Case Report

Acute abdominal pain: chameleon presentations of acute myelitis

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Abstract

Patients with acute abdominal pain typically undergo urgent clinical assessment to exclude serious underlying surgical diagnoses. However, a diverse range of less common medical conditions may also present with abdominal pain and their severity can range from benign to life threatening. Here we present a case of myelitis (inflammation of the spinal cord) presenting with acute abdominal pain that was initially diagnosed clinically as biliary pathology. We review the canonical differential diagnosis for medical causes of acute abdominal pain and highlight the clinical features that raise the suspicion of spinal pathology. We argue that awareness of the basic clinical features of structural and inflammatory spinal lesions could improve early recognition of these potentially overlooked diseases.

Keywords

Abdominal, pain, spinal, myelopathy, myelitis

Key points

- Patients presenting with abdominal pain that has a burning or girdle-like quality, or is associated with lower limb neurological symptoms, should be examined for clinical evidence of myelopathy.
- Causes of myelopathy (including myelitis) should be considered among the medical causes of abdominal pain.
- The investigation of choice is an MRI of the whole spine, to confirm and characterise the neurological cause for their pain.

Case history

A 49-year-old woman presented to ambulatory emergency care (AEC) with abdominal pain and sensory disturbance. She had been seen in the emergency department (ED) three days earlier, complaining of sudden-onset, bilateral, upper abdominal discomfort, described as "like a band". This began approximately 1 hour after eating a light lunch. The pain then gradually migrated to the right upper quadrant and was described as "a constant ache" with unpredictable exacerbations of 10/10 severity that had her "doubled over". It improved gradually over the course of the day, but then appeared to be exacerbated by eating a small amount of chocolate in the early evening. Thinking the pain was gastric in nature, she took over-the-counter antacids with no relief. She did not report systemic upset (including fevers or rigors), nausea and vomiting, urinary symptoms, or bowel dysfunction. She did, however, report some paraesthesias down her right leg, which she attributed to a "trapped nerve" in the context of feeling "tense". A similar episode of pain two weeks ago had resolved spontaneously. Her clinical examination (which on this initial encounter did not include thorough neurological assessment), ECG and blood tests were all found to be normal and she was referred back to primary care with a clinical diagnosis of biliary colic.

Three days later she presented to her GP complaining of ongoing abdominal pain, now associated with worsening sensory disturbance. She described feeling as though she had "one hot leg and one cold leg", noting that she was unable to feel the cold breeze against her right leg. She had also found that flexion of her neck produced shooting pains along the right leg and arm (Lhermitte's sign), but denied motor, bladder or bowel disturbance. Her past medical history included migraines for which she took 75mg aspirin daily as prophylaxis, and she also took the progesterone-only contraceptive pill. She stopped smoking 10 years earlier, drank alcohol infrequently, lived with her husband, and worked in administration. She was referred to AEC for further assessment where the vital signs and abdomen examination were normal. Neurological examination, however, revealed patchy sensory disturbance to a sensory level in the upper abdomen (T6/7) associated with pathologically brisk deep tendon reflexes most pronounced in the right leg, though both plantar responses were down-going.

MR imaging of the brain and whole spine revealed an enhancing T2 hyperintense lesion in her mid-thoracic cord, which was felt to explain her symptoms (Figure 1). On review of an MRI

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Figure 1. T2 weighted magnetic resonance imaging (MRI) of the mid-thoracic spine showing a short inflammatory lesion in the thoracic cord consistent with myelitis.

performed seven years previously for recurrent headaches and mild sensory disturbance there was evidence of subtle T2 hyperintensities. Together these were felt to represent dissemination in time and space, thus consistent with a diagnosis of relapsing and remitting multiple sclerosis.

Discussion

Acute abdominal pain

The case presented provides an example of spinal pathology, specifically an inflammatory lesion of the cord known as myelitis, presenting acutely to hospital with with abdominal pain. Acute abdominal pain is typically assessed in the emergency department or by general surgeons. The clinical approach centres on exclusion of acute surgical pathology such as peritonitis, appendicitis, cholecystitis, pancreatitis and many others. The majority of these pathologies are associated with an abnormal abdominal examination and/or deranged first line bloods (in particular inflammatory markers or liver function tests). In our case, while abdominal pain was the prominent feature of their presentation, there was a notable absence of focal or severe tenderness on abdominal examination, and unremarkable bloods. Such presentations are commonplace in the emergency department and often receive a diagnosis of mild or benign disorders such as biliary colic and

Table 1. Causes of acute upper abdominal pain

Gastrointestinal	Hepatopancreatobiliary	Splenic	Cardiopulmonary
GORD	Biliary colic	Infarction	Ischaemic heart disease
Peptic ulcer disease	Cholecystitis	Abscess	Pericarditis
Constipation	Cholangitis	Rupture	Lower lobe pneumonia
Gastritis, gastroenteritis and colitis	Pancreatitis		Pulmonary embolism
Ischaemia	Hepatitis		
Obstruction	Budd chiari syndrome and portal vein thrombosis		
Peritonitis			
Endocrinopathy	**Neurological**	**Rare and miscellaneous**	
Addison's disease	Radiculopathy	Acute porphyria.	Lead and iron poisoning
Diabetic ketoacidosis	Myelopathy	Periodic fever syndromes.	Functional
Hypercalcaemia		Hereditary angioedema	
Hypothyroidism		Paroxysmal nocturnal haemoglobinuria	

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gastro-oesophageal reflux disease that are better worked-up or managed in primary care.

Some cases of recurrent, unusual or "scan-negative" abdominal pain may be referred under the care of acute physicians and gastroenterologists. Medical causes are exceedingly diverse, and identifying the underlying diagnosis often requires a high index of suspicion. In the case presented the pain was localised to the upper abdomen. Anatomically, the upper abdomen is home to the liver, biliary system, stomach, duodenum, pancreas and spleen. These structures of the embryonic foregut classically refer a non-specific discomfort to the epigastrium, and pain may become more focal or lateralised with irritation of the parietal peritoneum. It is also important to consider chest pathology, including cardiac pain and lower lobe lung pain, that may be felt as upper abdominal pain. The common causes of upper abdominal pain are listed in table 1, as are important medical differentials that present without a localising organ such as diabetic ketoacidosis and adrenal insufficiency. Also included are rare hereditary and genetic disorders causing episodic abdominal pain such as hereditary angioedema, acute intermittent porphyria and familial mediterranean fever. Finally, in the right clinical context, a diagnosis of a functional gastrointestinal disorder (FGID), as defined most recently in the Rome IV criteria, should be considered.[1]

Myelopathy, Myelitis and their initial work-up

Myelitis is a term used to describe inflammation of the spinal cord parenchyma, usually due to an infective, post-infective or autoimmune process. Patients with myelitis present with myelopathy, a clinical syndrome characterised by upper motor neuron signs bilaterally in the lower limbs, a sensory level, and sphincter disturbance (urinary retention, faecal incontinence, and sexual dysfunction). In many cases, the myelopathy may be incomplete or asymmetric with clinical signs more prominent on one side. In the case of a spinal cord hemi-lesion, patients present with the classical Brown-Séquard syndrome of ipsilateral pyramidal weakness and dorsal column sensory loss (fine touch and proprioception) associated with contralateral loss of spinothalamic sensation (pain and temperature). Despite the somewhat patchy presentations described in our case, the combination of a sensory level and lower limb reflex abnormalities helped to highlight the presence of an underlying spinal lesion.

In patients presenting acutely with clinical myelopathy it is important to first exclude compression by a structural lesion that may require urgent surgical intervention such as spinal tumours, epidural abscesses, and bony disease of the spinal column. In many cases, the time-course of onset can be a crucial clinical pointer. Hyperacute disease is more commonly musculoskeletal or vascular in origin, including spinal cord infarction or haemorrhage, whereas a more acute and subacute tempo suggests myelitis due to infection or inflammation, or high-grade neoplasia.[2] In almost all cases, the first line investigation of choice is an MRI scan of the whole spine. This will not only show any compressive lesion, but it will also show many intrinsic lesions of the cord and roots. Once a suspected inflammatory lesion has been demonstrated on imaging, the differential diagnosis narrows. In our case, the lesion was short (less than three spinal segments), whereas in some it may be described as longitudinally extensive (three or more spinal segments). The extent of the myelitis lesion, as well as patterns of gadolinium contrast enhancement, help to hone-in further on the underlying cause, with the shorter lesions more suggestive of Multiple Sclerosis (MS), and longer ones of Neuromyelitis Optica Spectrum Disorder (NMOSD).[2] A wider differential diagnosis of intrinsic spinal cord lesions is shown in Table 2.

Table 2. Causes of acute spinal lesions

Short (<3 spinal segments)	Long (>3 spinal segments)
Multiple sclerosis	Neuromyelitis optica spectrum disorder
Autoimmune	Autoimmune
Infective, most commonly viral or atypical bacteria	Infective, most commonly viral
	Acute disseminated encephalomyelitis
	Sarcoidosis
	Vascular > Infarction > Malformation
	Neoplastic > Ependymoma

Neurological causes of abdominal pain

Neurological disease presenting with abdominal pain is widely recognised, though disease processes localising to nerve roots (radiculopathies) and ganglia (gangliopathies) are more classically associated with pain.[3] Examples include spinal disc herniation, diabetic radiculopathy, Guillain Barre Syndrome, herpes zoster, and Lyme radiculitis. With the exception of Zoster, the majority of these more commonly affect the lumbar and sacral regions causing sciatica-like symptoms, but may also manifest with abdominal pain due to thoracic root involvement. Unlike myelopathic lesions, however,

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pathology affecting only the roots and ganglia will not result in neurological signs below the level of the lesion. Pain associated with myelitis and other intrinsic spinal lesions is well described anecdotally, and isolated descriptions are found throughout the published literature,[4–8] though this phenomenon does not appear to have been systematically characterised. Writing in 1935, American Gastroenterologist Everett Kiefer remarked that spinal abdominal pain often has a girdle-like quality, tends not to be fixed in its position (unlike migratory pains coming from the abdominal viscera), and may be associated with neurological symptoms in the lower limbs.[9]

In our case the patient describes this typical band-like pain that appeared to wax and wane without any clear exacerbating or relieving factors. She also described sensory changes in her legs which likely represented early myelopathy. As an aside, although not described in our case, autonomic dysreflexia and area postrema syndrome, both well reported in longitudinally extensive transverse myelitis due to NMOSD,[10-11] may further distract from a neurological pathology if present, with the former mimicking the haemodynamic abnormalities of systemic sepsis and the latter characterised by refractory nausea, vomiting and/or hiccups which may further anchor clinicians to the abdomen.

Summary

Patients presenting with abdominal pain that has a burning or girdle-like quality, or is associated with lower limb neurological symptoms, should be examined for clinical evidence of myelopathy, especially if first line investigations are unrevealing. Neurological pathologies affecting either the spinal cord or nerve roots should be included among the medical causes of abdominal pain, to prompt clinicians to consider these diagnoses in the correct clinical context. If suggestive, patients should undergo MRI of the whole spine, to confirm and characterise the neurological cause for their pain, and onward referral to neurological or spinal surgical services should be made as appropriate.

Declaration of competing interests

Nothing to declare

References

1. Schmulson MJ, Drossman DA. What Is New in Rome IV. *J Neurogastroenterol Motil.* 2017;**23(2)**:151.
2. Mariano R, Flanagan EP, Weinshenker BG, *et al.* A practical approach to the diagnosis of spinal cord lesions. *Pract Neurol.* 2018;**18(3)**:187-200.
3. Song KS, Cho JH, Hong JY, *et al.* Neuropathic pain related with spinal disorders: A systematic review. *Asian Spine J.* 2017;**11(4)**:661-674.
4. Hamodat H, Tran A. Neurosarcoidosis resulting in thoracic radiculopathy: A case report. *J Med Case Rep.* 2019;**13(1)**.
5. Lin CC, Liu CP, Lee CM, *et al.* Atypical presentation of spinal epidural abscess - Prolonged and intractable abdominal pain. *Int J Gerontol.* 2009;**3(4)**:244-247.
6. Nomura S, Shimakawa S, Kashiwagi, *et al.* Acute abdominal pain as the only symptom of a thoracic demyelinating lesion in multiple sclerosis. *Brain Dev.* 2015;**37(10)**.
7. Luney M, Adiamah A, Pearson L. Thoracic spondylodiscitis presenting as abdominal pain. *BMJ Case Rep.* 2016;2016.
8. Park JE, Chung ME, Song DH *et al.* Inexplicable abdominal pain due to thoracic spinal cord tumor. *Ann Rehabil Med.* 2014;**38(2)**:273-276.
9. Kiefer ED. Abdominal pain as a misleading symptom of spinal cord lesions. *Am J Dig Dis.* 1935;**2(9)**:520-526.
10. Furlan JC. Autonomic dysreflexia following acute myelitis due to neuromyelitis optica. *Mult Scler Relat Disord.* 2018;**23**:1-3.
11. Shosha E, Dubey D, Palace J, *et al.* Area postrema syndrome: Frequency, criteria, and severity in AQP4-IgG-positive NMOSD. *Neurology.* 2018;**91(17)**:E1642-E1651.

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