Patient-specific computational modeling to improve the clinical outcome of vascular access creation


Cardiovascular Biomechanics

Research output Chapter in Book/Report/Conference proceeding › Chapter › Academic

Abstract

The key factor for successful creation and maintenance of vascular access is the multidisciplinary approach, involving not only vascular surgeons, but in particular nephrologists, interventional radiologists, dialysis nurses and vascular lab technicians. With this combined effort, the handling of the magnitude and complexity of vascular access issues in dialysis patients can be faced with confidence. The subjects of the 2009 European Vascular Access Course are related to multidisciplinary access creation and maintenance; this is why the 22 chapters are presented and written by 5 nephrologists, 11 surgeons, 5 radiologists and 1 biomedical technologist. The first section starts with the biology of access, the pre-operative assessment and the endovascular and surgical techniques to enhance vascular access maturation. Central venous catheter options and the management of vein obstruction are addressed extensively in the second section of the course. The growing elderly and co-morbid patient group needs increasingly secondary upper and lower limb access procedures with or without the implantation of prosthetic grafts with their additional complications. Therefore, vein transposition techniques and the use of novel prosthetic grafts are also highlighted in this book. Whether endovascular or surgical intervention is preferable for the treatment of thrombosed accesses is discussed too. In addition, the endovascular and the various surgical techniques for the treatment of angio-access induced ischemia, a limb-threatening complication, are reviewed.

Fingerprint

Blood Vessels, Dialysis, Veins, Maintenance, Transplants, Endovascular Procedures, Central Venous Catheters, Patient-Specific Modeling, Lower Extremity, Thrombosis, Ischemia, Extremities, Nurses, Therapeutics, Nephrologists, Radiologists, Surgeons

Cite this

BACKGROUND: A profound knowledge of vascular anatomy and an understanding of vascular access functionality with respect to possible complications are critical in selecting the site for arteriovenous anastomosis. METHODS: Outline of vasculature variations of the upper limb with prevalence reported in literature of at least 1%, which may affect access creation, is depicted in this review. RESULTS: Over a dozen arterial anatomical anomalies of the upper limb, the most common is "high origin" of the radial artery (12-20%). Superficial positions of brachial, ulnar and radial artery as well