morphological and immunohistochemical properties of leukemia in horses. Review of medical and laboratory records over 17 years identified 16 horses diagnosed with leukemia. Horses included 9 males and 7 females ranging from 0.2 to 25.9 years (median 6.5) in age. All horses with acute lymphocytic leukemia (ALL) were below 4 years, and all horses with myelodysplastic syndrome (MDS) were above 13 years of age. Fifteen horses (93%) had thrombocytopenia (7–68 $\times$ 10^9/L), eleven (69%) had anemia (hematocrit 0.08–0.27 L/L), and all had atypical leukocytes on blood films. Six cases were classified as ALL based on immunohistochemical detection of CD3, CD20 and/or CD79a antigens; six as acute myeloid leukemia (AML; 4 myelomonocytic, one basophilic, one eosinophilic) by >20% blast cells with expression of Iab antigen and partial leukocyte differentiation; and four cases as MDS with refractory thrombocytopenia (n = 3) or neutropenia (n = 1) with excess blasts based on ineffective hematopoiesis and dysplasia. Postmortem examination identified leukemia involving lymph nodes (n = 8), liver (n = 8), lung (n = 4), gastrointestinal tract (n = 4) and kidney (n = 3) in addition to hematopoietic tissue. Horses with ALL or AML survived <42 days while two horses with MDS had historical cytopenia exceeding one year, and two are alive 342 and 80 days after diagnosis. These findings indicate variable features and prognosis of leukemia in horses.

THE INFLUENCE OF CLEANING, DISINFECTION AND DRYING METHODS ON ENDOSCOPE HYGIENE IN EQUINE MEDICINE. A.K. Barton[1], N. Roschanski[2], R. Merle[3], U. Rösler[2], H. Gehlen[1]. [1]Equine Clinic, Berlin, [2]Institute for Animal Hygiene and Environmental Health, Berlin, [3]Institute for Veterinary Epidemiology & Biostatistics3, Department of Veterinary Medicine, Freie Universitaet Berlin, Berlin

In times of increasing numbers of infections caused by multiresistant bacteria, sufficient, but feasible cleaning and disinfection of veterinary endoscopes is of great importance. In the here described study, two cleaning- and disinfection methods (manual vs. automatized) as well as two different drying techniques (air-drying vs. pressurized air) were compared. Therefore, 4 groups of 40 endoscopic examinations were investigated by sampling of working channel, endoscope tip and shaft at 3 time-points. Microbiologic swab results were evaluated for total bacteria counts, successful cleaning and disinfection was defined as total bacteria of 0 or at least 4 log reduction. Overall, the percentage of successful cleaning, disinfection and drying over the different groups varied from 74 to 82%. A significant influence of the method of drying and the examined organ system was found for the working channel, while no significant factors were found for tip and shaft. Disinfection was most successful after examinations of the lower airways ($P = 0.003$), while odds ratios for the gastrointestinal tract and upper airways were 0.073 and 0.115, respectively. There was also a trend towards a positive effect of pressurized air drying, but this remained insignificant ($P = 0.095$). Overall, modern methods of disinfection and drying were found to be superior for the localizations working channel and endoscope tip ($P < 0.05$), but not for the shaft. In conclusion, careful cleaning and disinfection is essential in particular after endoscopic examinations of the upper airways and the gastrointestinal tract. Pressurized air drying seems preferable.

CHRONIC PYLORIC DISORDERS IN HORSES: 47 CASES. B. Bezdekova[1], P. Wohlsein[2], M. Skoric[3], M. Venner[4]. [1]Equine Medical, Skalice nad Svitavou, Czech Republic, [2]Department for Pathology, School of Veterinary Medicine of Hannover, Hannover, Germany, [3]Department of Pathology and Parasitology, University of Veterinary and Pharmaceutical Sciences Brno, Brno, Czech Republic, [4]Equine Clinic Destedt, Destedt, Germany

Pyloric pathologies in horses have little evidence in scientific literature. Forty seven cases of chronic pyloric disorder were identified from retrospective analysis (1996–2015; CZE, GER). Mean and median ages were 4 years $\pm$ 3.3 and 3 years (0.8–16 years) respectively. Five geldings, 22 mares and 17 stallions were presented with the majority being Warmbloods. Most of the horses presented clinical signs of a chronic disorder including poor body condition (40; 87%), slow eating (39; 83%), recurrent colic (35; 74%), selective appetite (30; 64%) and frequent recumbency (27; 57%). The most consistent laboratory abnormality was hypoalbuminemia (10; 36%). Slow gastric emptying was confirmed in 29 individuals during gastroscopy and/or ultrasonography. Endoscopy revealed distal esophagitis in 9/47 horses, severe secondary ESGD in 47/47 cases and chronic disorder was seen in 45/45 pyloruses. Depressed, flat or raised fibrinosuppurative pyloric ulcer/ulcers were presented. Pyloric motility was absent or severely altered in all but one case. Treatment was applied in 32 cases, with 28 responding well. All treated cases received antiulcer medication and four underwent surgical therapy. The clinical signs recurred after the end of medical treatment in at least 11 cases. The outcome was known in 44 cases from which 18 (41%) survived long term (observation period 6 month – 6 years). Horses diagnosed up to three years of age were significantly less likely to survive ($P = 0.0007$). This study extends the evidence on equine chronic pyloric disorders and supports the suggestion of a poor prognosis for young individuals.

DETERMINATION OF SALIVARY CORTISOL IN DONKEY STALLIONS. F. Bonelli[1], A. Rota[1], C. Aurich[2], N. Ille[2], P. Baragli[1], D. Panzani[1], F. Camillo[1], D. Gatta[1], V. Meucci[1], M Sgorbini[1]. [1]Department of Veterinary Sciences, via Livornese snc, San Piero a Grado PI, Italy, [2]Vetmeduni Vienna, Vienna, Austria

The aim was to validate a commercial enzyme immunoassay for the determination of salivary cortisol in donkeys. Seven stallions were included. Saliva samples were collected at 8:30 AM on thirteen not consecutive days by a cotton-based swab (Salivette®, Germany). The swab was grasped with a clamp, inserted at the angle of the lips into the mouth of the donkey and placed gently under the tongue for 1 minute and afterwards returned into a polypropylene tube. Tubes were then centrifuged for 10 min at 700 g and the obtained saliva was frozen at −20°C until analysis. A commercial enzyme immunoassay without extraction (Demeditec Diagnostics, Kiel-Wellsee, Germany) was used for cortisol saliva determination. The assay was validated for donkey saliva by measuring recovery of cortisol standard, serial dilution curve parallelism, intra-assay and inter-assay coefficient of variation and limit of detection. Cortisol mean levels and standard deviation were calculated for each day of sampling. One-way ANOVA for repeated measures and Tukey's test were performed. The ELISA method was found to be sensitive and reproducible for cortisol concentration determination in donkey saliva. Recovery of cortisol standard to donkey saliva was 107.9% and serial dilution of saliva samples with assay buffer resulted in changes in optical density parallel to the standard curve. The intra-assay coefficient of variation was 10.7%, the inter-assay variation was 8.0% and the minimal detectable concentration was 0.01 ng/mL. No statistical significant differences were found among cortisol levels in each animal on the 13 different days of collection.

BLOOD GAS LEVELS IN NEWBORN FOALS AFTER NORMAL AND ASSISTED DELIVERY. F. Bonelli[1], A. Lanci[2], J. Mariella[2], F. Freccero[2], C. Castagnetti[2], P. Marmorini[1], M. Sgorbini[1]. [1]Department of Veterinary Sciences, Veterinary Teaching Hospital "Mario Modenato", Pisa, Italy, [2]Department of Veterinary Medical Sciences, University of Bologna, Italy

Umbilical cord blood gas analysis can provide important information about conditions of the newborn and its use is common in human medicine for diagnosis of perinatal diseases. The aim of this study was to evaluate the blood gas levels and acid-base status in newborn foals after normal and assisted delivery. Fifteen foals were included and were divided into 2 groups: 12 healthy foals (Group 1) with gestational age ≥320 days, normal delivery, and APGAR score ≥8 five minutes after birth and 3 foals (Group 2) with gestational age ≥320 days, assisted delivery and APGAR score <8. Blood samples were drawn from an umbilical artery (Group 1) and from jugular vein (Group 2). The pH, pCO2, pO2, SO2%, HCO-3 and base excess were assessed using a standard laboratory blood gas analysis. Blood lactate concentration was also evaluated in 6 foals of Group 1 and in all foals of Group 2 with a hand-held analyzer. Mares' age and parity, gestational age, and length of stage II labor were also recorded. Shapiro-Wilk normality test was applied. Whitney test for unpaired data and Student's t test were used for statistical analysis. Statistical differences were obtained for pH (Group 1: 7.4 $\pm$ 0.1; Group 2: 7.3 $\pm$ 0.0), HCO-3 (Group 1: 31.5 $\pm$ 6.2 mmol/L; Group 2: 30.1 $\pm$ 2.1 mmol/L), lactate (Group 1: 5.4 $\pm$ 1.9 mmol/L; Group 2:13.0 $\pm$ 8.0 mmol/L), and base excess (Group 1: 5.7 $\pm$ 6.2;

Group 2: 3.3 ± 1.3), while no differences were obtained for the other data collected. Our results showed acidosis in foals born after assisted delivery, as reported in human neonatology.

USE OF A COMMERCIAL HIGH-FIBRE EQUINE LIQUID DIET FOR ENTERAL TUBE FEEDING IN HORSES: CLINICAL EXPERIENCE IN 9 CASES. C. Cesarini, S. Cerri, A.A. Leroux, L. Lecoq, S. Grulke, A. Salciccia, H. Amory. Faculty of Veterinary Medicine, Department of Companion Animals and Horses, University of Liège, Liège, Belgium

Enteral tube-feeding of hypophagic/dysphagic horses can be challenging due to the limited availability of liquid diets formulated for the equine species. Human products are expensive and lack fibre, whereas slurries made from pelleted horse feedstuffs are difficult to pass through nasogastric tubes. Enteral recipes for horses combining specific components have been described but they are cumbersome and time-consuming to prepare. The aim of this retrospective study is to describe the use of a commercial high-fibre equine liquid diet (EquidgelTM) to provide nutritional support to 9 hospitalized adult horses. The diet was prepared following the manufacturer's recommendations and administered through a nasogastric tube by gravity flow. An oesophagostomy was performed in 2 horses to facilitate long term tube-feeding. Reasons justifying tube-feeding included dysphagia (5/9), oesophageal rupture (1/9), temporo-mandibular fracture (1/9) and hyperlipidemia and weight loss secondary to prolonged fasting (2/9). Duration of tube-feeding ranged from 36 h to 56 days. The volume administered ranged from 3–6 L/meal given in 6–12 meals/day. Despite an abrupt introduction, the new diet was well tolerated by all horses. The production of faeces was reduced but consistency was normal, and no detrimental behavioural effects were noted. Three horses presented minor complications that were transient and associated to prolonged nasogastric tubing (purulent rhinitis (2/9), pharyngeal ulcers (2/9), gastric reflux and ulcers (1/9)) or non-related to diet. In conclusion, the commercial liquid diet EquidgelTM is a user-friendly product, well tolerated and easy to administer by gravity flow through large-medium nasogastric tubes, providing a useful alternative for enteral tube-feeding in horses.

ENDOTHELIN-1 PLASMA CONCENTRATION IN HORSES WITH CARDIAC DISEASE AT REST AND AFTER EXERCISE. H. Gehlen, I. Hofheinz. Clinic for Horses, Freie Universität Berlin, Berlin

Cardiac biomarkers simplify diagnosis and staging of cardiac disease, can provide prognostic information and help in monitoring therapy in humans and small animals. In horses with cardiac disease plasma ET-1 concentration has not been evaluated. Influence of physical exercise on ET-1 plasma concentration has been studied in healthy horses but not in horses with cardiac disease. The objective of this study was to evaluate plasma ET-1 concentration for its value as a possible diagnostic and prognostic biomarker in horses with cardiac disease before and after exercise. Fifty-four equine patients from the Equine Clinic of Free University of Berlin including 15 horses with no evidence of cardiac disease, 22 horses with evidence of cardiac disease and normal heart dimensions and 17 horses with evidence of cardiac disease and altered heart dimensions. Diagnosis was based on history, clinical examination, electrocardiography and echocardiography. Plasma samples were collected at rest and after longing exercise and stored at −80°C. Analysis were performed by using a commercial endothelin-1 ELISA kit. Plasma levels of endothelin-1 in horses with cardiac disease were not significantly higher than plasma levels in horses without cardiac disease. But a significant correlation could be observed between the plasma levels of endothelin-1 in horses with cardiac disease and the left atrial diameter at rest as well as post exercise. This suggests a relation between the severity of disease and the ET-1 plasma levels. Therefore ET-1 may be useful for detecting horses with left trial enlargement, but further studies are necessary to improve this hypothesis.

TARGETED HYGIENE MANAGEMENT SYSTEM: RAPID BENEFICIAL EFFECTS. K.-S. Klein[1], B. Walther[2], A. Lübke-Becker[2], H. Gehlen[1]. [1]Equine Clinic, Surgery and Radiology, Freie Universität Berlin, Germany, [2]Department of Microbiology and Epizootics, Freie Universität Berlin, Germany

To achieve an effective hygiene management within equine clinical environments, an objective assessment of given hygiene structures, work flows and patient-associated risk factors is imperative together with a continuing surveillance of multi-drug resistant (MDR) pathogens frequently associated with nosocomial infections. In the first part of this interventional study, critical hygiene areas and procedures were identified and assessed with respect to their distinct risks for both, the equine patients and the veterinary personnel during an observation period of six months. In addition, a continuing surveillance of site infections (SI) associated with MDR pathogens was implemented for two important distinct medical indications (colic surgery, open injuries). Then, the intervention process started with practical hygiene education of the personnel including a strong focus on hand hygiene compliance. A bundle of further actions was implemented, including standard operation procedures (SOPs) for bandage change, wound- and catheter management and application of drugs. Horse owners were informed about correct behavior in the stables, regular room cleaning plans were accomplished and an appropriate mandatory hygiene instruction for students, residents and guests was introduced. An increase of 190% was documented for consumption of alcoholic hand disinfection in the second study phase, while the overall rate of recorded SI in colic- and injury patients decreased by 12.1 and 6.6%, respectively. Noted cases of MDR pathogens in SI decreased by 9.5%. Here we provide strong evidence for the necessity of continuing surveillance of defined site infections and the beneficial effects of a targeted hygiene management implemented and evaluated in a large equine clinic, given that all structural measures and responsible authorities act in concert.

UTILITY OF HISTOLOGICAL EXAMINATION OF THE BRONCHIAL MUCOSA IN DIAGNOSTICS OF RECURRENT AIRWAY OBSTRUCTION (RAO) IN HORSES. A. Niedźwiedź[1], Z. Jaworski[2], H. Borowicz[1]. [1]Department of Internal Diseases with Clinic for Horses, Dogs and Cats; Wroclaw University of Environmental and Life Sciences, Wrocław, Poland, [2]Department of Horse Breeding and Riding, University of Warmia and Mazury, Olsztyn, Poland

Equine recurrent airway obstruction (RAO), is one of the most common respiratory problems in older horses. It is characterized by airway obstruction, excessive mucus accumulation and influx of neutrophils into the bronchial tree. History, clinical examination and result of bronchoalveolar lavage (BALF) cytological assessment has been recognized as a "gold standard" in RAO diagnostics. However, pathological features of the bronchial mucosa and its utility in diagnostics of equine RAO is poorly characterized. A total of 40 horses were evaluated: 30 horses with RAO and 10 healthy animals. An acute crisis of RAO was induced by placing all horses in a poorly ventilated stable, bedding them on straw and feeding them hay with a visible mold growth for 48 hours prior to the examination. At each bronchoscopy, at least three or more biopsies were obtained from both right and left first segmental bronchi. The samples were fixed by perfusion with 10% formol saline and then stained hematoxylin and eosin (HE). Samples were scored in respect to surface epithelium, lamina propria, smooth muscle, glands, inflammation type, hyperemia and additional findings. Statistical differences in means were determined by one way analysis of variance (ANOVA) with Tukey's test. Material obtained from 6 horses (1 control and 5 RAO-affected) has been evaluated as non-diagnostic. The statistical analysis revealed no statistical differences for any of the assessed variables in the two groups. In conclusion, abnormalities found in biopsy samples from bronchial mucosa do not seem to help in diagnostics of RAO in horses.