

Five-year outcomes of endovascular aortic repair at 108 Military Central Hospital

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Summary

Objective: To evaluate the results of endovascular surgery to treat aortic disease at 108 Military Central Hospital. **Subject and method:** We conducted a prospective descriptive study of 69 patients undergoing stent graft at 108 Military Central Hospital from 12/2016 to 03/2021. **Result:** Endpoints: Technical success rate 100% (n = 69); Survival: n = 65 (94.2%); Target vessel patency: n = 67 (97.1%); Re-intervention n = 0 (0%); 30-day in-hospital mortality: n = 3 (4.3%), Endoleak: n = 2 (2.8%), spinal cord ischemia: n = 2 (2.8%), Stroke: n = 2 (2.8%), Infection: n = 1 (1.4%). **Conclusion:** Endovascular repair to treat aortic disease is a safe and highly effective method. The procedure should be considered in the Hybrid operation room and performed by cardiovascular surgeon- interventional cardiologist.

Keywords: Aortic disease, aortic aneurysms, aortic dissection, stent graft.

1. Background

The aortic disease includes aneurysm, stenosis, rupture, trauma, aortic dissection. Among them, aortic aneurysm and aortic dissection have high morbidity and mortality [1]. There are four methods of treating aortic pathology: Medical treatment, open operation, Endovascular repair, and Hybrid operation. The open operation of aortic pathology is a major, lengthy and difficult surgery [2]. Along with the development of science and technology, Endovascular aortic repair is a new, less invasive procedure, lower risk of death, and has been successfully implemented in many medical centers around the world [3]. However, treatment of aortic pathology using stent graft is performed mainly in

major cardiovascular centers in Vietnam and there are few published results. Therefore, we carried out this study with objectives: *To evaluate the results of endovascular aortic repair at the Department of Cardiovascular Surgery - Cardiovascular Institute - 108 Military Central Hospital.*

2. Subject and method

2.1. Subject

Including 69 aortic disease patients undergoing stent graft at the Department of Cardiovascular Surgery - Cardiovascular Institute - 108 Military Central Hospital from December 2016 to March 2021.

Selection criteria

Aortic aneurysm > 5.5cm in diameter.

Aortic dissection type A.

Acute aortic dissection type B has complications including: Rupture of the aorta into the pleural space, pericardial cavity, ischemia of the viscera, aortic dilatation.

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Post-traumatic aortic pseudoaneurysm.

The patient had sufficient information about the treatment method and agreed to participate in the study.

Exclusion criteria:

Type B dissection is uncomplicated.

The patient did not consent to participate in the study.

2.2. Method

Study design: A prospective and descriptive and study.

Endpoints:

Technical success rate.

Survival.

Target vessel patency.

Re-intervention rate.

30-day in-hospital mortality.

Complications after endovascular repair: Endoleak, spinal cord ischemia, stroke, infection.

2.3. Statistical analysis

Collected data were entered and processed on the biomedical statistical software SPSS 20.0.

3. Result

Table 1. Clinical characteristics of the patient

| Characteristics | | Number | Rate (%) |
|--------------------|--------|-----------|----------|
| Average age (year) | | 65.3 ± 11 | |
| Gender | Male | 56 | 81.2 |
| | Female | 13 | 18.8 |
| Hypertension | | 65 | 94.2 |

Comment: The mean age of the patients was 65.3 ± 11 years old, the oldest age: 90 years old, the lowest age: 25 years old. Male patients were mainly (81.2%). Most of the patients had comorbidities with hypertension (94.2%).

Table 2. Characteristics of aortic pathology

| Characteristics | | Number | Rate (%) |
|------------------------------------|--------------------|--------|----------|
| Status of aortic wall on admission | Rupture | 4 | 5.8 |
| | Threats to rupture | 4 | 5.8 |
| | Stable | 51 | 88.4 |
| Location | Thoracic | 28 | 40.6 |
| | Abdominal | 38 | 55.1 |
| | Iliac | 3 | 4.3 |
| Type of lesion | Aneurysm | 61 | 88.4 |
| | Pseudoaneurysm | 2 | 2.8 |
| | Aortic dissection | 5 | 7.3 |
| | Trauma | 1 | 1.4 |

Comment: Most of the lesions were aortic aneurysms (88.4%), in which abdominal aortic aneurysms accounted for a larger number (55.1%).

Table 3. Techniques in endovascular aortic repair

| Techniques | | Number | Rate (%) |
|------------|---|--------|----------|
| Hybrid | Total debranching | 9 | 13 |
| | Carotid-carotid-subclavian bypass | 10 | 14.5 |
| | Iliac arterial conduits for endovascular access | 1 | 1.4 |

| | | | |
|----------------------------|------------------|----|------|
| Endovascular aortic repair | | 49 | 71.1 |
| Access | Surgical femoral | 20 | 29 |
| | Conduit | 1 | 1.4 |
| | Percutaneous | 48 | 69.6 |

Comment: Most stent grafts were implanted by the endovascular intervention (71.1%). One patient with a small bilateral femoral artery, underwent Hybrid surgery to create an iliac arterial conduit for endovascular access.

Table 4. Results

| Endpoints | Number | Rate (%) |
|------------------------------|--------|----------|
| Technical success rate | 69 | 100 |
| Survival | 65 | 94,2 |
| Target vessel patency | 67 | 97,1 |
| Re-intervention | 0 | 0 |
| 30-day in-hospital mortality | 3 | 4,3 |
| Endoleak | 2 | 2,8 |
| Spinal cord ischemia | 2 | 2,8 |
| Stroke | 2 | 2,8 |
| Infection | 1 | 1,4 |

Comment: The 5-year survival rate was 94.2% with a 97.1% target vessel patency.

4. Discussion

Endovascular stent-graft repair of aortic disease is increasing and becoming the optimal method of choice for cardiovascular centers. Since 2016, at 108 Military Central Hospital, the endovascular stent graft technique has been implemented with good results: The technical success rate was 100%, no patient required re-intervention.

In our study, males accounted for a higher proportion than females, accounting for 81.2%. This result is consistent with the overall prevalence of the aortic disease [1]. The mean age of the patient group was higher than that of other pathological groups (65.3 ± 11 years old) with comorbidities mainly hypertension (94.2%). This feature is consistent with the pathogenesis of aortic diseases.

Thoracic aortic disease is more common than abdominal aorta in European countries [4]. However, the results of our 5-year study show that abdominal aorta lesions account for a higher rate than thoracic aortic lesions, accounting for 55.1%. The majority of

patients had aortic aneurysms (88.4%). There was 1 case of thoracic aorta injury caused by sharp objects; the patient was admitted to the hospital in a state of hemorrhagic shock. We performed an emergency stent graft intervention.

Hybrid surgery (stent graft implantation combined with surgery) gives doctors more options in the treatment of aortic diseases. Hybrid surgery is a more effective and safer treatment than surgery or endovascular intervention, especially in the treatment of lesions of the aortic arch [5]. We performed total debranching for 9 patients, carotid - carotid - subclavian bypass for 10 patients. Hybrid surgery allows to completely treat lesions of the aortic arch without using Cardiopulmonary bypass. Shorter operative time, reduced postoperative time. To perform this technique, it is required that the patient be operated in the Hybrid operating room and performed by a cardiovascular surgeon-interventional cardiologist.

In our study, there were 2 cases of endoleaks, accounting for 2.8% of cases. This rate is lower than the Hu Z.'s study (2016) [6] published with the rate of 10%. The first patient had an infrarenal aneurysm

of the abdominal aorta, with the neck flexed > 75 degrees. Type 1A endoleak occurs immediately after stent-graft release. We performed balloon angioplasty at the central tip, endoleak was reduced. After 2 months of follow-up, the endoleak completely disappeared. The second case, also with an abdominal aortic aneurysm, was a type II endoleak. After a 1-month follow-up period, the endoleak also completely disappeared.

A rare complication is spinal cord ischemia. In the study of Ranney D (2017) [7] including 579 patients, this complication accounted for 0.5%. However, we encountered 2 cases, accounting for 2.8%. Both of these patients had coverage of the left subclavian artery. We operated left carotid-subclavian bypass for both patients, cerebrospinal fluid drainage in 1 patient. Both patients recovered completely after 3 days.

Patients requiring re-intervention due to endoleak (Type I, II, III) according to author Ranney D. (2017) was 7.3% [7]. However, in our group of patients, there were no cases requiring re-intervention. The 5-year survival and Target vessel patency rates were 94.2% and 97.1%, respectively, similar to similar studies in the world [1, 4, 8].

Endovascular stentgraft repair of aortic disease has been implemented in many cardiovascular centers in Vietnam, however, the results of studies have not been published much. Therefore, our study inevitably has limitations such as small sample size; short follow-up time; no control group. In the future, we will continue to study with a larger sample size, longer study period, and with a control group.

5. Conclusion

Endovascular repair to treat aortic disease is a safe and highly effective method. The procedure should be considered in the Hybrid operation room and performed cardiovascular surgeon-interventional cardiologist.

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