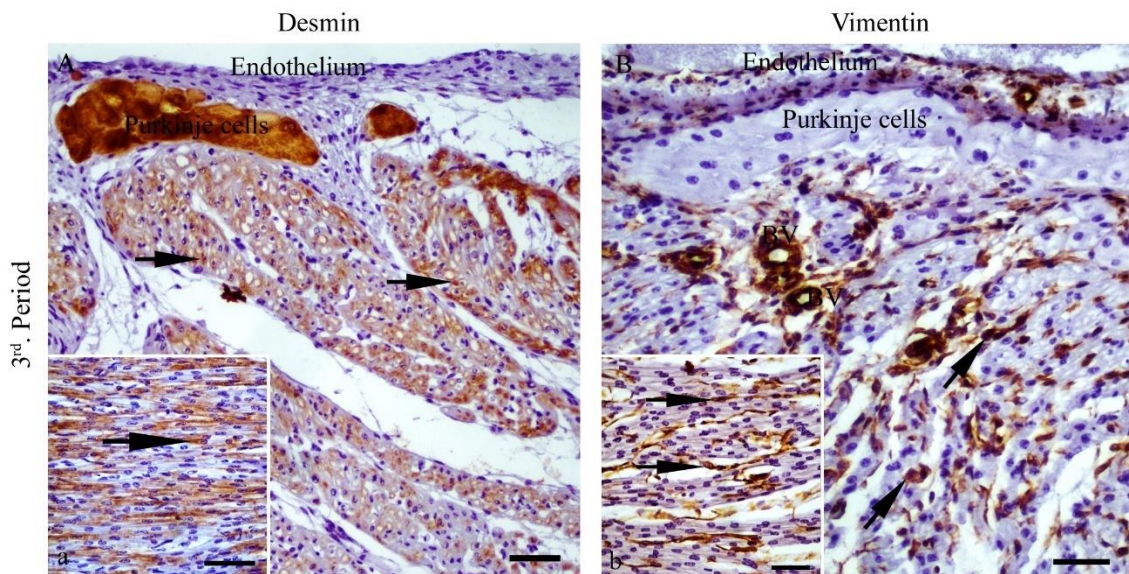


Figure 3. Immunolocalization of desmin and vimentin in the 3rd period of pregnancy. Arrow: heart muscle cells, Endothelium, Purkinje cells, BV: Blood Vessel. Scale Bar; 25 µm (a, b), 50 µm (A, B).

DISCUSSION

Cytoskeletal proteins regulate many essential cell processes, such as cellular division, mechanosensing, cell adhesions, and motility. These functions are performed through microfilaments (actin filaments), microtubules, and intermediate filaments (IFs). It has been reported that intermediate filaments have important roles in myoblast cells as well as cell migration, adhesion, and proliferation (Hakibilen et al., 2022).

Desmin is one of the first muscle proteins to be expressed in the limbs from the beginning of embryonic development. It has a critical role in the differentiation and development of mononuclear myoblasts and mature muscle cells (Li et al., 1997). It has also been reported that desmin is the primary intermediate filament for the heart muscle and is observed in the cardiac muscle cells from the 8th day of embryogenesis in mice and its density in these cells increases with the progression of development (Li et al., 1997; Schaart et al., 1989). Desmin expression intensity increases in the heart at 9-18 weeks of pregnancy in humans, and it reaches the highest intensity at 13-14 days of pregnancy in mice, while it also has a positive effect on heart development in humans Yamamoto et al., (2011) and mice Ya et al., (1997). The same papers, however, report that it has no effect on the differentiation of muscle cells in the human heart. In another study carried out on humans, it was stated that desmin is localized in the cytoplasm of fetal heart muscle cells and its expression intensity decreases depending on the progression of pregnancy (Kim, 1996). It has been stated that in the heart, desmin is especially abundant in Purkinje cells, which are specialized muscle cells in the ventricular conduction system. Desmin is densely located in the cytoplasm of these cells. In addition, it has been reported that it is seen intensely at electrical junctions in normal myocytes. As a result of these, it has been surmized that desmin has a positive role in cardiac physiology by contributing to the development of heart muscle cells and providing stimulation (Carlsson and Thornell, 2001). In the studies, it is seen that cardiomyopathies are formed as a result of mutations that may occur in desmin in general, and the destruction of contractile myofibrils occurs with the systemic catabolic state, resulting in muscle atrophy (Agnetti et al., 2022; Aweida et al., 2019). In parallel with the results of studies on humans and mice, in our study, it was observed that desmin was expressed in the heart during pregnancy in bovines. However, it has been determined that desmin expression, which increases in direct proportion to the progression of pregnancy in humans, is at similar levels throughout the whole pregnancy period in bovines. It was thought that this situation was caused by the species-specific differences and the different metabolic and physiological functioning of the living being. In addition, the intense observation of desmin in Purkinje cells, which allows electrical impulses to transmit faster in the heart, suggests that it plays a critical role in the physiology of these cells.

While vimentin is highly expressed in mesenchymal precursor cells in the early stages of embryo development, it has been reported that it is limited to endothelial cells, fibroblasts, and smooth muscle cells in postnatal life (Cheng and Shen, 2016). It has been stated that many biological processes such as cell development and migration, wound healing developed abnormally as a result of mutating vimentin in mice, while lipid and immune metabolism disorders, and neural function disruptions also occurred. These situations reveal how critically important vimentin is for cellular and biological processes (Paulin et al., 2022). In human studies, it was reported that vimentin expression was observed in the majority of developing heart cells, endothelial cells and fibroblasts between 8-12 and 9-20-28 weeks of pregnancy, and the expression intensity decreased with fetal age, to the point of being expressed only in connective tissue after birth (Dewing et al., 2021; Kim, 1996). In a postmortem study on humans, myocardial cells were negative for vimentin but showed positive for non-myocardial cells, including vascular endothelium, vascular smooth muscle,

fibroblasts, nerve fibers, adipocytes, and mesothelial cells (Kondo et al., 2022). It has been reported that vimentin, which is known to be expressed in endothelium and fibroblasts in the mature human heart, is increased in patients with heart failure and is accepted as a marker of this disease (Heling et al., 2000). In a study carried out on bovines, it was shown that while desmin immunoreactivity was positive in heart muscle and Purkinje cells, it was negative for vimentin, while vimentin shaped a positive immunoreaction in endothelial and vascular cells (Kjörell et al., 1987). While desmin and vimentin immunoreactivity were observed in embryonic heart muscle cells in rabbits, it was reported that only desmin caused a positive reaction in mature cardiac muscle cells (Vander-Loop et al., 1992). It has been stated that vimentin is expressed from the earliest stage of heart development in the embryonic period in mice and localized in cardiac muscle cells throughout the embryonic period (Kachinsky et al., 1995). The findings obtained in the present study also support the findings of these previous studies, as vimentin is found to have a positive immunoreaction in certain muscle and endothelial cells and vessel walls during pregnancy. It has been suggested that vimentin induces differentiation and proliferation of these cells, as has been reported in the embryonal muscle cells, but this role disappears with the maturation of the muscle.

CONCLUSION

As a result, it was determined that desmin and vimentin intermediate filaments affect many biological processes such as differentiation, division and proliferation of cardiac muscle cells as well as forming the shape and structure of these cells. In addition, mutations or deficiencies of these filaments have been reported to cause myopoies in many muscles, including the heart muscle. In the view of this information, it has been assumed that desmin and vimentin may play a major role in the growth and development of the heart and the fulfillment of its physiological function by participating in the structural components of the developing heart in bovines during pregnancy.

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Determination of Radial Strain and Strain Rates by Speckle Tracking Echocardiography in Dogs with Heart Failure

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Abstract: It is aimed to assess radial systolic myocardial function with speckle tracking echocardiography in healthy dogs and in dogs diagnosed with hearth failure. Twenty-one client-owned dogs were included in the study: 10 healthy (CHg) and 11 diagnosed with heart failure (HFg). Speckle tracking echocardiography analysis of radial strain and strain rate in systole was performed at the level of papillary muscle of the left ventricle. Raw records obtained and were evaluated retrospectively by using computer software. The difference between the two groups in terms of total peak systolic strain was statistically significant according to the results of the two-way ANOVA test ($p<0.001$). The introduction of the speckle tracking echocardiography technique into routine clinical practice for evaluating left ventricular systolic and diastolic functions will benefit early diagnosis in veterinary cardiology cases.

Keywords: Dog, Speckle Tracking Echocardiography, Hearth Failure.

Kalp yetmezliği olan köpeklerde benek takibi ekokardiyografi ile radyal global gerilim ve gerilim hızlarının belirlenmesi

Özet Çalışmada sağlıklı köpeklerde ve kalp yetmezliği tanısı konulan köpeklerde benek takibi ekokardiyografi ile radyal sistolik miyokard fonksiyonunun değerlendirilmesi amaçlanmaktadır. Çalışmaya sahipli 21 köpek dahil edildi. 10 köpek sağlıklı (CHg) ve 11'i kalp yetmezliği (HFg) grubunda değerlendirildi. Radyal gerilim ve sistoldeki gerilim hızının benek takibi ekokardiyografi analizi, sol ventrikül papiller kas seviyesinde yapıldı. Elde edilen ham kayıtlar bilgisayar yazılımı kullanılarak geriye dönük olarak değerlendirildi. Toplam zirve sistolik gerilim açısından iki grup arasındaki fark, iki yönlü ANOVA testi sonuçlarına göre istatistiksel olarak anlamlıydı ($p<0,001$). Sol ventrikül sistolik ve diyastolik fonksiyonlarının değerlendirilmesi için benek izleme ekokardiyografi tekniğinin rutin klinik uygulamaya girmesi veteriner kardiyoloji vakalarında erken tanıya fayda sağlayacaktır.

Anahtar kelimeler: Köpek, Benek Takibi Ekokardiyografi, Kalp Yetmezliği

INTRODUCTION

Heart failure is a syndrome results as insufficient cardiac output and inadequate delivery of oxygen and nutrients to tissues. It is a clinical syndrome and can be caused by a lot of heart diseases like chronic valvular heart disease (CVHD). About 10% of dogs in many regions around the world are known to have heart disease and about 75% of these cases are CVHD (Atkins et al., 2009). Although the cause of the disease is unknown, there have been studies of hereditary reasons in some breeds (Olsen et al., 1999; Swenson et al., 1996).

Dilated cardiomyopathy (DCM) is one of the most common cardiac diseases in dogs (Fox et al., 1999). Typically, DCM causes clinically significant morbidity and mortality, including congestive heart failure (CHF) and sudden death, which are secondary outcomes of ventricular arrhythmias. Dilated cardiomyopathy is generally considered to be a disease of large and giant breed dogs (Bonagura and Twedt, 2008). It is reported that the prevalence is high in Doberman Pinscher, Irish Wolfhound, Great Dane, Boxer, American Cocker Spaniel, Airedale Terrier, Newfoundland, English Cocker Spaniel, Dalmatian, German Shepherd and Poodle (Ettinger and Feldman, 2009; O'Grady and O'Sullivan, 2004).

Two-dimensional (2D) speckle tracking echocardiography (STE) is a new imaging technique. Similar to tissue doppler imaging (TDI), STE allows offline calculation of myocardial velocity and deformation parameters. Strain is a measure of the quantity of non-dimensional myocardial deformation and is usually expressed as percentage (%) (Blessberger and Binder, 2010). Basically, strain measures the contraction and relaxation of myocardial fibrils. Unlike tissue doppler imaging, it reflects only active contraction, because the deformation parameters derived from STE are not affected by passive traction of scar (Behar et al., 2004).

The aim of this study was to assess radial myocardial function of the left ventricle (LV) using STE in healthy and dogs with heart failure.

MATERIAL and METHODS

This study was approved by Ankara University Animal Research Local Ethics Committee with permission number 2017-21-162.

Animals

This study was carried out as a result of echocardiography examinations performed in dogs with suspected cardiological disorders in Ankara University Faculty Veterinary Medicine, Small Animal Hospital. After clinical examination, electrocardiography and echocardiography were performed. Echocardiographic examinations were retrospectively evaluated with custom computer software for ultrasound device.

Healthy dogs with no cardiological symptom, CHg (cardiologically healthy group, n:10), and dogs with heart failure HFg (heart failure group, n:11), were examined in two groups. In HFg, 5 dogs were diagnosed with dilated cardiomyopathy and 6 dogs with myxomatous valve disease.

Conventional Echocardiography

After clinical examination, ECG was performed in the patient lying in the right lateral position according to the normal procedure. After the ECG printout, three electrode probes of the echocardiography device were implanted to the right fore, left and right hind legs with alcohol and ultrasound gel in order to obtain simultaneous ECG data. Echocardiographic images were obtained considering standard recommendations (Thomas et al., 1993) and stored for offline analysis. Video loops from short axis levels, (papillary muscle, mitral valve, aortic valve) and long axis planes were recorded. Left parasternal apical images were also recorded when four-chamber images were required or if there was a suspicion of valve disease. Dogs showing

pathological arrhythmia findings other than sinus arrhythmia during ECG were excluded from the study group.

Speckle Tracking Echocardiography (STE)

Analysis of two-dimensional STE data was performed offline using stored raw data images. Images were obtained using the highest possible frame rate for probe, depth and sector width. All examinations were performed without sedation in any of the dogs in the study group and at least 6 consecutive cycle images were recorded in each examination. All imaging examinations were performed by the same experienced sonographer using Hitachi Arietta 60 model USG device and S211 Sector Probe 1-5 MHz). Each of the 6 consecutive cardiac cycles obtained were selected and the endocardial border of the myocardium was carefully monitored by the observer to determine region of interests ROI).

Measurements and calculations related to left ventricular strain were performed using Echolab DAS-RS1 program. After the strain data of the marked regions were transferred to the xml format by the software, the peak levels of the segments were averaged. Images below 54 frames per second were not included.

Statistical Analysis

All graphical and statistical applications were performed by using GraphPad Prism 7.03 program. Histogram, box plot graphs were created for each parameter and examined for normal distribution. After outliers were defined, the data were subjected to Shapiro-Wilk and D'Agostino & Pearson normality tests. In both groups, column statistics were applied for age, M mode data and radial peak systolic speckle tracking data at papillary muscle level, and data such as mean, median, and standard deviation were determined at 95% confidence interval. For strain variables of regions two-way ANOVA test was used and Sidak Multiple Comparison test was used for multiple comparisons.

RESULTS

While the ratio of male and female dogs in CHg was 50% (5 males / 5 females), there were 18.18% males and 81.82% females in HFg (2 males / 9 females) Median age was determined as 36 months in CHg and 70 months in HFg . While there was no correlation between age and strain and strain rates in both groups, it was observed that there was a correlation ($p < 0.05$) between the strain rates of ML and MP regions in CHg.

Conventional echocardiography data for each group are provided in Figure 1. M mode data between the two groups were not statistically different. Both groups were compared in terms of heart rate during examination by using independent t test the and it was determined that the difference between two groups was not statistically significant ($p = 0.197$, Figure 2).

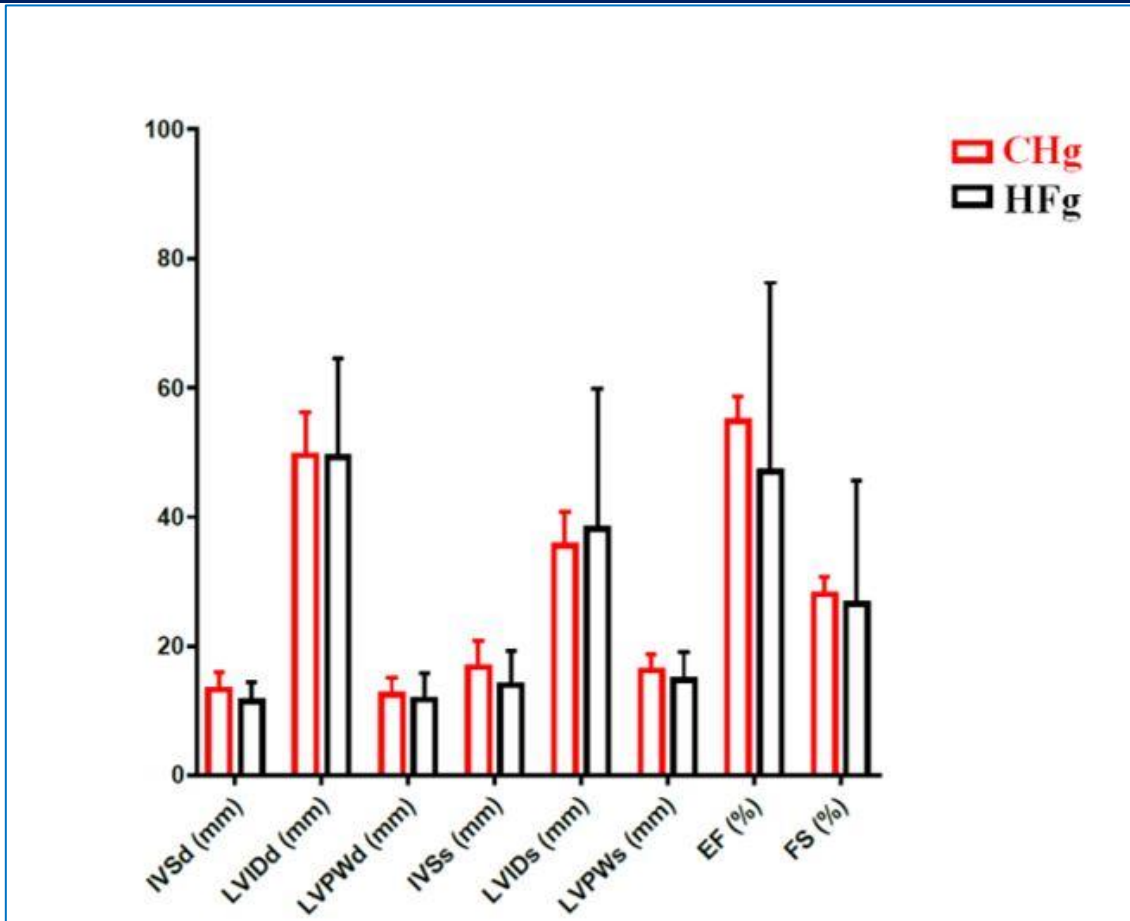


Figure 1. M mode data.

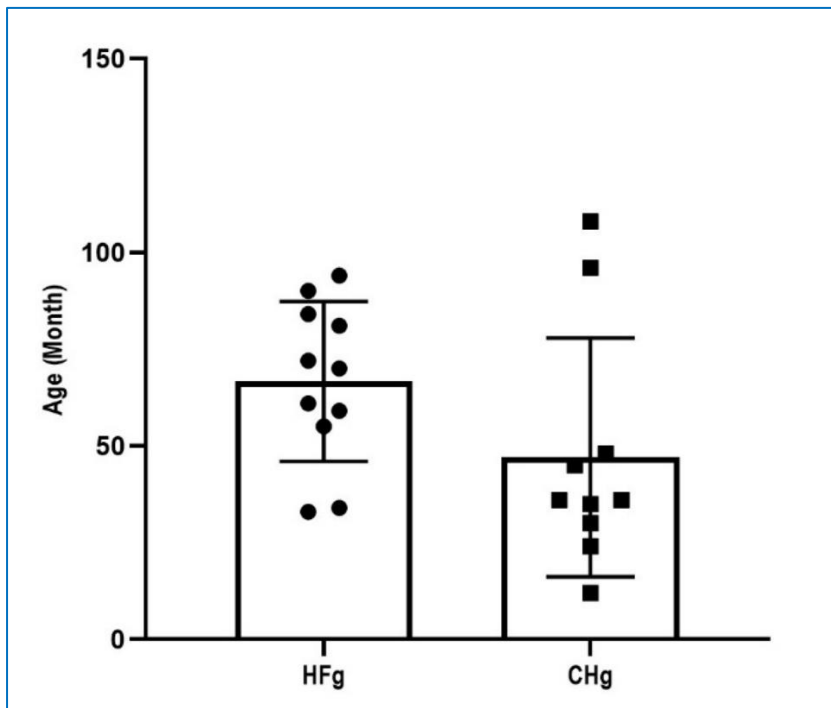


Figure 2. Heart rate comparison by using independent t test between two groups.

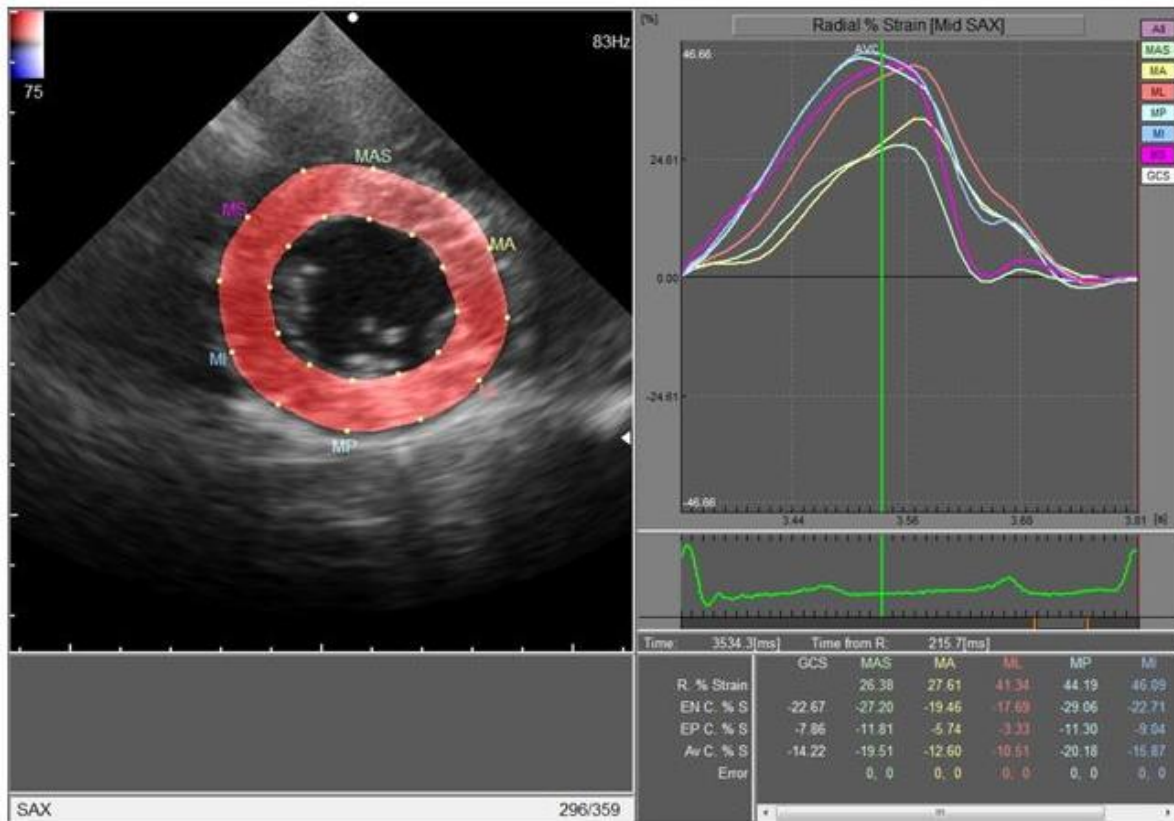


Figure 3. Strain measurement with STE at the papillary muscle level and Region of Interests (ROI).

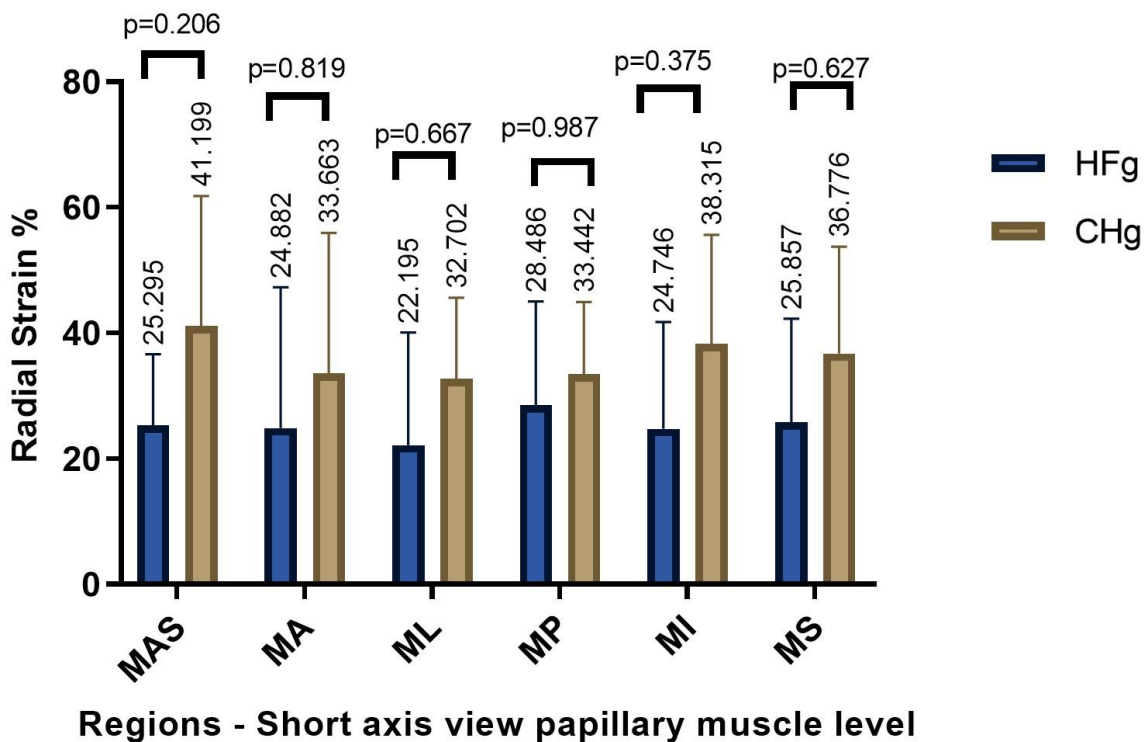


Figure 4. Strain difference graph as a result of two-way Anova test and p values of multiple comparisons test.

DISCUSSION

Damage and its location in the heart muscle play an important role in the diagnosis of many heart diseases. M-mode echocardiography is technically the easiest way to define the contraction force of the left ventricle in the radial direction. Although this method is extremely simple and fast, it is not always applicable because it reflects a very limited area of the ventricle and is insufficient in early diagnosis. Speckle tracking echocardiography provides more detailed and healthy data while examining short axis movements such as radial, circumferential and rotational movements (Chetboul et al., 2007).

Standard echocardiographic methods used in the diagnosis of heart diseases in dogs are inadequate compared to human medicine in terms of insufficient image quality and measurable data. While many techniques were experienced on dogs (Amundsen et al., 2006) before they were put into practice in human cardiology, unfortunately, cardiological imaging techniques in dogs did not progress well due to lack of equipment and qualified assistance. Based on the speckle tracking echocardiography method, studies on animals with and without heart disease in countries such as France (Chetboul, 2010; Chetboul et al., 2007, 2008; Chetboul and Tissier, 2012), the United Kingdom (Pedro et al., 2017), Denmark (Westrup and McEvoy, 2013), Japan (Suzuki et al., 2013a, b, c), Italy (Baron Toaldo et al., 2017; Caivano et al., 2016; Spalla et al., 2016), Spain (Santarelli et al., 2017) and Taiwan (Chen et al., 2014) have been carried out, and any internationally published studies (Terzi and Albanan) based on advanced imaging techniques from our country have only just begun since 2017.

In a study (Kayar and Uysal, 2004) from Turkey which is based on left ventricular function in Kangal Dogs; it was observed that the length of the interventricular septum, left ventricular inner diameter and left ventricular free wall increased in parallel with body weight and body surface area, and left ventricular free wall size was found to be higher in males than in females. Also, it was determined that FS and EF values decreased with the increase in body weight and body surface area. In our study, there was no statistically significant difference between the two groups when M mode data were compared. However, a significant difference was found in the strain data between the two groups. Considering that there were dogs with both DCM and myxomatous valve disease in HFg in this study, although the M mode data did not differ, strain data was different between these two groups. This explains why strain values are important for early diagnosis in preclinical asymptomatic patients such as stage A and B1, according to the classification determined by ACVIM (Atkins et al., 2009).

According to the results of this study; It has been determined that strain, which is one of the indicators of systolic functions of the left ventricle, is affected in HFg. Especially in DCM patients, it is observed that strain rate is also affected with strain. In a study conducted on Great Danes in UK (Pedro et al., 2017); radial and circumferential strain and strain rates were determined at the apex, papillary muscle, and mitral valve levels. Both the strain and strain rate data are statistically different in the DCM group. In this study, while the strain data between the two groups were statistically different, the strain rate data were not. The author thinks that this situation may have resulted from the evaluation of myxomatous valve patients and DCM patients together in the group with heart disease.

In a study (Suzuki et al., 2013) investigating the effect of heart rate on STE data, short axis radial, circumferential, and long axis STE data were evaluated. It was observed that there was no difference between the groups in the STE data of dogs with pacemakers and heart rates of 120, 140, 160 and 180 per minute. In this study, there was no statistically significant difference in heart rate between the two groups.

In the HFg group of patients with heart failure, there are dogs with both DCM and myxomatous valve disease. The reason for creating separate groups from these patients is the prediction that the target number of n will not be achieved. In many studies (Borgarelli et al., 2004; Chen et al., 2014; Pedro et al., 2017; Suzuki et al., 2013c) on the subject, groups are specifically divided into patients with DCM or valvular disease. The evaluation of these two different diseases, that cause damage to the muscular structure of the heart in different ways, in the same group can be considered among the limitations of this study.

CONCLUSION

In this study; working functions of the left ventricle in the radial direction on the short axis were compared between healthy and heart failure groups using the STE technique in large breed dogs. It was observed that the peak systolic strain values in the group with heart disease were different when compared to the healthy group, but strain rate data was not statistically different. Including speckle tracking echocardiography technique among routine clinical applications will be beneficial in early diagnosis in veterinary cardiology cases. The necessity of high-resolution image recording and the necessity of a software to evaluate the results can be counted among the disadvantages of the technique. Despite these disadvantages, it is recommended to become a technique frequently used in veterinary cardiology.

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Conflict of Interests: The authors declared that there is no conflict of interests.

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Red alarm: Heat stress, zonulin/lactate levels and calves

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Abstract

Contemporary climatic alterations influence incidence/spatial distribution and vigour of heat stress (heSt) conditions. As a reverberation of heSt, disfigurement of intestinal epithelial barrier integrity in relationship with hyperthermia/hypoxia due to blood repartition, might take place. The latter conditions might participate within a leaky gut accompanied transfer/penetration of luminal pathogenic bacteria, endotoxins and probable antigens. Given heSt is capable of changing intestinal permeability, the purpose of this prospective field trial was to determine the gastrointestinal permeability of calves exposed to heSt at 2 different time points. Apparently healthy (otherwise) 27 calves were subjected to blood sampling and circulating serum zonulin levels were detected in March 2021 and August 2021. Inter-group and intra-group comparison showed statistically significant differences ($p < 0.05$) among circulating mean serum zonulin levels (ng/mL) in August Group (26.07 ± 11.41) analytes in comparison to March Group (14.58 ± 9.32) (self-control). Hyper-l-lactatemia (plasma l-Lac > 2.2 mmol/L) was evident in 50 % of calves. Given existing heat-health warning systems in Europe along with red alarm for humans, available results in this study should be cautiously taken into consideration, in which heSt influence intestinal integrity and gastrointestinal disturbances are at the gate endanger intestinal health of calves. Maybe it is time for red alarm against heSt for calves.

Keywords: Heat stress, calves, zonulin, lactate

INTRODUCTION

Heat stress (hS) has been paid growing attention as a consequence of climbing global temperatures (Schär et al., 2004), globally elevating population of production animals along with the build-up of agriculture (Renaudeau et al., 2012). On July, 2022 exhibited heatwaves storming Europe over the past months continued [without rain], in which official authorities are calling red alerts in several countries/ regions. Besides on July 31, the European Commission's Joint Research Centre suggested that nearly 1/2 of Europe is highly exposed to heatwaves. In Central and Eastern Europe, Hungary's National Meteorological Service has raised the alarm (Anonymous 1). Extreme heat is one of the most dangerous types of critical-weather events, in which calves should be cautiously subjected to physical examination and health interpretation. Therefore, as hS is capable of changing intestinal permeability, the purpose of this prospective field trial was to determine the gastrointestinal permeability of calves exposed to heSt at 2 different time points.

MATERIAL AND METHODS

Previous Triage in Veterinary Medicine Involving 3 Systems: Field Triage, Medical Triage, and Mobile Veterinary Unit Triage Field Triage were well known and recognized

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(Anonymous III). Among them Field triage, a well-organized for identification of animals the vast majority likely to be of beneficial from the available care under strict conditions, subclassified into 3 colored categories:

- 1) animals might likely die nonetheless of how much care they received. Coded color = Black;
- 2) animals would survive even if/not they receive care. Coded color = Green; and
- 3) to those of animals would benefit markedly from strict interventions. Coded color = Red (Anonymous III; Animal Triage Procedures Wyoming Department of Health Adapted from “Veterinary Disaster Triage: Making the Tough Decisions” by Wayne E. Wingfield, MS, DVM, Colorado State University) as shown in table 1.

Table 1. Colored diagram of field tirage adopted (Anonymous III) in this study.

immediate	minor	Dead, dying or euthanatize
Able to be benefit from strict intervention	Able to stand, wound could be detected however might survive	Dead, dying or euthanatize

Study demographics

This self-control prospective field research was performed in 3 different private farms. All enrolled calves were apparently healthy, were self-control, in which sera sampling was deemed accessible twice at in March 2021 and August 2021. This study was approved by the local ethic committee of Aydin Adnan Menderes University- HADYEK on 27.10.2021 with no: 64583101/2021/146.

Sampling and field research

A total of 1.5 ml blood was withdrawn from *Vena jugularis* of all calves into anticoagulated tubes. Sera samples were refrigerated prior to laboratory work. Commercially available Bovine Zonulin ELISA test kits (MyBiosource ELISA kits, USA) were purchased. Testing methodology was adopted from previous studies by the first author involved (Alic Ural et al., 2021a, Alic Ural et al., 2021b).

RESULTS

Zonulin and lactate levels

Inter-group and intra-group comparison showed statistically significant differences ($p < 0.05$) among circulating mean serum zonulin levels (ng/mL) in August Group (26.07 ± 11.41) analytes in comparison to March Group (14.58 ± 9.32) (self-control). Hyper-lactatemia (plasma l-Lac > 2.2 mmol/L) was evident in 50 % of calves.

Colored triage findings

All 27 calves were red colored triaged (which were than forwarded to responsible veterinary surgeon for necessary supportive/palliative care treatment and preventive measures, table 2).

Table 2. Calves that involved in this study were triaged in red color.

	All 27 calves involved in this study were triaged in red color, detected by the study researchers.
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DISCUSSION

There are some quick facts well written and described previously. First of all, hS exhibits even if cows are exposed to much more heat than they can get rid of, leading to severe stress, declining milk production and elevating disease rates. Temperature and therefore humidity levels dictate even if cattle initiated warm-heated. In this position shading along with suitable ventilation are quite important for diminishing the incidence of hS (Anonymous II). In the present study it was observed that no preventive measurements were deemed available for cows involved.

Given elevating number of dairy animals and the escalation of production, hS is featured challenge of the dairy industry nowadays. In a well-designed invited review, the effects of hS regarding the health/biological functioning of dairy cows, diminished milk production and reproductive performance, induction of feelings of hunger/thirst, were all discussed in detail with high lightened dept literature (Polsky et al., 2017). Interestingly all 27 calves exhibited signs of feelings of hunger/thirst, similar to the latter description.

In an attempt to compare obtained findings, a detailed literature search revealed national researches. Prior and probably a pioneer study enrolled in August 2021 [hS with a record of 41.1°C and %36 humidity], serum zonulin levels were analyzed by use of same methodology herein, in calves under hS. Serum zonulin (ng/ml) levels were at mid-night and mid-day values were as follows 60,07 ± 21,20 vs. 34,60 ± 10,90, (p=0,018), respectively. Zonulin concentration changes were related to intestinal barrier disruption/intestinal permeability elevation due to hS (Ural et al., 2021a). Another research, this time with cows exposed to hS, revealed serum zonulin levels were markedly (p=0,012) changed [44°C at 12 pm - vs. 31°C at 00 am, respectively]. According to the latter work, hS negatively influenced intestinal integrity among cows (Ural et al., 2021b). Comparatively Inter-group and intra-group comparison revealed marked differences (p<0.05) among circulating mean serum zonulin levels (ng/mL) in August Group (26.07±11.41) analytes in comparison to March Group (14.58±9.32) (self-control). As aforementioned above those results should be cautiously subjected to interpretation with red alarm (red colored triage). Veterinary health officers along

with field veterinary surgeons should take into consideration possible preventive measurements against intestinal permeability increase as detected by zonulin concentrations.

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Causes of Death and Economic Dimension in Cattle Farms in Ardahan Province

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ABSTRACT

The aim of this study is to examine the most common causes of death and effective factors in Ardahan province, which has an important potential for bovine breeding. For this purpose, 60 producers dealing with animal husbandry activities in Ardahan province and agreeing to participate in the survey were interviewed. In line with the data obtained, it was determined that there were a total of 1035 cattle, 732 cows and 303 heifers, in 60 farms, and a total of 37 (3.58%) cows/heifers died due to various reasons in 18 farms (30%) in the 1-year period between June 2020 and June 2021. In the same period, it was determined that 68 (12.25%) of a total of 555 calves died in 31 farms (36.67%) due to various reasons. In the study, it was reported that among the causes of death of 37 cows, 10 of them died due to malnutrition, 6 of them due to infection, 4 of them due to poisonous grass, 4 of them choking on the chain, 3 of them diarrhea, 2 of them due to falling and slipping, and the cause of death of the remaining 8 cattle was unknown. In the study, it was reported that among the causes of death of 68 calves, 32 had diarrhea, 14 had septicemia symptoms, 6 had respiratory tract infections, 10 had navel infection and swelling in the joints, and the cause of death for the remaining 6 was unknown. In the research, it was determined that both calf deaths and cow deaths were found together in 12 (20%) of 60 farms, and this was attributed to insufficient care-feeding knowledge of the producer. In the research, it was also found that 95% of the farms give colostrum as soon as the calf is born, however, the ratio of the farms that clean the navel with tincture diode as soon as the calf is born is 51.7%, the rate of those that have their calves vaccinated for septicemia is 23.3%, the rate of the those that have the pneumonia vaccine is 18%, 3 and 70% of the farms reported that the calves stayed in the same environment with the cows.

As a result, it has been seen that the loss of both cattle and calves is significant in Ardahan province, and it is thought that training and seminars should be focused on minimizing the economic loss by explaining the factors causing this to the producer.

Key words: Cattle death, Calf death, Infection, Ardahan

INTRODUCTION

Ardahan is one of the important cattle production centers in Turkey thanks to its rich grass and pastures (Ayvazoğlu & Demir, 2020). Animal husbandry is the most important and largest economic input for Ardahan, which is below the Turkey average in terms of industrialization, and the involuntary cattle deaths in the enterprises cause great damage to this economic input.

The main reason for the deaths encountered in the enterprises is the deterioration of the optimal conditions that constitute the animal health and welfare (Azkur & Aksoy, 2018). The deterioration of these conditions can be caused by problems such as infections and errors made in care and nutrition.

Accepting animal deaths as a problem in cattle breeding enterprises is the first and most basic step to control mortality. Accurate definition of causes of death is essential for reducing cattle and calf mortality rates. In this context, it was aimed with this study to reveal the causes of death of cattle and calves in the Ardahan region and to investigate their economic importance.

MATERIALS AND METHOD

The material of this study consisted of the data obtained from the face-to-face survey study conducted with the producers who were engaged in animal husbandry activities in Ardahan province and agreed to participate in the survey. The study was conducted with 60 producers between May 2020 and May 2021.

Statistical Analysis

Data analysis was done by the program of IBM SPSS Statistics 20.0. (SPSS 2011).

RESULTS

It was found in the survey study conducted with dairy cattle farms in Ardahan that the participants were 37.93 years old on average, and that their enterprises had an average of 58 ± 47.73 m² (min: 10, max: 200). In the analysis, the average living area per cattle was determined as 2.63 m².

It was determined in the research that the enterprises produced with traditional methods and kept the cattle of all age groups together. Table 1 shows the situation of the breeders keeping calves and cows together.

Table 1. Coexistence of calves and cows.

	Frequency	Percent (%)
Yes	42	70,0
No	4	6,7
Partially	14	23,3
Total	60	100

It was determined when Table 1 was examined that a significant part of the breeders, except 6.7%, kept calves and cows together.

The cause of the calf deaths determined in the study is given in Table 2. It was determined when Table 2 was examined that 68 (12.25%) of 555 calves died and the highest cause of death was diarrhea.

Table 2. Cause of death of calves

	Frequency	Percent (%)
Diarrhea	32	47,06
Septicemia	14	20,59
Pneumonia	6	8,82
Navel infection	10	14,71
Other	6	8,82
Total	68	100

Vaccination status of the calves in the study is given in Table 3. It was determined when Table 3 was examined that 51.7% of the septicemia vaccine was administered and 56.7% of the pneumonia vaccine was administered.

Table 3. Vaccination status of calves

		Frequency	Percent (%)
Septicemia vaccine	Yes	31	51,7
	No	14	23,3
	Partially	10	16,7
	I do not know this vaccine	5	8,3
Pneumonia vaccine	Yes	34	56,7
	No	11	18,3
	Partially	6	10,0
	I do not know this vaccine	9	15,0

The practices of the breeders in the region to increase the resistance of the calves and to prevent umbilical lesions are given in Table 4. It has been determined when Table 4 is examined that 95% of the breeders give colostrum to their calves as soon as they are born, whereas 50% of the farms do not pay attention to navel cleaning.

Table 4. Attitudes of enterprises towards increasing the resistance of calves and preventing umbilical lesions

		Frequency	Percent (%)
Is colostrum given as soon as the calf is born?	Yes	57	95,0
	No	3	5,0
Is the navel of the calf cleaned with batikon (tincture diode) as soon as it is born?	Yes	31	51,7
	No	29	48,3

In line with the data obtained, it was determined that there were a total of 1035 cattle, 732 cows and 303 heifers, in 60 farms, and it was determined that a total of 37 (3.58%) cows/heifers died in 18 farms (30%) due to various reasons during the 1-year period between June 2020 and June 2021. The causes of death of 37 cows are given in Table 5.

Table 5. Causes of death of cow/heifer

	Frequency	Percent (%)
Nutritional disorder (acidosis, etc.)	10	27,03
Respiratory tract infection	6	16,22
Poisoning	4	10,81
Choking (entanglement)	4	10,81
Diarrhea	3	8,11
Fall-slip injuries	2	5,41
Other (cause unknown)	8	21,62
Total	37	100

It is seen when Table 5 is examined that the main cause of cow/heifer deaths is eating disorders due to improper nutrition.

Both in the research and the literature study, the most important diseases seen in cattle in the region are foot and mouth, brucella jaundice, burns and parasitic diseases. The data obtained regarding the vaccination applications of breeders for these diseases are given in Table 6.

Table 6. Vaccination status of cows/heifers

		Frequency	Percent (%)
Does she get the Brucella vaccine regularly?	Yes	42	70,0
	No	18	30,0
	Sometimes	15	25,0
Does she get the FMD vaccination regularly?	Yes	48	80,0
	No	12	20,0
Does she give parasitic vaccination to her pre-pasture animals?	Yes	29	48,4
	No	20	33,3
	Sometimes	11	18,3
Total		60	100,0

It has been determined when Table 6 is examined that approximately 25% of the producers do not have their vaccinations regularly.

DISCUSSION AND CONCLUSION

In livestock enterprises, cattle and calf deaths are an important economic loss, and determining the specific causes of death is the most important step in the control of mortality. As a matter of fact, reducing the mortality rate in enterprises can be reduced by 50% with the right herd management systems (McConnel et al., 2008).

In the analysis, the average living area per cattle was determined as 2.63 m², and it was determined that this area was sufficient in the light of the literature information (Demir Ayvazoğlu & Adıguzel Isık, 2020). However, in our study, it was determined that 93.3% of calves and cows stayed together. However, coexistence of calves and cows is not a desirable situation since they create a predisposing factor for septicemia and respiratory diseases.

It has been reported that calf deaths are the most important problem of cattle breeding in the world, varying between 1.4-9.5% in European countries, 7% in the USA and up to 50% in Turkey (Mötus et al., 2017; Akyuz et al., 2017; Azkur & Aksoy, 2018). The main causes of death in calves are known as diarrhea, pneumonia and sepsis (Klein et al., 2009; Akyuz et al., 2017; Güneş, 2008). In the study conducted in parallel with the findings of this study, the mortality rate in calves was determined as 12.25%, and the highest cause of death was found to be diarrhea with a rate of 32%.

Each calf obtained in dairy cattle enterprises is the most important source of income for the enterprise, and in this context, it is necessary to improve the defense system and environmental conditions of the calves with preventive medicine practices that will minimize calf diseases and deaths (Akyuz et al., 2017). In order to strengthen the defense system of the calves, it is necessary to give colostrum and to be vaccinated.

It was determined in the study that 95% of the farms gave colostrum to the calves. The most effective way to protect against infectious agents causing diarrhea and respiratory diseases in calves is the complete and timely intake of colostrum. Because newborn calves cannot get enough immunoglobulin (Ig) from their mothers, IgG level in serum is below 10 mg/mL and this level does not protect the calf against diseases (Godden et al., 2009).

Vaccination is our most important assistant in catching the disease or reducing the effects of the disease. When an epidemic is observed in unvaccinated farms, preventive vaccinations to be made to calves within the first 12 hours after birth are very important (Akyuz et al., 2017). It was determined in our study that although the rates of morbidity and mortality due to septicemia, diarrhea and pneumonia were high in calves in Ardahan, half of the breeders had their calves vaccinated to protect them from diseases. In addition, since calves are completely vulnerable to diseases when they are born, environmental conditions must be quite sterile. However, since a completely sterile environment cannot be created, cleaning the navel is of great importance in preventing navel infections. In our study, it was determined that 50% of the business owners do not give importance to cleaning the belly part. In this case, the mortality rate due to umbilical infections in the region is around 15%.

In the interviews with the breeders, the death rate of the cow/heifer was determined as 3.58%. In different studies, cattle deaths were reported as 5% in Denmark, Italy and the USA (Miller et al., 2008; Thomsen & Sørensen 2009; Fusi et al., 2017). In parallel with the findings

of this study, the main causes of death in cattle were reported in the study conducted in Italy as metabolic/digestive system disorders (22.3%), mastitis/breast problems (17.1%), calving problems (13.9%), lameness/locomotor disorders (12.4%), accidents (10.8%), other known causes (8.8%) and unknown causes (14.7%) (Fusi et al., 2017). In a different study conducted in Sweden, the known causes of death of cattle were reported as digestive disorders (12%), udder/nipple disorders (15%), calving problems (9%), metabolic diseases (9%) and accidents (5%) (Alvåsen et al., 2014). Unlike these studies, the number of cows/heifers that died by drowning as a result of being entangled in chains was found to be remarkable. This shows that the animal welfare level is low. As a matter of fact, the main cause of death in dairy cattle enterprises is the failure to provide optimal conditions for animal health and welfare. Studies have reported that increasing animal welfare significantly reduces sudden deaths in cattle (Maden et al., 2021).

As a result, it has been observed that the loss of both cattle and calves is significant in Ardahan province, and it is thought that training and seminars should be focused on minimizing the economic loss by explaining the factors causing this to the breeder.

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A Case of Chronic Constipation Related to Nutritional Secondary Hyperparathyroidism in a Cat

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ABSTRACT

Nutritional secondary hyperparathyroidism (NSHPT) is a metabolic disease. This study aimed to report clinical findings, especially constipation, and serum biochemical changes related to NSHPT in a cat. The Material of the study consist of a 5-month-old female domestic British shorthair cat which had been eating beef and liver for a long time, and included chronic constipation, abdominal pain, severe tenesmus, growth retardation, and lameness. On the physical examination growth retardation, abdominal pain, abdominal tension and irritated anal area detected. An enlarged colon was detected on radiographic examination. It was determineted that there was an increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value. In conclusion, this case demonstrates that NSHPT can leads to constipations in cats. If enlarged or megacolon present, prognosis is poor.

Keywords: Cat, Constipation, Hyperparathyroidism, Nutritional

INTRODUCTION

Nutritional secondary hyperparathyroidism (NSHPT) is a metabolic disease which characterized by lameness, constipation, lordosis, kyphosis, fractures of long bones and vertebral bodies (Asi et al., 2014; Tudor et al., 2021). The disease is caused by excessive phosphate (Ca:P ratios of about 1:16 to 1:35 which contrast with the recommended 1:1 for cats) in diets, insufficient calcium, or both (Asi et al., 2014). Dietary calcium deficiency, such as beef or liver, result in transient decreased serum calcium concentration, and including over-activity of the parathyroid glands resulting in excessive production products the parathyroid hormone (PTH). PTH plays a key role for maintaining calcium (Ca), phosphorus (P), vitamin D homeostasis and bone health. As a result, the calcium absorbtion from gastrointestinal tract and bone is increased, enhancing phosphorus excretion by kidney (Krook et al., 2020; Won et al., 2004). If presents hypocalcemia and hyperphosphatemia, it causes clinical signs in kittens such as anorexia, weight loss, depression, hyperesthesia, constipation, joint pain, and lameness (De Macedo et al., 2018; Moarrabi et al., 2008; Yurdakul et al., 2017). The laboratory findings characterised by increased serum PTH, P, ALP and decreased serum Ca:P ratio (Bharti et al., 2021; Ghanem et al., 2018; Tudor et al., 2021).

This study aimed to report clinical findings, especially constipation, and serum biochemical changes related to NSHPT in a cat.

CASE DESCRIPTION

[Full Text](#)

A 5-month-old female domestic British shorthair cat with complained of severe chronic constipation and growth retardation applied to Prof. Dr. Servet SEKİN's Veterinary Hospital, Dicle University. On history, it was learned that the cat had been eating beef and liver for a long time, and included chronic constipation, abdominal pain, severe tenesmus, growth retardation, and lameness.

Blood samples were taken from the cephalic vein. Two separate blood samples were taken for hematological examinations, with anticoagulant (EDTA) and without anticoagulant for biochemical analysis. Hematological analysis was performed immediately.

The sample taken for biochemical analysis was centrifuged at 3000 r.p.m. for 10 minutes and the serum was aspirated carefully by automatic pipette and transferred into clean dry labeled eppendorf tubes, and stored at -20°C till examination. Biochemical analyzes were repeated one month after treatment.

On the physical examination growth retardation, abdominal pain, abdominal tension and irritated anal area detected and an enlarged colon was detected on radiographic examination (Figure 1).



Figure 1. A- The diseased cat, B and C- Irritated anal area, D- An enlarged colon on radiography.

In hematological parameters, white blood cell (WBC), lymphocytes (Lymph), monocytes (Mon), granulocytes (Gran), red blood cell (RBC), hemoglobin (HGB), haematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), red cell distribution width (RDW), platelet (PLT), mean platelet volume (MPV), platelet distribution width (PDW) and platocrit (PCT) was checked. In the hematological analyzes, it was determined that there was no alterations in the hematological parameters when compared with the reference values.

In biochemical parameters, parathyroid (PTH), creatinine (Crea), blood urea nitrogen (BUN), alkaline phosphatase (ALP), total protein (TP), albumin (Alb), globulin (Glob), calcium (Ca), phosphorus (P) and the ratio of calcium:phosphorus (Ca:P) was determined. It was determined that there was an increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value (Table 1).

Table 1. Biochemicals parameters in the cat

Parameters	Diseased cat	Reference values (12)
PTH(pg/ml)	78	10-33
ALP (IU/L)	356	10.0-80
BUN (mg/dl)	30	10.0-30.0
CRE (mg/dl)	0.81	0.8-1.8
ALB (g/dl)	2.8	2.1-3.9
GLOB (g/dl)	3.1	1.5-5.7
TP (g/dl)	5.9	5.4-7.8
Ca (mg/dl)	9.7	8.0-10.7
P (mg/dl)	8.2	1.8-6.4
Ca:P	1.18	1,67-2,97*

* Calculated based on reference values.

NSHPT was diagnosed with based on clinical sign and increased serum ALP, P, PTH levels and normal BUN and Crea levels. For treatment purposes, methimazole and vitamin D were given and it was referred to the surgery clinic for total colonectomy. But, colonectomy was not performed. In the interview with the patient's owner, it was learned that the general condition of the patient was good, but the constipation have continued.

DISCUSSION

The pathogenesis of this disease is the stimulation of the parathyroid gland by decreased blood calcium. Low dietary calcium induces hypocalcemia, stimulating increased parathormone secretion to compensate for this. The low blood calcium was caused both by low calcium intake and also by a relative phosphorus intake. High dietary phosphorus causes hyperphosphatemia, which, in turn, causes hypocalcemia, thus stimulating the parathyroid gland (Krook et al., 2020).

The typical clinical signs of NSHPT in kittens include anorexia, weight loss, depression, hyperesthesia, constipation, joint pain and lameness. Researchers report various clinical and radiographical findings related to NSHPT. In a previous study (Kurt et al., 2020), it was reported that clinical signs included pain in the whole body, reluctance to move, growth retardation with no history of trauma, osteopenia, multiple fractures of all limbs, and lordosis of the caudal vertebrae. One report also observed that lameness, difficulty walking and lumbar pain (Tal et al., 2018). Difficulty in walking, lameness, decreased bone density, costochondral nodes, and pressure sensitivity in the bones has been reported previously (Yurdakul and Bakir, 2017). Clinical signs including disturbance in locomotion manifested by reluctance to move, posterior lameness, joint pain and uncoordinated gait were observed in

another report (Ghanem et al., 2018). Several findings which related to NSHPT included dyspnoea, open mouth breathing, epiphora, excessive nasal secretions, tachycardia, pale mucous membranes, debility, loosely attached teeth, and pigmented oral mucosa of the upper jaw also reported (Bharti et al., 2021). Additionally, lethargy, lameness, epiphyseal fracture, femoral cupping, marginal radiopacity and pelvic collapse has been reported (Asi et al., 2014). Researchers have observed that lameness in the hind limbs, reluctance to move and preference for the decubitus position, osteopenia, accompanied by thinning of the compact diaphysis, with a double linear appearance, and pathological fractures (Tudor et al., 2021). Won et al. (2004) reported that abnormal gait, reluctance to move, depressed withdrawal reflex were noted at the neurological examination and osteodystrophic change of the lumbosacral vertebra. Similar to previous findings pathological fractures, thin cortex, constipation, decreased bone density and pelvic and column vertebral deformity have been described in a separate study (Moarrabi et al., 2008). Progressing through to paraparesis with neurological deficit in pelvic limbs, constipation and urinary retention have been reported (De Macedo et al., 2018). In addition, one study detected that onset of posterior lameness of various intensity and disinclination (reluctance) to stand or move due to skeletal and muscular pain, ataxia and constipation (Ghanem et al., 2018). In the present study chronic constipation, abdominal pain, severe tenesmus, growth retardation, lameness, abdominal tension, irritated anal area and enlarged colon was detected. The clinical and radiological findings reported in this study were consistent with what the researchers have reported. It is thought that constipation is caused by hypocalcemia and hyperphosphatemia leading to intestinal motility (Tal et al., 2018).

Common laboratory findings associated with NSHPT are increased serum PTH, P, ALP and decreased Ca:P ratio. Different studies have been stated that there was an increase in serum ALP, CK, P and PTH levels (Asi et al., 2014; Tudor et al., 2021; Won et al., 2004); however, calcium was slightly below normal level of and levels of inorganic phosphate and creatinine were normal (Asi et al., 2014). Hyperphosphatemia, normocalcemia, high ALP level and increased parathyroid hormone (PTH) level might be seen in NHSPT (Lacitignola et al., 2018). Bharti et al. (2021) have stated in a Labrador puppy with NSHPT hypoproteinemia due to hypoglobulinemia, hyperalbuminemia, hypocalcemia, hyperphosphatemia, and decreased Ca:P ratio. It has been stated in a separate study there was a significant increased in serum CPK, ALP, BUN, P, PTH levels, and decreased in TP, Alb, Glob levels (Ghanem et al., 2018). Similar results have also achieved by a different study; there was an increase in serum ALP and P levels and a decrease in the Ca:P ratio in cats with NSHPT (Yurdakul and Bakir, 2017). Previous studies stated that level of ALP and P high in some affected and healthy cats, but difference was not significant, additionally serum PTH values was higher in cats with NSHPT compared to reference values (Kurt et al., 2020; Moarrabi et al., 2008). In the present study, it was detected that there was an increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value. NSHPT is diagnosed with an increase in ALP, P and PTH values and normal BUN and Crea values (Turgut, 2000). The obtained results were observed to be consistent with what the researchers have been reported.

As a result; NSHPT can cause constipation in addition to clinical signs such as joint pain and lameness. Alterations in biochemical parameters in the disease include increase in ALP, P and PTH values, and a decrease in the Ca:P ratio compared to the reference value.

In conclusion this case demonstrates that NSHPT can leads to constipations in cats. If enlarged or megacolon present, prognosis is poor.

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