Patient Safety in Dialysis Access
Patient Safety in Dialysis Access

Volume Editors

Matthias K. Widmer  Bern
Jan Malik  Prague

58 figures, 48 in color and 35 tables, 2015

Illustrations

Janine Heers  Zürich
Contributions to Nephrology
(Founded 1975 by Geoffrey M. Berlyne)

Matthias K. Widmer, MD
Universität klinik für Herz- und Gefäßchirurgie
Inselspital
CH–3010 Bern (Switzerland)

Jan Malik, MD, PhD
3rd Department of Internal Medicine
First Faculty of Medicine
Charles University and General University Hospital
U nemocnice 1
CZ–128 08 Prague (Czech Republic)

Library of Congress Cataloging-in-Publication Data
Patient safety in dialysis access / volume editors, Matthias K. Widmer, Jan Malik.
p. ; cm. -- (Contributions to nephrology ; ISSN 0302-5144 ; vol. 184)
Includes bibliographical references and indexes.
(electronic version)
I. Widmer, Matthias K., editor. II. Malik, Jan, 1968- , editor. III.
Series: Contributions to nephrology ; v. 184. 0302-5144
Kidney--surgery. 4. Patient Safety. W1 CO778UN v.184 2015 / WJ 378]
RC901.7.P48
617.4'61059–dc23
2014047410

Bibliographic Indices. This publication is listed in bibliographic services, including Current Contents® and Index Medicus.

Disclaimer. The statements, opinions and data contained in this publication are solely those of the individual authors and contributors and not of the publisher and the editor(s). The appearance of advertisements in the book is not a warranty, endorsement, or approval of the products or services advertised or of their effectiveness, quality or safety. The publisher and the editor(s) disclaim responsibility for any injury to persons or property resulting from any ideas, methods, instructions or products referred to in the content or advertisements.

Drug Dosage. The authors and the publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new and/or infrequently employed drug.

All rights reserved. No part of this publication may be translated into other languages, reproduced or utilized in any form or by any means electronic or mechanical, including photocopying, recording, microcopying, or by any information storage and retrieval system, without permission in writing from the publisher.

© Copyright 2015 by S. Karger AG, P.O. Box, CH–4009 Basel (Switzerland)
www.karger.com
Printed in Germany on acid-free and non-aging paper (ISO9706) by Kraft Druck, Ettlingen
ISSN 0302–5144
e-ISSN 1662–2782
# Contents

## VII  Foreword  
Vincent, C. (Oxford)

## IX  Preface  
Widmer, M.K. (Bern); Malik, J. (Prague)

## X  Acknowledgements

### The Topic

1. **Patient Safety: What Is It All about?**  
   Schwappach, D. (Bern)

### Preventive Treatment Strategies

13. **Patients with Chronic Kidney Disease: Safety Aspects in the Preoperative Management**  
   Malovrh, M. (Ljubljana)

24. **What Every Doctor Should Know about Drug Safety in Patients with Chronic Kidney Disease**  
   Paparella, M.; Martina, V.; Rizzo, M.A.; Gallieni, M. (Milan)

51. **Patient Safety in Vascular Access Patients on Hemodialysis: Contrast Agents and Renal Function**  
   Vogt, B. (Bern)

59. **Contrast Agents and Ionization with Respect to Safety for Patients and Doctors**  
   von Tengg-Kobligk, H. (Bern/Heidelberg/Columbus, Ohio); Kara, L.; Klink, T.; Khanicheh, E.; Heverhagen, J.T.; Böhm, I.B. (Bern)

75. **Cardiac Safety in Vascular Access Surgery and Maintenance**  
   Malik, J.; Kudlicka, J.; Tesar, V.; Linhart, A. (Prague)

### Dialysis Access Creation

87. **Simulation in Vascular Access Surgery**  
   Widmer, M.K. (Bern); Davidson, I. (New Orleans, La.); Widmer, L.W.; Schmidli, J.; Wyss, T.R. (Bern)
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>Team Training to Establish a Safety Culture in Dialysis Access Surgery</td>
<td>Davidson, I. (New Orleans, La.); Widmer, M.K. (Bern); Nolen, B. (Fort Worth, Tex.); Ross, J. (Orangeburg, S.C.); Slakey, D.P. (New Orleans, La.)</td>
</tr>
<tr>
<td>107</td>
<td>How to Perform Safe Anesthesia in Patients with End-Stage Renal Disease</td>
<td>Seidl, C.; Eberle, B. (Bern)</td>
</tr>
<tr>
<td>123</td>
<td>Careful and Safe Vascular Access Creation</td>
<td>Wyss, T.R.; Widmer, M.K. (Bern)</td>
</tr>
<tr>
<td></td>
<td>Dealing with Complications of Vascular Access</td>
<td></td>
</tr>
<tr>
<td>143</td>
<td>How to Prolong the Patency of Vascular Access</td>
<td>Glazer, S. (Orange, Calif.); Saint, L.; Shenoy, S. (Saint Louis, Mo.)</td>
</tr>
<tr>
<td>153</td>
<td>Safety Issues in Surgical and Endovascular Techniques to Rescue Failing or Failed Arteriovenous Fistulas and Arteriovenous Grafts</td>
<td>Lazarides, M.; Georgiadis, G.; Argyriou, C. (Alexandroupolis)</td>
</tr>
<tr>
<td>164</td>
<td>Vascular Access-Induced Hand Ischemia: Risks and Safe Management</td>
<td>Sessa, C.; De Lambert, A.; Pirvu, A.; Palacin, P.; Pichot, O. (Grenoble)</td>
</tr>
<tr>
<td></td>
<td>Catheters as Dialysis Access</td>
<td></td>
</tr>
<tr>
<td>176</td>
<td>Patient Safety in Peritoneal Dialysis</td>
<td>Slakey, D.P.; Davidson, I. (New Orleans, La.)</td>
</tr>
<tr>
<td>189</td>
<td>Safety Aspects in Patients on Hemodialysis with Catheters</td>
<td>Polakovič, V.; Lopot, F. (Prague)</td>
</tr>
<tr>
<td>205</td>
<td>Nosocomial Infections in Dialysis Access</td>
<td>Schweiger, A. (Bern); Trevino, S. (St. Louis, Mo.); Marschall, J. (Bern/St. Louis, Mo.)</td>
</tr>
<tr>
<td></td>
<td>Dialysis Access Care</td>
<td></td>
</tr>
<tr>
<td>222</td>
<td>How to Improve Vascular Access Care</td>
<td>van Loon, M. (Maastricht)</td>
</tr>
<tr>
<td>234</td>
<td>The Patient’s Role in Patient Safety and the Importance of a Dedicated Vascular Access Team</td>
<td>Shemesh, D.; Olsha, O.; Goldin, I.; Danin, S. (Jerusalem)</td>
</tr>
<tr>
<td></td>
<td>Outlook</td>
<td></td>
</tr>
<tr>
<td>251</td>
<td>Patient Safety in Dialysis Access: Education and Research</td>
<td>Tordoir, J.H.M. (Maastricht); Widmer, M.K. (Bern)</td>
</tr>
<tr>
<td>264</td>
<td>Author Index</td>
<td></td>
</tr>
<tr>
<td>265</td>
<td>Subject Index</td>
<td></td>
</tr>
</tbody>
</table>
Twenty-five years ago, the field of patient safety, apart from a number of early pioneers, did not exist, and the lack of attention to medical accidents could reasonably be described as negligent. Major progress has now been made in assessing the nature and scale of harm. The findings of the major record review studies are widely accepted, and numerous other studies have catalogued the nature and extent of surgical adverse events, infections, adverse drug events and other safety issues. Analyses of incidents are now routinely performed, albeit often in a framework of accountability rather than in the spirit of reflection and learning.

Substantial progress has been made in many clinical areas in understanding the causes of error and harm. Surgery, for instance, was long ago identified as the source of a high proportion of preventable adverse events. A decade ago, most of these would have been considered unavoidable or ascribed, generally incorrectly, as due to poor individual practice. Studies of process failures, communication, teamwork, interruptions and distractions have now identified multiple vulnerabilities in systems of surgical care. Many groups are now moving beyond the undoubted gains of checklists to a more sophisticated understanding of surgical teamwork in both the operating theatre and the wider health care system. A considerable number of interventions have shown that errors can be reduced and processes made more reliable in many other areas of health care. Interventions such as computer order entry, standardisation and simplification of processes and systematic handover have all been shown to improve reliability, and in some cases reduce harm, in specific contexts.

We are also learning that safety needs to be approached differently according to context. Each clinical activity poses its own particular risks to patients and the solutions must be customised and adapted for each setting. Some settings benefit from tight procedures and standardisation, whereas others require more flexible approaches to the management of risk and crisis.

Foreword
Dialysis is of enormous benefit to patients and their families but, like other effective treatments, also poses risks. This book brings our understanding of patient safety to bear on the processes and systems of dialysis access, examining both the nature of the risk to patients and the means of managing them effectively. The book will surely be greatly welcomed by dialysis patients, families and all those who care for them.

*Charles Vincent*, London
Professor of Psychology
University of Oxford
Emeritus Professor Clinical Safety Research
Imperial College London
Preface

Patients with end-stage renal disease and its comorbidities have a high risk of suffering adverse events during their continuous treatment as in- or outpatients. Furthermore, dialysis access creation and maintenance are prone to complications. Therefore, specific strategies and various techniques to promote a patient safety initiative are of genuine interest.

Even 15 years after the publication of To Err Is Human: Building a Safer Health System by the Institute of Medicine, doctors and nurses are not always aware of the consequences of unsafe behavior. Today, we face the fact that knowing about the right thing is not a guarantee of doing the right thing. With this book, we aim to raise health care professionals’ awareness of the aspects of patient safety, which combines medical education with evidence-based medicine. We are convinced that preventive strategies are key to avoid harm and to improve the outcome of the treatment of the growing number of patients with chronic kidney failure.

We are grateful that so many authors from different countries have contributed to this book. They give us a diversified insight into important concepts and technical tricks, which are essential to create and maintain a functional dialysis access. With checklists in our mind, we can be more precise in the timing and in the process of dialysis access creation. Besides simulation training, we also need a better focus on interdisciplinary and interprofessional communication. We are convinced that these efforts lead to more satisfaction amongst health care professionals and result in an improved medical outcome for our patients.

We thank the Vascular Access Society (www.vascularaccesssociety.com), the Vascular International School (www.vascular-international.org) and several industrial sponsors for their support when we started this patient safety project.

Please share your contributions with us at patientsafetyvas@insel.ch.

Matthias K. Widmer, Bern
Jan Malik, Prague
Acknowledgements

The volume editors gratefully acknowledge the support by the following sponsors:

Vascular Access Society
*Maastricht, The Netherlands*

Vascular International Foundation and School
*Fürigen, Switzerland*

Bio Nova International
*North Melbourne, Australia*

GE Healthcare
*Prague, Czech Republic*

Jotec Sales AG
*Muri, Switzerland*

MAQUET GETINGE GROUP
*Hilversum, The Netherlands*

MCM MEDSYS AG
*Solothurn, Switzerland*

Vascutek Deutschland GmbH, a Terumo Company
*Spreitenbach, Switzerland*