

**Supplementary table 1: RICH-Trial site investigators**

Center	Investigators
Aachen University Hospital Aachen, Dept. of Intensive Care Medicine	PI: Prof. Dr. Gernot Marx Deputy: Dr. Tim-Philipp Simon
Augsburg Klinikum Augsburg	PI: Dr. Ulrich Jaschinski Deputy: Dr. Philipp Deetjen
Bad Saarow HELIOS Klinikum Bad Saarow, Dept. of Intensive Care Medicine	PI: Dr. Stefan Wirtz Deputy: Ali Allam
Berlin Charité Universitätsmedizin Berlin, Dept. of Anesthesiology and Operative Intensive Care Medicine	PI: Prof. Dr. Claudia Spies Deputy: Dr. Kathrin Schmidt
Berlin Charité Universitätsmedizin Berlin CVK, Medical Department, Division of Nephrology and Internal Intensive Care Medicine	PI: Priv.-Doz. Dr. Dietrich Hasper Deputy: Dr. Jan Kruse
Berlin Charité Universitätsmedizin Berlin CCM, Medical Department, Division of Nephrology and Internal Intensive Care Medicine	PI: Prof. Dr. Torsten Slowinski Deputy: Dmytro Khadzhyrov
Bielefeld Evangelisches Klinikum Bethel gGmbH Bielefeld, Germany	PI: Dr. Friedhelm Bach Deputy: Dr. Anne-Kathrin Eickelmann
Bochum Universitätsklinikum Knappschafts Krankenhaus Bochum, Dept. of Anesthesiology and Intensive Care Medicine	PI: Prof. Dr. Roland Schroers Deputy: Priv.-Doz., Dr. Peter Schenker
Bonn University Hospital Bonn, Dept. of Anesthesiology and Intensive Care Medicine	PI: Prof. Dr. Christian Putensen Deputy: Dr. Jens-Christian Schewe
Düsseldorf University Hospital Düsseldorf, Dept. of Anesthesiology	PI: Prof. Dr. Detlef Kindgen-Milles Deputy: Dr. Thomas Dimski
Düsseldorf University Hospital Düsseldorf, Dept. of Nephrology	PI: Prof. Dr. Christian Rump Deputy: Priv.-Doz. Dr. Johannes Stegbauer
Erlangen University Hospital Erlangen Dept. of Medicine 4, Nephrology and Hypertension	PI: Prof. Dr. Carsten Willam Deputy: Dr. Gunnar Schley
Essen University Hospital Essen, Dept. of Nephrology	PI: Dr. Bartosz Tyczynski Deputy: Dr. Maria Stavropoulou
Frankfurt University Hospital Frankfurt, Dept. of Anesthesiology, Intensive-Care Medicine and Pain Therapy	PI: Prof. Dr. Dr. Kai Zacharowski Deputy: Prof. Dr. Patrick Meybohm
Gießen University Hospital Gießen, Dept. of Anesthesiology and Intensive Care Medicine	PI: Prof. Dr. Michael Sander Deputy: Dr. Christian Koch

Göttingen University Medical Center Göttingen, Dept. for Anesthesiology	PI: Prof. Dr. Onnen Mörer Deputy: Priv.-Doz. Dr. Daniel heise
Greifswald University Medicine Greifswald, Dept. of Anesthesiology and Intensive Care Medicine	PI: Dr. Sixten Selleng Deputy: Dr. Matthias Gründling
Halle (Saale) University Hospital Halle, Dept. of Anesthesiology and Intensive Care Medicine	PI: Prof. Dr. Michael Bucher Deputy: Dr. Thomas Steinke
Hamburg University Medical Center Hamburg-Eppendorf, Dept. of Intensive Care	PI: Prof. Dr. Stefan Kluge Deputy: Dr. Thomas Steinke
Heidelberg University Hospital Heidelberg, Dept. of Anesthesiology	PI: Prof. Dr. Johann Motsch Deputy: Priv.-Doz. Dr. Thorsten Brenner
Jena University Hospital Jena, Dept. of Anesthesiology and Intensive Care Medicine	PI: Priv.-Doz. Dr. Andreas Kortgen Prof. Dr. Frank Bloos
Kiel University Hospital Schleswig-Holstein, Campus Kiel, Dept. for Anesthesiology	PI: Prof. Dr. Norbert Weiler Deputy: Priv.-Doz. Dr. Gunnar Elke
Köln Kliniken Köln, Krankenhaus Köln-Merheim, Dept. of Medicine I, Nephrology and Transplantation Medicine and Intensive Care Medicine	PI: Prof. Dr. Achim Jörres Deputy: Dr. Jörn Dullinger / Dr. Robert Schuhmann
Leipzig University Hospital Leipzig, Dept. of Anesthesiology and Intensive Care medicine	PI: Prof. Dr. Hermann Wrigge Deputy: Dr. Philipp Simon
Mainz Universitätsmedizin Mainz, Dept. of Anesthesiology	PI: Priv.-Doz. Dr. Marc Bodenstein Deputy: Dr. Rita laufenberg-Feldmann
München Technical University of Munich, University Hospital, Dept. for Anesthesiology	PI: Dr. Markus Heim Deputy: Dr. Ralph Bogdanski
Münster University Hospital Münster, Dept. of Anesthesiology, Intensive Care and Pain Medicine	PI: Prof. Dr. Alexander Zarbock Deputy: Dr. Thomas Ermert
Nürnberg Klinikum Nürnberg	PI: Prof. Dr. Stefan John Deputy: Dr. Thomas Schrauzer
Regensburg University Hospital Regensburg, Dept. of Surgery	PI: Dr. Ivan Göcze Deputy: Prof. Dr. Thomas Bein
Solingen Municipal hospital Solingen, Dept. for Nephrology and General Internal Medicine	PI: Dr. Michael Schmitz Deputy: Priv-Doz. Dr. Johannes Stegbauer
Tübingen University Hospital Tübingen, Dept. of Anesthesiology and Intensive Care Medicine	PI: Prof. Dr. Peter Rosenberger Deputy: Priv.-Doz. Dr. Helene Häberle

**Supplementary table 2: Protocol changes after amendment (exclusion criteria)**

Old version	New version
Patients with increased bleeding risk (e.g. an active bleeding from ulcers in the gastro-intestinal tract, hypertension with a diastolic blood pressure higher than 105 mm Hg, injuries (intracranial haemorrhage, aneurysm of brain arteries)of or surgical procedures on the central nervous system if a heparinization with a target aPTT 45-60 s is not allowed by the treating neurologist or neurosurgeon, severe retinopathies, bleeding into the vitreum, ophthalmic surgical procedures or injuries, active tuberculosis; infective endocarditis)	Patients with increased bleeding risk (e.g. active bleeding from ulcers in the gastro-intestinal tract, hypertension with a diastolic blood pressure higher than 105 mmHg, injuries (intracranial haemorrhage, aneurysm of brain arteries) of or surgical procedures on the central nervous system if a heparinization with a target PTT 45-60 s is not allowed by the treating neurologist or neurosurgeon, severe retinopathies, bleeding into the vitreum, ophthalmic surgical procedures or injuries, active tuberculosis, infective endocarditis)
Diseases or organ damage related with haemorrhagic diathesis (coagulopathy, thrombocytopenia, severe liver or pancreas disease)	Diseases or organ damage related with haemorrhagic diathesis (coagulopathy, thrombocytopenia, severe liver or pancreas disease)
Pre-existing kidney disease KDOQI IV not requiring RRT (GFR < 30 mL/min)	Removed.
Previous renal-replacement therapy due to acute kidney injury in the last 90 days	Removed.
Dialysis-dependent chronic kidney insufficiency	Dialysis-dependent chronic kidney insufficiency
Need of therapeutic systemic anticoagulation	Need of therapeutic anticoagulation ( <u>PTT&gt; 60 s</u> )
Allergic reaction to one of the anticoagulants or ingredients, Heparin-induced thrombocytopenia	Allergic reaction to one of the anticoagulants or ingredients, Heparin-induced thrombocytopenia
AKI caused by permanent occlusion or surgical lesion of the renal artery	AKI caused by permanent occlusion or surgical lesion of <u>both</u> renal arteries
AKI caused by (glomerulo-)nephritis, interstitial nephritis, vasculitis or postrenal obstruction	AKI caused by (glomerulo-)nephritis, interstitial nephritis, vasculitis or postrenal obstruction
Do-not-resuscitate order	Do-not-resuscitate order
Hemolytic-uremic syndrome/thrombotic thrombocytopenic purpura	Hemolytic-uremic syndrome/thrombotic thrombocytopenic purpura

Persistent and severe lactate acidosis in the context of an acute liver failure and/or shock	Persistent and severe lactate acidosis in the context of an acute liver failure and/or shock
Kidney transplant within the last 12 months	Kidney transplant within the last 12 months
Pregnancy and nursing period	Pregnancy and nursing period
Abortus imminens	Abortus imminens
No hemofiltration machine free for use at the moment of inclusion	No hemofiltration machine free for use at the moment of inclusion
Participation in another clinical intervention trial in the last 3 months	Participation in another clinical intervention trial in the last 3 months
Persons with any kind of dependency on the investigator or employed by the sponsor or investigator	Persons with any kind of dependency on the investigator or employed by the sponsor or investigator
Persons held in an institution by legal or official order	Persons held in an institution by legal or official order

## Supplementary table 3: Steering Committee and Data Safety Monitoring

### Board

Name	Institution
Univ.-Prof. Dr. med. Alexander Zarbock	Chair of the Department of Anesthesiology, Intensive Care Medicine and Pain Therapy, University Hospital Muenster, University Muenster, Germany
Univ.-Prof. Dr. med. Gernot Marx	Chair of the Department of Intensive Care Medicine, University Hospital Aachen, University Aachen, Germany
Dr. Dipl. Stat. Joachim Gerß	Institute of Biostatistics and Clinical Research, University Muenster, Germany
Prof. Dr. med. D. Kindgen-Milles	Medical director of Critical Care Medicine, University Hospital Duesseldorf, University Duesseldorf, Germany
Dr. med. Torsten Slowinski	Department of Nephrology, Charite, Universitaetsmedizin Berlin, Berlin, Germany

### DSMB Membership

The Data Safety Monitoring Board (DSMB) is composed of independent experts. In the RICH trial, the DSMB consists of two physicians and one statistician not involved in the execution of the trial:

Univ.-Prof. Dr. med. Peter Zahn

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Univ.-Prof. Dr. med. Hartmut Bürkle

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PD Dr. Guido Knapp Department of Statistics

TU Dortmund Universität

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**Supplementary table 4: RICH Center Ethic Boards**

<b>Center</b>	<b>Ethic board</b>
Aachen University Hospital Aachen, Dept. of Intensive Care Medicine	Ethik-Kommission an der Medizinischen Fakultät der RWTH Aachen
Augsburg Klinikum Augsburg	Ethik-Kommission der Bayerischen Landesärztekammer
Bad Saarow HELIOS Klinikum Bad Saarow, Dept. of Intensive Care Medicine	Ethik-Kommission der Landesärztekammer Brandenburg
Berlin Charité Universitätsmedizin Berlin, Dept. of Anesthesiology and Operative Intensive Care Medicine	Ethikkommission des Landes Berlin
Berlin Charité Universitätsmedizin Berlin CVK, Medical Department, Division of Nephrology and Internal Intensive Care Medicine	Ethikkommission des Landes Berlin
Berlin Charité Universitätsmedizin Berlin CCM, Medical Department, Division of Nephrology and Internal Intensive Care Medicine	Ethikkommission des Landes Berlin
Bielefeld Evangelisches Klinikum Bethel gGmbH Bielefeld, Germany	Ethik-Kommission der Ärztekammer Westfalen-Lippe und der Westfälischen Wilhelms-Universität Münster
Bochum Universitätsklinikum Knappschaftskrankenhaus Bochum, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission der Medizinischen Fakultät der Ruhr-Universität Bochum
Bonn University Hospital Bonn, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission an der Medizinischen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn
Düsseldorf University Hospital Düsseldorf, Dept. of Anesthesiology	Ethik-Kommission der Medizinischen Fakultät der Heinrich-Heine-Universität Düsseldorf
Düsseldorf University Hospital Düsseldorf, Dept. of Nephrology	Ethik-Kommission der Medizinischen Fakultät der Heinrich-Heine-Universität Düsseldorf
Erlangen University Hospital Erlangen Dept. of Medicine 4, Nephrology and Hypertension	Ethik-Kommission der Medizinischen Fakultät Friedrich-Alexander-Universität Erlangen-Nürnberg
Essen University Hospital Essen, Dept. of Nephrology	Ethik-Kommission der Medizinischen Fakultät der Universität Duisburg-Essen
Frankfurt University Hospital Frankfurt, Dept. of Anesthesiology, Intensive-Care Medicine and Pain Therapy	Ethik-Kommission des Fachbereichs Medizin der Johann Wolfgang Goethe-Universität Frankfurt
Gießen University Hospital Gießen, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission des FB Medizin der Justus-Liebig-Universität Gießen

Göttingen University Medical Center Göttingen, Dept. for Anesthesiology	Ethikkommission der Medizinischen Fakultät der Georg-August-Universität Göttingen
Greifswald University Medicine Greifswald, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission an der Universitätsmedizin Greifswald
Halle (Saale) University Hospital Halle, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission der Medizinischen Fakultät der Martin-Luther-Universität Halle-Wittenberg
Hamburg University Medical Center Hamburg-Eppendorf, Dept. of Intensive Care	Ethik-Kommission der Ärztekammer Hamburg
Heidelberg University Hospital Heidelberg, Dept. of Anesthesiology	Ethikkommission der Med. Fakultät Heidelberg
Jena University Hospital Jena, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission der Friedrich-Schiller-Universität Jena an der Medizinischen Fakultät
Kiel University Hospital Schleswig-Holstein, Campus Kiel, Dept. for Anesthesiology	Ethik-Kommission der Medizinischen Fakultät der Christian-Albrechts-Universität zu Kiel
Köln Kliniken Köln, Krankenhaus Köln-Merheim, Dept. of Medicine I, Nephrology and Transplantation Medicine and Intensive Care Medicine	Ethik-Kommission der Universität Witten/Herdecke
Leipzig University Hospital Leipzig, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission an der Medizinischen Fakultät der Universität Leipzig
Mainz Universitätsmedizin Mainz, Dept. of Anesthesiology	Ethik-Kommission der Landesärztekammer Rheinland Pfalz
München Technical University of Munich, University Hospital, Dept. for Anesthesiology	Ethik-Kommission der Fakultät für Medizin der Technischen Universität München
Münster University Hospital Münster, Dept. of Anesthesiology, Intensive Care and Pain Medicine	Ethik-Kommission der Ärztekammer Westfalen-Lippe und der Westfälischen Wilhelms-Universität Münster
Nürnberg Klinikum Nürnberg	Ethik-Kommission der Medizinischen Fakultät Friedrich-Alexander-Universität Erlangen-Nürnberg
Regensburg University Hospital Regensburg, Dept. of Surgery	Ethik-Kommission an der Universität Regensburg
Solingen Municipal hospital Solingen, Dept. for Nephrology and General Internal Medicine	Ethik-Kommission der Ärztekammer Nordrhein
Tübingen University Hospital Tübingen, Dept. of Anesthesiology and Intensive Care Medicine	Ethik-Kommission der Medizinischen Fakultät der Eberhard-Karls-Universität und am Universitätsklinikum Tübingen

