Letter to the Editor

Effect of hybrid endovascular repair for thoraco-abdominal aortic aneurysms on renal function

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In the article by Kuratani et al. [1], the investigators described excellent early and long-term results after extended selective visceral reconstruction and extended thoracic endovascular aortic repair (TEVAR).

As outcome data on hybrid endovascular repair for thoraco-abdominal aortic aneurysms (TAAA) emerge, the renal implications of the procedure need to be scrutinized. Concern regarding the long-term effect on the renal function and the potential nephrotoxicity of intravenous contrast in the follow-up period must be considered [2]. In addition, manipulation of the aorta and visceral arteries may lead to the disruption of lipid-laden plaques and subsequent embolization into the renal vasculature [3,4].

Over the past 5 years, we performed the study to determine whether there is deterioration in renal function during follow-up in patients who have undergone TEVAR, as recommended by the Dutch Randomized Endovascular Aneurysm Management (DREAM) trial [5], and to explore the potential implication of lifelong surveillance of renal function with contrast-enhanced computed tomography. According to our results, mean serum-creatinine concentration increased and creatinine clearance decreased over long-term follow-up that is independent of preoperative renal disease and renal arterial occlusion in seven (12%) of 49 patients and is likely related to the repetitive administration of the contrast agent. Our results, and consecutively the conclusions, are similar to published data by Jacksonville, Pittsburgh, and New York group [2,3,4].

The findings reported by Kuratani et al. [1] included patients who had a lower frequency of some co-morbidities, including diabetes and hypertension, compared with the cohorts described in previous studies. Moreover, Asian people have lower body mass index and all findings reported by Kuratani et al. are of little help to clarify conflicting results about nephrotoxicity of intravenous contrast in the follow-up period from other observational studies and clinical trials [3,4].

Renal failure (RF) has been reported as one of the leading causes of postoperative death following conventional thoraco-abdominal aneurysm repair; also endovascular repair involved new potential risks specific to the procedure.

According to our study results, the etiology of postoperative RF most likely is multifactorial, resulting from a combination of mechanical, atheroembolic, and contrast-related contributors. In particular, the relationship between contrast type and volume and renal function after TEVAR has not been established. Contrast-induced renal insufficiency is reversible, yet in our patients, the noted creatinine rise was permanent in only one case of those patients who had deterioration of renal function: this suggests factors other than contrast exposure alone as contributory, suggesting atheroembolic sequelae.

Unfortunately, obtained findings of the well-written article by Kuratani et al. [1] only analyzed data from a regional consortium and does not describe strategies, which could be adopted to minimize the likelihood of adverse renal effects associated with their hybrid procedure at all stages of evaluation and intervention.

Only with demographic data, which are comparable between European and Asian population, and treatment recommendations for prevention of RF, we could attempt to push the limits of such or similar hybrid procedures in the treatment for TAAA.

References


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Reply to the Letter to the Editor

Reply to Hudorovic and Ahel

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Keywords: Endovascular aortic repair; Contrast nephrotoxicity; Renal function

This is a reply to Dr Hudorovic’s Letter to the Editor titled ‘Effect of hybrid endovascular repair for thoraco-abdominal aortic aneurysms on renal function.’ [1].
In his letter, Dr Hudorovic discussed interesting points and limitations of hybrid thoracic endovascular aortic repair (TEVAR) for thoraco-abdominal aortic aneurysms (TAAA) [2].

The procedure is associated with the following risks to renal function:

1. It requires anastomoses of renal arteries.
2. TEVAR alone is associated with the risk of emboli, including lipid-laden plaques in the kidneys.
3. In follow-up, contrast-enhanced computed tomography (CT) scans are essential for detecting TEVAR-specific complications (e.g., endoleaks and migration). This requires the use of intravenous contrast agents, which is associated with contrast nephrotoxicity.

In my opinion, open surgery is also associated with the first two risks mentioned above, with risk rates probably similar to that of TEVAR. Thus, there is a significant risk of contrast nephrotoxicity, and patients with preoperative renal dysfunction should not undergo the procedure.

The procedure also has advantages over open surgery. Thus, risks and benefits must be weighed when choosing the appropriate procedure. Imaging systems that do not require intravenous contrast agents will likely become widespread in the future, making this type of discussion obsolete.

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References


Letter to the Editor

Chest-tube digital assessment after pulmonary resection: the crucial role of time-trend analysis and a new model to predict a persistent air leak

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Several companies have designed, developed, and recently marketed chest-tube drainage systems that contain a digital air-leak meter for the use in the postoperative period of lung resections but, to date, only sparse reports on their clinical usefulness have been published [1–3]. In this setting, we wish to comment on the recent report by Brunelli et al. [1]. We concur with the statement that ‘the main advantage of providing objective and reproducible data is to decrease inter-observer variability of the air leak assessment . . . one of the principle factors in delaying chest-tube removal.’ This is also confirmed by Varela et al. [4], who observed an increased agreement rate in the chest-tube withdrawal decision-making process with the use of digital devices: this was due, in the authors’ reflection, to the fact that an objective quantitative measure of the air leak and, above all, an accurate ‘time-trend’ analysis of the air leaks ‘increased surgeon’s confidence in the security of the procedure.’ In our own experience (unpublished data) of 39 patients who underwent pulmonary resection where air leaks were accurately analyzed on a daily basis with a new digital system, we routinely adopted a blinded chest-tube withdrawal policy based on the established clinical behavior (empirical) with no influence of instrumental measurement. We could observe, thanks to the digital recording of air leaks, that (1) these can be intermittent with a no-leak period of more than 6 h followed by period with significant leakage, and (2) the differential of measured air leak of 1st vs 2nd postoperative day (Δ% P.O.D) seems to have a predictive value (by receiver operating curve (ROC) analysis) towards the presence of persistency (>5 days) of the air leak itself.

This observation, certainly needing further experimental support for the planning of which we would value the authors’ reflection and reaction, would challenge the criteria adopted by them as drain-removal policy at least on two grounds: (1) air leaks are intermittent, probably determined by non-standard and variable factors (position, effort, etc.) and, therefore, a fixed empirical 6 h threshold seems to be not completely suitable, and (2) having at hand univocal drain-removal criteria (as the ones provided by digital measurement devices) would make the clamping procedure useless or, at least, not entirely appropriate (we concede a pragmatic value in the validation phase of digital systems).

Postoperative parameters with validated predictive value in the management of the chest drain are of high clinical interest. These can be easily integrated with the pre- and intra-operative criteria that have been so far investigated [5]. We advocate prospective randomized clinical trials to validate the Δ% P.O.D as a stratifier and to identify additional indicators to determine the right moment to remove a chest drain after a pulmonary resection.

References

