



CASE REPORT

Spinal transient ischemic attack: Rare and treatable cause of transient weakness with radicular pain

Spinal geçici iskemik atak: Radiküler ağrılı geçici zaafın nadir ve tedavi edilebilir bir nedeni

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Summary

Transient ischemic attack (TIA) of spinal cord (SC) is very rare and characterized by sudden onset of paralysis, sensory loss, back pain. We present a patient with acute painful paraplegia and symptoms resolved within a few hours. We identified 10 patients in literature search. Five of them were male, the mean age of patients was 53.8. Paraparesis/pleji was present in all. Only two patients did not have radicular pain. Vascular risk factors were hypertension in five patients, smoking in five and diabetes mellitus in one. TIA period ranged from 1 min to 24 h. The most common etiology was aortic dissection (n=6). Four patients had aortic thrombosis. Six patients were treated with medical and surgical methods; other four were treated with only medically. SC ischemia and aortic diseases should be kept in mind in short term/persistent acute spinal syndromes with pain.

Keywords: Aortic diseases; spinal cord ischemia; transient ischemic attack; vascular risk factors.

Özet

Spinal kordun geçici iskemik atağı (TIA-sc) çok nadir görülür ve ani başlangıçlı felç, duyuşal kayıp, sırt ağrısı ile karakterizedir. Akut ağrılı paraplejisi olan ve birkaç saat içinde düzelen semptomları olan bir hastayı sunuyoruz. Literatür taramasında 10 hasta belirledik. Bunların beşi erkekti, ortalama yaş 53.8 idi. Paraparezi / pleji hepsinde mevcuttu. Sadece iki hastada radiküler ağrı yoktu. Vasküler risk faktörleri beş hastada hipertansiyon, beş hastada sigara ve bir hastada diabetes mellitus idi. TIA dönemi 1 dakika-24 saat arasında değişmekteydi. En yaygın etiyoloji aort diseksiyonu idi (n=6). Dört hastada aort trombozu vardı. Altı hasta tıbbi ve cerrahi yöntemlerle tedavi edildi, diğer dördü sadece tıbbi olarak tedavi edildi. Ağrılı kısa süreli/kalıcı akut spinal sendromlarda spinal kord iskemisi ve aorta hastalıkları akılda tutulmalıdır.

Anahtar sözcükler: Aorta hastalıkları; geçici iskemik atak; spinal kord iskemisi, vasküler risk faktörleri.

Introduction

Ischemic events of the spinal cord (SC), which including SC infarction (SCI) and transient ischemic attack of SC (TIA-sc), are very rare and often remain undiagnosed. However, their results can be quite severe. Ischemic etiology should be taken into the differential diagnosis in patients with acute medullary syndrome.^[1] Anterior spinal artery (ASA) infarction is much more common than the posterior spinal artery (PSA) syndrome because of the difference in collateral supply between these two regions.^[2] Neurovascular syndromes are defined by the level of the infarction,

the most common being the ASA syndrome, presenting with weakness, back pain, areflexia, spinothalamic sensory loss, and autonomic dysfunction. Patients with vascular risk factors, such as diabetes mellitus (DM), hypertension (HT), and hyperlipidemia, should be carefully examined for ischemic lesions. We present a female patient who was admitted to the emergency department (ED) for acute painful paraplegia and symptoms resolved within a few hours. Abdominal aortic stenosis was detected in investigations and abdomino-femoral aortic bypass operations were performed as an emergency. We review the literature

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for similar cases and discuss this potentially permanently damaged condition.

Literature Search and Inclusion Criteria

This literature search was conducted in February 2018. Peer-reviewed journal articles published in English were identified by a search of the biomedical electronic databases MEDLINE. The following key words were used as MEDLINE search terms for the TIA-sc review: "SC TIA/s, recurrent/intermittent SC ischemia, transient paraparesis/quadruparesis/tetraparesis." All potentially relevant articles were investigated as full text. Participants must be over 18 years of age. Exclusion criteria: symptoms lasting longer than 24 h, after trauma/surgery, hematomas, animal experimentation, abstracts which without full texts.

Case Report

A 51-year-old female patient presented at the ED because of sudden severe back pain, lower extremity weakness and incontinence after standing for all day. In the first examination, the blood pressure was 95/60 mm Hg in the right and 90/60 mm Hg in the left, heart rate 98/min, awake, paraplegic, loss of deep tendon reflexes in the lower extremities, and urinary incontinence was present. The patient's complaints and findings were completely resolved within half an hour while the emergency service was waiting for scheduled imaging. Examination of the abdomen and chest showed no abnormalities. The pre- and post-contrast thoracic and lumbar magnetic resonance imaging (MRI) which was made at the 24th h of complaints has not been detected any pathological feature (Fig. 1 a-d). There have not been similar complaints before. She denied known systemic disease. The family history was unremarkable except that type 2 DM of her mother. No medications were used regularly. Approximately, 30 pack/years were smokers. On physical examination in service was normal. Neurological examination was normal except pain and temperature sensations were impaired below the T11 dermatome on the right and L1 dermatome on the left side and areflexic without spasticity. There was very mild color change area in the patient's toes and soles. Peripheral pulses of distal lower extremity were weak but could be bilateral by manual examination. Routine blood tests were performed and that showed no pathology except fasting blood sugar of 225 mg/dL (70–110 mg/dL) and HbA1c: 8.5 (normal: 4–5.9).

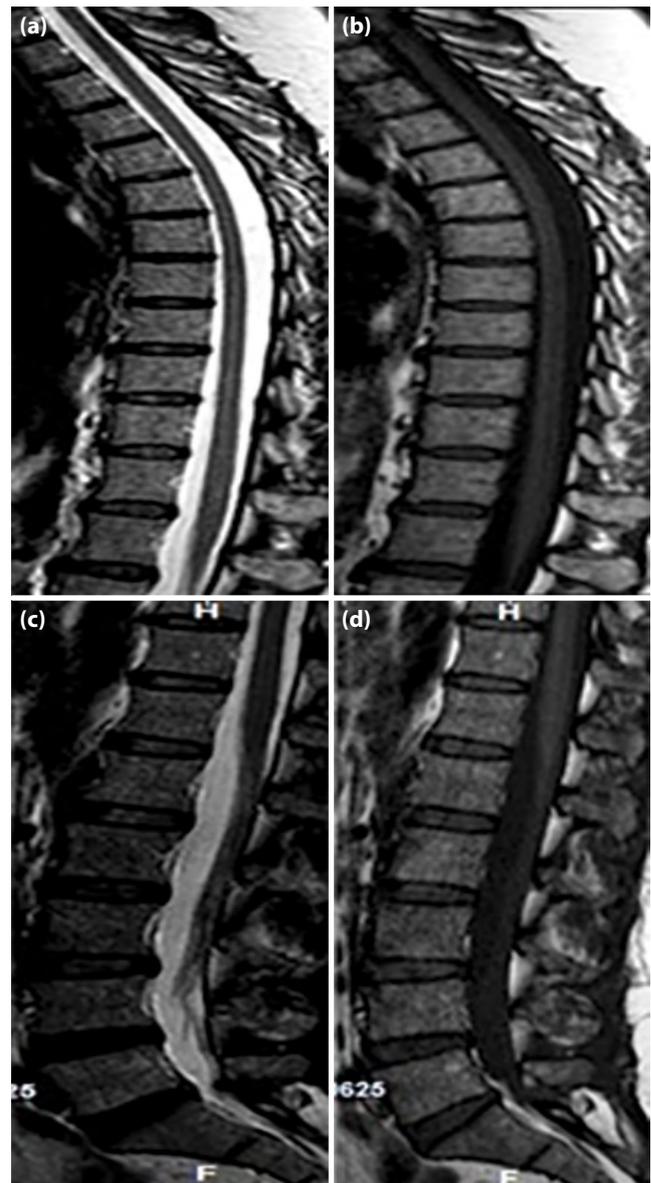


Figure 1. (a-d) The pre- and post-contrast thoracic and lumbar magnetic resonance imaging were normal.

Conduction studies, F-wave latency and persistence and muscle studies were normal in electromyography (EMG). It was concluded that all this finding is due to TIA-sc when considering the patient developed acute, rapidly improving symptoms and neurological examination, normal neuroimaging and EMG findings, risk factors such as newly detected DM and heavy smoking. Low molecular weight heparin 1.2 cc/day, acetylsalicylic acid (ASA) 300 mg/day, and oral anti-diabetic drugs were started. Iliac arteries were occluding in lower extremity Doppler ultrasonography. Conventional angiography performed the next day and stenosis of the infrarenal abdominal aorta and bilateral iliac arteries. "Aortobifemoral bypass graft surgery" was made the same day. After the operation, neurological examination and peripheral circulation were normal.

Literature Review

We have identified 11 patients (including our index case) were suffering from TIA-sc in a literature review^[3-12] (Table 1) according to our criteria. Six of them were male (%50), the mean age was 52.3 (32-66). Paraparesis/pleji was present in all. Two patients had no radicular pain, three had no sensorial symptom. All of them had clinic findings with SCI involving the ASA. Only one patient was accompanied by PSA. The findings lasted an average of 4.2 h (5 min-24 h).

HT was present in 5 patients (%45), smoking in 5 patients (%45) and DM in one patient (%9). One patient was quit smoking more than 10 years ago. TIA period ranged from 1 min to 24 h. Furthermore, one patient had anemia, one sciatica lumbar laminectomy, one Polycythemia Vera, one Rheumatoid Arthritis, and the other one had non-Hodgkin's lymphoma. The most common etiology was aortic dissection (n=6). In addition, 4 patients, our patient was included, had aortic thrombosis.^[3-5] One patient's etiology was thoracic disc herniation.^[12]

In dissection group, three of them was treated by surgery.^[6,9,10] Other three of them treated by medical methods.^[7,8,11] Three of four patients who had thrombosis were treated medical and surgical methods (index, 3,8).

Discussion

TIA-sc was first described by Dejerine in 1911, and manifests as painless paraparesis. SCI is uncommon compared to cerebral stroke, but the outcome may be more disabling.^[10,11] Real prevalence of SCI is unknown, however is thought to account for all 1-2% of the central neurovascular incidents, 5-7% of all acute myelopathy.^[1,13] TIA-sc is even rarer and is difficult to determine the prevalence. Rich anastomotic network of arteries combined with relatively lower atherosclerotic changes could attribute to the relative rarity of SCI. The diagnosis is often clinical based on abrupt onset deficit with associated back pain.^[14] ASA infarction is more common than PSA syndrome because of the difference in collateral supply between these two regions.^[14] Other SC syndromes may result affected vascular lesions of the aorta, intrinsic spinal arteries or radicular arteries.

In most cases, sensory changes occur first, it follows weakness in minutes or hours. In many SCI patients,

the maximum disability occurs within 12 h. Back pain is often characterized radicular. Urinary retention typically occurs in the acute phase, but involuntary emptying of the bladder or defecation can be monitored at the beginning of the ischemic event. Typical examination findings are flaccid paresis below the level of the lesion, decreased superficial and deep tendon reflexes. Preservation of muscle strength and reflexes suggest PSA territory infarction which is a very rare syndrome. Isolated proprioceptive deficits are rare.^[1,9,15] There were 2 patients without radical pain in the literature group (in dissection group- 6, 7) that matched our criteria.

Studies of SCI showed that, atherosclerosis and HT includes about 50% of patients, followed by DM and heart disease (31.8% each), aortic disease was the most common localization.^[16] The most common etiology of TIA-sc is disease of the aorta (dissection and thrombosis), while the most common cause of cerebral TIA is embolism. Etiologies SCI include aortic aneurysm repair, traumatic aortic rupture, arteriovenous malformation, cryptogenic, TIA and cardiac arrest as the most frequent diagnoses.^[1,2] Occlusive vascular disease, thromboembolism, endovascular procedures, fibrocartilaginous embolism, vasculitis, arterial dissection, thrombosis, venous occlusion collagen vascular disease, syphilitic angiitis, bacterial endocarditis, pregnancy, sickle-cell disease, neurotoxic effects of iodinated contrast material used in angiography, compression of spinal arteries by tumor, systemic arterial hypotension, and decompression sickness, local mechanical vascular compression, and arthritis secondary to DM also have been reported as less common etiologies in some SCI series.^[1,2,6] In our TIA-sc group, most common etiology was aortic disease (dissection [n=6] and thrombosis [n=4]) (Table 1).

Acute aortic occlusion (AAO) is associated with a high morbidity and mortality and may present as a painless paraplegia. Zaniel et al's^[17] series consisted of eleven patients with AAO admitted to their unit during the 1 year of study. The most common medical conditions in patients were HT (%64), ischemic heart disease (%45), and DM (%45). All the ten male patients had a long history of cigarette smoking. There was no TIA-sc in Zaniel's series.^[17] In our TIA-sc series, HT %27, DM was only our patient. Three of smokers were in thrombosis group (3/4). Although occlusion may occur in any segment of the aorta, the terminal part of the abdominal

Table 1. Reported and index cases of spinal transient ischemic attack

Author	Sex	Age	Pain	Weakness	Loss of sensation	Bladder incontinence	Localization	HT	DM	Smoking	Other	Duration	Etiology	Therapy
Index	F	51	+	+	+below the T11 right L1 left	+	ASA	-	+	+	-	2 h	Aorta thrombosis	Medical+Surgery (LMWH, emergency Aortafemoral bypass)
Hussain et al. ^[3]	M	57	+	+	+saddle anesthesia (S2-3)	-	ASA	+	-	+	-	15-45 min	Aorta thrombosis	Medical+surgery (Abciximab treatment, then warfarin, elective aorto-femoral bypass surgery after 6 months)
Zingler et al. ^[4]	F	64	+	+	-	-	ASA	+	-	-	-	10 min	Aortic dissection	Surgery (graft replacement of the ascending aorta)
Costa et al. ^[5]	F	63	-	+	+	-	ASA	+	-	+	Rheumatoid arthritis	10 min	Aortic dissection	Medical (Antihypertensive agents)
Hsu and Lin (case 2) ^[6]	M	62	-	+	-	-	ASA	-	-	Quit smoking	Anemia lumbar laminectomy for sciatica	6hr.	Aortic dissection	Medical (antihypertensive medication and vitamin K antagonist)
Joo and Cummings ^[7]	M	32	+	+	+below the knee in the right side, Left side normal	-	ASA	-	-	-	Non-Hodgkin's lymphoma RT+KT	1.5 h	Aortic dissection, congenital bicuspid valve	Surgery (prosthetic aortic root replacement, coronary re-implantation and ascending) aorta replacement with extending open distal anastomosis
Van Zeggeren et al. ^[8]	M	40	+	+	+ below L1	+	ASA	-	-	+	-	10 min	Aorta thrombosis	Medical+surgery (in line aortic repair by proximal thromboendarterectomy and the warfarin)
Syed and Fiad ^[9]	M	52	+	+	-	-	ASA	-	-	-	Polycythemia Vera	30 min.	Thrombosis Adamkiewicz occlusion	Medical (platelet inhibitors and phlebotomies hydroxyurea)
Altuwajiri et al. ^[10]	F	51	+	+	+	-	ASA	+	-	+	-	1-5 min	Aortic dissection	Surgery (Open fenestration for aortic dissection)
Tanaka et al. ^[11]	M	66	+	+	+below T9	-	ASA+PSA	+	-	-	-	24 h	Aortic dissection	Medical (antihypertensive agents)
Guest et al. ^[12]	F	38	+	+	+	+	ASA	-	-	-	-	12 h	Thoracic Disc Herniation	Medical (ASA)

HT: Hypertension; DM: Diabetes mellitus; T: Thoracic; L: Lumbar; S: Sacral; ASA: Anterior spinal artery; PSA: Posterior spinal artery; RT+KT: Radiotherapy plus chemotherapy; hr: Hours; min.: Minutes; LMWH: low molecular weight heparin, ASA: Acetylsalicylic acid.

aorta distal to the renal arteries (infrarenal), especially the iliac bifurcation portion, is the most frequent site of the occlusion, like in our patient. It is important for clinicians to diagnose cases of AAO early with quick referral to a Vascular Unit for further management if morbidity and mortality rates are to be reduced.^[8]

A multidisciplinary approach is essential in for diagnosis and treatment of the TIA-sc. First, tumor, abscess, granuloma, hematoma or disc herniation which may require emergency surgical intervention should be excluded by neuroimaging. Furthermore, acute paraparesis which may cause acute transverse myelopathy, viral myelitis, Guillain Barre syndrome should be distinguished as well as other neurological pathologies, primarily. Once the differential diagnosis is narrowed to ischemic etiology by emergent imaging, vascular risk factors such as DM, HT, hyperlipidemia, and the various causes of arteritis are addressed.^[2] In our patient, thrombotic event probably precipitated by exertion and hypotensive episode on the basis of severe atherosclerosis of the aorta. All these were suggesting depending on a steal phenomenon^[8] that resulted in TIA-sc. Zingler and friends submitted a 40-year-old male patient with atherosclerotic occlusion of infrarenal aorta and TIA-sc in a similar manner to our patient.^[4]

SCI is a serious disease and has no effective treatment at present.^[16] The medical management of SC ischemia focuses on supportive measures and reducing risk for recurrence. Recurrence risk is managed with maintenance of adequate blood pressure, early bed rest, and reversal of proximate causes such as hypovolemia or arrhythmias.^[15] Naloxone hydrochloride and calcium channel blockers have been used experimentally to treat SCI, but no studies have been undertaken in humans. There is no evidence to support utilization of antiplatelets or anticoagulants for spinal ischemia.^[2] However, current recommendations for prophylaxis recurrent cerebral stroke and myocardial infarction show us inhibition of platelet aggregation is useful, provided that monitoring of patients with an increased risk of bleeding.^[18]

Similar to cerebral stroke management, acute management of SCI includes close monitoring and avoidance of hypotension. After identification of a risk factor, measures to reduce the significance of the insult with appropriate medical management are undertaken.^[1]

We have followed our patient with LMAH and ASA in the acute period, postoperative ASA was continued. Furthermore, we were organized our patient's treatment as diet and oral antidiabetic drugs for DM, therapy was planned for smoking cessation during hospitalization.

Conclusion

The prognosis is generally poor in SCI, preventive treatments is vital importance. Therefore, transient clinical signs suggestive of SC involvement detected in patients, must be present in the differential diagnosis of the TIA-sc. Patients with vascular risk factors, such as DM, HT, hyperlipidemia, should be carefully examined for ischemic lesions. Ischemic etiology should be taken into the differential diagnosis in patients with acute medullary syndrome. Rapidly planning of investigations and initiation of the treatment, which can help prevent serious and permanent disability.

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