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Editors and Chairmen:
Professor Dr. D. Reinwein
Medizinische Klinik und Poliklinik, Essen, Federal Republic of Germany
Professor Dr. P. C. Scriba
Klinik für Innere Medizin, Lübeck, Federal Republic of Germany

The Various Types of Hyperthyroidism

Edited by
D. Reinwein and P. C. Scriba
Assisted by D. Beysel

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Editors' Addresses:

Prof. Dr. D. Reinwein, Medizinische Klinik und Poliklinik der Universität, Abteilung für klinische Endokrinologie, Hufelandstr. 55, 4300 Essen, Federal Republic of Germany

Prof. Dr. P. C. Scriba, Klinik für Innere Medizin der Universität, Ratzeburger Allee 160, 2400 Lübeck 1, Federal Republic of Germany

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Contents

List of Lecturers

Dr. W. D. Alexander
Department of Medicine
Gardiner Institute
Western Infirmary
GB-Glasgow G11 6NT

Prof. Dr. P. Beck-Peccoz
Reparto di Endocrinologia
e Medicina Costituzionale
Policlinico
Via F. Sforza 35
I-20122 Milano

Prof. Dr. G. Benker
Med. Klinik und Poliklinik
der Universität
Abt. für Endokrinologie
Hufelandstraße 55
FRG-4300 Essen 1

Prof. Dr. L. E. Braverman
University of Massachusetts
Medical School/Dept. of Medicine
Division of Endocrinology
and Metabolism
USA-Worcester, Massachusetts 01605

Prof. Dr. W. H. Dillmann
University of California
Department of Medicine
225 Dickinson Street [H-811-C]
USA-San Diego, CA 92103-9981

Prof. Dr. D. Emrich
Medizinische Universitätsklinik
Abteilung für Nuklearmedizin
Robert-Koch-Straße 40
FRG-3400 Göttingen

Dr. J. M. Hansen
Department of Internal
Medicine and Endocrinology F
Herlev Hospital
DK-2730 Herlev

Prof. Dr. R. Hehrmann
Medizinische Klinik I
Diakonissenkrankenhaus
Rosenbergstr. 30
FRG-7000 Stuttgart 1

Prof. Dr. G. Hennemann
Academisch Ziekenhuis Rotterdam
Inwendige Geneeskunde III, Tevens
Dr. Molewaterplein 40
NL-3015 GD Rotterdam

Prof. Dr. R. L. Himsworth
University of Aberdeen
Department of Medicine
and Therapeutics
GB-Foresterhill, Aberdeen AB9 2ZD

Prof. Dr. C. Jaffiol
Hôpital Lapeyronie
555, route de Ganges
F-34059 Montpellier Cedex

Prof. Dr. K. Joseph
Abt. für Klin. Nuklearmedizin
der Philipps-Universität
Baldinger Straße
FRG-3550 Marburg

Priv.-Doz. Dr. G. Kahaly
III. Med. Klinik
Abt. Endokrinol./Univ.-Kliniken
Langenbeckstr. 1
FRG-6500 Mainz

Dr. J. M. Kaufman
RUG – Akademisch Ziekenhuis
Afd. Endokrinologie
De Pintelaan 185
B-9000 Gent

Dr. F. S. Keck
Univ.-Klinik Innere Medizin I
Steinhövelstr. 9
FRG-7900 Ulm

Prof. Dr. P. Kendall-Taylor
The Royal Victoria Infirmary
Queen Victoria Road
GB-Newcastle upon Tyne NE 1 5LP

R. Kohlwagen
Klinikum der Univ. Heidelberg
Abt. für Innere Medizin I
Luisenstr. 5
FRG-6900 Heidelberg

Dr. I. A. Kourides
Memorial Sloan-Kettering
Cancer Center
1275 York Avenue
USA-New York, N.Y. 10021

Dr. T. Kreisig
Abt. Nuklearmedizin
Radiologische Poliklinik der Universität
Ziemssenstr. 1
FRG-8000 München 2

Dr. B. Leopold
Institut für Medizinische Biochemie
Harrachgasse 21/III
A-8010 Graz

Prof. Dr. W. Meng
Med. Universitätsklinik
und Poliklinik
Friedrich-Loeffler-Str. 23a
GDR-2200 Greifswald

Dr. H. W. Müller-Gärtner
Universitätskrankenhaus Eppendorf
Abt. für Nuklearmedizin
Martinistraße 52
FRG-2000 Hamburg 20

Dr. Ph. de Nayer
Univ. Louvain/Medical School
Nuclear Medicine
St. Luc UCL
B-1200 Brussels

Priv.-Doz. Dr. Dr. Th. Olbricht
Med. Klinik und Poliklinik
der Universität
Abt. für Endokrinologie
Hufelandstr. 55
FRG-4300 Essen

Dr. R. Paschke
Klinikum Mannheim der Universität Heidelberg II. Med. Klinik
Theodor-Kutzer-Ufer
FRG-6800 Mannheim

Dr. H. Perrild
Department of Medicine C
Bispebjerg Hospital
DK-2400 Copenhagen

Prof. Dr. med. R. C. Pickardt
Medizinische Klinik Innenstadt
der Universität München
Ziemssenstr. 1
FRG-8000 München 2

Priv.-Doz. Dr. F. Raue
Klinikum der Univ. Heidelberg
Abt. für Innere Medizin I.
Luisenstr. 5
FRG-6900 Heidelberg

Prof. Dr. Chr. Reiners
Abt. für Nuklearmedizin
Universitätsklinikum
Hufelandstr. 55
FRG-4300 Essen 1

Prof. Dr. D. Reinwein
Med. Klinik und Poliklinik
der Universität
Abt. für klinische Endokrinologie
Hufelandstr. 55
FRG-4300 Essen

Prof. Dr. H. D. Röher
Chirurgische Universitätsklinik
Moorenstraße 5
FRG-4000 Düsseldorf

Dr. B. Saller
Med. Klinik II Klinikum
Großhadern der Universität
Marchioninistr. 15
FRG-8000 München 70

Prof. Dr. H. Schatz
Zentrum für Innere Medizin
der Universität
FRG-6300 Giessen

Prof. Dr. H. Schleusener
Klinikum Steglitz der FU Berlin
Medizinische Klinik
Hindenburgdamm 30
FRG-1000 Berlin 45

Dr. B. Schlote-Sautter
II. Medizinische Klinik
Klinikum Mannheim der
Universität Heidelberg
Theodor-Kutzer-Ufer
FRG-6800 Mannheim 1

Dr. H.-G. Schneider
Abt. für Innere Medizin I
Universität Heidelberg
Luisenstr. 5
FRG-6900 Heidelberg

Priv.-Doz. Dr. H. M. Schulte
I. Med. Univ.-Klinik
Schittenhelmstr. 12
FRG-2300 Kiel

Prof. Dr. P. C. Scriba
Klinik für Innere Medizin
der Universität
Ratzeburger Allee 160
FRG-2400 Lübeck 1

Prof. Dr. P. Stubbe
Universitäts-Kinderklinik
Robert-Koch-Str. 40
FRG-3400 Göttingen

Dr. J. Sturm
Chirurgische Klinik
Klinikum Mannheim der
Universität Heidelberg
Theodor-Kutzer-Ufer
FRG-6800 Mannheim

Priv.-Doz. Dr. J. Teuber
Med. Klinik II
Klinikum Mannheim der
Universität Heidelberg
Theodor-Kutzer-Ufer
FRG-6800 Mannheim

Dr. M. Tosti Balducci
Cattedra di Endocrinologia
Universitá di Pisa
Viale de Tirreno, 64
I-56018 Tirrenia [Pisa]

Prof. Dr. F. E. Ulrich
Klinik und Poliklinik für
Innere Medizin der Universität
Leninallee 2
GDR-4020 Halle

Prof. Dr. K. H. Usadel
II. Medizinische Klinik
Klinikum Mannheim der
Universität Heidelberg
Theodor-Kutzer-Ufer
FRG-6800 Mannheim 1

Prof. Dr. P. G. Walfish
Mount Sinai Hospital
Endocrinology and Metabolism
600 University Avenue/Suite 640
C-Toronto, Ontario M5G 1X5

Prof. Dr. Jan D. Wiener
Academisch Ziekenhuis
Vrije Universiteit
Postbus 7057
NL-1007 MB Amsterdam

Prof. Dr. R. Windeck
Med. Klinik und Poliklinik
der Universität
Abt. für Endokrinologie
FRG-4300 Essen 1

III.1.1 Hyperthyroid heart disease: Diagnostic and therapeutic aspects

P. C. Scriba

The secondary cardiopathy following an abnormality of the thyroid gland function may be accessable to causal treatment. This is one of the reasons for the cardiologists interest in endocrinology. The cardiovascular changes to be observed in thyrotoxicosis may be clearer in perspective when dealt with in comparison to hypothyroidism. For this reason, a case of myxedematous heart disease is demonstrated first.

The condition of myxedematous heart disease was first described and named by Hermann Zondek. Zondek had to leave our country in the early 30s and died 1979 in Jerusalem [1]. Prof. Zondek was one of the outstanding endocrinologists who as a victim of German policy and crime disappeared from Berlin and left the country so much poorer. In these days, we shall commemorate in this country the 50th anniversary of a day of terror and shame, the Reichskristallnacht. Remembering H. Zondek may add to our awareness of the past and help in aiming at a better world.

A brief description of the heart in hypothyroidism should start with the fact, that myocardial function is itself altered in the sence of a diminished function. Vora et al. [2] were able to demonstrate a slowed diastolic thinning rate of the posterior ventricular wall. – Further, the prolonged systolic time interval may be used as peripheral sign of hypothyroidism [3]. – The reader is referred to recent reviews for further details [3, 4]. It is well known, that hypothyroid patients tolerate less digoxin than euthyroid patients. The reverse is true for hyperthyroid patients. Giving a constant dose of 0.25 mg digoxin or 0.1 mg digitoxin, respectively, resulted in lower serum levels of digoxin in thyrotoxic patients as compared to euthyroid and hypothyroid patients, respectively [5]. The levels were negatively correlated to creatinine clearance, the latter obviously contributing to what is known as refractoriness to digitalis in hyperthyroidism. Notably, the levels for digitoxin were not different under these conditions.

A systematic comparison of the changes of the heart in thyrotoxicosis and hypothyroidism [3] has to list among others the two most prominent aspects of 1. cardiac failure and 2. arrhythmia in thyrotoxicosis.

Congestive heart failure and cardiac hypertrophy are sometimes though certainly not regularily observed in thyrotoxic patients as demonstrated in 2 such cases. Dr. Dillmann has dealt with the direct effect of thyroxine on the

myocardium. Forfar et al. [6] were able to show, that the left ventricular ejection fraction was decreased in thyrotoxic patients by exercise, whereas it increases in controls. This and the ratio of the ejection time to LVET were not normalized by propranolol. The latter observation was used as an argument for the direct effect of thyroxine.

In addition, there is evidence in the literatur [7] that a prolaps of the mitral valve may be observed in approximately half of the patients with immunogenic hyperthyroidism but only in 2 of 20 patients with thyrotoxicosis due to thyroidal autonomy. Further, the prolaps of the mitral valve was correlated to endocrine orbitopathy rather than to actual thyrotoxicosis. A "myxedematous" state of the mitral valve specific for immunogenic hyperthyroidism was therefore claimed [7].

Absolute arrhythmia due to atrial flutter or fibrillation may be observed in 10–15% of all thyrotoxic patients [3, 4]. When euthyroidism is achieved, some 60–90% of these patients return to normal sinus rhythm spontaneously. If medical or electrical cardioversion has to be applied at all, this should be done only after the patient has been euthyroid for a few months.

Regarding this problem the other way round, some 6–10% of all patients with absolute arrhythmia are reported to have thyrotoxicosis. Interestingly, Forfar et al. [8] have studied 4 patients who actually had only a negative TRH test but no T_4 or T_3 elevation and could only be converted after antithyroid treatment. – The explanation of arrhythmia in thyrotoxic patients is complex. Direct thyroxine effects and an increased sensitivity towards catecholamines play their role. Some of the patients probably have preexistent and contributing coronary heart disease. This may be concluded from occasional ECG changes of the ischemic type which disappeared after antithyroid treatment as observed in some of our patients. An increase in supraventricular extrasystolies may trigger atrial fibrillation.

Finally, the well known effectiveness of blocking beta-receptors in thyrotoxic patients has to be mentioned. A word of caution may be added. Beta-receptor blocking may be unnecessary and probably even dangerous if given too long and bradycardia should be carefully avoided in the thyrotoxic patient.

In summary, this short overview was meant as a clinical introduction to the review by W. H. Dillmann.

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