Chapter 1
Introduction

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The prevalence of most bone and joint infections is steadily increasing, mainly due to the rising life expectancy of the population and the increasing use of bone fixation devices and prosthetic joints. For frequent infectious diseases, many diagnostic and therapeutic aspects have been studied in controlled trials [1–3]. In contrast, the management of bone and joint infections is mostly based on expert opinion, since randomized clinical studies comparing different orthopedic techniques, antimicrobial agents, or treatment durations are missing. Thus, diagnostic and therapeutic advice is mainly based on individual clinical expert knowledge and observational studies [4–7].

The optimal diagnostic and therapeutic management of bone and joint infections needs a special know-how in different fields of medicine. Many physicians have only limited clinical experience, since arthritis and osteomyelitis are rare infectious diseases. Therefore, a multidisciplinary approach to these infections is desirable. Guidelines for the management of bone and joint infections are available for only a few topics [8]. In addition, publications on the clinical practice comprising different aspects of these infections are scarce. The aim of this book is to close this gap with texts from a multidisciplinary team of experts in the field. Indeed, specialists in Microbiology, Pharmacology, Preclinical Research, Pediatrics, Pediatric and Adult Orthopedic Surgery, Infectious Diseases, and Cardiovascular Surgery contributed to this book. This broad spectrum of expertise made it possible to cover a wide range of pathophysiological, epidemiological, diagnostic, and therapeutic aspects of bone and joint infection. The principal focus of the book is on clinical practice. It should enable clinicians in managing patients according to the best available evidence.

Beside the routine microbiological tests, novel techniques, such as molecular diagnostic procedures [9] and matrix-assisted laser desorption ionization time-of-flight (MALDI–TOF) mass spectrometry [10], are increasingly used for the diagnosis of infectious diseases including bone and joint infection. The role of the bone/serum ratio in the antimicrobial treatment of bone and joint infections is still a matter of debate. Important methodological
differences have to be considered for adequately judging data on bone penetration. These
data are often controversially discussed in the literature, mainly due to the use of various
experimental techniques in different studies [11, 12]. Distinct differences in the extent of
bone penetration by various classes of antimicrobial agents have been observed. However,
proof for the clinical relevance of these differences is still missing. Thus, knowledge about
pharmacokinetics and pharmacodynamics of antibiotics in bone should stimulate
planning of clinical studies to fill this missing gap. Many current treatment concepts are
based on preclinical studies in vitro and in animals [13]. Such data are especially impor-
tant for the management of implant-associated infections, a field in which controlled
clinical trials are lacking.

Septic arthritis encompasses a nonhomogenous group of joint infections. In this book,
eight different clinical situations are covered. Many aspects of arthritis in children differ
from that in adults. In children, Kingella kingae, a microorganism that in adults almost
exclusively causes endocarditis, plays a prominent role [14]. In addition, Streptococcus
agalactiae is still common in neonates. In contrast, Haemophilus influenzae type b almost
disappeared in young children due to the effective conjugate vaccine. By gathering a
careful case history, rare microorganisms such as Erysipelothrix sp., Mycobacterium
marinum, or Scedosporium sp. can be suspected and actively looked for. Arthritis of axial
joints is rare and difficult to diagnose. Intravenous drug use is the most frequent risk
factor for all types of axial arthritis, namely, of the sternoclavicular joint, the symphysis
pubis, and the sacroiliac joint. Surgery is rarely needed, if the diagnosis is rapidly made
and the patient has no pyogenic complications. Prosthetic joints are increasingly used
not only in hip and knee, but also in other joints, mainly shoulder, ankle, and elbow. The
perioperative infection rate ranges from about 0.5 to 1.5% after hip or knee arthroplasty
up to 10% after elbow or ankle joint replacement. Since many aspects vary between the
different joint prostheses, separate chapters deal with periprosthetic joint infection in
this book.

Osteomyelitis encompasses a large spectrum of different diseases. Many different
classifications are used, depending on different aspects of disease (e.g., pathogenesis,
duration, presence of implant) and according to the specialist who is managing the case
(e.g., orthopedic surgeon, infectious disease specialist, pediatrician, angiologist). In this
book, aspects of age (children, adults), duration of disease (acute, subacute, chronic),
presence of implant, anatomic location (long bones, vertebrae, jaws), and presence of
diabetes are presented in separate chapters.

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Together with all authors, I trust that this multidisciplinary book will allow gathering rapid and exhaustive information regarding all types of bone and joint infection. If this book helps in improving patient management, we have reached our goal.

References


