

Abstract

The study was planned to know the treatment of cubs during gastrointestinal problem and develops insight into how to nurse abandoned cubs at the zoo. On 14th, November 2020 a Royal Bengal Tiger cub (Joe Biden) was born in Chattogram Zoo, Foy's Lake, Chattogram, Bangladesh. His mother abandoned him and his siblings, and only Joe survived when he was taken care of by the zoo authority. Firstly, Joe was provided a commercial baby feed named "Cerelac." After that, he showed some clinical signs of a digestive problem (anorexia, diarrhea with fresh blood, weight loss). To identify the causal agent- nasal, oral, and anal swab samples were collected, and different laboratory examinations were done. Results gave information about the presence of *Escherichia coli*, which does not lead to any confirmatory diagnosis as it is a general commensal bacteria present in GIT. Within this time, the cub was treated with anti-diarrhoeal drugs and probiotics. Through more study, the feedings were also altered from "Cerelac" to Goat milk. Finally, after four days of supportive treatment and feeding adjustment, Joe was recovered from the digestive issues. Since cured, the feces was normal, and gradually he gained weight. The meat was provided to Joe at the age of 12 weeks, and now he is a healthy tiger who is being re-introduced in a cage. The study helped to know more about abandoned or orphaned Tiger cub management and treatment in the zoo, which also visualized the concentration we should provide in captive breeding of big cats.

Keywords: Abandoned tiger cub, digestive problem, treatment, feeding.

CHAPTER 1

Introduction

The Royal Bengal tiger (*Panthera tigris*) is numerous maximal subspecies of Tiger in Asia. It is considered an endangered species due to poaching, harm, and habitat fragmentation based on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (Chundawat, R.S et al., 2021). Royal Bengal Tiger is one of the penetrating threatened animals in the Bangladesh forest (Kamal et al., 2012); it belongs to the Family: Felidae (Azad et al., 2005). As the numbers of wild tigers decline, captive breeding programs have become a principal focus of the zoo community, which magnifies the importance of research on tiger husbandry (Pitsko et al., 2003).

Humans maintain wild animals in zoological parks for education, conservation, research, and recreation purpose (Pitsko et al., 2003). The captive environment can provide secure havens for animals if appropriate environmental enrichment is available to perform basic life-history traits adequately (e.g., foraging, territoriality, social behaviors, resting, mating, and nursing young ones) (Breton G, Barrot S., et al., 2014). However, suppose the environment does not offer them their natural behaviors (swimming, climbing, stalking, and predation). In that case, tigers tend to develop behavioral stereotypes, such as pacing, self-mutilation, aggressiveness, loss of appetite, and increased reproductive failure (Bretone et al., 2014; Pitsko et al., 2003). However, Tigers (*Panthera tigris*) have huge home ranges in the wild and natural predatory hunting behaviors that are difficult to provide in captivity (Pitsko et al., 2003). Tiger populations in captivity are small and vulnerable to many risks (Traylor et al., 2010).

Diarrhea due to infectious causes is a common problem in feline (Cook, A.K., 2008). However, digestive disorders may occur from dysbiosis, disruption, or imbalance in the normal GI microbiota. It may result from an increase or decrease in some commensal bacteria, involve the introduction of pathogenic organisms, or the proliferation of opportunistic bacteria. Significant dysbiosis is found in cases of acute diarrhea (infectious, non-infectious, and hemorrhagic), chronic diarrhea (food or antibiotic responsive and IBD), GI motility disorders, also the use of antibiotics and gastric acid reducers (Webb, C.B., 2019).

In case of abandoned/orphaned cub hand-rearing, to promote optimal growth, health, and psychological well-being, hand rearers must be available to the cubs to provide the natural mother's care, husbandry, and comfort. Hand rearing involves more than feeding and cleaning. While providing nutrition and hygiene, natural mothers also provide cubs with warmth, security, and comfort. The bodyweight of the cub needs to be noted before the commencement of feeding. Fresh cow's milk and milk powders should be generally avoided. Milk powders lead to dermal problems and diarrhea. Goat milk or bitch milk, if available, are suitable (Ginman et al., 2001). It is advised to feed the cubs between 10-20% of their body weight per day (e.g. 1 kg body weight: 10% = 100mls, 20% = 200mls. Always aim for the 20%). This daily amount is then divided into the total amount of feeds throughout the day (Baker, R et al., 2006). For bottle feeding, have the cub stand on all fours and its head angled up so that no fluid enters the lung. A disinfected baby bottle with a nipple can be used for this purpose. With milk, Septran antibiotic syrup may be added to prevent infection. Excess of this antibiotic should be avoided as it may destroy beneficial microbes that aid digestion, and vitamin syrup and gripe water can be added to the milk to aid digestion. All staff engaged in rearing tiger cubs should wash their hands thoroughly with soap and water after their daily ablutions and also should de-worm themselves once in 6 months irrespective of signs and symptoms (Ginman et al., 2001).

Objectives:

- Understand the treatment of cubs during gastrointestinal problems.
- Develop insight about how to nurse abandoned/orphaned cubs at the zoo.
- Improve knowledge about cub management at human care.

CHAPTER 2

Case Description

2.1. General Information:

A Royal Bengal Tiger cub was born on 14th November 2020 at Chittagong Zoo from the tiger couple 'Joya' and 'Raj.' As the mother refused to provide milk and neonatal care to its three cubs, two of them died after 48 hours, and the zoo authority rescued another cub. It was named 'Joe Biden' after the US president Joe Biden, who was that time newly elected and reinstated US to the "Paris Climate Agreement (COP21)". Hand feeding and proper management helped this abandoned cub to survive.

2.2. Medical History:

On 26th November 2020, 12 days old "Joe Biden" was noticed having digestive issues after feeding 1 part "Baby Cerelac" (a commercial mixture of powder milk, wheat, rice grain, minerals): 1 part lukewarm water. Maintaining 25% of its body weight, six times in a day (4 hours interval) from the day it was rescued.

2.2. Symptoms & signs:

The cub was weak due to being off-fed. Diarrhea was present with fresh blood. Weight loss was observed. At the start of the illness, it weighs 1.30 kg, and during diarrhea, it weighs 1.10 kg.

2.3. Sample collection & preservation:

The nasal and anal sample was collected through psychological restraining. 2 samples were preserved inside a 10 ml vial with Phosphate Buffer Saline (PBS) at 4°C temperature for further examination.

2.4. Sample findings:

Escherichia coli (E. coli) bacteria were found in the anal sample, a naturally common organism found in GIT. Due to this, the diagnosis of the causal agent remains unclear. Also, no evidence of parasite presence was not found through coproscopy.

2.5. Treatment & follow up:

Symptomatic treatment of diarrhea was given, using an anti-diarrheal agent and probiotics for four days. Anti-diarrheal agent Bismuth subsalicylate (BSS) was provided 1ml orally for four days, mixed with goat milk once a day. Due to this agent, the feces appeared blackish. Enterogermina was provided with milk, 400 million/kg body weight, once a day, orally for four days.

During this treatment, “Baby Cerelac” was stopped and replaced with- 1 part Goat milk: 1 part lukewarm water (10% Of Bodyweight), six times a day. After recovery, the cub gained weight and became 1.50kg.

Figures



Figure 1.1: Diarrhoea and weakness of the cub

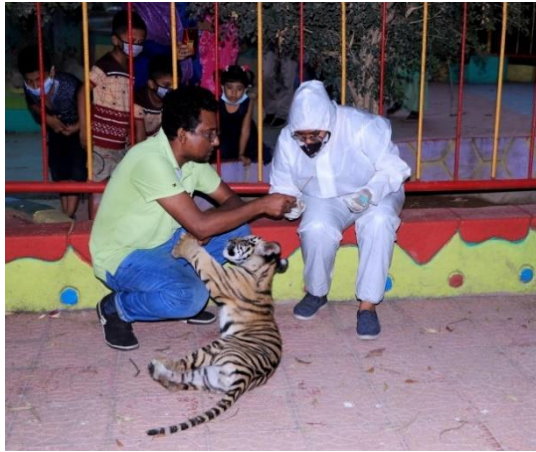


Figure 1.2: Collection of anal and nasal swab by psychological restraining.



Figure 1.3: Bottle feeding (goat milk).



Figure 1.4: Joe Biden re-introduced in cage.

CHAPTER 3

Discussion

Through research, Mohr AJ stated that- symptomatic therapy of the dog and cat with acute, self-limiting diarrhea usually involves empirical therapy because the causes for many of these diarrheal disorders are often undetermined. Symptomatic therapy's principal goals are restoring and maintaining fluid and electrolyte balance, dietary modification, administration of broad-spectrum anthelmintics, and judicious use of antimicrobials when warranted. The unfounded recommendation of withholding food for 24 to 48 hours to facilitate “bowel rest” is unsupported. There is growing evidence that early enteral nutritional support benefits are far superior for promoting intestinal integrity and weight gain and improving patient outcomes (Mohr 2003). In the case of the cub, no “bowel rest” was maintained, as it was very vulnerable. Only fluid therapy, antidiarrheal drug, and probiotics are provided orally as symptomatic treatment, which was to the point.

Bismuth subsalicylate has anti-inflammatory, mild-antibiotic, antacid, and protective qualities. It is commonly used in humans to treat indigestion and diarrhea but is sometimes used by veterinarians (pet med., 2021). Bismuth subsalicylate (BSS) is a compound without important aqueous solubility that is extensively used to treat gastrointestinal disorders. BSS can bind bacteria of diverse species, and these bound bacteria were subsequently destroyed. The killing of bacteria exposed to BSS may have been due to interruption of ATP synthesis or a loss of membrane integrity (Sox and Olson., 1989).

Probiotics are given to patients with GI disease to correct dysbiosis (measured or assumed) and return the microbiota to a normal, healthy state. According to the World Health Organization, probiotics are living organisms (not just bacteria) that, when administered in adequate amounts (the more, the better), confer a health benefit on the host. (Weese et al. 2011 & 2003). Probiotics are widely available for use in animals, but the quality control of veterinary probiotics is poor (Weese, J.S., 2003). *Bacillus subtilis* can be used as an oral probiotic. Enterogermina is a commercial *B. subtilis* probiotic preparation. *Bacillus subtilis* is used for oral bacteriotherapy and bacterioprophyllaxis of gastrointestinal disorders, many of which lead to diarrhea. Ingestion of significant quantities of *B. subtilis* is meant to restore the

normal microbial flora, reduced due to illness (Green et al., 1999). Probiotics also have been used to facilitate the eradication of intestinal parasites. (Benyacoub J et al., 2005).

The cub was not provided any antimicrobial treatment. In “Canine and Feline Gastroenterology,” Robert J. narrated- use of antimicrobials as empirical therapy in the management of uncomplicated or non-infectious diarrhea is not recommended because of the unfavorable effects of the antibiotics on the normal intestinal microflora and their tendency to promote resistant strains of bacteria. Antibiotics are suggested when specific bacterial or protozoan enteropathogens, such as *Campylobacter*, *Clostridium*, or *Giardia*, are isolated from the feces (Robert J., 2013).

A previous study shows that a day-old white tiger cub was hand-reared after maternal rejection at MC Zoological Park, Chhatbir, Punjab, India, in 2007 (Sharma and Singh, 2008). It was fed with goat milk in a feeder bottle (initially four times with 35ml each that gradually increased to 50ml as the cub grew) and changed to the milk of a bitch (the foster mother for the cub) twice a day. As the cub was deprived of colostrum, an antibacterial drug containing Trimethoprim 40mg and Sulphamethoxazole 200mg/5ml were fed to ward off any contingent infection. Intermittently, the feed was supplemented with vitamin, gripe water, and calcium. The cub started accepting chicken soup from 12 weeks; it started accepting chunks of boiled chicken, mutton, and buffalo meat in subsequent stages (Sharma and Singh, 2008). The management can be compared to the facilities provided to Joe, which will clarify that Joe was provided a commercial feed firstly, and after disease recovery, when he switched to Goat milk, it helped him to be healthy. Though no supplementary nutrients were not given to him. He was given beef when he was 12 weeks old.

CHAPTER 4

Conclusion

The cub “Joe Biden” was rescued from his mother when she abandoned him after giving birth. Due to stereotypic behavioral changes in captivity, some big cats show this kind of behavior sometimes. Joe was experimentally provided a commercial feed preparation. Due to some unknown cause, he became ill. According to signs and symptoms, supportive therapy for diarrhea and the digestive imbalance was provided. Dietary change was also done. In order to identify the cause (infectious or non-infectious) of illness, we collected anal and nasal swabs from Joe by psychological restraining. Through laboratory examination (coproscopy, agar culture), no ensured diagnosis could be made. After four days of care and treatment, Joe recovered from illness, gained weight, and switched to meat gently. At the age of six months, on May 2021, he was re-introduced in the cage. Joe is now a bloomy and strong boy n Chattogram Zoo. His treatment and management taught us how to deal with a cub and mothered him in the absence of his mother if this type of situation happened in captivity. The study developed insight about what we should do and which things need to be avoided, rearing a Tiger cub.

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Biography

I, Mir Nishat Tasnim Tania, daughter of A. T. M. Golam Kibria and Khurshida Begum. I was born on 10th October 1997. My home district is Rangunia, Chattogram. I passed my Secondary School Certificate examination in 2013 and gained a GPA of 5.00. I completed my Higher Secondary Certificate in 2015 from Bangladesh Women's Association Girl's High School & College, Chattogram, where I achieved a GPA of 5.00. As my father worked for Bangladesh Forest Department from childhood, I had a hidden desire to work with Wildlife. Besides my academics, I am interested in volunteering, blood donation, painting, recitation, anchoring, photography, etc. I would like to work for the well-being of animals and pursue my dream career as a practitioner & researcher in the future.

References

- Azad, M.A.K., Hashem, M.A. and Hossain, M.M., 2005. Study on human Royal Bengal tiger Interaction of in situ and ex situ in Bangladesh. *J Biol Sci*, 53, pp.250-2.
- Kamal, M.S. and Nimmy, S.F., 2012. Knowledgebase Representation for Royal Bengal Tiger in the Context of Bangladesh. *Global Journal of Computer Science and Technology*.
- Baker, R., Selkeld, J. and Smith, E., 2006. Husbandry guidelines for the tiger *Panthera tigris*. *Western Institute of Sydney*.
- Benyacoub, J., Perez, P.F., Rochat, F., Saudan, K.Y., Reuteler, G., Antille, N., Humen, M., De Antoni, G.L., Cavadini, C., Blum, S. and Schiffrin, E.J., 2005. Enterococcus faecium SF68 enhances the immune response to *Giardia intestinalis* in mice. *The Journal of nutrition*, 135(5), pp.1171-1176.
- Breton, G. and Barrot, S., 2014. Influence of enclosure size on the distances covered and paced by captive tigers (*Panthera tigris*). *Applied Animal Behaviour Science*, 154, pp.66-75.
- Chundawat, R.S., Khan, J.A. & Mallon, D.P., 2011. *Panthera tigris* ssp. *tigris*. *The IUCN Red List of Threatened Species* 2011:e.T136899A4348945. <https://dx.doi.org/10.2305/IUCN.UK.2011->
- Cook, A.K., 2008. Feline infectious diarrhea. *Topics in companion animal medicine*, 23(4), pp.169-176.
- Ginman, L. (Ed) (2001) Sumatran Tiger Cub Handrearing. Taronga Zoo
- Green, D.H., Wakeley, P.R., Page, A., Barnes, A., Baccigalupi, L., Ricca, E. and Cutting, S.M., 1999. Characterization of two *Bacillus* probiotics. *Applied and environmental microbiology*, 65(9), pp.4288-4291.

- Mohr AJ, Leisewitz AL, Jacobson LA, et al: Effect of early enteral nutrition on intestinal permeability, intestinal protein loss, and outcome in dogs with severe parvoviral enteritis. *J Vet Intern Med* 17:791–798, 2003.
- Pet md., 2021. Pepto Bismol. Retrieved from <https://www.petmd.com/pet-medication/pepto-bismol>.
- Pitsko, L.E., 2003. *Wild tigers in captivity: A study of the effects of the captive environment on tiger behavior*, Doctoral dissertation, Virginia Tech.
- Robert J. Washabau, Chapter (s): Robert J. Washabau, Michael J. Day, Canine and Feline Gastroenterology, W.B. Saunders. 2013; 481-48.
- Traylor-Holzer, K., 2010. The science and art of managing tigers in captivity. *Tigers of the World*, pp.283-292.
- Weese, J.S. and Martin, H., 2011. Assessment of commercial probiotic bacterial contents and label accuracy. *The Canadian veterinary journal*, 52(1), p.43.
- Weese, J.S., 2003. Evaluation of deficiencies in labeling of commercial probiotics. *The Canadian veterinary journal*, 44(12), p.982.
- Webb, C.B., 2019. Fecal Microbiota Transplantation: from theory to practice.