performed at high-volume centers, our results may not be generalizable to other centers with lower surgical volume.

CONCLUSIONS

In this propensity-matched series, FEVAR was associated with a higher mortality and an “any complication” occurrence compared with OSR, highlighting that OSR should be considered preferable to FEVAR for the low-risk patient with a CAAA. Mesenteric infarction was the principal cause of death after FEVAR. Identifying patients with potential target vessel difficulties or graft complications might identify patients at risk for FEVAR. Thereby, the extension of the infrarenal AAA treatment paradigm shift to EVAR cannot be applied to a similar paradigm shift of CAAA to FEVAR. Prospective studies will help to determine benefits of FEVAR over OSR.

AUTHOR CONTRIBUTIONS

Conception and design: MR, VP, GL
Analysis and interpretation: MR, VP, FC, SM, PD, RC, JB, GL
Data collection: MR, VP, FC, SM, PD
Writing the article: MR, VP, GL
Critical revision of the article: MR, VP, FC, SM, PD, RC, JB, GL
Final approval of the article: MR, VP, FC, SM, PD, RC, JB, GL
Statistical analysis: VP, SM
Obtained funding: MR, RC, JB, GL
Overall responsibility: VP

MR and VP participated equally and share first authorship.

REFERENCES


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DISCUSSION

Dr Gustavo Oderich (Rochester, Minn). I rise here because your results are markedly different than what has been reported in numerous publications, including meta-analyses, systematic reviews, prospective studies, and national data sets. Clearly both operations—open or fenestrated repair—require a set of skills and a learning curve that has to be mastered for one to achieve outstanding results. Case selection, planning, and multidisciplinary postoperative care can have great impact on early outcomes of
both procedures. Therefore, the obvious question is whether the learning curve and skill set which has been achieved at the Massachusetts General Hospital (MGH) with open repair of hundreds of patients with juxtarenal, suprarenal, and thoracoabdominal aneurysms over decades, has also been achieved with the first 50 fenestrated cases done at your center. Clearly, at least in our experience, I think fenestrated repair does require a learning curve, planning, case selection, and mastering a set of skills—even for those that are already skilled and experienced with other types of endovascular procedures.

The other particular question pertain the cause of death, which in most patients was mesenteric ischemia. Do you think this was due to embolization or ischemia from narrow or occluded stents? We now stent all single-diameter scallops. I’ll tell you that at least in our experience, scallops of 10-mm diameter may be associated with mesenteric ischemia, and the safest is probably to stent liberally.

**Dr Maxime Raux.** One of the major causes of death was not mesenteric ischemia but infarction due to multiple embolisms after catheterization, but no superior mesenteric artery was thrombosed after the procedure. And when we made computed tomography scans for the patients, all superior mesenteric arteries were patent, but it is probably related to multiple emboli.

**Dr John Ricotta** (Washington, D.C.). That was a very nice paper. If I interpreted correctly, what it says is if you have a patient that is suitable for open repair, that fenestrated repair offers no benefit and may be worse. But it doesn’t address the issue of the patient who is not suited for open repair. You had about 15 of your patients in the fenestrated group who were not propensity matched, so I assume that they didn’t match with anybody in the open group. Could you tell us what happened to those patients? Could you tell us whether the mortality rate in the open group that was not propensity matched was the same as in the propensity-matched group so that we can get some idea about that?

**Dr Raux.** The mortality rate in the open group was mostly the same, but in the fenestrated endovascular repair group (FEVAR) group, on the unmatched patient, the mortality rate was higher, with 10.5% mortality for the unmatched patient. Maybe Professor Becquemin would like to comment.

**Dr Jean-Pierre Becquemin** (Crétail, France). I have some comments. First, I want to congratulate Maxime for this very important work and also my colleagues from MGH for the outstanding results. Obviously, we were disappointed by our own results with FEVAR, which resulted in a higher than expected mortality rate. As mentioned, this mortality rate was mostly related to multiple atherosclerotic embolisms. It was probably a mistake to treat some of these patients with FEVAR.

Lessons can be drawn from this study: (1) surgery can give excellent results in expert hands, and (2) FEVAR is not an easy procedure. It may be very tricky, even if you carefully select patients. Sometimes the target vessels, the aorta, or the access vessels are not suitable and pushing the limits of indications may end up in catastrophe.

Finally, I think that FEVAR has obviously a future since stent graft technology will improve as well as the skill of surgeons performing these procedures. The key selection criterion, in my opinion, is not patients’ general status (high risk for FEVAR, low risk for open repair), but more the anatomical suitability of vessels. With a proper selection, results of FEVAR will probably equal the results of open surgery in the near future.