RIEDEL'S STRUMA IN CONTRAST TO STRUMA LYMPHOMATOSA

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In 1896[3] and 1897[5] Riedel reported three cases of a peculiarly hard, indurated, infiltrating lesion of the thyroid which clinically and at operation was thought to be a malignant neoplasm, but was interpreted pathologically to be a chronic inflammatory process. The non-neoplastic nature of the lesion and its benignancy seem to have been confirmed by the clinical course of the disease following incomplete surgical removal of the lesion. The definitive cause of the process was not determined. The consistency of the tumefaction was compared to that of iron, and this physical feature gave rise to one of the terms, "eisenharte strumitis," which was applied to these cases by Riedel and by subsequent writers.

During the discussion that followed the presentation of Riedel's first two cases, Cordua[4] mentioned his experience with a similar case, that of a female 13 years of age. Additional data concerning this case were furnished to Tailhefer[6] in a personal communication from Cordua. The details, however, were never published, according to Riedel[5] (1910); hence the case is of little statistical value except for the facts as to age and sex.

In the fifteen years succeeding Riedel's original publication, cases of similar nature were reported under various titles by Tailhefer[6] (1898): ("inflammation chronique primitive, canceriforme"); Ricard[11] ("degenerescence fibreuse du corps thyroide"), (1901); Berry[15] ("primary chronic inflammation"), (1901); Silatschek[19] ("eisenharter strumitis"), (1910); Spannaus[20] ("Riedelsche struma"), (1910); Delore and Alamartine[21] ("thyroidite ligneuse"), (1911); Sebileau[22] ("ligneous thyroiditis"), (1911), and Murray and Southam[24] ("ligneous thyroiditis"), (1912).

It is well to pause and consider this small group of cases, reported by several different authors from three different countries, for if there is any justification for dignifying these and subsequently reported cases by the name of Riedel's disease or ligneous thyroiditis, with the implication that they constitute an entity, as opposed to any other sort of chronic thyroiditis of unknown or non-specific etiology, this justification is to be found in a study of the case records as a whole and in series. The entity of the disease cannot be established by singling out any particular feature of the individual cases, because up to the present time no pathognomonic indication of Riedel's disease, either clinically or pathologically, has been discovered.

That the foregoing is not an overstatement has been amply demonstrated by the diversity of interpretation by recent writers of the cases previously published; by the fact that no two writers accept and list the same cases in their reviews, and by the further fact that cases in which well established and well recognized pathological changes in the thyroid are associated with the greatest variety of clinical conditions have been and are being reported as instances of Riedel's disease under the guise of chronic or ligneous thyroiditis.

If we assume that Riedel's disease is an entity, it seems to me that there is no possibility of reconciling many cases reported and cited as Riedel's disease since 1912 with those reported prior to that date. The latter cases present a striking uniformity of clinical symptoms, physical signs, operative findings, pathological changes in the thyroid, involvement of surrounding structures, and postoperative course. Moreover, in all instances these cases are characterized by an extension beyond the thyroid, which leaves no grounds for quibbling, by malformation of one or both lobes of the thyroid beyond the possibility of recognition as an organ or gland, and by the absence of a known etiological factor in each case. The available data do not indicate that the onset of the disease was preceded by hyperthyroidism in any case, nor did spontaneous suppuration occur. In no instance can it be seriously maintained — and certainly it has not been demonstrated — that the thyroid was the seat of tuberculosis, syphilis or a neoplastic process. There is rather universal agreement that the lesion is in the nature of a chronic inflammatory process. If these be the criteria of Riedel's disease, more than 50 per cent of the cases appearing in the literature should be reclassified.

The objection may and doubtless will be raised that the cases cited thus far represent the end stage of the process. This may or may not be true. My only intention is to point out and emphasize that at least the end stage is well known. Any process proposed as representing the incipient or intermediate stage should logically tend to progress to the end stage, it should not be inconsistent with what we know of the disease in all its aspects, and it should admit of no other interpretation if it is to be considered as an entity. These conditions, we believe, have not been realized up to the present time.

In 1912 Hashimoto[26] reported four cases which he designated "Struma lymphomatosa," all in women forty years of age and over, who presented few and relatively insignificant symptoms, associated with uniform bilateral enlargement of the thyroid. The onset

of the disease was insidious and its progress was slow. The enlarged thyroid gland was firm to hard in consistency (in one case malignancy was thought to be present); at operation the gland was found to be adherent to the trachea but not to the surrounding structures. In these four cases, both lobes were resected without great difficulty, except for bleeding in two cases, and no serious post-operative complication occurred. Recovery was slow in all cases, but was complete within from twelve to eighteen months. Two of the patients developed symptoms suggestive of post-operative hypothyroidism, and a third was treated for this condition by the administration of thyroid preparations. Pathologically the glands were found to be extensively infiltrated by lymphocytes, both diffusely distributed and in localized collections, and in all cases the glands contained numerous lymphoid follicles with germinal centers. Varying degrees of fibrosis and atrophy and hypertrophy of the glandular tissue were recorded. In Hashimoto's cases, as in those reported by Riedel, there was no indication that hyperthyroidism, hypothyroidism, suppuration, tuberculosis, syphilis or neoplasm were factors in the etiology. The exact nature of the condition was not determined, but Hashimoto came to the definite conclusion that his cases were not in the same category with Riedel's. It is a singular fact that no other cases have appeared in the literature under the title of "struma lymphomatosa," so far as I am aware. In association with Dr. E. P. McCullagh,[61] I have recently reported four cases of a similar nature and we are in general agreement with Hashimoto's conclusions.

Numerous authors have suggested and have apparently accepted the opinion that struma lymphomatosa is the early stage of Riedel's disease. A few have dissented. Heineke[30] (1914) did not believe that the two conditions were identical. Reist[39] (1922) seemed to make certain distinctions between them. Perman and Wahlgren[50] (1927) stated that, in their own case at least, Riedel's disease was not necessarily preceded by struma lymphomatosa. At the first operation a small, white, hard nodule, in no way suggestive of struma lymphomatosa, was removed from the lower pole of the right lobe. Seventeen months later, at the second operation, both lobes were diffusely involved and the findings were characteristic of Riedel's struma.

The writer, likewise, is of the opinion, based on a study of Hashimoto's four cases, four reported by Graham and McCullagh,[61] and cases which I now believe can be identified in the literature, that Riedel's struma is not necessarily preceded by struma lymphomatosa; that struma lymphomatosa does not necessarily progress

to Riedel's struma; and that it is highly improbable that there is any necessary relationship between these two conditions.

If the foregoing observations can be substantiated, it would seem more logical to separate the two groups, collect and report more complete data, and trust to further experience to determine the exact status of these two relatively rare lesions, presumed by some to be entities and by others to be non-entities. The latter is the only possible conclusion that can be drawn from a study of the cases reported in the literature up to the present time.

In support of this position, a summary of the results obtained from a recent study of the literature is submitted. This is not presented as a complete review of the literature, but it is believed that the original sources of information have been examined, relative to at least 90 per cent of all cases reported or cited as Riedel's struma, ligneous thyroiditis, woody thyroiditis, Hashimoto's disease, struma lymphomatosa and chronic thyroiditis, when there has been an implication of relationship to either Riedel's struma or struma lymphomatosa.

From 82 original publications, 104 cases have been collected which are listed in Table 1. The year, the author, the author's interpretation and the number of cases reported or cited are indicated in their respective columns. The small columns to the right indicate my disposition of the 104 cases for the purpose of the present paper, which is to *contrast the type of lesion reported by Riedel with the type of lesion reported by Hashimoto.*

Group 1 — Acceptable as Riedel's struma (41 cases).

Group 2 — Acceptable as Hashimoto's struma (24 cases).

Group 3 — Adenomata with inflammation and fibrosis (8 cases).

Group 4 — Cases of hyperthyroidism (2 cases).

Group 5 — Atrophy and fibrosis, not compatible with groups 1 and 2 (3 cases).

Group 6 — Suppuration in the thyroid (5 cases).

Group 7 — Tuberculosis of the thyroid (1 case).

Group 8 — Syphilis of the thyroid (3 cases).

Group 9 — Unverified by examination of tissue (6 cases).

Group 10 — Insufficient data (11 cases).

It should be borne in mind that all the cases listed in Table 1 have been reported or cited as instances of Riedel's disease. The groups indicate clearly although not completely the great variety of clinical diseases and pathological processes that have been reported as Riedel's struma.

TABLE I

A List of 104 Cases Reviewed

Year	Author	Reported as	Number of Cases	Writer's Interpretation and Grouping for Statistical Purposes — Group No. 1	2	3	4	5	6	7	8	9	10
1883	Wolfler	Multiple Fibromata	1	--	--	1	--	--	--	--	--	--	--
1885	Bowlby	Infiltrating Fibroma (? sarcoma)	1	1	--	--	--	--	--	--	--	--	--
1896	Riedel	Eisenharte Strumitis	2	2	--	--	--	--	--	--	--	--	--
1896	Cordua	In discussion	1	--	--	--	--	--	--	--	--	--	1
1897	Riedel	Chronic Strumitis	1	1	--	--	--	--	--	--	--	--	--
1898	Tailhefer	Chronic Primary Thyroiditis (Cancriforme)	1	1	--	--	--	--	--	--	--	--	--
1898	Riedel	Cited by Tailhefer	1	--	--	--	--	--	--	--	--	--	1
1898	Kuttner, Case 2	Struma syphilitica	1	1	--	--	--	--	--	--	--	--	--
1899	Loewy et Loeper	Tumeur Fibreuse du Cou	1	1	--	--	--	--	--	--	--	--	--
1900	Viannay	Strumitis	1	--	--	--	--	--	1	--	--	--	--
1901	Ricard	Fibrous Degeneration	3	1	--	--	--	--	--	--	--	--	2
1901	Berger	In discussion	1	--	--	--	--	--	--	--	--	1	--
1901	Walther	In discussion	2	--	--	--	--	--	--	--	--	2	--
1901	Poirier	In discussion	1	--	--	--	--	--	--	--	--	1	--
1901	Berry	Chronic Thyroiditis	2	1	--	1	--	--	--	--	--	--	--
1902	Ourmanoff	Fibroma of Thyroid	1	1	--	--	--	--	--	--	--	--	--
1904	Genet	Compression vena cava	1	--	--	--	--	--	1	--	--	--	--
1909	Poncet et Leriche	Inflammatory tuberculosis and the thyroid gland	1	--	--	--	--	--	--	1	--	--	--
1910	Silatschek	Eisenharte Strumitis	1	1	--	--	--	--	--	--	--	--	--
1910	Spannaus	Riedel's Struma	1	1	--	--	--	--	--	--	--	--	--
1911	Delore et Alamartine	Ligneous Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1911	Sebileau	In discussion	2	2	--	--	--	--	--	--	--	--	--
1911	Barjon	Ligneous Thyroiditis	1	--	--	--	--	--	--	--	--	1	--
1912	Murray and Southam	Ligneous Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1912	Vogel	Strumitis	1	--	--	1	--	--	--	--	--	--	--
1912	Hashimoto	Struma Lymphomatosa	4	--	4	--	--	--	--	--	--	--	--
1912	Poncet et Leriche	Syphilis of Thyroid	1	--	--	--	--	--	--	--	1	--	--
1913	Meyer	Thyroiditis Chronica Maligna	1	1	--	--	--	--	--	--	--	--	--
1913	Simon	Riedel's Struma	1	1	--	--	--	--	--	--	--	--	--
1914	Heineke	Chronic Thyroiditis	2	2	--	--	--	--	--	--	--	--	--
1914	Tomaselli	Ligneous Thyroiditis	1	--	--	--	--	--	1	--	--	--	--
1914	Wrede	Eisenharte Strumitis	1	1	--	--	--	--	--	--	--	--	--
1915	Brunger	Chronic Thyroiditis	3	--	--	--	2	1	--	--	--	--	--
1918	Balfour	Riedel's Struma	1	--	--	--	--	--	--	--	--	--	1
1920	Berry	Chronic Thyroiditis	3	2	--	1	--	--	--	--	--	--	--
1921	Nicholson	Woody Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1921	Kleinschmidt	Eisenharte Struma	1	1	--	--	--	--	--	--	--	--	--
1922	Monod	Ligneous Thyroiditis	3	1	--	--	--	--	--	--	2	--	--
1922	Reist	Chronic Thyroiditis	6	--	4	2	--	--	--	--	--	--	--
1922	Mysch	Riedel's Struma	1	--	--	--	--	--	1	--	--	--	--
1922	Erkes	Riedel's Struma	1	1	--	--	--	--	--	--	--	--	--
1924	Bohan	Ligneous Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1924	St. George	Chronic Productive Thyroiditis	3	2	--	--	--	1	--	--	--	--	--
1925	Shaw and Smith	Riedel's Chronic Thyroiditis	6	--	4	1	--	1	--	--	--	--	--
1925	Meeker	Riedel's Struma	1	--	1	--	--	--	--	--	--	--	--
1925	Hahn	Non-suppurative Chronic Thyroiditis	1	--	--	1	--	--	--	--	--	--	--
1926	Smith and Clute	Ligneous Thyroiditis (Riedel)	5	--	5	--	--	--	--	--	--	--	--
1926	Grunberg	Chronic Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1926	Searls and Bartlett	Thyroiditis (Riedel)	2	--	--	--	--	--	--	--	--	--	2
1927	Perman and Wahlgren	Chronic Thyroiditis (Riedel)	1	1	--	--	--	--	--	--	--	--	--
1927	Tucker and Gertz	Chronic Thyroiditis (Riedel)	1	1	--	--	--	--	--	--	--	--	--
1927	Schultz	Riedel's Struma	3	--	--	--	--	--	--	--	--	--	3
1927	Matthews	Woody Thyroid	1	1	--	--	--	--	--	--	--	--	--
1928	Mallet-Guy, Barbier and Heitz	Chronic Ligneous Thyroiditis	1	1	--	--	--	--	--	--	--	--	--
1928	Johnson	Thyroiditis	1	--	--	--	--	--	--	--	--	1	--
1929	Wingate	Chronic Thyroiditis (Riedel)	2	1	1	--	--	--	--	--	--	--	--
1929	Heyd	Benign Granuloma (Riedel)	2	1	--	--	--	--	--	--	--	--	1
1929	Kent	Chronic Thyroiditis (Riedel)	2	2	--	--	--	--	--	--	--	--	--
1929	Hellner	Eisenharte Strumitis	1	1	--	--	--	--	--	--	--	--	--
1929	Maloney	Ligneous Thyroiditis (Riedel)	3	1	--	1	--	--	1	--	--	--	--
1931	Graham and McCullagh	Struma Lymphomatosa	4	--	--	4	--	--	--	--	--	--	--

Pertinent data relative to Groups 1 and 2 are summarized in Table 2. Groups 3 and 5 will be discussed in a separate communication in the near future.

The contents of Table 2 do not and are not intended to establish as an entity either Riedel's struma or struma lymphomatosa. Little support, however, is to be found for the view that these two are interdependent or interrelated conditions. The indications are strongly in the other direction.

The incidence with reference to age and sex is striking and is probably not without significance. In Group 1, 41.5 per cent of the patients were males and 58.5 per cent were females. In Group 2 only 4.2 per cent were males and 95.8 per cent were females. In Group 1 the youngest patient was 23 years of age, the oldest 64; the mean age was 43.5 and the average age was 36.2. In Group 2 the youngest patient was 40 years of age; the oldest 75; the mean age 57.5 and the average was 52.4. It is worthy of note that the youngest patient in the Hashimoto group was older than the patient of average age in the Riedel group. That the average age of patients in a group of cases presumed to represent the early stage of a process is greater than the average age in a group presumed to represent the end stage is indeed a strange coincidence.

The average duration of symptoms (when symptoms were present at all in the Hashimoto group) was somewhat greater in Group 2 than in Group 1.

The duration of the goiter was slightly greater in the Hashimoto than in the Riedel group. While the difference is not great, it indicates that, although the average duration of the Hashimoto struma (said to be the early stage) may be as great or greater than the average duration of Riedel's struma (said to be the end stage), in not one of the twenty-four cases of the former type did the disease progress to anything approaching the picture presented by Riedel's cases.

The thyroid involvement was bilateral in approximately 50 per cent of cases in Group 1 and in 100 per cent in Group 2. If Riedel's struma is preceded by struma lymphomatosa, one lobe must have regressed remarkably in 50 per cent of the cases in Group 1.

Diffuse cervical cellulitis was present in 78 per cent of cases in the Riedel group and entirely absent in those in the Hashimoto group. The most that can be affirmed in regard to the latter group is that in some cases the capsule of the gland was adherent to surrounding muscles. Adhesions of equal extent occur frequently in cases of exophthalmic goiter.

TABLE 2

Comparison of Riedel's and Hashimoto's Struma

		Group 1 41 Cases Riedel Type	*Group 2 24 Cases Hashimoto Type*
Sex	Male	17 (41.5%)	1 (4.2%)
	Female	24 (58.5%)	23 (95.8%)
Age	Youngest	23 years	40 years
	Oldest	64 years	75 years
	Mean	43.5 years	57.5 years
	Average	36.2 years	52.4 years
Duration of Symptoms	Shortest	15 days	30 days
	Longest	2 years	6 years
	Average	7.3 months (26 cases)	1.2 years (14 cases)
Duration of Goiter	Shortest	30 days	3 days
	Longest	3 years	6 years
	Average	1 year (28 cases)	1.3 years (16 cases)
Hyperthyroid	Preoperative	none	none
Hypertension	Preoperative	none	5 (20%)
Clinical Diagnosis	Malignant	20 } 90%	6 } 55%
	Malignant?	8 }	5 }
	Benign	4	9
	Not stated	9	4
Thyroid Involvement	Bilaterial	51.4%	100%
	Unilateral	48.6%	none
Operative Findings	Diffuse	78.0%	----
	Cervical	----	none
	Cellulitis	----	----
Operation	Completed	22.2%	54.2% (2 lobes)
	Incomplete	51.2%	41.7% (1 lobe)
	Abandoned	17.0%	none
	Biopsy only	9.8%	4.2%
	Tracheotomy	22.2%	none
Hypothyroid	Postoperative	19.0% (32 cases)	58.0% (19 cases)
Deaths	Postoperative	4	none
	Later	2	none

In 90 per cent of the cases in the Riedel group a diagnosis of malignant goiter was made, or maglignancy was suspected and could not be ruled out. In only 55 per cent of the Hashimoto group was the lesion diagnosed as malignant or suspected of being malignant.

Postoperative hypothyroidism occurred in 58 per cent of the Hashimoto group and in only 19 per cent of the Riedel group.

In Group 2 no deaths were recorded. In Group 1 four patients died following operation while in the hospital, and two died after being discharged from the hospital. The data concerning the end results are rather meagre, however, in both groups.

Operative and postoperative complications in the Hashimoto group were practically nil, while both the operative and postoperative complications in the Riedel group make a distressing record. These complications include division of the clavicle, resection of the manubrium, resection of the jugular vein, carotid artery, vagus

and recurrent nerves, injury to the esophagus, injury to the thoracic duct, hemiplegia, panophthalmitis, and numerous tracheotomies. None of these complications occurred in the Hashimoto group.

Without going into further detail, I believe that the data which have been summarized justify the opinions which I expressed earlier in the paper.

Nothing has been said concerning the pathologic histology in either group. I believe that too great reliance upon the microscopical findings and too little attention to the clinical and pathological picture as a whole has resulted in more confusion than clarity. The microscopical findings alone are not sufficient to distinguish between Hashimoto's and Riedel's struma, or between these and certain cases of exophthalmic goiter, myxedema, syphilis, tuberculosis, chronic inflammation, degeneration and fibrous replacement in and around adenomata, and involutional changes in senility.

In collecting data on the cases under consideration, specific information concerning age, sex, the previous existence of goiter; duration of symptoms; duration of the goiter; the extent as well as the character of the involvement of the thyroid; limitation of the process to the thyroid or extension beyond it (including more than the mere statement that the gland was adherent); adhesions to the trachea as opposed to adhesions to surrounding structures; the presence in the thyroid of adenomata, cysts, areas of calcification, frank inflammation, including small or large abscesses; the presence or absence of hyperthyroidism and hypothyroidism before and after operation; the amount of tissue removed; the character of the thyroid tissue remaining; the gross characteristics of the lesion, and finally the microscopical findings, will aid in satisfactorily orienting ourselves in regard to this problem.

The following conceptions concerning the nature of these two types of lesions have proved useful to us:

1. The group of cases generally classified as Riedel's disease, ligneous thyroiditis, productive thyroiditis (exclusive of specific infections, such as typhoid, tuberculosis, syphilis, actinomycosis, etc.) may be looked upon as having a local inflammatory process in the thyroid for which an etiological factor should be sought. In these cases the general body economy is affected only secondarily by reason of destruction of the thyroid, interference with respiration and deglutition, and injuries to important blood vessels and nerves. Such a process has its counterpart in other organs and tissues, and may be expected to behave in a similar manner, except for the fact that the thyroid gland is so situated that complications can occur readily.

2. The changes which occur in the thyroid in the presence of the Hashimoto type of lesion may be considered primarily to be local manifestations of a constitutional disorder, the nature of which is as yet not understood. What the initial changes in the thyroid may be is not known, but it seems clear that in the course of time these changes tend to become degenerative (rather than inflammatory) and sclerosing, and ultimately may be accompanied or complicated by more definitely inflammatory phenomena of a non-specific character. The lymphoid tissue, which is variable in amount and to a less degree in character, is non-specific for Hashimoto's struma.

3. The possibility of the transition from struma lymphomatosa (Hashimoto) to lymphosarcoma of the thyroid should be considered. A patient in whom this occurrence seemed probable came under observation and was operated upon in March, 1930. Further details of this case will be published later. Recently I had the opportunity of examining the clinical record and the sections from a similar and even more suggestive case sent to me by Dr. Lawrence W. Smith, of New York, to whom I am indebted for the privilege of mentioning the observation at this time. In view of these two cases, a review of lymphosarcomata of the thyroid in general, with due consideration of struma lymphomatosa as a possible point of departure, seems necessary but is beyond the scope of the present paper.

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