Snapping scapula due to traumatic costal fractures: A case report

Kembu Nakamoto, MD, PhD,[a] Seiji Sumiura, MD, PhD,[b] Hiroshi Hashiyada, MD,[a] and So-ichiro Kiya, MD,[a] Kudamatsu, Yamaguchi, Japan

From the [a]Division of General Thoracic Surgery, and [b]Department of Orthopedic Surgery, Shunan Memorial Hospital, Kudamatsu, Yamaguchi, Japan.

Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication May 18, 2020; revisions received May 18, 2020; accepted for publication May 19, 2020; available ahead of print May 24, 2020.

Address for reprints: Kembu Nakamoto, MD, PhD, Shunan Memorial Hospital, 1-10-1 Ikunoya-minami, Kudamatsu, Yamaguchi 744-0033, Japan (E-mail: nakamoto@hcsdojinkai.or.jp).

JTCVS Techniques 2020;3:375-7

2666-2507

https://doi.org/10.1016/j.xjtc.2020.05.016

Snapping scapula syndrome.

CENTRAL MESSAGE

Multiple dislocated fractures involving the 6th rib around the inferior scapular angle are an appropriate indication for surgical fixation to preserve scapular movement.

See Commentaries on pages 378 and 380.

Costal fractures with flail chest, severe rib dislocation, or chest pain may require emergent fixation in the operating room.[1] Snapping scapula is a syndrome involving disturbed scapular motion and persistent pain, usually associated with audible or palpable clicks during overhead or throwing motions.[2] Common causes include bursitis, muscle abnormalities, and bone or soft-tissue abnormalities. Snapping scapula syndrome caused by 6th rib fractures is generally unrecognized in cases of chest trauma. The motion orbit of the inferior scapular angle crosses the 6th rib.[3] Experiences of costal resection for thoracoplasty or invasive lung cancer suggest that snapping scapula can result in a unique form of scapular motion dysfunction.[4] Fractured 6th rib stumps that fractured around the aforementioned crossing point might pop out due to thoracic negative pressure and disturb scapular motion. We experienced a case in which upper limb motion was disturbed by an old fracture of the 6th rib, and surgical repositioning of the 6th rib resolved the problem. This article discusses 6th rib fractures with dislocation around the inferior scapular angle and the indications for surgical fixation in cases of chest trauma.

CASE PRESENTATION

The institutional review board of our hospital granted ethics approval to this study (#01-05, 2019 MSH), and individual patient consent was obtained.

A 60-year-old man had a history of right chest wall trauma, involving multiple fractures of the 4 to 9th ribs caused by a motorbike accident, and was treated at an emergency hospital in January 2012. He had suffered shoulder pain and discomfort during abduction movements since the accident, and visited our clinic in September 2018.

A click was palpated at the right scapular angle when the right upper limb was abducted. Three-dimensional images of the costal wall obtained with computed tomography showed a bulge at the old fracture sites from the 4th to 9th ribs with inward retraction of the anterior chest wall. The tip of the scapula was getting caught on the callus of the 6th rib in an abduction position of over 110° (Figure 1).

Surgical repositioning of the fractured 6th rib stump was considered. A skin incision was made at the auscultation triangle under the general anesthesia with an intercostal nerve block,[5] and access to the surgical site was gained. The 6th rib was transected at the site of the bulge, and the stumps were trimmed and connected with a titanium clutching plate (KANI Staple; USCI Japan Ltd, Tokyo, Japan).

The patient's postoperative course was uneventful, and the click and shoulder pain he experienced during abductor movement had disappeared. The repositioned stumps were smoothly connected (Figure 2).

DISCUSSION

Mechanisms Underlying Snapping Scapula

Snapping scapular is not generally recognized, but experiences of costal defect after chest wall resection for invasive lung cancer have suggested that it can disturb

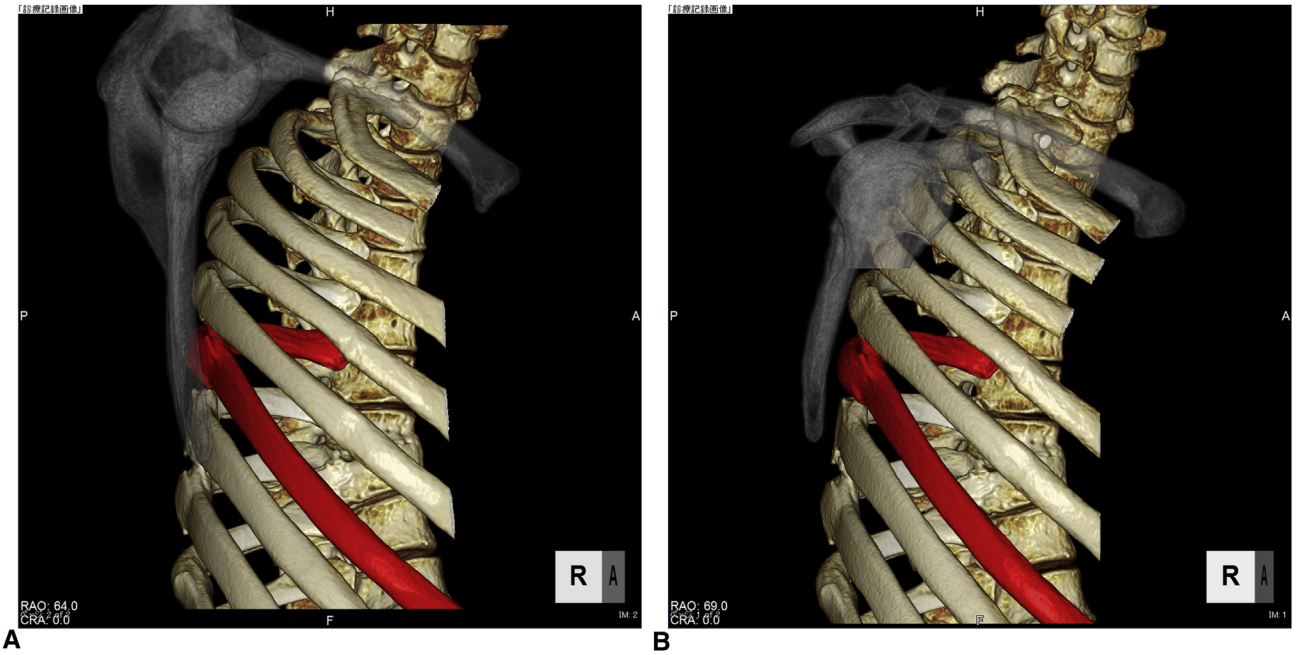

FIGURE 1. Three-dimensional computed tomography of the snapping scapula. A bulging fracture site in the 6th rib (shown in *red*) blocked the motion of the medial scapular edge in the abductor position of the right upper limb (A), whereas the blockage was relieved in the adductor position (B).

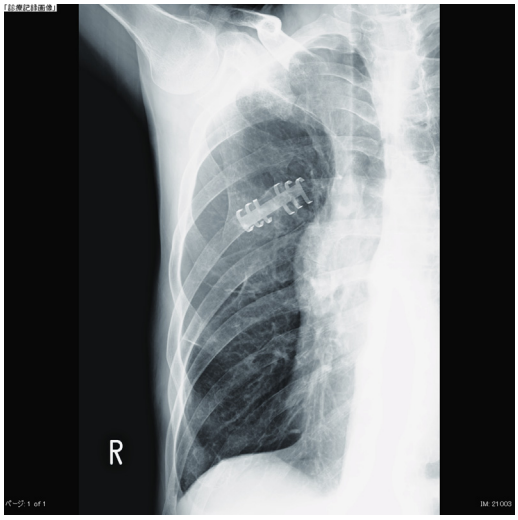

FIGURE 2. The 6th rib was repositioned using a titanium clutching plate. The blocking of scapular motion in the abductor position caused by the bulging 6th rib was resolved.

scapular movement.[4] The motion orbit of the inferior scapular angle crosses the 6th rib, which is most curved among all true ribs.[6] Negative thoracic pressure can easily cause multiple fractured ribs to retract inward, and fractured rib stumps that are located close to the spine can pop out, disturbing scapular movement. In the present case, the scapular angle got stuck in the depression of the chest wall around the 6th rib in the area where it crossed the scapular margin.

Indications for Surgical Fixation

Traumatic costal fractures with flail chest and respiratory suppression due to severe chest pain may require emergent fixation in the operating room.[1] Among the 12 ribs, costae 5 to 8 exhibit the greatest incidence of traumatic rib fractures.[1] Our experiences of 23 such cases, in which surgical fixation was performed, showed that one third of the patients were at risk of snapping scapula without surgical intervention. Multiple rib fractures involving the 6th rib around the crossing point with the scapular angle might be another indication for surgical fixation to prevent snapping scapula.

Surgical Procedures

A titanium plate attachment that has clutching claws is our first-choice surgical procedure for rib fractures. Plates provide rigid fixation and are even applicable to crush fractures. The procedure is relatively simple to perform under a nerve block with infiltration anesthesia.[5] In addition, such plates have minimal effects on magnetic resonance imaging and computed tomography.

CONCLUSIONS

Snapping scapula is a frequently unrecognized type of motion disturbance associated with rib fractures and might be an appropriate indication for surgical fixation in cases involving 6th rib fractures.

We thank Yuya Nakamura, RT, and Muneo Hiromoto, RT, for their help with 3-dimensional computed tomography image preparation.

References

1. Beks RB, de Jong MB, Houwert RM, Sweet AAR, De Bruin IGJM, Govaert GAM, et al. Long-term follow-up after rib fixation for flail chest and multiple rib fractures. *Eur J Trauma Emerg Surg*. 2019;45:645-54.
2. Zaidenberg EE, Rossi LA, Bongiovanni SL, Tanoira I, Maignon G, Ranalletta M. Snapping scapular syndrome secondary to rib intramedullary fixation device. *Int J Surg Case Rep*. 2015;17:158-60.
3. Lees WM. Thoracic incision. In: Shiels TW, ed. *General Thoracic Surgery*. Philadelphia, PA: Lea & Febiger; 1983:305-14.
4. Kozower BD. Chest wall resection and reconstruction for non-small cell lung cancer. *Op Tech Thorac Cardiovasc Surg*. 2007;11:279-85.
5. Tanaka E, Tutumi Y, Nakamoto K. Comparison of the perioperative management between ultrasound-guided thoracic paravertebral block and local anesthesia for video-assisted thoracic surgery with a miniaturized thoracoscope under non-intubation anesthesia. *BAOJ Surg*. 2017;3:023.
6. Rohen JW, Yokochi C, Lutjen-Drecoll E. *Anatomy. A Photographic Atlas*. 8th ed. Stuttgart: Schattauer GmbH; 2016:201.