Effect of Long-term Treatment on Subjective Problems of Patients with Common Thyroid Gland Disorders in the Czech Republic

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Abstract: In this study, a total of 364 patients of the Endocrinology outpatient clinic who had undergone thyreopathy treatment of various lengths were investigated. The objective of the study was to find out the consequences of thyroid gland disorder on a person's life, and whether the treatment length has any effect on subjective problems of patients. Common problems reported by patients were evaluated; the final number of such "common problems" in the final stage of the research was 56. In order to achieve better orientation in the processing of results, the patient-described types of disorders were classified according to the patients' own opinions into the following groups: eufunctional thyroid gland, inflammation, hypothyroidism, hyperthyroidism, tumour and surgery. The fact is that in the first year of treatment, almost half of all patients with a thyroid gland disorder experienced some problems caused by the disease. It is not a favourable finding that in the upcoming years, i.e. from 2 to 10 years, the number of those with problems will increase to as much as 61%. The period of treatment between 11 and 15 years means a decrease in the occurrence of problems to 50%, but with the number of patients with problems increasing, their number becomes even higher than that in the period of 2 to 10 years. Influence of aging processes should be also taken into account.

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Introduction

The thyroid gland (glandula thyroidea) is one of the most important regulating organs and participates in a number of bodily functions (Zamrazil and Vondra, 2007). Without a properly functioning thyroid gland, the existence of an organism is impossible. Disorder of this gland is the second most common endocrine disorder, after diabetes. A relatively large portion of the population of the Czech Republic is treated for thyreopathy – usually decreased or increased function (Němec and Zamrazil, 2005). Unfortunately, the initial signs of the disorder can often be overlooked, or patients can mistakenly regard them as symptoms of ageing, anxiety status or other disorders (Stárka and Zamrazil, 2005). The causes are unclear; in addition to genetic factors, a altered hormonal spectrum is probably also important. Physicians in the Czech Republic are confronted with disorders of endocrine function, as well as inflammations and tumours. Diagnosis of all thyroid gland disorders is performed by a general practitioner along with endocrinologists. As the text implies, a thyroid gland disorder is known sufficiently for it to be associated with some particular problems, and the manifestations of those problems will force the patients to visit a medical specialist. The study thus monitored how the problems change over the course of the disorder treatment. Since the literature has not yet mentioned any similar results, the data were evaluated on the bases of personal findings.

Material and Methods

The study was conducted with the agreement and support of the management of the Department of Medicine of the First Faculty of Medicine, Charles University in Prague, and the Central Military Hospital Prague, the internal medicine ward, endocrinology outpatient clinic. It was performed at a special site led by Assoc. Prof. Miroslav Vodák, MD., PhD., the senior physician deputy. He informed us that the site examines about 1,500 patients with a thyroid gland disorder per year. Upon an agreement with him and with effective support from other professional staff, the investigation was performed in the morning hours during blood drawing so that the questions did not hamper the examined patients. The whole study was conducted for one year, from January 2005 to December 2005. As the site examines about 1,500 patients with a thyroid gland disorder per year, in the course of a year every patient was addressed. Although the investigation was performed anonymously, only 364 patients (with only 20 of them being men) were willing to give the required information. In order to get patients' purely subjective view when describing problems caused by the disorder, the data were collected directly from patients (without being corrected by a physician). Data processing was based solely on information revealed by patients. The study found that the disease symptoms led to a variety of serious life consequences, occupational as well as private and intimate. The acquired data was evaluated using the following statistical methods: calculation of mean values, degree of variance, first and second classification of frequency tables, variation range and chi-quadrate test.

Results

Classification of a particular disorder of the thyroid gland was performed purely according to information provided by the investigated persons (without considering the professional diagnosis in documentation), so the percentage representation definitely does not correspond to data mentioned in the scientific literature. The patients used their own formulations to classify the types of thyroid gland disorders as: eufunctional thyroid gland, thyroditis, hypothyroidism, hyperthyroidism, tumour and surgery. This part of the investigation showed that quite a large portion of patients treated for any disorder of the thyroid gland feels the consequences of their disease in their personal, working and intimate life, even if the disorder is medicated. Table 1 shows the more frequent results.

Most consequences of a euthyreoidal thyroid gland are felt by the age group of 61 years and older. However, considerable consequences of the disorder start to be experienced after the 51st year of life. Most consequences of thyroid gland inflammation are experienced by the age group starting from 41 years of age. Number of consequences of hypothyroidism almost doubles after 41 years of age. The consequences almost double again in the next age decade. However, the highest number of consequences ia manifested in the age group between 51 and 60 years. Only one-fifth of persons in this age category do not experience any consequences from their disease. In the case of hyperthyroidism, consequences of thyroid gland disorders do not manifest with increasing age. Most consequences of hyperthyroidism are experienced by the age group up to 30 years old.

Table 1 – Comparison of life consequences of the disease

Type of disease	Consequences
Eufunctional	fatigue, worsened eyesight, weight gain, sweating, dry skin, brittleness of nails, problems with breathing, dyspnoea, hypersensitivity and somnolence
Inflammation/thyroiditis	fatigue, dry skin, weight gain, brittleness of nails, hair loss, sweating, hypersensitivity and worsened eyesight
Hypothyroidism	fatigue, sweating, weight gain, somnolence, hair loss, dry skin, brittleness of nails, dyspnoea, trembling hands, worsened eyesight, aversion to intimacy, hypersensitivity
Hyperthyroidism	fatigue, sweating, weight gain, somnolence, hair loss, dry skin, brittleness of nails, dyspnoea, trembling hands, worsened eyesight, aversion to intimacy, hypersensitivity
Tumour	fatigue and hair loss
Surgery	fatigue, sweating, hair loss, worsened eyesight, dry skin, somnolence, dyspnoea, weight gain and overweight
Patient does not know	fatigue, weight gain, sweating, worsened eyesight, brittleness of nails, hypersensitivity, somnolence, hair loss, swelling, dyspnoea, trembling hands, deferred reactions and aversion to intimacy

Table 2 – Disease consequences according to length of treatment

Length of treatment	No problems	Problems	Type of problems
1 year	30 (52%)	28 (48%)	14× fatigue, 7× somnolence, 5× worsened eyesight and hypersensitivity, 4× trembling hands, 3× sweating, 2× dry skin, brittleness of nails, weight gain, dyspnoea, deferred reactions, hair loss and aversion to intimacy with partner
2–5 years	51 (39%)	79 (61%)	33× fatigue, 9× hair loss, 7× somnolence, 6× dry skin, sweating and dyspnoea, 5× hypersensitivity 4× and overweight, weight gain, somnolence and worsened eyesight, 3× aversion to intimacy with partner, disability pension, 2× feeling cold, lack of concentration, unreasonable anxiety, problems with weight, deferred reactions, worsened memory, weight loss and swelling, 1× brittleness of nails, loss of energy, appetite, cold fever, resignation, glaucoma, worsened breathing, pain in muscles and joints, internal trembling, need to take medication, sleeplessness, trouble communicating, worsened psyche, intolerance of contraception, nausea, hypertension
6–10 years	27 (39%)	42 (61%)	17× fatigue, 8× worsened eyesight and weight gain, 6× brittleness of nails and somnolence, 5× dry skin, dyspnoea, hair loss and sweating, 3× hypersensitivity and sweating, 2× worsened breathing and aversion to intimacy with partner, 1× weight loss, trembling hands, slow walk, heart palpitations, disability pension, inability to do housework, cold fever, unreasonable anxiety, sleeplessness, itching of eyelids, menstrual problems, pain, deferred reactions, heart arrhythmia, need to take medication
11–15 years	16 (50%)	16 (50%)	11× fatigue, 7× sweating, 6× hair loss, 4× trembling hands, 3× aversion to intimacy with partner, 2× somnolence, hypersensitivity, dyspnoea and overweight, 1× weight gain, brittleness of nails, cold fever, deferred reactions, swelling, weight loss
16 and more years	22 (27%)	38 (63%)	13× fatigue, 8× sweating, 7× dry skin and hair loss, 6× worsened eyesight, 5× hypersensitivity, brittleness of nails and weight gain, 2× deferred reactions, dyspnoea and aversion to intimacy with partner, 1× somnolence, swelling, urge to cough, trembling hands, disability pension, worsened breathing

Consequences of thyroid gland tumours are not very significant due to the low number of cases. In the case of thyroid gland surgery, the results occur mostly in the oldest monitored age. Within the category of patients who do not know the type of their disorder, it is obvious that consequences occur mostly in the oldest monitored age group. However, starting with the age of 51, a significant increase occurs, six times higher than that in the previous decade. Table 2 presents a comparison of treatment length with the manifesting consequences of the disease (the ascertained numbers and types). The research has shown that fatigue and sweating occurred with all types of disease. With the exception of euthyreosis, hair loss occurred in every monitored category of the disease. With the exception of thyroiditis, weight gain was observed in all types of the disease. Except for surgeries and thyroiditis, worsening of eyesight was seen in all categories. Nail brittleness was also reported in all categories, except for patients with tumours and those undergoing thyroid gland surgery.

Table 3 – Comparison of reported problems in hypothyreosis with those recognized so far

	Hypothyroidism (patients)	Hypothyroidism (findings)
	Subjective complaints	
Heat tolerance	sensation of cold, chilliness	chilliness
Sleep	somnolence, sleeplessness	somnolence
Feel of performance	fatigue, less energy, low performance, worsened memory	lowering, particularly mental
Appetite	increased appetite	worsened or normal
Indigestion	–	obstipation, meteorism
Circulatory problems	–	–
Movement problems	slow walk, trembling hands	stiffness, pain in joints and muscles
	Objective problems	
Change in weight	overweight, weight gain, weight loss	usually growth
Mental and nervous changes	lack of concentration, deferred reactions, unreasonable anxiety, hypersensitivity, depression	overall slow-down, worsened recollection, sluggish reflexes
Circulatory changes	–	bradycardia, silent sounds, reduced difference between systolic-diastolic BP
Dermal changes	poor dermal quality, dry skin	rough, dry skin, myxedema
Eye changes	itching of eyelids, worsened eyesight, glaucoma	swollen eyelids

Other problems not published yet
Poor quality of hair, nails, worsened breathing, dyspnoea and negative influence on sexual life, disability pension, brittleness of nails, aversion to intimacy, dyspnoea, loss of hair, sweating, urge to cough, swelling, menstrual problems, inability to do housework

It is thus obvious that in the first year of treatment, problems caused by the disease occurred in about half of patients suffering from a thyroid gland disease. This finding can be expected, since the course of the disease is still coordinated in the first year of treatment. Not a favourable finding, however, is the fact that during following years of treatment, i.e. within 2 to 10 years, the number of patients with some problems increases to as much as 61%. The treatment period between years 11 and 15 reduces problems to 50%, but a longer treatment leads to a new increase in patients with problems, which is even a bit higher than in the period from 2 to 10 years. Since the broad lay public uses virtually only the terms "decreased" or "increased" activity of the thyroid gland (hypothyroidism or hyperthyroidism) (Tables 3 and 4) (Zamrazil et al., 2003), a comparison of the subjective and objective problems of the specific disorders with the problems so far published in scientific literature turned out to be very interesting.

Table 4 – Comparison of reported problems in hyperthyroidism with those recognized so far

	Hyperthyroidism (patients)	Hyperthyroidism (findings)
	Subjective complaints	
Heat tolerance	sweating	sweating
Sleep	somnolence	sleeplessness
Feel of performance	deferred reactions, lack of concentration, fatigue	initially feeling of performance, exhaustion caused by more severe forms
Appetite	–	usually increased (even considerably)
Indigestion	–	diarrhoea or frequent stools
Circulatory problems	–	palpitations, sensation of irregularity
Movement problems	trembling hands	amyosthenia, trembling, shoulder pains
	Objective problems	
Change in weight	weight loss, weight gain, weight problems	loss (as much as 5 to 10 kg a month)
Mental and nervous changes	hypersensitivity, resignation, anxiety	precipitancy, anxiety, irritability, easily induced reflexes with rapid movement of limbs
Circulatory changes	–	tachycardia, arrhythmia (atrial fibrillation), increased systolic-diastolic difference of BP
Dermal changes	dry skin	soft, warm, sweaty skin, thin vellus, dermatographism
Eye changes	worsened eyesight	increased shine of bulbs, eyelid refraction in GB thyreotoxicosis, signs of orbitopathy

Other problems not published yet

Swelling, dyspnoea, lack of interest in intimacy, contraception intolerance, loss of hair, brittleness of nails

Discussion

The thyroid gland is the largest endocrine gland in the human body. It is composed of follicles whose walls are formed by cells which produce the hormone calcitonin and iodine compounds, in particular T4 and T3 (Zamrazil et al., 2003). They increase basal metabolism (metabolism of carbohydrates, proteins and lipids). They stimulate blood circulation and breathing and support growth. Both hormones regulate consumption of energy in all organs and cells of the human body. The metabolism they affect the most is glucose metabolism – blood circulation (Šterzl, 2006), lipid metabolism – immune and haematological system (Zamrazil and Pelikánová, 2007), protein metabolism – skin (Marek and Brodanová, 2002), development of the organism and nervous activity – skeletal muscles (Zamrazil and Čeřovská, 2000), gastrointestinal system – bones (Zamrazil and Vondra, 2000), and gonad activity (Paulíková, 2001). The thyroid gland is part of the endocrine system (internal secretion gland) and produces special hormones – thyroxine (tetraiodothyronine) and triiodothyronine (Greenspan and Baxter, 2003). The thyroid gland needs about 200 μg of iodine daily for its optimal function (Kalvachová, 2001). However, it is equipped with various compensation mechanisms which enable it to maintain sufficient hormogenesis, even with lower doses, for a relatively long time. This is usually accompanied by an increase in the volume of the thyroid gland, caused particularly by TSH (Dvořáková et al., 2006). TSH is carried by the blood to the thyroid gland in which it stimulates decomposition of the colloid and the release of T4 and T3 into the blood (Stárka, 2007). Intense and long-term stimulation leads to growth of the thyroid gland (Pacini and DeGroot, 2006). TSH secretion is suppressed in turn, i.e. if the concentration of T4 and T3 in the blood is high, secretion of TSH decreases. And vice versa, if the concentration is lower, secretion of TSH is stimulated (Wiersinga, 2006). If goitre is too big, sometimes surgery must be done (Astl, 2007). It is necessary if the thyroid gland increases so much that it oppresses the adjacent organs, i.e. the trachea and reverse nerves, which may cause breathing problems (Čáp and Ryška, 2003). If suspicious nodules occur, a sample of tissue is taken through aspiration. Diagnosis of all thyroid gland disorders should be done by a general practitioner with endocrinologist cooperation. The examination is based on a detailed anamnesis and physical examination. A family history can determine whether there is a genetic predisposition for familial occurrence (Zamrazil and Vondra, 2000). Currently, there is about a 40% family burden, either viral or some other infectious disease (Bednářová and Zamrazil, 2007); in addition, some drugs are reportedly able to initiate thyreotoxicosis and hypothyroidism. Stress and strong psychological challenges often precede thyreotoxicosis of Graves-Basedow type, and pregnancy can activate autoimmune thyreoidal disorders. Gynaecological anamnesis informs about the use of contraception and possible sterility (often occurring with hypothyroidism). Pregnancy, whether interrupted or completed, may initiate a functional disorder of the thyroid gland. Other initiating diseases

include Crohn's disease and diabetes mellitus type I (Markalous and Gregorová, 2004). The number of medicines that can harm the thyroid gland is also increasing (Bednářová and Zamrazil, 2009). The influence of irradiation is also undeniable. The primo-patient then undergoes other necessary examinations (clinical, laboratory, imaging, aspiration biopsy as well as supporting examinations – e.g. Achilles tendon reflex, changes in ECG and ORL) to have the type of their disease diagnosed (Němec and Zamrazil, 2005).

Since the research was based purely on patients' data, including diagnoses reported by them, instead of collected medical documentation, any distortions that could possibly have been caused by the professional approach of the medical staff were excluded. Of course, this comes at the cost of the fact that the diagnoses reported by patients may not always be true. (Just as an illustration: patients with reported hyperthyroidism sleep well and long, they are tired, gain weight and resign. Swelling should not occur with this type of the disease but it is often reported by patients. A female patient with reported hypothyroidism who should have been somnolent reported, on the contrary, sleeplessness. Weight loss should not be in situ in this case, yet the patient reported it). It is thus undisputedly clear that patients perceive the symptoms of a thyroid gland disorder very subjectively. This fact appears to be a considerably significant finding, indicating that patients' problems or their subjective feelings are considerably different from the symptoms described by scientific literature. Thus the investigated issue has not yet been mentioned in the literature (most probably due to its subjectively less predictive value for attending medical staff compared to their own objective findings and assessment of the actual health status of the patient). For that reason, the objective indices were not monitored; on the contrary, the objective was to focus on the subjective indices. A questionnaire with both open and blind questions was selected as the most appropriate means of collecting information. It is apparent that in the first year of treatment, some problems caused by the disease occur in approximately half of all patients with a thyroid gland disorder (Blahoš and Zamrazil, 2006). The results imply that except in the case of inflammation, in which only long-term treatment resulted in the regression of problems, problems of other patients increased over the first years of treatment. This fact is more or less to be expected, since in the first year of treatment the course of the problem is still coordinated. This finding that is not favourable is the fact that during subsequent years of treatment, i.e. within 2 to 10 years, the number of patients with some problems increases to as much as 61%. The treatment period between years 11 and 15 (except for surgeries, for which a slight increase is visible even in this period) brings about a decrease in problems to 50%, but a longer treatment leads to a new increase in patients with problems, which is even a bit higher than in the period from 2 to 10 years. It is important to note that one-half to two-thirds of patients in long-term treatment report some problems. This finding is not a good sign, as by all expectations most problems should manifest at the beginning of the

treatment and decrease gradually over the course of treatment. In the case of a eufunctional thyroid gland, the occurrence of problems in patients is lower than the absence of problems, for as long as 10 years following the initiation of treatment. In the next monitored period the ratio of both monitored parameters becomes equal. Inflammation of the thyroid gland always manifests as problems when treatment is initiated, and lasts for as long as 10 years from the initiation of the treatment. It is clear that in the subsequent treatment period the number of problems that occurred decreased slightly. The real origin of thyroiditis is not fully known (Amino and Hidaka, 2006). The treatment is anti-inflammatory or antibiotic; using non-steroidal anti-rheumatics or corticoids if the above-mentioned are ineffective, and in exception cases local surgeries, if intraparenchymatous abscesses occur (Zamrazil et al., 2003). In the case of hyperthyroidism, the number of problems prevails over the feeling of being cured in all monitored categories (Zamrazil, 2007). Hypothyroidism may also cause depression (reported in as many as 20% of cases) (Stárka and Zamrazil, 2005). The correct medicine and dosage should be monitored continuously, since excessive application of the hormone increases the risk of osteoporosis and cardiac arrhythmia and under-dosing increases the risk of hypertension and increased cholesterol levels (Marino et al., 2006). The need for thyroxine changes often throughout life. By contrast, almost nobody complains about problems in the initial phase of hyperthyroidism. Increased activity of the thyroid gland (hyperthyroidism) results in an excessive level of its hormones in the blood-stream (thyreotoxicosis). Thus the human body is in a permanent emergency status (Zamrazil et al., 2003). The number of problems increases with the duration of the disease, while the last monitored category – the longest treatment – report a far higher number of problems than of feelings of not having them. Patients who undergo thyroid gland surgery have almost no problems the first year afterwards. Unfortunately, in the following 10-year period and over the next 16 years the number of patients with problems increases significantly. An exception is the period from 11 to 15 years, in which the number of patients satisfied with their actual health status is relatively high – the highest during the whole time of treatment. Patients who do not know have a ratio of problems to non-problem status that is balanced in the 1st year of treatment, identically to the period of treatment between 11 and 15 years. The other treatment periods bring about more serious consequences of the treatment for the patients.

Conclusion

An overall comparison of thyroid gland disease implies that patients complain about the most problems or consequences of the disease symptoms between the 2nd, 10th, 16th and subsequent years of treatment, whereas the least number of complaints about problems is reported when treatment is initiated.

In the case of the thyroid gland dysfunction which is most frequently perceived by the layman public (increased or decreased activity), it is quite evident that the

disease symptoms, even if treated, are of a permanent nature, in at least half of the persons questioned.

An absolutely unambiguous result of the research is the fact that patients perceive the symptoms of thyroid gland disease very subjectively, and their symptoms do not always correspond to those described in the literature, or to those which should match the particular classification of their disease. Possible effects of ageing itself during the long-term observation should be considered.

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