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Gastroschisis accompanied with Palatoschisis in tiger cubs: A case report

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Abstract
Gastroschisis accompanied by palatoschisis is an unusual condition and has been rarely reported. Twin cubs of tiger were born at White tiger zoo safari, Mukundpur, Rewa, Madhya Pradesh, India, with a rare anomaly of gastroschisis along with palatoschisis. One of the twins was male and the other was female. In spite of all the necessary precaution and strict surveillance of a team of veterinarians both the cub died in a span of 4 hours.

Keywords: gastroschisis, palatoschisis, Tiger cub, twin

Introduction
Tiger is referred to as king of forest in India because of its majestic look, ruthless killing instinct and fascinating behaviour. Rewa, Madhya Pradesh, India, the land of tiger is proud to be the home land of first white tiger of world "Mohan". Tigers are considered as a solitary animal and rule a territory of about 6-7 kilometers. A single male lives with four to five females in their conquered kingdom.

Gastroschisis can be characterized as abdominal muscle defect wherein, there is protrusion of abdominal viscera outside the body cavity. (Yilmaz *et al*., 2016) [9]. It was referred to as "cleft belly" in the ancient literature, until it was first defined by Calder in 16th century. Walkin in the year 1943 first attempted to close the defect in 1943 in human being. (Basak *et al*. 2013) [2]. Palatoschisis or cleft palate is a common congenital anomaly of oral cavity in humans and animals (Berghe 2010) [3]. In human its prevelance is about 0.05 -.3 % (Thornton *et al*., 1996) [7] whereas, in domestic animal its prevalence is 0.6 case per 1000 births (Noden and de Lahunta, 1985) [6].

Gastroschisis accompanied by palatoschisis is an unusual condition and has been rarely reported, however they have been reported individually in different species of animals.

Case report
Twin cubs of tiger were born at White tiger zoo safari, Mukundpur, Rewa, Madhya Pradesh, India, the land of tigers. The cubs were the offspring of the male tiger, Bandhu, aged 10 years and female Durga aged 3 years and eight months (Fig 01). The tigress parturated at its full term and there was no complication during the birth of the cub. Both the cubs when born appeared to be identical and were having their abdominal viscera hanging outside the abdominal cavity. The morphology of the cub made it suspicious to be a monozygotic. The cubs were minutely observed for any other abnormalities and it was found that gastroschisis was too accompanied by palatoschisis (Fig. 02). Hurriedly, the animals were transferred to intensive care unit. The intestinal viscera were repositioned into the abdominal cavity and the abdominal fissure was closed. Both the kids were made to suckle the tigress but it was a futile attempt. The first cub died after a time span of 40 minutes whereas, the lifespan of the other cub was a little longer and it collapsed after four hour contrary to the fact that both were kept under strict surveillance of a team of veterinarians. After the death of the cubs, minute macroscopic details of both the animals were done. The markings on the limbs, neck, body and tail was observed for and it was found that they were different from each other. Sex of the cub was too observed and it was found that one of the cubs was male whereas, the other was female. Marking and the sex of the animal was concrete reason to declare that the fetus was dizygotic and not monozygotic.

Weight of both the cubs was taken and it was found that first cub which was male was 1.95 kilogram and that of 2nd cub, a female was 1.15 kilogram. Length of both the cub (From dorsal aspect to dock) was 28 cm. Girth of first cub was 22 cm and that of 2nd cub was 20 cm. All the visceral organ of abdominal cavity of the female cub was well developed however; it was surprise to find that the intestine of male cub was ill developed. Length of small intestine of male cub was 21cm and large intestine was 9 cm. Thoracic cavity of both the cub was fully developed with well-developed heart and lung. Dissection of heart was done to find that the valves and chambers were well formed. Size of skull of male and female cub was 10 cm and 9 cm and that of cleft palate was 8 cm and 7 cm respectively. Skulls of both the cubs were opened to observe different part of brain and it was found that it was completely developed with prominent sulcus and gyrus. There was not any indication of microcephalic brain.

Fig 1: Female tigress "Durga" who gave birth to two cubs

Fig 2: Cubs born with Gastroschisis accompanied with palatoschisis

Discussion

Case of gastroschisis accompanied by palatoschisis in tiger cub is a rare incidence. A case of palatoschisis in tiger cub was reported in animal sanctuary Seminole, Saint Petersburg. In animal sanctuary Seminole, Saint Petersburg, Fabian and chester was born to Natasha at wild life rescue and rehabilitation centre, which died before any attempt for surgical procedure was taken (DeGregory, 2009) [4]. Going through the literature it seems that gastroschisis accompanied by palatoschisis might be the first case to be reported here. When the tiger cub was born, both the cubs appeared to be mirror image of each other and it was suspected that both might be monozygotic but looking into the stripe pattern and sex of both the cubs it was concluded that they were dizygotic. If the twins vary in sex they do not have same DNA and are clearly fraternal or dizygotic in nature. Moreover, the stripe patterns of the tiger are like finger print of human being and no two tigers can have the same stripe pattern (Yelena, 2019) [8]. Identical twins are monozygotic whereas, non-identical twins are dizygotic. The necessary and accessory sex organ of both the cubs was well developed. When the cubs were born with shortcomings (Fig 02) it was first thought to be a case of Schistosoma refluxus but later on this opinion was discarded. The reason behind the change in opinion might be due to the findings of Knight (1996) [5] and Aydm (2006) [1] who defined Schistotoma refluxs as a congenital abnormality characterized by ventral curvature of spine and inversion of the neck towards the sacrum, fissure in thoracic and abdominal wall, ill developed diaphragm and ankylosis of limb. However in the present case ventral curvature of spine and inversion of the neck towards the sacrum was lacking moreover, the diaphragm was completely developed. Thus looking to the fact it was concluded that it was a case of gastroschisis accompanied with palatoschisis

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