

# Routinary use of preoperative transthoracic echocardiography in abdominal aortic aneurysm, does it solve problems?

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The prevalence of abdominal aorta aneurysm (AAA) is estimated at 1.4% of the population of the United States. This condition is strongly associated to age and the presence of hypertension which are progressively increasing. Over the last few years endovascular aneurysm repair (EVAR) has gained ground to traditional open surgical repair. This information arise from randomized clinical trials, such as OVER and EVAR, where both strategies were compared (1,2). In the first trial, the 30-day mortality was 0.5% *vs.* 3%;  $P=0.004$ , in the latter 1.8% *vs.* 4.3%;  $P=0.002$ . The results were favorable to EVAR approach compared to traditional open surgery. Due to the lower rate of perioperative complications the use of the EVAR approach has increased, whenever it is technically possible. In this context the importance of the evaluation of preoperative risk has decreased. The approach to preoperative risk assessment has traditionally been based on the examination of conventional cardiovascular risk factors which have been proved to be associated with major cardiovascular events in post-intervention setting. However this strategy is not useful on an individual basis (3). Based on the change of surgical technique and the weakness of preoperative evaluation, O'Driscoll *et al.* (4) propose using transthoracic echocardiography (TTE) to improve the long-term prognostic evaluation of patients undergoing EVAR.

Using a retrospective cohort design, the author analyzed 273 consecutive patients undergoing elective EVAR between 2008 and 2010, in a single tertiary care center in the United Kingdom (patients mean age 73.1, 80% male and 77% with hypertension). All patients underwent a

comprehensive TTE within the preoperative evaluation. The primary outcome measured was long-term all-cause mortality with a mean follow-up of  $3.2\pm 1.5$  years. In addition to the young age and the presence of diabetes, three TTE variables presented a significant association to the primary objective: mitral regurgitation (HR 8.13, 95% CI, 4.09–12.16), greater tubular ascending aorta (HR 5.6, 95% CI, 2.77–11.33) and reduction of left ventricular ejection fraction (HR 0.96, 95% CI, 0.93–0.98). The authors recognize some limitations of their study, the main one the lack of knowledge related to the cause of death, though they conclude “TTE provides important long-term prognostic information in patients undergoing EVAR... and may serve as a useful tool for guiding clinical management”.

Considering this paper published in *Circulation Cardiovascular Imaging*, should we incorporate TTE in routinary preoperative evaluation of patients undergoing elective EVAR? We believe that TTE should not be performed routinely. We will discuss this affirmation further.

We congratulate the authors and recognized the effort to provide more evidence in this field, however we must remember that although EVAR approach is associated with a reduction of risk perioperative, this reduction is evident in short-term 30-day, nonetheless the long-term mortality is similar independently of which technique is used and it remains disappointingly high (5). In EVAR trial (2) (1,252 patients, average age 74) mortality in follow-up was 7.5/100 *vs.* 7.7/100 patients/year,  $P=0.72$ , whereas in OVER trial (1) (881 patients, average age 70) mortality was 7% *vs.* 9.8%

to 1.8 years,  $P=0.13$ . In the light of these results we should take into account the next considerations: the presence of AAA is associated with high long-term mortality, there is a progressive decline in the rate of post-EVAR deaths related to cardiovascular causes and in the present study we ignore the cause of death. Consequently the EVAR alone is not the solution. It is key an appropriated selection of the candidates undergoing the EVAR technique as shown by the results of EVAR-2 trial (6). In EVAR-2, 338 patients with AAA not candidates to open surgery due to comorbidity, were randomly assigned to either EVAR or medical treatment, follow-up was 3.1 years. The mortality related with the AAA presented a decrease (3.6/100 *vs.* 7.3/100 patients/year, HR 0.53, 95% CI, 0.32–0.89,  $P=0.02$ ) although total mortality did not change with EVAR (21/100 *vs.* 22.1/100 patients/year, HR 0.99, 95% CI, 0.78–1.27,  $P=0.97$ ). The authors concluded that when the comorbidity contraindicates open surgery, EVAR did not improve prognosis over medical treatment. Demographic characteristics of this study (76 years old, 4 years 64% total mortality) resemble more O’Driscoll work (73 years old, 3 years 29% mortality) than the OVER study (death 8% to 1.8 years). One question that can be considered is whether the selection of candidates to EVAR approach in O’Driscoll study was optimal and it should be consider that 2011 AHA guidelines recommend surgery or EVAR if life expectancy is more than 2 years (7).

The population with AAA may resemble diabetic population since both of them are of high risk. The improvements in technology have permitted to equalize the results to 30 days in the setting of percutaneous coronary intervention between diabetic and non-diabetic population. Nevertheless the long-term result still diverges (8). Something similar may occur with EVAR technique in the treatment of AAA if the selection of candidates is not appropriated. On the other hand, appropriated screening of coronary disease in asymptomatic diabetic population can identify high risk patients but no further intervention has improved its prognosis (9), this can be applied to the realization of TTE in patient candidates for EVAR: what can be done next? The authors found strong association between the presence of mitral regurgitation (unclear etiology), tubular dilated ascending aorta (without cut-off point) with mortality in the follow-up, but based on these findings there are not measures that can be taken to improve the prognosis.

When attempting to implement a screening program (in this case prior to EVAR TTE) there are a series of requirement that should be considered (10):

- (I) Elevated prevalence and/or high prognostic impact of the disease to be ruled out;
- (II) Effective tools to identify at-risk patients;
- (III) Clear definition of the diagnostic techniques and their sequence;
- (IV) After identification of the problem, intervention that favorably modifies patient’s risk must be defined;
- (V) Ideally, the cost-effectiveness of the screening strategy should be determined.

For the reasons we previously argued, we conclude that routinely TTE evaluation prior to EVAR approach does not improved the results.

What can we do to achieve a better stratification of our patients with AAA candidates to EVAR?

- (I) Adequate selection of patients. In terms of comorbidity, they must have the same probability of being assigned to open surgery that to EVAR approach (6) and subsequently guided by technical aspects;
- (II) Expectancy of life greater than 2 years (7);
- (III) Optimize cardio-protective treatment (beta-blocker and ACEI), that was low in the present study (4);
- (IV) Rational use of image techniques to answer to specific issues.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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