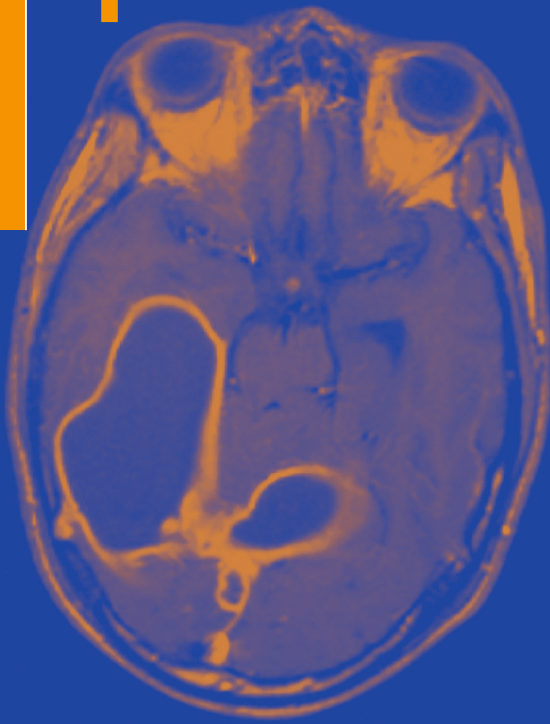


Ali Akhaddar

Atlas of Infections in Neurosurgery and Spinal Surgery



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 Springer

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To His Majesty Mohammed VI, King of Morocco
To my parents, my wife, and my children, with love
To my teachers, with gratitude
To my patients, who are my inspiration

Foreword I

Professor Ali Akhaddar has written a comprehensive *Atlas of Neurosurgery and Spinal Surgery Infections*. This book will become a standard reference for neurosurgeons and spinal surgeons in the future, as it is very difficult to find this information so well described in one place. I foresee it being used in all departments of neurosurgery and spinal surgery and in infectious disease specialties. As time goes on, this area of neurosurgery will receive more attention because advances in the diagnosis and treatment of CNS-associated infections will benefit from the advances in precision medicine, in which the approach to diseases is precisely matched to each person's genetics.

Dr. Akhaddar is to be complimented on undertaking this work, as infection is mostly ignored by neurosurgeons and spinal surgeons and left to our colleagues in other specialties to treat. That approach leads to the further disintegration of the specialty of neurosurgery, which encompasses the diagnosis and treatment of all diseases affecting the central nervous system, including the spine. I suggest that all neurosurgeons and spinal surgeons obtain a copy of this fine book as a standard reference. It would also be of value to have a neurosurgeon devote time to this specialty of neurosurgery during residency, as proficiency in the knowledge of infectious disease is very important in both the developing world and developed world. It would also be valuable for departments of neurosurgery to add members of the infectious diseases specialty to the department of neurosurgery. Rounds made with these specialists could add further dimension to the understanding of infectious diseases treated in other organs that would have application to neurosurgery patients.

This is an excellent work.

James I. Ausman, MD, PhD

Professor of Neurosurgery, University of California, Los Angeles (UCLA), USA

Former Chairman of Neurosurgery, Henry Ford Hospital and University of Illinois at Chicago, USA

Editor in Chief, *Surgical Neurology International*

Foreword II

This book, written and edited by Prof. Akhaddar, is an important contribution to the improvement of the neurosurgical care of the patients. It covers an area that is not so frequently discussed in the literature. Textbooks of this format on the topic—atlas with multiple figures, illustrating the text—are essential for the education of young colleagues, especially in those parts of the world where infectious diseases present a major health problem.

Prof. Ali Akhaddar is very experienced in this field, which allows him to highlight the most important points for the reader. The textbook is very well structured: each chapter has an epidemiology and etiology, clinical presentation, imaging features, laboratory findings, treatment options, and outcome subsections. All the 30 chapters are very well illustrated. It covers not only the most frequent infections but also diseases that in the Western world are just of academic interest. However, in some parts of the world, they are not uncommon and their treatment is very challenging.

I would like to congratulate and thank Prof. Akhaddar for his efforts to prepare this textbook, which I certainly recommend not only to the young neurosurgeons but also to those that are less experienced in the field of infectious diseases.

Madjid Samii, MD

Professor of Neurosurgery

President of the International Neuroscience Institute, Hannover, Germany

Honorary President of the World Federation of Neurosurgical Societies (WFNS)

Preface

If there's a book that you want to read, but it hasn't been written yet, then you must write it.

Toni Morrison (*Nobel Prize in Literature, 1993*)

Management of central nervous system (CNS) and spinal infections is challenging. Without early diagnosis and adequate treatment, these serious diseases can result in permanent neurologic deficits, seizure, spinal deformities, and, in severe cases, generalized sepsis and death. Modern neurosurgery and spinal surgery have received a great deal of consideration in the literature, but the topic of craniospinal infections has not attracted comparable attention. It is essential to recognize and become familiar with the variety of infectious conditions that should continue to preoccupy our surgical community, and this atlas focuses on CNS, cranial, and spinal infections from a surgical perspective. Classically, cranial and spinal infections are arranged by the anatomical location involved. The development of these diseases requires a good knowledge of the pathogens implicated, the patients' predisposing factors and comorbidities, sources of infections, and mechanisms of spread. Although the most common origin of neurosurgical infections is nonspecific bacteria, the role of other microorganisms should not be overlooked. The particular topic of postoperative cranial and spinal infections is also considered.

Ubi pus, ibi evacua ("If there's pus about, let it out.")

Today, this well-known Latin aphorism is not always appropriate for infections encountered in neurosurgery and spinal surgery: first, because of the singular anatomic composition of the CNS and its coverings; second, because of the advent of antimicrobial chemotherapy; and finally, because of the wide variety of clinical presentations and infectious lesions that affect these body areas. Presently, the spectrum of treatment goes from antibiotic therapy alone to combination with surgical drainage to more invasive surgical procedures.

CNS infections differ from those of other organ systems in many ways. The brain and spinal cord are protected from infection by the skull and the spine and are surrounded by layers of meninges, which serve as a mechanical barrier—a defense reinforced by the chemical and mechanical filtering capacities of the blood-brain barrier. The composition of the cerebrospinal fluid (CSF) makes it a very good culture medium, however, as the CNS and subarachnoid space are regarded as immunologically sequestered because of the lack of a lymphatic system.

Though many of the infectious processes that affect the CNS and the spine can result in severe sequelae and even death, the prognosis of these infections has improved significantly over the past 30 years, in great measure as a result of improved techniques to aid diagnosis, modern antibiotics and surgical procedures, and intensive care facilities. These make neurosurgical and spinal infections more challenging to manage, especially with the changing traits of many infectious diseases in the past few decades. Indeed, increases in migratory flows, refugee movements, international travel, and immunocompromising conditions have advanced the likelihood of detecting infectious diseases that are usually uncommon, especially in developed countries. In addition, the augmentation of cranial and spinal procedures worldwide has increased the relative incidence of postoperative infectious complications, even as other sources of infection have decreased. It is well recognized that severe postsurgical infection is a real

nightmare for the neurosurgeon and the spinal surgeon. In all cases, the early identification of the infectious agent and aggressive medical treatment (with or without further surgery) are decisive in achieving the best outcome.

For many scientists, old and new infections will occur in the future, as they did in the past. Meanwhile, updated information on the diagnosis and management of cranial and spinal infections is required, especially for clinicians, surgeons, neuroradiologists, and laboratories, which may be unfamiliar with the wide array of clinical presentations and neuroimaging characteristics of these diseases. Furthermore, modern diagnosing and managing of patients with infectious diseases are done largely through examination of “visual signs.”

Most textbooks of neurosurgery and spinal surgery neglect the subject of infection or mention it only briefly, but infections will continue to be part of cranial and spinal practices, and we surgeons must consider this reality. Colleagues at any stage of training must also live with the consequences of cranial and spinal infections, increase experience from them, and learn the appropriate lessons. It is essential for us to recognize the variety of infectious conditions that continue to be seen in our practices.

What the mind does not know, the eyes cannot see—Johann Wolfgang von Goethe

With the introduction of the multidisciplinary and interdisciplinary team approach, a need has become evident for a timely and concise book about CNS and spinal infections from a surgical perspective. This book combines illustrations and biological, clinical, radiological, and surgical images taken from the author’s extensive library (1997–2017) to provide readers with unparalleled access to a comprehensive collection of craniospinal infectious images. “One picture is worth a thousand words” (*Tess Flanders*). This atlas is designed to complement and provide a visual supplement to already existing good textbooks on CNS infections. The involvement of each lesion and area is dealt with in a brief and easy-to-comprehend manner. In a unique way, various neuroimaging and laboratory abnormalities are then linked to the clinical features, treatment procedures, and surgical views, to encourage a smooth and easy practical integration. Practicing neurosurgeons, spinal surgeons (including orthopedists), neurologists, rheumatologists, neuroradiologists, infectious disease specialists, rehabilitation physicians, microbiologists, pharmacologists, histopathologists, and other clinicians and researchers worldwide will find a comprehensive visual encyclopedia using more than 1,140 parts of figures of CNS, cranial, and spinal infections.

The 30 chapters of this book cover most common infectious conditions seen in neurosurgical and spinal practices and requiring surgical interventions. It is divided into five sections: a general introduction, craniocerebral infections, vertebromedullary infections, infections following cranial and spinal surgery, and a section describing the most important specific pathogens and other particular conditions.

The main goal is to deliver more information in less space than traditional prose. Besides documenting the work, this atlas has a teaching value. The format makes it easily accessible, as it includes a definition of each infection and its epidemiology and etiology, main clinical presentations, imaging features, laboratory findings, treatment options, and outcome information. It will help the reader in choosing the most appropriate way to manage this multipart problem. We hope this atlas will provide a timely addition to the fields of neurosurgery, spinal surgery, and infectious diseases.

Marrakech, Morocco
December 2016

Ali Akhaddar, MD, IFAANS

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Contents

Part I General Considerations

1 Classification and Sources of Infections	3
Suggested Reading	6
2 Laboratory Collections and Sample Processing	9
Suggested Reading	21

Part II Infections of the Brain and Its Coverings

3 Scalp Abscesses	25
Epidemiology and Etiology	25
Clinical Presentations	25
Imaging Features	25
Laboratory Findings	26
Treatment Options	26
Outcomes	26
Suggested Reading	31
4 Cranial Osteomyelitis	33
Epidemiology and Etiology	33
Clinical Presentations	33
Imaging Features	33
Laboratory Findings	34
Treatment Options	38
Outcomes	41
Suggested Reading	42
5 Cranial Epidural Abscesses	43
Epidemiology and Etiology	43
Clinical Presentations	43
Imaging Features	44
Laboratory Findings	45
Treatment Options	45
Outcomes	45
Suggested Reading	50
6 Cranial Subdural Empyemas	51
Epidemiology and Etiology	51
Clinical Presentations	51
Imaging Features	51
Laboratory Findings	52

Treatment Options	52
Outcomes	54
Suggested Reading	64
7 Posttraumatic Meningitis	65
Epidemiology and Etiology	65
Clinical Presentations	65
Imaging Features	65
Laboratory Findings	68
Treatment Options	68
Outcomes	69
Suggested Reading	71
8 Brain Abscesses	73
Epidemiology and Etiology	73
Clinical Presentations	73
Imaging Features	73
Laboratory Findings	75
Treatment Options	76
Outcomes	83
Suggested Reading	94
9 Infectious Encephalitis	95
Epidemiology and Etiology	95
Clinical Presentation	95
Imaging Features	95
Laboratory Findings	96
Treatment	97
Outcomes	98
Suggested Reading	104
10 Pyogenic Ventriculitis	105
Epidemiology and Etiology	105
Clinical Presentations	105
Imaging Features	105
Laboratory Findings	106
Treatment Options	107
Outcomes	108
Suggested Reading	110
11 Pituitary Abscesses	111
Epidemiology and Etiology	111
Clinical Presentations	111
Imaging Features	111
Laboratory Findings	111
Treatment Options	112
Outcomes	113
Suggested Reading	116
12 Orbital Abscesses	117
Epidemiology and Etiology	117
Clinical Presentations	117
Imaging Features	119
Laboratory Findings	120
Treatment Options	120
Outcomes	123
Suggested Reading	124

13	Mucopyoceles	125
	Epidemiology and Etiology	125
	Clinical Presentations	125
	Imaging Features	125
	Laboratory Findings	126
	Treatment Options	127
	Outcomes	128
	Suggested Reading	135
14	Pott’s Puffy Tumors	137
	Epidemiology and Etiology	137
	Clinical Presentations	137
	Imaging Features	137
	Laboratory Findings	137
	Treatment Options	140
	Outcomes	140
	Suggested Reading	141
15	Intracranial Infectious Aneurysms	143
	Epidemiology and Etiology	143
	Clinical Presentations	143
	Imaging Features	143
	Laboratory Findings	144
	Treatment Options	144
	Outcomes	145
	Suggested Reading	148

Part III Infections of the Spine and Its Coverings

16	Paraspinal Pyomyositis	151
	Epidemiology and Etiology	151
	Clinical Presentations	151
	Imaging Features	152
	Laboratory Findings	154
	Treatment Options	156
	Outcomes	156
	Suggested Reading	157
17	Vertebral Body and Discal Infections	159
	Epidemiology and Etiology	159
	Clinical Presentations	159
	Imaging Features	163
	Laboratory Findings	167
	Treatment Options	169
	Outcomes	170
	Suggested Reading	170
18	Spinal Epidural Abscesses	171
	Epidemiology and Etiology	171
	Clinical Presentations	171
	Imaging Features	172
	Laboratory Findings	172
	Treatment Options	173
	Outcomes	175
	Suggested Reading	176

19 Spinal Subdural Abscesses	177
Epidemiology and Etiology	177
Clinical Presentations	177
Imaging Features.	178
Laboratory Findings	178
Treatment Options.	178
Outcomes	181
Suggested Reading	181
20 Spinal Cord Abscesses	183
Epidemiology and Etiology	183
Clinical Presentations	183
Imaging Features.	183
Laboratory Findings	186
Treatment Options.	187
Outcomes	188
Suggested Reading	188
 Part IV Infections Following Cranial and Spinal Surgery	
21 Surgical Site Infections in Cranial Surgery	191
Epidemiology and Etiology	191
Clinical Presentations	194
Imaging Features.	194
Laboratory Findings	198
Treatment Options.	198
Outcomes	203
Suggested Reading	215
22 Surgical Site Infections in Spinal Surgery	217
Epidemiology and Etiology	217
Clinical Presentations	218
Imaging Features.	218
Laboratory Findings	221
Treatment Options.	222
Outcomes	227
Suggested Reading	228
 Part V Specific Pathogens and Other Particular Conditions	
23 Brain Tuberculomas	231
Epidemiology and Etiology	231
Clinical Presentations	231
Imaging Features.	232
Laboratory Findings	233
Treatment Options.	235
Outcomes	236
Suggested Reading	248
24 Spinal Tuberculosis	249
Epidemiology and Etiology	249
Clinical Presentations	249
Imaging Features.	251
Laboratory Findings	274
Treatment Options.	274
Outcomes	275
Suggested Reading	275