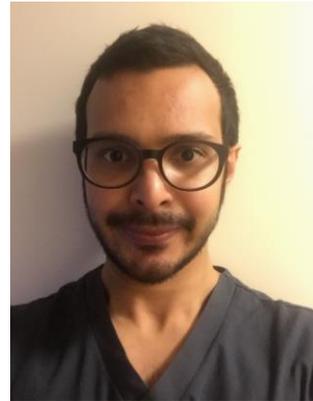


SUBCLAVIAN STEEL SYNDROME

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43-year-old female patient with chronic renal failure on hemodialysis three times per week presents with an episode of sudden onset visual disturbance. A carotid Doppler ultra-

sound was done which did not show carotid stenosis; however, it showed a reversal of blood flow through the subclavian artery. The transient visual disturbance was attributed to the reversal of blood flow through the subclavian artery.

Keywords: subclavian steel syndrome, carotid Doppler ultrasound, transient visual disturbance.



Резюме

СИНДРОМ ПІДКЛЮЧИЧНОГО ОБКРАДАННЯ

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У 43-річної хворої на хронічну ниркову недостатність при проведенні гемодіалізу три рази на тиждень виникали епізоди раптового порушення зору. Було проведено каротидне доплерівське ультразвукове дослідження, яке не показало каротидного стенозу; однак, воно показало зворотний кровотік по підключичній артерії. Транзиторні порушення зору були пов'язані зі зміною кровотоку по підключичній артерії.

Ключові слова: синдром підключичного обкрадання, каротидне доплерівське ультразвукове дослідження, транзиторні порушення зору.



Резюме

СИНДРОМ ПОДКЛЮЧИЧНОГО ОБКРАДЫВАНИЯ

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У 43-летней больной хронической почечной недостаточностью при проведении гемодиализа три раза в неделю возникали эпизоды внезапного нарушения зрения. Было проведено каротидное доплеровское ультразвуковое исследование, которое не показа-

ло каротидного стеноза; однако, оно показало обратный кровоток по подключичной артерии. Транзиторные нарушения зрения были связаны с изменением кровотока по подключичной артерии.

Ключевые слова: синдром подключичного обкрадывания, каротидное доплеровское ультразвуковое исследование, транзиторные нарушения зрения.

Clinical presentation

43-year-old female patient with a previous history of chronic renal failure on hemodialysis three times per week was assessed for a possible right-sided amaurosis fugax suffered during the first hour of dialysis.

She presented with a sudden onset of blurred vision followed by complete loss of vision in the right eye lasting approximately 15 seconds with complete resolution. She was mildly drowsy and confused immediately after the event. During the event, there was no focal neurology, no involuntary movement or signs of overt seizure-like activity.

Physical examination soon after the episode revealed an awake and alert patient, with mild dysarthria, no aphasia or memory loss. Strength was 5/5 in all four limbs, no sensory loss was noted, no cerebellar or cranial nerve dysfunction. There was no reduced visual acuity or visual field loss.

Due to this clinical presentation she was treated as having a right amaurosis fugax and given antiplatelet treatment and statins for secondary prevention of cerebro-vascular infarcts. Once discharged, a carotid artery Doppler ultrasound was performed to rule out carotid stenosis and a reverse blood flow in the right subclavian artery was noted (figure 1 and 2). The transient visual disturbance was ultimately attributed to the reversal of blood flow rather than a single blood clot and the antiplatelet treatment was discontinued.

Discussion

Subclavian steal syndrome involves retrograde flow through the vertebral artery when there is an ipsilateral proximal stenosis or compression of the subclavian artery. It is commonly considered as a differential diagnosis for pulse weakness/absence and systolic blood pressure difference between two upper limbs, but the majority of patients are asymptomatic [1]. In the case of symptomatic patients, features of ischaemia involving the ca-

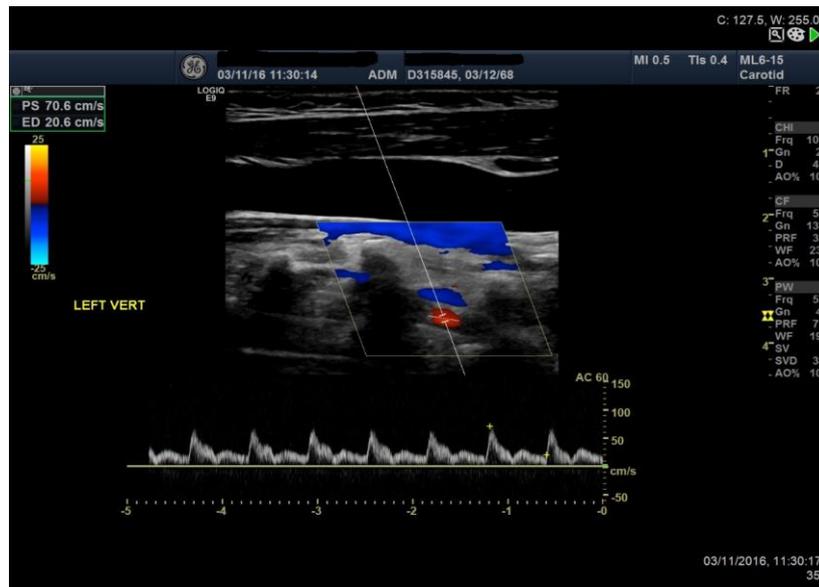
rotid and vertebrobasilar artery are experienced. This results in a myriad of variable symptoms such as hemiparesis, syncope, visual disturbances, dizziness, vertigo, ataxia, nystagmus and numbness.

The diversion occurs due to the lower pressure in the proximally occluded subclavian artery and results to retrograde flow (siphoning) through the vertebral artery in to the distal portion of the subclavian artery to supply the arm. Contorni first described the flow in 1960 when he investigated a patient with a diminished pulse pressure [2]. Reivich then translated the concept in 1961 to a patient with cerebral consequences due to the reversed flow [3]. But it was Fisher who first used the term subclavian steal syndrome a few months later [4].

A publication by Field et al has noted an incidence of 2.5% based on a study of 6534 individuals [5]. The pathophysiological features of the syndrome are due to atherosclerotic disease in the majority of patients and shares a similar epidemiological profile where men tend to be affected more and age groups between 50-60 are involved [6]. Nicholls et al have hypothesized that the process of atherosclerosis is thought to be enhanced in the left subclavian artery compared to the right due to the increased blood flow [7]. As a result, the syndrome is usually found on the left side and the phenomenon is supported by Labropoulos et al that observed an occurrence of 82.3% of their cohort [1]. Other rare non-atherosclerotic causes for subclavian steal syndrome have been described elsewhere in the literature [8].

There is no established classification for the clinical subtypes of this rare syndrome, but a hemodynamic classification using Doppler waveforms for the severity of the syndrome exists [9]. The severity explores on the extent of the retrograde vertebral flow in terms of pre-steal, partial and complete.

Several types of radiological imaging techniques using invasive angiography or non-invasive techniques like ultrasound scan, magnetic resonance angiography and computerised tomography angiography can be used for investigation and diagnosis.



Figures 1-2. A reverse blood flow in the right subclavian artery

While diabetic patients are at an increased rate of atherosclerosis, our patient experienced vascular-neuro symptoms when she was dialysed through her right brachial arteriovenous fistula. The ultrasound Doppler carotid artery scan reported no obvious stenosis in the extra cranial carotid arteries, but there was evidence of a partial retrograde flow in the right vertebral artery. With an arteriovenous fistula, the changes in the vascular flow rate and pressures during dialysis can develop conditions required for a subclavian

steal syndrome and is recognised as a dialysis associated steal syndrome in the literature [10]. Our case study is in concurrence with the work of three other case reports that have encountered patients with neurological symptoms secondary to vascular insufficiency during dialysis of their brachial arteriovenous fistulas with retrograde flow of the ipsilateral vertebral arteries [11,12,13].

As described earlier, the majority of symptomatic patients suffer from the consequences of atherosclerosis due to the patho-

physiology of the condition. In patients with benign symptoms, non-surgical interventions are used and primarily focus on modifying atherosclerotic risk factors by diet, cholesterol, blood pressure control, diabetes, exercise and smoking [14]. In the case of non-atherosclerotic causes of the syndrome and those with severe symptoms due to atherosclerosis, different types of surgical interventions by vascular surgeons can be used to relieve the symptoms, but have their own success rates and complications [15,16].

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