

Management of Impaction in Greater One-horned Rhino

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The Greater one-horned Rhino (*Rhinoceros unicornis*) are horse like single stomach animals. The most distinguishing feature of digestive system of rhinoceros is having a well-developed caecum. Owen-smith (1988) described Indian rhinoceros as a mega herbivore which possesses a well-developed huge and saccular caecum with large looped capacious colon and has a simple stomach with cornified areas.

Generally, rhinoceros eat 1-3% of their body weight as feed and 1-2% on a dry matter basis per day (Fowler and Miller-2003). The Greater one-horned Rhino consumes a mix of grasses, shrubs, forbs, leaves, twigs and fruits. In Kanpur Zoological Park rhinoceros are provided around 100 kg green fodder, 2 kg fruits, rock salt daily along with 2-3 kg feed concentrate on a cemented platform to prevent sand occlusion in lower digestive tract as advised by Das *et al* (2013) that food should not be offered on ground because sand colic has been reported in rhinoceros, therefore they should be either fed on sturdy trough or on concrete pads.

Correspondingly in a study conducted by Wyss *et al* (2012) on necropsy reports of captive rhinoceros in 57 adult (>5 years) it was found that among gastrointestinal problems, gastric ulcers and impactions, often with sand, were the most frequent finding. Impaction as a finding was found in nine adult animals, four of them specified as sand impaction. These four animals were all from different regions worldwide, one from Europe, from Asia, from North America and Australia.

Additionally, in one animal, a sand accumulation was noted, but not an impaction. Furthermore, two animals with gastric impaction and one with colonic impaction were noted in which the cause for the impaction was not specified.

Kanpur Zoological Park is presently having four rhinoceros in its pride collection. Due to excellent record in breeding rhinoceros, the Kanpur zoo has been recognised as participating zoo for rhinoceros breeding by Central Zoo Authority, New Delhi.

The Kanpur zoo male rhinoceros (Rohit) aged around 25 years has an excellent breeding record and himself is a zoo born. Previously he was provided around 100 kg *Chari* and occasionally around 30 kg chopped *Chari* along with 70 kg unchopped *Chari* plus 2kg concentrate, rock salt and 2 kg banana during summer season on a cemented floor. However during winter season each rhinoceros is given 2 kg



Fig 1. Rectal massage of the Rhinoceros



Fig 2. Hard faecal ball containing maldigested chari leaves/sugarcane bagasse (*kholi*) enveloped by faecal matter

jaggery, rock salt, sugarcane and 100 kg berseem apart from fruits and concentrate. Up to the age of 23 years the said animal was quite healthy and had never been medicated except for preventive medication such as deworming at every four months. However, on August 9, 2012 He was reported dull by the concerned keeper and on investigation it was found that the animal had not defecated for last two days though he was feeding normally. Since not to defecate for one or two days is a normal feature among animals, hence he was kept under observation without any medication. But after two days the rhinoceros was given carminative and digestive powder, purgative (herbolex tabs, liquid paraffin, magnesium sulphate powder and castor oil) along with antimicrobial drug. Owing to flatulence, green fodder was withdrawn to avoid over distension of gastrointestinal tract but to compensate energy needs feed concentrate was increased and around 15kg Spinach was added with the concentrate to boost up the energy level. Because the animal did

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not defecate for several days but was always found in quest of food therefore IBT power pack (Crescent laboratory, Mumbai) containing an ayurvedic digestive powder and Sodium Picosulphate 1 mg/ml in 100 ml bottle was given orally on 15th & 16th August. Apart from this around 500 ml liquid paraffin was infused intra rectally with massaging on 16th August evening. Subsequently on 17th August he defecated 108 kg and passed sumptuous quantity of urine. The animal was relieved from the trauma and normal feeding rescheduled in a controlled fashion with feeding of tender leaves of spinach, probiotics and turmeric as intestinal antiseptics.

Keeping herbivorous nature of the animal in mind, the rhinoceros was constantly monitored for any ailment related to digestive system as in such cases the chances of recurrence are always there due to possibility of formation of diverticulum. The animal did not show any symptoms of impaction up to November 2013. However on 12th November 2013 rhinoceros became anorectic along with diarrhoea and was treated with oral sulphadiazine and trimethoprim. The rhinoceros recovered on 22nd November and was supplemented with anabolites, B-complex and probiotics up to 28th November and the rhinoceros became hale and hearty.

The animal again fell prey to constipation on 19th February 2014 and did not defecate up to 27th February but was taking almost normal food. Keeping in view his feeding was reduced and rescheduled but the laxatives were continued. He passed 15.35 kg hard faecal mass in the shape of the balls at 9.30 AM and 10.20 AM followed by nine more faecal ball droppings totally weighing 54 kg. Thus total faecal matter passed was 69.35 kg throughout the day. The animal was totally at ease. Laxatives, tonics, groundnut oil, probiotics and intestinal antiseptics were continued rotationally. Again from 2nd March 2014 he did not defecate. Despite of continuous medication of laxatives, electrolytes, intestinal antiseptics and homeopathic medicines success could not be achieved though he was straining rigorously at his marked site of defecation. Finally on 21st March morning after twenty days on administration of refined oil enema and rectal massages he passed out 5kg+40 kg hard and dry faecal lump. Immediately after evacuation the animal started running here and there in joyful manner. During entire procedure the rhinoceros was fed chopped banana leaves, spinach, and berseem along with feed concentrate, banana and papaya ripe fruits.

Experts from different veterinary institutions were of the opinion that in the mega herbivores there are the possibilities of development of diverticulum in any part of G.I.T. when they are fed sumptuous quantity of the stalk of the green fodder as these animals

inhabit in the marshy area where they eat tender watery plants, though infection may not be there. This accumulated mass goes on to become large and blocks the lumen of G.I.T. subsequently this blocked passage withholds the food's digestion and thus stops peristalsis. Due to which signs of pain straining are exhibited by the animal and indigestion leads to anorexia, dullness, dehydration and respiratory distress.

Similarly Arora (2003) described that rhinoceros often eat earth and when there is teeth problem undigested fibrous large sized balls are formed which at times stuck in the lumen at the end of colon part of their intestines.

Likewise Kik and Kaandorp (2004) described that necropsy findings in an old white rhinoceros revealed that sand and impaction of the colon with maldigested food provoked torsion of the left dorsal and ventral colon. Stomach impaction with non-chewed material and sand, subsequently evoked a rupture of stomach, resulting in a massive peritonitis. Colic signs weren't that obvious but animal must have died with bitter pain.

Therefore the basic intention of the treatment in this case was clearance of the G.I.T. which is advocated by reducing the impacted mass either by surgery or by giving low and high grade purgatives orally and per rectally as well as enema with pressure and as far as possible manual evacuation of impacted faecal matter. As surgery and sedation could have resulted into the injuries, tympany and recumbency complications due to the large size and heavy weight of the animal. The only document of surgical intervention by Simon and Jenke (1977) was initially a success in which impaction in small colon was broken into small pieces by gentle massage without exteriorizing or incising the colon after approaching surgically from left lower Para lumbar area posterior to the last rib. But the animal collapsed on fourth day. Necropsy findings revealed an additional impaction of the anterior half of small colon which was impossible to reach surgically. Therefore other procedures were adopted by the authors who finally led to success.

During first instance of the disease the animal was administered several purgatives/laxatives but ultimately faecal matter softener Sodium Picosulphate 1 mg/ml in 100 ml bottle was given orally along with an ayurvedic digestive powder (IBT power pack, Crescent laboratory, Mumbai) with rectal massage and per rectal enema of liquid paraffin. Usually rhinoceros don't allow rectal massage therefore initially he was approached from dry moat during night hours by the zoo veterinarians. But during second instance of the disease the animal developed tendency to sit near enclosure wall away

from dry moat. Thus making it difficult to approach him from a safe point. Meanwhile his condition began to deteriorate with severe abdominal pain and it was noticed that he was even having pain during micturition. Therefore it was decided to give him rectal massage and was approached by the zoo veterinarians and surprisingly the rhinoceros fully cooperated during entire period of rectal massage and refined oil enema administration. During above procedure it was found that entire distal portion of the digestive tract till the approachable limit was always empty. Perhaps rectal massage stimulated lower G.I. tract and peristaltic movements were re-established and refined oil enema acted on dry and hard faecal matter which further helped in evacuation. The major cause attributed to recurrent impaction was perhaps formation of a diverticulum somewhere in initial part of lower G.I. tract as evident by hard faecal ball containing maldigested chari leaves /sugarcane bagasse (khai) enveloped by faecal matter.

Various case studies conducted by Arora (2003) revealed that a food ball weighing 7.5 kg was found lodged in the colon of a rhinoceros at National Zoological Park, New Delhi during 1970-71 and a rhinoceros died in 1980 at Lucknow Zoological Garden, Lucknow after exhibiting colicky pain. Necropsy showed occlusion of colon with coarse sand weighing about 7 kg and mucosa of colon was completely necrosed.

After third episode of impaction it was decided to withdraw sugarcane entirely from his diet and was regularly given chopped chari mixed with unchopped chari in order to avoid large sized bolus which may act as nidus for the formation of food/faecal ball leading to formation of diverticulum. Magnesium sulphate and liquid paraffin are now more frequently added in preventive medication schedule of rhinoceros of the Kanpur zoo.

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