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Thoracic endovascular aortic repair for type B aortic dissection patients: 11-year experience from a Chinese Tertiary Center

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Thoracic endovascular aortic repair (TEVAR) has been gradually considered as the mainstream therapy for type B aortic dissection (TBAD), especially for complicated acute TBAD,[1] due to its minimally invasive nature and satisfactory clinical outcomes. Currently, our knowledge of aortic dissection and endovascular treatment is primarily derived from western registries including the International Registry of Acute Aortic Dissection (IRAD) and Vascular Quality Initiative (VQI), which includes few Asian TBAD patients without any Chinese population. Therefore, we report a long-term single-center experience of TBAD patients who underwent TEVAR in a Chinese high-volume tertiary center. The preliminary results would provide useful insight and enhances our understanding of this disease in the Chinese population.

Hospitalized TBAD patients that underwent TEVAR from 2009 to 2019 in the Department of Vascular Surgery, Zhongshan Hospital were included in this study and clinical data were retrospectively collected from the electronic medical records system. Enrolled TBAD patients were classified into acute (1–14 days), subacute (15–90 days), and chronic (>90 days) stages.[2] The general procedure of TEVAR and operative details have been described in previously published studies of our center.[3] This study was approved by the Institutional Review Board of Zhongshan Hospital Fudan University.

Clinical characteristics and outcomes, including demographics, comorbidities, in-hospital mortality and complications, and length of hospital stay (LOS) were collected and analyzed. In-hospital complications refer red to retrograde type A dissection (RTAD), paraplegia caused by spinal ischemia, stroke, acute kidney injury (AKI), and bowel ischemia. Stent-graft (SG) types were categorized into imported SGs and domestic SGs according to the manufacturers.

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Joinpoint regression analyses were performed to examine the trends in the in-hospital mortality and LOS from 2009 to 2019. Annual percentage variations and 95% confidence intervals (CIs) were used to quantify changes and test significance. A generalized linear model was utilized to evaluate the risk factors for aortic-related in-hospital mortality.

A total of 1573 TBAD patients that underwent TEVAR were included. Mean age was 56.1 years, and patients in the 50 to 70 years groups composed the majority. Males accounted for the majority in our cohort (83.2%). History of hypertension was presented in 67.9% (1068 of 1573) of the inpatients. Additionally, only 38.3% (602 of 1573) inpatients were covered by local medical insurance in our system.

The aortic-related in-hospital mortality rate was 2.42% (38 of 1573), and the total incidence of post-operative complications were 8.07% (127 of 1573). A total of 15 patients (0.95%) had RTAD, ten of whom died of it. AKI occurred in 51 patients (3.24%), and four of them died due to renal failure. There were also 28 cases of stroke (1.78%), 14 cases of bowel ischemia (0.89%), and nine cases of paraplegia (0.57%) within the hospitalization period. RTAD was the most common cause of in-hospital death, followed by rupture, bowel ischemia, aorto-esophageal fistula, and other causes related to dissection progression or initial TEVAR.

Over the past decade, the reduced annual in-hospital mortality trend was not statistically significant. However, the yearly proportion of mortality in the acute population revealed a notably decreasing trend, with a –12.91% annual percentage change. From the generalized linear model results, patients with hypertension had higher risk of aortic-related in-hospital death (risk ratio 3.13, 95% CI: 1.23–7.93).

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The average LOS decreased significantly over the past decade with a –6.50% annual percentage change. However, there was no marked difference in LOS between the imported SG and the domestic SG groups ($P = 0.9256$). Early outcomes were also comparable between the two groups.

The overall incidence of post-operative complications in our study was similar with previous studies. However, we had a relatively low incidence of paraplegia. Besides, the overall aortic-related in-hospital mortality (2.42%) was following the rate reported in other studies (which ranged from 0%–5%) in recent years, yet was lower than the latest result of the 20-year experience from the IRAD (10.6%).[4] We further evaluated the potential risk factors for aortic-related in-hospital mortality in this study. History of hypertension was found to be a risk factor associated with in-hospital death based on our analysis. However, Bossone *et al* [5] reported that the low presenting systolic blood pressure (SBP) (≤80 mmHg) was an independent risk factor of the in-hospital mortality in acute TBAD patients from the IRAD study. Considering that their study focused on all-cause in-hospital mortality and the impact of low SBP was found to be associated with myocardial dysfunction and cardiac tamponade, the discrepancy of results was unsurprising. Our study further emphasized the importance of blood pressure control especially in TBAD patients with history of hypertension.

LOS was another point of interest. It decreased over the past decade in accordance with the evolution of endovascular devices and experience accumulation. Besides, LOS and early outcomes of the imported SG and the domestic SG group were comparable, indicating the early safety and efficacy of domestic SG though long-term follow-up data was required for further evaluation.

This study provided 11-year single-center experience of TEVAR for TBAD patients in a Chinese high-volume tertiary centre. These preliminary results showed a favorable early outcome of TEVAR over the past decade including both the imported SG and the domestic SG group. A history of hypertension was found to be an independent risk factor for in-hospital mortality. Further investigation of this study will be carried out with long-term follow-up data.

Declaration of patient consent

Individual consent for this retrospective analysis was waived.

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Conflicts of interest

None.

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