Management of dystocia secondary to feto-pelvic dysproportion in a primiparous West African dwarf doe

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Abstract

Extensive or semi-intensive system of goat rearing allows indiscriminate breeding of young females before attaining the requisite body weight and this has been found to be associated with high rate of dystocia. A 9-month old primiparous West African Dwarf (WAD) doe weighing 12 kg was presented to the Veterinary Teaching Hospital (VTH), Federal University of Agriculture Abeokuta, Ogun State, Nigeria with complaint of difficulty in giving birth which has started more than 24hours before presentation. Manual manipulation was attempted without success before presentation. The doe was dull and weak with intermittent straining. There was mild abdominal distension. There was swollen vulva with mild bloody discharge. Dystocia was diagnosed based on physicoclinical examination and an emergency caesarean section carried out following standard protocol. Dead oversized and fully developed foetus was removed from the uterus following the surgery. The pre-surgical haemogram revealed neutrophilia and lymphocytopaenia with macrocytic anaemia. This is a reported case of caesarian section in management of feto-pelvic dysproportion induced dystocia in a young primiparous doe.

Keywords: doe, caesarian section, primiparous, breeding, dystocia

Running title: Management of dystocia in a primiparous West African dwarf doe

Prise en charge de la dystocie secondaire à une disproportion fœto-pelvienne chez une chèvre West African Dwarf

Résumé

L'élevage extensif ou semi-intensif des chèvres favorise la reproduction indiscriminée des jeunes femelles avant qu'elles n'atteignent le poids corporel requis, ce qui est associé à un taux élevé de dystocie. Une chèvre West African Dwarf (WAD) primipare âgée de 9 mois et pesant 12 kg a été présentée à l'Hôpital d'Enseignement Vétérinaire (VTH) de l'Université Fédérale d'Agriculture d'Abeokuta, dans l'État d'Ogun, au Nigéria, avec des difficultés à mettre bas depuis plus de 24 heures avant la consultation. Une manipulation manuelle avait été tentéste sans succès avant la présentation. La chèvre était abattue et faible, avec des efforts intermittents. On observait une légère distension abdominale, une vulve gonflée et un écoulement sanguinolent léger. La dystocie a été diagnostiquée sur la base d'un examen physico-clinique, et une césarienne d'urgence a été réalisée selon le protocole standard. Un fœtus mort, de taille excessive et pleinement développé, a été retiré de l'utérus après l'intervention. L'hémogramme pré-chirurgical a révélé une neutrophilie, une lymphocytopénie et une anémie macrocytaire. Ce cas rapporte une césarienne dans la prise en charge d'une dystocie induite par une disproportion fœto-pelvienne chez une jeune chèvre primipare.

Mots-clés : chèvre, césarienne, primipare, reproduction, dystocie

Introduction

Small ruminant (Sheep and goats) production and husbandry have received greater attention in tackling food insecurity and increased demand for animal protein in most developing countries including Nigeria (Chiejina *et al.*, 2015; Fasae *et al.*, 2015). Ewe or doe to be used for breeding should be at least at 12 months of age to allow them reach above 70% of adult body weight and good body condition score because breeding too young does usually result in dystocia (Kumar and Honparkhe, 2023). Also, good management system and breed selection for easy parturition is a good husbandry system. However, semi-intensive or extensive management system commonly practiced in Nigeria and other developing nations encourages indiscriminate mating

among underage goats with poor or lack of breeding selection and monitoring. This indiscriminate mating practice has led to various reported cases of dystocia in underaged or primiparous ewe and does (Bhattacharyya *et al.*, 2015; Ukwueze *et al.*, 2017; Ahmed et al 2019: Bolaji-Alabi *et al.*, 2022). Unfortunately, most of the time, no proper breed selection and the female may not have a fully developed pelvis and mature enough to carry heavy breed foetus (Hussain and Zaid, 2010; Ali, 2011).

The normal delivery process in small ruminant has been described. It involves three different stages. The first Stage of Labor (Cervix Dilation) is associated with uterine contraction that dilate the cervix and lasted up to 12 hours. The second stage of labor (birth) involves the doe actively pushing out the kids through birth canal and last for 1-2hours. The normal presentation for normal delivery in goat is head first with forward-stretched forelimbs. The beginning of normal birth comes with visible head and hoof. The third stage of labor involved expelling the placenta and can last up to 12 hours after delivery of kid(s) (Menzies and Bailey, 1997; Fubini and Ducharme, 2004; Noakes *et al.*, 2009). However, a condition in which an animal encounter difficulty in giving birth and would require intervention for successful fetal delivery is refers to as dystocia (Youngquist and Threlfall, 2006). It usually occurs when there is a delay in the first or second stages of parturition or failure for the first stage of parturition to progress to the next stage within 30 minutes (Fubini and Ducharme, 2004; Purohit, 2006; Noakes *et al.*, 2009; Sharma *et al.*, 2014; Bhattacharyya *et al.*, 2015). It is a common condition in small ruminants with very low incidence of around 5% worldwide and is associated with high economic losses to farmers either due to death of new-born or dam or both (Brounts *et al.*, 2004; Purohit, 2006; Ali, 2011; Sharma *et al.*, 2014; Bhattacharyya *et al.*, 2015; Khan *et al.*, 2018).

Dystocia in goats is either caused by foetal or maternal conditions. Foetal causes include fetal malpresentation, foetal malposition, oversized foetus and congenital abnormalities (Sharma *et al.*, 2014; Malik *et al.*, 2019). Maternal causes include uterine inertia, over feeding of dam during pregnancy, ring womb and narrow pelvis or feto-pelvic disproportion (Khan *et al.,* 2018). The occurrence of dystocia may be either due to maternal or fetal causes but sometimes both contributed together (Bhattacharyya et al., 2015). Feto-pelvic disproportion commonly occurs in young animals with low body weight when bred early resulting in either relative fetal oversize (small pelvis with normal size foetus) or absolute fetal oversize (normal pelvis with bigger size foetus), (Sharun and Erdoğan, 2019). It is commonly seen in ewes or does carrying a single large foetus (Purohit, 2006). Dystocia in primiparous due to the narrow pelvis of the dam relative to the size of the foetus may occur due to breeding of the animals at young age and/or poor state of nutritional management during gestation (Ahmed *et al.*, 2019). Several reports have shown that the prevalence of dystocia is highest in young yearlings or primiparous ewe and doe and this is associated with feto-pelvic disproportion or narrow pelvis among other fetal or maternal causes of dystocia (Speijers *et al.*, 2010; Kumar *et al.*, 2013; Sharma *et al.*, 2014; Bhattacharyya *et al.*, 2015; McHugh *et al.*, 2016; Refshauge *et al.*, 2016; Ukwueze *et al.*, 2017; Ahmed *et al.*, 2019: Bolaji-Alabi *et al.*, 2022).

Successful management of dystocia therefore depends upon the correct diagnosis of its causes and adoption of suitable corrective measures. Prompt assisted delivery during dystocia is therefore important in reducing fetal and maternal losses (Malik *et al.*, 2019). However, small pelvis diameter in small ruminants limit the use of manual obstetrical manipulation of the foetus to relieve dystocia (Mobini *et al.*, 2002). Dystocia is therefore usually relieved with cesarean section in small ruminants and usually performed in right lateral recumbency under local analgesia, with or without sedation (Fubini *et al.*, 2002; Brounts *et al.*, 2004; Fubini and Ducharme, 2004; Kumar *et al.*, 2013; Bhattacharyya *et al.*, 2015; Khan *et al.*, 2018; Ahmed *et al.*, 2019). This is a reported case of dystocia in a young primiparous doe that was presented 36 hours after the onset of labour leading to emergency caesarean section with resultant fetal death.

Case report

Case presentation

A nine months old primiparous West African Dwarf (WAD) doe weighing 12 kg was presented to the Veterinary Teaching Hospital (VTH), Federal University of Agriculture Abeokuta, Ogun State, Nigeria with complaint of difficulty in giving birth which has started more than 24hours before presentation. Manual

manipulation has been attempted without success before presentation. The doe was dull and weak with intermittent straining. There was mild abdominal distension. There was swollen vulva with mild bloody discharge (Figure 1). Fetal anatomical part was not visible outside until two fingers were inserted through the vulva and the nostril of foetus was felt in the birth canal but fetal viability was not ascertained. The mucous membrane was slightly pale. The Rectal temperature (38.1°C), heart rate (87 beats/minute) and respiratory rate (30 cycle/minute) were all observed to be within normal range. Based on the history and physico-clinical examination, diagnosis of dystocia due to feto-pelvic disproportion and absolute foetal oversize was made and an emergency caesarean section was therefore recommended to save the life of the dam and prevent sepsis. Prior to surgical intervention, blood sample was collected via jugular venipuncture for heamtological analysis.

Surgical management

The presurgical haemogram revealed neutrophilia and lymphocytopaenia with macrocytic anaemia (Table 1). Figure 2 to 6 represent that surgical management procedure. The doe left lateral side was aseptically prepared for surgery by clipping the hair around the flank and scrubbing with chlorhexidine and povidone-iodine. The patient was then draped for the procedure. Due to the health status of the doe, sedation was avoided and anaesthesia was achieved by Inverted L block technique using 2% Lidocaine Hydrochloride at 4mg/kg following placement of patient on right lateral recumbency on the surgical table.

Venous access was secured through the jugular vein and circulating blood volume was maintained with 5% dextrose saline (Unique Pharmaceutical Ltd, Sango Ota, Ogun State Nigeria) at the rate of 3mL/kg/hr. Routine laparo- hysterotomy procedures were performed as previously described (Kumar *et al.*, 2013; Bhattacharyya *et al.*, 2015; Ukwueze *et al.*, 2017; Khan *et al.*, 2018; Ahmed *et al.*, 2019; Bolaji-Alabi *et al.*, 2022). Thereafter, dead, oversized and fully developed foetus was removed from the uterus.

The uterus and abdominal cavity were lavaged with normal saline and properly cleaned. The uterus incision was closed with double rows of Lambert suture pattern using Size 0 Vicryl suture (Vicryl, Huaiyin medical instrument company LTD, Jiangsu Province, China). The abdominal muscle layer was closed enblock with simple continuous suture pattern using Size 1 Vicryl suture while the skin was closed with horizontal matress pattern using Size 2 Nylon suture. The recovery of the animal from anaesthesia was smooth. The skin incision was dressed with application of povidone iodine. Penicillin-streptomycin (Hebei Hope Harmony Pharmaceutical Co. Ltd., China) at 1000IU/kg – 10mg/kg and multivitamin (Kepro B.V. Holland) 1mL/10kg were administered intramuscular for 5 days. It was placed on haematinics (Center iron dextran+vitamin B_{12} 2mL intramuscularly) for 5 days. The patient was represented 14 days post-surgery for evaluation and skin sutures removal.

Figure 1: primiparous doe with gravid uterus and bloody vaginal discharge upon presentation

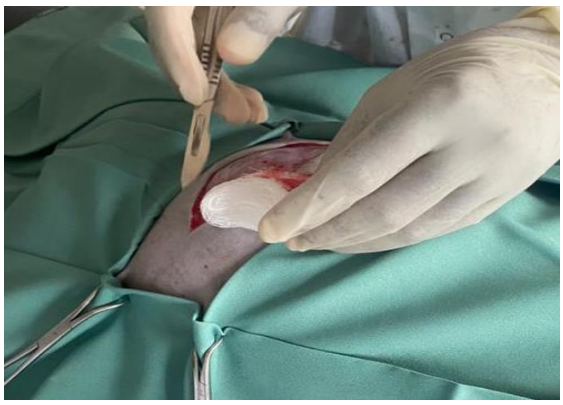

Figure 2: The doe was aspetically drapped and skin incision was made on the left lateral wall of the abdomen

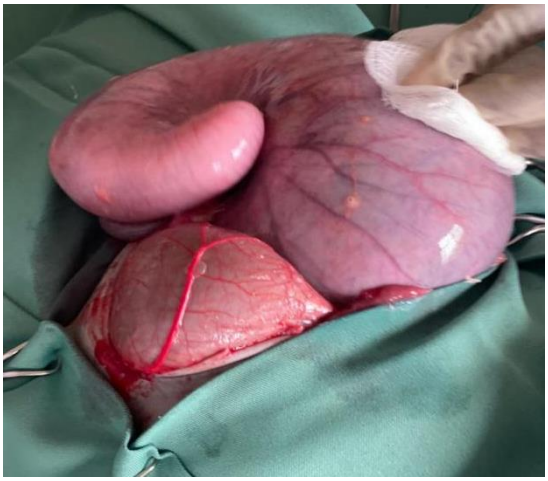

Figure 3: The gravid uterus was exteriorized and incised

Figure 4: The large sized male kid weighing 3.2kg was extracted dead from the uterus

Figure 5: The uterus incision was closed with lambert suture pattern

Figure 6: Following closure of the abdominal wall, the skin incision was closed with horizontal matress suture pattern

Table 1: Complete blood counts parameters of a-9 month old doe with dystocia

Parameter	Patient values	*Reference values	Interpretation
WBC (10^3/uL)	10.38	4–8	High
Neutrophils (%)	75.4	10–50	High
Lymphocytes (%)	20.1	40–55	Low
Monocytes (%)	3.0	0–6	Normal
Eosinophils (%)	0.1	0-10	Normal
Basophils (%)	0.1	0-3	Normal
PCV% ($\times 10^{-2}$ L/L)	18.6	27–45	Low
RBC (10^6/uL)	2.84	9–15	Low
Hemoglobin (g/dL)	7.9	9–15	Low
MCV (*fL*)	44.2	28–40	High
MCH (*pg*)	27.8	8-12	High
MCHC (g/dL)	62.8	31-34	High
Platelets ($\times 10^3$/µL)	900	800–1,100	Normal

*Reference values (Jones and Allison, 2007)

Footnotes

PCV is packed cell volume

WBC is white blood cell count

RBC is red blood cell count

MCV is mean corpuscular volume

MCH is mean corpuscular hemoglobin

MCHC is mean corpuscular hemoglobin concentration

Discussion

Dystocia is life threatening condition that require urgent intervention to safeguard the life of both the dam and foetuses. Early presentation is very important for the survival of the foetus and dam but this case was presented more than 24hours after initiation of parturition. Late presentation of pregnant doe for veterinary intervention has been noted to be detrimental to fetal survival in cases of dystocia (Ukwueze *et al.*, 2017; Bolaji-Alabi *et al.*, 2022). Earlier surgical intervention during course of dystocia by performing caesarean section ensures satisfactory outcome with good prognosis for both foetus and dam (Ukwueze *et al.*, 2017). The major cause of the dystocia in this case was feto-pelvic disproportion and absolute fetal oversize in which the pelvic diameter is normal but the foetus is bigger relative to its size. Feto-pelvic disproportion and fetal oversize which is commonly encountered in young primiparous female goats (Sharun and Erdoğan, 2019) especially in cases of singleton with tendency of fetal oversize (Purohit, 2006). This corroborated several other reports where the prevalence of dystocia was found to be more in young yearlings or primiparous ewe and goats and associated with feto-pelvic disproportion or narrow pelvis among other fetal or maternal causes of dystocia (Speijers *et al.*, 2010; Kumar *et al.*, 2013; Sharma *et al.*, 2014; Bhattacharyya *et al.*, 2015; McHugh *et al.*, 2016; Refshauge *et al.*, 2016; Ukwueze *et al.*, 2017; Ahmed *et al.*, 2019: Bolaji-Alabi *et al.*, 2022). Our observation was that lack of breeding control and indiscriminate mating in the herd lead to mating of this young ninemonth old doe leading to dystocia. This did not conform with recommendation that doe to be used for breeding should be at least at 12 months of age to allow them reach above 70% of adult body weight and good body condition score (Kumar and Honparkhe, 2023). In this case the doe owner attempted manual manipulation which proved abortive due to narrow pelvis relative to size of the foetus, therefore, caesarian section had to be carried out. The oversized foetus was a male and dystocia rates have been reported to be higher in male kids (McHugh *et al.*, 2016) because male are generally heavier than female at birth and thus would need more birthing assistance (Matheson *et al.*, 2012). Cesarean section as performed in this case is indicated for management of dystocia in small ruminants (Fubini *et al.*, 2002; Brounts *et al.*, 2004; Fubini and Ducharme, 2004; Kumar *et al.*, 2013; Bhattacharyya *et al.*, 2015; Khan *et al.*, 2018; Ahmed *et al.*, 2019) . Even though report on the level of awareness on the dangers of indiscriminate mating among goat farmers is scarce, it is very important to create awareness among local breeders of small ruminants of the importance of monitored breeding in spite of any management system practice adopted. This is because losses as a result of dystocia translate to eventual economic loss and decline in the targeted animal protein output at large.

Conclusion

Young primiparous female goats are prone to dystocia especially due to feto-pelvic dysproportion. The current extensive or semi-intensive system of rearing goat with poor/lack of breeding control allow goat to be bred indiscriminately too early. Surgical intervention via caesarian section relieved dystocia in this case and saved the life of the dam.

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