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CASE REPORT

Vascular Complications of Ehlers-Danlos Syndrome in Young Chinese Adults

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ABSTRACT

Arterial dissection is uncommon in young adults and there are usually underlying causes. This report describes 2 young patients with vascular complications after trivial injury who were diagnosed to have Ehlers-Danlos syndrome. One patient died while the other remains in a stable condition. Early clinical recognition of this syndrome is necessary so as to prevent mortality and reduce morbidity.

Key Words: *Complications, Ehlers-Danlos syndrome, Vascular disease*

INTRODUCTION

Ehlers-Danlos syndrome (EDS) is a rare genetic connective tissue disorder. One of the sub-types, type IV, mainly presents with vascular complications and the vascular consequences may be the first presentation. This report is of 2 patients with EDS type IV and the diagnostic imaging aspects are highlighted.

CASE 1

A 27-year-old Chinese man with good past health and unremarkable family history was admitted to casualty because of increasing pain after receiving a blunt injury to his left groin 2 days previously. The injury was minor, in that he hit the edge of his wooden bed after a slip and fall. At the accident and emergency department, the patient became shocked with a blood pressure (BP) of 60/30 mm Hg and pulse of 125 beats per minute. His condition stabilised after fluid resuscitation. He had left groin tenderness with no obvious bruising. His femoral pulse was normal. His abdomen was distended. His haemoglobin was 128 g/L (normal range, 140 to 175 g/L).

Computed tomography (CT) of the abdomen and pelvic examination showed a huge pseudoaneurysm over the left common and external iliac arteries with marked retroperitoneal haemorrhage that extended up to the level of the upper abdomen (Figures 1 and 2). There was intimal dissection over the left common iliac artery.

At laporotomy, the CT findings were confirmed but the source of the bleeding could not be located. The bleeding could not be controlled, even with packing, and the patient subsequently died in the operating theatre.

Autopsy showed a ruptured left common iliac artery dissection. In addition, histology showed multiple areas of scattered fragments of elastic tissue in the aorta and the common iliac arteries. Together with the clinical presentation, these features were in keeping with EDS as suggested by the pathologist.

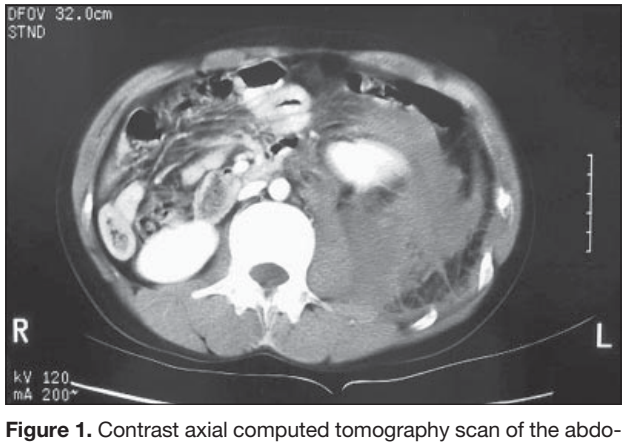

Figure 1. Contrast axial computed tomography scan of the abdomen showing a large left retroperitoneal haematoma surrounding the left kidney.

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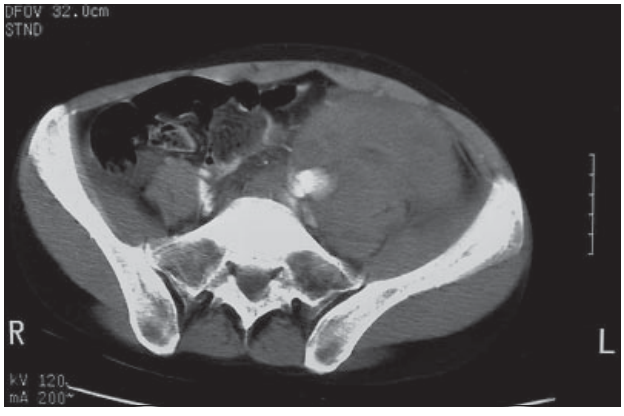

Figure 2. Contrast axial computed tomography scan of the pelvic region demonstrated a large left pelvic haematoma arising from the rupture of the dissecting left common iliac artery.

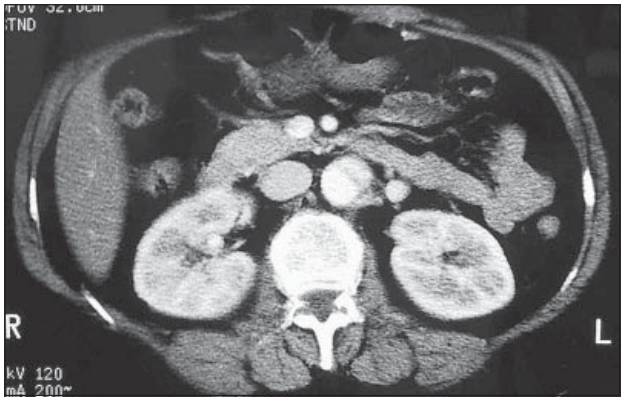

Figure 3. Contrast axial computed tomography of the abdomen showing abdominal aortic dissection.

CASE 2

A 41-year-old woman with good past health and unremarkable family history presented with left chest wall pain after a fall from a height (2 meters) at work. At admission to hospital, she was conscious and alert with a stable BP and pulse. At physical examination, local tenderness and swelling was found over the anterior left chest wall. Subsequent CT of the thorax and abdomen showed a small haematoma over the subcutaneous area of the lower left anterior chest wall. An incidental finding of a DeBakey type B dissecting aneurysm (5 cm in greatest diameter) was noted, which extended from the inferior portion of the aortic arch down to the infra-renal level (Figure 3). Another aneurysm was found over the innominate artery (Figure 4). However, there was also dural ectasia on follow up magnetic resonance imaging (MRI) scan (Figure 5), which is an uncommon association of EDS. The overall phenotypic features were compatible with EDS type IV.

Due to this patient's stable condition, the thoracic surgeon advised close monitoring of the size of the aorta

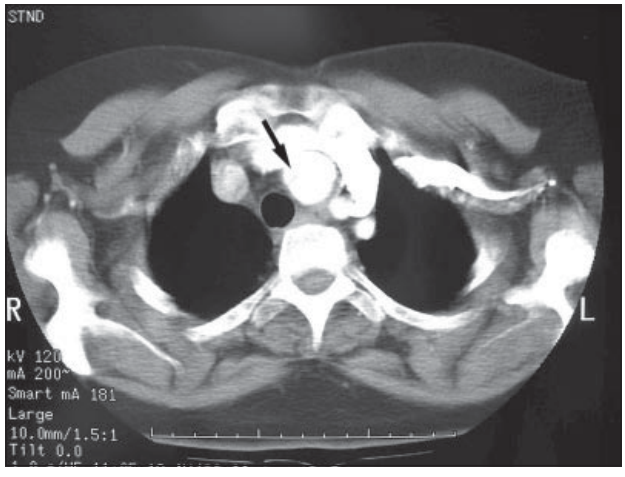

Figure 4. Contrast axial computed tomography of the thorax showing innominate artery aneurysm (arrowhead).

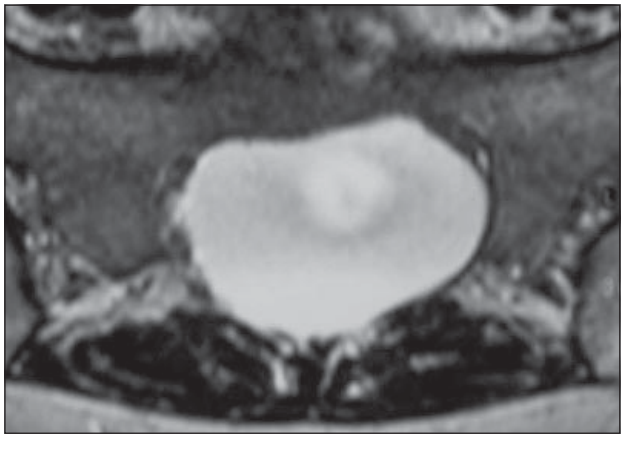

Figure 5. T2-weighted magnetic resonance imaging with axial scan of the sacral region demonstrating dural ectasia.

and BP, while surgical intervention is not yet necessary. Follow-up CT for the subsequent 3 years show no significant interval changes of the aorta and the patient remains in a stable condition.

DISCUSSION

EDS is a rare genetic connective tissue disease with a prevalence of less than 1 in 150,000. The basic underlying pathology, which is common to all EDS types, is the abnormal metabolism of type I or type III collagen. EDS has more than 10 types and most are associated with skin hyperextensibility and joint hypermobility but there are no significant vascular manifestations except for type IV EDS.

EDS was first described in 1682 by Van Meekeren in a 23-year-old man who could pull his right pectoral skin to his left ear.[1] In 1901, Ehlers, a Danish dermatologist, reported a similar phenomenon,[2] followed by Danlos, a French physician, in 1908.[3] Type IV EDS was first

described by Sack in 1936[4] and later was recognised as a distinct clinical entity by Barabas in 1966.[5] Type IV is a rare form of EDS (accounting for 4% of the total number of cases). The disease is inherited in both autosomal dominant and autosomal recessive fashions, involving the gene COL3A1, so that amino acid production for type III procollagen is abnormal.[6] Sporadic cases with a new mutation are not uncommon (as illustrated by the 2 patients described here). Pope et al subdivided type IV EDS into 3 subtypes, as follows:

- classic type (type III collagen defect complete) — the first patient had this type
- long-lived type (type III collagen defect incomplete) — the second patient had this type
- atypical type.

The diagnosis of EDS is mainly made by clinical findings.[7,8] However, the diagnosis can be confirmed by biochemical assays showing procollagen production in cultured skin fibroblasts or by the identification of a mutation in the gene for type III procollagen (COL3A1).[9] This is particularly useful for subsequent genetic counselling. The major clinical vascular manifestations of type IV EDS are arterial dissection and aneurysm that could be multiple and complicated by spontaneous rupture. The mortality rate for type IV EDS with vascular complications is approximately 50%.[10] Arterial rupture with uncontrolled bleeding is the cause of death in 90% of these patients.[11] Type IV EDS therefore represents the most deadly form. Only a limited number of successful surgical interventions, both in elective and emergency situations, have been reported.[12-14] Other serious complications of type IV EDS include colon perforation, splenic rupture, uterine rupture, and pneumothorax. The skin findings are minimal hyperextensibility but substantial bruising. This is mainly related to the structural integrity of the blood vessels. Dural ectasia is a rare association, which can cause scalloped vertebrae.[15]

Other underlying causes should be considered if arterial aneurysm, dissection, or rupture is detected in young patients. Inherited connective disorders such as EDS and Marfan's syndrome, congenital heart disease, severe trauma, pregnancy, and family history of aortic dissection are risk factors for young patients with such vascular complications. Also, the appropriate type of imaging modality should be considered. Standard arteriogram should be avoided, if possible, as it is associated with a high complication rate, including uncontrollable local bleeding, arterial dissection, or disruption at the puncture site or at a remote site. Conventional angiography may be associated with a 17% to 67% major complication rate and result in 5% to 20% mortality rate.[10,16] Therefore, the investigation of any vascular complication in patients with suspected EDS should be performed non-invasively, for example, by ultrasound, CT, spiral CT angiography, or MRI angiography.

To date, there is no definitive cure for EDS. The prognosis is poor for patients with EDS type IV and 1 study has shown a median survival of 48 years.[14] Surgical intervention for vascular complications is difficult and frequently unsuccessful.[16] This is mainly due to the fact that the vascular tissue is friable. Therefore, treatment is directed at the prevention of injury and the management of complications. It is important to recognise EDS before an irreversible catastrophic consequence occurs. In addition, genetic counselling is useful for patients with a family history. Knowledge of the subtypes of this disease can predict the prognostic outcome, and some patients can be relative long-lived.

CONCLUSION

The vascular complication of Ehlers-Danlos syndrome is usually the first presentation and may be catastrophic in outcome. The early recognition of this disease by the use of non-invasive imaging is beneficial for the subsequent management and also useful as a prognostic indicator for the patient.

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