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## Abdominal pain of thoracic spine origin in a 17 year-old boy: a case presentation

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**Abdominal pain and abdominal wall pain can be caused by thoracic spine abnormality and dysfunction. It is a relatively rare condition which needs to be considered, especially when abdominal pain is not explained by gastrointestinal and surgical work up. This is a case presentation of a 17 year-old boy suffering from severe abdominal pain of unexplained origin, which caused several months of missed school and physical activities. The patient was successfully diagnosed and treated with satisfactory outcome after hospitalization, on outpatient basis in a physiatrist's office. The clinical presentation, history of present illness, diagnostic studies, physical examination and treatment with outcome are described in the article.**

### Introduction

Abdominal pain of unknown etiology may be confused with an abdominal wall pain due to thoracic spine dysfunction [1,2]. When there is no known etiology of the visceral pain, the musculoskeletal abdominal wall pain needs to be considered to avoid unnecessary diagnostic testing, surgical procedures and mistaken assumption of psychosomatic syndrome [1-5]. This condition has been described 80 years ago and is still often forgotten in modern medicine [3].

We are presenting an unusual case of a 17 year-old male with history of severe abdominal pain, which persisted for a few months and remained unchanged at a level of 8/10 (on a scale of 0–10) after hospitalization, treatment with oral corticosteroids, anti-depressants and anxiolytic medications. During hospitalization, several diagnostic studies did not identify the source of pain. Abdominal XR, CT SCAN, blood work, medical and surgical evaluations were negative. The patient did not complain of cervical, thoracic or lumbar spine pain. Spine XR and MRI studies were within normal limits. EMG/NCV was positive for T7-T10 paraspinal muscles denervation pattern bilaterally. The treatment with fluoroscopy guided thoracic lateral facet joint injections resulted in complete alleviation of abdominal pain and full recovery of function.

### Case presentation

A 17 year-old boy developed severe abdominal pain in right lower quadrant,

**Bóle jamy brzusznej o niewyjaśnionej etiologii mogą pochodzić z kręgosłupa piersiowego. Przedstawiamy stosunkowo rzadki przypadek przewlekłych bólów brzucha o nieustalonej przyczynie – badania diagnostyczne nie wykazywały żadnych nieprawidłowości. Pacjent to 17-letni chłopiec, który przez blisko sześć miesięcy cierpiał na silne bóle brzucha, z powodu których nie był w stanie uczęszczać ani na zajęcia szkolne, ani na sportowe. Podczas hospitalizacji nie udało się określić etiologii bólów brzucha. Pacjent został zdiagnozowany i był skutecznie leczony w gabinecie ambulatoryjnym specjalisty w dziedzinie medycyny fizykanej i rehabilitacji. Poniżej omówiono historię choroby, badanie fizykalne, badania diagnostyczne oraz leczenie i wynik postępowania terapeutycznego.**

right upper quadrant, suprapubic and in midline. The pain was described as stabbing, gnawing and burning. The pain was constant, aggravated by walking or driving over street bumps. He denied trauma, accident or injury. He admitted that the day before onset of his signs and symptoms he was playing drums in a marching band. He stated the drums weigh about 40 lbs and they were suspended on his body with a harness mechanism. He contacted his pediatrician and also a gastroenterologist and was treated with Medrol dose pack, Amitriptyline and Nexium. The pain was not improving and had progressed to the point that the patient was hospitalized. All diagnostic studies performed during hospitalization were negative: CBC, CMP, UA, abdominal ultrasound, appendix ultrasound, stool test and cultures, endoscopy and colonoscopy. The patient had no chills, sweats, nausea, vomiting, diarrhea and constipation. He was afebrile and vital signs were stable. He was discharged home with the recommendation of daily oral Amitriptyline. He was unable to attend school or perform any physical activities for several months after being discharged from the hospital due to painful symptoms. He presented to an outpatient Physical Medicine and Rehabilitation (PMR) specialist's office. On physical examination, he appeared to be in emotional distress due to pain. vital signs were within normal limits: Pain scale 5–8, BP 107/64, HR 100, Ht 5 ft 10 in, Wt 108, BMI 15.49, Wt % 2.57, BMI % 0.05, Ht % 63.08.

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Physical examination: musculoskeletal and neurological examination was within normal limits except for thoracic kyphosis – most likely secondary to seeking position of comfort. The thoracic kyphosis was easily corrected by voluntary posture control [6]. Patient denied spine pain and there was no pain on palpation at the cervical, thoracic or lumbar spine.

Diagnostic studies obtained on outpatient basis included imaging and electrodiagnostic testing. Imaging studies: thoracic spine XR and thoracic spine MRI which were within normal limits.

Electrodiagnostic testing included ANS (autonomic nervous system study) which was within normal limits. Thoracic and lumbar paraspinals as well as bilateral lower extremity EMG/NCV was positive for bilateral T7-T10 thoracic paraspinal denervation pattern with normal nerve conduction study.

### Treatment

Based on distribution of pain and EMG/NCV demonstrating positive for bilateral T7-T10 thoracic paraspinals denervation pattern, we decided to perform diagnostic thoracic medial branch block with 1% Lidocaine.

Fluoroscopy guided right and left T7 Diagnostic Medial Branch Block with 1cc of 1% Lidocaine to each site brought immediate and complete resolution of pain, which lasted three weeks. When the pain came back three weeks later, it was less severe than originally, rated at level 4/10 (scale 0 to 10) and was successfully treated with an injectable corticosteroid, Dexamethasone. The distribution of pain was limited to the lower abdominal wall; therefore, lower level of thoracic spine injection site was chosen at that time – bilateral T11-12 facet joints [3].

Fluoroscopy guided right and left T12 Therapeutic Medial Branch Block was performed with 4 mg of Dexamethasone/1 cc to each level which brought complete resolution of pain for next six weeks. After six weeks the discomfort came back, rated at 5–6/10. The patient and his mother were given option of treatment with bilateral T12 MB radiofrequency ablation (RFA) or autologous Platelet Rich Plasma (PRP) injection.

Fluoroscopy guided right and left T12 Therapeutic Medial Branch Block with PRP (autologous platelet rich plasma) brought complete resolution of pain [7-13].

At this time, eight weeks later, the patient is asymptomatic, fully functional at school and proficient with sports activities.

### Discussion

Unexplained abdominal pain may be a neurogenic pain of thoracic spine origin [1-5]. Dysfunctional thoracic spine may be

difficult to diagnose especially when the patient denies spine pain, there is no pain on palpation, and imaging diagnostic studies remain within normal limits. Electrodiagnostic studies may be helpful in establishing an accurate diagnosis, however they are often negative as well. It is important to consider lateral facet syndrome of the thoracic spine, which may cause abdominal pain. In this case diagnostic medial branch block (MBB) at bilateral T6-7 lateral facet joint injections (Bilateral T7 MBB) alleviated 100% of the pain on a temporary basis for three weeks and confirmed the diagnosis [1,14,15]. The Therapeutic MBB with Dexamethasone performed at T11-T12 lateral facet joint injections bilaterally (T12 MBB) alleviated the remaining pain, also on a temporary basis, for six weeks. The distal levels T11-12 were chosen based on the distribution of pain [1,2,14-16]. Final, long-lasting resolution of pain in this case was achieved with use of regenerative rather than anti-inflammatory solution: autogenous PRP. Other possible interventional treatment options include thoracic medial branch radiofrequency ablation (MB RFA). Physical therapy has a role in strengthening of the paraspinal muscles, posture control, body mechanics and work/sports conditioning programs.

### Conclusions

It is important to remember musculoskeletal sources of unexplained abdominal pain [17,18]. Often the imaging diagnostic studies are within normal limits and diagnosis remains clinical [1-3]. Diagnostic medial branch blocks and lateral facet joint injections may confirm the suspected diagnosis of abdominal pain of thoracic spine origin [14-16]. Sometimes pain relief after an injection of a local anesthetic lasts longer than just the duration of action of medication used, in this case 1% Lidocaine. In addition to local anesthetics, anti-inflammatory injectable medications, regenerative agents (autologous PRP and stem cells) and radiofrequency ablation may be effective as therapeutic tools [7-9,19-22].

It is important to identify the thoracic spine origin of abdominal pain and to promptly institute an effective treatment [7-12] in order to avoid unnecessary surgery and mistaken diagnosis of psychosomatic disorder [13,23,24].

### References

1. Maigne R: Low back pain of thoracolumbar origin. *Arch Phys Med Rehabil.* 1980; 61: 389-395.
2. Maigne JY, Lazareth JP, Guérin-Surville H, Maigne R: The lateral cutaneous branches of the dorsal rami of the thoraco lumbar junction. An anatomical study on 37 dissections. *Surg Radiol Anat.* 1986; 8: 251-256.
3. Maigne R: Thoracolumbar junction syndrome a source of diagnostic error. *J Orthop Med.* 1995; 17: 84-98.

4. Srinivasan R, Greenbaum DS: Chronic abdominal wall pain: a frequently overlooked problem. *Am J Gastroenterol.* 2002; 97: 824-830.
5. Costanza CD, Longstreth GF, Liu AL: Chronic abdominal wall pain: clinical features, health care costs, and long-term outcome. *Clin Gastroenterol Hepatol.* 2004; 2: 395-399.
6. Ussher NT: Spinal curvature-visceral disturbances in relation Thereto. *Cal West Med.* 1933; 38: 423-428.
7. Manchikanti L, Falco FJ, Singh V, Benyamin RM, Racz GB, et al: Comprehensive evidence based guidelines for interventional techniques in the management of chronic spinal pain. *Pain Physician* 2009; 12: 699-802.
8. Polatin PB, Kinney RK, Gatchel RJ, Lillo E, Mayer TG: Psychiatric illness and chronic low back pain: The mind and the spine – which goes first? *Spine* 1993; 18: 66-71.
9. Pneumaticos SG, Chatziioannou SN, Hipp JA, Moore WH, Esses SI: Low back pain: prediction of short-term outcome of facet joint injection with bone scintigraphy. *Radiology* 2006; 238: 693-698.
10. Bellini M, Barbieri M: Percutaneous cryoanalgesia in pain management: a case series. *Anesthesiol Intensive Ther.* 2015; 47: 333-335.
11. Dahl MC, Freeman AL: Kinematic and fatigue biomechanics of an interpositional facet arthroplasty device. *Spine J.* 2016; 16: 531-539.
12. Ashby EC: Abdominal pain of spinal origin. Value of intercostal block. *Ann R Coll Surg Engl.* 1977; 59: 242-246.
13. Sharpstone D, Colin-Jones DG: Chronic, non-visceral pain. *Gut* 1994; 35: 833-836.
14. Rubin D: Epidemiology and risk factors for spine pain. *Neurol Clin.* 2007; 25: 353-371.
15. Cohen SP, Raja SN: Pathogenesis, diagnosis and treatment of lumbar zygapophyseal (facet) joint pain. *Anesthesiology* 2007; 106: 591-614.
16. Grober LJ, Robertson PA, Novotny JE, Pope MH: Etiology of spondylolisthesis: Assessment of the role played by lumbar facet joint morphology. *Spine* 1993; 18: 80-91.
17. Melnick J: Treatment of trigger mechanisms in gastrointestinal disease. *N Y State J Med.* 1954; 54: 1324-1330.
18. Cope Z: Cope's early diagnosis of the acute abdomen. Oxford University Press 1974.
19. Cavanaugh JM, Ozaktay AC, Yamashita HT, Aramov A, Getchell TV, et al: Mechanisms of low back pain: A neurophysiologic and neuroanatomic study. *Clin Orthop Relat Res.* 1997; 335: 166-180.
20. Helbig T, Lee CK: The lumbar facet syndrome. *Spine.* 1988; 13: 61-64.
21. Czervionke LF, Fenton DS: Fat-saturated MR imaging in the detection of inflammatory facet arthropathy (facet synovitis) in the lumbar spine. *Pain Med.* 2008; 9: 40-46.
22. Lakemeier S, Line M, Schultz W, Fuchs-Winklemass S, Timmesfeld N, et al: A comparison of intraarticular lumbar facet joint steroid injections and lumbar facet joint radiofrequency denervation in the treatment of low back pain: a randomized, controlled, double blind trial. *Anesth Analg.* 2013; 117: 228-835.
23. Rodeghero JR, Denninger TR, Ross MD: Abdominal pain in physical therapy practice: 3 patient cases. *J Orthop Sports Phys Ther.* 2013; 43: 44-49.
24. Gallegos NC, Hobsley M: Recognition and treatment of abdominal wall pain. *J R Soc Med.* 1989; 82: 343-344.