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A new sign of the slipping rib syndrome?

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Abstract

The slipping rib syndrome is characterized by burning pain in the lower thorax and upper abdomen, often disabling, caused by hypermobility of the costal cartilage with entrapment of the intercostal nerve. The syndrome is often underdiagnosed. The diagnosis is clinical and the definitive treatment is surgical, with an excellent result for pain relief. Based on the observation of 4 cases undergoing rib resection for SRS, we noticed a new possible sign of the disease. Our patients showed less thickness of the ipsilateral rectus abdominis muscle on ultrasound of the abdomen. The aim of this study is to demonstrate this sign in the diagnosis of SRS, to make this disease more recognizable and treatable.

Keywords: Thoracic surgery • Chest wall • Rib resection • Slipping syndrome • Thoracic pain

INTRODUCTION

The slipping rib syndrome (SRS) is characterized by intense pain in the lower rib arch radiating to the side and the upper abdomen, or by chest pain. The pain is usually intermittent and it could be very debilitating. SRS is characterized by an abnormal sliding of the costal cartilage with incarceration of the intercostal nerve, with consequent pain.

The aetiology still remains unclear but the cause could be either a congenital anomaly of the chest wall or the destruction of the fibrous articulation of the rib or their cartilage portion. The syndrome is often unilateral [1].

To date SRS is still a little known and under-diagnosed syndrome. The symptoms can be vague and the clinic can be misinterpreted.

Most of patients undergo many different tests because they are often suspected to reflect abdominal diseases or psychogenic origins.

The delayed diagnosis could seriously compromise the quality of life. The main challenge in SRS is the diagnosis, which is based on the knowledge of its existence, on the careful clinical history and on the physical examination, with the evidence of hypermobility of the lower ribcage at the Hook manoeuvre. This manoeuvre is performed grabbing the rib and confirming the rib mobility, causing the typical pain [2].

To date, the definitive treatment consists in the surgical resection of the slipping rib cartilages. However, non-surgical alternatives are available today, such as botulinum toxin injection [3] or local anaesthetic block.

PATIENTS AND METHODS

We performed a prospective analysis of 4 patients who underwent surgery for SRS correction between 1 January 2016 and 1 January 2018. All patients with costochondritis, rib fractures, previous trauma or Tietze syndrome were excluded. In the past, we noticed intraoperatively an apparent laxity of the upper abdominal wall, so we decided to perform a pre-operative ultrasound, to evaluate the thickness of the rectus of the abdomen in 3 sites: insertion with the xiphoid process, middle point of the xipho-pubic line and at the level of the umbilicus. We used the ultrasound linear probe (6–12 MHz) with a Vinno6 Device; the examinator was a thoracic surgeon with a course certificate in thoracic and emergency ultrasound.

Three patients were females (75%) with an average age of 29.25 years, the side most frequently affected was the left (75%), all patients reported pain (100%), the Hooking manoeuvre was positive in all patients (100%), and all patients had previous medical evaluations and conservative therapies without benefit (100%). Two patients were in psychological counselling (50%), and sadly the diagnosis was made after years of pain. In the remaining 2 patients, the diagnosis was made after about 9 months.

The diagnosis of the SRS was exclusively clinical. All patients underwent routine blood tests, electrocardiogram, chest x-ray, and anaesthetic evaluation, as preoperative assessment. We never performed intercostal nerve block before surgery. The data relating to muscle thickness of our patients are reported in Table 1 and the muscle thickness of 4 healthy volunteers in Table 2.

The surgery was performed under general anaesthesia, with single lumen oro-tracheal intubation and in supine decubitus. We performed a small subcostal incision in correspondence of

Table 1: Muscle thickness in our patients

Patient	Muscle site	Left thickness (cm)	Right thickness (cm)	Delta
1	Insertion	**0.74**	0.99	**0.25**
	Middle of xipho-pubic line	**0.56**	0.69	0.13
	Umbilicus	**0.58**	0.71	0.13
2	Insertion	0.97	**0.74**	**0.23**
	Middle of xipho-pubic line	0.73	**0.56**	0.17
	Umbilicus	0.65	**0.55**	0.10
3	Insertion	**0.72**	0.98	**0.26**
	Middle of xipho-pubic line	**0.53**	0.68	0.15
	Umbilicus	**0.55**	0.69	0.14
4	Insertion	**0.70**	0.97	**0.27**
	Middle of xipho-pubic line	**0.56**	0.70	0.14
	Umbilicus	**0.59**	0.72	0.13

Table 2: Muscle thickness in healthy controls

Normal population	Muscle site	Left thickness (cm)	Right thickness (cm)	Delta
1	Insertion	0.96	0.95	0.01
	Middle of xipho-pubic line	0.80	0.80	0
	Umbilicus	0.85	0.85	0
2	Insertion	1.09	1.09	0
	Middle of xipho-pubic line	1.16	1.17	0.01
	Umbilicus	0.94	0.94	0
3	Insertion	0.84	0.84	0
	Middle of xipho-pubic line	0.79	0.78	0.01
	Umbilicus	0.80	0.80	0
4	Insertion	0.98	0.98	0
	Middle of xipho-pubic line	0.81	0.82	0.01
	Umbilicus	0.86	0.86	0

the slipping ribs. After the costal plane was reached, the costal hypermobility was definitively confirmed. Afterwards, a wide subperiosteum resection of the cartilage en bloc with the hypertrophic fibrotic tissue was performed. In all cases, the resection involved a bone tract, with a careful preservation of the intercostal nerve and muscle. A chest tube placement was not necessary in any case because we performed a dissection of the ribs in the extrathoracic plane.

The dimension of the resection is generally performed from 3 to 5 cm.

RESULTS

Analyzing the data (Table 1), we observed that the most frequently affected side was the left side, the most affected gender was the female, and the differences in thickness of the rectus abdominis between the affected side and the contralateral were predominant at the insertion of the muscle on the xiphoid process with an average difference of 0.25 cm, that was not observed in a small sample of healthy controls (Table 2). No perioperative and postoperative complications occurred in our series.

In all 4 cases, the anatomopathological examination showed normal bone tract.

All patients treated had immediate disappearance of pain and no signs of recurrence at 2 years.

CONCLUSION

The SRS is a rare disease characterized by hypermobility of costal cartilage associated with omolateral pain. The definitive treatment of SRS is surgical and it consists in the resection of the interested portion of chest wall.

With this article, we want to underline the importance of the knowledge of the SRS. This syndrome affects young people, limiting the activities of daily life, causing disabling pain and having a strong psychological impact.

It is known that the rectus abdominis muscle is innervated by the 7th to 11th intercostal nerves. Observing our patients we thought that a continuous and chronic entrapment of the nerve can create a weakening and suffering of the muscle innervation with consequent hypotrophy of the rectus abdominis. The hypotrophic muscle involved could create greater instability in the lower part of the costal arch. We believe that this sign could be useful for an early diagnosis of SRS, mostly in case of doubt.

This is a small study, but in our population, the sign has been characteristic because we did not observe it in the healthy people.

Conflict of interest: none declared.

Reviewer information

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