

Introduction

Subacute posttraumatic ascending myelopathy (SPAM) is a rare event that occurs after spinal cord trauma or ischemia. Here, we review all reported cases of SPAM and discuss the possible pathological mechanisms of this rare condition. We also present an unusual case of SPAM after a gunshot wound to the spine.

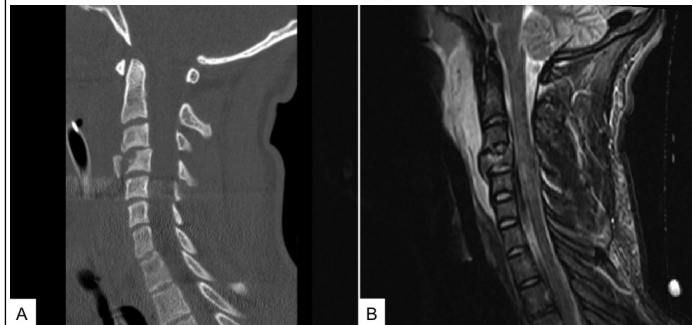
Methods

We summarize the full body of available literature on SPAM published in English. We show the initial level and severity of all initial injuries, and describe the progression and recovery demonstrated in each case. We also describe a case of SPAM treated by the authors that illustrates several common and uncommon aspects of SPAM.

Results

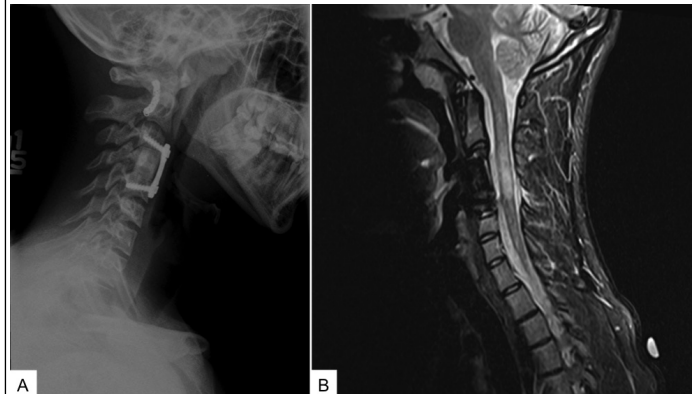
The English literature contains 27 descriptions of SPAM, most of which presented with complete SCI. The time from injury to deterioration varied from 2 to 86 days and several patients exhibited spontaneous recovery. In our case, an 18-year-old male presented after a gunshot wound to the neck. He sustained a fracture to C4 and MRI showed subtle T2 changes within the spinal cord centered at C4/5. He was free from long track signs from time of admission to discharge 2 weeks later. Seven weeks later, he developed progressive severe myelopathy and weakness. MRI performed at that time revealed T2 signal change from C2 to C6 without evidence of syrinx or spinal cord compression. His myelopathy spontaneously improved over several weeks.

Figure 1 - Preoperative imaging



A: Sagittal CT scan showing comminuted fracture of the C4 vertebral body after GSW to the neck. B: Sagittal T2 MRI showing subtle T2 signal change below C4.

Figure 2 - Postoperative imaging



A: Lateral radiograph obtained nine weeks after surgery showing good placement of hardware with no evident complication. B: MRI showing extensive T2 changes from C2 to upper C6 corresponding to the patient's delayed onset of myelopathy.

Conclusions

The pathologic causes of SPAM are unknown, but several hypotheses have been put forth: anterior spinal artery thrombosis, delayed secondary injury, an autoimmune phenomenon or disruption of normal CSF flow. Clinicians must be vigilant in the days and weeks after SCI, and patients should be counseled appropriately, so that SPAM is properly recognized and treatment trials can be carried out.

Table 1 - All reported cases of SPAM

Article	Age/sex	Mechanism	Degree of SCI	Initial Spinal Level	Superior Extent of SPAM (either imaging or clinical)	Symptoms of SPAM	Time until decline (days)
Frankel (1969)	40/U	Fracture	C	T12	T5	Rising sensory level	6
	28/U	Fracture/dis	C	T12	T7	Rising sensory level	2
	20/U	Fracture	C	L1	T5	Rising sensory level	6
	43/U	Fracture/dis	C	L1	T7	Rising sensory level	11
	23/U	Fracture/dis	C	L4	C8	Rising sensory level	2
	45/U	Fracture/dis	C	L2	C7	Rising sensory level	8
Aito et al. (1999)	30/F	MVA	C	T11	C4	UE numbness	14
Belanger et al. (2000)	21/M	Fall	C	C7	Medulla	Respiratory decline	7
	44/M	Fall	I	L1	C3	UE weakness	8
	25/M	Fall	C	T6	C3	UE weakness and numbness	13
Al-Ghatany et al. (2005)	37/M	MVA	C	T4	C5	UE paresthesias, hand weakness	12
Schmidt (2006)	35/F	Hyperflexion	C	T11	C5	T5 sensory level	14
Planner et al. (2008)	43/F	MVA	C	C4/5	Foramen Magnum	C4 symptoms	10
	18/M	MVA	C	C3/4	Medulla	Dysphagia, respiratory decline	14
	49/M	MVA	C	C6	C2	Neck/shoulder pain	69
	39/M	MVA	C	C5	Foramen Magnum	None	16
	24/M	MVA	C	T4	C2	Shoulder pain	86
	23/M	MVA	C	C5	Foramen Magnum	Respiratory decline	12
	47/M	GSW	C	T4	Medulla	Respiratory decline	36
	30/M	Fall	C	C5	Foramen Magnum	C3 symptoms	7
32/M	Vascular Inj.	C	C5	Foramen Magnum	Shoulder pain, UE sensory symptoms	8	
Meagher et al. (2012)	21/F	Fall	C	C6	Medulla	C4 symptoms	4
	23/M	MVA	C	C4	Foramen Magnum	None	13
Meagher et al. (2012)	38/M	MVA	C	T4	C4	UE weakness and numbness	23
Kovanda et al. (2014)	15/M	MVA	C	T4	C3	UE weakness	38
Okada et al. (2014)	75/F	MVA	C	T8	C2	UE weakness, respiratory decline	4
This Case	18/M	GSW	I	C4	C2	Bilateral UE weakness, long-tract signs of myelopathy	42

SPAM=sub-acute posttraumatic ascending myelopathy, U=unknown, MVA=motor vehicle accident, GSW=gunshot wound, Fracture/dis=Fracture/dislocation, C=complete, I=incomplete, UE=upper extremity

Learning Objectives

- Understand the presentation and clinical course of SPAM
- Explain possible pathophysiologic mechanisms of SPAM