Endotoxemia and Endotoxin Shock: Disease, Diagnosis and Therapy
Contributions to Nephrology

Vol. 167

Series Editor

Claudio Ronco  Vicenza
Endotoxemia and Endotoxin Shock
Disease, Diagnosis and Therapy

Volume Editors

Claudio Ronco  Vicenza
Pasquale Piccinni  Vicenza

22 figures, 4 in color, and 10 tables, 2010
Contents

VII Preface
Ronco, C.; Piccinni, P. (Vicenza); Rosner, M.H. (Charlottesville, Va.)

Endotoxemia: Pathophysiological Background

1 Endotoxin in the Pathogenesis of Sepsis
Marshall, J.C. (Toronto, Ont.)

14 Endotoxins and Other Sepsis Triggers
Opal, S.M. (Pawtucket, R.I.)

Extracorporeal Endotoxin Removal: Theory and Technology

25 Rationale of Extracorporeal Removal of Endotoxin in Sepsis: Theory, Timing and Technique
Ronco, C.; Piccinni, P. (Vicenza); Kellum, J. (Pittsburgh, Pa.)

35 Extracorporeal Removal of Endotoxin: The Polymyxin B-Immobilized Fiber Cartridge
Tani, T. (Otsu City); Shoji, H. (Tokyo); Guadagni, G. (Milan); Perego, A. (Monselice)

45 Mechanisms of Polymyxin B Endotoxin Removal from Extracorporeal Blood Flow: Molecular Interactions
Vesentini, S.; Soncini, M.; Fiore, G.B.; Redaelli, A. (Milan)

Fiore, G.B.; Soncini, M.; Vesentini, S.; Redaelli, A. (Milan)

Endotoxin Removal in Septic Shock in Clinical Settings

65 Endotoxin Removal by Polymyxin B Immobilized Cartridge Inactivates Circulating Proapoptotic Factors
Martin, E.L.; Ranieri, V.M. (Turin)
77 Polymyxin-B Hemoperfusion and Endotoxin Removal: Lessons from a Review of the Literature
Cruz, D.N.; de Cal, M.; Piccinni, P.; Ronco, C. (Vicenza)

83 PMX Endotoxin Removal in the Clinical Practice: Results from the EUPHAS Trial
Antonelli, M. (Rome); Fumagalli, R. (Monza); Cruz, D.N. (Vicenza); Brienza, N. (Bari); Guinta, F. (Pisa) on behalf of the EUPHAS Study Group

91 Early Management of Endotoxemia Using the Endotoxin Activity Assay and Polymyxin B-Based Hemoperfusion
Novelli, G.; Ferretti, G.; Ruberto, F.; Morabito, V.; Pugliese, F. (Rome)

102 Endotoxin Activity Level and Septic Shock: A Possible Role for Specific Anti-Endotoxin Therapy?

Endotoxin Removal: Building the Evidence

111 Endotoxin Removal: How Far from the Evidence? From EUPHAS to EUPHRATES
Rachoin, J.-S. (Camden, N.J.); Foster, D. (Toronto, Ont.); Dellinger, R.P. (Camden, N.J.)

119 Endotoxin Removal: How Far from the Evidence? The EUPHAS 2 Project
Martin, E.L. (Turin); Cruz, D.N. (Vicenza); Monti, G.; Casella, G.; Vesconi, S. (Milan); Ranieri, V.M. (Turin); Ronco, C. (Vicenza); Antonelli, M. (Rome)

126 Author Index

127 Subject Index

Retraction
“Acute Heart Failure Treatment: Traditional and New Drugs” by Gheorghiade M, Palazzuoli A, Ronco C. Contrib Nephrol, 2010;165;112-128.
This chapter of a previous volume of Contributions to Nephrology has been retracted at the authors’ request. A miscommunication between the corresponding author and the co-authors resulted in the publishing of an unfinished article.
Preface

Several signs and symptoms in sepsis are due to the presence of endotoxin in the circulation. Both in animal and human models there is an evident immunological response to the bacterial invasion of the host and the consequent release of endotoxin into the bloodstream. The presence of endotoxin in the circulation leads to altered cardiovascular function, lung dysfunction and acute kidney injury, often characterizing a clinical picture of sepsis and septic shock. This humoral nature of the syndrome makes it logical to try to remove the circulating endotoxin as much as possible in order to mitigate its biological and clinical effects at the cellular, tissue and organ levels. This can be achieved today with a very specific hemoperfusion process utilizing cartridges with immobilized polymyxin B in an extracorporeal circuit. This approach seems to provide for a significant removal of endotoxin with a significant reduction of its circulating levels.

The basic mechanisms, rationale and the clinical results of this new therapeutic approach are summarized in the present volume. The contributors of this book represent a group of outstanding investigators whose studies have helped expand the scientific knowledge about this field. The clinical effects reported in several chapters demonstrate a mitigation of the septic cascade in the early phases, with amelioration of the prognosis and outcome in septic patients treated with this specific form of hemoperfusion. Recent clinical trials seem to confirm the expectations showing a reduction of mortality in patients with early signs of abdominal sepsis due to recent surgery. This opens new avenues for specific interventions in sepsis and, once more, represents important material for a book in the Contributions to Nephrology series.

We would like to thank the authors and all the contributors for the enormous effort and the quality of their scientific chapters. We also would like to thank all who made this publication possible and especially Karger for the outstanding editorial assistance.
We feel this book will be a milestone in the field of extracorporeal therapies in sepsis and will be a companion for both basic scientists and clinical professionals for their continuous educational improvement.

Claudio Ronco, Vicenza
Pasquale Piccinni, Vicenza
Mitchell H. Rosner, Charlottesville, Va.