

Title: Role of Color-Duplex Ultrasound, Contrast-enhanced Ultrasound and Computed Tomography in the surveillance of Endovascular Aortic Aneurysm Repair

Authors: F.B. Călinescu 1, I. Droc 1, R. Dammrau 2, A. Mironiuc 3

1 Cardiovascular Surgery Department, Army's Clinic Emergency Center for Cardiovascular Diseases, Bucharest, Romania

2 Cardiovascular Surgery Department, MediClin Herzzentrum, Lahr, Germany

3 Second Surgical Clinic, "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania



Background

With increasing application of aortic stent graft placement (EVAR) for aortic aneurysm repair comes the potential for more long-term complications. An economical yet safe protocol to monitor the patient and device after EVAR is critical. There has been a tremendous amount of progress since Dr. Parodi's initial EVAR report in 1991, but the ideal EVAR follow-up modality and intervals remain controversial.

Aim

In order to contribute to the development of a safer and yet economic EVAR follow-up protocol, we conducted a prospective comparative study for the evaluation of diagnostic accuracy between Color- Duplex Ultrasound (DUS), Contrast-enhanced Ultrasound (CEUS) and Contrast-enhanced Computed Tomography (CTA) in detecting changes in the abdominal aortic aneurysm (AAA) size and endoleaks during follow-up after endovascular aneurysm repair.

Methods

12 patients with AAA treated by EVAR between January 2010 and July 2013 at the Army's Clinic Emergency Center for Cardiovascular Diseases- Bucharest were included in the study. The patients underwent a regular EVAR follow-up protocol at our center at 1,6 and 12

months (min. 2 examination sets/patient) with imaging procedures including DUS and CEUS on the same day (by investigator 1) and within 3 days CTA (by investigator 2). The investigators were blinded to the results of any previous examination. A series of specific parameters were followed. The collected data was entered in a 2x2 contingency table, making a separate table for each complication. In each case the “gold standard” method was compared to the proposed alternative imaging method (CTA with DUS, and CTA with CEUS). Sensitivity, specificity, positive and negative predictive values and accuracy was calculated for each of the diagnostic methods based on the contingency tables. The Pearson Coefficient Correlation was performed to assess the strength of the relationship between DUS and CTA in the measurement of the residual aneurysm sac size post repair.

Results

27 investigation sets were performed. There was one case of type II endoleak, detected by all three imaging procedures (at 30 days post EVAR), with a stable aneurysm diameter that did not require reintervention.

The Pearson Coefficient correlation indicated a large degree of correlation between DUS and CTA when measuring residual aneurysm size following EVAR.

Conclusion

Based on the results of our study, we propose an EVAR follow-up protocol, that is both safe and economic.