



The slipping rib syndrome: A case report



E.A.K. van Delft*, K.M. van Pul, F.W. Bloemers

VU University medical Center, Amsterdam, The Netherlands

ARTICLE INFO

Article history:

Received 18 December 2015
Received in revised form 4 April 2016
Accepted 4 April 2016
Available online 8 April 2016

Keywords:

Rib
Costa
Pain
Slipping
Case report

ABSTRACT

We present a case report and review of literature about slipping rib syndrome, a syndrome rarely recognized and often un or misdiagnosed. In literature there is no clear consensus about the diagnosis and treatment. We present a case of a 47 year old man who was diagnosed with slipping rib syndrome after a cycling incident 8 years ago. Also, we developed a flow chart according the diagnostic and therapeutic steps in the treatment of slipping rib syndrome.

CENTRAL MESSAGE: Knowledge and treatment of the slipping rib syndrome can prevent chronic complaints and unnecessary comprehensive treatment.

© 2016 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The slipping rib syndrome is a condition hard to recognize and is often underdiagnosed [1]. The syndrome may occur at any age, but mostly middle-aged people are affected. There is no difference in prevalence of the syndrome between men and women [2]. The syndrome is caused by hypermobility due to (traumatic) disruption of the interchondral fibrous attachments of the anterior connection of the ribs, which allows the costal cartilage tips to sublunate and impinge the intercostal nerves. Contrary to the first 7 ribs, which are firmly attached to the sternum by costosternal joints and ligaments, rib 8–10 are connected to each other through a weaker fibrocartilaginous band. Therefore these so called floating ribs are mostly involved in the slipping rib syndrome [3]. This impingement causes severe pain and a slipping sensation and is provoked by respiratory movements, bending and external influences e.g. palpation by the examiner [4]. Differential diagnoses for these symptoms include rib fractures, Tietze Syndrome, bone metastases, muscle tears, pleuritic and abdominal diseases [5]. In literature, a few cases have been published, giving no clear consensus about the treatment of this syndrome.

2. Case report

A 47 year old healthy man complained of pain in the right flank after a cycling incident eight years earlier. Since this blunt trauma the patient experienced a painful 'slipping' movement of his right

lower ribs. The pain was provoked in particular during cycling, deep inspiration and bending. Previous evaluation in another institution by means of X-rays and a bone scan did not reveal any abnormalities. Pain medication (Paracetamol and NSAIDs) did not improve the complaints; an intercostal nerve block relieved the pain only temporarily. Physical examination revealed a positive hooking maneuver. This manipulation is first described in 1977 [6]: on examination the hands are placed under the lower costal margin on the side of the pain. Drawing the hands anteriorly or to cranial reproduces the pain and eliciting of causes a slipping or clicking feeling [3,8]. The pain was reproduced by the maneuver, subluxation of the 10th rib was felt and the diagnosis 'slipping rib syndrome' was made. This subluxation was also visible during the surgery. Our surgical treatment consisted of a partial resection of the 10th rib. The anterior side of the 10th rib was resected over approximately 10 cm, which ceased the ability of slipping, Fig. 1. The patient was discharged two days after surgery. Two weeks after the procedure the patient was examined in the outpatient department. No complications occurred. After 2 months follow up the patient remained pain free, the wound was healed and he was discharged from further follow-up.

3. Discussion

The Slipping rib syndrome remains poorly recognized and frequently results in unnecessary and extensive diagnostic evaluation. In literature, a few cases have been published, giving no clear consensus about the treatment of this syndrome. [7] Persistence of complaints after oral and local analgetic treatment suggests the possibility of this syndrome [8]. It is a clinical diagnosis and can be made by the use of the "Hooking maneuver". Additional diagnostic imaging or measurement is not indicated; however Meuwly et al.

* Corresponding author at: VU University medical Center, department of Trauma-surgery De Boelelaan 1117, P.O. Box 7057, 1007 MB Amsterdam, The Netherlands.
E-mail address: evavandelft@gmail.com (E.A.K. van Delft).



Fig. 1. Resection of the 10th rib over approximately 10 cm.

Table 1
Flow chart diagnosis and treatment of slipping rib syndrome.

Step 1:	Recognition of the syndrome
Step 2:	Analgesic treatment by oral medication
Step 3:	Performing a Hooking maneuver → Positive? Slipping rib syndrome highly plausible
Step 4:	Single intercostal nerve block → (Temporary) release of pain? Slipping rib syndrome highly plausible → No release of pain? Consider other diagnoses (rib fractures, Tietze Syndrome, bone metastases, muscle tears, pleuritic and abdominal diseases)
Step 5:	Only temporary release of pain after single intercostals nerve block? → Resection of the slipping rib and connected costal cartilage

describe how luxation of cartilaginous ribs can be visualized with ultrasound examination. The use of radiological imaging is important in ruling out other conditions. For example, a bone scan can be useful to diagnose costochondritis [9,10]. If a hooking maneuver is followed by an intercostal nerve block which releases the pain, the diagnosis slipping rib syndrome is highly plausible [1]. We recommend conservative treatment with pain medication when the pain is only of minor nuisance. When the pain is more severe, a simple intervention, e.g. a single intercostal nerve block provides permanent relief in many patients. If the pain persists, resection of the slipping rib and the connected costal cartilage can be performed, as we executed in our patient [3]. Table 1 shows a flow chart representing the diagnostic and therapeutic steps in the treatment of slipping rib syndrome.

In literature, small cohort studies on this rare condition have been published, all with good outcome, however, there is no consensus about successive diagnostic steps in the treatment of this syndrome [4,9].

4. Conclusion

The Slipping rib syndrome is an often under diagnosed disease for which sometimes comprehensive diagnostic evaluation is performed. Knowledge of the slipping rib syndrome can lead to quick

Open Access

This article is published Open Access at sciedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.

and simple diagnosis and prevent months or years of chronic complaints. Therefore knowledge of the syndrome is important; it can lead to quick and simple diagnosis. Radiological imaging could help ruling out other conditions. Treatment of pain should be the first step; by medication or placement of a nerve block. If this is not conclusive a partial resection of the rib can be performed.

Conflicts of interest

No conflicts of interest.

Funding

No source of funding.

Ethical approval

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

E.A.K. van Delft: writing manuscript, obtaining informed consent from patient, revision K. van Pul: performing surgery, co-writer. F. Bloemers: performing surgery, revision manuscript.

Guarantor

E.A.K. van Delft.
K.M. van Pul.
F.W. Bloemers.

References

- [1] B.E. Udermann, D.G. Cavanaugh, M.H. Gibson, S.T. Doberstein, J.M. Mayer, S.R. Murray, Slipping rib syndrome in a collegiate swimmer: a case report, *J. Athl. Train.* 40 (2) (2005) 120–122.
- [2] N. Lum-Hee, A.J. Abdulla, Slipping rib syndrome: an overlooked cause of chest and abdominal pain, *Int. J. Clin. Pract.* 51 (4) (1997 Ju) 252–253.
- [3] N.L. Turcios, Slipping rib syndrome in an adolescent: an elusive diagnosis, *Clin. Pediatr.* 52 (9) (2012) 879–881.
- [4] D.A. Saltzman, M.L. Schmitz, S.D. Smith, C.W. Wagner, R.J. Jackson, S. Harp, Case report: the slipping rib syndrome in children, *Paediatr. Anaesth.* 11 (2001) 740–743.
- [5] J.Y. Meuwly, S. Wicky, P. Schnyder, D. Lepori, Slipping rib syndrome, a place for sonography in the diagnosis of a frequently overlooked cause of abdominal or low thoracic pain, *J. Ultrasound Med.* 21 (2002) 339–343.
- [6] G.J. Heinz, D.C. Zavala, Slipping rib syndrome, *J. Am. Med. Assoc.* 237 (1977) 794–795.
- [7] D.P. Mooney, N.A. Shorter, Slipping rib syndrome in childhood, *J. Pediatr. Surg.* 32 (7) (1997) 1081–1082.
- [8] M. Migliore, M. Signorelli, R. Caltabiano, E. Aguglia, Flank pain caused by slipping rib syndrome, *Lancet* 383 (2014) 844.
- [9] G.P. Copeland, D.G. Macin, J.M. Shennan, Surgical treatment of the 'slipping rib syndrome', *Br. J. Surg.* 71 (July (7)) (1984) 522–523.
- [10] L.L. Peterson, D.G. Cavanaugh, Two years of debilitating pain in a football spearing victim: slipping rib syndrome, *Med. Sci. Sports Exerc.* 35 (10) (2003) 1634–1637.