Turkish Journal of Emergency Medicine xxx (2017) 1–6

Contents lists available at ScienceDirect

Turkish Journal of Emergency Medicine

journal homepage: http://www.elsevier.com/locate/TJEM

Controversies in the differential diagnosis of Brown-Sequard syndrome due to cervical spinal disease from stroke: A case series

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ARTICLE INFO

Article history:
Received 9 January 2017
Received in revised form
22 April 2017
Accepted 5 May 2017
Available online xxx

Keywords:
Brown-Sequard syndrome
Cervical cord
Herniated disc
Spinal epidural hematoma
Stroke

ABSTRACT

Stroke is generally considered to be the first preliminary diagnosis in patients presenting with acute hemiparesia in the emergency department. But rarely in unexpected spontaneous neurological pathologies that may lead to hemiparesis. The data from 8 non-traumatic patients who underwent surgical treatment for brown-sequard syndrome (BSS) were reviewed retrospectively. All patients were initially misdiagnosed with strokes. Two of the patients had spinal canal stenosis, two had spinal epidural hematomas, one had an ossified herniated disc and three had soft herniated discs. None of the patients complained of significant pain at the initial presentation. All of the patients had a mild sensory deficit that was initially unrecognized. The pain of the patients began to become evident after hospitalization and, patients transferred to neurosurgery department. Cervical spinal pathologies compressing the corticospinal tract in one-half of the cervical spinal canal may present with only hemiparesis, without neck and radicular pain. If it's too late, permanent neurological damage may become inevitable while it is a correctable pathology.

1. Introduction

Brown-Sequard syndrome (BSS) is usually the result of trauma to one-half of the spinal cord, and constitutes 2–4% of all traumatic spinal cord injuries. BSS can also be associated with non-traumatic causes, such as a herniated cervical disc, cervical stenosis, and spontaneous cervical epidural hematoma (SCEH).[1,2] Although it has been described previously, the pure form of BSS is rarely found with ipsilateral motor paralysis and contralateral loss of pain and temperature. Contralateral hypoesthesia may not be noticed at first, and the sensory symptoms and pain can be mild because the neurological deficits are not fully formed.[1,2] Especially in overcrowded emergency departments, and in cases with insufficient patient history and incomplete neurological examination, hemiparesis can be the most evident complaint in patients with cervical narrow spinal canal pathologies without pain. Often in the emergency department, a prediagnosis of ischemic stroke is generally preferred over BSS because acute cerebral ischemia (ACI) produces more fatal outcomes, and is seen more commonly. Moreover, BSS may mimic acute stroke, especially in patients with advanced age, leading to diagnostic challenges.[3,4] For this reason, we aimed to presented our case series with cervical spinal disease for differential diagnosis of BSS from stroke.

2. Case presentations

We reviewed the data of patients, admitted to the emergency department between 2009 and 2014 with prediagnoses of ischemic stroke, and subsequently performed operation because the BSS has been identified in the neurosurgery department. These 8 patients presented with spontaneous unilateral hemiparesis of the upper and lower extremities, without significant cervical pain. In all of the patients, aroused the suspicion of cerebral ischemia, and they initially underwent cranial computed tomography (CT). Since these CTs did not reveal ischemia, they each underwent diffusion weighted magnetic resonance imaging (DW-MRI) of the brain. In light of the examinations and normal CT results, and DW-MRI results at the acute stage, the patients were believed to have ischemic

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Peer review under responsibility of The Emergency Medicine Association of Turkey.

http://dx.doi.org/10.1016/j.tjem.2017.05.002

Please cite this article in press as: Koksal V, Yavasi O, Controversies in the differential diagnosis of Brown-Sequard syndrome due to cervical spinal disease from stroke: A case series, Turkish Journal of Emergency Medicine (2017), http://dx.doi.org/10.1016/j.tjem.2017.05.002

stroke and were admitted to the neurology department. The failure to detect other clinical findings of cerebral ischemia, and the increased degree of pain in some cases, negated the prediagnosis of ischemia, and all cervical MRIs results were showed findings, which can cause BSS. Subsequent to the clarification of the definitive diagnosis, the patients were transferred to and operated in the neurosurgery department.

There were six (75%) males and two (25%) females cases, and the median age was 62 years (range; 54–85). Seven of the cases had clinical complaints which first began during daily activities. Only one had a history of falling (from the same level) due to a loss of balance. In this case, at first, the trauma history was thought to be responsible for the symptoms. Then, hemiparesis was thought to be responsible for the falling due to the normal soft tissues and vertebral bones of the cervical spine on the radiography and cervical CT. But then, spinal cord edema due to acute trauma was seen on T2 sagittal MRI of the cervical spine. In two cases, SCEH was found to be the cause of the BSS.

None of the patients complained of significant neck or cervical radicular pain at the initial presentation, but after presenting to the emergency department, neck pain is manifested within 3–7 days cause by epidural bleeding became within 3–7 days because patient did not have cervical CT or MRI at initial presentation. The cervical MRIs and CT images (if any) of all of the cases are shown in Fig. 1. The cervical MRIs revealed significant multi-level spinal stenoses in four of the cases, and prior single-level herniated disc in two of the cases (Fig. 1). Based on the reassessment of the CTs, three of the patients with stenotic cervical spinal canal showed asymmetrical ossification of the posterior longitudinal ligament (ossified PLL), markedly narrowing the canal at the lateral recesses. In one case with cervical disc herniation (CDH), the MRI scan displayed edema in the spinal cord (Fig. 1; case 8). The radiographs of the patients with stenotic spinal canals revealed spinal spondylosis.

The clinical complaints of the SCEH patients resolved over time, after surgery. One SCEH case had a history of warfarin and acetylsalicylic acid use, while the other case had no facilitating cause. Each of these cases performed a hemilaminectomy on the epidural hemorrhage side. The one-year follow-up of the cases that received hemilaminectomy of the cervical spine exhibited no deformities in the cervical area. Six of the patients completely recovered, one patient with SCEH and one with CDH showed incomplete recovery. The demographic data of all of the patients and outcomes are shown in Table 1.

3. Discussion

In the present study, we focused on the causes of non-traumatic BSS associated with pathologies of the upper spinal cord, and how the differential diagnosis between ischemic stroke and non-traumatic BSS can be done. Pathologies affecting the cervical

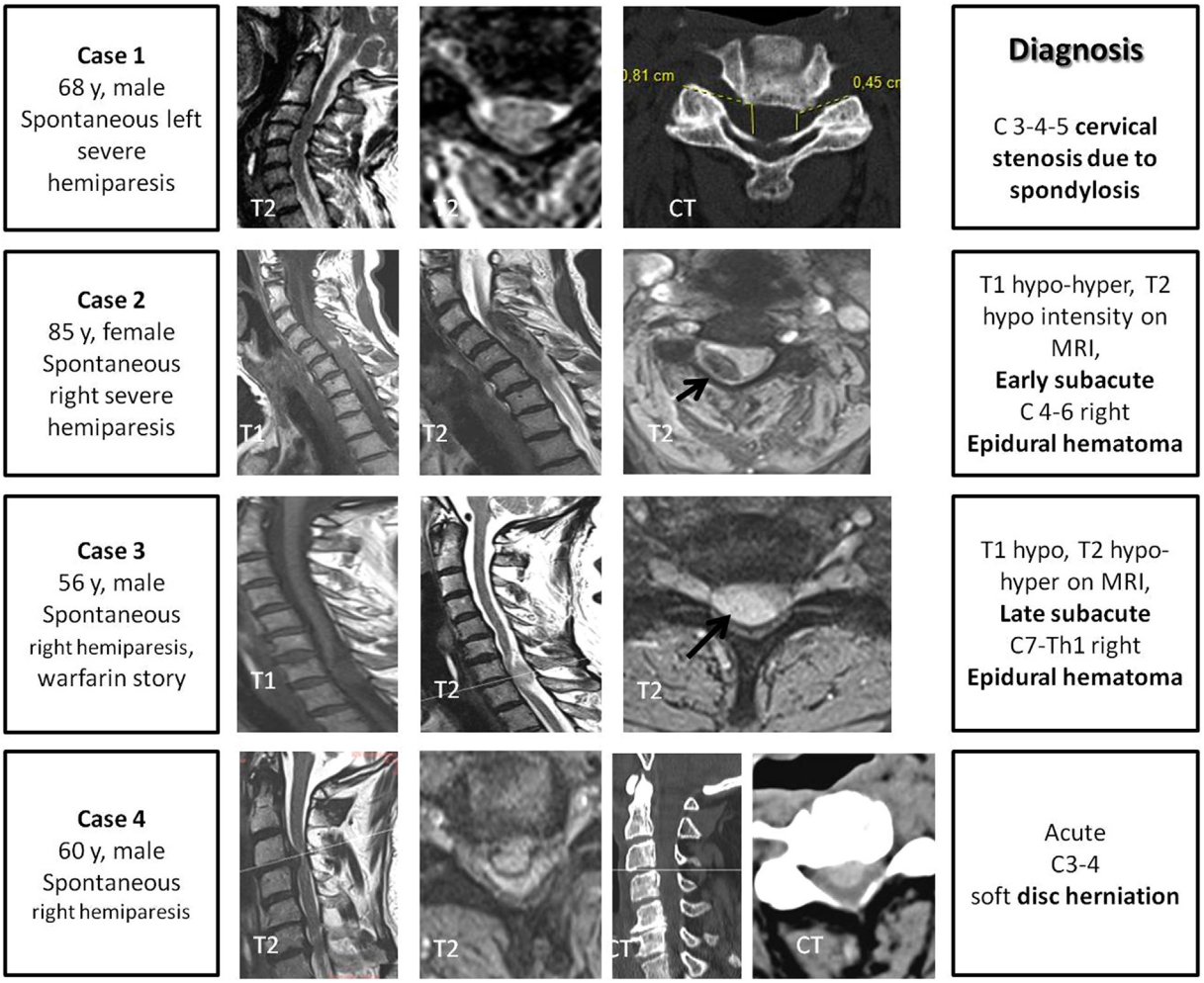

Fig. 1. (Parts 1 and 2). Clinical and radiographic characteristics of all 8 cases.

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