

제1늑골의 피로골절

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Stress Fracture of the First Rib

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Isolated stress fracture of the first rib is rare, and repeated muscular pulling and fatigue of bone is thought to be responsible for this fracture. The diagnosis can be made by taking a thorough history and performing chest roentgenography, computed tomography or magnetic resonance imaging. Conservative treatment generally cures this condition. We report here on a case of exercise-induced isolated stress fracture of the first rib in a non-athlete college student and we review the related articles.

(Korean J Thorac Cardiovasc Surg 2009;42:674-676)

Key words: 1. Ribs
2. Fracture
3. Stress, mechanical

CASE REPORT

A 18 year old Korean male, a college student presented to the clinic with a complaint of left upper chest pain which developed three days before. He has been playing basketball as a hobby. He was right handed and he was trying to give himself a strenuous exercise on his left arm to improve ball control skill. He has no episode of blunt trauma. Three days prior to his visit, he felt a snap in his left upper chest and left upper back during above mentioned exercise. He also felt even difficulty in breathing and prickling pain on left arm. He was admitted to our hospital for further evaluation on his aggravating pain.

He had a known mild scoliosis of his thoracic spine. Otherwise he has no known disease in his past history. Physical examination showed tenderness on left supraclavi-

cular area. Otherwise there were no remarkable findings.

The chest radiograph (Fig. 1) showed a cortical disruption of posterior segment of the left first rib. Mild scoliosis of thoracic spine convex to the right was also noted.

Chest MRI (Fig. 2) showed transverse discontinuity in the posterior segment of left first rib, meaning fracture, which showed high signal intensity on T2WI and low signal intensity on T1WI. Surrounding soft tissue also showed low signal intensity on T1WI and high signal intensity on T2WI with intense contrast enhancement. On T2WI, left trapezius muscle had a focal high signal intensity adjacent to the fracture. Bone mineral density (BMD) was normal. Whole body radioisotope bone scan revealed hot uptake in left first rib (Fig. 3). With history and all these findings, the diagnosis was established as a stress fracture of the left first rib. With conservative treatment the patient was discharged with im-

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논문접수일 : 2009년 4월 2일, 논문수정일 : 2009년 7월 29일, 심사통과일 : 2009년 8월 27일

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본 논문의 저작권 및 전자매체의 지적소유권은 대한흉부외과학회에 있다.

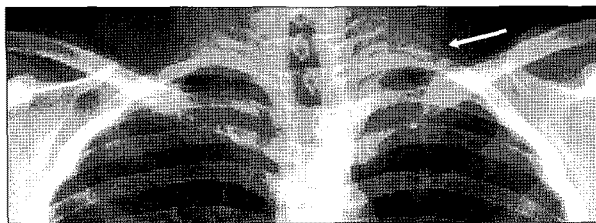


Fig. 1. Chest radiograph shows cortical disruption of posterior segment of the left first rib.

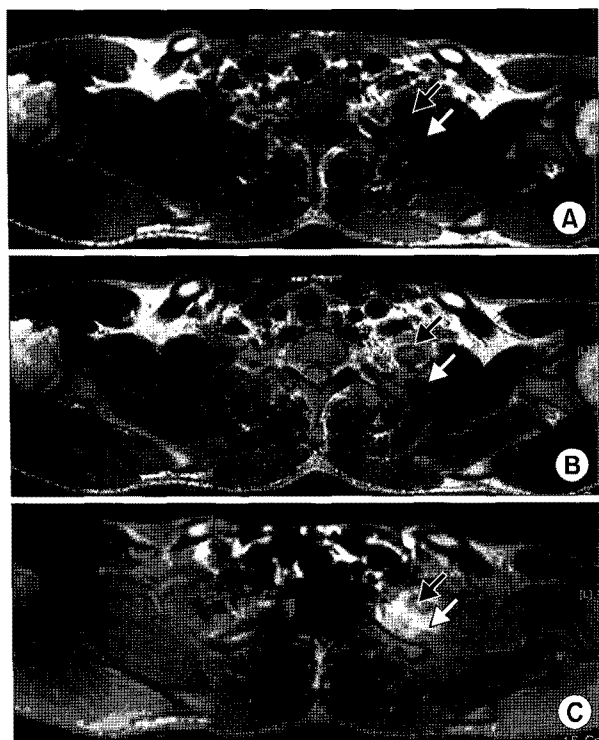


Fig. 2. Chest MRI with T1-weighted (A), T2-weighted (B), and gadolinium enhanced axial scan (C). Left 1st rib shows cortical disruption with low marrow signal intensity on T1-weighted (A) and increase SI on T2-weighted image (B) (arrow). The lesion shows surrounded hematoma with low SI on T1WI and diffuse increase SI on T2WI. Gadolinium enhanced scan (C) shows intense contrast enhancement of the fracture and surrounded soft tissue hematoma (white arrow).

proved symptoms.

DISCUSSION

The fracture of the first rib in trauma is usually combined with other skeletal injuries, such as clavicle, shoulder and ribs.

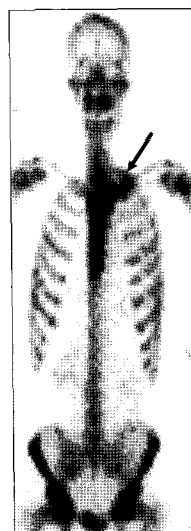


Fig. 3. Radioisotope bone scan showed hot uptake of the left first rib (arrow).

Isolated first rib fracture is rare. Metatarsal stress fractures are commonly seen in athletes such as soccer player[1].

There have been reports on stress fracture of the first rib in professional athletes, including rowers[2], a kick boxer[3], and a soccer player[4]. Some professions such as lifting heavy milk crates[5] or as a sequel of whiplash injury[6] also may cause this rare condition. However, isolated first rib fracture without injury in ordinary people, like our case, is rare. The cause of stress fracture is unclear but shearing force generated by a repeated pulling of bone by inserted muscles is considered as an etiology. A proposed mechanism for first rib fracture is that a simultaneous pulling of the first rib by scalenus anterior medialis and serratus anterior muscles creates a shearing force on a weak point of the first rib[4]. Others suggested an influence of reduced bone mineral density as an etiology[7]. The patient in this report is an energetic healthy young male student with no history of trauma. His bone mineral density was normal. He is right handed but the fracture occurred in his left first rib. He had intentionally repeated vigorous exercise to train his left hand for the basketball control skills. The history of a sudden onset of pain during a vigorous exercise without other cause for fracture, and the studies with reliable diagnostic modalities including MRI and bone scan supported establishment of the diagnosis of isolated left first rib fracture. The patient was recovered with

conservative management with analgesics.

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=국문 초록=

제1늑골의 피로골절은 드물다. 반복되는 근육수축으로 인한 뼈의 피로가 골절의 원인이라고 생각된다. 자세한 병력 조사와 컴퓨터 단층 촬영 및 전자기 공명영상 등으로 진단할 수 있다. 진통제 등 보존적 요법으로 치료한다. 농구를 취미로 하는 18세 남자 대학생 환자에서 운동연습으로 인한 제1늑골의 피로골절을 경험하였기에 문헌 고찰과 함께 이에 보고한다.

중심 단어 : 1. 피로골절
2. 제1늑골
3. 기계적 스트레스