Global Journal of Medical research
Veterinary Science and Veterinary Medicine
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Pregnancy Related Biometrical Changes in the Ovaries and Uterus of the Balami Sheep

By Alhaji Zubair Jaji, A.I. Akanmu, R.A.Buduwara, N. Elelu , E. Kigir , M.B. Mahre & B. Gambo
University of Ilorin, Nigeria

Abstract- A pregnancy related biometrical study was carried out on ovaries and uterus of the Balami sheep in Maiduguri, Nigeria, with the aim of documenting information on it. Dimensions of 10 non-pregnant and 30 apparently normal pregnant Balami sheep ovaries and uteri obtained from the Maiduguri Municipal abattoir were analyzed. The length, diameter, thickness and weight of left ovary showed no significant increase along the stages of gestation while only the length of the right ovary showed very significant ($p<0.01$) and extremely significant ($p<0.001$) increases during the second and third stages of gestation. The length and diameter of the left uterine horn showed levels of significant increases ($p<0.05$ – $p<0.001$) during the last two stages of gestation while those of the right uterine horn showed extremely significant increases ($p<0.001$) during these periods.

Keywords: *balami sheep, biometry, ovary, pregnancy, uterus.*

GJMR-G Classification : *FOR Code: WP 400, WC 900*

Strictly as per the compliance and regulations of:

Pregnancy Related Biometrical Changes in the Ovaries and Uterus of the Balami Sheep

Alhaji Zubair Jaji [α], A.I. Akanmu [σ], R.A.Buduwara [ρ], N. Elelu [ω], E. S. Kigir [¥], M.B. Mahre[§] & B.Gambo[χ]

Abstract- A pregnancy related biometrical study was carried out on ovaries and uterus of the Balami sheep in Maiduguri, Nigeria, with the aim of documenting information on it. Dimensions of 10 non-pregnant and 30 apparently normal pregnant Balami sheep ovaries and uteri obtained from the Maiduguri Municipal abattoir were analyzed. The length, diameter, thickness and weight of left ovary showed no significant increase along the stages of gestation while only the length of the right ovary showed very significant ($p<0.01$) and extremely significant ($p<0.001$) increases during the second and third stages of gestation. The length and diameter of the left uterine horn showed levels of significant increases ($p<0.05$ – $p<0.001$) during the last two stages of gestation while those of the right uterine horn showed extremely significant increases ($p<0.001$) during these periods. The length of the uterine body showed extremely significant increase ($p<0.001$) towards the last two stages of pregnancy while the cervical diameter showed extremely significant increase during the last stage of gestation. It was concluded that in the Balami sheep, pregnancy does not seem have significant effect on the dimensions and weights of the left ovary but do have levels of significant increase ($p<0.01$ – $p<0.001$) in the length of the right ovary during the last two stages of gestation. Conversely, pregnancy has levels of significant effect on the dimensions of the horns, body and cervix of the uterusfrom mid gestation to full term.

Keywords: balami sheep, biometry, ovary, pregnancy, uterus.

I. Introduction

The domestic sheep, Ovis. aries, is a ruminant Chordate of the Bovidae, subfamily in the Artiodactyla, family, order Mammalia. It shares a common Class, Caparinae, and Phylogenetic origin, with the goat. (Geoffrey, et al., 2005).

Sheep have most likely descended from the wild Mouflon of Europe and Asia, one of the earliest animals to be domesticated for agricultural purposes (Sheep (2012). Sheep are important part of the global agricultural economy (Weaver, 2005).

Sheep are raised for fleece, meat (lamb, hogget or mutton) and milk. and continue to be important for wool and meat today. They are also occasionally raised for pelts, as dairy animals, or as model animals for science. Sheep husbandry is practiced throughout the majority of the inhabited world and has been fundamental to many civilizations (Sheep (2012).

Numbering a little over 1 billion worldwide, sheep are the most numerous species in their genus, Ovis. The population of sheep in the world is estimated at 1.3 billion flocks, Africa has 20 million flocks, about 3.4 million of which was estimated to be found in Nigeria (Geooff, et al., 2005; RIM 1992). According to FAOSTAT, 2012, the population of sheep in Nigeria is currently estimated at 33.9 million making up 3.1% of the world's total.

The Balami sheep is the largest native sheep in Nigeria and is favoured as a stall-fed breed by Muslims throughout the Nigerian Middle Belt. It is white and hairy with pendulous ears, a bulbous nose and a long thin tail: rams have a throat ruff and are homed but ewes are normally polled (Blench, 1995).

Reproductive performance is economically important in small ruminant because of its effect on the number of offspring produced per year (Greyling, 2000). To maintain a good reproductive performance a clear idea about the reproductive organs of small ruminant is necessary. The biometry of genital tracts of the female reveals the overall wellbeing of the animals. The knowledge of biometrical status of female genital tract is essential to perform artificial insemination, pregnancy diagnosis and dealing with infertility problems (Kunbhar et al., 2003) and its treatment (Kumar et al., 2004). The information on biometry of the reproductive tract of the pregnant Balami goat is rare in literatures. This present study aims at documenting information on the progressive biometrical changes in the ovaries and uterus during pregnancy in this breed of sheep.

II. Materials and Methods

These studies were carried out on uteri and ovaries of thirty pregnant and ten non-pregnant adult Balami sheep at the Maiduguri Metropolitan abattoir. The animals were apparently healthy, sexually matured and of varying ages (2 - 3½ years and above) and weights. The organs were collected immediately after slaughter.Scalpels and blades were used to incise, excise, separate and dissect the organs. Tanning coat and a superior tailoring rule (Butterfly Brand) were used to measure length and widths of uteri and ovaries. The ovarian thickness was measured using micrometer screw gauge (Mitutoyo Brand). Lengths of uteri and

Authors α, ¥: Department of Veterinary Anatomy, University of Ilorin, Nigeria.
e-mails: jajidvm@yahoo.com, jajidvm@unilorin.edu.ng
Authors σ, ρ, χ: Department of Veterinary Anatomy, University of Maiduguri, Nigeria.
Author ω: Department of Veterinary Public health, University of Ilorin, Nigeria.
Author §: Department of Veterinary Physiology, Pharmacology and Biochemistry, University of Maiduguri, Nigeria.

ovaries were measured in centimeters. Ovarian weights were measured in grams using electronic precision balance (Metra brand).

The 20 weeks gestation period of the Balami sheep was divided into three stages (6-8weeks, 8-14weeks and 14-20weeks).The stages of gestation were established, after measurements of the dimensions of the ovaries and uteri, by determining the age of fetuses associated with each pregnancy. This was done through comparing their crown-rump length and body weight measurements with those of the tropical ovine fetuses from the Maiduguri abattoir, as reported by Sivachelvan et al. (1996).

The length of either ovary was the distance between its anterior and posterior ends. The breath was the distance between its attached and free borders and the thickness, the distance between its medial and lateral surfaces. The length of the uterine body was the distance from the point of bifurcation of the uterine horns to the tip of internal os of the cervix and the breath was the greatest distance of its right and left walls. The length of the uterine horn was the distance from the middle of the point of bifurcation of the uterus utero-oviductal junction and the breath the distance between its right and left walls. The length of the cervix was the distance from the tip of internal os to the tip of external os of the cervix, and the breath the greatest distance of its right and left walls.

The differences between the above dimensions along the three periods of gestation were tested using the ANOVA from the computer statistical software, Graph pad Instat®, version 3.06, 32 bit for Windows.

III. Results

In the adult non-pregnant Balami ewe studied the ovaries (Figure 4.1) were observed to be almond in shape. In the pregnant ewe however, the ovaries were characterized with copora lutea that altered their size and form. The copora lutea were firm in consistency along the stage of gestation.

In adult non-pregnant Balami ewe studied, the left ovary measured 1.63+0.61cm in length, 1.43+0.32cm in diameter, 1.04+0.24cm in thickness and 1.04+0.34g in weight, while the right ovary measured 1.15+0.55cm in length, 1.35+0.38cm in diameter, 0.76+0.44cm to thickness, 0.79+0.38g weight. . The measurements of the left ovary showed no significant increase along the stages of gestation while only length of the right ovary showed very significant ($p<0.01$) and extremely significant ($p<0.001$) increases respectively during the second and third stages of gestation (Table1).

In the adult non-pregnant Balami ewe, the left uterine horn (figure1) measured 11.78+1.86cm in length and 3.56+0.70cm in diameter, while the right uterine horn measured 11.76+2.03cm in length and 4.07+1.81cm in diameter. . The length and diameter of the left uterine horns showed levels of significant increases ($p<0.05$ – $p<0.001$) during the last two stages of gestation while those of the right uterine horn showed extremely significant increases ($p<0.001$) during the said periods (Table1).

In the non-pregnant Balami ewe, the uterine body (figure 1) measured 8.67+1.21cm in length and 6.33+1.73cm in diameter. The length of the uterine body showed extremely significant increase ($p<0.001$)while diameter showed levels of significant increases ($p<0.01$ – $p<0.001$) throughout pregnancy (Table 1).

In the non-pregnant Balami ewe, the cervix measured 6.69+2.61cm in length and 2.22+0.93cm in diameter. The cervical diameter showed extremely significant increase during the last stage of gestation (Table 1).

Figure 4.1 : Photograph of the reproductive system of a of non-pregnant Balami ewe showing the ovaries (O) uterine horns (UH), Uterine body (UB) and Cervix (C).

Table1 : Pregnancy related biometrical changes in the ovaries and uterus of the Balami Sheep with good body condition scores in Maiduguri, Nigeria

Organs		Dimension (Mean ± SD)	Physiological state of ewe			
			Non-Pregnant	Pregnant		
				1st Stage	2nd Stage	3rd Stage
Ovary	**Left**	Length (cm)	1.63±0.61	1.63±0.34 ns	1.59±0.42 ns	2.04±0.62 ns
		Diameter (cm)	1.43±0.32	4.81 ±0.33 ns	1.22±0.46 ns	1.46±0.23 ns
		Thickness (cm)	1.04±0.24	1.11±0.34 ns	1.07±0.18 ns	0.59±0.63 ns
		Weight (g)	1.04±0.34	1.08±0.49 ns	0.74±0.23 ns	0.99±0.43 ns
	Right	Length (cm)	1.15±0.55	1.58±0.57 ns	1.85±0.29**	2.04±0.36***
		Diameter (cm)	1.35±0.38	1.39±0.52 ns	1.54±0.38 ns	1.51±0.29 ns
		Thickness (cm)	0.76±0.44	1.08±0.40 ns	0.81±0.40 ns	1.14±0.35 ns
		Weight (g)	0.79±0.38	0.94±0.33 ns	1.22±0.46 ns	1.04±0.37 ns
Uterine horn Left		Length (cm)	11.78±1.86	16.66±5.79 ns	23.59±0.45**	31.88±12.69***
		Diameter (cm)	3.56±0.70	8.43±3.54 ns	11.65±4.72*	19.22±6.83 ns
	Right	Length (cm)	11.76±2.03	15.42±5.02 ns	26.5±10.08***	26.65±6.82***
		Diameter (cm)	4.07±1.81	6.28±2.48 ns	13.8±2.93***	14.89±2.09***
Uterine body		Length (cm)	8.67±1.21	15.52±5.29 ns	23.5±8.73***	35.54±7.43***
		Diameter (cm)	6.33±1.73	14.36±4.67**	25.16±5.04***	30.94±5.46***
Cervix		Length (cm)	6.69±2.61	6.59±1.02 ns	5.5±1.31 ns	6.22±0.58 ns
		Diameter (cm)	2.22±0.93	2.42±0.45 ns	2.85±1.03 ns	4.69±0.91***

ns:Not Significant
*:Significant –P<0.05
**:Very Significant –P<0.01
***:Extremely Significant –P<0.001

IV. Discussion

In adult non-pregnant ewe studied, the ovaries were almond in shape. Ovaries of the pregnant ewe, were characterized with corpora lutea, which altered their size and form. The copra lutea were firm in consistency along the stages of gestation.The development and further increase in corpus luteum across the stages of gestation were associated with a significant increase in the overall size of ovaries in agreement with Smith (1986). The results of the length, diameter, of the present study of non-pregnant ewe show slight increase when compared with those of Hafez (1987). This may be due to breed related difference. Feeding of ewes on bush leaves, dry fodder or grasses with less supplemented feeds from two or three weeks of age have also shown to cause retarded growth and development of reproductive their tract (Obwolo, 1992). It can also be due to climatic effect of the first dry season when growth may be seriously retarded Oyeyemi et al (2001). The gravid and non-gravid right ovaries were larger in dimensions and heavier in weight as compared to left ones which confirms the fact of right ovary being more active than the left one, in agreement with Pineda (2003), as in doe (Gupta, 2011; Jaji et al. (2012) and cow (Pineda (2003). The left ovary is the most active in the camel (Jaji et al., 2010) and mare and sow (Pineda, 2003).

Just like in the doe (Jaji et al., 2012), the uterus of the ewe of the present study was observed to be of the bicornuate type. In the non-pregnant ewe, the length and diameter of the left and right uterine horn show a slight decrease when compared with those reported by Smith (1986). The increased length and diameter of the left uterine horns could be attributed to the increases in the fetal sizes and fluids associated with each stageof gestation as incamel (Jaji et al., 2010).There is no significant difference between dimensions of the left and night ovaries and uterine horns both in the pregnant and non-pregnant ewes. This could be attributed to twinning that is often associated with the ovine pregnancy, which engages ovary and horn of either side of the reproductive system of the ewe.

In non-pregnant ewe, the length and diameter of the non-gravid uterine bodyrecoded in this study were higher than the values recorded by Sisson and Grossman (1975). The discrepancy could be due to breed variation (Obwolo, 1992). The uterine body of the pregnant ewe, showed very significant increase in biometrical values during the three stage of gestation. These were attributed to the attendant increases in fetal

sizes and fluids associated with each stage of gestation as in camel (Jaji et al., 2010).

The length and diameter of the cervix of non-pregnant ewe show a slight decrease when compared to those recorded by Smith (1986) in the doe.The anatomy of the sheep cervix is highly variable between animals and may explain the differing success of transcervical Artificial Insemination between individuals (Keshaw et al., 2005). Breed, age, parity and physiological state influence the length of the ovine cervix. Themean length of the cervical canal has been described as, 6.5, 5.5 and 6.7 cm (Fukui Y & Roberts, 1978; Halbert, 1990; More, 1984) respectively and the length ranges from 5.7 to 10 cm (Abusineina , 1969) illustrating the high variabilitybetween individuals.

The results of this study have established the baseline data for the dimensions of the two vital organs in the reproductive system of the Balami ewe. This information will make diagnosis of the various abnormalities of these organs easier. More of such work on other local (Udder and Yankasa) and internationalbreeds need to be carried out for better understanding of reproduction in this species. Further histological studies need to be undertaken to determine the sequential histological changes during pregnancy in this breed, towards a better understanding of its reproductive anatomy.

V. Acknowledgement

The authors are grateful to the entire technical staff of the Department of Veterinary Anatomy, University of Maiduguri, for technical assistance.

References Références Referencias

1. Abusineina M.E. Effect of pregnancy on the dimensions and weight of the cervix uteri of sheep. Br Vet J 1969; 125:21–4.
2. Dellmann, H.D. and Eurell .J.A. (1998). Textbook of veterinary Histology Williams and Wilkins Paris.
3. FAOSTAT. Food and Agriculture Organization of the United Nations. FAOSTAT Database on Agriculture. Italy: Rome; 2011. [http://faostat.fao.org/default.aspx.] Geoffrey Miller, et al (April 2007). "Ovulatory cycle effects on Tip earnings by lap dancers (128): 375-381.
4. Greyling, J.P.C. (2000). Reproduction traits in the Boer goat doe. Small Ruminant Research, 36(2).171–177.Hafez, E.S.E. (1987) Reproduction in Farm Animals, lea and Febigari, Philadelphia, USA, Pp315 – 323.
5. Gupta M.D. Akter MM, Gupta AD & Das A (2011). Biometry of female genital organs of black bengal goat. International Journal of Natural Sciences, 1(1):12-16.
6. Halbert G, Dobson H, Walton J, Buckrell B. The structure of the cervical canal of the ewe. Theriogenology 1990; 33:977–92.
7. Hafez, E.S.E. (1987). Reproduction in farm animals, fifth edition (ed. E. S. E. Hafez), pp. 260-294. Lea and Febiger, Philadelphia.
8. Jaji A.Z. Kwari HD, Ribadu AY, Sivachelvan MN & Salisu T (2010). Pregnancy Related Biometrical and Histological Changes in the Dromedary Ovaries and Uterus. Nigerian Journal of Experimental and Applied Biology, 11(2):237-245.
9. Jaji, A.Z., Buduwara R.A., Akanmu, A.I., Zachariah, M., Luka, J. & Gambo, B. (2012). Pregnancy related biometrical changes in the ovaries and uterus of the sahelian goat. Sokoto Journal of Veterinary Sciences, Volume 10 (Number 1). June, 2012. http://dx.doi.org/10.4314/sokjvs.v10i1.4
10. Kelvin. D.P. (2006). Virginia Maryland Regional College of Veterinary Medicine. Retrieved April, 4th, 2012.http://www.sheepandgoat.com/articles/artificialfeedin.html/1234/2006.
11. Kershaw, C.M., Khalid, M., McGowan, M.R., Ingram, K., Leethongdee, S., Wax, G., Scaramuzzi, R. J. (2005). The anatomy of the sheep cervix and its influence on the transcervical passage of an inseminating pipette into the uterine lumen. Theriogenology 64 (2005) 1225–1235.
12. Kunbhar, H.K., Samo M.U., Memon A.& Solangi, A.A. (2003). Biometrical studies of Reproductive organs of Thari cow. Pakistan Journal of Biological Sciences, 6(4):322-324.
13. Kumar S., Ahmed F.A. & Bhadwal, M.S. (2004). Biometry of female genitalia of Murrah buffalo (Bubalus bubalis). Indian Journal of Animal Reproduction, 25(2):143-145.
14. Obwolo, M.J., (1992) Survey of the reproductive organ abnormalities of ewe in Zimbabwe Bull animal hitth. Prod. Afr., 40:85-86.
15. Oyeyemi, M.O., Akusu nd G.A.T. Ogundipe, (2001) Effects and Economic implications of different planes of nutrition on gestation periods and birth weight of West African Dwaf Goats. Trop. Vet., 19:210-215.
16. Pineda M.H. (2003). Female Reproductive System. In: McDonald's Veterinary Endocrinology and Reproduction (MH Pineda & MP Dooley, editors). Iowa State University Press, Iowa USA, Pp 283–321
17. Sheep (2012). Smallstock in Development.". Retrieved April, 4th, 2012 from http://www.smallstock.info/ breeds/sheep01.htm
18. Sissons and J.D. Grossman (1975) Anatomy of the Domestic animals, 5th ed. W.B. Saunders. Philadelphia USA, Pp: 953-954.
19. Sivachelvan M.N. Ghali M & Chibuzo G.A. (1996). Foetal age estimation in sheep and goats. Small Ruminant Research, (19)1:69-76.

20. Smith, M.C. (1986) Caprine reproduction. In current therapy in theriogenology, marrow, D.A. (ed) 2nd ed. W.B. Saunders publishers Philadelphia, USA, Pp577-579.
21. Weaver, S. (2005). Sheep: Small-Scale Sheep keeping for pleasure and profit 3 Burroughs Irvine, CA 92618: Habby farm press, an imprint of Bon Tie press, a division of Bontie inc. ISBN 1-931993-491.

This page is intentionally left blank