

Abstract

Introduction

Minimally invasive plate osteosynthesis (MIPO) on the posterior aspect of the humerus is considered a potential danger to the radial nerve.

Objective

This study aimed to determine the safety and feasibility of applying MIPO of the humerus via the posterior approach and to observe the tension of the radial nerve in different elbow positions.

Materials and methods

Two separate incisions were made on the posterior aspect of the humerus of each of ten fresh cadavers. The radial nerve was identified at the proximal incision and the distance which the nerve could be elevated from the bone with the elbow in flexion and extension was measured. A 10-hole extra-articular distal humeral locking compression plate (LCP) was inserted and fixed through the submuscular tunnel. The tunnel was then explored to determine the entrapment of the radial nerve and to observe the anatomical relationship of the radial nerve to the plate and bone.

Results

No entrapment of the radial nerve and its branches was found. The distances which the radial nerve could be elevated with the elbow in extension were greater than in flexion ($p < 0.01$). The location where the radial nerve crossed the medial border of the posterior surface of the humerus was 80.1-132 mm (average 104.7 mm) 95% CI: 37.03 – 40.79% of the total humeral length and the lateral border of the posterior surface of the humerus was 116.6-175.5 mm (average 142.7 mm) 95% CI: 51.26 - 55.02% of the total humeral length. The location of the axillary nerve was 38.7-61.7 mm (average 47.9 mm) 95% CI: 16.65 – 18.42% of the total humeral length.

Conclusions

MIPO of the humerus using the posterior approach is a feasible option for treatment of distal humeral shaft fracture. The risk of radial nerve injury can be minimized by careful dissection and by keeping the elbow in extension during plate insertion.

Keywords:

Humerus fracture, Minimally invasive plate osteosynthesis (MIPO), Posterior approach, Radial nerve