
Urolithiasis

Michael E. Moran

Urolithiasis

A Comprehensive History

Michael E. Moran, MD
William P. Didusch Center for Urologic History
American Urological Association
Linthicum, MD, USA

ISBN 978-1-4614-8195-9 ISBN 978-1-4614-8196-6 (eBook)
DOI 10.1007/978-1-4614-8196-6
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2013947802

© Springer Science+Business Media New York 2014

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. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

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.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

*To the women who have stood with me through all trials
and tribulations of life: Gail, Mattison, and Aubrey.
To my mentors who have greatly influenced my professional
pathway—particularly Sakti Das and George Drach.
Finally, to all of the students who have endeavored
to persevere my exotic methods—“serva me, servabo!”*

“Toruruwai”—MEM

Contents

1 A History of Histories	1
Introduction.....	1
Why History?	1
A History of Stone Disease.....	2
Modernism and Urolithiasis.....	3
References.....	4
2 Epistemology and Lithology	5
Introduction.....	5
Not Created Equal.....	6
Stones Through Time.....	9
Lithology.....	10
Stone Research Centers.....	12
Renal Anatomy and Physiology.....	13
Stones: A Big Problem.....	14
References.....	15
3 Laboring Under the Stone: A Literary Legacy of Lithiasis	17
Introduction.....	17
Early Modern Suffering	17
Writers on Suffering.....	18
Physicians and Suffering.....	18
Discussion	19
References.....	19
4 Paleolithology	21
Introduction.....	21
Findings of Prehistoric Urolithiasis	21
Discussion	24
References.....	24
5 Greco-Roman Stone Disease	27
Introduction.....	27
Stone Disease and Greco-Roman Theories.....	27
Discussion	28
References.....	29

6	Dark Ages, Dark Therapies	31
	Introduction.....	31
	Middle Ages for Urolithiasis	31
	Dark Ages	32
	Dark Remedies.....	34
	Discussion	35
	References.....	35
7	Renaissance of Urolithiasis	37
	Introduction.....	37
	Out of Darkness	38
	Humanism and Suffering	39
	Questioning Nature?	40
	Medicine and Surgery	42
	Conclusions.....	44
	References.....	45
8	Van Beverwijck: The Bridge from Ancient to Modern	47
	Introduction.....	47
	William Harvey and Stone Disease.....	47
	Johan van Beverwijck	48
	Beverwijck's <i>Treatise</i> : Chapter One	48
	Beverwijck's <i>Treatise</i> : Chapter Two	51
	Thomas Sydenham and Hermann Boerhaave	53
	Conclusions.....	54
	References.....	55
9	Enlightened Minds and Stone Disease	57
	Introduction.....	57
	Stone Disease and the New Medicine.....	58
	Protochemistry	60
	Matthew Dobson, M.D., F.R.S.....	61
	Sampson Perry, Surgeon	62
	Discussion	63
	References.....	64
10	Charlatans, Quacks, and Joanna Stephens	67
	Introduction.....	67
	Charlatans and Secrets Become Respectable?.....	68
	The Rise of Quackery	71
	Joanna Stephens' Controversy	75
	Inquiry into Stephens' Nostrums	77
	Another Fish Tale: Modern Chemolysis	78
	Conclusions.....	79
	References.....	81
11	Evolution of Stone Disease	85
	Introduction.....	85
	Evolution of Evolution.....	87
	Biologic Concretions: Plants.....	88

	Biologic Concretions: Animals.....	89
	Darwin's Dilemma.....	90
	Zoonomia.....	92
	Charles Darwin: The Uncle.....	94
	The Muse and the Malady.....	95
	Conclusions.....	96
	References.....	98
12	Founding Fathers of Stone Chemistry.....	101
	Introduction.....	101
	The New Dawn.....	101
	The Founders.....	103
	The English School.....	105
	The French School.....	110
	Golding Bird.....	111
	Discussion.....	112
	References.....	114
13	Famous Stone Sufferers.....	117
	Introduction.....	117
	The Legacy of the Famous Stone Patient.....	117
	Famous Stone Patients.....	117
	Discussion.....	119
	References.....	119
14	Frederik Ruysch's Fascination with Urolithiasis.....	121
	Introduction.....	121
	Ruysch's Life and Times.....	121
	Ruysch's Use of Kidney Stones: Exhibits.....	124
	Peter the Great.....	125
	Anatomical Controversy and Surgical Upheaval.....	126
	Discussion.....	127
	References.....	129
15	Gray's Anatomy of Stones: Henry Vandyke Carter.....	131
	Introduction.....	131
	Anatomy Lessons.....	131
	Gray's Anatomy.....	136
	Henry Vandyke Carter.....	137
	Carter's Stone Disease.....	138
	Beale Anatomy, Urine, and Microscopes.....	140
	Conclusions.....	142
	References.....	143
16	The Stone Hospital and Stone Treatment.....	145
	Introduction.....	145
	Hospitals and Stone Disease.....	146
	"The Norwich School of Lithotomy".....	148
	Mr. Cheselden.....	150
	John Yelloly.....	152

Sir Astley Cooper.....	154
Dr. Civiale	155
The Necker Hospital and Paris.....	157
St. Peter's Hospital for the Stone	157
Conclusions.....	158
References.....	160
17 Liesegang Rings.....	163
Introduction.....	163
Crystals	164
Crystallization.....	165
What's In a Name?.....	168
Every Picture Tells a Story.....	171
Liesegang	171
Liesegang Rings.....	172
Supersaturation Theory.....	174
Modern Science and Phases of Precipitation.....	176
Conclusions.....	176
References.....	178
18 Lithotomy.....	181
Introduction.....	181
Ancient Art of Lithotomy	182
The Third Stream	185
Surgeons and Lithotomists of the Dark Ages	185
The Sixteenth Century	187
The Seventeenth and Eighteenth Centuries	191
William Cheselden.....	194
The Norwich School of Lithotomy	196
The Suprapubic Lithotomy	199
The Transrectal Lithotomy.....	200
The American Lithotomists	201
Conclusions.....	203
Addendum Lithotomies	204
Lithotomia Celsiana	204
Paul of Aegina.....	206
Susruta's Lithotomy	206
William Cheseldon (via John Douglas)	207
References.....	209
19 Lithotripsy and Litholapaxy.....	213
Introduction.....	213
Early Attempts at Avoiding Lithotomy.....	214
Civiale	216
The French Group	218
Vincenz Kern and Orthodoxy	219
Mr. Henry Thompson.....	222
University College Hospital.....	223

Thompson and Royal Stones	224
Early American Lithotritry	227
Dr. Bigelow	228
Thompson on Bigelow	230
Conclusions	231
References	232
20 Imaging the Beast: Sounding, Lithoscopes, and Röntgen Rays	235
Introduction	235
The Sound and the Fury	236
The Sound of Silence	238
Röntgen	240
Lithoscopes	241
Stones and Early X-rays	243
Let There Be Light	245
Modern Radiologic Diagnosis	249
Conclusions	251
References	251
21 Rise of “Science” in Stone Disease	255
Introduction	255
Science Itself and Stone Disease	256
Disease Itself	257
William Ord	258
The Stones Speak	260
Physiology	261
Conclusions	264
References	266
22 Fictitious Stones and Sir William Osler	269
Introduction	269
Sir William Osler	270
Osler’s Fictitious and Real Encounter	271
Hypochondria	272
Drugs and Doctors	274
Munchausen’s Syndrome	276
Drugs and Stone Disease	277
The Opium Smoker	278
Discussion	279
References	282
23 Early Modern Stone Disease	285
Introduction	285
An Indian Rhinoceros	287
Alexander Randall	288
Baby Steps	292
Rise of Modern Surgery	293
Ureterolithotomy	295
Staghorn Stones	297

Conclusions.....	299
References.....	301
24 Epidemiology	305
Introduction.....	305
Rise of Epidemiology	306
Demography.....	307
The French School and Medical Statistics.....	309
Stone Disease: The Earliest Trends	311
Stone Disease and the Norwich School	312
Civiale's Data.....	314
Early Modern Trends	317
Modern Urolithiasis Epidemiology.....	320
Discussion	322
References.....	324
25 Pathophysiology	327
Introduction.....	327
Light in the Darkness	328
Animal Models.....	329
Cell Culture Models.....	331
Chemistry Models.....	332
24-h Urine Collections	333
Birdwell Finlayson and EQUIL	335
Discussion	337
References.....	338
26 The Rarest Stone of All!	343
Introduction.....	343
Searching for the Needle in a Haystack.....	344
Blue Stones and Blue Urine.....	345
The Rarest Stone of All!	345
Discussion	347
References.....	349
27 The Largest Stone of All!	351
Introduction.....	351
Largest Historical Stone.....	352
Largest Bladder Stone.....	354
Largest Stone in Urinary Diversion	355
Largest Transurethral Stone	355
Famous Kidney Stones.....	356
Smallest, Most Famous Stone.....	358
The Fastest Lithotomy	358
Self-Performed Perineal Vesicolithotomy?.....	359
Self-Performed Nephrolithotomy?.....	360
The First Documented Renal Stone Surgery.....	360
Samuel Pepys' Bladder Stone.....	361
Conclusions.....	362
References.....	362

28	Lithotripsy: From Rocket Science to the Clinic	365
	Introduction.....	365
	Stone Destruction: Terms.....	366
	Microexplosive Lithotripsy	366
	Electrohydraulic Lithotripsy	367
	Ultrasonic Lithotripsy	370
	Laser Lithotripsy	374
	Shock Wave Lithotripsy	375
	Discussion	376
	References.....	378
29	Modern Stone Science	381
	Introduction.....	381
	Scientific Meetings and Globalization	382
	The R.O.C.K. Society	383
	Stones: An Overview	385
	Uric Acid Stone Disease	385
	Calcium Phosphate Stone Disease	389
	Calcium Oxalate Stone Disease	390
	Struvite Stone Disease	392
	Cystine Stone Disease.....	394
	Associated Diseases	397
	Modern Synthesis.....	399
	Stone Genetics	400
	Discussion	402
	References.....	405
30	Equal Rights: Stone Disease and Females	411
	Introduction.....	411
	Women of Greece.....	412
	Female Anatomy Lessons	413
	Stones and Gender Through Time	418
	Theories of Gender Superiority	419
	Equal Rights.....	420
	The Loss of Gender Bias.....	421
	Conclusions.....	422
	References.....	425
	Bibliography from the Scatterplot	427
31	The Urologist's Guide to the Galaxy	431
	Introduction.....	431
	Science Fiction.....	431
	Science Fact	432
	Stones in Space	433
	References.....	434
32	Towards Keeping the Hippocratic Oath (Six Sigma)	437
	Introduction.....	437
	Principles of Change	437
	The Law of Accelerating Returns	440

Information Technologies	442
Artificial Intelligence	443
Biotechnology	444
Nanotechnology	446
To Err Is Human.....	447
Six Sigma	449
The Future of Stones.....	450
Discussion	451
References.....	452
33 Epilogue	455
On Epilogues.....	455
On History.....	456
On the History of Urolithiasis.....	456
References.....	458
Index.....	459