

CASUISTRY OF DISEASES IN DONKEYS AND MULES ATTENDED AT THE VETERINARY HOSPITAL IN THE COUNTRYSIDE OF SÃO PAULO, BRAZIL

CASUÍSTICA DE ENFERMIDADES EM ASININOS E MUARES ATENDIDOS NO HOSPITAL VETERINÁRIO DO INTERIOR DE SÃO PAULO, BRASIL

Thayssa Duarte Costa¹
Karen Nayara Abdala Ferreira²
Bruna Tambeli Anobi³
Camilla de Souza⁴
Julio Guerra Segura⁵

ABSTRACT: This study aimed to conduct an analysis of the main diseases in donkeys and mules attended at the Veterinary Hospital of Centro Universitário Anhanguera in Leme, São Paulo, Brazil, from 2009 to 2019. Through a review of clinical cases derived from the hospital records and data tabulation, the most common diseases affecting these species were identified and studied, providing relevant information on these conditions. The study collected a total of 66 records, with 30,30% referring to donkeys and 69,70% to mules. Among the donkeys, 100% of the studied cases were males under 15 years old, while the female mules had significant numbers compared to the donkeys (63,04% versus 36,96% of males), between 5 and 10 years of age. Regarding the diseases found across all studied species, the three highest concentrations were records related to gastroenteric problems (40,90%), followed by dermatological diseases (24,25%) and musculoskeletal problems (18,19%). It was concluded that more effective and targeted management of these species, along with specialized and periodic veterinary care, as well as increased awareness among owners regarding proper care, contribute to the health and well-being of donkeys and mules.

Keywords: Annual casuistry. Endemic prevalence. Large animal hospital practice. Routine care.

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RESUMO: Este estudo teve como objetivo realizar uma análise das principais enfermidades em asininos e muares atendidos durante o período de 2009 a 2019 no Hospital Veterinário do Centro Universitário Anhanguera da cidade de Leme, São Paulo, Brasil. Por meio de uma revisão de casos clínicos oriundos dos prontuários arquivados no estabelecimento e tabulação de dados, foram identificadas e estudadas as doenças mais comuns que afetam essas espécies, fornecendo informações relevantes sobre as enfermidades. No estudo foram coletadas 66 fichas sendo 30,30% referente aos asininos e 69,70% referente aos muares; nos asininos 100% dos casos estudados eram machos com menos de 15 anos, enquanto as muares fêmeas tiveram números expressivos quando comparados aos asininos (63,04% contra 36,96% dos machos), entre 5 até 10 anos de idade. Sobre as enfermidades encontradas unindo todas as espécies estudadas as três maiores concentrações foram as fichas relacionadas a problemas gastroentéricos (40,90%), seguidas de enfermidades dermatológicas (24,25%) e problemas musculoesqueléticos (18,19%). Concluiu-se que um manejo mais eficaz e direcionado a essas espécies, juntamente com acompanhamento veterinário especializado e periódico, além de uma melhor conscientização dos proprietários quanto aos cuidados vem a contribuir para a saúde e bem-estar de asininos e muares.

Palavras-chave: Casuística anual. Prevalência endêmica. Prática hospitalar em grandes animais. Rotina de atendimento.

¹Doutora em Ciências na área de Zootecnia, Faculdade de Zootecnia e Engenharia de Alimentos da Universidade de São Paulo.

²Graduanda em Medicina Veterinária, Centro Universitário Anhanguera de Leme.

³Graduanda em Medicina Veterinária, Centro Universitário Anhanguera de Leme.

⁴Mestre em Ciências na área de Biociência Animal, Faculdade de Zootecnia e Engenharia de Alimentos da Universidade de São Paulo.

⁵Doutor em Ciências na área de Zootecnia, Faculdade de Zootecnia e Engenharia de Alimentos da Universidade de São Paulo.

INTRODUCTION

Donkeys and mules are terms used to refer to different types of equine animals (BURNHAM, 2002). Donkeys belong to the species *Equus africanus asinus* and are commonly known as jumentos, burros, or asnos in Portuguese. They are characterized as medium to large-sized animals with long ears and a robust body. Donkeys are valued for their physical endurance and load-carrying capacity and are also raised as companion animals or for recreational purposes (RODRIGUES et al., 2021). Mules, on the other hand, are hybrids resulting from the crossbreeding between a donkey (jack) and a female horse (*Equus caballus*). As a result, mules possess a combination of characteristics from both donkeys and horses (equines). They can be males (mule) or females (molly), and they are sterile (MCLEAN, 2014; COSTA; PACHECO, 2017).

These animals are commonly used for work; however, their population has been rapidly declining as a result of increased access to mechanical equipment that replaces them in agricultural tasks. Donkeys and mules are often considered animals of low social status, and their basic care is frequently neglected. Additionally, they are frequently subjected to excessive work routines, overloading, physical abuse and little/no access to appropriate veterinary attention (HAMEED et al., 2016; QUEIROZ et al., 2020).

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Both species have received less scientific attention compared to horses, primarily because they have historically been primarily associated with work and transportation in rural areas, while horses have been more widely used in sports and recreational activities (BURN et al., 2010a). This cultural difference may have contributed to a lower priority for specific studies on donkeys and mules. These species have distinct physiological and anatomical characteristics compared to horses, which can make the study of their pathologies more complex and challenging (MENDOZA et al., 2018).

The preservation of animal genetic resources is a crucial area for sustainable human development. Therefore, it is necessary to promote actions that generate well-being for donkeys and mules, which despite being introduced animals are part of Brazilian culture and history (RISCHKOWSKY et al., 2010; QUEIROZ et al., 2020). Thus, the objective of this study was to evaluate the clinical and surgical cases observed in donkeys and mules during the period from 2009 to 2019 at the veterinary hospital of Centro Universitário Anhanguera in Leme, São Paulo, Brazil, with the aim of observing the casuistry of diseases.

MATERIALS AND METHODS

For the elaboration of this study, the method of surveying the veterinary medical records of large animals was used, obtained from clinical consultations conducted at the Veterinary Hospital of Centro Universitário Anhanguera (UNIFIAN) in Leme, São Paulo. The consultations were conducted from January 2010 to November 2020, considering the occurrence and frequency of pathologies in these groups of animals.

The Veterinary Hospital of UNIFIAN in the city of Leme offers a variety of services, including veterinary clinical care, consultations, surgeries, diagnostic tests, hospitalization and specialized services in different areas. The existing medical records at the facility contained detailed records of clinical information related to the treatment of each patient, including medical history, physical examinations, laboratory test results, diagnoses, prescribed treatments, disease progress monitoring and other relevant observations made by the professionals.

Each medical record was considered a clinical consultation, and the information was grouped and tabulated in a Microsoft Excel© 2007 spreadsheet for quantitative data investigation. Firstly, data on age, sex, species, and reason for consultation were collected. Subsequently, clinical, demographic, and follow-up information of the patients throughout the study period was recorded. Once the cases had been followed for a predetermined period, statistical analysis was performed to evaluate the outcome results. Finally, the results were interpreted and critically discussed, taking into consideration the existing literature.

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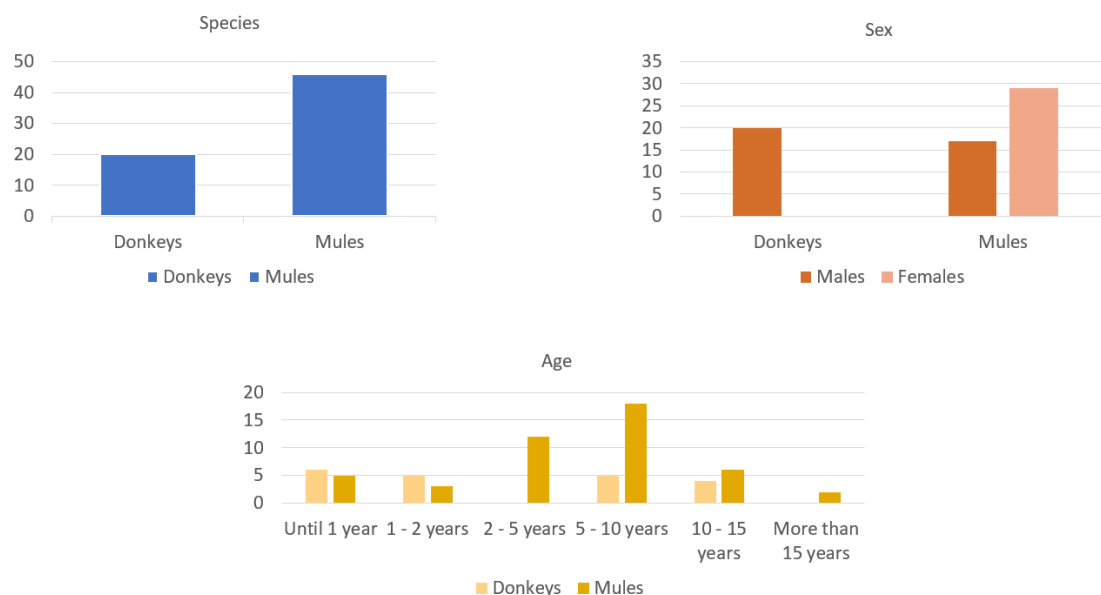
RESULTS AND DISCUSSION

In the study, 66 records were collected, with 30,30% referring to donkeys and 69,70% referring to mules. The collected data proved to be relevant for the studied region, as these animals are more commonly studied in rural areas of Northeast Brazil, such as the Caatinga and Sertão regions (PESSOA et al., 2014); the Midwest, widely spread in states like Mato Grosso and Mato Grosso do Sul, where these animals are used for rural work and transportation (WATANABE et al., 2009; CUNHA et al., 2020); and the South of Brazil, especially in the states of Rio Grande do Sul and Paraná, serving both for work and leisure purposes (HEIDMANN et al., 2012; COSTA; PACHECO, 2017). The animals in the study were primarily used for transportation and leisure activities and the majority of the animals (42/66)

were from Leme (26,20% of donkeys and 73,80% of mules), with the remainder coming from neighboring cities within a maximum distance of 90km.

Mules showed significant numbers compared to donkeys, particularly female mules (63,04% versus 36,96% of males), between the ages of 5 and 10 years (Figure 1). This group of animals may be more susceptible to certain diseases due to various factors, including hormonal and physical development stage, as well as exposure to different environmental conditions. Hormonal maturation in mules can vary individually, but it generally occurs between 3 and 5 years of age. Similar to other equine species, female mules may enter the estrous cycle and exhibit reproductive-related behaviors (FERNANDES et al., 2021). However, it is important to note that mules are sterile hybrids, so even if they reach hormonal maturity, they are not capable of reproducing naturally (MCLEAN, 2014). These physiological changes directly influence their behavior and may require appropriate attention and management.

Figura 1. Espécies estudadas na pesquisa, sexo e idade dos animais atendidos no Hospital Veterinário da UNIFIAN, de janeiro de 2009 a dezembro de 2019.



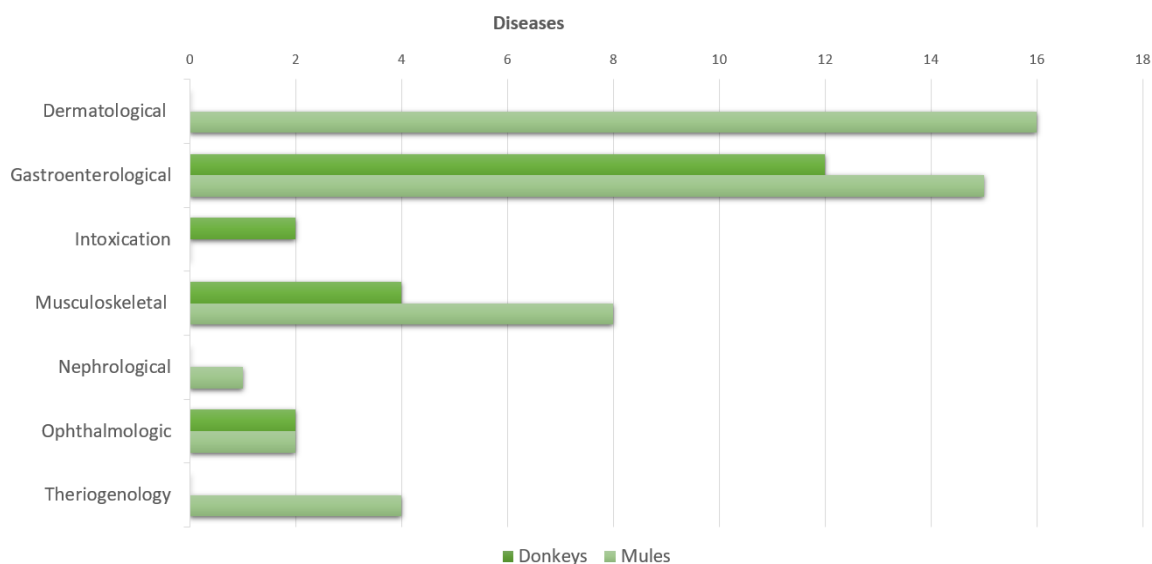
Mules are commonly used for work in rural activities, such as cargo transportation or agricultural tasks, and this intensive physical demand can cause excessive wear and tear during the age range of 5 to 10 years, increasing the likelihood of injuries and diseases related to physical exertion (PEARSON et al., 2003; PRITCHARD et al., 2005; BURN et al., 2010a). As these animals age, their immune system may face additional challenges due to repeated exposure to a wider variety of pathogens, such as viruses, bacteria, parasites, and fungi, which can increase the risk of diseases (PEARSON et al., 2003; BURN et al., 2010).

On the other hand, in donkeys, 100% of the studied cases were males under 15 years old. During the growth phase, young male donkeys undergo physical and hormonal changes, which can affect the development of their bodily systems, including the immune system (BURDEN;

THIEMANN, 2015; ATTIA et al., 2022). The immune system of young donkeys may not be fully developed, making them more susceptible to infections and diseases (JANG et al., 2001; ATTIA et al., 2022). It is important to note that inadequate management practices, such as stressful transportation, changes in the environment, or lack of balanced nutrition, can predispose them to stress and compromise the immune system, making them more susceptible to infections and diseases (ALI et al., 2015; DAI et al., 2016). Additionally, as young male donkeys reach sexual maturity, they may exhibit reproductive behaviors such as attempting to mount other animals and displaying aggression, increasing the risk of injuries and exposure to diseases transmitted through physical contact, especially when interacting with unfamiliar animals (JONES, 1997; MCLEAN, 2014; DAI et al., 2016).

Regarding the diseases found in all the studied species, the three highest concentrations were related to gastroenteric problems (40,90%), followed by dermatological diseases (24,25%) and musculoskeletal problems (18,19%). However, the three most commonly encountered diseases in donkeys were gastroenteric problems (60%), musculoskeletal problems (20%), and ophthalmic complications and intoxication (both with 10%); while in mules, dermatological problems (34,78%), gastroenteric problems (32,60%), and musculoskeletal problems (17,40%) were more prominent (Figure 2).

Figure 2. Diseases found in donkeys and mules attended at the Veterinary Hospital of UNIFIAN, from January 2009 to December 2019.



Regarding the dermatological problems found, it was observed cases of burns in the belly and elbow region, presence of ectoparasites, abrasions in the chest area, and the occurrence of warts in the auricular, forehead, and muzzle region. The burns in the animals occurred as a consequence of intentional fires in plantations near the pasture where the mules were kept. The

origin of the ectoparasites was due to lack of care from the owners. The abrasions in the chest area were caused by fights between the mules and other animals on the property. The warts were found in mules under two years of age who had contact with foals that had papillomatosis in the same property.

It is mentioned that burns are uncommon in horses, with most cases occurring as a result of fires in pastures, barns, or stables. Thermal injuries can also be caused by contact with hot solutions, electrocution or lightning strikes, friction (e.g., rope burns), abrasions, radiotherapy, and chemicals (e.g., topical medications used improperly, caustic agents applied maliciously) (HANSON, 2005). Most burns are superficial and easily treated and heal quickly, while severe burns can result in rapid shock or hypovolemia with associated cardiovascular changes (MENDOZA et al., 2018). In the study, the prognosis was positive, with hygiene and dressing performed, along with the application of an antibacterial ointment, neomycin, to protect the lesion against opportunistic microbial agents. Dermatitis problems caused by ectoparasites are commonly reported in donkeys and mules, possibly due to lack of care and management of the animals (BURN et al., 2010; TESFAYE et al., 2016; SILVA et al., 2017). The study described the presence of ticks, which attach to the mule's skin, especially in thin areas such as ears, neck, belly, and legs. Ticks can be visible as small round or oval structures, usually dark or brown in color, firmly attaching to the skin. Symptomatic treatment is performed using anti-inflammatory, antihistamines, antibiotics to control secondary infections, and topical substances aimed at revitalizing the injured skin (ROBINSON, 2009), as was done with the mules in the study. Regarding the mules with warts, confirmation of papillomavirus infection was obtained through histological collection and confirmation, along with the history provided by the owners of the animals. Papillomavirus is a viral infection that can affect both horses and mules and is more common in young animals, causing the appearance of warts or lesions on the skin and mucous membranes (HAINISCH et al., 2023). If mules live with infected sick horses, there is a risk of virus transmission between the animals, and transmission typically occurs through direct contact with the lesions or warts caused by the virus, but it can also occur indirectly through contaminated objects, such as shared handling equipment (ABOUELKHAIR; KENNEDY, 2022). Therefore, it is important to separate the animals, monitor the sick ones, and raise awareness among owners about hygiene and management practices.

About gastrointestinal problems, the presence of parasites was reported in both donkeys and mules, as well as issues of cecal impaction. Gastrointestinal parasites, such as worms and protozoa, can reside in the walls of the digestive tract and feed on the host's tissue, causing

physical damage, inflammation, ulcerations, and even perforations (EGBE-NWIYI; GANA, 2003). These lesions can lead to problems such as diarrhea, gastrointestinal bleeding, and weight loss, which were the main reasons reported by the owners for seeking treatment at the UNIFIAN Veterinary Hospital. The presence of a large number of parasites can cause digestive dysfunction as these parasites feed on nutrients present in the animals' food, resulting in inadequate absorption of essential nutrients and leading to malnutrition, nutritional deficiencies, and overall weakening of the digestive system (AYELE et al., 2006). Additionally, the presence of parasites in the gastrointestinal tract triggers an immune response, causing additional damage to the digestive tract and contributing to gastrointestinal symptoms such as diarrhea, loss of appetite, and abdominal discomfort (ESMAEEL et al., 2010). Another problem reported in both animals was cecal impaction, which is the accumulation of dehydrated ingesta in any segment of the gastrointestinal tract and is one of the most common abdominal diseases, even in equine species, constituting the main cause of colic in the species (FERREIRA et al., 2009). Impactions preferentially form in areas where the intestinal diameter decreases, such as the pelvic flexure and the transition from the right dorsal colon to the transverse colon. They can also occur near sphincters, such as the ileocecal-colic sphincter. The specific pathogenesis of cecal impaction is not fully understood; however, there have been reports of cecal impactions associated with poor dentition, decreased water intake, feeding with coarse forages, administration of non-steroidal anti-inflammatory drugs, and infestation with *Anaplocephala perfoliata* (PLUMMER, 2009).

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The two cases of intoxication occurred in donkeys that escaped from their enclosure and grazed in an unknown vegetation area. It is possible that the animal consumed a toxic plant, resulting in lethargy and apathy. The animal was kept under observation at the Veterinary Hospital for 24 hours and no hematological alterations were observed, adequate dietary monitoring was provided and vitamin B₁ was administered. Poisoning in donkeys is occasionally reported, but most of the information regarding clinical signs and management is based on horses (BATES, 2023). Donkeys are more susceptible to being affected by toxic substances in their environment, such as poisonous plants and pesticides. (JACKSON, 1995; BATES, 2023). In many cases of acute plant poisoning, sudden death is the presenting sign (NOBRE et al., 2004), while risks of pesticide poisoning include metaldehyde slug baits and anticoagulant rodenticides (CHOUBISA, 2023). Caution should be exercised when examining and treating donkeys due to differences in their behavior, vital signs, laboratory parameters, and therapeutic approaches (BATES, 2023). Treatment for most cases of poisoning in donkeys is supportive, focusing on managing clinical signs and attempting to reduce the progression of

toxicosis, removing the source of exposure, and administering specific antidotes when available, practical, and clinically appropriate.

Among the musculoskeletal problems reported (12/66), donkeys (4/12) showed increased volume and pain in the hind limb after trauma with wire, leading to granuloma formation. They also experienced foot problems due to excessive work and all the animals were above 5 years of age. In mules (8/12), similar foot problems were observed, along with three cases of limited water intake and being bedridden for more than two days with pain in the left tarsal joint. Radiographic examination diagnosed them with bone spavin, also known as osteoarthritis or osteoarthrosis of the distal tarsal joints, all in animals above 5 years of age. Detailed studies on the epidemiology, types, and clinical signs of lameness in donkeys are only available for working animals and this population has shown a surprisingly high prevalence (90% in one study), particularly in the hind limbs. This can be attributed in part to unique anatomical characteristics, type of physical activity, and age (PRITCHARD et al., 2005; BURN et al., 2010). In general, musculoskeletal diseases in donkeys are similar to those described in horses, but some anatomical idiosyncrasies must be considered. Foot lesions appear to be the main cause of lameness (65% of cases), and this is the structure where the differences between both species are most pronounced (REIX et al., 2014). The dorsal wall of the hoof is more upright in donkeys compared to horses (5° - 10°), and their hoof-pastern axis is more vertical. Additionally, the sole is more rounded in donkeys, forming a U-shape (important for corrective shoeing in laminitis and soft tissue problems such as tendonitis). Regarding mules with bone spavin, it is noted that some animals are demanded beyond their capabilities, making them more predisposed to develop musculoskeletal problems due to mechanical and functional stress on these structures (MELO et al., 2006). Physical exertion, conformation defects, and hoof imbalance can contribute to these problems due to the uneven distribution of weight on musculoskeletal structures such as tendons, ligaments, and joints (MARANHÃO et al., 2006). It is believed that intense physical activity, particularly the one performed by these animals, influence the development of this condition. The repetitive compression and rotation of the tarsal bones, along with excessive tension on the ligaments in the region are crucial factors in the pathogenesis of the disease (DA SILVA GARCIA, 2009).

The only reported nephrological issue was observed in a 15-year-old female mule with urethral edema and ulceration. A urinalysis was performed, revealing hematuria and bacterial presence. Local washing with cold water, application of Tanidil®, pentabiotic and cetoprofen were performed to reduce inflammation, relieve pain and promote ulcer healing. Bacterial or fungal infections in the urinary tract can cause inflammation and ulceration in the urethra.

These infections can be secondary to underlying problems such as urinary obstructions, poor hygiene, or compromised immune systems (SCHUMACHER, 2007). Often, the main complaint is related to an unusual urination position, as well as decreased urine flow with a different color (FEITOSA, 2014). Therefore, it is important to adopt preventive measures and good animal management, keeping housing areas and pastures clean and free of dirt, accumulated feces, and stagnant urine. Regular cleaning of the areas where mules stay and proper waste disposal contributes to reducing the risk of infections and irritations. Avoiding situations that may cause trauma or injuries to the urethral region, such as falls, collisions, unwanted coverings, or improper use of handling equipment, by ensuring careful and safe containment and handling of the animals. Ensuring that mules have constant access to clean and fresh water and conducting regular health exams, including physical examinations, evaluation of the skin and mucous membranes, and checking renal and urinary tract function. Early detection of problems can help intervene quickly and prevent complications.

Regarding the ophthalmological issues, two donkeys and two mules had conjunctivitis. It is worth noting that there are ocular anatomical differences between donkeys and horses, as donkeys' eyes usually have a slightly more recessed configuration and thicker periocular hair. These distinctions, combined with their reserved behavior and extensive or semi-wild daily management, make it difficult to detect mild and initial ocular lesions in donkeys. As a result, veterinarians often encounter severe, recurrent, and chronic ocular pathologies, with partial vision loss being a common finding during the examination of these animals (MENDOZA et al., 2018). In the studied cases, all animals underwent cold water washing of the affected area, nasolacrimal ducts were unblocked to ensure proper drainage. Additionally, the application of gentamicin saline eye drops was recommended four times a day for a duration of 15 days, this treatment regimen aimed to reduce inflammation, control infection, and promote healing of the conjunctival tissues.

In the study, four male mules under 5 years of age were evaluated for elective surgery related to theriogenology, which encompasses the physiology and pathology of the male and female reproductive systems, as well as veterinary clinical practices in gynecology, andrology, and obstetrics. These animals underwent preoperative evaluation for orchiectomy, which is the surgical removal of the testicles. Orchiectomy is a common and recommended procedure in young male mules for various purposes, including behavioral management and health benefits (OLIVEIRA et al., 2023). Castration can help reduce undesirable behaviors associated with reproductive instincts, such as aggression, mounting other animals, and territorial behavior. It also eliminates the risk of diseases related to the reproductive organs, such as testicular tumors

and scrotal hernias, and may reduce the risk of urinary tract infections (DE PAIVA et al., 2016; ARAÚJO; RICCI SILVA, 2022). It is important to note that the decision to perform the surgery should be based on individual assessment and discussion with a veterinarian, taking into consideration factors such as age, overall health of the animal, intended use, and specific context to determine if castration is appropriate and recommended in each case.

FINAL CONSIDERATIONS

Donkeys and mules are valuable animals and play important roles in agricultural activities, transportation, and recreation. By understanding and studying the diseases that affect these species, it is possible to improve their management, prevent diseases, promote animal welfare, and minimize suffering. There is a lack of information regarding the occurrence of diseases in these animals in Brazil, making this study pioneering in the Leme region and neighboring municipalities. It was concluded in this study that diseases related to gastrointestinal problems, followed by dermatological conditions and musculoskeletal issues, are significant for both species. Attention is also needed for ophthalmic complications, intoxications, problems related to theriogenology, and nephrology, which have prompted owners to seek veterinary care.

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