Pediatric Allergy
Nima Rezaei
Editor

Pediatric Allergy
A Case-Based Collection with MCQs,
Volume 1

Springer
Editor
Nima Rezaei
Department of Immunology, School of Medicine
Research Center for Immunodeficiencies (RCID)
Children’s Medical Center
Tehran University of Medical Sciences (TUMS)
Tehran
Iran

Network of Immunity in Infection, Malignancy
and Autoimmunity (NIIMA)
Universal Scientific Education and Research
Network (USERN)
Tehran
Iran

https://doi.org/10.1007/978-3-030-18282-3

© Springer Nature Switzerland AG 2019
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of
the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation,
broadcasting, reproduction on microfilms or in any other physical way, and transmission or information
storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology
now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication
does not imply, even in the absence of a specific statement, that such names are exempt from the relevant
protective laws and regulations and therefore free for general use.
The publisher, the authors, and the editors are safe to assume that the advice and information in this book
are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the
editors give a warranty, express or implied, with respect to the material contained herein or for any errors
or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims
in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland
Preface

Immunology has found its way well into the practice of pediatrics. Years after publication of the first pediatric text books, footprints of immunology can be found in diagnosis and practice of almost all pediatric disorders. Delivering a magnificent contribution is the advent of novel diagnostic methods of molecular genetics in pediatric practice. Genetic diagnosis is now an indispensable part of the routine practice of primary immunodeficiency diseases, inborn metabolic errors, and monogenic malformations, making its way into diagnostic criteria of some as well. It wont go far wrong to state that the science of pediatrics has entered an era of interdisciplinary practice with genetics and immunology. The rapid flow of discovery of biological drugs during the last decade, availability of whole exome (and genome) sequencing methods, and the outstanding boost in the rate of success of hematopoietic and solid organ transplantation are all affirmative to this notion. Thanks to molecular genetic methods, an increasing number of the newly introduced monogenic diseases are being characterized, donors and recipients are being cross-matched using intricate genotype:phenotype cross matching, and immunotherapy for allergy benefits from state-of-the-art characterization of culprit epitopes in peptide scale. This book series tries to strike a balance between cutting-edge science of immunology and clinical practice of pediatrics, through a series of meticulously chosen case discussions, presented by pediatric practitioners and immunology experts.

This three-volume book series is a collection of well-presented case discussions in the field of pediatric immunology and allergy. Volume I, Pediatric Allergy, is focused on diagnosis and practice of allergy, asthma, atopy, and relevant disorders. Volume II, Pediatric Immunology, thoroughly addresses primary immunodeficiency disorders, and finally, Volume III, Pediatric Autoimmunity and Transplantation, is a constellation of cases in autoimmune and rheumatologic disorders of childhood, secondary immunodeficiency conditions, and real cases with hematopoietic and solid organ transplantation.

Volume I of this series is dedicated to represent some of the many faces of hypersensitivity disorders, from food and drug allergy to allergic rhinitis, atopic dermatitis, to asthma, and finally anaphylaxis as a fatal outcome of all hypersensitivity
reactions. Starting by Chapters 2–12, with allergic rhinitis as the prototype of allergic disorders, we move onto Chapters 13–25, focused on case discussions on food allergy, and Chapters 26–36 presenting case discussions on urticaria and atopic dermatitis. Completing the picture of atopy triad, Chapters 37–44 give a glimpse over state-of-the-art guidelines for asthma diagnosis and management. In Chapters 45–53, the reader is introduced to drug hypersensitivity reactions, as second most common cause of allergic reactions in the pediatric population. The final chapters of this volume, from Chapters 54–60, are dedicated to anaphylaxis, a potentially lethal systemic hypersensitivity reaction, and a must-know for every physician practicing in pediatric care.

The *Pediatric Immunology and Allergy Series* is the result of a multinational collaboration of more than 350 scientists from more than 100 well-known universities/institutes worldwide. I would like to hereby acknowledge the expertise of all contributors and their generous devotion of time and effort in preparing each of the 290 chapters of the series. I would like to extend my gratitude to the Springer publication for providing me the opportunity to publish the book.

Hopeful I remain that this book provides an exemplary touch to the fast-growing intersection of pediatric medicine and basic immunology, and a useful guide for pediatric practitioners worldwide.

Tehran, Iran

Nima Rezaei
Acknowledgment

I would like to express my sincere gratitude for the tremendous efforts of my Editorial Assistant, Dr. Farzaneh Rahmani. I would like to gratefully acknowledge her fine work, without which completion of this book would not have been possible.

Nima Rezaei
Contents

1 Introduction to Allergy ....................................................... 1
   Luke A. Wall, Maryam Rahmani, Farzaneh Rahmani, Iva Topalusic,
   Hossein Esmaeilzadeh, Sara Manti, Samin Sharafian,
   Carmelo Damiano Salpietro, Caterina Cuppari, Kevin S. Gipson,
   and Nima Rezaei

2 Sneezing and Rhinorrhea ............................................... 11
   Maryam Rahmani

3 Persistent Rhinitis ............................................................ 17
   Juan J. L. Sienra-Monge, Omar J. Saucedo-Ramirez,
   and Elsy M. Navarrete-Rodríguez

4 Itchy and Blocked Nose .................................................... 21
   Juan J. L. Sienra-Monge, Jaime M. Del-Rio-Chivardi,
   and Elsy M. Navarrete-Rodríguez

5 History of Paranasal Sinus Surgery and Recurrent Rhinitis ....... 25
   Juan J. L. Sienra-Monge, Omar J. Saucedo-Ramirez,
   and Elsy M. Navarrete-Rodríguez

6 Copious Nasal Secretions Since Early Childhood ................... 29
   Mohammad Nabavi, Mohammad Hassan Bemanian,
   and Sima Shokri

7 Perennial Rhinitis and Post Nasal Drip ................................ 33
   Charmi Patel and Punita Ponda

8 Nasal Congestion Since Childhood ...................................... 37
   Charmi Patel and Punita Ponda

9 Nasal Congestion and Headache ........................................ 41
   Franklin Mariño-Sánchez, Álvaro Carrillo, Meritxell Valls-Mateus,
   and Joaquim Mullol
10 Annoying Nasal Itching and Rhinorrhea ............................................. 49
Franklin Mariño-Sánchez, Meritxell Valls-Mateus, and Joaquim Mullol

11 Progressive Headaches and Right Eye Proptosis ............................... 55
Gordon Myers, Michael E. Dunham, and Luke A. Wall

12 Persistence of Rhinorrhea After Use of Nasal Spray .......................... 61
Farzaneh Rahmani and Maryam Rahmani

13 Bloody Streaks in Stool ................................................................. 65
Samin Sharafian

14 Vomiting and Angioedema After Eating Chocolate ............................. 69
Farzaneh Rahmani

15 Facial Angioedema Following Smoothie Ingestion .............................. 73
Alexandra Langlois and Moshe Ben Shoshan

16 Itchy Eyes and Rhinorrhea When Playing with Her Dog ................... 79
Eva Macías, Milagros Lázaro, and Ignacio Dávila

17 Acute Reaction After Drinking Formula Milk ................................... 83
Kok Wee Chong, Wenyin Loh, and Jan Hau Lee

18 Recurrent Itchy Mouth ................................................................. 89
Charmi Patel and Punita Ponda

19 Recurrent Wheals When He Exercised .............................................. 95
Makiko Hiragun, Shunsuke Takahagi, and Michihiro Hide

20 Reflux and Failure to Thrive .......................................................... 101
David A. Hill

21 Abdominal Rash and a History of Hirschsprung ................................. 107
Mahboubeh Mansouri

22 Recurrent Sepsis-Like Episodes ....................................................... 111
Purificacion Gonzalez-Delgado and Javier Fernandez

23 Vomiting, Lethargy and Pallor ........................................................ 119
Melanie A. Ruffner and Terri F. Brown-Whitehorn

24 Nausea, Profuse Sweating, and Flushing After Eating Seafood .......... 125
Sara Manti, Bianca Faraci, Annamaria Bagnato, and Caterina Cuppari

25 Acute Reaction to Influenza Vaccination .......................................... 131
Silviya Mihaylova Novakova, Plamena Ivanova Novakova, and Maria Toncheva Staevska

26 Extensive Rashes ................................................................. 135
Brian K. Y. Chia and Emily Y. Gan
43 Tachypnea, Fever and Eosinophilia ............................... 219
Kevin S. Gipson, Ryan H. Avery, and Luke A. Wall

44 Cough and Fever ................................................... 225
Nikolaos A. Karantaglis

45 Yellow-Colored Facial Skin Rash ................................. 229
Mojgan Kianiamin, Farzaneh Rahmani, and Nima Rezaei

46 Recurrent Angioedema of the Eyes and Lips .................. 233
Eva Rebelo Gomes and Carmo Abreu

47 Urticaria and Facial Angioedema ............................... 239
Elena Camelia Berghea

48 Hypotension and Erythema During Anesthesia .................. 243
Silviya Mihaylova Novakova, Ivan Petkov Novakov,
and Manuela Dimitrova Yoncheva

49 Deterioration After Emergency Treatment for Asthma Attack .... 247
Sakine Işık and Suna Asilsoy

50 Viral Pneumonia and History of Short-Bowel Syndrome ........ 253
Federica Porcaro, Maria Giovanna Paglietti, Antonella Diamanti,
and Renato Cutrera

51 Collapse and Angioedema at the Emergency Department ......... 257
Iva Topalusic, Irena Ivkovic-Jurekovic, Martin Cuk,
and Marta Navratil

52 Acute Reaction to Pentavalent Vaccine .......................... 261
Darko Richter

53 Allergy to Bus ....................................................... 269
Iraj Mohammadzadeh, Farzaneh Rahmani, and Nima Rezaei

54 Recurrent Loss of Consciousness ................................. 273
Hossein Esmaeilzadeh

55 Generalized Urticaria and Decreased Consciousness
After Barbecue ...................................................... 277
Taher Cheraghi

56 Recurrent Abdominal Cramps, Diarrhea and
Loss of Consciousness ............................................. 283
Irena Ivkovic-Jurekovic and Marta Navratil

57 Recurrent Hives After Sea Bathing ............................... 287
Eva Rebelo Gomes

58 Bee Sting Reaction ............................................... 293
Charmi Patel and Punita Ponda
Contents

59 Lip Angioedema Following Hepatitis B Vaccination ............... 297
   Darko Richter

60 Extensive Rash and Swollen Eyelids Following Eating
   Peanut Cookie .................................................. 303
   Nima Rezaei

Index. ........................................................................ 307
Contributors

Carmo Abreu, MD  Centro Hospitalar do Porto, Porto, Portugal

Stefania Arasi, MD Allergy Unit, Department of Pediatrics, University of Messina, Messina, Italy

Sonia de Arriba-Méndez, MD, PhD Pediatric Service, University Hospital Salamanca, Salamanca, Spain

Suna Asilsoy, MD Department of Pediatric Allergy and Immunology, Dokuz Eylul University, Izmir, Turkey

Ryan H. Avery, BS Department of Pathobiological Sciences, Louisiana State University School of Veterinary Medicine, Baton Rouge, LA, USA

Annamaria Bagnato Unit of Pediatric, Department of Pediatrics, University of Messina, Messina, Italy

Wojciech Baran, MD, PhD Department of Dermatology, Venereology and Allergology, Wroclaw Medical University, Wroclaw, Poland

Andrea Barbalace, MD  Unit of Pediatric, Department of Pediatrics, University of Messina, Messina, Italy

Mohammad Hassan Bemanian, MD Department of Allergy and Clinical Immunology, Rasoul Akram Hospital, Iran University of Medical Sciences, Tehran, Iran

Elena Camelia Berghea, MD Emergency Clinical Hospital for Children M.S. Curie, Bucharest, Romania

University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

Terri F. Brown-Whitehorn, MD Division of Allergy and Immunology, Children’s Hospital of Philadelphia, Philadelphia, PA, USA

Department of Pediatrics, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA
Lucia Caminiti, MD  Allergy Unit, Department of Pediatrics, University of Messina, Messina, Italy

Álvaro Carrillo, MD  Unidad de Rinología y Cirugía de Base de Cráneo, Servicio de Otorrinolaringología, Hospital Universitario Ramón y Cajal, Madrid, Spain

Taher Cheraghi, MD  Department of Pediatrics, 17th Shahrivar Children’s Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran

Brian K. Y. Chia, MBBS, MRCP  National Skin Centre, Singapore, Singapore

Kok Wee Chong, MBBS, MRCPCH (UK)  Allergy Service, Department of Paediatric Medicine, KK Women’s and Children’s Hospital, Singapore, Singapore

Martin Cuk, MD  Nephrology Department, Children’s Hospital Zagreb, Zagreb, Croatia

Caterina Cuppari, MD  Unit of Pediatric, Department of Pediatrics, University of Messina, Messina, Italy

Renato Cutrera, MD  Respiratory Unit, Academic Department of Pediatrics, Bambino Gesù Children’s Hospital, IRCCS, Rome, Italy

Ignacio Dávila, MD, PhD  Allergy Department, University Hospital of Salamanca, Salamanca, Spain

Allergy Service, Department of Biomedical and Diagnostic Sciences, Biosanitary Institute of Investigation, University Hospital of Salamanca, Salamanca, Spain

Purificacion Gonzalez-Delgado, MD  Allergy Section, Alicante University General Hospital-ISABIAL, Alicante, Spain

Jaime M. Del-Rio-Chivardi, MD  Hospital Infantil de México Federico Gómez, Ciudad de México, Mexico

Antonella Diamanti  Artificial Nutrition Unit-Gastroenterology, Hepatology and Nutrition Unit, Bambino Gesù Children’s Hospital, Rome, Italy

Valeria Dipasquale, MD  Unit of Pediatric, Department of Pediatrics, University of Messina, Messina, Italy

Michael E. Dunham, MD  Pediatric Otolaryngology, Children’s Hospital, Louisiana State University School of Medicine, New Orleans, LA, USA

Hossein Esmaeilzadeh, MD  Allergy Research Center, Namazi Hospital, Shiraz University of Medical Sciences, Shiraz, Iran

Bianca Faraci  Unit of Pediatric, Department of Pediatrics, University of Messina, Messina, Italy

Javier Fernandez, MD  Allergy Section, Alicante University General Hospital-ISABIAL, Alicante, Spain

Department of Clinical Medicine, Miguel Hernandez University, Alicante, Spain
Emily Y. Gan, MBBS, MRCP, MD  Department of Dermatology, KK Women’s and Children’s Hospital, Singapore, Singapore

Javad Ghaffari, MD  Department of Allergy and Clinical Immunology, Mazandaran University of Medical Sciences, Sari, Iran

Kevin S. Gipson, MD, MS  Division of Pediatric Pulmonology, Department of Pediatrics, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Eva Rebelo Gomes, MD  Basic and Clinical Immunology Unit, Laboratory of Immunology, Faculty of Medicine, University of Porto, Porto, Portugal

Allergy and Clinical Immunology Service, Centro Hospitalar Universitario do Porto, Porto, Portugal

Michihiro Hide, MD, PhD  Department of Dermatology, Institute of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan

David A. Hill, MD, PhD  Division of Allergy and Immunology, Department of Pediatrics, Children’s Hospital of Philadelphia, Philadelphia, PA, USA

Makiko Hiragun, MD  Department of Dermatology, Institute of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan

Sakine Işık, MD  Department of Pediatric Allergy and Immunology, Süreyyapaşa Chest Diseases and Thoracic Surgery Training Hospital, Istanbul, Turkey

Irena Ivkovic-Jurekovic, MD, PhD  Children’s Hospital Zagreb, Zagreb, Croatia

Faculty of Medicine, University of Osijek, Osijek, Croatia

Faculty of Dental Medicine and Healthcare, University of Osijek, Osijek, Croatia

Nikolaos A. Karantaglis, MD, MSc  Pediatric Pulmonology Unit, 3rd Pediatric Department, Hippokrateion Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

Mojgan Kianiamin, MD  Chamran Medical Hospital, Tehran, Iran

Alexandra Langlois, MD  Division of Pediatric Allergy, Dermatology and Clinical Immunology, Department of Pediatrics, Montreal Children’s Hospital, McGill University Health Centre, Montreal, QC, Canada

Milagros Lázaro, MD, PhD  Allergy Department, University Hospital of Salamanca, Salamanca, Spain

Jan Hau Lee, MBBS, MRCPCH (UK), MCI  Children’s Intensive Care Unit, KK Women’s and Children’s Hospital, Singapore, Singapore

Wenyin Loh, MBBS, MRCPCH (UK)  Allergy Service, Department of Paediatric Medicine, KK Women’s and Children’s Hospital, Singapore, Singapore

Eva Macías, MD, PhD  Allergy Department, University Hospital of Salamanca, Salamanca, Spain