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Olgu Sunumu

Transesophageal Echocardiography in a Patient with Chronic Type B Aortic Dissection Treated with Thoracic Endovascular Aortic Repair

Hasibe Gül BAYTAN*, Oben BAYSAN**, Gülser GÜNAYDIN*, Bilge TUNCER*, Alper TOSYA**, Tahsin EDGÜER***, Tayfun AYBEK****

SUMMARY

Thoracic endovascular aortic repair (TEVAR) is a viable alternative to open surgical repair in patients with thoracic aneurysm of descending aorta. Besides computerized tomography (CT) scanning and magnetic resonance imaging (MRI), intraoperative imaging with TEE is mandatory for better delineation of aortic pathology for confirming guide wire placement in true lumen, checking graft positioning, detecting procedure-related complications and follow-up(1). Therefore, an anesthesiologist has an important role in providing these data to the endovascular team.

Key words: *thoracic endovascular aortic repair, transesophageal echocardiography, aortic dissection, fallow-up studies*

ÖZET

Torasik Endovasküler Aort Tamiri Uygulanan Bir Kronik Tip B Aort Diseksiyonu Hastasında Transözofageal Ekokardiyografi'nin Yeri

Torasik aorta anevrizması olan bir hastada, açık cerrahiye geçerli bir alternatif torasik endovasküler aort tamir yöntemidir. Aortik patolojinin daha iyi tanımlanabilmesi ve kılavuz telin gerçek lumendeki yerinin doğrulanması, greft pozisyonunun teyit edilmesi, prosedüre bağlı komplikasyonların tespit edilmesi ve takip için CT ve MR yanında intraoperatif transözofageal ekokardiyografi görüntülemesi gereklidir. Bu nedenle bir anesteziyolog bu verilerin endovasküler ekibe sağlanmasında önemli bir role sahiptir.

Anahtar kelimeler: *torasik endovasküler aort tamiri, transözefagiyal ekokardiyografi, aortik diseksiyon, izlem çalışmaları*

CASE

A 52-year-old man with a history of hypertension presented with sudden stabbing back pain. His history included a mechanical aortic valve replacement and placement of ascending aortic hemashield graft for a 70 mm- diameter dissecting aneurysm in the ascending aorta (Standford type A) at 2007. During the same year, a pseudoaneurysm at the arcus aorta was found and repaired with a graft and right common carotid and subclavian artery reanastomosis. A dissecting descending aortic aneurysm (Standford type B, maximal diameter 55 mm) was detected in 2009 but managed conservatively.

His ECG showed left ventricular hypertrophy and nonspecific ST segment abnormalities. His chest radiography revealed an enlarged distal aortic arc and descending thoracic aorta with cardiomegaly. We performed a CT scanning which revealed a dissecting descending aortic aneurysm (maximal diameter, 68 mm) beginning just beyond the left subclavian artery, and extending to the iliac arteries. A perfused false lumen (50 mm) partially compressed the true lumen (6 mm). The ascending aorta and arcus had no signs of aneurysmal dilatation or dissection. Previous multiple surgical interventions deemed as prohibitive for another surgery. Therefore, we decided to perform endovascular intervention under TEE guidance beca-

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* TOBB Etü Hastanesi, Anesteziyoloji Kliniği
** TOBB Etü Hastanesi, Kardiyovaskuler Cerrahi Kliniği
*** TOBB Etü Hastanesi, Radyoloji Kliniği
**** Güven Hastanesi, Kardiyoloji Kliniği
Yazışma adresi: Uzm. Dr. Hasibe Gül Baytan, Yasam Cad. No:5, Soğütözü 06510 Ankara
e-mail: gul_baytan@yahoo.com

use we wanted to be sure about correct positioning of the guide wire within the true lumen.

After placement of appropriate monitoring devices, anesthesia was induced with fentanyl and ethomidate, and endotracheal intubation was facilitated with esmeron. Right jugular venous and left radial arterial catheters were placed under ultrasound guidance. Anesthesia was maintained with 100 % oxygen in 2 % sevoflurane and iv remifentanil infusion. After induction of anesthesia, TEE probe was inserted. Mild hypotension was maintained while inserting endovascular stent under nitroglycerin infusion. Anticoagulation was achieved to maintain activated clotting time at a value grater than 300 seconds.

A 5F catheter was inserted into the right femoral artery and a stiff guide wire was advanced through the catheter to the proximal descending aorta. Their positions were confirmed by TEE and angiography. A 42 mm x 42 mm x 20 mm self-expandable endovascular stent graft was introduced over the stiff guide wire. A long-axis TEE image was obtained when the stent graft was deployed at the proximal landing zone 3 [2]. The left subclavian artery was covered intentional. A strong echogenic line was visualized in the proximal descending thoracic aorta (Figure 1). A spontaneous echo contrast of the initial thrombosis of the false lumen was observed on TEE. An angiography was performed to confirm the position of the stent and evaluate potential leaks. The distal end of the stent was observed at T9. Endoleaks were not demonstrated angiographically. After evaluating the blood flow rates in the aorta and its branches, the delivery system was removed. The patient was followed in the Intensive Care Unit for 24 hours without neurologic complications.

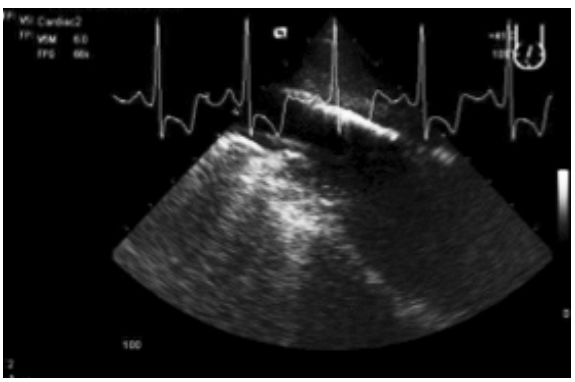


Figure 1.

At one-month, TEE detected a residual communicating flow between the true and false lumens of the distal descending aorta not accessed by the stent (Figure 2). A subsequent CT scan revealed a larger true lumen (18 mm), a thrombosed false lumen with diminishing size (15 mm) and the same aneurysm with a diameter of 68 mm (Table 1).

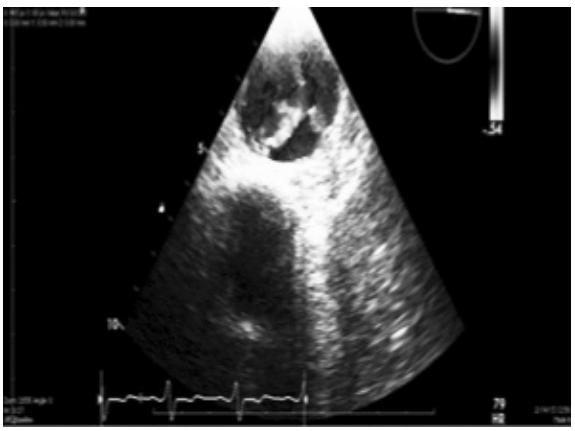


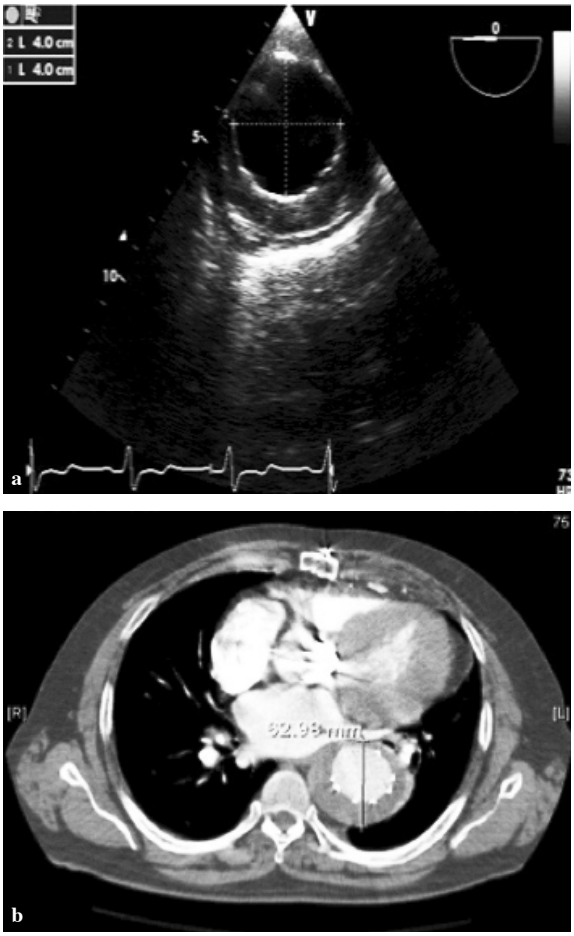
Figure 2.

Table 1.

		Pre-Tevar	Post-Tevar 1 month	Post-Tevar 1 year	Post-Tevar 2 year
CT	True lumen diameter	4 mm	18 mm	41 mm	42 mm
	Aneurysm diameter	68 mm	68 mm	68 mm	69 mm
	False lumen diameter	50 mm	15 mm	Totally trombosed	Totally trombosed
	True lumen area	92.26 mm^2	312 mm^2	1140,5 mm^2	1337 mm^2
	False lumen area	1952 mm^2	423 mm^2	Trombosed	Trombosed
TEE	True lumen diameter	11x27 mm	19x30 mm	36x39 mm	40x40 mm

Serial CT scanning and TEE exams revealed that while the aneurysm size was unchanged, the true lumen diameter and area increased in both imaging modalities. The false lumen diameter and area showed a gradual decrease and totally thrombosed lumen at one year (Figure 3a, b). After two years TEE confirmed that the stent-graft reached its original diameter (42 mm) (Table 1) (Fig 4a, b).

Figur 3a, b.



Figur 4a, b.

TEVAR is an acceptable strategy for treating thoracic aortic disease with comparable morbidity and mortality to what? [3]. The goals of TEVAR for acute type B aortic dissection include coverage of the proximal entry tear, true lumen extension with the restoration of flow to the visceral organs and obliteration of false lumen flow with subsequent complete thrombosis [4]. Although especially for preoperative diagnosis, planning, and angiography, CT and MRI can be used, TEE is suitable during the perioperative period [1]. Angiography is an invasive and time-consuming imaging modality, but TEE provides useful information by identifying the entry site, correct positioning of the guide wire within the true lumen, proper stent positioning and early detection of possible complications [5].

TEE can also be used for patient follow-up to reveal post interventional problems. Distal flow due to tear at the distal descending aorta is clearly delineated by TEE at one month. Further extension of dissection at the distal site usually requires a secondary intervention [6].

CONCLUSION

In our case TEE provided invaluable information in both peri-, and post- interventional periods. By using TEE, stent graft placement, and discrimination between true, and false lumens were accomplished without complications. Furthermore, TEE detected a distal tear site at postoperative one month, which was confirmed by CT scan. However, the distal tear site was not repaired due to patient preference. Moreover, the true lumen showed consistent enlargement with concomitant shrinkage of the false lumen.

In this case, the significance of TEE was studied by performing it both at real time TEVAR procedure and at follow-up period. The measurements taken with TEE revealed similar results with CT scan.

TEE, confirmed when necessary by CT, is an important determinant for diagnosis of aortic pathology, management and follow-up after TEVAR.

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