

Case Report

A case study of dystocia and abortion in Angora goats

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Abstract

This observational study investigated the incidence of dystocia over 3 years in a commercial Angora goat herd and the occurrence of spontaneous abortion in 1 year. The does ($n = 41-127$) were grazed extensively and were shedded overnight during late pregnancy for shearing. Incidence of doe mortality ($\leq 3\%$) and assisted dystocia delivery ($\leq 9\%$) were lower in 2022 and 2023; in 2024, doe mortality (13.4%) was associated with a high rate of abortion and dystocia (19.7%) in the first week of the predicted kidding period. Abortion in very late pregnancy in 2024 increased doe mortality due to their inability to expel dead, decomposing full-term kids. Although the cause of abortion was not established, stakeholders should be aware of the high risk of abortion with Angora does from noninfectious causes.

Keywords: Dystocia, mortality, abortion, pregnancy, nutrition

Background

High rates of abortion are a potential risk in goat reproduction in many breeds,¹ particularly in Angora does.² Abortion in goats has been associated with infectious³ and noninfectious causes.^{4,5} Undernutrition is reported to be a key noninfectious cause of abortion, with low blood glucose, low body condition score, and mineral deficiencies being risk factors for high rates of abortion ($> 50\%$).^{5,6} Undernutrition in late pregnancy has also been associated with lack of viability in live-born kids.⁷

Although abortion can occur at any stage of pregnancy, it is more common from days 90 to 120 of pregnancy.² This is consistent with increased placental sensitivity to high peripheral cortisol concentrations from days 101 to 125 (compared to other periods of pregnancy), wherein high cortisol may result in abortion after 36 hours of restricted nutrition and stress due to transport.⁸ Inadequate nutrition increases fetal cortisol, promoting regression of the corpus luteum (sole source of progesterone in goats) with subsequent abortion.⁹ Failure of corpora lutea to produce progesterone results in loss of pregnancy in does within 2 days, although if > 1 corpus luteum is present, pregnancy may continue for varying periods.¹⁰ Short-term events such as cold snaps, transport or shearing of Angora does therefore create a risk of abortion due to an induced period of fasting.^{2,11}

Although the occurrence of abortion in goats is well documented,^{1,2,4} the occurrence in late pregnancy and implications

on fetal death, dystocia, and doe mortality are not. This study reports observations of an abortion event and the associated incidence of dystocia, and contrasts with previous years dystocia incidence.

Case presentation

This study used historical data from a private farm so was exempt under the Charles Sturt University Animal Ethics Committee (project 2024EA-17). Retrospective kidding records were obtained for an Angora herd in southern Australia, managed under extensive grazing conditions. Mixed-age (1.5-8.5 years) does were typically mated in early May for 6 weeks; vaccinated against clostridial diseases annually, drenched as required to manage gastrointestinal worms, and managed to maintain does in a target condition score 3/5¹² through regular physical assessment. The goat herd did not have any known history of abortion, and there had been no introduction of new goats nor contact with other goat herds since 2022.

Shearing in each year was conducted in February to April then again in late September during late pregnancy by competent, professional shearers using electric handpieces in a shearing shed. No other procedures were undertaken on does at September shearing. For the September shearing, does were shorn on day 143 from buck introduction in 2022 and 2023 after a single overnight fast (with no access to feed and water for $\sim 16.5-20.5$ hours). In 2024, does were mated from May 7,

2024, and were due to commence kidding on October 4. Does were shedded overnight with no feed or water on 2 occasions prior to shearing; on day 140 from buck introduction (due to the threat of rain) and again on day 144 from buck introduction (immediately prior to shearing). Does were shedded for < 20 hours on each occasion and were grazing ample green pasture (estimated 1,500 kg DM/ha) such that nutrition was only limited by fasting while shedded. The pasture in 2024 was primarily lucerne (*Medicago sativa*) and annual grasses (mostly barley grass – *Hordeum leporinum*) with no known toxic plants. Grain supplements were not required; mineral supplements were not offered due to no known soil mineral deficiencies in the region. Does were inspected daily after shearing and throughout the kidding period, with some kids tagged and weighed at birth. Full kidding records were available for the 2 previous years.

No samples from aborting goats were collected for laboratory testing due to the owner not initially recognizing elevated rates of dystocia with an abortion storm. The owner had > 40 years of experience in commercial sheep management and assisting dystocia in ewes.

Outcome

After pre-kidding shearing in 2024, no clinical signs consistent with pregnancy toxemia were observed and does appeared healthy. Elevated rates of doe mortality and dystocia occurred in the first week of the kidding period (6-11 days after shearing) and days 150-155 after buck introduction. Out of 127 does, 17 does died and 16 surviving does needed assistance during the 6 weeks of kidding period (Table 1). Mortality of does was recorded as follows: euthanasia due to inability to deliver kids (6/17), euthanasia due to signs consistent with septicaemia with decomposing fetuses (2/17), euthanasia for gangrenous mastitis (2/17), dead pregnant does without kidding (3/17), and does dying after giving birth to live kids (4/17). A total of 24 does were assisted during kidding, with only 4 of the assisted does giving birth to live kids.

Commonly, dystocia was not associated with fetal parts evident at the vulva, but a malaligned fetus within the reproductive tract. Where the kid could be moved and presentation assessed, anterior presentation with one or both forelegs flexed and deviation of the head (head back, down or crown presenting) were the

most common forms of malposture in 2024 (Table 2). All fetuses were fully developed and appeared full-term. Most dead fetuses delivered in the first week of kidding were in advanced stages of decomposition with signs reported including dehydrated cloudy eyes, generalized edema, sloughing of mohair, brown to blue skin, brown amniotic fluid, and putrid odor. These signs are consistent with death occurring several days before, strongly suggesting abortion.¹³ Dead fetuses appeared to hamper delivery. For assisted does (where kids were delivered), 7 had single, 10 had twins and 1 had triplet. Live kids were born unassisted to 15 does in the first 4 days of the kidding period.

In comparison, shearing during late pregnancy was not associated with any perceived abortion event in either of the previous 2 years nor with abnormally high dystocia. In those years, the incidence of assisted delivery ($\leq 9\%$) and doe mortality (1-3%) were markedly lower than for 2024. Oversize kids were not considered a causative factor in any cases of dystocia in any year, with maximum birthweights of 3.7 kg (Table 2). The does were in better body condition (3.5-4/5 score) at kidding in 2024 than in previous years (3.0).

Discussion

Late-term abortions have been reported as presenting sometimes live fetuses, without mention of dystocia.¹¹ The

Table 2. Percentage malalignment of dystocia cases (number of does in brackets)

Particulars	2022 (%)	2023 (%)	2024 (%)
Head deviated	33 (1)	67 (4)	33 (6)
Both kids at once	0	17 (1)	11 (2)
One or both forelegs flexed	33 (1)	17 (1)	39 (7)
Posterior presentation	0	0	6 (1)
Breech presentation	0	0	11 (2)
Deformed fetus	33 (1)	0	0
Total number	3	6	18
Birthweight (kg)	1.5-3.2	2.2-3.3	1.8-3.7

Table 1. Percentage of does (number of does in brackets) assisted at delivery or dead for sequential intervals from the due date of kidding (day 150 after buck introduction)

Day of kidding	2022		2023		2024	
	Assisted (%)	Dead ^a (%)	Assisted (%)	Dead ^a (%)	Assisted (%)	Dead ^{a,b} (%)
-3 to -1	0	0	1.0 (1)	0	0	0
1-7	2.4 (1)	2.4 (1)	4.0 (4)	1.0 (1)	13.4 (17)	9.4 (12)
8-14	2.4 (1)	0	1 (1)	1.0 (1)	0.8 (1)	1.6 (2)
15-21	0	0	0	0	3.1 (4)	2.4 (3)
22-28	0	0	0	0	1.6 (2)	0
29-57	2.4 (1)	0	3.0 (3)	1.0 (1)	0 (0)	0
Total assisted or dead	7.3 (3)	2.1 (1)	9.0 (9)	3.0 (3)	19.7 (24)	13.4 (17)
Number of does in herd	41		100		127	

^ainclude euthanized at assisted delivery; ^binclude 2 does euthanized on days 11 and 19 due to gangrenous mastitis or cancer

occurrence of decomposing fetuses and their impact on the incidence of dystocia and doe mortality in the present study is therefore noteworthy.

Etiology of 2024 abortion storm reported here cannot be determined. Infectious causes cannot be excluded; however, with the herd history and the predilection for goats to abort after short-term nutritional stress events,^{2,11} a noninfectious (stressor related) etiology is a more likely explanation. There is clear evidence that nutritional restriction causes substantial abortions;^{5,14} restriction to 75% of maintenance requirement during late pregnancy caused 52% of does to abort 2 weeks after the change in ration.¹⁵ In comparison, Angora does fed to maintenance requirements have resulted in low rates of abortion (2%).¹⁴

It is unclear why abortion occurred in 2024 but not in previous years if the cause was the fasting/handling event, given does were always shorn during late pregnancy and subjected to fasting immediately prior to shearing. It is possible that the additional shedding event prior to shearing in 2024 may have provided an additive nutritional deprivation stress effect. Additionally, the good condition of does in 2024 may have contributed to the occurrence of abortion. If the shearing/fasting event was the cause, this is difficult to avoid during some stage of pregnancy, given Angora goats are often shorn at 6-month intervals. Since abortions can occur at any stage of pregnancy, management to reduce the risk would appear prudent and simultaneously reducing the risk of weather-induced abortion due to cold weather² that may be more likely when recently shorn (risk of hypothermia). Minimizing the period does are off feed when shedded for shearing and the provision of high-energy supplement immediately prior to shearing may reduce the risk and warrants further investigation.

Aggressive handling by humans has been reported as being associated with fetal loss in dairy goats.¹⁶ Although rough handling did not occur at shearing in the present report, the process of shearing and the presence of unfamiliar persons could be perceived by goats as highly aggressive. Similarly, a low social status has been associated with abortion.⁴ A low status may result in reduced access to feed leading to 'nutritional restriction abortion'. When shedded overnight for shearing, lower status does may be unable to escape from aggressive does, resulting in stress and increased movement for a prolonged period that possibly increases the risk of abortion.

Regardless of the cause of the abortion storm in 2024, the consequences of late-term fetal death on rates of dystocia and doe mortality were severe. Malalignment, particularly malposture, rather than excessive birthweights, caused dystocia in the event reported here. The alignment of fetuses involved in dystocia were consistent with reported patterns in other breeds.¹⁷ In extensively grazed herds with minimal monitoring to allow intervention in cases of dystocia, the level of doe mortality could be much higher after an abortion storm or fetal death without expulsion, than that reported here.

It is suggested that abortion in very late pregnancy may increase doe mortality due to does being unable to expel decomposing, term lambs that is less probable in mid-pregnancy due to the smaller fetal size. These larger dead fetuses could be more susceptible to malposture during parturition, as the fetus is unable to participate in the required actions to correctly engage in the birth canal resulting in dystocia and

likely death of the dam. Abortion cases near term may be confused with malalignment and dystocia, overlooking the opportunity to improve welfare and production through preventive management. The prevalence of abortion in does in Australia is unknown; nevertheless, veterinarians should be aware of the high risk with Angora does and consider both noninfectious and infectious causes as risk factors.

Strategies to manage dystocia in commercial herds need to focus on prevention. This will vary with the cause, such that in the case of a dystocia storm as reported here, laboratory analyses to diagnose infectious or noninfectious cause may allow appropriate current and future interventions. Since nutritional restriction is a potential cause, timing events earlier in late pregnancy may reduce the risk of fetal death causing dystocia along with minimizing the period of restriction. Where does must be yarded for several hours or overnight, the provision of an energy supplement such as lupin grain immediately before or during yarding may reduce the risk. In small herds, drenching with 50 ml propylene glycol may be a feasible option. However, this will only be beneficial if there is a nutrient deficit interaction inducing fetal compromise, as hypothesized in this case. Daily surveillance of does for 2 weeks after any handling or stress event may enable early detection of abortion or dystocia, and intervention (assistance or euthanasia) for the latter.

Learning points

- High rates of abortion are a potential feature of goat reproduction
- Rates of dystocia in goats can be increased after an abortion storm during late pregnancy
- Abortion cases near term may be confused with fetal malalignment and resulting dystocia
- Abortion storms may be associated with periods of stressors such as undernutrition and handling that could be ameliorated by appropriate surveillance and management
- Dystocia was associated with malposture rather than over-size kids in all years

Conflict of interest

None to declare.

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