CT- and Fluoroscopy-Guided Percutaneous Transabdominal Embolization of Type II Endoleak

Bilgisayarlı Tomografi ve Floroskopi Rehberliğinde Perkütan Transabdominal Yolla Tip II Endoleak Embolizasyonu

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Abstract

We report a case of a 79-year-old male patient who was treated 3 years previously at another hospital for an abdominal aortic aneurysm with a maximal diameter of 80 mm. After the treatment control period, computed tomography imaging revealed a type II endoleak and no progression in the size of the aneurysm sac. Selective injection of the superior mesenteric artery revealed that the endoleak was filled by the inferior mesenteric artery via the marginal artery. However, it was not possible to access using retrograde catheterization. We decided to treat the type II endoleak percutaneously. Embolization was performed at the tomography table using fluoroscopy with a mobile C-arm, and the puncture was performed transabdominally because there was no access to the sac via a translumbar approach. Under fluoroscopic guidance, various diameter/length coils were deployed. Follow-up computed tomography scans confirmed the collapsed aneurysm sac. When other conventional endovascular methods have failed, percutaneous transabdominal treatment of a type II endoleak with sac enlargement offers an alternative treatment method.

Key Words: Abdominal aortic aneurysm, embolization, type II endoleak

Case Report

We report the case of a 79-year-old male patient who was treated 3 years previously at another hospital for an abdominal aortic aneurysm with a maximal diameter of 80 mm. After the Abdominal aortic aneurysm (AAA) treatment control period and at the 6 month follow-up, CT imaging revealed a type II endoleak (Figure 1A) but no size progression of the aneurysm sac (72 mm). The patient had also undergone coronary artery bypass surgery and had diabetes mellitus.

Due to abdominal pain and a distension problem, non-contrast abdominal CT imaging was performed. This CT revealed a growing aneurysm sac (88 mm), paraaortic irregularity and changes in the hyperdensity (Figure 1B). After contrast media injection, the type II endoleak persisted.
at the anterior proximal part of the aneurysm sac. Digital subtraction angiography (DSA) revealed a type II endoleak via the inferior mesenteric artery. Selective injection of the superior mesenteric artery (SMA) indicated that the endoleak was filled by the inferior mesenteric artery (IMA) via the marginal artery. However, it was not possible to access the region using retrograde catheterization of IMA. After the transarterial approach failed, we decided to treat the type II endoleak percutaneously. Before embolization, intravenous prophylactic antibiotics were administered to the patient. With the patient in the supine position, local anesthesia was given at the puncture site of the abdomen. Embolization was performed on the CT table using fluoroscopy with a mobile C-arm. A 20-gauge Chiba needle was used to puncture the sac under CT guidance. The puncture was performed transabdominally because there was no access to the sac through a translumbar approach. After a confirmation of arterial blood was observed, a 0.018-inch guidewire was positioned (Figure 2A). After a 5 F catheter was placed, a microcatheter system (Progreat; Terumo) was advanced distally. Under fluoroscopic guidance, various diameter/length coils (both pushable and detachable coils) were deployed along the anterior part of the AAA (Figure 2B). Follow-up CT scans confirmed the collapsed aneurysm sac.

**Discussion**

Type I and III endoleaks should be treated immediately. However, there is no consensus regarding the treatment of type II endoleaks. Persistent type II endoleaks remain a common problem after AAA repair. Most type II endoleaks resolve spontaneously, making secondary intervention unnecessary. Secondary intervention becomes necessary when a growing aneurysm sac is detected [6-8].

Embolization can be performed through a transarterial or direct percutaneous puncture of the aneurysm sac via a translumbar, transcaval or transabdominal approach. Baum et al compared transarterial and translumbar embolization and found that 16 of 20 patients exhibited persistent endoleak after transarterial embolization [2]. They suggested that single vessel embolization is an ineffective treatment for type II endoleak. However, Stravropoulos et al showed that a modified transarterial embolization technique involving an embolization of the endoleak sac and the feeding artery produced similar results to those of translumbar embolization [7]. In addition, they reported that an occlusion of the endoleak cavity is essential to perform a complete embolization.

Translumbar and transcaval embolizations are ideal when the endoleak sac is located posterolaterally to the stent graft. But when the sac is located at the anterior end of the stent graft, a transabdominal approach is the only way to reach the sac. For transabdominal embolization, CT and/or ultrasonography guidance minimizes the risk of visceral organ injury. After being positioned in the endoleak sac using a microcatheter system, coils, liquid embolic agents, onyx or a combination of embolic agents are used to perform the embolization. Coils and onyx produce artifacts on follow-up CT scans that make it difficult to detect the endoleaks.

There are many reported techniques that can be applied to prevent a type II endoleak before an endovascular aneurysm repair. Nevala et al showed that preoperative coil embolization of the IMA reduced the frequency of type II endoleaks [8]. In the literature, there are controversial reports on the use of preoperative embolization to prevent type II endoleaks.

*Figure 1. Contrast-enhanced CT A) reveals an anterior type II endoleak sac. The same CT B) also shows the growing aneurysm sac.*
Type II endoleaks can also be treated using surgery, but this method is more invasive and should only be used after embolization has failed.

In conclusion, when other conventional endovascular methods have failed, percutaneous transabdominal treatment of type II endoleak with sac enlargement offers an alternative treatment method.

**Conflict of interest statement:** The authors declare that they have no conflict of interest to the publication of this article.

**References**