

Acquired reproductive tract abnormalities of ewes in northwest of Iran: an abattoir survey

Saberivand, A.^{1*} and Haghighi, M.²

¹Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran;

²Graduated from Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran

*Correspondence: A. Saberivand, Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran. E-mail: adel64ir@yahoo.com

Summary

Reproductive abnormalities cause major losses of sheep production. Abattoir materials were used to determine the extent of reproductive wastage. Reproductive tracts were collected from 524 ewes slaughtered at Urmia slaughter-house in Urmia, northwest of Iran, during a period of 12 months. Overall, 30.10% of the ewes examined were pregnant. A total of 149 (28.44%) tracts developed acquired reproductive tract abnormalities. Based on the observation of the tracts, abnormalities of the ovaries, ovarian bursa and uterine tubes and uterine lesions accounted for 11.41%, 21.48% and 67.11% of the lesions, respectively. The most common ovarian lesion was ovario-bursal adhesions (47.06%). Uterine tube obstruction was the most common uterine tube abnormality (8.07%). Pyometra (8.07%), uterine hemorrhage (6.73%) and endometritis (4.04%) were the most common abnormalities observed in the uterus. Two tracts (0.9%) contained macerated fetal remnants. A large number of tracts (16%) had melanin pigment in the uterine wall. It is concluded that, firstly, the large number of pregnant ewes slaughtered highlights significant economic losses. Secondly, lesions such as hydrosalpinx, pyometra and metritis were likely to affect female sheep reproduction. The acquired abnormalities were therefore more significant in terms of individual animal infertility than as a major cause of infertility in flocks.

Key words: Abnormalities, Female reproductive tract, Ewe, Infertility

Introduction

Sheep production is as important as agronomy production for economy of the studied area (northwest of Iran). Abattoir material has previously been used to allocate the extent to which reproductive wastage reduces production efficiency in Iran (Emady, 1976; Talebzadeh, 1994; Piroozpanah, 1996; Haghighi, 2002) and elsewhere (Emady *et al.*, 1975; Alostha *et al.*, 1998; Goossens *et al.*, 1998; Smith *et al.*, 1998; Smith *et al.*, 1999). These have produced interesting but highly variable results ranging from null (Arthur, 1956) to 23.3% (Winter and Dobson, 1992) of tracts having abnormalities.

The present study was carried out to obtain more accurate information on the abnormalities of the ovine female reproductive tract over a period of 12 months in Urmia slaughter-house in Urmia, northwest of Iran.

Materials and Methods

Between October (2000) and September (2001), reproductive tracts collected from 524 ewes slaughtered in Urmia abattoir in Urmia, northwestern Iran. Almost all animals slaughtered in Urmia abattoir reared under a tribal husbandry system. Consequently, many different breeds of sheep were handled. Most of the ewes slaughtered in this abattoir were at least 2 years old. Material collection took place at least twice a month for a whole year period. All tracts were taken to the laboratory and inspected for pregnancy and any apparent abnormalities. The specimens were divided into pregnant and non-pregnant groups. In the pregnant group, after recording the measurements of different parts of the tracts, the uterine horns were carefully opened. The number and distribution of fetuses were compared with the number of the corpora lutea. The approximate age of the fetuses was estimated by measuring the crown-rump length (Arthur *et al.*, 2001).

Details of the colour, shape and size of the reproductive organs as well as gross

abnormalities were recorded. The tracts in which the lesions were not readily identifiable by gross examination and those in which the presence of novel or rare conditions was suspected (40 tracts) were selected for histological examination. Specimens were fixed in 10% formalin and stained with Haematoxylin and Eosin.

All tracts were then incised along the longitudinal axis of the cervix, uterine body and uterine horns. Gross examination of 485 tracts was performed. Uterine tube patency was assessed using a water-soluble dye. The uterus was manually clamped 1 to 2 cm below the utero-tubal junction to prevent retrograde flow of dye through the cervix. Free flow of dye through the fimbria following its injection into the uterine lumen was considered to indicate patency. Follicles were regarded as cystic if their diameter exceeded 10 mm and as luteinised if they had a thick wall with characteristic yellowish luteinised tissue within the wall of the cyst (Winter and Dobson, 1992).

Results

A total of 524 tracts were examined of which 39 tracts were excluded due to injuries of the slaughter-house dressing process and/or immaturity of the tracts (reproductive tracts of prepubertal animals). Among 485 tracts examined, 146 (30.10%) were pregnant, 125 (85.61%) had single pregnancies, 58 (46.40%) fetuses were located in the right uterine horn and 67 (53.60%) in the left. Twenty-one (14.38%) ewes had twin pregnancies.

A total of 51 (14.30%) pregnant ewes were in the early stages of gestation (<51 days), 81 (55.10%) were in mid-gestation (days 51 to 100) and 15 (10.20%) were in late gestation (>day 100). The total number of abnormalities observed in 485 ewes was 149 (28.44%).

The pathological conditions encountered in ovaries are presented in Table 1. Ovarian follicular cysts were observed in 2 (11.76%) cases, both formed on the right ovary. The cysts typically do not have an ovulation point and are lined by granulosa cells (Alosta *et al.*,

1998). Luteal cysts were diagnosed in 2 (11.76%), which were equally distributed in both ovaries. Luteal cysts do not have an ovulation papilla and are lined with a connective tissue layer and the theca is luteinised (Alosta *et al.*, 1998).

Eight (47.06%) tracts examined had ovario-bursal adhesions; 12.50% of these were in the left side, 37.50% were on the right side and 50% were bilateral. The severity of the adhesions varied from few fibrin strands between the ovary and mesosalpinx to complete adhesions involving the entire ovary and part of the urinary bladder surface.

In two tracts (11.76%), peri-ovarian abscesses were observed; one on the left and the other on the right side. Ovarian hematoma was found in two cases (11.76%), only on the left side.

Lesions of the ovarian bursa were common. As indicated in Table 2, uterine tube obstructions recorded in 18 (56.25%) tracts, 3 cases bilateral and 15 cases unilateral in which 5 were on the right and 10 on the left. Two (6.25%) cases of uterine tube obstructions (all on the left) also coincided with uterine infections. Four tracts (12.50%) had also uterine tube obstructions coincided with adhesions to the surrounding tissues.

Salpingitis was diagnosed in 3 (9.37%) of the tracts, all of which were unilateral (2 on the right and one on the left). Two (6.25%) cases of unilateral hydrosalpinx were observed (one on each side). Pyosalpinx was recorded in 3 tracts (9.37%) (two on the right and one on the left).

Of 100 uterine abnormalities, endometritis occurred in 9 (9%) tracts; metritis was evident in 3 (3%) tracts; pyometra occurred in 18 (18%) ewes and a corpus luteum was present in all of them. The uterine hemorrhages were observed in 15 (15%) tracts. Three of the tracts had their caruncles adhered to each other. Macerated fetuses were found in 2 (2%) tracts; one of which had the fetus remnants in the vagina and the cervix accompanied with vaginitis and cervicitis. *Cysticercus tenuicollis* cysts were attached to the uterus and the uterine

Table 1: Frequency of ovarian abnormalities of sheep

Abnormalities	Percent (n)	Right (%)	Left (%)	Both sides
Follicular cysts	11.76(2)	100	-	-
Luteal cysts	11.76 (2)	50	50	-
Ovario-bursal adhesions	47.06 (8)	37.50	12.50	50
Ovarian hypoplasia	5.90 (1)	100	-	-
Ovarian hematoma	11.76 (2)	-	100	-
Peri-ovarian abscesses	11.76 (2)	50	50	-
Total	100 (17)	-	-	-

Table 2: Frequency of uterine tubes abnormalities of sheep

Abnormalities	Percent (n)	Right (%)	Left (%)	Both sides
Uterine tube obstruction	56.25 (18)	27.78	55.55	16.67
Hydrosalpinx	6.25 (2)	50	50	-
Salpingitis	9.38 (3)	66.67	33.33	-
Pyosalpinx	9.38(3)	66.67	33.33	-
Obstruction and uterine infections	6.25 (2)	-	100	-
Obstruction and adhesion	12.50 (4)	25	25	50
Total	100 (32)	-	-	-

tubes of 4 tracts. Deposition of melanin pigment was observed in 36 (36%) of tracts.

Discussion

In general, the validity of any abattoir survey must be considered in the interpretation of its results (Smith *et al.*, 1998). No doubt, the results of such a survey may have degrees of biases. A large number of ewes examined may have been culled for infertility, sterility or damage caused by lambing. A reasonable number of specimens were taken to ensure that the collected materials are as representative as possible of a population of sheep in the area during the whole year. So the incidence of abnormalities observed in ewes examined is most likely a reflection of the situation among cull animals, although it may be less representative of the whole population of the breeding ewes.

The reported number of 147 (36.40%) pregnant ewes in this study was less than those previously reported in Iran which ranged from 40.47% to 50.82% (Piroozpanah, 1996; Haghghi, 2002). However, it was much higher than the most rates reported in a number of surveys conducted overseas such as 10% (Alosta *et al.*, 1998), 3.37% (Smith *et al.*, 1999) and 4.7% (Emady *et al.*, 1975). The greatest rate for ewes that were pregnant at the time of slaughter was 60% reported by Goossens *et*

al., (1998) in the Gambia.

Since we had no access to the history of the ewes examined, all underdeveloped (those not reached puberty) tracts were considered as immature tracts. The possible reason may be some congenital or acquired factors such as parasitic diseases.

Totally, 485 tracts were examined in this study of which 149 (28.44%) had one or more macroscopic pathological abnormalities. This is almost four times higher than that reported from Ireland (Alosta *et al.*, 1998). Smith *et al.*, (1998) observed an average of 3.32% pathological abnormalities in cull and nulliparous ewes. Several studies have reported very much lower rates of pathologic abnormalities of ovine reproductive tracts, 3.32% as reported by Smith *et al.*, (1998) and 9.4% by Alosta *et al.*, (1998). However, Adams (1975) and Winter and Dobson (1992) have reported 50% and 23% reproductive abnormalities, respectively, in ewes. The lowest reported reproductive abnormality rate in ewes was 0.72% (Emady *et al.*, 1975).

The variation in the rate of pathological abnormalities in this study may be due to the age of the sheep. As Smith *et al.*, (1998) indicated, pathological conditions of reproductive tract were higher in adult (6.57%) than in nulliparous ewes (1.95%).

A rate of 3.59% ovario-bursal adhesions observed among all ovarian abnormalities, indicates that it is one of the important

abnormalities in the ovary and may occur following any infection of reproductive tract.

The incidence of 2.68% ovarian cysts is slightly more than the range (0.15%-2%) reported by others (Emady, 1976; Alosta *et al.*, 1998; Smith *et al.*, 1999). However, it may be an indicator of infertility problems in the region. The most probable causes of ovarian cysts are malnutrition and hormonal disorders. Nevertheless, the importance of ovarian cysts in ewes is not well-established (Winter and Dobson, 1992).

Uterine tubes abnormalities accounted for 14.35% of the total acquired abnormalities. Uterine tube obstruction alone and coincided with uterine infection and adhesions to surrounding organs occurred in 56.25%, 6.25% and 12.5% of cases, respectively. A total of 6.25% of hydrosalpinx was detected in the ewes. It can arise in several ways, as sequel to salpingitis, as a result of external pressure from cysts or possibly as a result of congenital abnormalities.

Uterine abnormalities were the most frequently noted macroscopic abnormalities in ewes in our study. From the uterine pathologic conditions, pyometra (18%), uterine hemorrhages (15%) and endometritis (9%) were the most frequent disorders, respectively. These conditions usually occurred following retained placenta and abnormal parturition, which highlights a poor reproductive management. They often prohibit pregnancy of the animal and if left untreated can extend to other parts of reproductive tract even to other members of the flock. Usually, melanin deposition on uterine caruncles occurs and they may cause darker appearance of uterus and uterine horns.

It is concluded that acquired abnormalities of the reproductive tract is primarily caused (directly or indirectly) by uterine infections such as pyometra, endometritis, salpingitis and pyosalpinx. The second most important causes are nutritional deficiencies and parasitic infestations. These can readily be controlled by improving management and health in the property. Hormonal imbalance is also a causative factor for abnormalities of reproductive tract. Based on this information the following suggestions are made to reduce the

incidences of reproductive abnormalities:

Since sheep is a seasonal breeder, the preventive measures should be made before the breeding season. Only those ewes are bred that previously were examined by relative methods such as ultrasound scanning for any reproductive tract abnormalities. Any weak and infertile ewe should be culled. Apply selection criteria using sound and registered rams. Finally, the manipulation of the reproductive tract should be minimized while handling dystocia in the ewes.

Pregnancy testing should be undertaken to prevent slaughtering of pregnant ewes. Although a low budget may force the farmers to send animals to the slaughterhouse, an extensive questionnaire survey should be conducted to confirm it.

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References

- 1- Adams, NR (1975). A pathological and bacteriological abattoir survey of the reproductive tracts of merino ewes in Western Australia. *Aust. Vet. J.*, 51: 351-354.
- 2- Alosta, RA; Vaughan, L and Collins, JD (1998). An abattoir survey of ovine reproductive tracts in Ireland. *Therio-genology*. 50: 457-464.
- 3- Arthur, GH (1956). Data on sheep reproduction derived from abattoir material. *J. Comp. Pathol.*, 66: 345-355.
- 4- Arthur, GH; Noakes, DE and Pearson, H (2001). Pregnancy and parturition. *Veterinary reproduction and obstetrics*. 6th. Edn., London, Bailliere Tindall. P: 68.
- 5- Emady, M; Noakes, DE and Arthur, GH (1975). Analysis of reproductive function of the ewe based on post mortem examination. *Vet. Rec.*, 96: 261-266.
- 6- Emady, M (1976). Reproduction of the ewe and female goat in the province of Fars, Iran. *Vet. Rec.*, 99: 208-209.

- 7- Goossens, B; Osaer, S; Kora, S; Chandler, KJ; Petrie, L; Thevasagayam, JA; Woolhouse, T and Anderson, J (1998). Abattoir survey of sheep and goats in the Gambia. *Vet. Rec.*, 142: 277-281.
- 8- Haghghi, M (2002). Macroscopic and microscopic study of acquired abnormalities of ovine reproductive tract in Urmia slaughterhouse. A DVM thesis No. 697, submitted for the degree of DVM, School of Veterinary Medicine, University of Urmia, Iran. PP: 82-89.
- 9- Piroozpanah, SY (1996). Macropathologic study of ovine reproductive tract in Tabriz slaughterhouse. A DVM thesis No. 207, submitted for the degree of DVM, Faculty of Veterinary Medicine, Islamic Azad University of Tabriz, Iran. PP: 86-91.
- 10- Smith, KC; Long, ES and Parkinson, TJ (1998). Abattoir survey of congenital reproductive abnormalities in ewes. *Vet. Rec.*, 19(26): 679-685.
- 11- Smith, KC; Parkinson, TJ and Long, ES (1999). Abattoir survey of acquired reproductive abnormalities in ewes. *Vet. Rec.*, 144: 491-496.
- 12- Talebzadeh, MH (1994). Macropathologic study of ovine reproductive tract in Urmia slaughterhouse. A DVM thesis No. 107, submitted for the degree of DVM, School of Veterinary Medicine, Islamic Azad University of Urmia, Iran. PP: 85-96.
- 13- Winter, AC and Dobson, H (1992). Observations on the genital tract of cull ewes. *Vet. Rec.*, 130: 68-70.