The Value of Registries for Rare Diseases: Bacterial or Mycotic Aortic Aneurysm

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Bacterial infections of the aorta are rare. The label mycotic aneurysm is misleading, since mycoses or fungal infections of the aorta are much rarer still. The management of bacterial infections of the aorta has always been considered difficult, largely because they frequently herald aortic rupture and the outcomes of traditional surgery have been poor. Historically these patients were managed by surgical resection of the aneurysm, debridement of the infected tissue and revascularisation using in situ or extra-anatomic techniques with either prosthetic or less commonly autologous grafts. However, the results of such surgery have been disappointing with many patients being considered unfit to withstand the rigours of such major intervention and therefore palliated. Others have died as a result of the attempted curative surgery or had late infectious complications.

The creation of an international registry by Wanhainen and colleagues is an important step forward in improving patient management\(^1\). It builds on case series reported by pioneering centres in the endovascular management of aortic disease that demonstrated it was possible to use an endovascular strategy in the management of aneurysms attributed to bacterial infection\(^2\). These reports demonstrated the technical feasibility of the techniques but left many unanswered questions.

The management of rare diseases do not lend themselves well to assessment using standard surgical technique development tools\(^3\). Prospective registries in the endovascular management of other uncommon aortic diseases including thoracic aortic dissection and aneurysm have proven utility\(^4,5\). However, there are major drawbacks with such registries including reporting bias, missing data and selective loss to follow-up. Retrospective registries have additional limitations.

The primary consideration in understanding the role of endovascular interventions in
bacterial aneurysms is to assess feasibility. Any comparison of outcomes with historical series using standard surgical approaches must be tempered by the progress in antibiotic therapy and intensive care management. The report by Wanhainen and colleagues in this issue of Circulation demonstrates the feasibility of the endovascular approach across different centres in Europe, but prospective data will be needed to progress the management of bacterial aneurysms. It is interesting to note that few of these endovascular procedures were used as a ‘bridging procedure’ to definitive surgery, quite possibly because infections have apparently been arrested or controlled with antimicrobial therapy. An alternative explanation is that some or all of these patients were considered too frail to undergo major surgery or that possibly surgeons believe that the results of open surgery are no longer superior to an endovascular approach.

We are assured by the authors that “only a handful” of patients were treated with open repair but they do not provide numbers or outcomes of those treated with open surgery or no surgery at all. What proportion of patients presenting with bacterial aneurysms to the contributing centres were treated with endovascular interventions and can we be reassured that those patients treated with antibiotics alone or ‘palliated’ have such terrible outcomes?

The authors acknowledge that there are no standard diagnostic or reporting criteria for the diagnosis of infections of the aorta. Instead the authors used a panel of three criteria (biomarkers) for aortic infection used in everyday clinical practice (judged locally and confirmed in the ‘core lab’). However, it is quite plausible that some of these patients had alternative diagnoses such as an inflammatory aneurysm or connective tissue disorders. Further work will be required to develop consensus guidelines on the diagnosis of bacterial aneurysm (as for infective endocarditis and osteomyelitis of the diabetic foot).

Because this was a retrospective registry it was not possible to standardise clinical and
imaging follow-up. In a prospective registry it should be possible to strengthen the quality of the data by standardising diagnosis and follow-up with pre-specified criteria and regimens. Specifically, there were no data on the duration of pre-operative antibiotics, how patients were followed-up and how missing data (including loss to follow-up) were handled. Were data available for clinical (including microbiological and laboratory testing) and imaging follow-up outcomes? Complications such as endoleak not attributed to infection are not reported. In such cohorts it is quite possible that there may have been selective loss to follow-up.

Although the overall prognosis associated with endovascular treatment of bacterial aneurysm appeared quite poor, the data are hard to interpret given the heterogeneous nature of bacterial aneurysms with respect to site within the aorta, the presence of various causative bacteria (and one Candida infection) and the evolution of endovascular technologies over the 14-year study period. Specific groups of patients appeared to be particularly vulnerable to complications and premature death. The presence of gas on a CT scan resulted in a particularly poor long-term survival (5yr survival 36%).

The authors also suggest that patients with a Salmonella culture had better outcomes than those without a positive culture or culture of other bacteria. This requires confirmation in a separate study, since it is possible that this observation was due to chance alone: the regression analysis with 123 patients used 19 variables, so a much stronger p value would be needed to confirm a statistically reliable association.

In summary, these data emanating from the registry on endovascular procedures in aneurysms of bacterial etiology are a useful addition to the literature. However the registry has a number of important limitations that hamper clinical interpretation of the data. Further work is required to elucidate important information in regard to the diagnosis of bacterial aortic
aneurysm, the timing of intervention and to understand which patients may be better managed using an endovascular strategy. It is likely that a well-constructed prospective registry with clearly defined diagnostic criteria and standardised follow-up will be able to answer some of the outstanding questions.

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References:


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