The Use of Endografts to Treat Chronic Descending Thoracic Aortic Dissections

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20.1 Introduction

Acute type B aortic dissection is still associated with mortality as high as 10% in spite of recent sophisticated medical treatment mainly because of catastrophic complications, such as aortic rupture or aortic branch ischemia. Once the very acute phase has been overcome, the disease is well tamed and the mortality rate reduces markedly [13]. However, there are still some problems in this story. One is the patient’s compliance to medical therapy. Strict control of blood pressure is mandatory in those patients for their life time to avoid aortic rupture or redissection. In addition, their quality of life is significantly impaired for the same reason. The other serious problem is development of so-called dissecting aneurysms. It has been reported that 14–20% of patients with acute type B aortic dissection treated by drug therapy alone eventually develop false aneurysms during the first 4–5 years of follow-up [1, 6, 8, 12, 17, 25, 28, 36]. Surgical aortic replacement is required in these patients to avoid rupture of the aneurysm. However, it is associated with various problems such as the need for extensive aortic replacement. Although the operative mortality rate in these patients was improved from 17–40% in the 1970s to 4–17% in the 1980s, surgical intervention is still associated with considerable invasiveness and morbidity despite advances in surgical techniques and perioperative management [6, 8, 9, 11, 12, 24, 26, 27, 34].

The purpose of this chapter is to describe the strategy and the experience of Mie University Hospital for the treatment of patients with chronic type B aortic dissection [19].

20.2 Emergence of Endografting

Endovascular repair including percutaneous fenestration and stenting had been performed mainly for the treatment of visceral or leg ischemia before endografting became clinically available. Its safety and efficacy have been reported by several investigators [30, 31, 37]. On the other hand, endografting was initiated for the treatment of abdominal aortic aneurysms and it is now a good alternative to surgical graft replacement for both abdominal and thoracic aortic aneurysms [2, 4].

Application of endografting to aortic dissection was first reported by Dake et al. [5] and Nienaber et al. [29] in 1999. Dake et al. applied endografting to acute aortic dissection, while Nienaber et al. applied it to chronic dissection. Although the number of patients and the follow-up term of both reports are extremely limited, clinicians were encouraged by their reports and started endografting for the treatment of aortic dissection all over the world.
**20.3 Terminology and Classification**

Terminology and classification are the same as those that used for surgical intervention. Either De Bakey classification or Stanford classification can be used to classify the diseases [23]. However, the location of the entry tear should be added when Stanford classification is adopted since endografting directly depends on it.

In terms of the age of dissection, those within 14 days since onset are referred to as acute dissection, while those beyond 14 days are referred to as chronic according to the current classification [7]. This definition comes from the fact that those patients who survive beyond the acute phase have better prognosis [24]. However, this classification could be modified when endografting is applied. Sixty-six patients with aortic dissection were treated with endografting at Mie University Hospital. Among them 37 patients were treated within 1 month after diagnosis, while the other 29 patients were treated at more than 1 month after diagnosis. Intraoperative new intimal injury caused by the edge of the endograft developed in two patients who were treated within 1 month (0 and 21 days) (Fig. 20.1). Postoperative new intimal injury developed in four patients who were treated within 1 month, too (0, 7, 9, and 21 days) (Fig. 20.2). On the other hand, no intimal injury developed in those patients who were treated after more than 1 month. From this fact that 1 month seems the turning point at which the intimal flap becomes stiff and stable enough to tolerate the force acting on the edge of the endograft, dissection within 1 month might as well be referred to as “acute”, and that which is older than 1 month might as well be referred to as “chronic” when endovascular treatment of aortic dissection is discussed [19–21].

**Fig. 20.1.** New intimal tear caused by balloon dilatation in a patient with acute dissection. a. Aortography obtained before endografting. b. Aortography obtained immediately after endografting. Type I endoleak is clearly observed. Balloon dilatation was performed to obtain good apposition. c. Aortography obtained after balloon dilatation. A new intimal tear (arrow) was created at the bottom end of the endograft.

**Fig. 20.2.** Aneurysmal degeneration caused by the edge of the endograft in a patient with acute dissection. a. Aortography obtained before endografting. b. Aortography obtained immediately after endografting. The entry tear is completely closed. c. Aortography obtained 4 months later. Aneurysmal degeneration (arrow) developed at the top end of the endograft. (From Kato et al. [20])