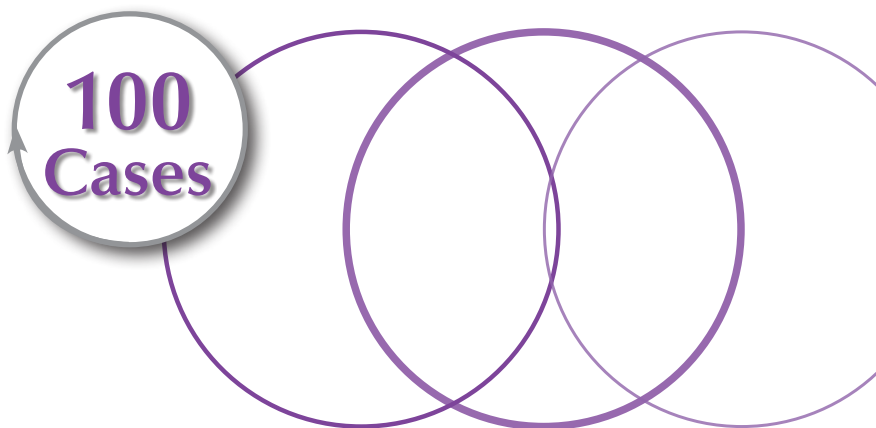


in Clinical
Pathology



in Clinical Pathology

Eamon Shamil MBBS MRes

Foundation Year 2 Doctor, Whipps Cross University Hospital,
Barts Health NHS Trust, London, UK

Praful Ravi MA MB BChir

Academic Foundation Year 2 Doctor, Hammersmith Hospital,
Imperial College Healthcare NHS Trust, London, UK

Ashish Chandra MD FRCPath DipRCPath (Cytol)

Consultant Histopathologist, Guy's & St Thomas' Hospitals,
NHS Foundation Trust, London, UK

100 Cases Series Editor:

Janice Rymer MBBS FRACP

Dean of Undergraduate Medicine and Professor of Gynaecology,
King's College London School of Medicine, London, UK



CRC Press

Taylor & Francis Group

Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

© 2014 by Taylor & Francis Group, LLC
CRC Press is an imprint of Taylor & Francis Group, an Informa business

No claim to original U.S. Government works
Version Date: 20140422

International Standard Book Number-13: 978-1-4441-7999-6 (eBook - PDF)

This book contains information obtained from authentic and highly regarded sources. While all reasonable efforts have been made to publish reliable data and information, neither the author[s] nor the publisher can accept any legal responsibility or liability for any errors or omissions that may be made. The publishers wish to make clear that any views or opinions expressed in this book by individual editors, authors or contributors are personal to them and do not necessarily reflect the views/opinions of the publishers. The information or guidance contained in this book is intended for use by medical, scientific or health-care professionals and is provided strictly as a supplement to the medical or other professional's own judgement, their knowledge of the patient's medical history, relevant manufacturer's instructions and the appropriate best practice guidelines. Because of the rapid advances in medical science, any information or advice on dosages, procedures or diagnoses should be independently verified. The reader is strongly urged to consult the relevant national drug formulary and the drug companies' printed instructions, and their websites, before administering any of the drugs recommended in this book. This book does not indicate whether a particular treatment is appropriate or suitable for a particular individual. Ultimately it is the sole responsibility of the medical professional to make his or her own professional judgements, so as to advise and treat patients appropriately. The authors and publishers have also attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, please access www.copyright.com (<http://www.copyright.com/>) or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. CCC is a not-for-profit organization that provides licenses and registration for a variety of users. For organizations that have been granted a photocopy license by the CCC, a separate system of payment has been arranged.

Trademark Notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Visit the Taylor & Francis Web site at
<http://www.taylorandfrancis.com>

and the CRC Press Web site at
<http://www.crcpress.com>

Dedications

*To my parents, siblings and mentors, who taught me
the importance of kindness, compassion and integrity*

Eamon Shamil

To my parents and my teachers

Praful Ravi

To my mother, my first teacher

Ashish Chandra

CONTENTS

<i>Preface</i>	<i>xi</i>
<i>Acknowledgements</i>	<i>xiii</i>
<i>Contributors</i>	<i>xv</i>

Section 1: CHEMICAL PATHOLOGY, IMMUNOLOGY AND GENETICS

Case 1: Polyuria and polydipsia	3
Case 2: Traces of blood found on a routine urine dipstick	7
Case 3: Confusion, lethargy and shortness of breath	9
Case 4: A child with facial swelling	11
Case 5: Joint pains and fatigue	13
Case 6: Anxiety, irritability and reduced menstrual frequency	15
Case 7: Screening for prostate cancer?	19
Case 8: A young woman found unconscious in bed	23
Case 9: A middle-aged woman with jaundice	27
Case 10: Drug overdose	31
Case 11: Fatigue, weakness and constipation	33
Case 12: Excessive hair growth and infertility	37
Case 13: Fatigue and irregular periods	41
Case 14: Stiff and painful hands	43
Case 15: Abdominal pain, nausea and vomiting	47
Case 16: Frequent throat and chest infections	51
Case 17: Right-sided flank pain moving to the groin	53
Case 18: A routine 'health check' for a 55-year-old man	55
Case 19: Collapse in a patient undergoing chemotherapy	59
Case 20: A 10-day-old baby with ambiguous genitalia	63
Case 21: Fatigue, weakness and weight gain	67
Case 22: Hypertension in a young woman	69
Case 23: Nausea, vomiting, weakness and paraesthesia	71
Case 24: Erectile dysfunction in a young man	73
Case 25: A young man with 'high cholesterol'	75
Case 26: Rash after a bone marrow transplant	77
Case 27: A fall on an outstretched hand	79
Case 28: A patient in follow-up after a liver transplant	81



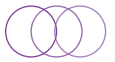
Case 29: A man with poorly controlled blood pressure	85
Case 30: Dizziness on standing upright	89
Case 31: Sudden-onset chest pain in a tall woman	91
Case 32: Concerns about the risk of breast cancer	93
Case 33: Seizure in a neonate	95
Case 34: Flu-like illness after foreign travel	97

Section 2: HISTOPATHOLOGY

Case 35: A young woman with ankle swelling and shortness of breath	103
Case 36: Chest pain and sudden death	105
Case 37: An elderly man with severe back pain	109
Case 38: Increased breathlessness and sudden death	111
Case 39: A worsening cough and haemoptysis	113
Case 40: A young man with shortness of breath and haemoptysis	117
Case 41: Sudden onset weakness and dysphasia	119
Case 42: Numbness, weakness and clumsiness	121
Case 43: Forgetfulness and disorientation	123
Case 44: Coffee-ground vomiting	125
Case 45: Episodic right upper quadrant abdominal pain	129
Case 46: Chronic diarrhoea and flatulence	133
Case 47: A young man with bloody diarrhoea	135
Case 48: Abdominal discomfort and generalized weakness	139
Case 49: Abdominal pain in a publican	143
Case 50: Abdominal distension, loss of appetite and malaise	145
Case 51: Delayed passage of meconium in a newborn	147
Case 52: Back pain and fever in a diabetic	149
Case 53: Urinary problems in an elderly man	153
Case 54: A young man with a testicular lump	155
Case 55: Heavy and painful menstrual bleeding	159
Case 56: Abnormal vaginal bleeding	163
Case 57: A lump in the breast	165
Case 58: Lymph node enlargement in a young man	167
Case 59: An itchy, bleeding mole on the back	171

Section 3: HAEMATOLOGY

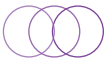
Case 60: Shortness of breath and heartburn	175
Case 61: Raised white cell count in an asymptomatic individual	179



Case 62: Worsening fatigue and bleeding gums	183
Case 63: Burning urine and an abnormal clotting screen	187
Case 64: Headaches, blurred vision and itching	189
Case 65: A painful arm and a large spleen	193
Case 66: A rash on the thighs	197
Case 67: Fatigue and weight loss	201
Case 68: Pneumonia with abnormal liver function	205
Case 69: Recurrent epistaxis	211
Case 70: Bruising after a pneumonia	215
Case 71: Headache and a rash	219
Case 72: Shortness of breath and weight loss	223
Case 73: Low platelets in pregnancy	227
Case 74: Anaemia resistant to a blood transfusion	231
Case 75: Asymptomatic anaemia in the elderly	235
Case 76: Back pain and fatigue	241
Case 77: Short of breath and underweight	245
Case 78: A large epigastric mass	249
Case 79: Deterioration after a blood transfusion	253

Section 4: MICROBIOLOGY

Case 80: Leg pain and fevers	259
Case 81: Fever and collapse	263
Case 82: Burning sensation when passing urine	269
Case 83: A bit short of breath	273
Case 84: Unhappy camper	277
Case 85: Diarrhoea in an elderly man	283
Case 86: A painful knee	287
Case 87: A pain in the ear	291
Case 88: A red eye	293
Case 89: Child with a rash	297
Case 90: Pelvic pain	303
Case 91: A painful swollen jaw	305
Case 92: Traveller's diarrhoea	311
Case 93: Fever in a returning traveller	315
Case 94: A spot of confusion	319
Case 95: Congenital infection	323



Contents

Case 96: A chronic cough	327
Case 97: A jaundiced view	331
Case 98: Gram negative bacteraemia	335
Case 99: A groin swelling	339
Case 100: Urethral discharge	343
<i>Reference Ranges</i>	347
<i>Index</i>	349

PREFACE

A sound understanding of pathology is crucial to the study and practice of clinical medicine. Moreover, an appreciation of the basics of this challenging subject helps students and doctors provide answers to the vital questions of how and why disease affects their patients. Despite its paramount importance, pathology is often poorly covered in the medical school syllabus though heavily represented in undergraduate and postgraduate examinations. We therefore hope that these 100 cases encompassing histopathology, clinical biochemistry, immunology, genetics, haematology and microbiology will provide medical students and junior doctors an insight into the pathologic basis of common clinical problems as well as helping in preparation for assessments.

Eamon Shamil
Praful Ravi
Ashish Chandra
February 2014

ACKNOWLEDGEMENTS

The specimen images are from The Gordon Museum of Pathology, King's College London.

CONTRIBUTORS

Histopathology

Dr Mark Ong BSc MBChB MRCS
Specialist Trainee in Histopathology
Guy's & St Thomas' NHS Foundation Trust
London, UK

Dr Alexander Polson FRCPath
Consultant Histopathologist
Guy's & St Thomas' NHS Foundation Trust
London, UK

Haematology

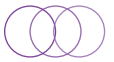
Dr Hassen al-Sader MBBS MRCP
Speciality Trainee in Haematology
Barts Health NHS Trust
London, UK

Microbiology

Dr Wael Faroug Elamin MBBS BSc (Hons) MD
Specialist Registrar Medical Microbiology
Barts Health NHS Trust
London, UK

Dr Caryn Rosmarin MBBCh DTM&H MSc (Med Micro) FCPATH (SA) FRCPath
Microbiology/Infection Control Consultant
Microbiology Training Programme Director (NE London)
Barts Health NHS Trust
London, UK

Section 1
CHEMICAL PATHOLOGY,
IMMUNOLOGY AND
GENETICS



CASE 1: POLYURIA AND POLYDIPSIA

History

A 45-year-old woman with a history of hypothyroidism presents to her GP with a three-month history of passing urine more frequently, including up to three times at night. She finds that her constant desire to drink fluids, particularly cold water, and her frequent need to visit the toilet are bothersome since she works as a teacher. Apart from hypothyroidism, she has no other health problems and takes no regular medications.

Examination

Peripherally, the patient is warm and well perfused, with no evidence of dehydration. Examination of her heart, lungs, and abdomen is unremarkable. Neurologic examination is normal. Urine dipstick is negative.

INVESTIGATIONS	
Haemoglobin	13.5
White cells	8.3
Platelets	325
Sodium	144
Potassium	4.2
Urea	6.5
Creatinine	100
Fasting glucose	6.0
Corrected calcium	2.25

A water deprivation test is performed, as shown in Figure 1.1.

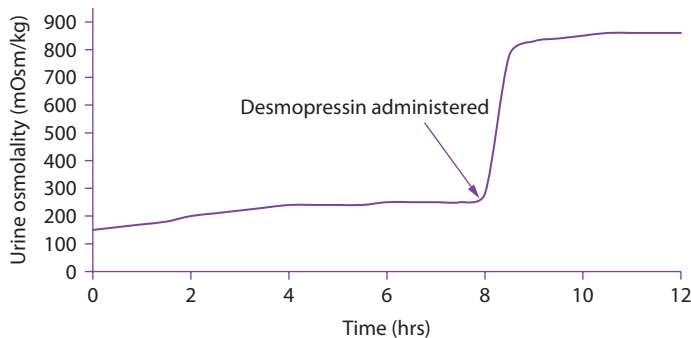
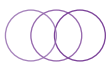


Figure 1.1 A water deprivation test.

Questions

1. What is the differential diagnosis for this presentation, and what further tests are required?
2. What are the principles of a water deprivation test, and how should the results shown in Figure 1.1 be interpreted?
3. Discuss the pathophysiology of the likely diagnosis, and suggest how the patient may be treated.

**ANSWER 1**

This woman presents with polyuria, nocturia and polydipsia. These symptoms have four important differential diagnoses: (1) diabetes mellitus, (2) diabetes insipidus, which may either be central or nephrogenic in origin, (3) hypercalcaemia, which may present like the above in an acute setting, and (4) primary polydipsia (PP). Therefore, investigations need to be directed at elucidating one of the above diagnoses. For diabetes mellitus, a fingerprick glucose may be performed, but formal fasting or random serum glucose is needed to make a diagnosis. Simple urinalysis may show the presence of glucose, which would point towards this diagnosis. Measurement of corrected serum calcium is needed to look for hypercalcaemia.

Diabetes insipidus is a relatively rare disease characterized by the excretion of large volumes of dilute urine as a result of either a deficiency of or a resistance to the actions of the posterior pituitary hormone antidiuretic hormone (ADH), also known as arginine vasopressin (AVP). ADH is released into the circulation from the posterior pituitary gland in response to an increase in serum osmolality, and acts to increase reabsorption of water by causing the insertion of aquaporin-2 (AQP2) channels into the apical membrane of the distal parts of the nephron. Deficiency of ADH leads to central diabetes insipidus (CDI), while failure of the kidney to respond to its actions causes nephrogenic diabetes insipidus (NDI).

Diagnosis of diabetes insipidus includes basic laboratory investigations and a fluid deprivation test. Hyponatraemia may be found secondary to dehydration, while urinalysis may show a low specific gravity (<1.005). Serum osmolality is increased due to excess free water loss. It may be formally measured, or estimated using the formula: $2 \times [\text{Na}^+] + [\text{urea}] + [\text{glucose}]$, as these are the main solutes in plasma. (For this patient, estimated serum osmolality would be around 300 mOsm/kg.) Similarly, urine osmolality will be low, generally less than 200 mOsm/kg, due to inadequate reabsorption of water from the distal parts of the nephron.

When the diagnosis is equivocal, a fluid deprivation test may be performed. Patients are withheld from fluid intake under close supervision for a period of 8 hours, with hourly measurement of body weight, urine volume and urine osmolality. After allowing a sufficient time for dehydration, desmopressin (synthetic ADH) is administered subcutaneously, and a final urine sample is taken one hour afterwards to measure urine osmolality. The table below shows how the results may be interpreted:

Urine osmolality (mOsm/kg)		Diagnosis
After fluid deprivation	After desmopressin	
<300	>750	CDI
<300	<300	NDI
>750	>750	PP
300–750	<750	Non-diagnostic

The essence of the test is that with CDI, urine will become more concentrated once the deficient ADH is replaced, whereas with NDI, the inability of the kidney to respond to ADH means that any further replacement by ADH has no effect.

CDI is commonly idiopathic though autoantibodies against ADH-secreting cells of the hypothalamus are found in several cases. Moreover, these patients tend to exhibit other autoimmune conditions, so the patient in our case is most likely to fall into this category,