1940

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Colloid Goiter and Its Incidence Among Adult Horses

W. G. Venzke, D.V.M., M.S. and C. H. Mannasmith, '43*

A GOITER is defined as any enlargement of the thyroid gland. Goiter is a condition usually found in iodine-deficient areas of the country. Iodine-deficient areas are found in the Great Lake region, Northwestern states, Northern plains region of the United States and Canada, extending from the Great Lakes to the Rockies. Therefore goiter is a relatively rare condition among the domesticated animals around Ames, Iowa.

Macroscopic appearance of the thyroid glands of a 22 year-old mare weighing approximately 1200 pounds. The right gland weighed 313 grams and the left gland 123 grams. The authors are indebted to L. Fisher for the photograph.

Thyroid enlargements may be due to the changes in any one or a combination of the tissues of the gland. The following factors may enlarge the thyroid: (1) increase in the blood or lymph content (edema, congestion, or hematoma); (2) increase in the volume of parenchymal cells (glandular hypertrophy, or hyperplasia); (3) increase in the colloid stored in the follicles; (4) increase in the quantity of stroma (interstitial hyperplasia); (5) cyst formation or new growth. It is quite possible that an increase in one of these tissue elements may be more than offset by an atrophy of another, in which case there may be an actual diminution in the size of the gland.

Synonyms

The thyroid enlargement with which this paper is concerned is commonly known as "colloid goiter". There are, however, several synonyms: adolescent goiter, simple goiter, diffuse parenchymatous goiter, tracheocele, bronchocele, struma, endemic goiter, and sporadic goiter. The writers have chosen the term "colloid goiter" as the term of preference for this variety of thyroidism.

Colloid goiter consists of a diffuse enlargement of the gland due to an increased amount of colloid distending the follicles. There is a normal content for the amount of thyroid tissue and a normal basal metabolic rate; and only minor symptoms appear in the non-endocrine systems. Recent studies of the mineral content in the soil and water, and the results of prophylactic treatment in preventing its occurrence, have associated the causative factor of colloid goiter with iodine deficiency.

Labile Tissue

The thyroid is a very labile tissue, capable of rapid progressive and regressive changes in all periods of life. All work that has been done, shows that

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Fall, 1940
thyroid enlargement begins as an epithelial hypertrophy followed by a hyperplasia. Colloid goiter may be thought of as the involution of the epithelial elements, or as the return of an active hyperplasia to the condition nearest to normal, (physiologically, chemically, and anatomically), that a gland which has once been actively hyperplastic can assume. There is nothing degenerative or atrophic in the process of involution. Proof of this is established by the fact that colloid goiters regenerate as readily as normal glands following partial removal. The processes involved in active hyperplasia; that is, the blood supply decreases, the store of iodine rises, the epithelium becomes cuboidal or flattened, and the colloid increases in density.

**Review of Literature**

In reviewing the literature, we failed to find reference to any very extensive studies relative to colloid goiter in the adult horse. Law ('11) stated in his textbook that goiter in horses may be diagnosed by the enlargement of one or both lobes of the gland. He also mentioned that Cadac cited cases in which the goitrous thyroid weighed as much as four pounds. Asphyxia, difficult deglutition, and dyspnea have all been observed in horses because of an enlarged thyroid gland.

Schlotthauer ('31) studied the thyroid glands of 100 horses grossly and microscopically. His data indicate that any gland weighing more than 0.06 gram for each kilogram of body weight is abnormal. It is possible, however, that smaller glands may also show pathologic changes. Of the 100 thyroid glands studied, Schlotthauer classified 34 as normal, 20 as hyperplastic, 9 as colloid and 37 as adenomatous. The adenomatous glands consisted of benign papillary, fetal and colloid. All the glands studied were apparently gathered in the state of Minnesota. Sex apparently is of no significance in the formation of thyroid pathology according to Schlotthauer.

Abbot and Prendergast ('31) found that the colloid goitrous glands ranged in

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**A Fibroma in the Wall of the Bladder**

**James Welch**

Class of 1941

A SEVEN year old female fox terrier with a history of unsuccessful attempts at urination was presented at the office of Dr. Herbert Lothe, Waukesha, Wis. The enlarged abdomen lead Dr. Lothe to believe the dog's bladder was distended with urine. An attempt to catheterize her was unsuccessful because of an obstruction at the anterior end of the urethra preventing the entrance of the catheter into the bladder. Permission was obtained from the owner to surgically remove the obstruction.

The ventral abdominal and pubic area was shaved and tincture of iodine was applied. A two inch, fourteen gauge needle was used to tap the bladder through the abdominal wall, and about 1½ pints of urine were removed.

**Operation**

The dog was then anesthetized with ether and Dr. Lothe proceeded to operate. An incision 2 inches in length was made just anterior to the pubis in the median line. By exploration, a hard, round growth was found at the neck of the bladder. An incision through the muscle layer of the bladder revealed a submucosal fibroma which was easily removed by blunt dissection. The incision in the bladder was closed with a continuous suture of No. 2 catgut; an interrupted suture of No. 2 catgut was used in the peritoneum and abdominal muscles. Silk was used to close the skin incision.

The tissue removed was an oval-shaped fibroma, 1½ inches wide by 2 inches long, and weighed 1½ ounces. This tumor was very hard and apparently has obstructed the urethral orifice of the bladder. The patient made an uneventful recovery.

**The Veterinary Student**
Weakest Link

Finally, let me stress an aspect of the relation of research to the practitioner. Rarely does the researcher hide his light under a bushel. He can be accused sometimes of setting out a light that would be scorned by a lightning bug or a smoky light that could not possibly illuminate any practitioner’s path, or rarely he may be an ignis fatuus to lead the unwary astray. In my experience, the weakest link in the chain that binds the laboratory to the practitioner is the attitude of the practitioner. Admitting that veterinary research is sketchy, that its failures and shortcomings are many, that the sources of the investigator are not always available, still the fact remains that all too frequently the practitioner doesn’t avail himself of the facilities offered by the laboratory. He is prone to depend upon experience, not to say intuition, and his own narrow, improperly interpreted experience at that. If anything can be done to promote veterinary investigations, let it be done. If anything can be done to induce the practitioner to avail himself of the accumulated rich storehouse of experimental work or to demand more and more of the investigator, let that also be done.


GOITER—

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size from 0.05 to 0.14 grams for each kilogram of body weight, the average weight being 0.08 gram, which is 0.02 gram above the maximal normal.

Case Cited

Since the fall of 1937, in the anatomy laboratory, we have had the opportunity to examine both macroscopically and
microscopically the thyroid glands of 51 horses. Thus far one case of colloid goiter has been observed. Figure 1. presents the macroscopic appearance of the thyroid glands of a 22 year-old mare, weighing approximately 1200 pounds. The right thyroid gland weighed 313 grams while the left weighed 12.5 grams. According to Schlotthauer's data the right gland weighed 280 grams above the maximal normal. Histologically, the thyroid gland showed abnormal amounts of colloid. All acini were filled with colloid. The walls of the follicles were thin, and lined with flattened cells having darkly stained nuclei. The capsule surrounding the gland was very thin.

**Treatment**

The treatment of colloid goiter among domesticated animals is most satisfactory, owing to its etiologic factor of iodine deficiency. Intravenous thyroxin treatment is most efficacious when given early in the course of the formation of colloid goiter. A few small doses of thyroxin given intravenously within a few months after the appearance of colloid goiter is frequently sufficient for complete and permanent relief. Engelbach ('32) states that thyroxin, when given intravenously, has a most decided effect upon the size of the thyroid enlargement in the majority of colloid goiter cases.

Other preparations that may be used advantageously as prophylactics are: sodium iodide, Lugol's solution and desiccated thyroid.

**References**


*Fall, 1940*