SMALL MAMMALS: COMMON DISEASES OF COMMON SPECIES

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INTRODUCTION

Pet rodents, such as guinea pigs, chinchillas, rats, and less frequently hamsters and gerbils are presented to veterinarians for a variety of problems. Being familiar with the natural history, anatomy, dietary, and husbandry requirements is critical for veterinarians to provide pet owners with the correct advice. Being able to recognize common diseases in pet rodents, will allow veterinarians to make an accurate diagnosis and offer treatment options.

GUINEA PIGS

Guinea pigs are medium-sized hystricomorphic rodents, which have been domesticated for thousands of years (5000 BC), originally in South America as a food source. Guinea pigs have become popular companion animals and are used in research. Guinea pigs are social animals and are ideally kept in groups, but aggression may occur between males, in particular if housed in pairs. Large single-level cages are recommended, and a large amount of absorbent bedding should be provided since guinea pigs produce large amounts of urine. Wire-sided cages with a solid bottom are recommended over solid wall enclosures (e.g. glass tanks) since better ventilation is ensured. Hiding boxes or other hiding structures (e.g. PVC pipes, etc.) should be provided.

Guinea pigs are obligate herbivores and are well adapted to a natural diet consisting of a large amount of fresh vegetation. Therefore, guinea pigs should receive fresh produce daily in addition to unlimited amounts of high-quality grass hay. Commercial guinea pig pellets can be offered but are not essential. They are fortified with ascorbic acid (vitamin C) since guinea pigs cannot endogenously synthesize their own vitamin C. However, vitamin C easily oxidizes and therefore fortified pellets should never be the sole source of dietary vitamin C. However, since most fresh produce (in particular fresh green and bell pepper) contains vitamin C, sufficient intake (30 mg/kg/day) is usually ensured if fresh produce is fed. Food mixes containing grains (e.g. corn, wheat) or seeds as well as dried fruits and other food items high in sugar and phosphorus should not be fed to reduce the risk of developing dental disease and obesity. Fresh water should be provided in bottles, which encourages more water intake compared to open dishes.
Guinea pigs are easy to restrain and are not at risk of injuring themselves or the handler. However, the ventral body should always be supported when picked up. Vocalization during restraint is normal in guinea pigs and is not a sign of pain.

GUINEA PIGS - COMMON DISORDERS

Vitamin C deficiency: Guinea pigs lack the enzyme L-gluconolactone oxidase which is required for endogenous vitamin C synthesis. Therefore, just like humans and primates, have to rely on dietary vitamin C. Vitamin C is essential for the synthesis of collagen, an essential component of connective tissue (e.g. joint capsules, joint ligaments) and wound healing. It also plays an important role in immune function and the synthesis of l-carnitine and several neurotransmitters. Because vitamin C is critically important in collagen synthesis, most clinical signs associated with a dietary deficiency directly relate to weakened or abnormal collagen and connective tissues, such as lameness due to joint disease (e.g. stifle joint swelling is frequently palpable), dental disease (periodontal ligaments), poor fur condition, delayed wound healing, but also secondary bacterial infection due to a weakened immune system.
The diagnosis of hypovitaminosis C is based on clinical signs and dietary history. Treatment includes increased supplementation with vitamin C, but changes to joints, teeth, etc., are usually not reversible. Therefore, chronic pain medications may be indicated in some cases. Prevention of this condition is based on sufficient dietary vitamin C intake (30 mg/kg/day) which is achieved by offering fresh greens. Kale, parsley, mustard greens, and bell peppers are high in vitamin C, but most fresh leafy greens contain sufficient amounts of vitamin C. Commercial guinea pig pellets, although fortified with vitamin C, should not be used as a sole source. Alternative vitamin C tablets can be offered. Supplementation of vitamin C in the water is not recommended, as it oxides quickly and becomes inactive.

Dental disease: Guinea pigs have four morphologically identical cheek teeth in each quadrant 4 cheek teeth in each quadrant and two incisors per arcade (I1/1 C0/0 PM1/1 M3/3). The incisor teeth are white. The cheek teeth are in an oblique position within the skull resulting in an occlusal surface angle of ~ 30 degrees. Guinea pig incisor and cheek teeth are continuously growing (elodont) because they have no root (aradicular) and instead have a very large crown (hypsodont), which is divided into the clinical crown (above the gingival margin) and the reserve crown (below the gingival margin). Bridging of the first mandibular cheek teeth and subsequent tongue entrapment, resulting in the inability to chew food. Cheek teeth crown elongation may lead to the inability to chew, temporomandibular joint issues, and shifting of the mandible rostrally. Cheek teeth elongation may lead to soft tissue injury, but this is less common compared to chinchillas or rabbits. The diagnosis is based on the history and intraoral exam findings. For a complete intraoral exam, deep sedation or anesthesia is required to rule out dental disease. Specialized equipment is needed to perform a complete intraoral exam and necessary clinical crown adjustments. Cheek dilators and a mouth gag are essential. For clinical crown height adjustment, only low-speed drills with diamond burrs should be used. Clinical-relevant incisor malocclusion is relatively uncommon in guinea pigs. Odontogenic abscesses are less common in guinea pigs compared to rabbits and retrobulbar abscesses should be a top differential for animals with exophthalmos.

Gastrointestinal disorders: Gastric gas accumulation is a normal finding on radiographs in guinea pigs and moderate to severe gastric tympany can be seen in animals that are systemically diseased and/or suffer from gastrointestinal hypomotility. However, gastric dilatation-volvulus (GDV) should be a differential in guinea pigs presented for anorexia and with moderate to severe gastric dilatation on radiographs, since GDV is not uncommon in guinea

pigs, but no risk factors have been identified yet. In GDV cases the stomach will be displaced in the right cranial abdomen, instead of being located in its physiological location in the left cranial abdomen. Therefore, the correct placement of lateral side markers is critically important to rule out GDV. The prognosis is poor with most reported cases not recovering from surgery and declining in the post-anesthetic period. Therefore, while surgical correction can be attempted the poor prognosis should be thoroughly discussed with the owners.

Diarrhea is common in guinea pigs and can be caused by increased ingestion of simple carbohydrates (e.g. fruits, treats) or inappropriate oral antibiotic therapy, both leading to dysbiosis. Bacterial pathogens (e.g. E. coli, Proteus, etc.) can lead to enteritis, diarrhea, and frequently sepsis. Endoparasites are relatively uncommon in pet guinea pigs, but Eimeria and Giardia-related diarrhea should be ruled out in young guinea pigs. Fecal impaction in the perineal sac in older intact male guinea pigs is not uncommon. The primary cause is unknown, but malodor and accumulation of large amounts of fecal material can occur. Evacuation of the fecal material resolves the condition.

Urinary tract disorders: Bacterial cystitis is common in guinea pigs of both sexes. It can be a primary bacterial infection or secondary to urolithiasis. Corynebacterium renale is a common urinary pathogen responsible for cystitis in many guinea pigs. Obtaining urine via catheterization or cystocentesis is recommended for urine culture and susceptibility in guinea pigs. Diagnostic imaging should be performed to evaluate the urinary tract and rule out urolithiasis. TMS is recommended for empirical treatment of urinary tract infections.
Calcium carbonate uroliths are almost exclusively diagnosed in guinea pigs, as they are in rabbits and chinchillas. Underlying risk factors have not been identified, but renal disease, genetic predisposition, obesity, and diet have been suggested. The diagnosis is reliably made by radiography since calcium carbonate calculi are radiopaque. However, care should be taken to include the urethra in the radiographs, to rule out urethral calculi, which are common. In females, smaller calculi can be removed via cystoscopy or if located in the short urethra by instrument retrieval through the external urethral opening. Cystotomy is well tolerated in guinea pigs. Uroliths < 5 mm may be passed naturally in both sexes since the urethra is relatively wide in this species. Anecdotally the use of phenoxybenzamine has been recommended to aid passage of the calculi.

Female reproductive disorders: Ovarian cysts are very common in middle-aged to older female guinea pigs, with cysts found in up to 75% of females on necropsy. Serous and follicular ovarian cysts can occur in guinea pigs. Serous cysts can become very large, contain fluid, and can compress and displace other abdominal organs, and can lead to abdominal distension. However, in most cases, serous cysts are considered incidental findings in guinea pigs. In contrast, follicular cysts are small, produce estrogen, and can lead to bilateral flank alopecia. Both types of cysts frequently occur concurrently. Treatment for serous cysts includes ovariectomy, but it is only recommended if the cysts are large and cause clinical signs. Since many guinea pigs with ovarian cysts are older, co-morbidities should be expected which may negatively impact anesthesia and post-surgical recovery. Ultrasound-guided aspiration can be performed to achieve a temporary reduction in cyst size. Medical treatment (i.e. hormone therapy) is not effective for serous cysts. In contrast, hormone therapy is an effective treatment for resolution of follicular cysts and associated alopecia. By inducing an LH surge, follicular cysts

will resolve, and hair regrowth will occur. GnRH agonists (e.g. gonadorelin) or sustained-release GnRH-agonists (e.g. leuprolide acetate or deslorelin acetate), as well as human chorionic gonadotropin, can be used for this purpose in guinea pigs. However, new follicular cysts will frequently develop in the future. Therefore, only ovariectomy will be therapeutic and prevent future disease. Prophylactic flank ovariectomy should be considered in young guinea pigs, to prevent the development of ovarian cysts and also reduce the risk for uterine disease (e.g. neoplasia, endometritis, pyometra prolapse), which commonly occurs concurrently with ovarian cysts.

Pneumonia is a very common disease in young guinea pigs < 12 months old. Frequently pneumonia is diagnosed in recently purchased animals that undergo periods of stress or who were kept in poor husbandry (overcrowding, etc.). A variety of bacterial pathogens can lead to pneumonia, with *Bordetella pneumonia* and *Streptococcus pneumoniae suspected to be the most common pathogens.* Tachypnea, dyspnea, and in severe cases, cyanosis can be seen. Auscultation will reveal harsh lung sounds bilaterally or unilaterally. Radiographs will confirm the diagnosis but are unlikely to change the initial treatment with empirically chosen antibiotics (TMS or enrofloxacin are recommended). Nebulization with gentamicin (5 mg/ml in 0.9% NaCl, 20-30 minutes q8-12h) is recommended as well. Severe cases will require hospitalization for oxygen therapy and usually have a poor prognosis. If empirical antibiotic treatment does not improve or resolve pneumonia, transcutaneous aspiration of consolidated lung lobes for cytology and aerobic bacterial culture and susceptibility is recommended to rule out atypical infections (e.g. Mycobacteria, fungal organisms) and to adjust antimicrobial therapy. In older guinea pigs the main differential for tachypnea and dyspnea besides pneumonia should be congestive heart failure.

Skin disorders: Alopecia in guinea pigs can be caused by mites, ovarian cysts (bilaterally symmetric), dermatophytes and vitamin C deficiency. Fur mites *(Chirodiscoides caviae)* are common in guinea pigs and often subclinical. Sarcoptic mites *(Trixacarus caviae)* are rare but can lead to severe alopecia and pruritus with secondary self-inflicted excoriation. Treatment for mites is with selamectin or ivermectin.
Pododermatitis mostly affects the pelvic limbs in guinea pigs and occurs due to pressure-induced ischemia & inflammation of the foot pad. Predisposing factors include abnormal weight bearing (e.g. due to stifle arthritis), and reduced mobility (e.g., due to arthritis, obesity). Abrasive bedding material and poor sanitation may lead to pododermatitis. In advanced cases, bone infection may be present. Treatment depends on the severity. In general, the application of bandages is avoided unless cases are severe, due to the risk of bandage-induced complications.

Neurological disorders: Differentials for guinea pigs presenting with neurological disorders suggestive of central nervous system disease such as depression, seizures, etc, include otitis media and interna, insulinoma, sepsis and encephalitis. Otitis media is very common in guinea pigs and often subclinical. Skull radiographs or computed tomography are diagnostic. Gram-positive bacteria are most commonly involved. Empirical treatment with azithromycin (30 mg/kg PO q24h for 20 days) is recommended, but clinical signs may not resolve, but further spread of the infection into the inner ear and/or the CNS may be prevented. Facial nerve paralysis is common in guinea pigs with otitis media and it should therefore be a differential in animals with

non-healing corneal ulcers. Facial asymmetry, drooling, head tilt, and dental disease can all be associated with otitis media and facial nerve paralysis.

Cervical lymphadenitis: *Streptococcus zooepidemicus* causes cervical and submandibular lymphadenitis in guinea pigs. The diagnosis is established through cytology & bacterial culture of the affected lymph node. Lymph nodes often rupture, and purulent drainage is visible. Treatment with antibiotics (TMS or azithromycin), is usually curative. In some cases, surgical removal may become necessary. The differential for this condition is lymphoma, which however usually affects other external lymph nodes (e.g. popliteal) as well and is seen predominately in older guinea pigs. Cytology will allow to differentiate between lymphoma and lymphadenitis.

Lymphoma: Incidental peripheral lymphadenopathy on physical exam is usually discovered in middle-aged to older guinea pigs. Animals frequently are leukemic, and therefore a complete blood count should always be evaluated. Prognosis depends on if clinical signs are present or not and how advanced the disease has already progressed by the time of diagnosis. Prednisolone is well tolerated in guinea pigs. Chemotherapy (oral, subcutaneous routes) can be considered as well. Survival times of 1-4 months have anecdotally been reported.

Ocular disorders: *Chlamydophila caviae* causes conjunctivitis with mucoid or serous discharge in young guinea pigs. Nasal discharge and sneezing may also be seen. The condition is usually benign and self-limiting. Treatment with doxycycline or azithromycin will resolve clinical signs.
Corneal ulcers are not uncommon in guinea pigs and can be caused by foreign bodies, retrobulbar abscesses (leading to exophthalmos), or facial nerve paralysis. Carefully check the lower conjunctival sac to rule out foreign bodies.
Osseous choristoma is caused by mineralization and bone formation in the ciliary body in older animals. This condition is usually subclinical, and secondary uveitis is rare. There is no targeted treatment and treatment is not usually required.
The protrusion of glandular tissue from the inferior conjunctiva is often referred to as pea eye in guinea pigs.

Hyperthyroidism is not uncommon in older animals (> 3 years). Thyroid hyperplasia, adenoma, and carcinoma are possible underlying causes. Clinical signs include weight loss despite increased appetite and hyperactivity. The diagnosis is achieved by measuring T4 (reference interval 1.1-5.2 µg/dL). The treatment of choice is I-131. Palliative treatment with methimazole (PO or transdermal) can be attempted but frequently is not effective. Surgical removal of palpable thyroid nodules can be considered.

Fibrous osteodystrophy is a genetic bone disorder that is common in satin breeds (~ 40% affected). It is usually diagnosed in young animals who have skeletal and dental disorders. The main differential is renal secondary Hyperparathyroidism, which is uncommon in guinea pigs.

CHINCHILLAS

Chinchillas are long-lived hystricomorphic rodents, which have been domesticated just a century

ago. Chinchillas are used as animal models in otological research and are becoming increasingly popular as companion animals. Chinchillas are adapted to a dry and cold climate, and in captivity, relative humidity should be less than 60%, with less than 50% being ideal. Environmental temperature should be between less than 75 F (24 deg C). While chinchillas are very tolerant to cold temperatures, high temperatures are not tolerated and heat stroke may occur, if the environmental temperature is higher than 80 F (27 deg C).

Chinchillas are social animals and are ideally kept in groups. Large cages with multiple levels are preferred (e.g. ferret cages) and single-level rabbit or guinea pig cages are not appropriate. A hiding box or other hiding structures (e.g. PVC pipes, etc.) should be provided, and if several animals are housed together sufficient hiding space should be provided. A dust (sand) bath should be provided for short periods regularly (at least once weekly). Commercial chinchilla sand should be used. Regular dust bathing is important, to allow chinchillas to maintain a healthy coat.

Chinchillas are obligate herbivores and are adapted to a natural diet low in water. Therefore, chinchillas should not receive fresh produce in significant amounts, to prevent GI disturbances. Chinchillas should be fed a diet consisting of high-quality grass hay and commercial chinchilla pellets. As treats dehydrated vegetables (e.g. carrots) and other commercial herbivore rodent treats are suitable. Raisins and other food items high in sugar and phosphorus should not be fed to reduce the risk of developing dental disease. Fresh water should be provided in a bowl or bottle.

Chinchillas can be handled and restraint like most other exotic companion mammals, but care should be taken to avoid “fur slip”, which will occur if chinchillas are grasped by their fur.

CHINCHILLAS - COMMON DISORDERS

Ketoacidosis and hepatic lipidosis are very common in chinchillas and occur secondary to any disease condition, which results in a negative energy balance, usually due to anorexia. Urine analysis is a simple and non-invasive diagnostic tool to diagnose ketoacidosis and monitor response to treatment. Routine plasma biochemistry will not aid in the diagnosis of ketoacidosis. Treatment should focus on the primary underlying cause, which led to anorexia while providing nutritional support and fluid therapy.

Gastrointestinal disorders commonly diagnosed in chinchillas include constipation and tympany, while diarrhea is less common. Causes for constipation are insufficient food intake secondary to other underlying disorders, enteritis, and metabolic disorders. Tympany occurs as secondary dysbacteriosis or hypomotility of the GI tract. Less commonly rectal tissue prolapse or intestinal intussusception can occur. Soft feces or diarrhea are most common in younger animals. Common underlying causes include sudden diet changes, inappropriate amounts of fresh vegetables or fruits, endoparasites, or bacterial overgrowth due to inappropriate oral antibiotic use.

Dental disorders, including cheek teeth elongation, periodontal disease, tooth resorption, and caries are common in chinchillas.[6,7] Periodontal disease and resorptive lesions are more

common in middle-aged or older animals. The incisor and cheek teeth of chinchillas grow life-long (elodont) and have no anatomic root (aradiculuar) and instead a large crown (hypsodont). The labial aspects of the incisor teeth are physiologically orange in color. Four morphologically identical cheek teeth are present in each dental arcade. The occlusal surface is 0 degrees, and the clinical crown is very short. Excessive salivation ("slobbers") is characteristic for chinchillas with intraoral pain or dental disease. Palpation of the ventral mandibular aspects may reveal bony irregularities, which occur secondary to apical cheek tooth elongation. Periodontal disease, tooth resorption, and caries are very common in chinchillas and can be easily missed.

Otitis externa is uncommon in chinchillas and if present usually developed secondary to otitis media and perforation of the tympanic membrane. Therefore, diagnostic imaging of the skull should be performed in all chinchillas diagnosed with otitis externa. Otitis media is usually bacterial in origin, and *Pseudomonas aeruginosa* is commonly isolated. Sterile sampling of the middle ear for cytology and bacterial cultures can be performed by a percutaneous technique developed for chinchillas. The bulla is accessed in a sterile fashion through its dorsal wall. This technique is performed under general anesthesia and is well tolerated.

Ocular disorders are common in chinchillas. Epiphora ("wet eye"), conjunctivitis corneal trauma, and keratitis are commonly diagnosed. The large and exposed cornea and the only rudimentary developed 3rd eyelids may predispose chinchillas to corneal trauma. *Pseudomonas aeruginosa* is the most common isolate from chinchillas with conjunctivitis.[8] Therefore empiric topical antibiotic treatment, pending bacterial culture and sensitivity results, should include gentamicin or polymyxin B-containing ophthalmic formulations.

Female reproductive tract diseases are not common in pet chinchillas. Endometritis and pyometra are the most common disorders. In breeding females fetal retention and mummification may be seen. Neoplasia of the reproductive tract in chinchillas is uncommon.

Male reproductive tract diseases are limited to the penis and prepuce. Fur rings, balanoposthitis, preputial abscesses, paraphimosis, and phimosis are diagnosed.

Urolithiasis in chinchillas is uncommon and affects predominately males. In all reported cases the calculi were composed predominately of calcium carbonate.[10] Hematuria is the most common clinical sign and a single or several calculi can be found in the bladder and/or urethra.[10] Urethral calculi carry a worse prognosis compared to cystic calculi. The rate of recurrence of urolithiasis in chinchillas following surgery has been reported to be 50%.

Cardiac disease is uncommon in chinchillas, while the presence of innocent (syn. physiologic) heart murmurs is somewhat common. Echocardiography is recommended for the evaluation of chinchillas with heart murmurs grade III/VI or higher or in animals with clinical signs likely associated with cardiac disease.

Dermatophytosis is often diagnosed in younger animals, and diagnosis and treatment are similar to other species. Ectoparasites are very rare in chinchillas, as their dense fur does not provide a suitable environment.

Fur chewing is a behavioral disorder in chinchillas, and is believed to occur more commonly in animals, which cope poorly to environmental stressors. It is believed to be an inherited condition and treatment should focus on optimizing the environment.

RATS - COMMON DISEASES

Respiratory disease: Differentiate between acute and chronic respiratory disease in rats. *Streptococcus pneumoniae*, *Corynebacterium kutscheri, Mycoplasma pulmonis*, and sialodacryoadenitis virus (SDV) (co-) infections are common in rats. Multifactorial disorder, immune status, concurrent disease, and husbandry are risk factors. The clinical signs include nasal discharge, snuffling, chromodacryorrhea (red tears), dyspnea, rough hair coat, torticollis, and death. Acute pneumonia can occur in young rats, and *Streptococcus pneumoniae and Corynebacterium kutscheri* are often the predominant pathogens. Septicemia may develop. Treatment includes Amoxycillin/clavulanic acid (15-20 mg/kg PO, SC q12h). *(safe to use in rats)* or azithromycin (30 mg/kg PO q12h). Oxygen therapy, saline nebulization, and supportive care should be provided if indicated. Chronic pneumonia is common in older rats, with a history of respiratory problems in the past. Treatment for chronic pneumonia includes enrofloxacin (10 mg/kg PO q12h) plus doxycycline (5 mg/kg q12h) or azithromycin (30 mg/kg PO q24h). Oxygen therapy, saline nebulization, and supportive care if indicated. In chronic cases, the prognosis is guarded, due to the severity of the underlying lung pathology. Diagnostic imaging is recommended to evaluate the extent and severity of the lower respiratory tract disease. Treatment with antibiotics is often required long-term, to prevent reoccurrence of clinical signs. A cure is not achieved. Optimize husbandry and nutrition and minimize stress.[1]

Dermatologic disorders: Alopecia may result from barbering, trauma, dermatophytes, or ectoparasites. Benign fibroadenomas of the mammary glands are the most common cause of subcutaneous masses. Bacterial infections may respond to amoxycillin/clavulanic acid, or trimethoprim-sulfa drugs. Itraconazole or terbinafine should be used for the treatment of dermatophytosis. Ivermectin or selamectin should be used for the treatment of ectoparasites. E-collars and separation of cage mates may be necessary, to prevent self-trauma or con-specific trauma.

Mammary tumors: The mammary tissue in rats is widespread and mammary gland neoplasia can occur in many areas of the body. Surgical removal often results in a local resolution, but reoccurrence at other sites of the body is common. Ovariectomy or administration of a sustained-release GnRH-agonist can be administered (i.e. deslorelin implant) may reduce the risk of developing mammary tumors if performed at a young age, but it does not appear to reduce the risk of recurrence once mammary neoplasms have developed.

Neuromuscular disorders: Bacterial infections, viral infections, neoplasia, poisoning, and trauma to the brain, ear, or spinal cord may cause ataxia, paresis, seizures, or torticollis. Pituitary adenomas are common in older rats. Central vestibular signs are seen. Treatment can be attempted with cabergoline, which may lead to temporarily reduction in the size of the pituitary gland.

HAMSTERS

Syrian hamsters and dwarf hamsters are the most common type of hamsters kept as pet. Syrian (syn. Golden; *Mesocricetus auratus*) hamsters are larger, solitary, and nocturnal. The group of dwarf hamsters consists of several different species *(Phodopus spp*), with the Campell's dwarf hamster, Djungarian (syn. Russian or Siberian (dwarf)) hamster and Roborowski hamster being the most common.

HAMSTERS - COMMON DISEASES:

Alopecia and skin lesions are common in hamsters. Dermatophytosis, ectoparasites, trauma from cage mates (in Syrian hamsters predominately), and neoplasia should be considered as common differentials. Demodicosis is common in immunocompromised and/or older hamsters. Deep skin scrapes are necessary for a diagnosis and should be performed under general anesthesia. Treatment with oral ivermectin (0.2 mg/kg PO q24h) is recommended by the author.[2] Alternatively selamectin (15-30 mg/kg topical q14-21 days) has been recommended. Treatment should extend beyond the resolution of clinical signs.

Enteritis: Inappropriate oral antibiotic therapy will lead to dysbacteriosis and overgrowth of opportunistic pathogens, such as *Clostridium difficile* or *Escherichia coli*. *Salmonella typhimurium* and *S. enteritidis* can cause enteritis in hamsters. Clinical signs are similar and include diarrhea, perianal soiling, dehydration, emaciation, and poor fur condition. Empirical treatment is often necessary. The prognosis is guarded to poor. Treatment for enteritis in hamsters includes supportive care (nutritional support and fluid therapy) as well as antibiotic therapy. Administer doxycycline or metronidazole if Clostridial overgrowth is suspected. Administer trimethoprim-sulfa if clostridial overgrowth is less likely. Treatment of Salmonellosis is not recommended due to the zoonotic potential from the development of a carrier state in surviving animals.[3]

Proliferative ileitis (syn. wet tail) is caused by *Lawsonia intracellularis*, a gram-negative intracellular bacterial organism. Clinical signs include watery diarrhea, matting of the fur on the tail, hunched stance, irritability, dehydration, and emaciation. This disease predominately affects young hamsters and stress, improper diet, change of diet, or overcrowding are predisposing factors. The prognosis is guarded. Treat with antibiotics effective against intracellular organisms

(e.g. enrofloxacin, doxycycline) Provide supportive care in the form of nutritional support and subcutaneous fluids, if indicated.

Cheek pouch prolapse occurs secondary to impaction or infection of the cheek pouches. Animals will chew the prolapsed tissue and cause further traumatization. Depending on the duration of the prolapse, the tissue may be necrotic upon presentation.
Under general anesthesia, the viability of the prolapsed cheek pouch tissue should be assessed and the presence of an underlying disease (e.g. impaction, infection) should be investigated.
If the prolapsed tissue is still viable, repositioning can be performed using a cotton-tipped applicator. A non-absorbable percutaneous suture is placed to keep the cheek pouch in its anatomically correct position. The suture is removed in 10-14 days. Suture placement does not always prevent the recurrence of prolapse, which is common. If the tissue is non-viable or the risk for recurrence of the cheek pouch prolapse is high or has re-prolapsed, perform amputation of the cheek pouch. Administer meloxicam (0.5-1 mg/kg SC, PO q24h). Administer antibiotics if an infection of the cheek pouch was diagnosed. Ensure good coverage against anaerobic bacteria (e.g. doxycycline, metronidazole). Provide supportive care, if indicated.

Bacterial pneumonia in hamsters may be caused by *Pasteurella pneumotropica*, *Streptococcus pneumoniae*, or other *Streptococcus* spp. The clinical signs are depression, anorexia, oculonasal discharge, and respiratory distress. Treatment includes the administration of systemic antibiotics, fluid therapy, and nebulization.

Abdominal distension is commonly seen in geriatric hamsters and can have a variety of underlying causes. Differentials include ascites secondary to cardiac or renal insufficiency, reproductive tract disease, neoplasia, or polycystic disease, which affects mainly the liver. Large space-occupying liver cysts are not uncommon in hamsters. Under sedation or general anesthesia abdominal ultrasound should be performed to further investigate the underlying causes for abdominal distension. Free abdominal fluid should be aspirated under ultrasound guidance. Fluid aspiration may be diagnostic and therapeutic, in cases in which respiratory distress is caused by abdominal distension. Whole-body radiographs should be performed if cardiac disease is suspected. The prognosis for abdominal distension in hamsters, regardless of the underlying cause, is guarded to poor.

Ocular proptosis: The etiologies include trauma, molar abscessation, infection, and excessive restraint. The treatment is the same as for a dog, including a temporary tarsorrhaphy. Remove the sutures in 7–10 days. Administer broad-spectrum antibiotics. If enucleation is indicated, the subconjunctival technique should be performed since hamsters have a well-developed retrobulbar plexus. If excessive hemorrhage occurs during enucleation.

Cardiomyopathy: The clinical signs include dyspnea, tachypnea, cyanosis, rales, tachycardia,

poor peripheral pulses, ascites, and pleural effusion. Thoracic radiographs and echocardiography are useful. Treatment includes furosemide (2–4mg/kg IM, SC, PO q4-12h) and ACE inhibitor. (e.g. enalapril 0.5-1mg/kg PO q24h). The prognosis is guarded-poor.

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