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Preface: Hot Topics in Small Animal Veterinary Medicine: 2010–2018 xv
Lisa L. Powell

Urinary Tract Infections Treatment/Comparative Therapeutics 581
Shelly J. Olin and Joseph W. Bartges

Urinary tract infection (UTI) is commonly encountered in small animal general practice. Within the past 5 years, there have been changes to terminology, such as the renaming of asymptomatic bacteriuria to subclinical bacteriuria, as well as paradigm shifts in the management of UTI. In general, there is an emphasis for responsible antimicrobial stewardship and selecting treatment based on urine culture and sensitivity and treating symptomatic bacterial UTI with a shorter duration of antimicrobials. In addition, for most cases, treatment of subclinical bacteriuria is not indicated.

Symmetrical Dimethylarginine: Evaluating Chronic Kidney Disease in the Era of Multiple Kidney Biomarkers 609
Helen Michael, Donald Szlosek, Celeste Clements, and Rebekah Mack

Symmetric dimethylarginine (SDMA) is a valuable surrogate marker for decreased glomerular filtration rate (GFR) and is incorporated into the International Renal Interest Society (IRIS) guidelines for diagnosing, staging, and treating chronic kidney disease (CKD). SDMA increases above the reference interval with smaller reductions in GFR rate than does creatinine and persistent mild increases in SDMA can be used to diagnose early-stage CKD. Evaluation of both SDMA and creatinine is recommended for diagnosis and monitoring of animals with CKD.

Pyometra in Small Animals 2.0 631
Ragnvi Hagman

Video content accompanies this article at http://www.vetsmall.theclinics.com.

Pyometra is a common disease in intact bitches and queens and occurs, although less frequently, in most other female pets. The illness is generally diagnosed within 4 months after estrus, in middle-aged to older bitches and queens. Hormonal and bacterial factors are important for the disease development, and progesterone plays a key role. The diagnosis is based on case history, clinical signs, and findings on physical examination, laboratory analyses and diagnostic imaging. Pyometra is potentially life-threatening and considered a medical emergency. Surgical
ovariohysterectomy is the safest and most efficient treatment, but purely pharmacologic options are possible in less severe cases.

**Acute Kidney Injury in Dogs and Cats**

Linda Ross

Acute kidney injury can cause significant morbidity and mortality in dogs and cats. Knowledge of the pathophysiology of renal damage can be beneficial to prevention and treatment. There are many causes of acute kidney injury, and the prognosis for each can vary. Appropriate fluid therapy and monitoring are essential for treatment.

**Fluid and Electrolyte Therapy During Vomiting and Diarrhea**

Luis H. Tello and Mariana A. Pardo

Fluid therapy is the most important therapeutic measure in patients suffering from dehydration or hypovolemia owing to gastrointestinal diseases. The therapy should be tailored based on the patient’s condition, physical examination, and diagnostic findings. The selection of the specific fluid therapy should be determined by specific abnormalities of the patient and the severity of the gastrointestinal disorder.

**Advanced Oxygen Therapy for the Small Animal Patient – High-Flow Oxygen Therapy and Mechanical Ventilation**

Kate Hopper and Lisa L. Powell

High-flow nasal oxygen therapy (HFNT) and positive pressure ventilation (PPV) are interventions used in the management of animals with respiratory failure. The indications for the use of these modalities, clinical application, prognosis, and a review of the current veterinary evidence are provided.

**Fluid Therapy for Pediatric Patients**

Leah A. Cohn, Amy J. Kaplan-Zattler, and Justine A. Lee

Pediatric dogs and cats within their first 12 weeks of life have important electrolyte requirements and physiologic considerations that may impact fluid therapy. Fluid requirements are higher in pediatrics, while fluid losses are greater due to underdeveloped physiologic responses. Hydration and volume status are difficult to assess in young animals, and their small size makes intravenous (IV) access difficult to obtain. Young patients can quickly deteriorate from dehydration, poor husbandry, and infection and become critically ill, requiring prompt recognition, treatment, intensive care, and monitoring. Clinicians should be aware of all available routes of fluid administration including oral, subcutaneous (SC), intraperitoneal (IP), IV, and intraosseous (IO), and the limitations associated with each route.

**Physical Rehabilitation for the Management of Canine Hip Dysplasia: 2021 Update**

David L. Dycus, David Levine, Barbara Esteve Ratsch, and Denis J. Marcellin-Little

Hip dysplasia is one of the most common orthopedic conditions affecting dogs. Initially, laxity of the femur leads to subluxation, and subluxation can
lead to an abnormal development or to progressive degeneration of the femoral head and dorsal acetabular rim. Osteoarthritis and its clinical impact progress over time. Changes to the femoral head and neck and the acetabulum and the impact on joint motion and pain vary widely among dogs. The rehabilitation of dogs with hip dysplasia includes rehabilitation therapy in dogs managed conservatively and the rehabilitation of dogs managed with surgery.

**Brachycephalic Obstructive Airway Syndrome**
Dorothee Krainer and Gilles Dupré

Video content accompanies this article at [http://www.vetsmall.theclinics.com.](http://www.vetsmall.theclinics.com)

Dogs presenting with brachycephalic obstructive airway syndrome suffer from multilevel obstruction of the airway as well as secondary structural collapse. Stenotic nares, aberrant turbinates, nasopharyngeal collapse, soft palate hyperplasia, macroglossia, tonsillar hypertrophy, laryngeal collapse, and left bronchial collapse are described as the most common associated anomalies. Rhinoplasty and palatoplasty as well as newer surgical techniques and prudent preoperative and postoperative care strategies have resulted in significant improvement even in middle-aged dogs.

**Fluid Therapy for the Emergent Small Animal Patient: Crystalloids, Colloids, and Albumin Products**
Elisa Mazzaferro and Lisa L. Powell

Water is essential for life. Without adequate fluid intake, normal body functioning becomes impaired and ultimately can lead to death. A fluid therapy plan should be considered for any small animal patient that has either inadequate fluid intake, excessive fluid loss, or both. A simplified approach to fluid therapy begins with an understanding of the composition of fluid and its distribution within the body. Next, consideration of electrolyte loss, acid-base disturbances, perfusion impairment, and loss of protein also becomes important when replenishing deficits by using various fluids that are commercially available to small animal practitioners.

**Glucocorticoids, Cyclosporine, Azathioprine, Chlorambucil, and Mycophenolate in Dogs and Cats: Clinical Uses, Pharmacology, and Side Effects**
Katrina R. Viviano

The treatment of immune-mediated diseases in dogs and cats continues to evolve as new therapies are adapted from human medicine. Glucocorticoids remain the first-line treatment followed by second-line therapies including cyclosporine, azathioprine (dogs), chlorambucil, or mycophenolate. Second-line therapies are introduced due to the patient’s lack of response or intolerable effects to glucocorticoids or may be introduced early in the disease treatment due to the patient’s severe life-threatening clinical presentation. The goals of immunosuppressive treatment are to achieve disease remission while minimizing drug side effects. Ultimately, gradual drug tapering to the lowest dose to maintain disease remission or successful drug withdrawal.
Degenerative valve disease (DVD) is the leading cause of heart disease and heart failure in the dog. The first consensus statement published in 2009 by the American College of Veterinary Internal Medicine was updated in 2019 and provides guidelines for the diagnosis and treatment of DVD. These updated guidelines recommend treatment with pimobendan in stage B2 DVD characterized by sufficient left heart enlargement. Asymptomatic dogs with DVD that do not meet or exceed the definition of stage B2 are considered stage B1. No treatment is recommended in stage B1 DVD. This article discusses the relevant scientific background and practical application of the updated DVD guidelines related to stage B. In addition, management of common sequelae of DVD that can result in clinical signs unrelated to congestive heart failure will be reviewed. The impact of new evidence on current recommendations and a glimpse into novel diagnostic approaches and possible future therapies will also be addressed.