

Animal Health & Husbandry in Alpacas

By Andrew Dart

Horses, cattle and sheep have been bred for centuries, to be domesticated animals. As part of the domestication process, desirable traits in each of these species have been selected with the purpose of making them more suitable to human needs. Tolerance of human contact and temperament are important traits. The success of this selection is no more evident than in the more domesticated species like cats, dogs and horses. It is less so in terms of the less intensively managed species such as ruminants and pigs. The natural “fright and flight” reflex of undomesticated species, or tendency to flee when frightened, that is so important for survival in the wild is still very much present in South American Camelids (SACs) when compared to other domesticated animals.

So What Does This Mean?

The SACs, like wild animals, will not express signs overt of disease that are typically seen in other domesticated species because, in the wild, these signs make the animals targets for predators. Instead they tend to mask signs of disease as a protective mechanism. As a consequence, as owners and veterinarians became involved in animal health and husbandry of alpacas, SACs were perceived to be very difficult to treat for disease. By the time animals demonstrated the overt signs of disease seen in domesticated species, the disease state was so advanced treatment was unsuccessful. Furthermore, the types of diseases affecting this unusual group of animals and our understanding of how to treat these diseases in alpacas remains largely speculative. So our understanding of the diagnosis and appropriate treatment options in an animal that was anatomically

and functionally very different to known domesticated species, further confused owners and veterinarians. The initial assumption was that alpacas were more susceptible to disease than domesticated species and less responsive to treatment.

On the contrary. As we have gained more knowledge about SACs, both owners and veterinarians are more aware of the early and more subtle signs of disease. This means early intervention, and a greater knowledge of the health problems, has led to a rapid improvement in herd and individual animal management. Early recognition of problems and greater knowledge about treatment options has seen a rapid improvement in survival. In fact, it would appear these animals are much more robust than most domesticated species.

An important point for all alpaca owners to understand is none of the drugs used in veterinary medicine are licensed for use in alpacas. Furthermore, most of the techniques used to treat these animals are based on the experience in other species. We know, largely from experience, most drugs we use in other species are safe in the alpaca. However, there still needs to be research into how effective and at what dose rate these drugs should be used. Until this information is available, and until the drugs are licensed for use in the alpaca, they will continue to be used off label and, consequently, at the owner's risk.

Adult Animals

In this country (Australia) adult animals are usually kept in very good condition, compared to the animals in South America. The alpaca is, in fact, a very efficient processor of poorer quality feeds that are high in fiber. This is facilitated by microbial digestion in the large compartments in the proximal intestine similar to ruminants. These animals require diets high in fiber.

Most animals are generally kept on smaller acreages and, as a result, are either hand fed or at the least, fed a supplementary diet where there is pasture. While this is not inappropriate, increasing the stocking density does increase risk of disease.

General Herd Management

I generally encourage owners, where

possible, to separate different classes of animals, so that males, pregnant females, females with a cria at foot and weaned crias to breeding age are in separate paddocks, if possible. This makes adjustments with feeding regimens easier to manage so that they do not become overweight. A set of scales is a very useful investment. By running animals over the scales each week, early signs of weight loss which might be associated with concurrent disease or with dietary change can be detected and managed early.

Intestinal Worms

The intestinal worms affecting the alpaca are the same as those that affect other domestic ruminants in this country. There is limited information on the pathological significance of worms and appropriate worming procedures in alpacas. However, because they are infested with the same parasites as other ruminants, some parallels can be drawn. In general, pasture management is underutilized but is an effective management technique. Worm eggs or larvae are generally passed in the faeces and survive in the moist environment of the faeces and ground cover. These eggs or larvae are ingested by the new host and continue the life cycle.

Alpacas defecate in a dung pile in one area of the pasture. Invariably this area has little grass and remains exposed to the elements. It is an area most animals prefer not to graze. Under these conditions, and where there are heavy frosts or extreme heat, the infective stage of the larvae will generally die. Combined with a reluctance to graze this area, the risk of transmission is already very low. When worming animals, if it is possible, move them to a rested pasture to ensure the animals enter the new “sterile” pasture free of worms, thereby minimizing ongoing infestation.

It would appear most adult alpacas are generally resistant to most worm species except the Barbers pole worm (*H. contortus*) which can cause severe anemia. In alpacas intestinal worms appear to be more opportunistic, causing problems in diseased or debilitated animals. Younger animals should also be viewed as being at a greater risk. The efficacy of oral wormers or “pour ons” have not been established in alpacas.

Furthermore, if the animal does not get the full dose it is ineffective. I generally advise owners to use injectable worming medication such as ivermectin to ensure the correct and effective dose is administered.

There is no right or wrong worming protocol. I generally suggest that animals less than one year, and breeding females who are also lactating, be done every three months while others can be done twice yearly. This will vary depending on stocking density, weather conditions and clinical evidence of excessive worm burdens. Any protocol will be most effective where it is combined with pasture rotation.

Routine Vaccinations

The most common vaccination used in alpacas is the ruminant 5 in 1 which covers the common clostridial diseases, including tetanus and enterotoxaemia. These diseases can cause sudden death and it would appear alpacas can be susceptible, albeit infrequently, but with massive losses. While it would appear these vaccinations do stimulate immunity, the length of time immunity is effective is less clear. Recommendations of vaccinations every three months, twice-yearly and yearly have been suggested. I would suggest worming and vaccination could be combined and pregnant females should be vaccinated in the last month of pregnancy. This will ensure the best chance of immunity being passed through the colostrum to the newborn.

Nutrition

Nutrition is a complex subject made even more complicated by the many anecdotal opinions of unqualified individuals. While I am not a nutritionist, it is not difficult to make some sensible recommendations based on good husbandry practices. Clearly, the foundation for any nutritional program in alpacas is a high fibre diet. In most management situations in Australia this will be in the form of hay. Alpacas are efficient users of fibre and have evolved as browsers and grazers of poor quality feed in rather harsh climates.

The tendency in this country is to overfeed these animals, often with concentrates in the form of pellets or grains, which are generally unnecessary

and a waste of money. Using a combination of a grass hay supplemented with lucerne hay should provide sufficient bulk and cover most nutrient needs for all classes of stock. The major concern in Australia is selenium deficiency. Provided the hay is sourced from an area where there is no selenium deficiency there will be sufficient selenium in the feed. Where possible, feed should be supplemented with access to pasture. Fresh green feed is a good source of vitamin E and A.

The volume of feed should be varied with the access to pasture and the body condition and weight of the animal. This is where scales can be very useful. As a rule of thumb young growing animals, pregnant females with a cria at foot and females in the last trimester of pregnancy will require a higher plane of nutrition. Similarly, geriatric animals and animals under stress or with a concurrent disease process, will have higher energy requirements. There should be very few animals which require a concentrate feed.

Pregnancy

Pregnancy is usually carried in the left horn of the uterus. Gestation length ranges from 331-367 days with an average of 344 days or approximately eleven months. Parturition is divided into three stages. Stage one may take two to six hours and begins with relaxation of the cervix and the initiation of uterine contractions to position the foetus in the birth canal. In the early period of stage one, females may isolate themselves from the herd, appear restless and urinate frequently. Most animals like some privacy and often they will give birth in the early hours of the morning when the owner is not around. It is advisable not to interfere at this stage, to allow the process to occur naturally.

Stage two labour is expulsion of the foetus which usually takes eight to twenty-five minutes. Stage three involves expulsion of the foetal membranes. Based on observations in Peru, in the natural state the entire process should take three to four hours but in maiden females there may be less demonstrable signs of early labour and the process may take six to eight hours.

The prevalence of dystocia is relatively low compared to domestic species and is

estimated at about 2% to 10%, but may be higher in maiden females. Usually the long neck and legs are involved but can be easily corrected by an experienced person. There have been cases reported where stage two labour has not progressed and the cervix does not dilate. Where the process of parturition does not progress, veterinary help should be requested early because manipulation of the foetus and tearing of the cervix may lead to permanent infertility, while long delays may lead to death of the cria.

Cesarean section can be performed in alpacas. While many veterinarians perform this procedure through a flank approach, a ventral midline approach under general anaesthesia is not only less stressful on the animal but is also associated with less complications and improved subsequent fertility.

Crias

Generally the newborn is between 8-14 kg. Higher birth weights in this country compared to Peru are probably associated with the females being in better condition. Generally gestation length in females is similar from year to year. Keeping records on breeding dates and birthing dates will prove useful so the owner can be aware of impending births. Dysmature crias do occur. These crias may be born during the suggested time for normal gestation. However they may not, for a variety of reasons, have undergone their full development inside the uterus. Generally, these crias have lower birth weights, un-erupted incisors, floppy ears and a silky coat. They are often weak and find it difficult to stand and nurse.

Crias have a poorly developed immune system and rely on transfer of immunity in the colostrum or mother's milk. This transfer must occur within the first 24 hours and preferably in the first eight to twelve. After this time the ability to absorb large proteins diminishes. There are a number of tests that can be performed to assess the efficacy of this transfer. However, in this country, simply doing a serum protein reading on a refractometer will provide a reasonable measure of colostrum absorption.

The importance of colostrum to

provide immunity for the first three months, until the neonatal immune system develops, should not be underestimated. It has been established that crias that have good colostrum transfer, and are exposed to unclean environments, are susceptible to disease. Those that do not get good transfer and are kept in clean environments may survive quite comfortably. So the importance of providing hygienic and clean paddocks for birth and the neonatal period should not be underestimated.

Young crias that are dysmature or are weak at birth and are not nursing, need early intervention. We have found that these crias can survive on short term energy reserves and appear quite bright for about 24 hours. If these crias are not nursing adequately and do not receive appropriate nutrition they invariably collapse into a semi-comatose condition. Invariably treatment at this time is usually unsuccessful. Early intervention to provide nutritional support for these crias until they are able to fend for themselves is usually successful. Hospitalisation with the mother, antibiotic cover, insertion of a feeding tube and administration of milk replacer, providing plasma as a source of antibodies, and fluid therapy is required. Even if the mother has little milk or stops lactating, as the cria becomes stronger, the dam will begin to increase or resume lactation.

Treatment of Disease

As time has passed, more information on the clinical signs of disease-appropriate treatment options have emerged. Where referral to a specialist institution was common, many of procedures are now performed in general practices. Nevertheless, new diseases and new surgical procedures are emerging everyday as we learn more about these animals. Generally speaking, alpacas are very amenable to surgical procedures and treatment of disease, provided intervention is early.

Anaesthesia and Surgery

Alpacas are anecdotally suggested to be difficult to anaesthetize. However, in the hands of a specialist anaesthesiologist, techniques for safely anaesthetizing have been developed and, in fact, these animals generally perform well under anaesthesia. In practice however,

specialist anaesthesiologists are not usually available to general veterinary practices and the task of anaesthetizing a relatively new species can be daunting.

Endotracheal intubation, or passing of a tube into the airways to provide a clear airway to pass anaesthetic gasses and to prevent aspiration of feed and saliva into the lungs, is desirable for longer procedures. The long, narrow, oral cavity can make passing an endotracheal tube more difficult without the right equipment. A long, bladed light source is useful. With the alpaca in a cush position the neck should be straightened by extending the head and the jaws should be held open with two pieces of gauze. The anaesthetist then pulls the tongue out of the mouth to have a clear view of the larynx. By placing a thin rigid object, like a piece of wire inside the endotracheal tube and then inserting it into the larynx, the endotracheal tube can be guided down into the laryngeal opening.

A variety of surgical procedures have been performed successfully including cesarean section, long bone fracture repair, limb amputation, limb straightening, ear canal ablation, tooth root infections, cleft palate, abdominal surgery, repair of the cranial cruciate ligament and repair of a dislocated hip.

Medical Conditions

A variety of medical conditions have been identified and treated in alpacas. Unfortunately, in areas where veterinary practitioners are unfamiliar with alpacas, often basic on-farm treatment is the default approach, rather than hospitalization and intensive medical treatment when indicated.

Placing an indwelling intravenous catheter can be more problematic in alpacas than in domestic species and is avoided by some veterinarians. When the appropriate technique is followed, it is not difficult. Clipping the fibre along a good length of the jugular furrow is mandatory. Holding off and visualising the jugular vein, and distending it, will provide appropriate landmarks for placing the catheter. Using a 15 blade and making a small incision in the thick skin overlying the jugular under local anaesthesia, will facilitate easy placement of the catheter.

The catheter should be advanced

down the vein part of the way with the stylet still in the catheter to help bypass the valves present in the alpaca jugular. Then, by using a swiveling action and maintaining distention of the vein, the catheter can be fully advanced. In crias it is usually unnecessary to create an incision as the catheters usually pass easily along the vein. Having an indwelling catheter placed either on farm or in the hospital is warranted because it provides easy access for fluids and medications. The small muscle mass of the alpaca makes repeated injections painful and stressful to the animals.

A variety of medical conditions have been investigated in the alpaca including ulcers, neurological disease-including polioencephalomalacia, liver disease, enteritis and diarrhoea, eye problems, ear infection, failure of passive transfer and dysmaturity, lymphosarcoma and other tumours.

Stomach ulcers are reportedly common in North America however the incidence appears to be lower here in Australia. However, animals under stress are most susceptible and it is not uncommon to use antiulcer medication in animals hospitalized with other disease conditions.

Like other ruminants, alpacas rely on the bacteria of the forestomachs as the source of dietary Vitamin B1. Deficiency in Vitamin B1 causes polioencephalomalacia, a neurological disease characterized by blindness, ataxia, disorientation, recumbency and seizures. If treated early it can be cured but if it is not, neurological changes become permanent and fatal. It is seen in animals under stress, animals that are inappetent and, on occasion, in animals that have been given oral medications, such as wormers, that upset the normal bacterial numbers in the stomachs. We have seen clinical signs in animals as young as three weeks of age which reflects the early development of the forestomachs and the ability for young animals to handle solid feed. Where animals are under treatment and not eating well a vitamin B1 supplement is recommended.

Liver disease is very common in alpacas. The most common cause is the ingestion of plants containing pyrrolizidine alkaloids. These cause cumulative damage so that exposure many years earlier can

destroy major area of the liver. Small exposures later in life or exposure to other liver toxins may be fatal in what otherwise appears to be a healthy animal. During phases when the alpaca is not exposed to these plants and the liver is not being damaged there is no non-invasive test for liver dysfunction.

Sporodesmin, or the spore of a fungus commonly found in rotting leaf or plant matter, can cause damage to the liver and biliary system. Species susceptibility to sporodesmin varies but it would appear alpacas are especially sensitive. Animals have shown signs of liver disease even where conditions are not exceptionally moist and spore counts on the pasture are low. It is not uncommon to see small exposures to sporodesmin become fatal where animals have underlying liver pathology from previous pyrrolizidine alkaloid exposure.

Conclusion

Unlike other new livestock ventures such as ostrich, alpacas appear to have found a niche market that still remains relatively untapped in terms of growth of the industry. Veterinarians have continued to learn about these animals and their husbandry and diseases. However, the knowledge base continues to grow and further improvements in management of these animals will also develop. In general these animals are robust and resistant to disease and, with good management disease and losses will be minimized.

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About the Author

Dr. Dart graduated in 1984 from the University of Queensland then went on to do a one-year internship at the University of Sydney followed by three years in a mixed (primarily equine) practice in Queensland. At the University of California he spent three years in large animal surgical residency followed by two years as a staff surgeon. It was here he had the opportunity to work with Dr. Murray Fowler and began performing surgery and conducting research on South American Camelids. He spent two years in private practice in Tamworth before joining the University of Sydney Veterinary Centre at Camden where he is now Associate Professor and Hospital Director. He is Boarded to perform Large Animal Surgery in both Europe and the United States and is a registered Equine Surgical Specialist in Australia. Dr. Dart has published over thirty articles on alpacas and is often asked to speak at national meetings on alpaca medicine and surgery.

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