

A HISTOMORPHOLOGY OF THE ONE HUMPED CAMEL (*Camelus dromedarius*) THYROID GLAND.

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ABSTRACT

An anatomical study involving the thyroid glands of 15 healthy camels (*Camelus dromedarius*) of different sex group A (Males) and group B (Females), were investigated under for gross and microscopic anatomy. Gross studies revealed that thyroid glands were located in between the third ring of trachea and the laryngopharynx portion of the pharynx and had two lobes, connected by an isthmus. They appeared to be reddish brown in colour. The values of weight, length, width and diameter of thyroid glands were show no significant difference between the groups ($P>0.05$). Histological observation revealed that the thyroid gland consisted of a connective tissue capsule and trabeculae were found extending from the capsule into the substance of the gland, which divided it into lobules. Each lobule consisted of two sized follicles in variable numbers, the large and small. The large follicles were lined by low cuboidal epithelium, while the small follicles were lined by high cuboidal to columnar epithelium. The follicles had colloid material in their lumen, probably an apocrine secretion from the lining epithelial cells. There was no evidence of Parafollicular or C-cells in thyroid glands of camel.

Keywords: Camel, Biometry, Thyroid gland, Gross, Histology.

INTRODUCTION

The thyroid gland is highly vascular and developmentally, the first endocrine gland in the mammals (Bello *et al.*, 2013). It is composed of two lateral lobes connected by a narrow median isthmus in front of the trachea in anterior lower neck (Malie *et al.*, 1987; Banks, 1993). Thyroxin plays an important role in metabolism of the animal body. Thyroid gland consists of follicles lined by follicular cells. The interfollicular space has been reported to be filled with connective tissue (Asari *et al.*, 1985; Bello *et al.*, 2012). The most outstanding feature of the vertebrate thyroid gland is its ability to concentrate large amount of iodine for the synthesis of thyroxin (Georgieva and Gerov, 1975).

The normal anatomy and physiology of dromedarian camel is least understood when compared to Llama, Guanaco, Cattle, Sheep, Goat and Pig (Bello *et al.*, 2012). The description of dromedarian camel is usually made as if it is identical with Llama specie (Bello *et al.*, 2012). Though, they are seasonal breeders (Belknap, 1994) that are closely related

anatomically to the South American Camelids (Georgieva and Gerov, 1975; Wilson *et al.*, 1990; Belknap, 1994; Umaru and Bello, 2012) little is known on the anatomy and physiology of the thyroid gland.

The present study was conducted to investigate the normal microscopic anatomy of thyroid gland of one humped camel (*Camelus dromedarius*) with the aim of understand the teaching of anatomy and physiology of the gland of the dromedarian Camel in the world.

MATERIALS AND METHODS

The study was carried out on 15 normal Adult one-humped camel collected from the metropolitan abattoir, Sokoto in winter season, using standard animal ethics approved by the government. The collected samples were then taken to the Veterinary Anatomy laboratory of Usmanu Danfodiyo University; where the gross and biometric values were determined.

1cm² thick of sample from each segment was collected and fixed in 10% formalin solution. After fixation was achieved, the tissue sample

was processed for paraffin blocks preparation. The sections of 5µm were subjected to haematoxylin and eosin for routine morphology (Luiz and Jose, 2005). The standard sections were examined under light microscope and micrographs taken using Sony digital camera(x5) with 12.1 mega pixel.

RESULTS AND DISCUSSION

Gross observations

Gross studies of thyroid gland of camel revealed that the gland was located in between the third ring of trachea and the laryngopharynx portion of the pharynx and consisted of two lobes. An isthmus connected these lobes to each other and reddish brown in colour. This finding is similar to other large animals like cattle and buffaloes (Getty *et al.*, 1986) i.e., with the first ring of trachea and consisted of two lobes on both side and an isthmus connecting these lobes. In camel, the colour of the gland is in concordance with the findings of Schwartz and Dioli (1992).

The values of weight, length, width and diameter in camels of different sex groups viz male and female are presented in Table 1. The mean weight was 43.90 and 48.08 g in two groups respectively, which was slightly lower than previously reported value of 52.7 gm in camel (Abdel-Wahab and Hamza, 1970). It has been reported that in summer the size of the gland increases (Yagil *et al.*, 1978). The mean diameters recorded were 0.97 and 1.05 cm which fell in the range of 0.5 to 1.5 cm in adult camels (Schwartz and Dioli, 1992). The mean length recorded was 5.36 and 6.36 cm, and is in agreement to 3 to 8 cm reported by Abdel-Wahab and Hamza, (1970) in camel. Similarly, the width of gland recorded was 3.35 and 3.53 cm and is in range of 1 to 4 cm reported earlier in this species (Schwartz and Dioli, 1992).

The statistical analysis revealed non-significant difference in various parameters between the two sex groups. However, the values of all the parameters were relatively higher in male camels compared with female group.

Histological findings

Histologically, the thyroid gland consisted of a connective tissue capsule composed of coarse and fine collagenous fibers with scattered fibroblast and small blood vessels all over the capsule (Fig.4, 2 and 3). The trabeculae were seen extending from the capsule into the

substance of the gland and dividing it into lobules. Blood vessels were also present in the connective tissue of the trabeculae. Each lobule consisted of aggregation of follicles. Three types of follicles were identified, large (A), medium (B) and small (C) (Fig. 4). The large follicles were lined by low cuboidal epithelium having flattened nuclei and were assumed to be inactive cells while the medium follicles were lined by columnar epithelium having oval nuclei. The small follicles were lined by cuboidal epithelium with rounded nuclei, these were active cells. Each follicle was filled with a gel-like material called colloid (Fig. 3). The colloid is a storage form of follicular epithelial secretion. There is no evidence of para follicular or C-cells in thyroid glands of camel. This result shown similar observations as reported previously in camel (Abdel-Magied *et al.*, 2000; Atoji *et al.*, 1999) i.e. the gland consisted of follicles of variable sizes with smaller lined by low cuboidal to semi squamous epithelium, while the larger ones were lined by high cuboidal to columnar epithelial cells. The parafollicular or C-cells were found missing but has been reported in cattle and buffaloes (Miyandad, 1973). Similar observations have been recorded by Abdel-Magied *et al.* (2000).

CONCLUSION

Base on the above findings, it can be concluded that thyroid gland does not vary considerably in weight, length, width and diameter between male and female adult camels.

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Table 1: values (Mean $\pm$ SD) of different parameters in camels of two age groups

	FEMALE	MALE
Weight (g)	45.70 $\pm$ 0.35 ^a	50.55 $\pm$ 0.26 ^b
Length (cm)	5.36 $\pm$ 0.46 ^a	6.36 $\pm$ 0.33 ^b
Width (cm)	3.35 $\pm$ 0.29 ^a	3.53 $\pm$ 0.21 ^b
Diameter(cm)	0.97 $\pm$ 0.13 ^a	1.05 $\pm$ 0.14 ^b

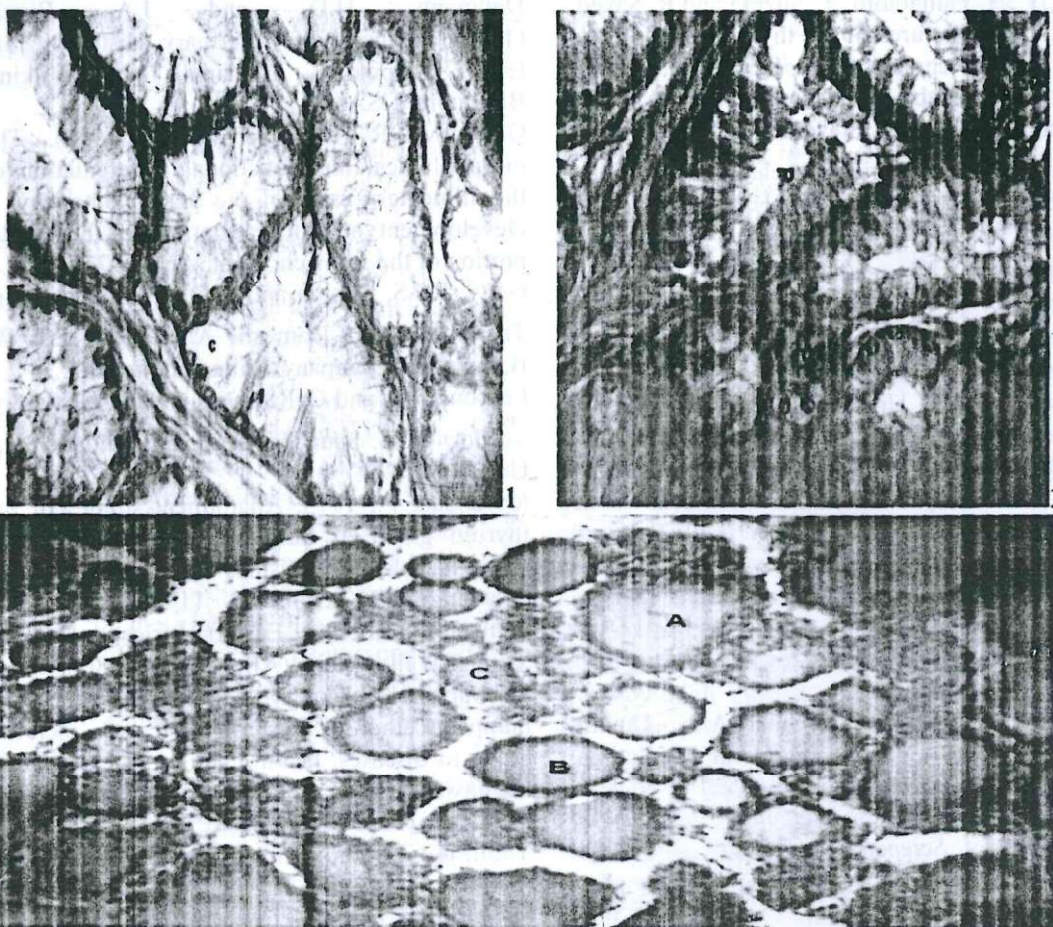


Fig. 1: Photomicrograph of Camel thyroid (Male) showing complete cellular differentiation and follicular organization, mature large follicles with colloid formation (A) with tall columnar epithelium, mature small follicles with low columnar/ cuboidal epithelium and developed colloid (B), complete follicles with no evidence of parafollicular cells (Yellow arrow) and prominent colloid observed. H&E 250×

Fig. 2: Photomicrograph of Camel thyroid (Female) showing complete cellular differentiation and follicular organization, mature large follicles with colloid formation (A) with tall columnar epithelium, mature small follicles with low columnar/ cuboidal epithelium and developed colloid (B), complete follicles with no evidence of parafollicular cells (Yellow arrow) and prominent colloid observed. H&E 250×

Fig. 3: Photomicrograph of Camel thyroid (Male) showing complete cellular differentiation and follicular organization, mature large follicles with colloid formation (A) with tall columnar epithelium, mature small follicles with majority cuboidal epithelium and developed colloid (B), complete follicles with no evidence of parafollicular cells (Yellow arrow) and prominent colloid observed. H&E 200×