

# Treatment of a Symptomatic Neck Mass Appeared Ten Years After Thyroidectomy with Endovascular Embolization: Case Report

## Tiroidektomiden On Yıl Sonra Ortaya Çıkan Semptomatik Boyun Kitesinin Endovasküler Embolizasyonla Tedavisi

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**ABSTRACT** Thyroid surgery is safe and can generally be performed with minimal morbidity. Most of the postoperative complications following thyroid surgery are not life-threatening, but can affect the quality of life. Arteriovenous fistula of the superior thyroid artery and vein is a rare complication of thyroid surgery. Patients with a history of thyroidectomy may present with a symptomatic neck mass in the late period. The possibility of an arteriovenous fistula of the superior thyroid artery and vein should be considered in such cases. Interventional radiology is successful in the definitive diagnosis and treatment of arteriovenous fistulas. In this article, an arteriovenous fistula diagnosed 10 years after thyroidectomy was defined. The fistula between superior thyroid artery and vein was treated with detachable coils and glue embolizations.

**Key Words:** Thyroidectomy; arteriovenous fistula; embolization, therapeutic

**ÖZET** Tiroid cerrahisi güvenilirdir ve genellikle minimal morbidite ile yapılabilir. Tiroid cerrahisinden sonraki postoperatif komplikasyonların çoğu yaşamı tehdit edici değildir fakat yaşam kalitesini etkileyebilir. Superior tiroid arterin ve venin arteriovenöz fistülü tiroid cerrahisinin nadir bir komplikasyonudur. Tiroidektomi öyküsü olan hastalar geç dönemde semptomatik boyun kitlesi ile karşımıza çıkabilirler. Böyle olgularda superior tiroid arterin ve venin arteriovenöz fistülü olasılığı düşünülmelidir. Girişimsel radyoloji arteriovenöz fistüllerin kesin tanı ve tedavisinde başarılıdır. Bu makalede, tiroidektomiden 10 yıl sonra tanı koyulan arteriovenöz fistül tanımlandı. Süperior tiroid arter ve ven arasındaki fistül, koiller ve sıvı embolizan ajanlarla tedavi edildi.

**Anahtar Kelimeler:** Tiroidektomi; arteriovenöz fistül; embolizasyon, tedavi amaçlı

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Postoperative arteriovenous fistulas (AVF) are extremely rare; but AVF following surgery is a well-known complication.<sup>1,2</sup> In literature, AVF secondary to several surgical procedures such as splenectomy, oophorectomy, nephrectomy, radical neck dissection and tonsillectomy have been reported.<sup>3</sup> The proper management of the patient with a thyroid disorder and the surgical technique of thyroidectomy have minimum complications, as described previously. Postoperative complications of thyroidectomy are related to the wound, hemorrhage, difficulty of respiration, nerve paralysis, recurrent hyperthyroidism or hypothyroidism and parathyroid deficiency.<sup>4,5</sup> In this case, a rare complication of thyroidectomy and its curative treatment with endovascular embolization are discussed.

## CASE REPORT

A 40-year-old woman attended to cardiovascular surgery department, with a progressively growing swelling on the neck, occasional cough attacks, chokes during eating and dyspnea. A soft mass of 4 cm in diameter was found on the anterior of the left sternocleidomastoid muscle on physical examination (Figure 1). Murmur of AVF and continuous thrill were positive over the mass. The patient was sent to our department for ultrasonography (USG). USG of the neck revealed a 4 cm diametered cyst-like mass in the left middle cervical region. On color Doppler USG, the mass was clearly hypervascular and flow of fistula was demonstrated in the region adjacent to the cyst. We discovered the absence of the thyroid gland during ultrasonographic examination. The patient mentioned that she had total thyroidectomy ten years ago because of nodular goiter. Digital subtraction angiography (DSA) was performed to due to a probable AVF. This procedure was done under local anesthesia. Percutaneous arterial access was achieved through the right femoral artery and 7F 11 cm vascular sheath (Cordis Endovascular, Miami Lakes, FL) was placed. A 5F angiographic catheter (Torcon NB advantage picard cerebral, Cook) was advanced through the sheath into the left external carotid artery. A fistula and a 3.5x4 cm diametered aneurysm secondary to fistula were detected between the left superior thyroid artery and its corresponding vein (Figure 2A, 2B). We decided to treat patient using intra-arterial embolization. The Picard catheter was removed. Intravenous 2500 units heparine was administered. A 5F guiding catheter (Envoy, Cordis Endovascular Systems, Miami Lakes, FL) was advanced into the left external carotid artery. MC Prowler catheter (Cordis Corporation, Bridgewater, NJ) and MC Rapid Transit catheter (Cordis Endovascular Systems, Miami, FL) were advanced into the distal left superior thyroid artery. Because of the high output fistula, the level of arteriovenous junction was filled with various detachable coils (Figure 2C). Then, total feeders were embolized with 25% of glubran 2 (glubran 2 is a cyanoacrylate-based surgical adhesive). Glubran 2 was injected after rinsing the mi-



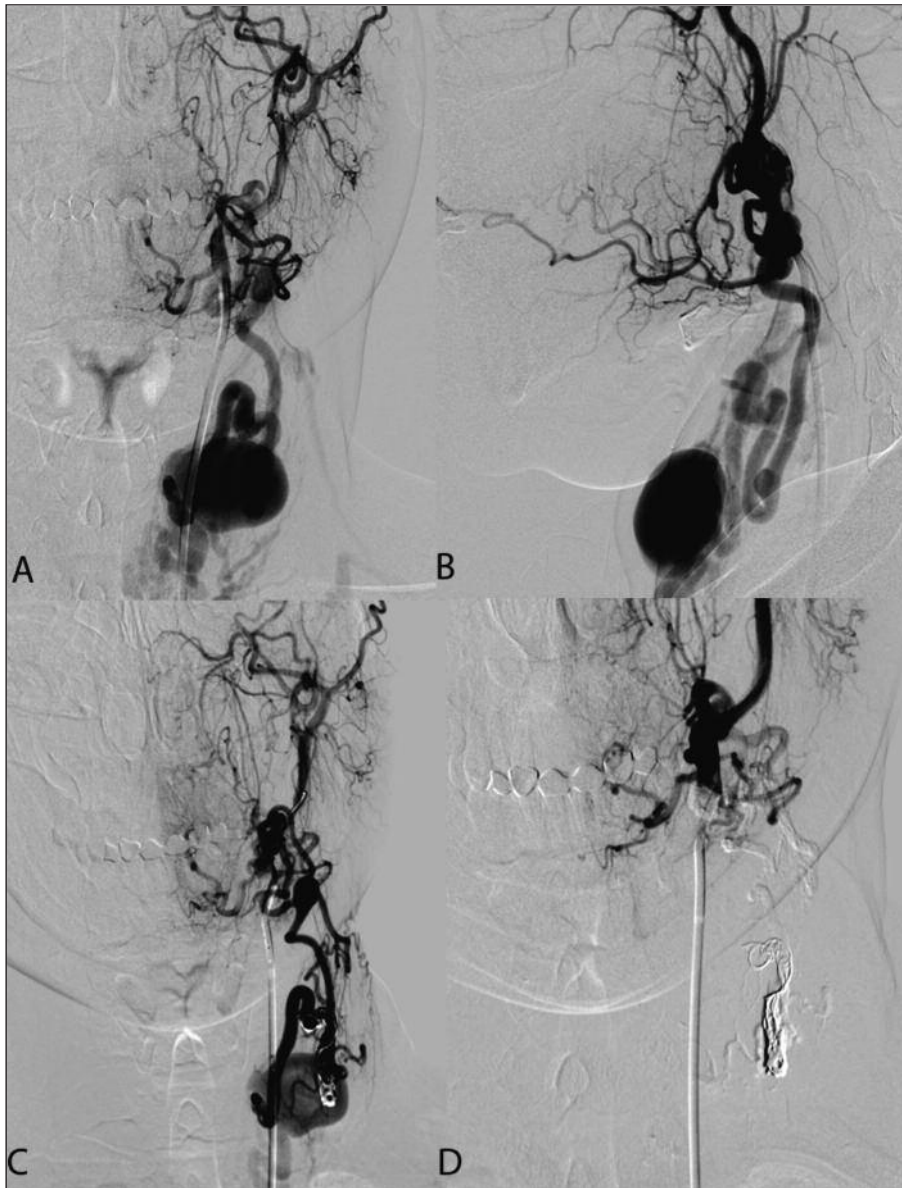
**FIGURE 1:** The 4 cm diametered soft tissue swelling anterior to the left sternocleidomastoid muscle.

(See for colored form <http://tipbilimleri.turkiyeklinikleri.com>)

crocatheter with glucose solution to remove saline flush solutions and blood. In control DSA, there was no clue in favor of a fistula (Figure 2D). Immediately after the procedure, the thrill and the swelling on the neck disappeared. The patient was discharged home on the same day.

## DISCUSSION

Most of the time, thyroid surgery is safe and can be usually performed with minimal morbidity. Post-operative complications following thyroid surgery are not life-threatening, but can affect the quality of life. The superior thyroid artery appears as the first branch from the external carotid artery at about the level of the bifurcation of the common carotid artery. The superior thyroid vein leaves the gland at the superior pole, just anterior and lateral to the superior thyroid artery. It pours into the cricothyroid tributary of the internal jugular vein. It should be ligated separately from the superior thyroid artery during thyroidectomy.<sup>4</sup> Fistula between these two vascular structures is a rare complication of thyroid surgery. In literature, the number of cases with this complication is very limited.<sup>1-3,6-8</sup> Lee et al. reviewed 2636 patients who underwent thyroidectomy due to thyroid cancer: While the most common complication was symptomatic parathyroidism, others involved vocal cord



**FIGURE 2:** Digital subtraction angiography of the left carotid artery showing the arteriovenous fistula between the left superior thyroid artery and the vein, and the aneurysm 3.5x4 cm in diameter secondary to fistula (A, B). Embolization of the fistula by coils (C). Embolization of total feeders with 25% of glubran 2 (D).

paralysis, hematoma, seroma, chylous fistula and Horner's syndrome. Strangely enough, they did not detect any case of AVF.<sup>9</sup>

AVF associated with superior thyroid vascular structures was first reported in 1914.<sup>2</sup>

Symptoms are frequently seen right after surgery, but patients often do not seek help for many years. The time interval between thyroidectomy and clinical evidence arising from fistula has ranged from less than one year to 20 years.<sup>1</sup> This

period in the first known case in the literature was 7 years.<sup>2</sup> In Webster's case, thyroidectomy was performed 20 years ago.<sup>3</sup> In our case, this period was 10 years. There are cases in whom fistula occurred immediately after the procedure.<sup>1,2</sup> So far, a sequelae such as high output failure mode as in large AVF has not been reported in fistulas of the superior thyroid artery. These fistulas are not inherently dangerous but can cause some discomfort in patients. They frequently coexist with symptoms such as swelling, murmur, thrill and compression

symptoms.<sup>1</sup> In our case also, local symptoms were prominent.

We observed that, surgery was usually used in the treatment of AVF after thyroidectomy. Jenvovsky et al. mentioned that the fistula was successfully treated by coil embolization.<sup>1</sup> The primary aim is to embolize the AVF and to occlude the fistulous communication with an endovascular procedure. In the treatment of our case, we used various detachable coils, as well as glubran 2. Because of the high output fistula, the level of arteriovenous junction was filled with various detachable coils. Then, total feeders were embolized with 25% of glubran 2.

There was no technical or periprocedural complication. Glubran 2 is a cyanoacrylate-based synthetic glue modified by the addition of a monomer synthesized by the manufacturer. With this material, it is possible to obtain the stability of endovascular embolization that is needed to treat tumors and vascular disease.<sup>10</sup>

As it is evident in this case, despite being rare, it is also possible to detect AVF in patients who have undergone thyroid surgery. We believe that the embolization procedure in the treatment of this rare complication of thyroidectomy is technically straightforward and relatively safe.

## REFERENCES

- Jenvovsky J, Markova H, Bohutova J. Unusual complication of total thyroidectomy: arteriovenous fistula. *Thyroid* 2000;10(4): 359-61.
- French WR, Patton RW, Wise RA. Arteriovenous fistula of the superior thyroid artery and vein. *Ann Surg* 1959;150(1):149-52.
- Webster MW. Arteriovenous fistula following thyroidectomy. *J Cardiovasc Surg (Torino)* 1982;23(6):515-7.
- Sanders LE, Rossi RL, Cady B. Surgical complications and their management. In: Cady B, Rossi RL. *Surgery of the Thyroid and Parathyroid Glands*. 3th ed. Philadelphia: WB Saunders Company; 1991. p.326-33.
- Uluçanlar H, Ay A, Ağaç A, Kutun S, Hasanoğlu A, Baran NT, et al. Complication rates of two different procedures in thyroid surgery: subtotal and total thyroidectomies. *Turkish Medical Journal* 2009;3(2):92-6.
- Grossberg P, Hamilton NT. Arteriovenous fistulae of the superior thyroid artery. *Aust N Z J Surg* 1982;52(6):587-9.
- Ghani SA, Hashim R. Arteriovenous fistula of the superior thyroid artery: post thyroid operation. *Med J Malaysia* 1984;39(4):314-6.
- Ibrahim N, Pollock D. Arteriovenous fistula of the superior thyroid artery and vein following thyroidectomy: a technical viewpoint. *J R Coll Surg Edinb* 1989;34(6):336-7.
- Lee YS, Nam KH, Chung WY, Chang HS, Park CS. Postoperative complications of thyroid cancer in a single center experience. *J Korean Med Sci* 2010;25(4):541-5.
- Raffi L, Simonetti L, Cenni P, Leonardi M. Use of Glubran 2 acrylic glue in interventional neuroradiology. *Neuroradiology* 2007;49(10): 829-36.