



MULTIPLE SCLEROSIS PRESENTING AS SPINAL CORD DCS: A CASE REPORT

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Background: Decompression sickness (DCS) and multiple sclerosis (MS) have some overlapping features. Both can present with a variety of neurological findings and show similar MRI findings. Here, we describe a case that was initially diagnosed as DCS but was later diagnosed as MS.

Case presentation: The patient was a 32-year-old male who was a beginner diver(21dives experience, AOW diver). He had no significant past medical history. He performed 3 dives a day (days 1 and 3) within No-Deco limits to a maximum depth of 36.4 m in CEBU, Philippines. (Table. 1)

Table 1: diving profile

Date	Max depth	Average depth	Time	Surface interval
6/23(day 1)	36.4m	unknown	28min	
	21.7m	unknown	35min	unknown
	15.0m	unknown	41min	unknown
6/25(day 3)	12.0m	unknown	48min	
	12.0m	unknown	42min	unknown
	12.0m	unknown	43min	unknown

Table 2: onset timeline

6/24(day 2)- numbness of lower limbs
6/27(day 5)- He flew back home without any worsening of symptoms.
6/30(day 8)- urinary retention without weakness of lower limbs
He got medical advice of self-catheterization.
7/4(day 12)- He went see another doctor and was diagnosed with DCS and treated according to the US Navy TT5 , but his symptoms worsened.

Gradual disease progression

He was admitted to our facility on day 19. On arrival at the hyperbaric unit, his general condition was good, but he complained of sensory disturbances in the bilateral lower limbs. Neurological examination revealed bilateral lower limb weakness (MMT2-4) and bladder rectal disorder. (Fig. 1)

MRI on day 12 revealed a T1 iso-intensity and T2 high-intensity lesion in the spinal cord of Th11-Th12, as well as spinal cord swelling. (Fig. 3) We diagnosed him with severe spinal cord DCS, and although it had been more than weeks since symptom onset, we treated him according to the US Navy TT6.

Fig. 1 7/11(day 19)

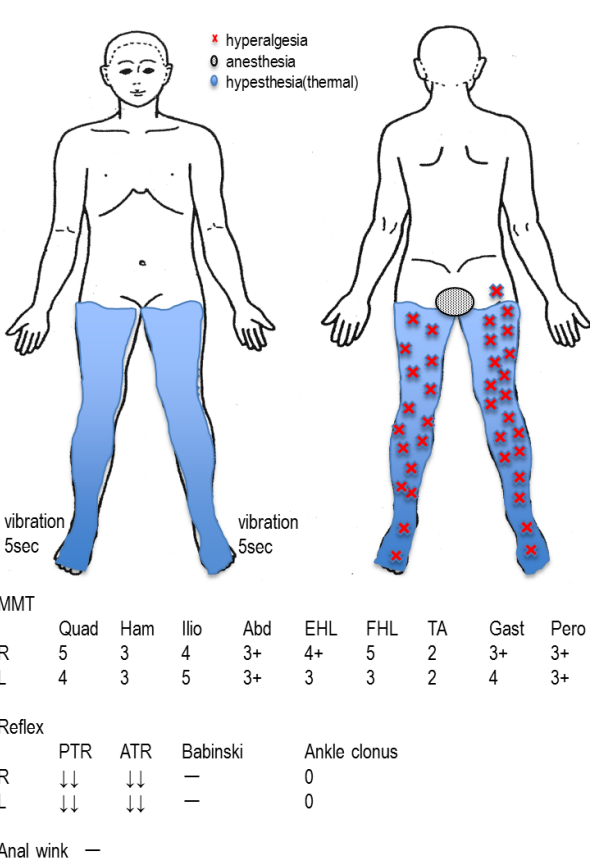


Fig. 2 7/28(day 36)

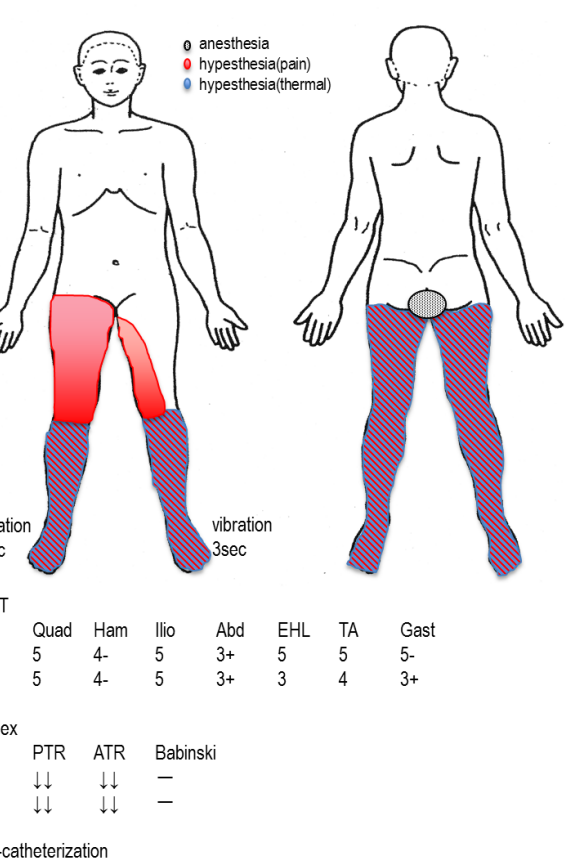


Table 3: HBO profile at our facility

7/11(day 19)	US Navy TT 6
7/12(day 20)	US Navy TT 6
7/14(day 22)	US Navy TT 6A
7/15(day 23)	US Navy TT 6
7/19(day 27)	US Navy TT 6
7/20(day 28)	US Navy TT 6A
7/22(day 30)	US Navy TT 6
7/25(day 33)	US Navy TT 6
7/26(day 34)	US Navy TT 6
7/28(day 36)	US Navy TT 6

Clinical evolution: He was treated by TT6 and 6A several times (Table 3), but his symptoms did not improve satisfactorily. (Fig. 2)

Insufficient response to HBO treatment

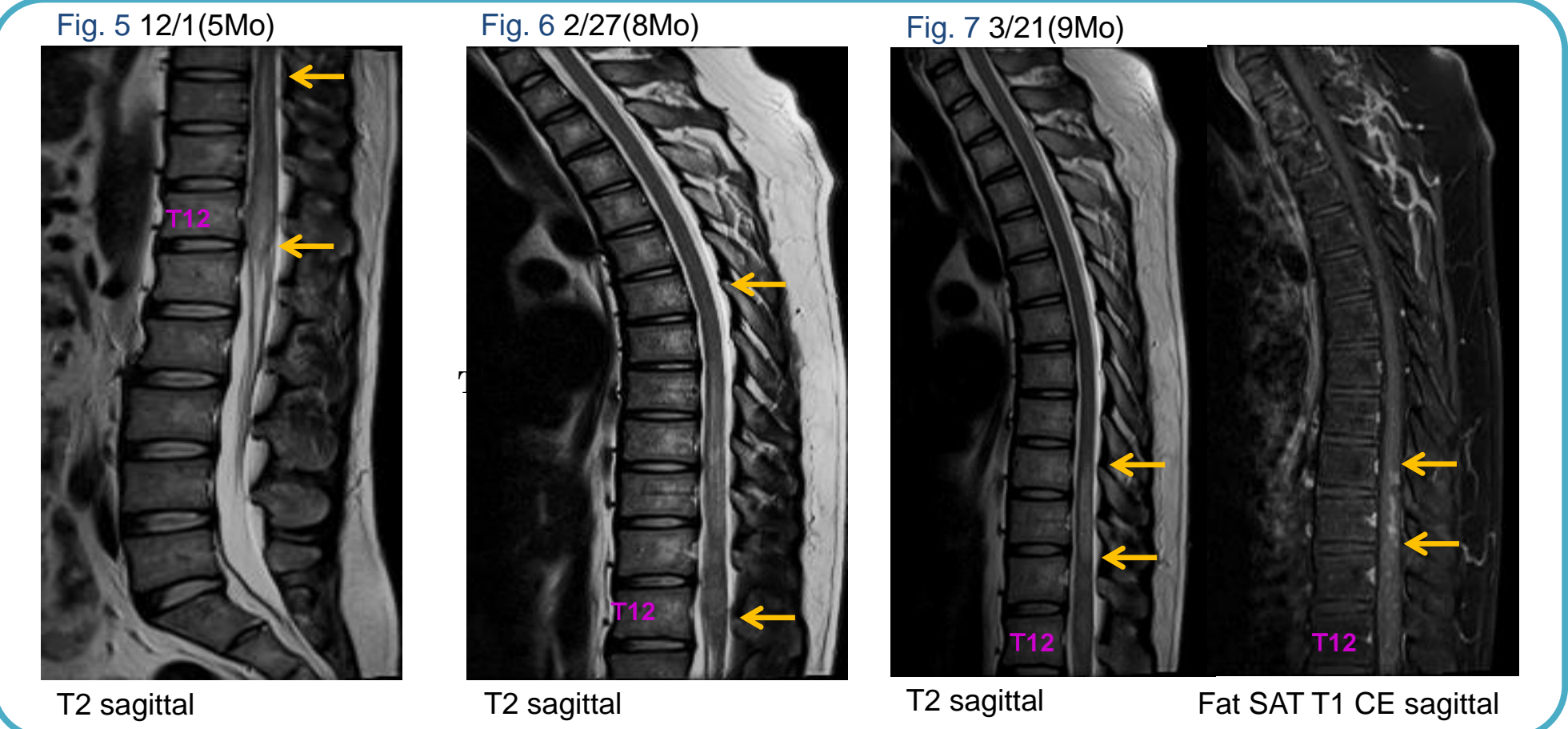
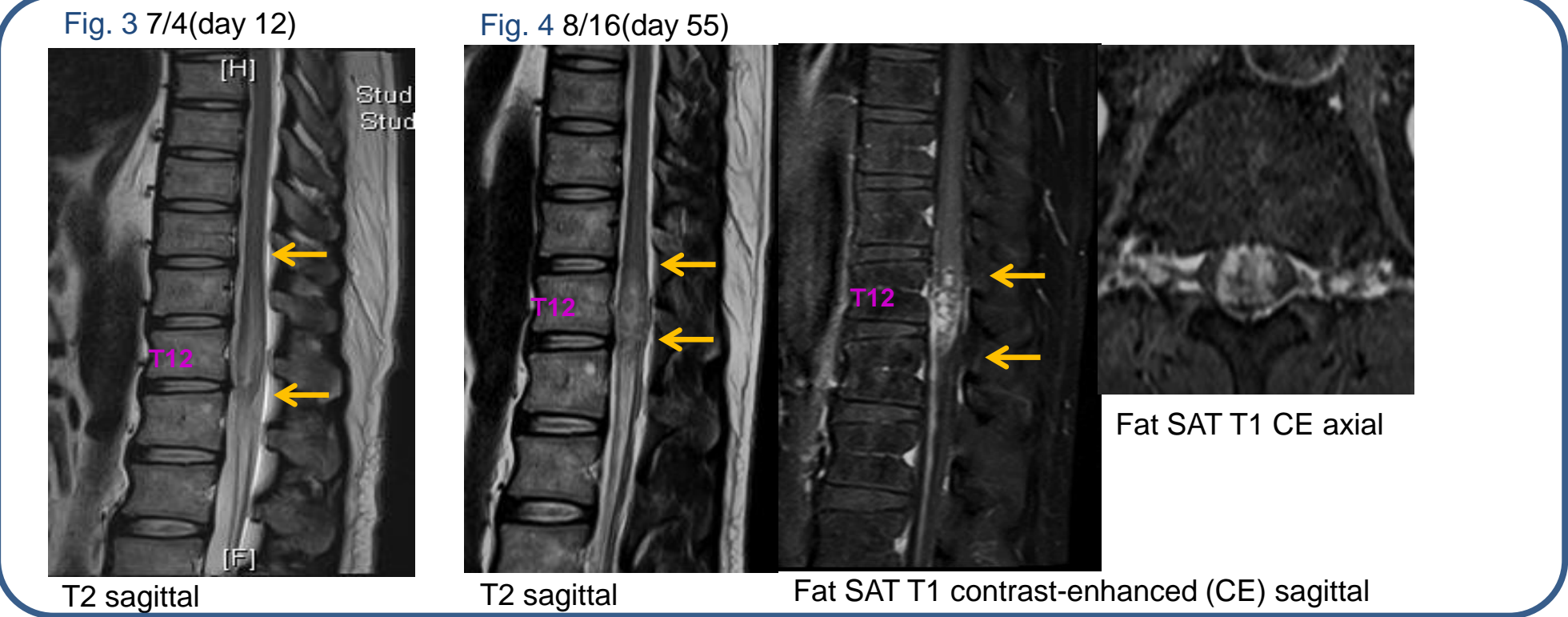


Fig. 8 8/28(14Mo)



MRI on day 35 showed that the lesion had grown. Steroid pulse treatment was added, and his symptoms and MRI findings partially improved: downsize of abnormal lesion. (Fig. 4) However, after 5 months, he had difficulty standing, and the MRI findings had worsened. (Fig. 5) Although this symptom improved, he had difficulty walking 2 months later. Furthermore, MRI findings had worsened. (Fig. 6) Steroid pulse treatment improved his symptoms and MRI findings. (Fig. 7, 8) He was then diagnosed as MS. (Table. 4)

Table 4: diagnosis of MS

Date	MRI finding	Timeline	Laboratory data
7/4(fig.3)	Th11-12 T2high-intensity lesion spine cord swelling	bilateral lower limb weakness (MMT2-4) bladder rectal disorder	herpesvirus negative cytomegalovirus negative tuberculosis negative parasite negative
8/16(fig.4)	downsize of abnormal lesion T12 CE (+) lesion	7/4-7/28 HBO symptom improved	
9/12	brain MRI normal	Nov. LBP, rt lower ext. weakness difficulty in standing	
12/1(Fig.5)	enlargement of abnormal lesion	symptom improved	
2/27(Fig.6)	Th6-12 T2high-intensity lesion	Feb. difficulty in gait	
3/21(Fig.7)	Th9-10 CE (+) lesion		3/19 lumbar puncture myelin basic protein high oligoclonal bands positive
8/28(Fig.8)	abnormal lesion (-)	symptom improved	NMO-IgG negative

Table 4. The 2005 Revisions to the McDonald Diagnostic Criteria for Multiple Sclerosis

Clinical Presentation	Additional Data Needed for MS Diagnosis
Two or more attacks ^a ; objective clinical evidence of two or more lesions	None ^b
Two or more attacks ^a ; objective clinical evidence of one lesion	Dissemination in space, demonstrated by: • MRI ^c or • Two or more MRI-detected lesions consistent with MS plus positive CSF ^d or • Await further clinical attack ^a implicating a different site
One attack ^a ; objective clinical evidence of two or more lesions	Dissemination in time, demonstrated by: • MRI ^c or • Second clinical attack ^a
One attack ^a ; objective clinical evidence of one lesion (monosymptomatic presentation; clinically isolated syndrome)	Dissemination in space, demonstrated by: • MRI ^c or • Two or more MRI-detected lesions consistent with MS plus positive CSF ^d and Dissemination in time, demonstrated by: • MRI ^c or • Second clinical attack ^a
Insidious neurological progression suggestive of MS	One year of disease progression (retrospectively or prospectively determined) and Two of the following: a. Positive brain MRI (nine T2 lesions or four or more T2 lesions with positive VEP) ^f b. Positive spinal cord MRI (two focal T2 lesions) c. Positive CSF ^d

quote from reference 2

Recently other neurologist diagnosed him as neuromyelitis optica (NMO) spectrum disorders and treated as NMO. It's sometimes difficult to distinguish NMO from MS. However, in either case, he should not be diagnosed as DCS.

Discussion: This case was atypical for severe spinal cord DCS for the following points:

1. Gradual disease progression

Severe manifestations of DCS typically develop rapidly after diving. In this case onset time was ordinary, however bladder rectal disorder and muscle weakness appeared over 1 week after diving.

2. Insufficient response to HBO treatment

His symptoms did not improve satisfactorily by HBO treatment. We thought that it was because of delayed HBO treatment at that time.

Conclusion: DCS that has a poor response to HBO treatment requires differential diagnosis of myelitis including MS, NMO.

References

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