



Curriculum Vitae

Personal information **Bernhard Dorweiler**

Work experience

01/04/2020 – CURRENT – Cologne, Germany

DIRECTOR, DEPARTMENT OF VASCULAR SURGERY – University Medical Center of Cologne

Director of Department of Vascular Surgery, University Medical Center Cologne and full professor of Vascular Surgery at University of Cologne.

01/04/2010 – 31/03/2020 – Mainz, Germany

DIRECTOR, DIVISION OF VASCULAR SURGERY – University Medical Center Mainz

Director of Vascular Surgery, Division of Vascular Surgery at the Department of Cardiothoracic&Vascular Surgery, University Medical Center Mainz

01/10/2006 – 31/03/2010 – Mainz, Germany

CONSULTANT VASCULAR SURGEON – University Medical Center Mainz

Consultant Vascular Surgeon and Managing Director, Division of Vascular Surgery from 01.04.2007 till 31.03.2010.

Research fellowship at the Department of Molecular Medicine, Columbia University Medical Center, New York, NY, USA from 01.02.2008-31.01.2009.

01/12/1997 – 30/09/2006 – Mainz, Germany

RESIDENT GENERAL/VASCULAR SURGERY – University Medical Center Mainz

Education and training

01/10/1990 – 30/09/1997 – Saarstraße 21, Mainz, Germany

MEDICAL DOCTOR – Johannes-Gutenberg University Mainz

<https://www.uni-mainz.de/>

14/09/2017 – 13/04/2018 – Rheingaustraße 1, Oestrich-Winkel, Germany

BACHELOR IN HEALTH ECONOMICS ("GESUNDHEITSÖKONOM") – European Business School

<https://www.ebs.edu/de/zertifikatsprogramm/gesundheitsoekonomie>

22/05/2012 – 22/05/2012 – Robert-Koch-Platz 9, Berlin, Germany

ENDOVASCULAR SURGEON – German Society for Vascular Surgery

<https://www.gefaesschirurgie.de/>

Additional information

Publications

The Future of Vascular Medicine - Role of 3D Printing

Zentralbl Chir . 2020 Oct;145(5):448-455

<https://pubmed.ncbi.nlm.nih.gov/31820426/> – 2020

Digitalisation is one of the key challenges in current surgery and will impact the future of surgical care as well as upcoming generations of surgeons. 3D printing is a technology that has recently been transferred from industrial prototyping into cardiovascular medicine. The digital model of the anatomical structure which needs to be engineered represents the inherent link of 3D printing to digital medicine. 3D printing technology is able to provide the surgeon with patient-specific models of anatomy and disease for surgical planning and patient informed consent as well as training templates for students and residents, surgical templates and even ready-to-use surgical implants. In our service, we have established a full-inhouse workflow for 3D printing and we currently use this technology for the generation of patient-specific models, training templates and for patient education, as will be presented in this article. Future advances in software solutions, printing polymers and easy-to-handle printers will further propagate and expand the applicability of this technology in cardiovascular medicine.

Long-Term Outcomes after Thoracic Endovascular Aortic Repair Using Chimney Grafts for Aortic Arch Pathologies: 10 Years of Single-Center Experience

Ann Vasc Surg . 2020 Sep 12;S0890-5096(20)30814-1. doi: 10.1016/j.avsg.2020.08.129.

<https://pubmed.ncbi.nlm.nih.gov/32927039/> – 2020

Background: This study reports the early- and long-term outcomes of the thoracic endovascular aortic repair using the Chimney-Graft technique (ChTEVAR) for the treatment of aortic arch pathologies.

Methods: From January 2010 to December 2019, patients who underwent aortic ChTEVAR technique in our institution were included. Early, mid, and long-term outcomes in this group of patients were evaluated. Patient follow-up data were obtained by imaging follow-up that are routinely performed after 3-6 months following initial surgery and then at yearly intervals.

Results: Aortic arch repair with a ChTEVAR was performed in 54 patients. The 30-day mortality was 18.5% (n = 10). All-cause 30-day mortality was higher in the subgroup of patients operated urgently (33% vs. 14%) without a significant difference (P = 0.141). Permanent neurological deficit (PND) was observed in 15% (8/54 patients); stroke in 11% (6/54), and paraplegia 4% (2/54). During follow-up the primary and primary-assisted chimney-graft patency was 96.8% and 97.8%, respectively. The multivariate analysis identified the age >70 years and the aortic diameter as independent risk factors for elevated mortality during the follow-up (P = 0.015 and 0.001, respectively). The PND was an independent predictor for 30-day mortality (P = 0.014, hazard ratio 13.5, 95% confidence interval 1.7-106.6).

Conclusions: The ChTEVAR has noninferior results to other open and endovascular aortic arch repair methods with an acceptable long-term survival especially in elective procedures.

Contemporary results with the biosynthetic glutaraldehyde denatured ovine collagen graft (Omniflow II) in femoropopliteal position

J Vasc Surg . 2020 May;71(5):1630-1643

<https://pubmed.ncbi.nlm.nih.gov/31870757/> – 2020

Objective: The objective of this study was to analyze the outcome of a contemporary series of femoropopliteal bypass operations with the glutaraldehyde denatured polyester mesh-reinforced ovine collagen prosthesis (OCP; Omniflow II [LeMaitre Vascular, Inc, Burlington, Mass]). The experience of two tertiary centers regarding long-term graft function, secondary reinterventions, and biodegeneration of the OCP prosthesis is presented.

Methods: Between January 2006 and January 2014, a series of 205 consecutive operations with the OCP in the femoropopliteal position (54 above knee and 151 below knee) were performed in 194 patients in 202 limbs for disabling claudication (72), chronic critical ischemia (105), acute ischemia (18), popliteal artery aneurysm (4), degeneration of a venous or prosthetic graft (5), and infection of a synthetic bypass graft (1). Grafts were observed with duplex ultrasound scan supplemented by additional angiography in case of recurrent ischemia with prospective documentation of follow-up data in a computerized vascular database. Retrospective analysis of graft patency, limb salvage, and diagnosis of aneurysmal graft degeneration was performed.

Results: The 30-day mortality was 3.9%. Early thrombotic bypass occlusion occurred in 8.2% of cases. Four early graft infections could be successfully managed by local treatment with graft preservation. After a mean (median) follow-up of 56 (55) months (range, 1-135 months), primary patency, primary assisted patency, secondary patency, and limb salvage were 71%, 78%, 78%, and 91% for above-knee bypass and 40%, 50%, 63%, and 87% for below-knee bypass at 5 years. Biodegeneration in the form of graft aneurysm or graft stenosis was detected in 26 grafts (12.6%), resulting in secondary open or endovascular procedures in 16 cases.

Conclusions: The OCP provides satisfactory medium- and long-term patency and limb salvage in the femoropopliteal position. Aneurysmal degeneration or graft stenosis may develop over time, demanding lifelong duplex ultrasound surveillance and secondary intervention if needed. Its possible infection-resistant behavior in a contaminated field combined with an acceptable graft patency and limb salvage justifies the use of this graft in the absence of autologous vein.

Development and evaluation of 3-dimensional printed models of the human tracheobronchial system for training in flexible bronchoscopy

Interact Cardiovasc Thorac Surg . 2019 Jan 1;28(1):137-143
<https://pubmed.ncbi.nlm.nih.gov/30020450/> – 2019

Objectives: Training and assessment of proper skills in flexible bronchoscopy are major educational goals for cardiothoracic residents. Therefore, we developed 3-dimensional (3D) printed models of the human tracheobronchial system for training and assessment of cardiothoracic residents in flexible bronchoscopy.

Methods: Three models of normal (size/shape) human tracheobronchial anatomy were generated using a commercially available 3D printer. Ten residents (inexperienced: Group 1; experienced: Group 2) participated in this study with an experimental setting of initial assessment (Model 1), training (15 min, Model 2) and post-training assessment (Model 3). The time needed for flexible bronchoscopy assessment of randomly assigned ostia was recorded before and after training. Additionally, the time for retrieval of a foreign body from the tracheobronchial system was measured before and after training.

Results: The average time for intubation of a given ostium (Model 1) at initial assessment was 88 s for Group 1 and 38 s for Group 2 ($P < 0.0001$). Following training, there was a significant reduction in time for intubation of a given ostium (Model 3) in both groups ($P < 0.0001$). However, the initial difference between experienced and inexperienced residents was no longer present following training. Additionally, the time for retrieval of a foreign body (cotton wool plug) from the tracheobronchial system was significantly reduced following training in both groups.

Conclusions: Accurate models of the human tracheobronchial system can be generated from representative patient images using 3D engineering software and 3D printing technology. With these models, residents can be effectively trained in flexible bronchoscopy with significant improvement in their proficiency and handling capability.

Human neutrophil elastase induces endothelial cell apoptosis by activating the PERK-CHOP branch of the unfolded protein response

FASEB J . 2017 Sep;31(9):3868-3881
<https://pubmed.ncbi.nlm.nih.gov/28507169/> – 2017

Human neutrophil elastase impacts on atherosclerotic plaque stability by inducing apoptosis in endothelial cells. Our aim was to investigate the proapoptotic mechanism of elastase on endothelial cells and to evaluate the presence of elastase in human plaque material. Human endothelial cells were treated with purified human neutrophil elastase. Apoptosis was assayed by caspase-3/7 activation, TUNEL, and sub-G1 assay. Activation of unfolded protein response (UPR) effector molecules binding Ig protein, soluble X-binding protein-1, protein kinase RNA-like ER kinase (PERK), and C/EBP homologous protein (CHOP) was analyzed by RT-PCR, immunocytochemistry, and Western blot. Genetic silencing of CHOP was achieved by small interfering RNA. Elastase induces autophagic-apoptotic forms of endothelial cell death in a time- and dose-dependent manner, in conjunction with a significant increase in phosphorylation/expression of the canonical UPR activation markers PERK and CHOP. By using CHOP knockdown, we identified CHOP as a key mediator of elastase-induced endothelial cell death. Immunohistochemical analysis of human rupture-prone plaque specimens confirmed the presence of elastase and colocalization with apoptosis. We have demonstrated for the first time that the PERK-CHOP branch of the UPR is causally involved in elastase-induced apoptosis of endothelial cells. Ex vivo analysis of human rupture-prone plaques confirmed the presence of elastase and its colocalization with markers of apoptosis. This novel role of elastase underlines the potential of combined targeting of elastase and endoplasmic reticulum stress in the prevention of plaque progression and cardiovascular events. Grechowa, I., Horke, S., Wallrath, A., Vahl, C.-F., Dorweiler, B. Human neutrophil elastase induces endothelial cell apoptosis by activating the PERK-CHOP branch of the unfolded protein response.

Three-Dimensional Analysis of Component Stability of the Nellix Endovascular Aneurysm Sealing System After Treatment of Infrarenal Abdominal Aortic Aneurysms

J Endovasc Ther . 2017 Apr;24(2):201-209
<https://pubmed.ncbi.nlm.nih.gov/27864458/> – 2017

Purpose: To assess short-term stability and conformational changes of the Nellix EndoVascular Aneurysm Sealing (EVAS) System using 3-dimensional (3D) analysis.

Methods: Postoperative computed tomography (CT) scans obtained at 0, 3, and 12 months in 24 patients (mean age 75±7 years; 22 men) who underwent EVAS between December 2013 and December 2014 for intact abdominal aortic aneurysm (within the instructions for use) were evaluated for stent-graft deviation in multiple planes using dedicated 3D analysis software. In addition, 2D analysis using an anatomically fixed reference landmark was performed to assess craniocaudal migration. Clinical and follow-up data of the patients were recorded and matched with results of the imaging analysis.

Results: Overall stability of the Nellix endografts was promising. Relevant conformational changes in the majority of cases were limited to the iliac graft segment and were clinically benign in all cases. Conversely, the only deviation of the proximal stent-graft segment was found in a patient with type Ia endoleak. Additional 2D analysis found relevant (≥5 mm) caudal migration of the Nellix stent-graft in 6 patients, including the one with the type Ia endoleak. In 3 patients, 3D analysis demonstrated the absence of relevant conformational changes of the endografts despite caudal migration.

Conclusion: Overall stability of the separate EVAS stent-grafts is promising in the short term. Relevant conformational changes (stent-graft deviation) in the majority of cases were benign and confined to the iliac segment.

Interaction between gut microbiota and toll-like receptor: from immunity to metabolism

J Mol Med (Berl) . 2017 Jan;95(1):13-20
<https://pubmed.ncbi.nlm.nih.gov/27639584/> – 2017

The human gut contains trillions of commensal bacteria, and similar to pathogenic bacteria, the gut microbes and their products can be recognized by toll-like receptors (TLRs). It is well acknowledged that the interaction between gut microbiota and the local TLRs help to maintain the homeostasis of intestinal immunity. High-fat intake or obesity can weaken gut integrity leading to the penetration of gut microbiota or their bacterial products into the circulation, leading to the activation of TLRs on immune cells and subsequently low-grade systemic inflammation in host. Metabolic cells including hepatocytes and adipocytes also express TLRs. Although they are able to produce and secrete inflammatory molecules, the effectiveness remains low compared with the immune cells embedded in the liver and adipose tissue. The interaction of TLRs in these metabolic cells or organs with gut microbiota remains unclear, but a few studies have suggested that the functions of these TLRs are related to metabolism. Alteration of the gut microbiota is associated with body weight change and adiposity in human, and the interaction between the commensal gut microbiota and TLRs may possibly involve both metabolic and immunological regulation. In this review, we will summarize the current findings on the relationship between TLRs and gut microbiota with a focus on metabolic regulation and discuss how such interaction participates in host metabolism.

Patency of renal and visceral vessels after open thoracoabdominal aortic replacement

J Vasc Surg . 2015 Sep;62(3):594-9
<https://pubmed.ncbi.nlm.nih.gov/26054587/> – 2015

Objective: In thoracoabdominal aortic aneurysms (TAAAs), a paradigm shift is observed from open surgery toward total endovascular aortic repair using fenestrated and branched endografts. Whereas outcome after open replacement in terms of mortality and paraplegia has been evaluated extensively, no studies exist addressing long-term patency of visceral and renal vessels. To enable comparison of target vessel patency between open and endovascular treatment, we analyzed our series of open TAAA replacements.

Methods: Our vascular surgery database was screened for patients who received open TAAA replacement between 1998 and 2012, and patient records were analyzed retrospectively. All available imaging scans (computed tomography and magnetic resonance angiography: preoperative, postoperative, and follow-up) were evaluated for graft and vessel patency.

Results: We identified 62 patients (mean age, 66 ± 10 years; 40 men) who had been operated on for aneurysms of Crawford types I (8), II (13), III (13), and IV (24) and Safi type V (4). A total of 181 vessels were revascularized by either patch inclusion (n = 147) or selective revascularization (bypass or transposition, n = 34); 48 survived the procedure, resulting in a number of vessels available for follow-up of 154 (patch, 126; selective revascularization, 28). The respective patency rates for overall, patch, and selective revascularization were 95.2%, 94.2%, and 100% at 5 years and 83.7%, 81.3%, and 100% at 10 years, respectively. In addition, a trend for better performance of selective revascularization (bypass or transposition) was evident as all vessel occlusions were observed in cases of patch inclusion, whereas all selectively revascularized vessels were patent.

The respective patency rates for the celiac trunk, superior mesenteric artery, and left and right renal artery were 100%, 97.5%, 92.3%, and 90.3% at 5 years.

Conclusions: In our series of open thoracoabdominal aortic replacement, excellent patency rates for revascularized renal and visceral vessels were observed during long-term follow-up. We were able to provide a reference value of long-term target vessel patency that can and should be taken into account to judge the efficacy of endovascular repair in TAAA.

Durability of open popliteal artery aneurysm repair

J Vasc Surg . 2014 Oct;60(4):951-7. doi: 10.1016/j.jvs.2014.04.035. Epub 2014 Jul 1.
<https://pubmed.ncbi.nlm.nih.gov/24993952/> – 2014

Objective: The objective of this study was to analyze our long-term results after open surgery for popliteal artery aneurysm. **Methods:** Records of patients who received surgery between 1998 and 2010 were retrieved from a computerized database and analyzed retrospectively. End points of the study were perioperative mortality and morbidity and patency and limb salvage rate.

Results: Two hundred and six popliteal aneurysms (median diameter, 30 mm; interquartile range, 18 mm) were treated (161 elective, 45 emergent) in 154 patients (mean age, 67 ± 11 years) using vein grafts (82%) via the medial approach (92%). Above-knee popliteal artery (45%) and below-knee popliteal artery (65%) were the predominant inflow and outflow vessels.

The overall surgical mortality was 2% (2% for elective and 3% for emergent procedures; P = not significant). Primary, assisted primary, and secondary patency rates were 88.1% (73.5%), 92.1% (84.3%), and 96.5% (89.8%) at 5 (at 10) years, respectively, with no significant difference between elective and emergent surgeries. Limb salvage rate was significantly reduced in the emergent group vs the elective group with 91.1% vs 98.6% at 5 and 10 years (P = .0049). The rate of freedom from any reintervention was 84.3% at 5 and 69.8% at 10 years, respectively.

Conclusions: Open surgery for popliteal artery aneurysm is marked by low perioperative mortality and morbidity and provides excellent long-term results.

Strategies for endovascular aortic repair in aortobronchial and aorto-esophageal fistulas

Thorac Cardiovasc Surg . 2013 Oct;61(7):575-80
<https://pubmed.ncbi.nlm.nih.gov/23828238/> – 2013

Objective: To report our experience of thoracic endovascular aortic repair (TEVAR) for acute bleeding originating from the thoracic aorta in patients with aortobronchial fistula (ABF) or aorto-esophageal fistula (AEF).

Patients and methods: A total of nine patients (three woman) were treated from September 1995 to March 2012 by TEVAR for ABF (n = 5) and AEF (n = 4). The implants (N = 14) were introduced with fluoroscopic guidance via the aorta (n = 1), the iliac (n = 2), or femoral (n = 11) artery, respectively.

Results: All aortic lesions could be sealed successfully. Perioperative morbidity was 0% in the ABF group and 50% (2 of 4) in the AEF group and no procedure-related morbidity was noted except one patient who received aortofemoral reconstruction because of iliac occlusive disease. After an overall mean follow-up of 56 months, three patients of the ABF group are alive and well and two patients died of nonrelated cause. Of the AEF group, one patient is alive after 22 months, and one died from metastasized esophageal cancer after 7 months.

Conclusion: TEVAR is a safe and reliable procedure in the management of ABF. For AEF, TEVAR provides a successful firstline treatment to seal the fistula and control bleeding. However, prognosis is limited by the esophageal lesion and by ongoing mediastinitis/sepsis.

Projects

Memberships

Memberships:

German Society for Surgery

German Society for Vascular Surgery

German Society for Cardiothoracic and Vascular Surgery

European Society for Vascular Surgery

Other Relevant Information

Digital skills

Microsoft Word Microsoft Office Microsoft PowerPoint Zoom Microsoft Excel GoTo Meeting Outlook Adobe (Adobe Photoshop, Adobe Illustrator) OsiriX Medical Image processing software