

肌肉骨骼系统感染

基本原则、预防、诊断和治疗

Infections of the musculoskeletal system

Basic principles, prevention, diagnosis and treatment

编 著 “肌肉骨骼系统感染” 瑞士骨科学会
和瑞士感染学会专家组

主 译 查晔军 蒋协远

主 审 刘 沂



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Preface to the Chinese version

Infection is common in clinical practices with increasing trends perhaps due to increasing amount of joint replacement & trauma management surgery cases. International scope on post joint replacement infection rate was 1%, higher in knee replacement; 2014 data from the US revealed post joint replacement rate was as high as 4%. Data from China was inadequate, but based on the 380,000 to 400,000 cases of joint replacement surgeries, even 1% infection rate will result on 4,000 cases. Other causes including trauma, bone & joint infection are also commonly seen.

Recent improper use of antibiotics, mutation of species, increasing drug resistance, lack of understanding on infection occurrence mechanism, improper & inadequate know-how of the physicians on handling early infection contributed to delay in diagnosis & treatment of infection, posing difficulties in post infection management. This is a challenge to the surgeon as well as the patient especially with implant associated infection, a timely severe complication with treatment difficulties, lack of matured evidence base and easily get deviated; a collaboration of multi-specialties (including infection specialist, microbiologist,

pathologist & plastic surgery specialist) will be needed, multiple revision surgeries will be needed, not only patient has to suffer more with unpredictable treatment outcomes, increasing financial spending and extended hospital stay, lowered hospital bed turnover rate, resulted in increased spending per case.

In view of this, Swiss Orthopaedics entrusted an expert group on “Infections of the musculoskeletal system” with 50% orthopedic surgeons, 50% infection specialist to compose a handbook on this theme aiming at providing assistance to orthopedic & general surgeon in dealing with these cases. The handbook starts from practice, fruitful precise & concise contents, including basic principles, prevention, diagnosis & treatment methods, helpful to orthopedic surgeon and infection specialist in setting correct treatment guidance principles, increase healing rate in patient suffering from Infections of the musculoskeletal system.

The chief editor of this book, Prof. Ochsner was a key member of AO/ASIF, very experienced in clinical practices, especially in the area of implant associated infection. Prof. Ochsner came to Beijing, visited Jishuitan hospital, and conducted AO courses many times in China since 1989.

Thanks for the help of Heraeus medical company for the distributon of the Chinese version of this manual.

The German & English version of this book were published & well accepted, it's believed the Chinese version will be an important clinical reference for orthopedic & other specialties in dealing with infection in China. It's inevitable that mistakes are

there due to translation levels, corrections are welcomed.

Beijing Jishuitan Hospital Traumatology & Orthopedics
Peking University 4th Affiliated Hospital
Professor JIANG Xie-yuan, Professor LIU Yi

中文版序言

感染在临床并不罕见,而且目前似乎有增多的趋势,这可能与手术数量的快速增加有关,包括内固定和人工关节置换手术。目前国际上一般认为人工关节术后感染率是1%,全膝关节置换术后感染率略高;美国2014年的资料表明人工关节术后感染率更是高达4%。中国内地的资料不详,但据估计2014年完成了38万~40万例人工关节置换手术,即使按照感染率1%计算,也有接近4000例。其他因各种原因,包括外伤、骨与关节感染疾病等,也更是屡见不鲜。

近年来,抗生素的不恰当的使用、菌种的变异、耐药细菌的增加、医生对感染的发生机制、以及对早期感染病症的认识不足和不能及时正确地处理,造成诊断和治疗的延误,使感染以后的处理颇为棘手。这对患者和医生都是一个挑战,特别是与内固定物或人工关节相关的感染,更是一种需要及时治疗的严重并发症,治疗起来也更加困难,因其没有太多的成熟规律可循,很容易走“弯路”;这可能就需要多科室专家协作(包括感染学专家、微生物学专家、病理学专家以及整形外科专家等)以及多次手术,不但增加了患者痛苦,而且很难预测最终的治疗效果,相关的经济费用也会增加很多,且“延长了住院时间,减少了床位周转率,增加了例均费用”。

有鉴于此,瑞士骨科学会委托了由骨科医师和感染专家各占约50%组成的“肌肉骨骼系统感染”专家组撰写了此手

册,以帮助骨科及外科医师等处理此类疾患。本手册从实用出发,内容丰富且简明扼要,包括基本原则、预防、诊断和治疗方法,有助于骨科医生和感染专家为肌肉骨骼系统感染患者制定正确治疗的指导原则,以提高感染的治愈率。

本书主要作者之一 Ochsner 教授曾长期在 AO 国际组织担任重要职务,临床经验丰富,特别是在与内固定物或人工关节相关的感染疾患治疗方面积累了大量经验。自 1989 年来曾多次在北京积水潭医院和我国举办 AO Course 来传授内固定技术。

感谢 Heraeus 医疗公司对本手册中文版发行提供的帮助。

本书德文版和英文版已先期出版发行,深受读者欢迎,深信中文版的发行能成为我国骨科和其他各学科从事感染疾病的临床医生一本重要的参考书。由于译者翻译水平所限,错误在所难免,敬请指正。

北京积水潭医院创伤骨科

北京大学第四临床医学院

蒋协远 刘沂

Preface by the President of *swiss orthopaedics* for the Chinese Edition

Infections of the musculoskeletal system, especially when combined with implants such as a joint prostheses or material of internal fixation, may lead to devastating local and general complications. If not properly treated, these dramatic situations may even make the retrieval of the implant necessary, sometimes associated with definitive serious functional impairment. The management of periprosthetic and musculoskeletal system infections requires not only advanced practical and theoretical skills in the field of orthopaedic surgery, but also strong awareness in microorganism's physiopathology and up-to-date expertise in antimicrobial treatments. During recent years, we observed huge progresses of knowledge in the area of musculoskeletal infections. Consequently, multidisciplinary approaches both by infectious diseases specialists and orthopaedic surgeons are mandatory to increase the success rate of treatments.

Continuous training in a fast growing discipline such as orthopaedic surgery is essential to maintain expertise. However,

the narrowing vision resulting of the hyperspecialisation entails the risks of losing the global overview. This can be compensated by joining forces and developing networks between experts. Thus, it is with great pleasure that the board of *swiss orthopaedics* (the Swiss Society of Orthopaedics and Traumatology) presents here the result of a combined effort by the Swiss Society of Infectious Diseases and *swiss orthopaedics* experts. Thanks to their exceptional work, they provided a handbook dedicated to all surgeons and physicians involved in the management of infections of the musculoskeletal system, which is a complete and very useful summary of basic principles, diagnosis, prevention and treatments of these complex situations. Peter OCHSNER and Werner ZIMMERLI, worldwide recognised for their expertise in the management of periprosthetic joint infections, acted as promoters for this handbook. The German and English editions encountered a very large success and sold out quickly. The French Edition is already on the way.

In 1986, the Swiss surgeons Hans WILLENEGGER, Martin ALLGÖWER, Thomas RÜEDI and Peter OCHSNER made a first professional tour to China. This allowed developing regular contacts between both countries. Since this period, a significant number of AO Chinese fellows came regularly to visit some Swiss centres of orthopaedics and traumatology. On the other hand, many Swiss orthopaedic surgeons, such as Walter DICK or more recently Olivier BORENS, were also invited to give lectures in China. In this very intense environment of collaboration, the production of a Chinese edition of the handbook appeared as an evidence.

After initial contacts between Peter OCHSNER and Yi LIU, the tremendous work of translation Xie Yuan JIANG (Beijing Jishuitan Hospital) and the support of People's Medical Publishing House Co, Ltd Beijing, allowed the achievement of this project.

Swiss orthopaedics is very proud to be directly involved in this medical and educational cooperation between Switzerland and China. We therefore particularly thank all people who permitted this partnership and wish a great success to the Chinese edition of this handbook specifically dedicated to infections of the musculoskeletal system.

Lausanne, April 2015

Alain Farron
President of *swiss orthopaedics*

中文版序言

(瑞士骨科学会主席)

肌肉骨骼系统感染,特别是伴有人工关节假体或内固定材料等内植物时,可引起严重的局部和全身性并发症。若治疗不当,甚至可能需要取出内植物,从而引起严重的功能障碍。处理假体周围感染和肌肉骨骼系统感染时,不仅需要骨科领域丰富的临床经验和理论知识,还必须充分了解微生物的病理生理学和抗菌治疗的最新专业技术。近年来,肌肉骨骼系统感染方面的知识不断更新和进步,因此,由感染疾病专家和骨科医师进行多学科合作处理必然会提高治疗的成功率。

对于骨科这样一个快速发展的学科,必须进行持续训练来维持其专业性。但是高度专业化会导致知识面局限,无法对知识全面了解。这需要专家之间的合作来补偿。因此,非常高兴并感谢瑞士骨科学会(瑞士骨科和创伤学会)委员会向我们展示瑞士感染学会和瑞士骨科学会专家共同努力的成果。根据他们出色的工作,为所有手术医生和内科医生提供了这一本手册,来了解如何处理肌肉骨骼系统感染;本手册充分总结了这类复杂情况的基本原则、诊断、预防和治疗。Peter OCHSNER 和 Werner ZIMMERLI 教授是世界知名的关节假体周围感染方面的专家,他们也推动和促成了本书的发行。本

书的德文版和英文版获得了巨大的成功,广受欢迎,一出版即很快告罄了。本书的法文版也即将出版。

1986年,瑞士骨科医生 Hans WILLENEGGER, Martin ALLGÖWER, Thomas RÜEDI 和 Peter OCHSNER 对中国进行了第一次专业访问,使两个国家建立起长久的联系。自那时起,许多中国的 AO 访问学者到瑞士的骨科和创伤中心学习。而许多瑞士的骨科医生,如 Walter DICK 以及近期的 Olivier BORENS,也被邀请到中国讲学。通过这种紧密的联系和合作,本手册的中文版顺利发行了。通过 Peter OCHSNER 教授和刘沂教授的早期联系,北京积水潭医院查晔军医生和蒋协远教授等完成了繁重的翻译工作,并在人民卫生出版社的帮助下,完成了本书的出版。

瑞士骨科学会非常荣幸直接参与了瑞士和中国之间这一医学和教育的合作。因此要特别感谢所有相关人员的努力,希望这一肌肉骨骼系统感染专业手册的中文版能获得巨大的成功。

瑞士洛桑,2015年4月

Alain Farron
瑞士骨科学会主席
(查晔军 译)

Preface by the expert group

Infections of the musculoskeletal system occur either spontaneously (e.g., arthritis of the native joint, spondylodiscitis, etc.) or as a postoperative complication (e.g., implant-associated infection). Orthopaedic surgeons rarely deal with infections on a routine basis. If these infections develop as nosocomial complications, affected patients often feel threatened and anxious. A frank and honest discussion and a thorough explanation of the diagnostic and therapeutic measures can restore the patient's trust in the treating doctors. Close collaboration between orthopaedic surgeons and infectious disease specialists is critical in bone infection and patients should experience this collaboration at their bedsides.

This book intends to provide recommendations for the procedures to follow in individual situations. They are aimed primarily at those orthopaedic surgeons and infectious disease specialists who do not regularly treat these sorts of patients. They explain both the diagnostic steps as well as the rational therapies. An additional objective is to introduce the orthopaedic surgeon to the approach of the infectious disease specialist and vice versa.

The 'Infections of the musculoskeletal system' expert group was commissioned by swiss orthopaedics to produce a book to promote greater understanding of these diseases among orthopaedic

surgeons. Approximately half of the expert group is composed of orthopaedic surgeons and the other half of infectious diseases specialists from swiss orthopaedics and the Swiss Society for Infectious Diseases, respectively.

Drafting this publication was considerably more difficult than originally thought. Our aim was to select the most important items. Concise presentation took priority over exhaustive treatment of the issues. Brand names were omitted as a matter of principle.

The present Chinese edition thanks its origin to the longstanding contacts between Prof. LIU Yi and the chief editor of this book. The translation is based on the first English edition of 2014 and has carefully been carried out by Prof. JIANG Xie Yuan and Dr. ZHA Yejun.

On behalf of the expert group

September 2014

Peter E. OCHSNER (chief editor) and

Olivier BORENS (president)

中文版序言(专家组)

肌肉骨骼系统感染既可以自发发生(如自身关节的关节炎、椎间盘炎等),也可以是一种术后并发症(如内植物相关性感染)。骨科医师很少按常规原则来处理感染,若这些感染是院内并发症,患者常感到威胁和焦虑。对诊断和治疗措施进行坦率的讨论和彻底的解释可重建患者对治疗医师的信任。骨科医师和感染专家的紧密合作对治疗骨科感染十分重要,患者应在床旁体验到这种合作。

本书旨在为个例采用的措施提供建议,主要针对不按常规治疗这类患者的骨科医师和感染专家,介绍了诊断的步骤和合理的治疗。另一个目的是介绍骨科医生与感染专家相互联系。

瑞士骨科学会委托“肌肉骨骼系统感染”专家组撰写一本书来更好的帮助骨科医师了解这些疾病。专家组中骨科医师和感染专家约各占一半,分别来自瑞士骨科学会和瑞士感染学会。

撰写本书比预想的更困难,作者的目标是选择最重要的部分,优先论述这些问题详尽无遗的治疗。作为原则问题,省略了商标名称。目前的英文版是基于修订和扩充的第2版的德文版编著而成。

本手册没有赞助商的积极支持是不可能发行的,我们要感谢 Heraeus 医疗公司对本书创造性的设计和对这些指南的

付印。

由于刘沂教授和本书主编之间的长期联系和良好关系，才有了这一中文版的出版。本中文版基于 2014 年出版的英文版(第 1 版)，由查晔军医生和蒋协远教授主译，刘沂教授主审。

代表专家组

2014 年 9 月

Peter E. Ochsner(主编), Olivier Borens(主席)
(查晔军 译)