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Spontaneous Healing of the Hypervascular Nonunion of Humeral Shaft—A Case Report—

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=국문초록=

불유합의 치료방법으로 골 이식술을 포함한 여러가지가 소개되었다[3]. 이 불유합은 그간 과혈성, 저혈성 무혈성 불유합 세군으로 분류되어, 과혈성과 저혈성 불유합에는 견고한 고정만으로도 골유합이 이루어질 수 있으며, 무혈성 불유합은 견고한 고정과 함께 생골이식술을 시행하여야 유합을 얻을 수 있다고 하였다[1,6]. 저자들은 강남성모병원 정형외과에서 수술후 발생한 상완골 과혈성 불유합 환자에게 재수술을 권유하였으나, 환자가 수술을 미루어 오던중 우연히 내원하였기에 만 4년 7개월에 검사한 결과 완전한 골유합이 일어났음이 밝혀졌다. 이 예의 임상경과가 일반적인 불유합의 운명과 상이하게 견고한 외 또는 내고정없이 자연골유합이 이루어진 진기한 예이므로 문헌고찰과 함께 보고한다.

Key Words: Nonunion, Hypervascular, Humerus shaft, Spontaneously united

Nonunion of fracture has been a major challenge to the orthopaedic surgeon. Many methods of treatment have been employed for this difficult problem. Many authors calssified this nonunion into three types; the hypervascular, hypovascular, and avascular nonunions. They described that the hyper- and hypo-vas cular nonunions as the therapeutic measure need only stabilization at the nonunion site by stable osteosynthesis or by good external immobilization[1,6], while avascular nonunion requires stability and improvement of the local circulation which provides better biologic condition for osteogenesis.

First of all nonunion needs internal stable fixation regardless of its type. Autogenous cancellous graft after decortication augments the healing further. Authors experienced a case of spontaneously healed hypervascular nonunion of the surgically treated humeral shaft, which deserves to be reported.

CASE REPORT

A 49 year-old woman was involved in an automobile accident on July 18, 1982 sustaining a fracture of her right humerus.

She was initially treated at local clinic and was transfered to our clinic.

Six days after injury open reduction and internal fixaton was performed. But stable fixation could not be obtained. When she was followed on Feburary 8, 1984, she still had pain and pseudomotion at the fracture site on her right arm. The roentgenogram taken on the day showed a hypervascular nonunion at the middle shaft with dislodgement of a plate and lateral angulation of the fracture.

There were no associated neurovascular problems. And motion of her shoulder, elbow and wrist were normal. We recommended her reoperation to provide rigid fixation. But she refused it because of phobia about operation.

On Dec. 17, 1986, she revisited us unexpectedly for further evaulation of her humeral

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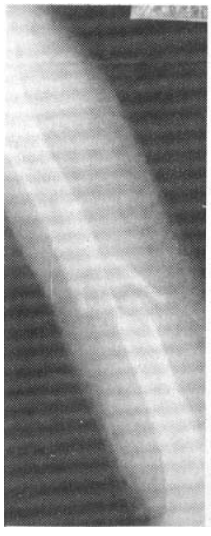

Fig. 1A

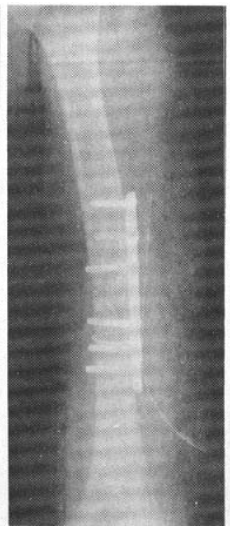

Fig. 1B

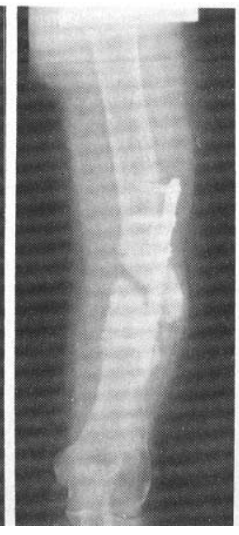

Fig. 1C

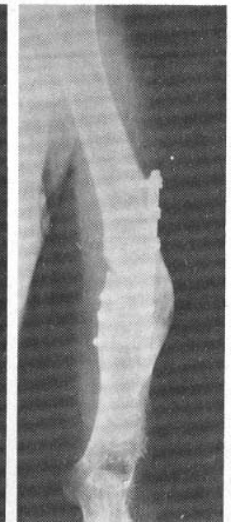

Fig. 1D

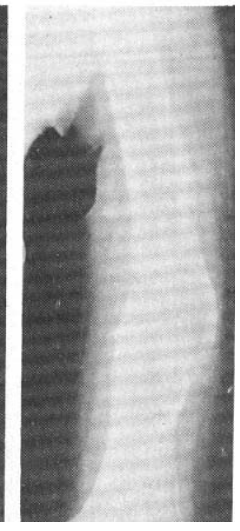

Fig. 1E

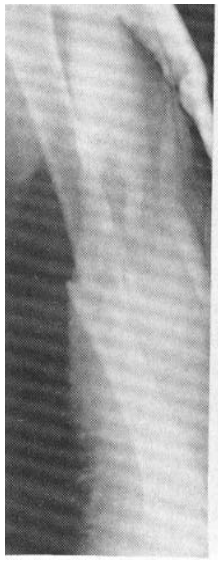

Fig. 2A

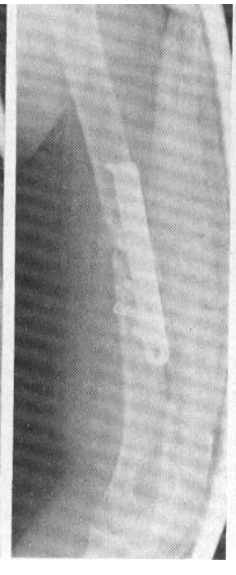

Fig. 2B

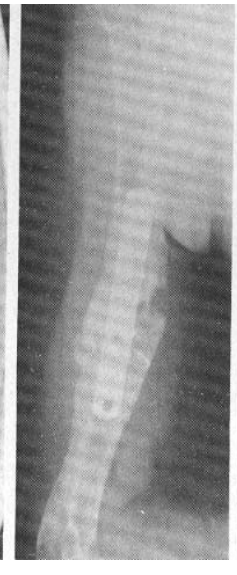

Fig. 2C

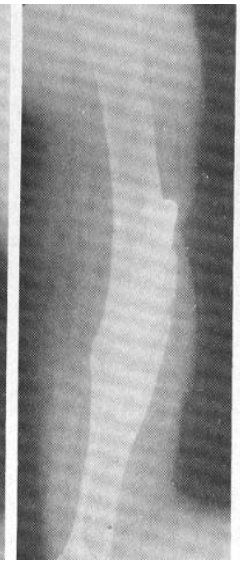

Fig. 2D

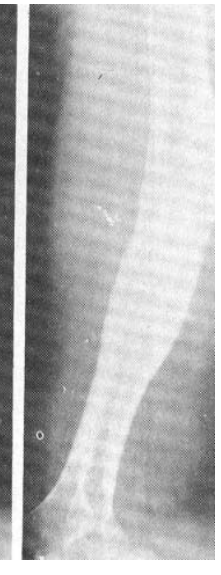

Fig. 2E

Fig. 1-A through 1-E in anteroposterior and 2-A through 2-E in lateral view. **1-A** and **2-A** taken on July 24, 1982, shows a comminuted and displaced fracture of the mid-part of the shaft of the left humerus. **Fig. 1-B** and **2-B** show postoperative X-rays. **Fig. 1-C** and **2-C** are the X-rays 58 weeks after operation. Hypervascular nonunion of elephant foot type is seen with dislodgement of the plate and lateral angulation of the fracture. **Fig. 1-D** and **2-D** are the X-ray four years and seven months after operation; the fracture was spontaneously healed. **Fig. 1-E** and **2-E** are the X-ray after the removal of the plate and screws.

fracture. Roentgenograms taken on the day showed complete osseous union of the previou sly estabilished nonunion. According to her statement, she had no immobilization of the nonunited humeral fracture since her last visit. She had only mild discomfort over the protrusion of the plate.

Physical examination disclosed no limitation of her shoulder, elbow, and wrist motions. On Dec. 23, 1986, a plate and screws were removed

(Fig. 1).

DISCUSSION

Delayed healing or nonunion is a rare complication of a fracture of the humeral shaft. There have been various methods of treatments for nonunion of a humeral fracture[2, 3].

Fixation with a type of fixative is commonly used in the primary or secondary treatment of this injury according to surgeon's preference.

If the fracture fragments are not rigidly fixed internally or externally, it cannot provide stability at the fracture site and the micromotion induced by insecure osteosynthesis leads to resorption of the fracture ends and adds further loss of stability, and the nonunion ensues.

To treat the estabilished nonunion, the fragments should be brought together into close contact with rigid fixation.

Some authors divide nonunion into hypervascular and avascular by the viability of the ends of the fragments[1-3, 4, 5, 6]: hypervascular nonunion was also divided into three; elephant foot. horsehoof, and oliogotrophic nonunion. They result from insecure fixation or premature weight bearing in a reduced fracture whose fragments are viable. In hypervascular nonunion, fragments are viable, and is biologically vital.

Therefore, in vital pseudarthrosis only stable internal fixation is required and bone grafting is not indicated. In avascular nonunion fragments are nonvital and inert, and is biologically inactive. Avascular nonunion is divided into four; torsion wedge, comminuted. bony defect, and atrophic. For treatment of avascular nonunions the application of cancellous bone grafts and decortication of the ends of the fragments are required to produce union in addition to stable internal fixation.

All nonunions regardless of their types have been known not to be united without surgical intervention. Therefore rigid internal fixation with or without bone graft was the routine procedure to produce union[1, 6].

The case reported here is the nonunion of the humeral shaft of a elephant type caused by insecure internal fixation. A secure internal fixation was recommended for treatment of this nonunion.

However the surgery or external immobilization could not be performed because of her refusal of further treatment. Four years and 7 months after initial osteosynthesis this established nonunion was naturally united.

Through this case it is suggested that in some case stable reosteosynthesis is not certainly necessary for the treatment of the hypervascular nonunion.

However, there arise questions: will it be always united spontaneously? and then how long will it take to produce union in the hypervascular nonunion without carrying out stable reosteosynthesis?

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