Locking Compression Plate: A Treatment Option for Diaphyseal Nonunion of Radius or Ulna

H T Ling, MBBS, M K Kwan, MS (Orth), Y P Chua, MS (Orth), A S Deepak, MS (Orth), T Sara Ahmad, FRCS

Department of Orthopaedic Surgery, University Malaya Medical Center, 50603 Kuala Lumpur, Malaysia

Summary

Treatment of radius or ulna nonunion requires both osteogenic environment and mechanical stability. We would like to report three radial and six ulnar diaphyseal nonunions treated with 3.5 mm locking compression plate (LCP) fixation. To assess the effectiveness of 3.5 mm LCP in treating diaphyseal nonunion of the forearm bones, we prospectively reviewed nine patients with the mean age of 33 years with diaphyseal nonunion of the radius or ulna. All patients were treated with 3.5 mm LCP. Bone grafting was only performed for atrophic nonunion. Surgical and functional outcome were evaluated. There were three atrophic nonunion of the radius, four atrophic nonunion of the ulna and two hypertrophic nonunion of the ulna. All nonunion united successfully with satisfactory functional outcome. 3.5 mm LCP is effective in the treatment of nonunion of ulna or radius.

Key Words: Nonunion, Radius, Ulna, Locking Compression Plate

Introduction

Displaced fractures of radius and / or ulna in adults are usually treated with internal fixation using 3.5 mm dynamic compression plate (DCP). In some centres, intramedullary devices like rush rod and Enfer's nail are used. Nonunion of internally fixed diaphyseal forearm fractures is uncommon and the incidence has been reported as below 5% 1-4. The principle of treatment basically relies on the understanding of the underlying cause. Hypertrophic nonunion reflects inadequate immobilization and requires stable immobilization. Atrophic nonunion reflects an inadequate blood supply or insufficient potential bone forming cells, and often both factors co-exist. The general plan is to resect the unhealthy bone, fill the defect with bone graft and immobilize the bone with plate and screws 1-5.

Use of locking compression plate (LCP) to treat humerus and clavicle nonunion had been reported 6-9. We treated nine patients with radius or ulnar nonunion using 3.5 mm LCP fixation and would like to report their treatment outcome.

Materials and Methods

Between August 2003 and May 2006, we treated nine patients with diaphyseal nonunion of the radius or ulna (Table 1). All patients were male and their mean age was 33 years (22 to 49 years). Five of them were smokers, consuming between 10 to 40 cigarettes a day. The mean time from the initial injury to the index surgery was 58 months (ranges from six months to 24 years). Four patients had been previously treated with 3.5 mm DCP fixation, two with one-third tubular plate fixation, and one with plating of radius and Kirshner wiring of ulna. There were two non-operated patients; one was treated by a traditional bone setter and the other had a Monteggia fracture dislocation which was neglected for 24 years. Diagnosis of nonunion was based on clinical and radiological findings. Absence of bridging bone across the fracture after duration of six months in a radiograph classifies the case as a nonunion. Hypertrophic nonunion is defined as: nonunion with bone bridging fractures.

Results

All union was non six patients were excellent, non six review of results were excellent. For two patients, one was lost to follow up and the other had a Monteggia fracture dislocation which was neglected for 24 years. Diagnosis of nonunion was based on clinical and radiological findings. Absence of bridging bone across the fracture after duration of six months in a radiograph classifies the case as a nonunion. Hypertrophic nonunion is defined as: nonunion with bone bridging fractures.

References


Corresponding Author: Ling How Tieng, Department of Orthopaedic Surgery, University Malaya Medical Center, 50603 Kuala Lumpur, Malaysia