

Twelfth rib syndrome: a case report

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journals.sagepub.com/home/imr**Jaewoong Jung, Misoon Lee  and Dasom Choi**

Abstract

Twelfth rib syndrome is a rare condition that causes severe pain in the loin. The diagnosis of this phenomenon is based on the patient's medical history and physical examination findings. However, many clinicians still lack an understanding of the disease; this delays an accurate diagnosis, causing patients to experience prolonged pain without proper treatment. We herein describe a 72-year-old woman and a 47-year-old woman with loin pain. They had undergone various imaging tests, but the cause of the pain remained unknown. Their pain was reproduced by the hooking maneuver, and twelfth rib syndrome was diagnosed. Both patients were immediately relieved of pain after a twelfth intercostal nerve block. Early diagnosis and appropriate treatment are needed for pain relief in patients with twelfth rib syndrome.

Keywords

Musculoskeletal pain, intercostal nerves, nerve block, twelfth rib syndrome, hooking maneuver, loin pain

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Introduction

Loin pain is most commonly associated with renal disease, particularly renal stones.¹ Therefore, patients with loin pain are often referred to a urology clinic to identify the origin of the pain. Other causes include abdominal aortic dissection, herpes zoster, muscular pain, rib fractures, and a fracture of a transverse process of a thoracic or lumbar vertebra.

Twelfth rib syndrome is also a cause of loin pain. Its clinical manifestation is pain in the loin with or without suprapubic or

groin pain.² The pain is intermittent or continuous and is described as a sharp ache, dull ache, or both³ for weeks or years.

Department of Anesthesiology and Pain Medicine,
Soonchunhyang University Bucheon Hospital,
Soonchunhyang University College of Medicine, Bucheon,
Republic of Korea

Corresponding author:

Misoon Lee, Department of Anesthesiology and Pain
Medicine, Soonchunhyang University Bucheon Hospital,
Soonchunhyang University College of Medicine, 170
Jomaru-ro, Bucheon 14584, Republic of Korea.
Email: misoonlee@schmc.ac.kr



The pathophysiology is assumed to involve irritation of the subcostal nerve by the highly mobile twelfth rib,⁴ which has a unique anatomy as a so-called “floating rib.” Although twelfth rib syndrome seems to be quite common, it is often overlooked⁵ and takes a long time to diagnose. The diagnosis depends on clinical symptoms and exclusion of other causes, and it is confirmed by the “hooking maneuver,” which was first described in 1977.⁶ The maneuver is positive when pain is reproduced by placing the hands under the lower costal margin on the side of the pain and drawing them anteriorly.⁷ Although this is a diagnostic method, it does not exclude other diseases.⁸

We herein describe two patients with twelfth rib syndrome and share our experience.

Case report

Case 1

A 72-year-old woman was referred for evaluation of a 10-year history of chronic intermittent pain in the right loin. Her numeric rating scale score for pain was 7 on a scale of 0 to 10, where 0 indicates no pain and 10 indicates the worst pain, and was exacerbated by walking. She had no specific history of trauma. Before visiting the pain clinic, she had been examined by a gastroenterologist and a nephrologist. A left renal cyst and a small hepatic cyst were found in a computed tomography (CT) scan of the abdomen and kidneys. Nevertheless, the nephrologist could not identify the cause of her pain, and she was referred to a pain clinic. Physical examination revealed tenderness throughout the rib margin on the right side, and her symptoms were reproduced by the hooking maneuver. A twelfth intercostal nerve block was performed under ultrasound guidance with triamcinolone (10 mg) in 5 mL of 0.4% mepivacaine, and her pain was immediately and

completely relieved. One week later, the patient said that she was doing well without pain, and she was lost to follow-up.

Case 2

A 47-year-old woman was hospitalized for loin pain and consulted with the pain clinic because the cause of the pain had not been found despite various tests. She had a 3-month history of intermittent pain in the loin and both lower rib cages. The pain was sharp and intermittent and was aggravated by walking. Her numeric rating scale score for pain was 8. She had no history of trauma or injury. All radiological findings were normal, including an abdominal CT scan, bone scan, and X-rays of the rib cage. Physical examination revealed severe tenderness in the subcostal area that was reproduced by the hooking maneuver. Her pain was completely relieved following twelfth intercostal nerve block under ultrasound guidance using triamcinolone (10 mg) in 5 mL of 0.4% mepivacaine. She remained well without pain for 1 week, at which time she was discharged. She was thereafter lost to follow-up.

Neither patient developed complications after the intercostal nerve block. This study was approved by our institutional review board (approval No. 2020-03-014). The board waived the requirement for informed consent.

Discussion

Diagnosis of twelfth rib syndrome is based entirely on clinical symptoms and is confirmed by reproduction of the same pain via manipulation of the twelfth rib using the “hooking maneuver.” We used the hooking maneuver to diagnose two patients in whom the cause of pain could not be found. Additionally, an intercostal nerve block was performed to confirm the diagnosis and relieve the patients’ pain. The

hooking maneuver is simple and easy to perform, and the reported sensitivity of the test is 70.4%.⁹

There are generally 12 pairs of ribs, which are categorized as true, false, and floating ribs. The true ribs (ribs 1–7) are directly connected to the sternum by the costal cartilage. The false ribs (ribs 8–10) are indirectly connected to the sternum. Their costal cartilages attach to the seventh costal cartilage. The floating ribs (ribs 11 and 12) are not connected to the sternum.¹⁰ In addition to these anatomical differences, the twelfth rib is shorter than the other ribs and has only a single articular facet. However, many structures are attached to the twelfth rib, including the quadratus lumborum, costodiaphragmatic pleural recess, lumbocostal ligament, lowest levator costarum, longissimus thoracis, iliocostalis, serratus posterior inferior, latissimus dorsi, and external oblique muscle. Because of these anatomical characteristics, the twelfth rib is highly mobile and can irritate the subcostal nerve.⁴ The subcostal nerve travels with the subcostal vein and artery. It then moves posteriorly toward the kidney and anteriorly toward the quadratus lumborum and continues between the transversus abdominis and the internal oblique muscles, where it innervates the lateral abdominal wall muscles.¹¹ Thus, pain from an irritated subcostal nerve may be produced in the groin or the suprapubic area as well as in the loin area. The pain may be exaggerated by a specific motion or position change, such as lateral flexion, rotation of the trunk, or rising from a sitting position.⁴ Such patients are often referred to a urology clinic for investigation by CT or magnetic resonance imaging, which are unnecessary. The causes of their pain are not found, and the patients receive inappropriate treatment and continue to experience prolonged pain.

The initial pain treatments are conservative and include physiotherapy, application of heat and ultrasound to the affected rib,

and nonsteroidal anti-inflammatory drugs.⁵ If these treatments are ineffective, more invasive infiltration with local anesthetics such as an intercostal nerve block or costo-vertebral blocks⁴ should be considered.² In the present study, two patients were treated with an intercostal nerve block and remained pain-free for at least 1 week. The block is effective for at least the duration of the local anesthetics and often provides long-term relief,⁵ and repeated nerve blocks are required if pain recurs. Because our patients were lost to follow-up, we do not know whether the pain recurred or whether an additional nerve block was needed. This is the limitation of our study. The pain is occasionally resolved by excising the affected rib.¹² The average duration of long-term pain relief in patients with twelfth rib syndrome is reportedly 17 months,³ and that in patients with slipping rib syndrome is 2.2 years.¹³

Both urologic causes and other causes, such as twelfth rib syndrome, should be considered in patients who have loin pain in the groin or suprapubic area. Simple manipulation of the affected rib is easy and confirms twelfth rib syndrome. An early diagnosis should be made and appropriate treatment administered to relieve the pain and avoid any unnecessary examinations, costs, and time.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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ORCID iD

Misoon Lee  <https://orcid.org/0000-0001-7470-0921>

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