Selected Abstracts from the March Issue of the European Journal of Vascular and Endovascular Surgery

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Comparison of Cognitive Function After Carotid Artery Stenting Versus Carotid Endarterectomy

Paraskevas K.I., Lazaridis C., Andrews C.M., Veith F.J., Giannoukas A.D. Eur J Vasc Endovasc Surg 2014;47:221-31.

The effect of carotid artery stenting (CAS) and carotid endarterectomy (CEA) on cognitive function is unclear. Both cognitive improvement and decline have been reported after CAS and CEA. We aimed to compare the changes in postprocedural cognitive function after CAS versus CEA. A systematic qualitative review of the literature was conducted according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-analysis statement for studies evaluating the changes in cognitive function after CAS compared with CEA. Thirteen studies (403 CEAs; 368 CAS procedures) comparing the changes in cognitive function after CEA versus CAS were identified. Most studies did not show significant differences in overall cognitive function or only showed a difference in a single cognitive test between the two procedures. A definitive conclusion regarding the effect of CAS versus CEA on cognitive function was not possible owing to heterogeneity in definition, method, timing of assessment, and type of cognitive tests. For the same reasons, performing a meta-analysis was not feasible. The lack of standardization of specific cognitive tests and timing of assessment of cognitive function after CAS and CEA do not allow for definite conclusions to be drawn. Larger, adequately-powered and appropriately designed studies are required to accurately evaluate the effect of CAS versus CEA on postprocedural cognitive function.

Use of Disposable Radiation-Absorbing Surgical Drapes Results in Significant Dose Reduction During EVAR Procedures

Kloeze C., Klompenhouwer E.G., Brands P.J.M., van Sambeek M.R.H.M., Cuypers P.W.M., Teijink J.A.W. Eur J Vasc Endovasc Surg 2014;47:268-72.

Objectives: Because of the increasing number of interventional endovascular procedures with fluoroscopy and the corresponding high annual dose for interventionalists, additional dose-protecting measures are desirable. The purpose of this study was to evaluate the effect of disposable radiation-absorbing surgical drapes in reducing scatter radiation exposure for interventionalists and supporting staff during an endovascular aneurysm repair (EVAR) procedure.

Materials: This was a randomized control trial in which 36 EVAR procedures were randomized between execution with and without disposable radiation-absorbing surgical drapes (Radpad: Worldwide Innovations & Technologies, Inc., Kansas City, US, type 5511A). Dosimetric measurements were performed on the interventionalist (hand and chest) and theatre nurse (chest) with and without the use of the drapes to obtain the dose reduction and effect on the annual dose caused by the drapes.

Results: Use of disposable radiation-absorbing surgical drapes resulted in dose reductions of 49%, 55%, and 48%, respectively, measured on the hand and chest of the interventionalist and the chest of the theatre nurse.

Conclusions: The use of disposable radiation-absorbing surgical drapes significantly reduces scatter radiation exposure for both the interventionalist and the supporting staff during EVAR procedures.

Management of Abdominal Compartment Syndrome and the Open Abdomen

Björck M., Wanhainen A. Eur J Vasc Endovasc Surg 2014;47:279-87.

Objectives: The management of the abdominal compartment syndrome (ACS) and the open abdomen (OA) are important to improve survival after major vascular surgery, in particular ruptured abdominal aortic aneurysm (RAAA). The aim is to summarize contemporary knowledge in this field.

Methods: The consensus definitions of the World Society of the Abdominal Compartment Syndrome (WSACS) that were published in 2006 and the clinical practice guidelines published in 2007 were updated in 2013. Structured clinical questions were formulated (modified Delphi method), and the evidence base to answer those questions was evaluated using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) guidelines.

Results: Most of the previous definitions were kept untouched, or were slightly modified. Four new definitions were added, including a definition of OA and of lateralization of the abdominal wall, an important clinical problem to approach during prolonged OA treatment. A classification system of the OA was added. Seven recommendations were formulated, in summary: Trans-bladder intra-abdominal pressure (IAP) should be monitored in patients at risk. Protocolized monitoring and management are recommended, and decompression laparotomy if ACS. When OA, protocolized efforts to obtain an early abdominal fascial closure, and strategies utilizing negative pressure wound therapy should be used, versus not. In most cases the evidence was graded as weak or very weak. In six of the structured clinical questions, no recommendation could be made.

Conclusion: This review summarizes changes in definitions and management guidelines of relevance to vascular surgery, and data on the incidence of ACS after open and endovascular aortic surgery.

A Novel Strategy to Translate the Biomechanical Rupture Risk of Abdominal Aortic Aneurysms to Their Equivalent Diameter Risk: Method and Retrospective Validation

Gasser T.C., Nchimi A., Swedenborg J., Roy J., Sakalihasan N., Böckler D., Hyhlik-Dürr A. Eur J Vasc Endovasc Surg 2014;47:288-95.

Objective: To translate the individual abdominal aortic aneurysm (AAA) patient's biomechanical rupture risk profile to risk-equivalent diameters, and to retrospectively test their predictability in ruptured and non-ruptured aneurysms.

Methods: Biomechanical parameters of ruptured and non-ruptured AAAs were retrospectively evaluated in a multicenter study. General patient data and high resolution computer tomography angiography (CTA) images from 203 non-ruptured and 40 ruptured aneurysmal infrarenal aortas. Three-dimensional AAA geometries were semi-automatically derived from CTA images. Finite element (FE) models were used to predict peak wall stress (PWS) and peak wall rupture index (PWRI) according to the individual anatomy, gender, blood pressure, intra-luminal thrombus (ILT) morphology, and relative aneurysm expansion. Average PWS diameter and PWRI diameter responses were evaluated, which allowed for the PWS equivalent and PWRI equivalent diameters for any individual aneurysm to be defined.

Results: PWS increased linearly and PWRI exponentially with respect to maximum AAA diameter. A size-adjusted analysis showed that PWS equivalent and PWRI equivalent diameters were increased by 7.5B mm (P = .013) and 14.0 mm (PB <B .001) in ruptured cases when compared to non-ruptured controls, respectively. In non-ruptured cases the PWRI equivalent diameters were increased by 13.2 mm ($P < .001$) in females when compared with males.

Conclusions: Biomechanical parameters like PWS and PWRI allow for a highly individualized analysis by integrating factors that influence the risk of AAA rupture like geometry (degree of asymmetry, ILT morphology, etc.) and patient characteristics (gender, family history, blood pressure, etc.). PWRI and the reported annual risk of rupture increase similarly with the diameter. PWRI equivalent diameter expresses the PWRI through the diameter of the average AAA that has the same PWRI, i.e. is at the same biomechanical risk of rupture. Consequently, PWRI equivalent diameter facilitates a straightforward interpretation of biomechanical analysis and connects to diameter-based guidelines for AAA repair indication. PWRI equivalent diameter reflects an additional diagnostic parameter that may provide more accurate clinical data for AAA repair indication.