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Gross morphometric findings of udder and teat in Boer local she-goats

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Abstract

The objective of the present study was to assess the morphology and morphometric measurements in lactating and non-lactating (n=15 each) Boer local she goats. In both the groups, udder was located in the inguinal region. It consisted of two mammary glands (right and left halves) divided by an intermammary groove and each had a single teat. In Boer local she-goats, right and left teat length (TL) significantly differed between the lactating and non-lactating animals. Udder length (UL), width of right (R-UW) and left (L-UW) quarter, udder thickness (UT), udder circumference (UC), teat diameter at base (TDB), teat diameter at tip (TDT), inter-teat distance (ITD), teat to floor distance (TFD), teat end to floor distance (TEFD) does not shown any statistical difference between lactating and non-lactating animals.

Keywords: Gross morphometric, teat, Boer local she-goats

1. Introduction

The mammary gland is a modified cutaneous gland common to all female mammals. It is a milk-producing gland to nourish and protect neonate. It present in a rudimentary and non-functional state in male of most species. The mammary glands of eutherian species are simple or complex. The size, shape and position of mammary gland are species dependent [1].

Sheep and goat forms the most important group of milk-producing animals after dairy cattle in both temperate and tropical countries [2]. Boer local is a crossbred goat evolved by crossing local she-goats of kanchipuram district with Boer bucks in Post Graduate Research Institute in Animal Sciences, Kattupakkam. Literature about gross morphology and morphometry in various machine milked sheep and goat breeds is reported by several authors. But to best of our knowledge no such work has been carried out in Boer local she-goats of Tamil Nadu. The present study was aimed to assess the udder morphology and morphometric traits in lactating and non-lactating Boer local she-goats that are in semi-intensive system of rearing during manual milking.

2. Materials and methods

The gross morphometric measurements of udder and teat were taken from thirty healthy Boer local she-goats. Animals were divided into two groups based on physiological status as lactating and non-lactating (n=15 each) group. The gross anatomical parameters of mammary gland (Fig. 1) such as udder length (UL) (from base of the gland to the base of the teat along the intermammary groove, width of right (R-UW) and left (L-UW) quarter (distance between two lateral borders of the gland to the intermammary groove), udder thickness (UT) (the distance between cranial and caudal borders of the gland at base) and udder circumference (UC) at base were measured using measuring tape [3].

The gross anatomical parameters of teats viz., (TL) teat length (distance between base and tip), teat diameter at base (TDB), teat diameter at tip (TDT), the inter-teat distance (ITD) at the base was measured using a measuring tape and vernier caliper (Paramasivan, 2007). (TDB) Teat to floor distance (distance between the base of the teat to the ground) and (TEFD) teat end floor distance (distance between the tip of the teat to the ground) for both right and left teats was recorded by using measuring tape [4].

3. Results and Discussion

3.1 Udder

Gross morphometric parameters such as UT (cm), UL (cm), R-UW (cm), L-UW (cm) and UC(cm) in Boer local she-goat of both lactating and non-lactating animals were given in Table

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1. In Boer local she-goats, no significant difference ($P \geq 0.05$) in UC (cm) was observed between lactating (31.25 ± 1.36) and non-lactating (27.63 ± 1.42) groups. These findings were in agreement with findings in Chilota and Suffolk Down sheep breeds [5], in West African Dwarf goats [6] and in local goats of Rohilkhand [7]. In Boer local she-goats udder shape was in cylindrical. That leads to insignificant difference in UC between lactating and non-lactating groups.

No significant difference was observed in udder thickness (UT) between lactating and non-lactating groups, which is in accordance with the findings in ewes [8]. No significant difference was found in UL of lactating and non-lactating she-goats. UL (cm) was found to be more in Boer local she-goats

3.2 Teat

Various gross morphometric measurements such as ITD (cm), R-TFD (cm), L-TFD (cm), R-TEFD (cm), L-TEFD (cm), R-TL (cm), L-TL (cm), R-TDB (cm), L-TDB (cm), R-TDT (cm), L-TDT (cm) were recorded in lactating and non-lactating ewes and she-goat and the values were presented in Table 1.

A significant difference ($P \leq 0.05$) was observed between lactating and non-lactating animals with regard to teat length (R-TL and L-TL). This is similar to the findings in West African Dwarf goats [6].

No significant difference ($P \geq 0.05$) was observed with regard to ITD between the groups in she-goat. Distance between teats did not show any changes in the first six week of lactation, and after that size of the teat and inter teat distance reduced after the weaning of lambs (non-lactating stage) in Manchega and Lacaune sheep breeds [9]. This suggested that the productive capacity of the ewe is related to the distance between teats. The variation in the present study might be the result of species and breed difference.

Between both lactating and non-lactating groups, the teat floor distance revealed no significant difference. These

findings were in total agreement with the findings in West African Dwarf goats [6]. No significant difference was observed in teat end floor distance between lactating and non-lactating groups of she-goats. This is in agreement with the earlier findings of Venkatesan (2014) in cows. In both ewes and she-goats, no significant difference ($P \geq 0.05$) was observed in right teat diameter at base (R-TDB), left teat diameter at base (L-TDB), right teat diameter at tip (R-TDT) and left teat diameter at tip (L-TDT) between the lactating and non-lactating animals as reported in ewes [8].

Table 1: Mean \pm SE of various gross morphometric measurements in the udder of Boer local she-goats

Parameters (cm)	Mean \pm SE		t value
	Lactating (N=15)	Non-lactating (N=15)	
UT	13.50 \pm 0.65	12.67 \pm 0.78	0.28 ^{NS}
UL	14.43 \pm 0.61	12.70 \pm 0.45	2.13 ^{NS}
R-UW	8.43 \pm 0.44	7.70 \pm 0.51	1.06 ^{NS}
L-UW	8.00 \pm 0.37	7.83 \pm 0.41	0.30 ^{NS}
UC	31.25 \pm 1.36	27.63 \pm 1.42	1.80 ^{NS}
ITD	6.60 \pm 0.35	6.57 \pm 0.37	0.06 ^{NS}
R-TFD	35.95 \pm 1.23	34.10 \pm 1.39	0.99 ^{NS}
L-TFD	35.15 \pm 1.07	34.47 \pm 0.86	0.47 ^{NS}
R-TEFD	30.04 \pm 0.96	30.57 \pm 1.41	0.32 ^{NS}
L-TEFD	30.44 \pm 1.16	30.69 \pm 0.95	0.15 ^{NS}
R-TL	4.64 \pm 0.27	3.66 \pm 0.27	2.50**
L-TL	4.80 \pm 0.27	3.93 \pm 0.22	2.40*
R-TDB	1.37 \pm 0.09	1.29 \pm 0.06	0.73 ^{NS}
L-TDB	1.29 \pm 0.06	1.33 \pm 0.08	0.42 ^{NS}
R-TDT	0.82 \pm 0.02	0.77 \pm 0.03	1.17 ^{NS}
L-TDT	0.82 \pm 0.03	0.83 \pm 0.04	0.17 ^{NS}

^{NS} - No significant difference between lactating and non-lactating groups ($P \geq 0.05$)

* - Significant difference between lactating and non-lactating groups ($P \leq 0.05$)

** - Highly significant difference between lactating and non-lactating groups ($P \leq 0.01$)

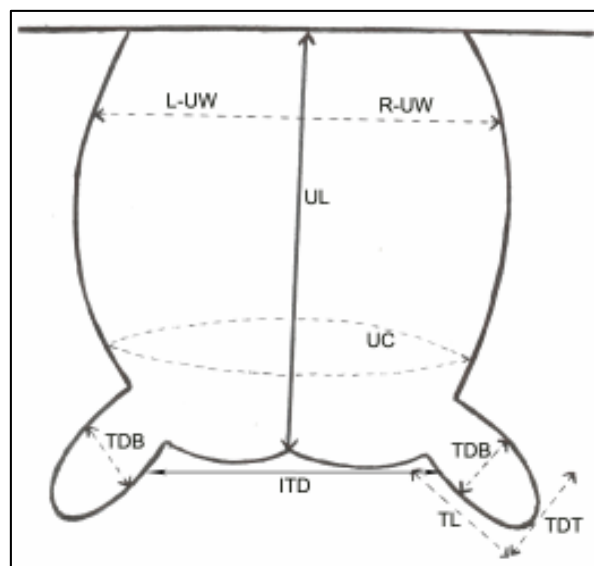


Fig 1: Schematic representation showing the method adopted in the measurement of various gross morphometric measurements [10]

ITD - Inter teat distance UC - Udder circumference
 TDB - Teat diameter at base UL - Udder length
 TDT - Teat diameter at tip L - UW - Left udder width
 TL - Teat length R - UW - Right udder width

4. Conclusion

Gross morphometric measurements in the udder and teat of lactating and non-lactating Boer local she goats was the pioneering study and will be used as a baseline data for conducting the more anatomical, physiological and pathological research works in various other breeds of goats.

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