

Quarantine Measures for Wild Animals in Indian Zoos - Principles and Practices

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The term "quarantine" is a very familiar word in both medical and veterinary science and it was actually derived from an old French official method "querente" meaning forty days of isolation (Arnall & Keymer, 1975) for a ship. It literally means compulsory isolation or detention to prevent spread of contagion or infection.

It may be questioned as to why quarantine is important for zoos. There is an old adage, "prevention is better than cure" and one of the first steps or practices one would adopt in the realm of preventive medicine is quarantine. The application of quarantine in wild animals is particularly difficult because of multiple species involvement coupled with different managerial practices, transfer and transhipment of captive animals practiced between the zoos including pancontinental exchanges not withstanding less practised translocation. Besides varieties of diseases that may afflict the wild animals, the spectrum of which is vast, make the task truly challenging.

It should be remembered that any newly procured wild animal and bird for a zoo could be a potential source of pathogenic microbes or parasites to an apparently healthy premises and its inhabitants. Even though an animal may have been considered free from any infectious disease at its previous captive facility, there are possibilities of the animal having contracted and/or exposed to infectious diseases during transit. Inadequately disinfected transport vehicles, crates, ropes, beddings and other ancillary materials which might have been earlier used for transportation of diseased animals and the cargo handlers are potential modes of transmission of the contagion to other areas. Therefore, quarantine is an invaluable method to prevent the introduction of infectious diseases or parasites into a free zone /zoo and obviously forms a part and parcel of any disease control programme. When practised in letter and spirit it helps to prevent the (re) entry of certain diseases into a country where these diseases are either non-existent or have been eradicated.

In the present context, the report of Dr. H. Hediger (1964), ex-Director, Basle Zoo may be considered who narrated the hazards of introduction of newly purchased birds directly among resident zoo birds, on several occasions, resulting in serious losses due to erysipelas, a bacterial disease. Similarly Dr. Murray E. Fowler (1986) in his monumental book "Zoo and wild animal medicine" cites numerous examples of introduction of disease through new acquisitions into an established collection without quarantine. There may be many such instances in India also but they are seldom documented and reported.

The wild animals and birds whether indigenous or exotic displayed in zoos are likely to suffer from a variety of diseases, many of them akin to livestock diseases, that could either be infectious or non-infectious. Their aetiology may be ascribed to bacteria, viruses, parasites, fungi or rickettsia. They may occur either singly or in combination. The crux of the issue is that once any one of them gets an entry into the zoo premises and strengthens its foothold, it

may be difficult to eradicate. At this juncture managerial practices, principles of disease control regimen become paramount because no amount of individual therapeutic measure for the sick would alleviate the problem. This necessarily would invite a rethinking of the old adage mentioned earlier and to carryout the task. The zoo veterinarians / care takers have to have the basic tenets of infectious diseases encountered in wild animals and birds, their likely source, epidemiology of the diseases in the precincts of the particular zoo and also the neighbourhood.

Furthermore quarantine in its own way affords a chance to the animal to acclimatize to the new environment besides offsetting the ill effects of trapping, crating and transportation so that the animal could regain strength to cope with immediate rigors of captive life. Basing on these considerations several countries including India have quarantine laws, conforming to global norms. In recent years the importance of quarantine has been largely appreciated and recognised and it has become mandatory as per "Recognition of Zoo Rules 1992" for all the Indian zoos.

In order that we are able to enforce the quarantine procedure effectively one needs to have a fair working knowledge of the regulations and also about the diseases occurring in various species of wild animals to be quarantined. Essentially the clinical manifestation of a disease is dependant upon several factors including the immune status and innate resistance of a particular animal /species. Clinically the disease may be classified as peracute, acute, sub-acute and chronic on the basis of time taken for the manifestation of disease. Similarly incubation period (time taken between the entry of infection and appearance of clinical signs), a key factor in determining the length of quarantine, varies with disease. Incubation period of some of the common diseases (Chakraborti, 1997; Boden, 1999) is short listed for reference.

Pasteurella organisms are normal inhabitants of upper respiratory tract but they become pathogenic under the influence of predisposing factors including various forms of stress to cause pasteurellosis. *Salmonella* infected animals excrete the organisms through faeces but recovered animals (carriers) and meat of infected animals/birds become a source of infection. Sometimes predisposing factors including stress trigger even the carriers to manifest the disease. The dogs (may be wild canids) recovered from leptospirosis excrete the organisms in urine for long periods (Boden, 1999). All these and similar such factors have to be taken into consideration for determining the quarantine period for different diseases in different species under varied situations.

Ideally, all the newly procured animals and birds in a zoo should be kept independently away from zoo veterinary

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hospital, isolation ward and animal display areas, in species specific enclosures specially constructed for the purpose but the constraints are many. Unfortunately enough, it is always not possible to construct a number of quarantine enclosures for countless species of wildlife received in the zoo from time to time. It is also sometimes difficult specially for the large animals like rhinoceros, hippopotamus, giraffe etc. to transfer again from quarantine to display enclosures once they are released out of the crates. In such cases the animals are released in newly constructed and/or existing enclosure duly disinfected or in a portion of properly partitioned (wall) enclosure only under a watchful eye. Rigidity in quarantine is sometimes not practiced when the animals are received from well managed zoos under cover of veterinary health certificate. From the earlier discussion it can be seen that the incubation period in majority of diseases is within 30 days. Therefore, the minimum period of quarantine for all species of newly received animals and birds need to be 30 days unless otherwise specially prescribed. It may extend upto 3-6 months for primates and other animals suspected for chronic diseases like tuberculosis, rabies etc. However, animals procured from the wild may require longer period of quarantine.

There should be separate facilities for drainage in the quarantine ward. Footbaths containing bactericidal and viricidal agents should be provided both at the entry and exit points and the disinfectant should be replenished daily (Lewis, 1995). Special attention should be paid to the cleanliness, hygiene, sanitation and disinfection of quarantine facilities. The quarantine enclosure should be thoroughly cleaned and disinfected before putting the animals and upon their exit to the display enclosures. The area should not be open to visitors. The excreta and feed refuses should be collected regularly and disposed off and the fomites properly disinfected. Separate attendants, utensils, equipments, clothings etc. should be provided for the occupants and attendants of quarantine area.

Initially the animals have to be stealthily viewed from a distance because disturbance caused by sudden appearance of a person in front of the animal may hamper the detection of any abnormality in their postures like thrown back, drooping forward, drooping wings, degree of steadiness while standing and walking, fractured limb, wounds, signs of deformity like swelling, hanging limb, soiled hind quarters, discharges from eyes and nostrils etc. (Arnall and Keymer, 1975) besides other signs of illness. Once the initial signs of sickness are detected, diagnosis and treatment become easier. Special attention has to be paid to the animal behaviour, appetite and subtle signs of disease problems if any and recorded daily.

Microscopical examination of stool, urine, blood, skin scrappings, discharges etc. should be carried out besides search for external parasites along with physical examination, x-ray examination, tuberculin test, vaccination etc. to eliminate the disease problem if any present in sub-clinical stage. Many of these examinations/tests can be done simultaneously to avoid frequent handling and thereby relieving the animal of frequent stress and excitement. If any positive cases of disease are detected during quaran-

tine they are to be treated as warranted. At least three consecutive negative screening tests for parasites (Lewis, 1995) and two negative tuberculin tests (Fowler, 1986) should form the criteria for passing the quarantine for such infections. It is cautioned that only killed vaccines are to be used, as chances of introduction of vaccine induced disease or post vaccinal virus shedding of live or modified vaccine can not be ruled out. After completion of quarantine period and after the animals are declared free from infection, they may be allowed to join the resident animals in display areas.

References

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Infectious Disease	Average incubation period
Foot - and - mouth disease	2-12 days
Rinderpest	2-15 days
Bluetongue	1-10 days
Bovine viral diarrhoea	1-21 days
Malignant catarrhal fever	2-8 weeks
Feline panleucopenia	2-10 days
Canine distemper	3 days - 3 weeks
Peste des petits ruminants	3-6 days
African horse sickness	6-8 days
Influenza	3-10 days
Rabies	Variable depending upon the site, severity of wound and the amount of virus deposited by the rabid animal. Usually from 10 days to 12 weeks and occasionally may be prolonged upto 4 years.
Ranikhet disease	3-5 days
Fowl pox	5-10 days
Anthrax	12-24 hours or more
Black quarter	1-5 days
Haemorrhagic septicaemia	2-5 days
Leptospirosis	1-10 days
Tuberculosis	2 weeks to 6 months or more