African Primates 9:45-50 (2014)

Brief Communication:

Vaginal Prolapse in a Handicapped, Multiparous Wild Chimpanzee in Budongo Forest Reserve, Uganda

Caroline Asiimwe[1], Vernon Reynolds[1,2], Paul Zziwa[1], Timothy Mugabe[1], Wyclif Walumbe[1], Geoffrey Muhanguzi[1], Fred Babweteera[1,4], and Klaus Zuberbühler[1,3,5]

[1]Budongo Conservation Field Station, Masindi, Uganda; [2]Oxford University, Madgdalen College, England (UK); [3]School of Psychology and Neuroscience, University of St Andrews, Scotland (UK); [4]Makerere University, Forestry Biodiversity and Tourism, Uganda; [5]Institute of Biology, University of Neuchatel, Switzerland

Abstract: The propensity of human females to develop vaginal prolapse is related to age, number of births, neonatal birth weight, genetics and other factors. Here, we report on a vaginal prolapse in a 33-year old, multiparous, handicapped wild chimpanzee (*Pan troglodytes schweinfurthii*), following her sixth delivery. Compared to the other 22 parous females of the Sonso community, the subject exhibited a high number of births within a short time period. Thus, the possible cause for her condition may have been the high number of vaginal births combined with the size and weight of the neonate. Additional possible factors not investigated here are: the impact of prolonged stage-two labour, persistent straining and genetic factors. The female fully recovered within 15 days and exhibited no unusual behavioural patterns or physiological abnormalities during recovery. We conclude that vaginal prolapse is not restricted to humans but also occurs in our closest relatives, the chimpanzees.

Key words: ***Pan troglodytes schweinfurthii,*** **vaginal prolapse, parity, health monitoring, Budongo Forest Reserve**

INTRODUCTION

Vaginal prolapse is a clinical condition characterised by bulging of the top of the vagina into the lower vagina or outside the opening of the vagina due to disruption in the functionality and strength of the levetar ani muscles, endopelvic fascia and ligaments or the uterosacral–cardinal ligament complex (Otto *et al.* 2002; Hunskaar *et al.* 2005; Cole *et al.* 2006). Here, we report on a handicapped adult female chimpanzee of the habituated Sonso community of Budongo Forest Reserve, Uganda, which developed a vaginal prolapse following her sixth delivery. To our knowledge, this condition has not been reported in wild chimpanzees. Our observations suggest that our closest living relatives, the chimpanzees (*Pan troglodytes*), can also suffer from a condition that so far has only been studied in humans and more distantly related animals (rhesus macaques: Otto *et al.* 2002; Shahryarinejad & Vardy 2008; squirrel monkeys: Couri *et al.* 2012; rats: Moalli *et al.* 2005a). Our findings also have implications for veterinarian decisions relating to the management of vaginal prolapse in wild chimpanzees, specifically whether or not intervention should be considered.

Case description

Our subject, Kalema (KL), was an adult female chimpanzee, first identified on 28 April 1992 at an estimated age of about 13 years. Most likely, she had immigrated into the Sonso community around that time since habituation of this community for

Correspondence to: Caroline Asiimwe, Budongo Conservation Field Station, P.O. Box 362, Masindi, Uganda; E-mail: asiimwecaroline@gmail.edu.

Figure 1. The focal animal, Kalema (KL), a 34-year old, multiparous female of the Sonso community, Budongo Forest, Uganda, interacting with another group member. KL is severely handicapped by a hairless, inwardly hooked right hand, caused by a snare injury. Photograph by B. Fallon.

research had started in 1990. However, identification of individuals was gradual so it is possible that she had been part of the community for a longer time. Her hairless, inwardly hooked right hand caused by a snare injury (Figure 1) made her identification easy. KL had her first infant at the estimated age of 14, followed by five more vaginal deliveries (Table 1). She lost two of her infants immediately after birth, which contributed to her short inter-birth intervals. As a consequence, KL was the first multiparous female in the Sonso community to deliver six infants by the age of 33 years (Figure 2).

On 12 September 2012, eight months after having tested positive for pregnancy, KL was seen carrying her sixth infant. The infant was estimated to weigh approximately 2.5 kg, based on the size of another female's infant that had been killed within 24 hours after birth by another group member. On that occasion, an exact weight was obtained and, therefore, visual comparison could be made

Table 1. Parity history of the adult female chimpanzee, Kalema (KL).

Birth	Infant Name	Infant Sex	Comment
Dec 1993	Unnamed	Unknown	Disappeared, cause unknown
Dec 1994	Bahati	Female	Emigrated
Sept 2000	Kumi	Female	Emigrated, occasional re-visits
Sept 2005	Unnamed	Unknown	Disappeared after 2 weeks, cause unknown
Sept 2006	Klauce	Male	Present in community
Sept 2012	Unnamed	Female	Died after 1 day, cause unknown

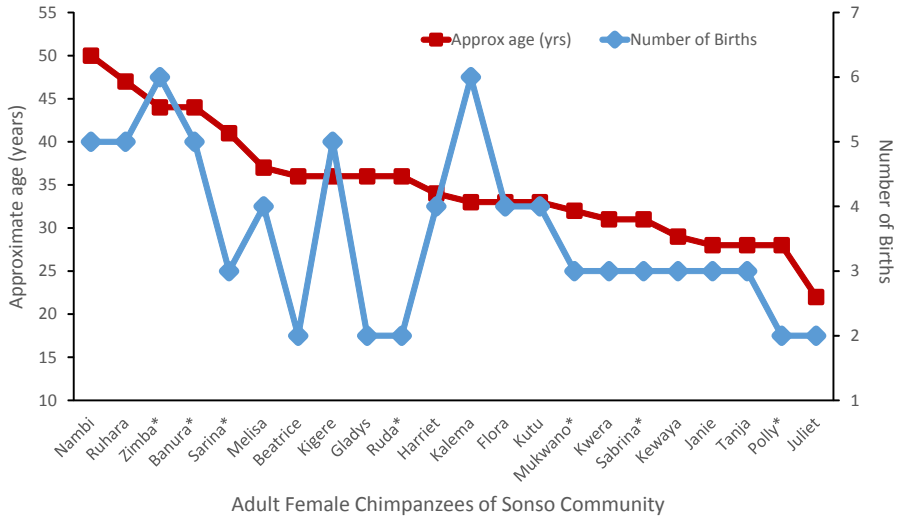

Figure 2. Graphical representation of the Sonso multiparous female chimpanzees according to age and number of births by 2012. *Subject was deceased by 2012.

(Asiimwe 2012; average birth weight = 1.78 kg; Morais 2013). We also noticed bloody mucoid discharge from KL's genital area, which she cleaned off with leaves, suggesting that the infant was born on the same morning or during the previous night. KL's genital area was bulging and we initially assumed this was caused by the placenta. Upon closer inspection it became apparent that the vaginal wall was protruding with the area very inflamed and congested. Due to her posture, additional pressure was exerted on the prolapsed vagina, which made it look extremely turgid (Figure 3). We were unable to identify the cause of the prolapse but it may have been related to her having a history of frequent vaginal births or the apparently large size of her infant. Other possible explanations are: prolonged second stage of labour, repetitive straining caused by constipation, or genetic factors.

We decided against medical intervention, which would have necessitated invasive chemical restraint followed by surgery, and instead opted for non-invasive observational data and sample collection to monitor the natural progress of the condition. To this end, we collected general behavioural data, faecal samples to estimate body temperature, and urine to test for liver, kidneys and metabolic function, level of infection, dehydration and pH.

Figure 3. Kalema's vaginal prolapse during the early stages. The vaginal wall was turgid and prone to bleeding on day 2. Photograph by M. Laporte, BCFS.

In all, 18 urine samples were collected and analysed using URIPATH urinary dip-stick tests (Plasmatec Laboratory Products LTD, UK) in the field from 12th to 26th September 2012 (n=9 early morning, n=9 mid-morning).

We found blood in KL's urine on day 1 postpartum, which we considered normal. Urine samples of subsequent days were negative for blood. From day 1 to 5 postpartum,

proteins were at trace levels, probably due to her recent pregnancy or the increased physical activity during parturition, suggesting that kidney function was normal. KL started testing positive for leucocytes on day 3 postpartum, perhaps due to an infection in relation to her prolapsed vagina. Leucocyte concentration was higher in the early morning samples (n=5) compared to the mid-morning ones (n=5). All samples were negative for glucose, ketones, urobilinogen, bilirubin and nitrites. The specific gravity measurements were between 1.000 and 1.005. pH was alkaline with an average of 9.0 (range between 8 and 9). From day 6 to 15 post-partum all samples were negative or within the normal range (Leendertz *et al*. 2010).

KL's average faecal temperature was 36.6°C, thus within the normal range of 35.5 - 37.8°C (Jensen *et al*. 2009). This suggested that the infection was localised to the prolapsed vagina, rather than having caused a systemic infection, which could have resulted in pyrexia.

KL continued to behave normally in terms of her basic behaviour, such as feeding, locomotor activity, and vocalization. Her social behaviour also remained normal as she continued to travel with the main group, including the alpha male. However, she was observed several times to drink water with the use of a leaf-sponge, a relatively rare behaviour in healthy chimpanzees, and to have longer rest periods compared to other individuals.

We continued to monitor the vaginal wall and found that it lost its turgidity on day 6. On day 8, we noticed localised areas of necrosis but the vaginal wall had started to retract. By day 12, only a small swelling was seen at the vulva and full recovery was recorded on day 15.

DISCUSSION

We have described an unusual case of vaginal prolapse in a free-ranging chimpanzee. Although chimpanzees have been observed for decades in the wild, we are not aware of any published records of a vaginal prolapse, although this could have been due to the lack of veterinary expertise of primate field researchers.

In humans, vaginal prolapse is caused by ligament weaknesses, which has been associated with high numbers of vaginal childbirths, advanced age, and high body-mass index as the most common risk factors (Hendrix *et al.* 2002; Schaffer *et al*. 2005; Swift *et al*. 2005; Kudish *et al*. 2009; Slieker-ten Hove *et al.* 2009). Compared to nulliparous women, the relative risk increases by a factor of 8.4 for women with two children, and by 10.9 for women with four or more children (Swift *et al*. 2005). In fact, because she has suffered early infant death in two cases, KL has had the highest number of pregnancies and vaginal births of all multiparous females in the Sonso community (Figure 2). Another possible contributing factor to her condition is the apparently large birth weight of her infant. The average neonate birth weight in chimpanzees has been determined at 1.78 kg (Morais 2013), indicating that KL's infant, estimated to be approximately 2.5 kg, was considerably overweight, which may have contributed to the vaginal prolapse. Other known risk factors in humans include prolonged second stage labour and repetitive straining (Chiaffarino *et al.* 1999; O'Boyle *et al*. 2002; Schaffer *et al.* 2005; Drutz & Alarab 2006). For wild chimpanzees, it is difficult to collect the relevant data to study these contributing factors, since females tend to give birth in tree nests and at night.

In humans, the ligaments eventually recover due to collagen scarring, but the connective tissue responsible for pelvic support can become elongated with reduced elasticity and strength, due to weaker type-3 collagen (Yamamoto *et al.* 1997; Kökçü *et al.* 2002; Moalli *et al.* 2005b). Whiteside *et al*. (2004) also found that women who had had a prolapse were likely to relapse after surgery with an odds ratio of 3.2. If these processes also play a role in chimpanzees, then a recurrence of a prolapse during KL's next delivery is likely.

In humans, vaginal prolapses are usually managed surgically (Randall & Nichols 1971; Adams *et al.* 1985; Morley & DeLancey 1988; Sauer & Klutke 1995). In our case, we opted against intervention because of the dangers associated with the use of anaesthetics and surgery in the field. Specifically, after delivery chimpanzee females may not be strong enough to cope with surgical intervention. Moreover, there is a considerable risk of hostile responses from other group members to anaesthetised individuals (and toward the human involved in the intervention). As a high-ranking group member, KL was almost always associated with other group members, including the alpha male, and it would have been very difficult to treat her in isolation. In addition, KL had a six-year old offspring that was still dependent, which would have complicated matters. For these reasons, we decided against surgical intervention and in favour of non-invasive monitoring. The favourable outcome suggests that surgical intervention can be avoided in wild chimpanzees.

ACKNOWLEDGEMENTS

We acknowledge the Uganda Wildlife Authority, the National Forest Authority and the Uganda National Council for Science and Technology for supporting our research and conservation activities at the Budongo Conservation Field Station (BCFS). We are thankful to the Royal Zoological Society of Scotland (RZSS) for providing core funding for the station. The 'Chimpanzee Health Monitoring Programme' in the Albertine Rift has been funded by the ARCUS foundation, the Great Ape Conservation Fund of the U.S. Fish & Wildlife Department and APE Tag, for which we are very grateful. We thank the Oakland Zoo for funding the snare removal program. Finally, we would like to thank our partners in the region, particularly the Jane Goodall Institute Uganda and the other chimpanzee study sites across the Albertine Rift. We thank the BCFS staff and management, our field assistants, the veterinary team and all researchers at BCFS for their support.

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Received: 6 July 2013
Accepted: 19 August 2014