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Anatomical Study of the Accessory Genital Glands in Males Sheep (*Ovis aris*) and Goats (*Caprus hircus)*

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Summary

The study revealed that the ampullae of ductus deferens(vas deferens), seminal vesicle and bulbourethral glands are paired in number and well developed in ram and buck except the prostate gland have only disseminated part surrounding the pelvic urethra (embedded in pelvic urethral wall) without body of gland. The anatomical parameters of the ampullae in ram are generally with mean length 4.98± 0.28cm,mean width 0.63 ± 0.04cm ,mean weight 2.24 ± 0.007gms and mean volume 1.4 ±0.03cm3.The seminal vesicle have mean length 3.68± 0.05cm, mean width 2.50±0.06cm ,mean weight 4.42± 0.15gms , mean volume 3.35±0.05cm3 .The bulbourethral gland have mean length 1.59± 0.36cm ,mean width 1.493±0.02cm ,mean weight 3.46±0.01gms ,mean volume 2.35±0.04cm3. The anatomical parameters of the ampullae in buck have mean length 4.87±0.29cm ,mean width 0.62±0.007cm, mean weight 2.18±0.007gms , mean volume 1.15±0.02cm3. the seminal vesicle gland parameters have mean length 3.61±0.01cm ,mean width 2.44±0.01cm, mean weight 4.18±0.15gms mean volume 3.05±0.04cm3.The bulbourethral gland parameters have mean length 1.58±0.005cm, mean width 1.46±0.006cm , mean weight 3.23±0.11gms and mean volume 2.05±0.03cm3.Generally the study did not observe any anatomical differences between the male accessory genital glands of ram and buck.

Key words: ovis aris, caprus hericus, ampullae, vas deferens, bulbourethral.

دراسة تشريحية للغدد التناسلية الملحقة في ذكور الاغنام المحلية (*Ovis aris*) والمعز المحلي (*Caprus hircus*)

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الخلاصة

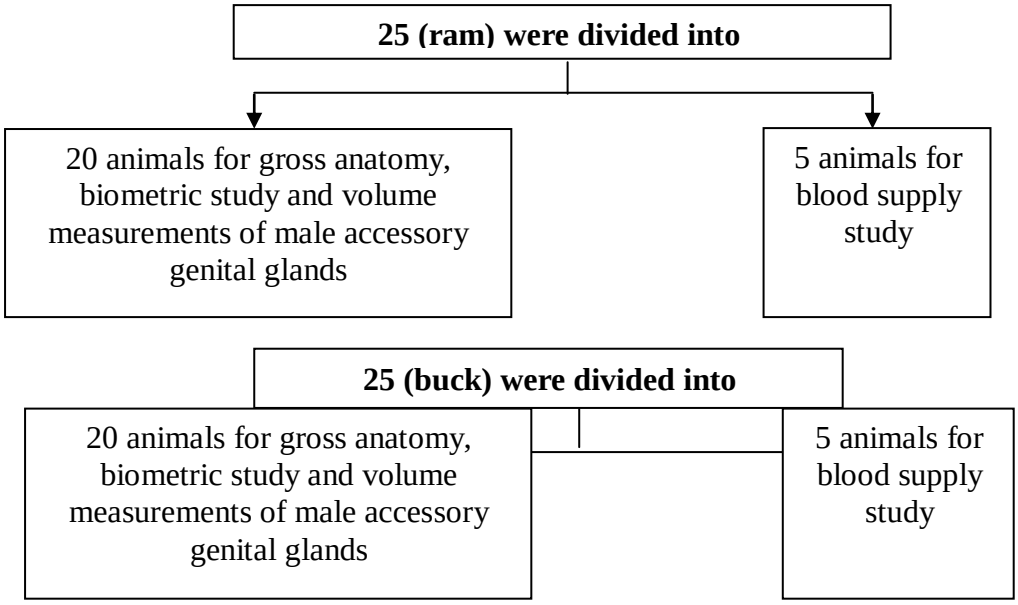
الدراسة بينت أن الجزء الغدي لأنبورة القناة الدافقة للمني (الاسهر) والحوصلة المنوية والغدة البصلية الاحليلية تكون مزدوجة (ثنائية) ومتطورة عدا غدة البروستات فتكون من النوع المنتشر حول الاحليل الحوضي (مغمورة في جدار الاحليل الحوضي) ولا وجود لجسم الغدة .وكانت القياسات التشريحية لأنبورة القناة الدافقة في الكبش كالأتي 0.06± 4.98 سم , ومعدل سعتها 0.04±0.63 سم بينما معدل الوزن كان 0.008±2.24 غم ومعدل الحجم 0.03± 1.4 سم3 اما القياسات التشريحية للحوصلة المنوية فكان معدل الطول 0.05±3.68 سم ومعدل سعتها 0.06±2.50 سم .ومعدل وزنها 0.15±4.42غم ومعدل الحجم 0.05± 3.35سم3 .اما القياسات التشريحية للغدة البصلية الاحليلية فكان معدل الطول 0.36±1.59سم.ومعدل سعتها 0.02± 1.49 سم ومعدل وزنها 0.01± 3.46 غم .ومعدل الحجم كان 0.04±2.35سم3. اما القياسات التشريحية في ذكور الماعز (التيس)فكانت في انبورة القناة الدافقة معدل الطول 0.29±4.87 سم ومعدل سعتها 0.007±0.62 سم ومعدل الوزن 0.007±2.18 غم ومعدل الحجم 0.029±1.15سم3.والقياسات التشريحية للحوصلة المنوية فكان معدل الطول 0.01±3.61 سم وعدل سعتها 0.01±2.44 سم ومعدل الوزن 0.15±4.18 غم ومعدل الحجم 0.04±3.05 سم3 اما القياسات التشريحية للغدة البصلية الاحليلية فكان معدل الطول 0.005±1.58سم .ومعدل السعة 0.06±1.46 سم ومعدل الوزن 0.11±3.23 غم .ومعدل الحجم 0.037 ±2.5سم^3.بصورة عامة لم يلاحظ خلال هذه الدراسة وجود فروقات تشريحية للغدد التناسلية الملحقة في الكبش والتيس .

Introduction

The accessory genital glands of males in sheep and goat are located along the pelvic portion of the urethra, with their ducts which opening and empty their secretion in to the urethral passage. They are include, the ampullae, vesicular glands, prostate gland and the bulbourethral glands. They contribute greatly to the fluid volume of semen. Their secretions are solution of buffers, nutrients and other substances needed to assure optium motility and fertility of semen(1,2and3).These glands produce the greater part of the ejaculate fluid, as a favorable medium for nutrition, and as a buffer against excess acidity of the female genital tract(4and5).They elaborate serous and mucous secretion that nourish and activate the spermatozoa, with ducts that empty their secretions in to the urethra(6). The enlarged end of the vas deferens near the urethra is the ampullae. Some have suggested that ampullae serve as a short term storage depot for semen. The two ampullae pass under the body of the prostate and open together with the excretory ducts of the vesicular glands into the urethra with aslit-like orifice on each side of the colliculus seminalis(7). Breazile(8) found that the ampullae of the ductus deference appears to derive from the vesicular gland. In stallion the ampullae measured about (15-20 cm) in long and its largest part nearly (2cm) in diameter. In bull, the ampullae about (10-12cm) in length and (1.2-1.5cm) in width. In sheep and goat, the ampullae is (6-8 cm) in long and (4-8mm) in diameter(9,10,11and12). According(13and14) ,they reported that one or both ampullae may be entirely dorsal. The vesicular glands are present in all domestic animal species except the camel, dog and cat.They are large, externally smooth. The glands are hollow, knobby organ(15and16). The vesicular gland are paired of lobular glands that are easily identified because of their knobby appearance(17,18and19) . Generally the prostate gland is present in all domestic animals. It is unpaired gland about the size of chestnut visible on the outside of the urethra just posterior to the excretory ducts of the vesicular gland(4,16and17). Two portions of prostate gland maybe distinguished according more to topgraphic than to histologic features: the compact of external portion (corpus prostate) and the disseminate or internal portion(20,21and22). The body of the prostate in one-humped camel has oval or circular shape connecting dorsally to the origin of the pelvic urethra and has pair of excretory ducts which are open on both sides of colliculus seminalis, while the disseminate part of the prostate surrounds the pelvic urethra lies caudally to the body and extend to its end(23and24). In dog the prostate is relatively large. It is yellowish in color, dense in structure, and lies at or near the anterior border of the pubis. It is globular and surrounds the neck of the bladder and the urethra at their junction. Amedian Furrow indicates a division into two lateral lobes(25,26and27). The paired bulbourethral gland is present in all domestic mammalian species except the dog. It consists of right and left club-shaped independent lobes, which lies on the dorsal surface of the caudal part of pelvic urethra and closely related to the bulb of penis(15). Hemeida(28) described the bulbourethral gland of balady buck were large, dense, spherical organs 1.5 cm in diameter and 2 gm in weight. The accessory genital glands are supplied by several branches arteries from internal pudendal artery that arises about the level of the lumbosacral articulation as the other terminal branch of the internal iliac(16).

Materials and methods

The present study is performed on the accessory genital glands at small ruminant's males sheep and goat (in local Iraqi breeds) as follow:



After collection of the samples from animals which include ampullae, vesicular gland and bulburethral gland. The measurements of the weight, length and width have been recorded absolutely after washing by saline and removing the adipose tissue . The dissected glands were preformed immediately within (15-25 minutes) after slaughtering. The weight is taken in gms on a sensitive electric balance* without dehydration of tissue. The anatomical parameters was taken length in cm which were taken by using a vernier caliber from the cranial extremity to the caudal and width were taken at extremity by using a vernier caliber also. Volume measurement is doing immediately within 10-25 minute after slaughtering by using a volumetric cylinder contains water and after that dipping the gland in the cylinder and read the difference in volume numbers which is equivalent to the volume of the gland. In order to study the blood supply of the accessory genital glands. The slaughter cadavers of ram and buck were taken and washed by water to remove blood. The cadavers were cutting transversally by handsaw at the level of last thoracic vertebrae, the arteries injected firstly by saline in order to clean them from the blood through the abdominal aorta and then the formalin 10% injected in the same site of the artery by using adapter with canula and dipping the specimens in 10% formalin for (48 hours) as fixation period, repeated by injection of mixture in ratio 2/5 ammonia with 3/5 Latex with added of red karmine powder to give red color gum milk latex mixture(31). The injection done also via the abdominal aorta. The tampon of cotton immersed in glacial acetic acid is useful to prevent any flow or lossing of latex from cutting small arteries by pressed on the site of punctured vessels.

*Electric balance- satorius 1112 MP

Results and Discussion

The result of this study showing that the ampullae of ram and buck are located near the neck of urinary bldadder cranially to the seminal vesicl gland consist from the terminal portion of vas deferens (ductus deferens) which enlargement and has elongated to spindle shape (Figurs 1,2 and 3). This coincide to the result of

(4,5,7and8).The study revealed the anatomical measurement according to (Tab.1). The length of ampullae in ram and buck ranging between 4.87-4.98 cm and width ranging between 0.63-0.62 cm. The average of weight 2.21 gm in ram and buck with 1.27 cm3 in volume. While the result of (9) found the length of ampullae is (6-8 cm) and (4-8 cm) in diameter and this not corresponding with present results. The vesicular glands are well developed in ram and buck. They are paired labular gland easily identified due to their characteristic knobby appearance (cluster of grape like) (Fig.4 and 5). This study agree with (3and17). The study finds that the seminal vesicle gland in ram and buck embedded in fatty tissue adjacent to the ampullae the study fixed all anatomical parameters of seminal vesicle glands listed in (Tab. 2) in ram and buck, its location dorsolaterl to the neck of urinary bladder and open in pelvic urethral after the excretory duct joined to the terminal part of vas deferens (Ampullae) to form ejaculatory apparatus. This results are similar to the anatomical description of vesicular gland in bull by(2,6and18).

The vesicular glands in bull described by(17) that have S-shape, irregular elongated form, often bent on itself and this is not near to this study. Present work revealed only disseminated part of prostate gland surrounds the pelvic urethra which extends caudally along the pelvic urethra. This result was in parallel with results of(4,6,22and29) But not in agreement with the results of (2and12) reported that the two lateral lobes of prostate gland in sheep well developed closely distributed along the pelvic urethra. The anatomical study show that the bulbourethral gland are pair of glands in ram and buck located on either side of pelvic urethra near the point where the pelvic urethra emerge from the pelvis region. The gland closely related to the root of penis. It has oval shape and pea in size (Fig.1, 6 and 7). This result compatible with (12and17) But(10) reported that the bulbourethral gland much larger and consists of two lobes has cylindrical shape in addition to these fact (5and12) register that the bulbourethral gland in bull and horse are embedded in the bulbo spongisum muscle and has spherical and ovoid shape. The study revealed that the accessory genital glands blood supply coming from branches of internal Iliac artery branched at the level of lumbosacral vertebral articulation and passing caudoventrally a long the dorsal border of the obturatorius internus muscle and appeared on deep surface of the sacrotuberal ligament, so the pudendal artery give rise many branches such as umbilical artery supply the ampullae and the prostate gland in buck and ram. And the small branch called cranial vesicular artery to the prostate gland (Fig. 8).

Table 1: Anatomical parameter of ampullae in ram and buck.

Measurement	Ram			Buck			Ram and buck
	Right mean ± SE	Left mean ± SE	General mean ± SE	Right mean ± SE	Left mean ± SE	General mean ± SE	General mean ± SE
Length (cm)	4.965 ± 0.060	4.995 ± 0.0669	4.980 ± 0.063	4.865 ± 0.284	4.893 ± 0.310	4.879 ± 0.297	4.929 ± 0.180
Width (cm)	0.638 ± 0.0395	0.627 ± 0.0422	0.6325 ± 0.0408	0.628 ± 0.010	0.623 ± 0.005	0.625 ± 0.0075	0.628 ± 0.0241
Weight (gm)	2.23 ± 0.0082	2.25 ± 0.0083	2.24 ± 0.0082	2.16 ± 0.0074	2.20 ± 0.0076	2.18 ± 0.0075	2.21 ± 0.00785
Volume (cm^3)	1.3 ± 0.0349	1.5 ± 0.0365	1.4 ± 0.0357	1.1 ± 0.0278	1.2 ± 0.0316	1.15 ± 0.0297	1.275 ± 0.0327

Table 2: Anatomical parameter of seminal vesicle gland in ram and buck.

Measurement	Ram			Buck			Ram and buck
	Right mean ± SE	Left mean±SE	General mean± SE	Right mean± SE	Left mean ± SE	General mean± SE	General mean ± SE
Length (cm)	3.693 ± 0.0513	3.685 ± 0.0644	3.689 ± 0.0578	3.616 ± 0.0110	3.615 ± 0.0109	3.6125 ± 0.0109	3.650 ± 0.0343
Width (cm)	2.516 ± 0.0619	2.488 ± 0.0646	2.502 ± 0.0634	2.431 ± 0.0116	2.452 ± 0.0108	2.441 ± 0.0112	2.4715 ± 0.0373
Weight (gm)	4.5 ± 0.1555	4.3 ± 0.1535	4.42 ± 0.1545	4.22 ± 0.1543	4.15 ± 0.1539	4.185 ± 0.1541	4.302 ± 0.1543
Volume (cm^3)	3.2 ± 0.0515	3.5 ± 0.0517	3.35 ± 0.0516	3.00 ± 0.0497	3.1 ± 0.05	3.05 ± 0.0498	3.2 ± 0.0507

Table 3: Anatomical parameter of bulbourethral gland in ram and buck.

Measurement		Ram			Buck			Ram and buck
Right mean ± SE	Left mean ± SE	General mean ± SE	Right mean ± SE	Left mean ± SE	General mean ± SE	General mean ± SE		
Length (cm)	1.591 ± 0.0640	1.589 ± 0.666	1.590 ± 0.365	1.581 ± 0.0055	1.585 ± 0.0053	1.583 ± 0.0054	1.5865 ± 0.1852	
Width (cm)	1.491 ± 0.0221	1.495 ± 0.0284	1.493 ± 0.0221	1.470 ± 0.01	1.465 ± 0.0035	1.4675 ± 0.00675	1.4802 ± 0.0144	
Weight (gm)	3.41 ±0.122	3.51 ± 0.131	3.46 ±0.0126	3.28 ±0.112	3.19 ±0.110	3.235 ±0.111	3.357 ±0.1185	
Volume (cm^3)	2.3 ±0.0449	2.4 ±0.0452	2.35 ±0.04505	2.00 ±0.0372	2.1 ±0.0375	2.05 ±0.0373	2.2 ±0.0411	

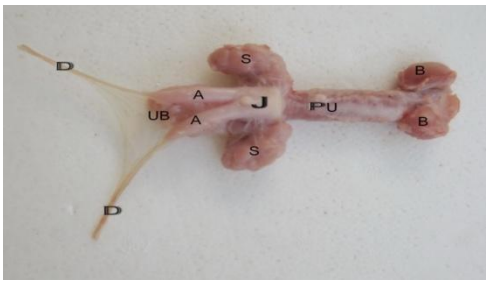


Figure 1: In buck the accessory sex gland related to pelvic urethra (PU), urinary (UB), ductus deferens (D), ampullae (A), vesicular gland (S), bulbourethral gland (B) and ejaculatory apparatus (J).

Figure 2: The accessory sex gland, vesicular gland (S), Ampulla of ductus deferens (A) and bulbourethral gland (B) in ram.

Figure 3: The Ampullae of ductus deferens (A) in buck.

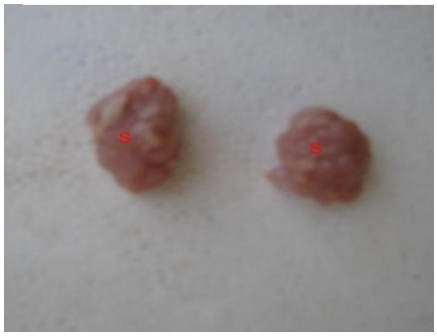


Figure 4: The vesicular gland (S) of ram (right and left).

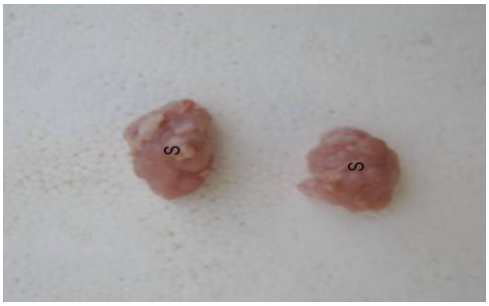


Figure 5: Vesicular gland of the buck (S) (Right and left).

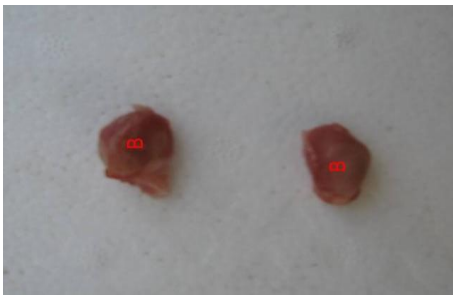


Figure 6: The bulbourethral gland (B) of the ram.

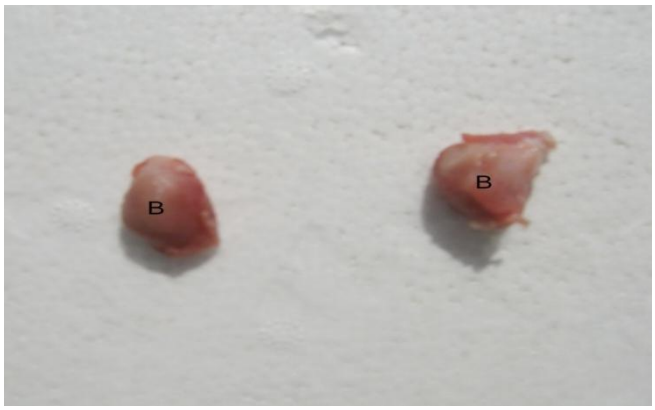


Figure 7: The bulbourethral gland (B) of the buck.

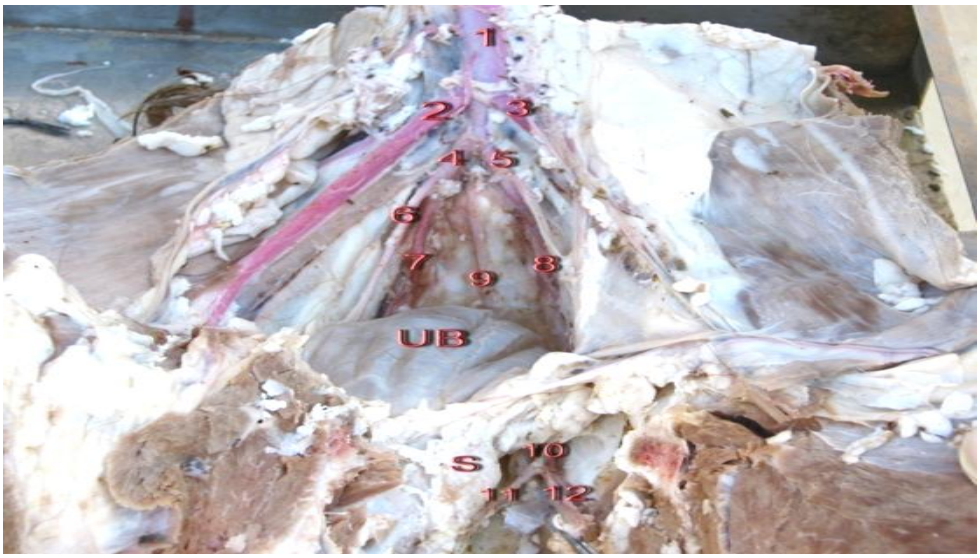


Figure 9: The blood supply of accessory sex glands seminal vesicle gland (S), urinary bladder (UB):

1- Abdominal aorta; 2- Right external iliac artery; 3- Left external iliac artery

4- Right internal iliac artery; 5- Left internal iliac artery; 6- Internal pudendal artery; 7- Umbilical artery; 8- Cranial gluteal artery; 9- Median sacral artery

10- Urogenital artery (prostate artery); 11- Branches to vesicular gland

12- Branches to bulbourethral gland

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