

Pharmacology
in
Clinical
Practice

BECKMAN

Pharmacology in Clinical Practice

BY HARRY BECKMAN, M. D.

Director, Departments of Pharmacology,

Marquette University Schools of Medicine

and Dentistry; and Consulting Physician,

Milwaukee County General Hospital and

Columbia Hospital, Milwaukee, Wisconsin

1952

DEDICATED TO ALL THOSE STUDENTS WITH
WHOSE FORBEARANCE AND AID I HAVE
DEVELOPED THIS SUBJECT
THROUGH THE YEARS

THE TRUE PHYSICIAN IS ONE WHO CURES;
OBSERVATION WHICH DOES NOT TEACH TO
CURE IS NOT OBSERVATION BY A PHYSICIAN
BUT RATHER BY A NATURALIST.

F. J. V. BROUSSAIS (1772-1838)

PREFACE

This book presents the kind of pharmacology that is taught here at Marquette. More than that, it represents the philosophy of pre-clinical teaching that has evolved within me as the years have passed. When I came into Pharmacology after clinical training, more than a quarter century ago, I found its pedagogical methods very disturbing. They were based on the premise that to fill a young man with scientific facts regarding a large number of drugs would equip him to use those drugs subsequently in the treatment of his patients. This is incorrect because it assumes that the physician or surgeon at the bedside or operating table, and the dentist at his chair, all reason forward from the drug to the patient. They do not. They reason back from the patient and his malady to the drug.

I think in terms of specific diseases and the opportunities they present to the pharmacologist, in terms of symptoms and not of anatomical groupings of organs or chemical groupings of drugs. The material in this book is presented with that orientation. This leaves no place for consideration of the historical development of compounds or the relationships of chemical composition and biologic activity. These are immensely important subjects—but only to the pharmacologist and graduate student in pharmacology, not to undergraduate medical and dental students or to practitioners in either profession.

There are two sections in this book. Section I presents the pharmacologic aspects of all—well, nearly all—the major problems that arise in medicine and dentistry. It should be studied, learned, mastered. Section II supplies a few chemical and physical facts about the drugs discussed in Section I and lists some representative commercially available preparations of each so that you will know the forms in which it is available. This Section is designed for reference only, but I hope you will find some pleasure, too, in using it.

Almost precisely 22 years ago today the first edition of my *Treatment in General Practice* appeared. Through all of the time that has since passed, my relations with my publishers, the great firm of W. B. Saunders Company, have been cordial and warmly sustaining. I offer them this new book to supersede the old in full confidence that they will derive as much pleasure from the task of bringing it out as I had in writing it.

HARRY BECKMAN, M.D.

July, 1952

CONTENTS

SECTION I

CLINICAL USE OF DRUGS

ALLERGY	3
Antihistaminics	4
Epinephrine	9
Ephedrine	11
Isuprel	12
Vaponefrin	13
Orthoxine	13
Aminophylline	13
Procaine	15
Emetics and Expectorants	16
Sedatives	16
Oxygen-Helium	17
Medication for Cough	17
Antibiotics	17
ACTH and Cortisone	17
Pyromen	19
Topical Application of Drugs in Hay Fever	19
Local Applications in Urticaria	20
 ANESTHESIOLOGY	 21
Inhalation Anesthetics	21
Stages of Anesthesia	22
Technic of Inhalation Anesthesia	25
Ether	27
Chloroform	32
Vinethene	33
Ethyl Chloride	34
Trichloroethylene	34
Nitrous Oxide, Ethylene, Cyclopropane	35
Intravenous Anesthetics and Adjuvants	39
Pentothal	39
Curare	43
Syncurine, Flaxedil and Tolserol	46
Syncurine	46
Flaxedil	47
Tolserol	47
Procaine	47
Rectal Anesthetics	48
Avertin	48
Pentothal	49
Paraldehyde	50
Ether-Oil	50
Spinal Anesthesia	51

Epidural (Peridural) Analgesia	61
Caudal Anesthesia	62
Infiltration and Regional (Blocking) Anesthesia	64
Topical Anesthetics	66
The Cocaine Group	66
Benzocaine and Butesin	69
Orthoform	69
Ethyl Chloride	69
Antihistaminics	70
Phenol	70
Premedication in Anesthesia	70
Choice among the Major Anesthetics	73
Anesthesia in Obstetrics	74
Anesthesia in Abdominal Surgery	79
Anesthesia in Thyroid Surgery	80
Anesthesia in Urologic Surgery	80
Anesthesia in Neurologic Surgery	80
Anesthesia in Thoracic Surgery	81
Anesthesia for Operations about the Head, Neck and Eyes	81
Anesthesia in Cardiovascular Disease	82
Anesthesia in Allergy	83
Anesthesia in a Poliomyelitis Patient	83
Anesthesia in Children	83
Anesthesia in the Aged	84
Dental Anesthesia	85
ANTIBIOTICS	88
Penicillin	88
Streptomycin	102
Dihydrostreptomycin	105
Aureomycin, Terramycin and Chloromycetin	106
Bacitracin	112
Polymyxin	113
Neomycin	114
AUTONOMIC PHARMACOLOGY	116
Anatomy and Physiology	116
Parasympathetic Stimulants	118
Parasympathetic Inhibiting Drugs	121
Sympathetic Stimulants	123
Sympathetic Inhibiting Drugs	126
Ganglionic Blocking Agents	127
Summarization of Typical Autonomic Drug Actions	127
CARDIOLOGY (Including the Vascular Diseases)	130
Aneurysm	130
The Arrhythmias	130
Quinidine	133
Digitalis	140
Mecholyl and Prostigmin	140
Neo-Synephrine	141
Magnesium Sulfate	142
Emetics	143
Atabrine	144
Atropine	144

Epinephrine and Ephedrine in Heart Block	144
Epinephrine and Procaine in Resuscitation	144
Barium Chloride	145
Potassium Chloride	146
Diethylaminoethanol	146
Pronestyl	146
Morphine	147
Procaine	147
Propylthiouracil	147
Carotid Sinus Syndrome	147
Cerebral Vascular Episodes	148
Congenital Heart Disease	149
Congestive Heart Failure	149
Digitalis and Associated Drugs	152
The Diuretics	164
Mercurial Diuretics	167
Xanthine Diuretics	172
Ammonium Chloride	173
Osmotically Active Diuretics	174
Miscellany of Other Drugs	174
Cor Pulmonale	178
Coronary Disease	180
Analgesics	180
Vasodilators	181
Sedatives	187
Protectives against Arrhythmias	188
Digitalis	188
Anticoagulants	188
Oxygen	189
Miscellany of Minor Drugs	189
Subacute Bacterial Endocarditis	193
Hypertension	196
Blood Pressure-Reducing Drugs	196
Pyromen as Pyrogenic Agent	203
Sucrose as a Depleting Agent	203
TEA and Amytal in Selection of Patients for Sympathectomy	203
Benzodioxan in Diagnosis of Pheochromocytoma	204
Neurocirculatory Asthenia	205
Pericarditis	205
Peripheral Vascular Diseases	205
Vasodilating Drugs	208
Phlebothrombosis	215
Thrombophlebitis	230
Varicose Veins	230
Injection Technic	231
DENTISTRY	238
Pain	238
Anesthesia	239
Periodontal Infections	239
Pulpal Infections	240
Extraction Infections	241
Prophylaxis of Subacute Bacterial Endocarditis	242
Stomatitis	242
Cellulitis	243

Osteomyelitis	243
Actinomycosis	243
Caries	244
Hemorrhage	246
Orthodontia	247
Autonomic Nervous System	247
Sterilization of Instruments	247
Lesions That the Dentist May Encounter and Should Recognize	247
 DERMATOLOGY	250
Vehicles	250
Bacterial Infections	253
Virus Infections	257
Fungus Infections	258
Scabies	260
Louse Infestation	261
Pruritus	262
Sensitization Dermatoses	264
Sunburn	265
Hyperhydrosis	265
Seborrheic Dermatitis	265
Idiopathic Dermatoses	266
 ENDOCRINOLOGY	275
Thyroid Hormone	275
Parathyroid Hormone (Including Discussion of Dihydrotachysterol and the Calcium Salts)	279
Parathyroid Extract	280
Dihydrotachysterol	281
Vitamin D	281
Calcium Salts	282
Anterior Pituitary and Adrenocortical Hormones	284
ACTH and Cortisone	285
DCA and the Adrenocortical Solutions in Water and Oil	294
Posterior Pituitary Hormones	296
Adrenal Medullary Hormones	298
Pancreatic Hormones	298
Sex Hormones	298
Estrogens and Progesterone	298
Chorionic Gonadotrophin and Testosterone	300
 GASTROENTEROLOGY	304
 HEMATOLOGY	305
Hypochromic-Microcytic Anemias	305
Iron for Oral Administration	306
Saccharated Iron Oxide Intravenously	308
Hyperchromic-Macrocytic Anemias	310
Liver Extract	315
Hog Stomach	317
Vitamin B ₁₂	317
Folic Acid	318
Anemias Primarily Benefited by Combating the Underlying Infection	318
Anemias Primarily Benefited by Correcting an Underlying Deficiency	319
Anemias Primarily Benefited by Combating Chemical Poisoning	319

CONTENTS

xiii

Anemias Primarily Benefited by Splenectomy	319
Anemias Primarily Benefited by Transfusion with Rh Negative Blood	319
Anemias for which There is No Satisfactory Therapy	319
Cobaltous Chloride in Anemias	320
ACTH in Refractory Anemias	321
Polycythemia Vera	321
Radioactive Phosphorus	321
Other Drugs	323
Agranulocytosis	323
Hemophilia	324
Purpura	324
Rutin	325
Protamine Sulfate	326
Toluidine Blue	326
Hypersplenism	327
Hypoprothrombinemia	327
Leukemia and Related Disorders	327
 INTERNAL MEDICINE	329
Chest Diseases	329
Asthma	329
Atelectasis	329
Berylliosis	329
Bronchiectasis	330
Bronchiolitis	331
Broncholithiasis	331
Common Cold	331
Cough	332
Emphysema	333
Empyema	334
Influenza	335
Loeffler's Syndrome	335
Lung Abscess	335
Lung Fluke Infestation	336
Mycoses	336
Pleurisy	336
Pneumonia	336
Pneumoconioses	343
Pulmonary Edema	344
Pulmonary Embolism	345
Pulmonary Hemorrhage	345
Spontaneous Pneumothorax	346
Tuberculosis	346
Streptomycin	346
Para-Aminosalicylic Acid	355
Hydrazides of Isonicotinic Acid	357
Drugs of Minor Importance	358
Chronic Gallbladder Disease, Gallstone Colic and Biliary Dyskinesia	360
Collagenous Diseases	366
Colloid Goiter	367
Constipation	367
Diabetes Mellitus	371
Aims of Insulin Therapy	372
Insulin Preparations and Choice among Them	373
Nature of Insulin Action	377

Combination of Insulin with Other Drugs	378
Absorption and Excretion of Insulin	379
Insulin in Special Situations	379
Diabetes in the Pregnant Woman	381
Diabetes in Children	382
Surgery in Diabetes	383
Cardiovascular Complications	383
Insulin Toxicity	383
Insulin Resistance	386
Insulin Allergy	387
Fever	388
Flatulence	389
Food Poisoning	390
Gastric Neuroses	391
Gastritis	393
Hyperinsulinism	393
Infectious Diseases	395
Acute Infectious Lymphocytosis	395
Amebiasis	395
Bartonellosis	399
Colorado Tick Fever	399
Common Cold	399
Erysipelas	399
Giardiasis	399
Infections Derived from Lower Animals	400
Anthrax	400
Balantidiasis	400
Brucellosis	400
Encephalitides of Virus Origin	401
Erysipeloid	401
Foot-and-Mouth Disease	401
Glanders	401
Leptospirosis (Weil's Disease)	401
Melioidosis	402
Plague	402
Psittacosis	402
Rabies	402
Rat-Bite Fever	402
Tularemia	403
Infections of Warmer Climates	403
Cholera	403
Coccidiostis	403
Dengue	403
Leishmaniasis	403
Leprosy	405
Malaria	408
Sandfly Fever	418
Trypanosomiasis	418
Yaws	419
Yellow Fever	421
Infectious Mononucleosis	421
Influenza	421
Listerellosis	421
Meningitis, Nonmeningococcal	421
Meningococcal Infections	421
Mycotic Infections	423

CONTENTS

XV

Pediatric Infections	425
Pneumonias	425
Poliomyelitis, Epidemic Pleurodynia, Dengue, Coxsackie Virus Disease	425
Relapsing Fever	425
Rickettsial Infections	426
Sepsis and the Nonmeningococcal Meningitides	428
Shigellosis	429
Smallpox	430
Streptococcal Sore Throat	430
Tetanus	431
Tuberculosis	431
Typhoid and Paratyphoid Fevers	431
Vincent's Infection	432
Insomnia	432
Kidney Disturbances	439
Infection	439
Allergy	439
Hypertension	439
Convulsions	440
Edema	440
Heart Failure	442
Uremia	442
Anuria	443
Liver Disorders	444
Neoplastic Diseases	448
Estrogens	448
Testosterone	450
Urethane	451
Nitrogen Mustard	453
Aminopterin	455
Stilbamidine and Pentamidine	457
ACTH and Cortisone	457
Radioactive Phosphorus	458
Radioactive Iodine	459
Arsenic	459
Podophyllum and Colchicine	459
Obesity	460
Pain	462
Aches and Pains	464
Intractable Pain	465
Morphine and Morphine-like Drugs	466
Procaine Intravenously	476
Intrathecal Alcohol	477
Cobra Venom	477
Pain Due to Visceral Distention	478
Pain Due to Smooth Muscle Stretch	478
Pain Due to Voluntary Muscle Spasm	478
Pain Due to Muscle Ischemia	479
Joint Pain	480
Traumatic Pain	480
Referred Pain	480
Preoperative and Postoperative Pain	480
Pain in Peptic Ulcer	480
Labor Pains	480
Painful Menstruation (Dysmenorrhea)	480
Low Back Pain	480

Headache	481
Pain in Anal Fissure and Hemorrhoids	481
Pain Resulting from Mucosal Congestion	481
Sore Throat	481
Earache	481
Painful Burns	481
Pain in Glaucoma	481
Peptic Ulcer	481
Antacids	482
Suppressants of Gastric Secretion and Motility	485
Combating Pepsin Action	488
Drugs after Vagotomy	488
Hemorrhage in Peptic Ulcer	488
Perforation	489
Rheumatic Disorders	489
Rheumatic Fever	489
Salicylates	491
Amidopyrine (Pyramidon)	503
ACTH and Cortisone	503
Penicillin Prophylaxis	505
Sulfonamide Prophylaxis	506
Rheumatoid Arthritis	506
ACTH and Cortisone	507
Analgesics	509
Gold	509
Niacin (Nicotinic Acid)	511
Vitamin D	511
Prostigmin	512
Intravenous Procaine	512
Ankylosing Spondylitis	513
Osteoarthritis	513
Nonarticular Rheumatism	514
Palindromic Rheumatism	514
Gout	514
Colchicine	515
ACTH and Cortisone	516
Salicylates	517
Cinchophens	517
Benemid	519
Sprue	520
Thyrotoxicosis	520
Propylthiouracil	522
Radioactive Iodine	524
Ulcerative Colitis	527
Virus Dysentery	528
Vitamin Deficiencies	529
Multiple Sub-classic Deficiencies	529
Vitamin B Complex Deficiencies	530
Beriberi (Thiamine Deficiency)	531
Pellagra	532
Nicotinic Acid Deficiency Encephalopathy	533
Ariboflavinosis	534
Rickets	534
Scurvy	538
Vitamin A Deficiency	539
Hypoprothrombinemia	541

Worm and Fluke Infestations	544
Tapeworm (Taenia, Hymenolepis and Diphyllobothrium Infestations)	545
Round Worm (Ascaris Infestation)	545
Pinworm (Oxyuris Infestation)	545
Whipworm (Trichocephalus Infestation)	546
Guinea Worm (Dracunculus Infestation)	546
Trichinosis	546
Hydatid Disease	546
Hookworm (Uncinaria and Ankylostoma Infestations)	546
Strongyloides Infestation	546
Filariasis, Loiasis and Onchocerciasis	546
Schistosomiasis (Blood Fluke Infestation)	547
Intestinal, Liver and Lung Flukes	549
 NEUROPSYCHIATRY	550
Psychoneuroses	550
Psychoses	550
Amnesia and Confusion	550
Anxiety Tension States	551
Depression	552
Toxic Confusional States	554
Psychomotor Excitement	554
Delirium Tremens	554
Children's Behavior Disorders	555
Narcolepsy	555
Feeble-mindedness	555
Convulsions	556
Epilepsy	557
Parkinsonism	564
Multiple Sclerosis	566
Muscular Atrophies and Dystrophies	567
Myasthenia Gravis	567
Familial Periodic Paralysis	569
Neurogenic Pain	569
Syringomyelia	569
Meniere's Disease	569
Bell's Palsy	570
Headache	570
Migraine	571
Motion Sickness	572
Sydenham's Chorea	574
Drug Addiction	574
Alcoholism	577
Cerebral Palsy	580
Enuresis	582
Hiccup	582
Poliomyelitis	582
 OBSTETRICS AND GYNECOLOGY	584
Infertility	584
Tests for Pregnancy	584
Ectopic Pregnancy	585
Prenatal Care	585
Abortion	585
Hydramnios	585

Rh Factor	586
Hyperemesis Gravidarum	586
Hemorrhage During Pregnancy	587
Eclampsia	587
Conduct of Labor	590
Stages of Labor and Their Pharmacologic Aspects	590
Delayed Labor	592
Prolonged Labor	592
Postpartum Hemorrhage and Retained Placenta	598
Postpartum Care	599
Care of the Newborn Infant	600
Prophylaxis of Obstetrical Infections	601
Endometriosis	602
Tumors and Cancer	602
Menstrual Disturbances	602
Menopause	607
Estrogens	608
Testosterone	609
 OPHTHALMOLOGY	611
General Pharmacologic Aspects	611
Mydriatics and Cycloplegics	613
Miotics	615
Other Drugs That Lower Intraocular Tension	617
Local Anesthetics	618
Cleansing Solutions	618
Antiseptics	619
Chemotherapeutic Agents Given Systemically for Local Action	622
Local Stimulants and Astringents	623
Chemosis with Dionin	623
Fluorescein Staining	624
Glycerin's Hygroscopic Action	624
Anticoagulants in Ophthalmology	624
Rutin in Ophthalmology	624
Tuberculin, Bee Venom and Fever Therapy in Ophthalmology	625
Antihistaminics Locally	626
Eye Burns	626
Ophthalmic Uses of Epinephrine	626
ACTH and Cortisone in Ophthalmology	626
Methods of Applying Drugs in Ophthalmology	627
 OTORHINOLARYNGOLOGY	631
Examinations	631
Sore Throat	631
Peritonsillar Abscess	632
Acute Sinusitis	632
Epistaxis	633
Atrophic Rhinitis (Ozena)	633
Excessive Cerumen	634
Infectious and Eczematous Dermatitis of the External Auditory Canal	634
Furunculosis of the External Auditory Canal	636
Perichondritis	636
Acute Otitis Media	636
Chronic Otitis Media and Sinusitis	637
Impaired Hearing	637

CONTENTS

xix

Vertigo	637
Tinnitus	637
Analgesics	638
Anesthesia	638
Vasoconstrictor Drugs as Nasal Decongestants	639
Nasal Decongestion through Humidification	640
PEDIATRICS	
Infant Feeding	642
Marasmus	642
Malnutrition	642
Colic	643
Croup	643
Celiac Syndrome	643
Megacolon	643
Pyloric Stenosis	644
Diaper Dermatitis	644
Infantile Diarrhea and Vomiting	644
Contagious Diseases	645
SULFONAMIDES	
Drugs and Sources	648
Combinations with Each Other	648
Nature of Action	648
Absorption, Distribution and Excretion	649
Resistance	650
Toxicity	650
SURGICAL SPECIALTIES	
Preparation for "Clean" Surgery	652
Antibiotics and Sulfonamides to Reduce Postoperative Morbidity	652
Cathartics	654
Anemia	654
Fluid, Electrolyte and Nutritional Deficiencies	654
The Deteriorated Patient	654
Preparation of Hands and of the Site of Operation	654
The Traumatic Wound	657
The Established Infection	657
Soft-tissue Infections	658
Chronic Osteomyelitis	663
Peritonitis	665
Urinary Tract Infections	665
Thermal Burns	670
The Systemic Aspects	670
The Local Aspects	674
Chemical Burns	675
"Household" Burns	677
Primary Shock	677
Secondary Shock	677
Surgical Shock	678
Cerebral Shock	679
Cardiogenic Shock	679
Dehydration	679
Water and Electrolyte Replacement Solutions	680

Choice of Solution in Specific Instances	681
Amount of Fluid to Give	681
Intravenous Feeding	682
Postoperative Use of Vitamins	684
Hemorrhage	684
Ileus	686
Urinary Retention	688
Stone in the Urinary Tract	689
Transfusion Reactions	692
Rectal Maladies	692
Anuria	693
Hiccup	694
Atelectasis	694
Phlebothrombosis	694
Pulmonary Embolism	694
Empyema	694
Lung Abscess	694
Tuberculosis	694
VENEREOLOGY	696
Syphilis	696
Penicillin in Syphilis	697
Aureomycin in Syphilis	703
Chloromycetin in Syphilis	704
Terramycin in Syphilis	704
Arsenic and Bismuth in Syphilis	704
Gonorrhea	708
Chancroid	710
Granuloma Inguinale	711
Lymphogranuloma Venereum	711
Erosive Balanitis	712
Trichomonas Vaginitis	713
SECTION II	
DRUG DATA	
A COMPENDIUM OF DRUGS	717
INDEX	771