



Incidence and Etiology of Dystocia in Sheep at Duhok Province

Saleem.A. Sofi¹

Bayar K. Zeebaree²

¹⁻ Department of Theriogenology, College of Veterinary Medicine, University of Duhok, Iraq.

²⁻ Department of Surgery and Internal Medicine, College of Veterinary Medicine, University of Duhok, Kurdistan region, Iraq.

Corresponding author: bayar.zeebaree@uod.ac

Abstract

Sheep are significantly contributed to the meat production and milk yield in Duhok region. Dystocia is extremely common reproductive conditions affecting sheep and could causes death of both ewe and newborn. This research is aimed as a reconsidering study on the prevalence and etiology of birth difficulties in sheep. A total of 86 dystocia cases were recorded at the veterinarian clinic during the period from September, 2019 to February, 2020. The effects of factors analyzed by general linear models. The significantly highest prevalence was documented during winter season and ewes carrying male fetuses ($p \leq 0.05$). Fetal dystocia 61(70.93%) cases outnumbered maternal causes 25 (29.07%) cases. The fetal malpresentation represent the most common fetal causes (43.02%), and ring womb (16.28%) as maternal causes. Other fetal causes included twinning, fetal oversize and monsters, whereas maternal causes include narrow pelvis, uterine inertia and toxemia. Fetuses were delivered by obstetrical management in 59 (68.60%) cases including manual traction in 55 (63.95%) cases, and hormonal treatment with manual traction in 4 (4.65%) cases. Whereas remaining cases 27 (31.4%) were surgically treated by caesarean section (CS). In conclusion, dystocia recorded as a major obstetrical problem in ewes and emergency assistance could reduce the mortality rate for both pregnant animals and their newborn. In order to safe high numbers of fetal and dam and to reduce the cost of treatments, sheep with dystocia should be considered as an emergency cases without postponing.

Keywords: Dystocia, Etiology, Incidence, Sheep.

Introduction:

Sheep and goat are the main source of meat and milk production in Kurdistan region of Iraq. In spite most of small ruminant's population in Kurdistan region is female, herd problems and reproductive diseases, mainly dystocia, have a significant effect on reproductive performance and profitability. Sheep is seasonally polyestrous animals; showing estrus mostly during summer and some in the beginning of autumn season. Consequently, common birth problems were reported during winter season (1). Dystocia or birth difficulty defined as difficulty in parturition which needs human intervention or

assistance. Failure of stage one transmission into stage two of parturition (about thirty minutes required to enter stage two) when neonate deliver (2,3). The process of giving birth in small ruminant has been described well by (4,5). Failure of fetal expulsion could contribute to perinatal death of mother and newborns. Perhaps, the excessive traction forces could injure the birth canal, increase retained placenta, uterine infection as well as extending lambing interval (6,7). Dystocia has been considered to be the major parturient problem in sheep and goats (8). The ability to diagnose birth difficulties is essential in small



ruminant, in order to offer the best emergency treatment for dystocia. The main causes of dystocia are originated either from fetal, maternal or it is fetomaternal causes (4). Several authors counted the causes of dystocia and they concluded that the fetal causes mainly due to oversize fetus, abnormal presentation, position or posture, and monsters. Whereas maternal causes are generally associated with failure of cervical dilatation (ring womb), narrow pelvis and uterine inertia (2,4,9,10). Fetopelvic disproportion can be considered as both fetal (oversize fetus) and maternal (inadequate birth canal and/or pelvic size) causes (11). However, other studies disproportion of fetopelvic recorded as maternal causes (12). Recently, Jacobson et al., reviewed dystocia and they reported that dead born and birth with damaged central nervous system can cause dystocia, prolonged parturition and dystocia could increase the risk of central nervous system lesions (10). The prevalence and causes of birth difficulties is varies among studies and ranged approximately from 8 to 50% (8). The incidence of dystocia increased with increased number of multiple birth and the rate of dystocia is various among cross breed ewes (10). The incidence of dystocia was 34% in Dorest ewes, 5.4% in West African Dwarf ewes and 4.1% in fine wool Merino ewes, the range of dystocia incidence in sheep and goat ranged from 8 to 50% (8). Summarized results from various publications showed the high incidence of newborn mortality before weaning and the majority of mortality rate due to dystocia (10,13). Ring womb or inadequate cervical dilatation and softening at parturition is reported as a major maternal causes of dystocia (9,14). Furthermore, seasonal effect on the incidence of incomplete dilatation of cervix has been testified by (15). The incidence of dystocia due to failure of cervical dilatation is approximately 30% (4,11,15). The etiology

of ring womb is unidentified until now, however, lack of hormonal secretion involving softening of collagen or a lack of collagen response in cervix tissue to the hormonal stimulation could be the causes of ring womb (16,17). Study showed no correlation between ring womb and body condition score, breed and age of animals, however, genetic predisposition of the ring womb seems to be with bloodlines and when bloodlines are congenital, the occurrence of ring womb increases in that breed (4). Medical and hormonal treatments as well as manually induced cervical dilatation, and surgical operation are used to treat ring womb with noticeable outcomes, several medical treatments have been failed to treat ring womb and enhance cervical dilation, for example, PGE₂, as intra cervical emollient, had no effect in cervical softening (18). Relaxin also did not appear to be of practical value in treating ring womb (19). However, calcium borogluconate and estradiol benzoate treatments have satisfactory outcome in goats (16). The optimal response has been achieved by prostaglandin F₂ analog (20). The incidence, causes, management and outcome of dystocia under distinct research region is high. Thus, this research is planned to cover most cases of birth difficulties of ewes to identify the prevalence and causes of dystocia. Study will provide assistant in assuming proper management and causes of ewes near the time of parturition in temperate district. The study was designed to describe the main dystocia causes in the local breed of sheep in Duhok area. Furthermore, it will be essential to explore the efficiency of hormonal therapy in dystocia in ewes carrying dead fetuses and estimating lamb mortality rate.

Materials and methods

The study was conducted on 86 sheep suffering from birth difficulties. The owners of



sheep were brought pregnant ewes at parturition period to investigate animals in both veterinary Teaching Hospitals at Duhok University and Veterinary Artificial Insemination Center at Veterinary Director. The details and treatments were carried out during the period from September 2019 to the end of February 2020. The ages of animals were ranged from 13 months to around 8 years old with different parities (first to parity sex). The cases were considered as dystocia when the active labor take more than one hour without giving birth. After that, birthing problems were identified and the clinical statuses of animal were recorded. Specific reproductive inspection included vulva, vagina abnormalities such as edema, bruising and necrosis, as well as presentation of fetus extremities, cervix dilatation, age, sex, breed, species, body weight, dam parity, viability and newborn number were recorded. In ring womb cases, transcutaneous ultrasound examination (Aloka SSD 500 machine; 5 MHz linear-array probe, China) was used to investigate the viability of fetus. In case the live fetus, surgical operations (CS) were performed in order to save the viable fetal (21). However, after confirming of dead fetus, estradiol benzoate (3mg) and PGF₂ α (cloprostenol sodium 250

μg) was injected intramuscularly and observed for 72 hours after injection, then the case is re-examined for cervical dilatation. During the observation period, the ewes were infused by 2 L of dextrose-saline (5%) per day. After that CS was performed immediately, if the cervical dilatation is failed.

Ethical approval

The current study procedures were approved by the College of Veterinary Medicine, University of Duhok.

Statistical analysis

Statistical analysis was conducted to consider the association between etiological factors. The effects of factors were analyzed by general linear models using GenStat software (GenStat 17th edition, 2014). The initial data on dystocia was transformed into percentage. The logistic regression then used to determine the effect of factors on dystocia. The results were offered as a percentage and a P. value greater or equal to 0.05 was used to estimate significant differences among factors. Subscript letters were used to indicate significant differences between factors. This study was permitted and accepted by the ethics committee of college of veterinary medicine and surgery at Duhok University.

Results

Close inspection of pregnant animals during late stage of pregnancy and parturition is essential for timely interference. Early diagnosis and interference in dystocia cases could results in a satisfactory outcome for dam and neonate. The study involved 86 sheep suffering from dystocia; the incidence of dystocia increased toward the end of calendar

year and reaches highest prevalence at the beginning of year, where the temperature and day light reduced. The highest rate ($p \leq 0.05$) was recorded on January (32.56%), followed by February (24.42%) and December (20.93%), however, the lowest rate was reported on September (2.32%); (Table 1).

Table 1: Frequency of dystocia in sheep delivered during each calendar month.

	Sept	Oct	Nov	Dec	Jan	Feb	Total
No.	2	5	12	18	28	21	86
Percentage	2.33%	5.81%	13.95%	20.93%	32.56%	24.42%	100%



Significantly higher ($P \leq 0.001$) number of fetal related causes of dystocia was observed (70.93%) compared to the maternal causes (29.07%); (Table 2). Furthermore, most common fetal causes of dystocia (Table 3) in the current study were maldisposition 37 (60.66%), twinning 13 (21.31%), oversized fetus 7 (11.48%) and monster 4 (6.55%).

Table 2: The rate of dystocia in sheep caused by maternal and fetus.

Causes	No.	Percentage	P. value
Maternal	25	(29.07%)	<0.001 ref
Fetal	61	(70.93%)	<0.001
Total	86	100%	Chi. Pr. <0.001

Table 3: Frequencies of specific fetal causes of dystocia in ewes.

Fetal Causes	No.	Percentage (Fetal Dystocia)	Percentage (Total Dystocia)	P. value
Malpresentation	37 ^a	60.66	43.02	<0.001 ref
Twinning	13 ^b	21.31	15.12	<0.001
Fetal oversize	7 ^{bc}	11.48	8.14	<0.001
Monsters	4 ^c	6.55	4.65	0.001
Total	61	100	70.93	Chi. Pr. <0.001

The prevalence of maternal causes of dystocia (Table 4) was considered as incomplete cervical dilatation (ring womb) 14 (56.0%), narrow pelvis 6 (24.0%), uterine inertia 3 (12.0%) and toxemia 2 (8.0%).

Table 4: Frequencies of specific Maternal causes of dystocia in ewes.

Maternal Causes	No.	Percentage (Maternal Dystocia)	Percentage (Total Dystocia)	P. value
Ringworm	14 ^a	56.0	16.28	<0.001 ref
Narrow pelvis	6 ^b	24.0	6.98	0.082
Uterine Inertia	3 ^b	12.0	3.49	0.010
Toxemia	2 ^b	8.0	2.33	0.015
Total	25	100	29.07	Chi. Pr. 0.004

In general the highest percentage of dystocia were due to the malpresentation followed by ring womb and multiple birth (Table 5). In terms of dystocia management, various methods were employed; obstetrical management, using manual removed of fetus and using hormones with manual traction, was used in 59 (68.60%) cases. Whereas the caesarian section required in remaining 27(31.4%) cases of dystocia (Fig 1).

Table 5: Total prevalence of causes of dystocia in sheep

General causes	Specific causes	No.	Percentage	P. value
Maternal Causes No= 25	Ringworm	14 ^b	16.28	0.002
	Narrow pelvis	6 ^{bc}	6.98	<0.001
	Uterine Inertia	3 ^c	3.49	<0.001
	Toxemia	2 ^c	2.33	<0.001
Fetal Causes No= 61	Twinning	13 ^b	15.12	0.001
	Fetal Oversize	7 ^{bc}	8.14	<0.001



	Malpresentation	37 ^a	43.02	<0.001 ref
	Monsters	4 ^c	4.65	<0.001
	Total	86	100	Chi. Pr. <0.001

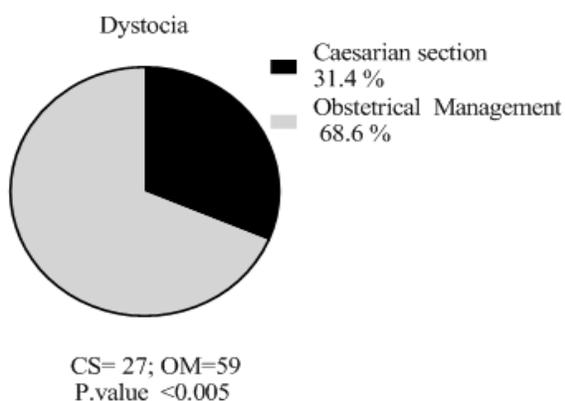


Figure 1: Managemental Methods used for delivery of fetus during dystocia in sheep.

Dystocia management or manipulations were performed in 86 cases of dystocia. In case of ring womb, only cervix of 4 out of 14 cases, are dilated following administration of Estradiol benzoate and cloprostenol sodium (250 µg) and fetuses have been removed within 12 to 15 hours. However, the other 10 ewes failed to respond to treatment and animal were subjected to surgical treatment CS. Manual traction was able to deliver 55 (63.95%) fetuses from 72 ewes and other 17 cases required CS (Table 6).

Table 6: Efficiency of dystocia treatments in sheep

General Technique	Specific management	No.	No.(Percentage) Responsive cases
Obstetrical Management N=86	Hormonal and manual traction	14	4 (4.65%)
	Manual traction	72	55 (63.95%)

The total cases (10 cases unsuccessful Hormonal and manual traction and 17 cases manual traction unproductive) required CS was due to the incomplete dilatation of cervix 10 (11.63%), fetal maternal disproportion or

narrow pelvis 6 (6.98%) and manual traction was unsuccessful in 11(12.8%) cases (Table 7). The surgical operation performed in left ventrolateral or oblique site was found to be more advantageous than other surgical sites.

Table 7: Efficiency of caesarian section (CS) treatments in 86 sheep dystocia

General Technique	Specific causes	No.	(Percentage) Responsive cases
Caesarian section (CS)	Ring womb	10	(11.63%)
	Narrow pelvis	6	(6.98%)
	Unsuccessful manual traction	11	(12.8%)

The incidence of dystocia in mother with multiple fetuses was 21 (24.42%), and it was 65 (75.58%) in ewes carried one fetus. In term of gender, dams carrying male fetuses (63.55%) had higher percentage ($p \leq 0.05$) of

dystocia compared to the opposite sex (female, 36.45%). Live fetus was recovered in 44 (41.12%) cases and dead fetus was 63 (58.88%) cases (Table 8).



Table 8: Data concerning ewe delivery and lamb.

Parameters	Type of delivery	No. of cases	Percentage of lamb	Percentage of ewes lambing	P. value
Type of delivery	Single	65	60.75%	75.58%	<.001
	Twin	21 (42)	39.25%	24.42%	
Type of sex	Male	68	63.55%	64%	0.011
	Female	39	36.45%	36%	
Mortality of lambs	Alive	44	41.12%	39.53%	0.054
	Dead	63	58.88%	60.47%	

Discussion

Sheep and their birth survival presented for management of dystocia regardless whether the case are treated surgically or manually is depended on animal clinical status. Prolonged gestation length and mismanagement of cases by inexperienced one will lead to worsening of the clinical status of animals. People in Kurdistan region of Iraq, mainly keep small ruminants for meat and milk purposes. In this research, higher dystocia cases were found in the December, January, and February, where these months considered as a season of parturition. Birth difficulty is usually originated either from maternal or fetal origin (4). The majority of dystocia cases 61 (70.93%) was fetal origin, including malpresentation, oversize fetus, monsters and twinning. Similar results to those presented in this study are recorded by (11,22). However, and in contrast to the results in the current study Scott, (2005) reported that more dystocia cases are originated from maternal causes in Saudi Arabia. The high frequency of dystocia resulted from fetal causes are attributed to the high rate of multiple birth in ewes. Furthermore, malnutrition and poor management during pregnancy period may exacerbated by fetal size in primiparous ewes (4,11). Failure of cervical dilatation (Ring

womb) was recorded as the main maternal causes of dystocia. The available publication showed that the frequency of ring womb ranged from 20 to 30% of all dystocia cases (4,23) and may be increased up to 50% (24). The main causes of incomplete dilatation of cervix is still unclear, but it has been suggested that insufficient of collagen softening hormones or tissue collagen response to hormonal secretions are mechanism of its occurrence (17). Sereval factor such as enzymatic breakdown of collagen, inflammation as well as hormonal regulation interact to ripening the cervix (25). The predisposing factors such as calcium and phosphorus deficiency, mineral or hormonal imbalances and uterine inertia have been incriminated in cases of ring womb (8). Cervical dilatation failure mainly associated with multiparous ewes bearing multiple fetuses, however, age, breed or body condition are not considered as a predisposing factors (26,27). The incidence of ring womb could be genotype dependent, study revealed that ewes carried this genotype serviced by carrier ram could incese the incidence of ring womb (28). Out of forty cases of ring womb only four cases (28.57%) were dilated after treatment with estradiol benzoate (3mg) and cloprostenol



sodium (250 µg). Earlier report indicated that the achievement rate of PGF2 α treatment in incomplete dilatation of cervix was about 68 % (29). Cases of dystocia can be managed or treated by several ways either manually, medically or surgically (30,31,32). It has been suggested that in case of small pelvic diameter particularly in small ruminants, the manual manipulation of the fetus and its possibility to relieve dystocia were limited (33). The primary safe techniques to relieve dystocia were the correction and traction of the fetus. In agreement with previous study (34), most of dystocia cases (63.95%) in current study were handled using manual traction. The failure of non-surgical techniques or manual assistance of birthing would direct our attention to other surgical techniques caesarian section (CS). In the current results, less than a one third of the dystocia were delivered surgically when the vaginal delivery is not indicated or impossible and CS are the only option to manage the cases (35). The surgical line infiltration site employed in the previous dystocia cases resulted in effective anesthesia. This analgesia technique for CS is frequently used by other researchers (32,36,37). Although, the least challenging technique involves extra local anesthetic volume (4,38). Caesarean section was conducted through the left paralumber approach in animals were in the lateral recumbency. It assists exteriorization of the gravid horns, mainly with oversized fetus and to reduces contamination of abdominal cavity (32,39). In term gender, ewes carried male fetus had significantly higher prevalence of dystocia compared to ewes bearing female fetus. Similar findings were reported in sheep (40) and cattle (41). The gender variation could

be due to larger birth size and heavier birth weight of male fetuses compared to female fetuses (10). Prolonged delivery and dystocia directly affect the survival rate of both ewe and fetus. The consequences are increase risk of circulation compromise and asphyxia, it could lead to central nervous system lesion due to lack of oxygen (10). The low rate of fetal survivability or higher mortality rate could be correlated to unnecessary delay in presentation of the dystocia cases. Furthermore, most cases of dystocia were unnoticed by owners. It has been recommended that sheep and goat mothers should be referred for veterinarian support within two hours from the beginning of the second stage of parturition labor, if there is no progress in birthing (6).

Conclusions

In conclusion, dystocia sheep should be considered as an emergency cases and animal should be presented for obstetric treatments immediately in order to save both dam and newborn. The effectiveness of treatment types for delivering lambs in dystocia depend on the dystocia type and causes of birth difficulty. Fetal dystocia was more common than maternal dystocia. Further genetic researches may be required to identify the best ways of preventing and reducing the frequency of dystocia in small ruminant.

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Conflict of interest

The present study was declared with no conflict of interest.

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