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Multiple Arterial Aneurysms Revealing a New Case of Ehlers-Danlos Syndrome

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Abstract **Case Report**

Ehlers-Danlos syndrome (EDS) is a rare genetic disorder transmitted in an autosomal dominant mode. Its progression in young adults is marked by vascular, digestive, and obstetric complications. We report the case of a 24-year-old woman presenting with a mass in the right femoral triangle. Non-invasive imaging revealed multiple staged arterial aneurysms in the lower limbs. The diagnosis of vascular Ehlers-Danlos syndrome was established based on facial dysmorphia, acrogeria, and a history of right humeral aneurysm surgery. The patient underwent surgery for the right femoral aneurysm due to its significant size and risk of rupture, with simple monitoring for the other arterial aneurysms that were discovered incidentally. The postoperative course was uneventful with a favorable outcome.

Keywords: Vascular Ehlers-Danlos Syndrome, Arterial Aneurysm, CT Angiography, Surgery.

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INTRODUCTION

Ehlers-Danlos syndrome (EDS) is an inherited disorder characterized by connective tissue fragility. Several subtypes are recognized based on clinical features, inheritance patterns, and underlying genetic defects. The vascular form (Type IV) is considered to have the most unfavorable prognosis, representing 5 to 10% of all EDS cases [1]. It primarily leads to arterial rupture and dissection, gastrointestinal perforations, or spontaneous organ ruptures. The diagnosis of vascular EDS is based on clinical and non-invasive imaging findings, but only the identification of a mutation in the Col3A1 gene provides diagnostic certainty [2]. We present the case of a 24-year-old woman admitted with a pulsating mass in the femoral triangle and a history of right humeral artery aneurysm rupture. The diagnosis of vascular EDS was made based on clinical and radiological criteria.

CASE REPORT

The patient, a 24-year-old woman, had a history of a right humeral artery aneurysm rupture, which was surgically treated in 2013. Surgical exploration confirmed the presence of a false aneurysm of the right humeral artery, which was repaired with direct arterial anastomosis. In January 2023, the patient presented with a pulsating expansive mass in the right femoral triangle, which had been evolving for 5 months without signs of ischemia. On clinical examination, the patient was afebrile, with a blood pressure of 130/70 mmHg, normochromic conjunctivae, facial dysmorphia (narrow nose, small chin, large eyes, and acrogeria). A pulsating mass with a thrill was found in the femoral triangle, with palpable peripheral pulses. The rest of the vascular examination was unremarkable. Blood work showed a hemoglobin level of 13 g/dl, white blood cells at 80,000/mm3, and a C-reactive protein level of 12 mg/l.

On imaging, a Doppler ultrasound of the lower limbs showed a large aneurysm at the termination of the right common femoral artery. A CT angiogram of the aorta and both lower limbs revealed multiple staged aneurysms of varying sizes affecting the femoropopliteal and tibial arteries on both the right and left sides, the largest located at the bifurcation of the right femoral artery (Fig. 1). A cerebral and supra-aortic trunk CT angiogram did not reveal any lesions, except for a dilation of the left vertebral artery in its V2 segment.

Our patient underwent surgery involving the excision of the right femoral aneurysm and reconstruction of the femoral bifurcation using a prosthesis (Fig. 2). The patient is regularly followed up in consultation. The other aneurysmal lesions remain stable for now.

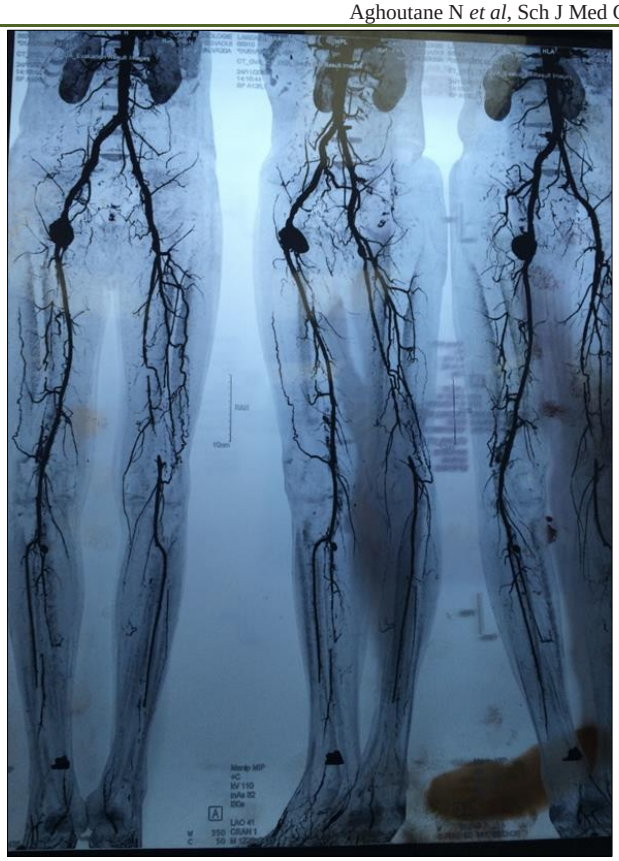

Figure 1: CT angiography with reconstruction showing multiple arterial aneurysms of the lower limbs

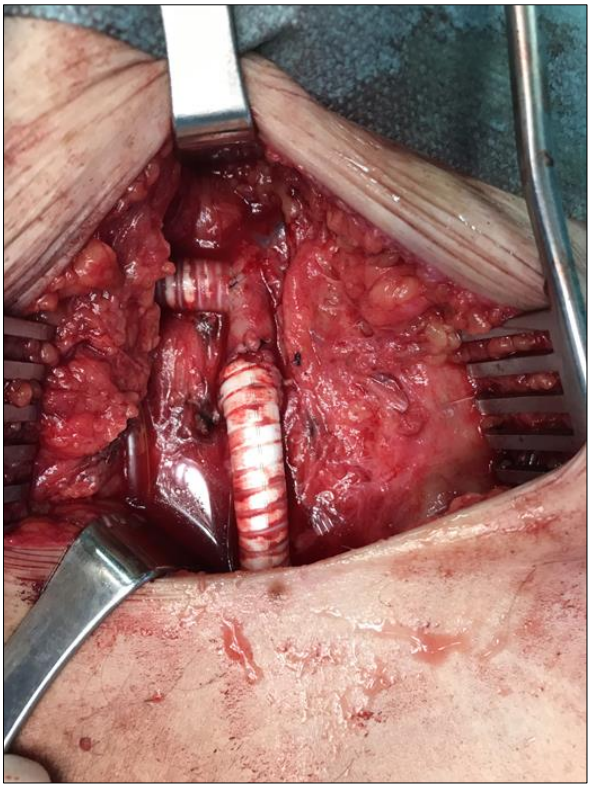

Figure 2: Operative view after arterial reconstruction by prosthetic graft

DISCUSSION

Vascular Ehlers-Danlos syndrome (EDS) is an inherited connective tissue disorder caused by a mutation in the Col3A1 gene, which encodes pro-collagen III. It is transmitted in an autosomal dominant manner and predisposes individuals to a high risk of arterial

complications that are absent in other types of EDS [1]. These arterial complications are severe and often occur spontaneously, though they may also be post-traumatic, manifesting as aneurysms, dissections, or arteriovenous fistulas [1, 2].

The presence of two major criteria strongly suggests a diagnosis of vascular EDS, and molecular tests are highly recommended to confirm the diagnosis. The presence of two or more minor criteria suggests vascular EDS but is not sufficient for a definitive diagnosis [3].

The major diagnostic criteria for vascular EDS include [3]:

- Arterial rupture
- Intestinal perforation
- Uterine rupture during pregnancy
- Family history of vascular EDS

The minor diagnostic criteria for vascular EDS include [3]:

- Thin and translucent skin (especially visible on the chest/abdomen)
- Characteristic facial features (thin lips, small chin, narrow nose, large eyes)
- Acrogeria (premature aging of the extremities, particularly the hands)
- Arteriovenous fistulas of the carotid arteries, cavernous sinus thrombosis
- Hypermobility of small joints

Our patient had one major criterion: arterial rupture (rupture of an aneurysm of the right humeral artery at the age of 14 years) and two minor criteria: characteristic facial features and acrogeria.

The biological diagnosis of EDS is based on culturing connective tissue cells obtained from a skin biopsy (fibroblasts). These cells produce type I, III, and, to a lesser extent, type V collagen. Biochemical analysis can detect quantitative and/or qualitative differences in these collagen proteins. Genetic analysis allows for the identification of the Col3A1 gene mutation [4].

The therapeutic management of vascular EDS is complex. In non-life-threatening situations, conservative treatment is the first-line approach for arterial complications. It is symptomatic in cases of hematomas or false aneurysms, combining bed rest, analgesics, and, depending on the case, local compression, transfusion, and desmopressin for some authors [5]. Anticoagulation for arterial dissections involves the use of unfractionated heparin administered via an electric syringe. Several European scientific societies recommend the use of beta-blockers by analogy with Marfan syndrome, although no scientific data currently support this [6]. Endovascular treatment indications include selective arterial embolization for hemostasis and occlusion of arteriovenous fistulas, particularly carotid-cavernous fistulas. The risks are associated with arterial puncture as well as arterial trauma caused by the guidewire during catheterization. Arterial CT angiography allows for arterial reconstructions without the need for conventional arteriography, which can cause false aneurysms at puncture sites [7].

The use of covered stents is helpful for excluding false aneurysms and arteriovenous fistulas, but it carries the risk of peri-prosthetic aneurysm formation or local complications, such as false aneurysm development due to dissection at the stent implantation site [8]. Surgical standby and prolonged intensive care monitoring are imperative during and after the endovascular procedure. The fragility of the vessels often makes surgery a last resort, with perioperative mortality ranging from 19% to 44% in cases of intraoperative hemorrhage and nearly 100% in cases of aortic injury [9]. Challenges include clamping, hemostasis, and suturing of the vessels and the wall. The high risk of arterial rupture by the clamp has led to the use of low-pressure aortic balloons, protected clamps, or elastic tourniquets for the extremities [10, 11]. Most authors prefer simple ligatures and only consider bypass or reconstructive surgery when acute ischemia is present. This approach is associated with significantly lower mortality [10]. Venous grafts are contraindicated [12]. Anastomoses are best performed without tension, using horizontal interrupted sutures reinforced with pledges. Most authors recommend protecting them with a patch or cuff made of Dacron or PTFE (polytetrafluoroethylene) to better distribute mechanical stress [10-13].

Monitoring the arterial tree enables the early management of vascular lesions. It is based on thorough clinical examination and non-invasive vascular imaging such as Doppler ultrasound and CT angiography [14]. This monitoring is performed at 3, 6, and 12 months, and then annually if the lesions remain stable, as is the case with our patient.

Prophylactic measures are essential and should be explained in detail to the patient [6]. Violent sports should be avoided due to tissue fragility, joint hypermobility should be prevented with stabilizing orthotics, and cosmetic surgery, arteriography, colonoscopy, and intrauterine procedures are discouraged [1]. Preimplantation genetic diagnosis may be an option for families with an identified mutation [15].

CONCLUSION

The occurrence of an arterial rupture in a young individual should prompt consideration of vascular-type Ehlers-Danlos syndrome (EDS). This diagnosis is confirmed through a careful clinical examination of the skin and facial features. The management of vascular lesions relies on surgery and endovascular techniques.

The complexity and multiplicity of the lesions may sometimes necessitate simple monitoring with medical treatment, including beta-blockers. While awaiting a curative treatment, particularly through molecular biology, preventive care is based on genetic counselling and family screening of patients.

REFERENCES

1. Malfait, F., Francomano, C., Byers, P., Belmont, J., Berglund, B., Black, J., ... & Tinkle, B. (2017, March). The 2017 international classification of the Ehlers–Danlos syndromes. In *American Journal of Medical Genetics Part C: Seminars in Medical Genetics* (Vol. 175, No. 1, pp. 8-26).
2. Naing, B. T., Watanabe, A., & Shimada, T. (2011). A novel mutation screening system for Ehlers-Danlos Syndrome, vascular type by high-resolution melting curve analysis in combination with small amplicon genotyping using genomic DNA. *Biochemical and Biophysical Research Communications*, *405*(3), 368-372.
3. Beighton, P., Paepe, A. D., Steinmann, B., Tsipouras, P., & Wenstrup, R. J. (1998). Ehlers-Danlos syndromes: revised nosology, Villefranche, 1997. *American journal of medical genetics*, *77*(1), 31-37.
4. Richards, S., Aziz, N., Bale, S., Bick, D., Das, S., Gastier-Foster, J., ... & Rehm, H. L. (2015). Standards and guidelines for the interpretation of sequence variants: a joint consensus recommendation of the American College of Medical Genetics and Genomics and the Association for Molecular Pathology. *Genetics in medicine*, *17*(5), 405-423.
5. Mast, K. J., Nunes, M. E., Ruymann, F. B., & Kerlin, B. A. (2009). Desmopressin responsiveness in children with Ehlers-Danlos syndrome associated bleeding symptoms. *British journal of haematology*, *144*(2), 230-233.
6. Baderkhan, H., Wanhainen, A., Stenborg, A., Stattin, E. L., & Björck, M. (2021). Celiprolol treatment in patients with vascular Ehlers-Danlos syndrome. *European Journal of Vascular and Endovascular Surgery*, *61*(2), 326-331.
7. Tonnessen, B. H., Sternbergh III, W. C., Mannava, K., & Money, S. R. (2007). Endovascular repair of an iliac artery aneurysm in a patient with Ehlers-Danlos syndrome type IV. *Journal of vascular surgery*, *45*(1), 177-179.
8. Naidu, S. G., Chong, B. W., Huettl, E. A., & Stone, W. M. (2007). Percutaneous embolization of a lumbar pseudoaneurysm in a patient with type IV Ehlers-Danlos syndrome. *Journal of vascular surgery*, *46*(5), 1036-1038.
9. Oderich, G. S., Panneton, J. M., Bower, T. C., Lindor, N. M., Cherry Jr, K. J., Noel, A. A., ... & Gloviczki, P. (2005). The spectrum, management and clinical outcome of Ehlers-Danlos syndrome type IV: a 30-year experience. *Journal of Vascular Surgery*, *42*(1), 98-106.
10. Sultan, S., Morasch, M., Colgan, M. P., Madhavan, P., Moore, D., & Shanik, G. (2002). Operative and Endovascular Management of Extracranial Vertebral Artery Aneurysm in Ehlers-Danlos Syndrome: A Clinical Dilemma: Case Report and Literature Review. *Vascular and Endovascular Surgery*, *36*(5), 389-392.
11. Lopez-Sainz, A., Mila, L., Rodriguez-Palomares, J., Limeres, J., Granato, C., La Mura, L., ... & Teixido-Tura, G. (2021). Aortic branch aneurysms and vascular risk in patients with Marfan syndrome. *Journal of the American College of Cardiology*, *77*(24), 3005-3012.
12. Parfitt, J., Chalmers, R. T. A., & Wolfe, J. H. N. (2000). Visceral aneurysms in Ehlers-Danlos syndrome: case report and review of the literature. *Journal of vascular surgery*, *31*(6), 1248-1251.
13. Maltz, S. B., Fantus, R. J., Mellett, M. M., & Kirby, J. P. (2001). Surgical complications of Ehlers-Danlos syndrome type IV: case report and review of the literature. *Journal of Trauma and Acute Care Surgery*, *51*(2), 387-390.
14. Zilocchi, M., Macedo, T. A., Oderich, G. S., Vrtiska, T. J., Biondetti, P. R., & Stanson, A. W. (2007). Vascular Ehlers-Danlos syndrome: imaging findings. *American Journal of Roentgenology*, *189*(3), 712-719.
15. Schwarze, U., Schievink, W. I., Petty, E., Jaff, M. R., Babovic-Vuksanovic, D., Cherry, K. J., ... & Byers, P. H. (2001). Haploinsufficiency for one COL3A1 allele of type III procollagen results in a phenotype similar to the vascular form of Ehlers-Danlos syndrome, Ehlers-Danlos syndrome type IV. *The American Journal of Human Genetics*, *69*(5), 989-1001.