Reply to LTTE of Joshi, Anil and Singh, Saurabh: Comment on Zhiquan An et al. Plating osteosynthesis of mid-distal humeral shaft fractures: minimally invasive versus conventional open reduction technique

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We authors very much appreciated the comments from Joshi et al. concerning our article [1]. There is still considerable controversy about the use of minimally invasive plate osteosynthesis (MIPO) in surgical treatment of mid-distal humeral shaft fractures.

As to the safety of MIPO in treatment of humeral shaft fractures, an anatomical study by Apivatthakakul et al. demonstrated that humeral shaft fractures could be safely treated with the MIPO technique [2]. In our experience with 44 cases of mid-distal humeral shaft fractures treated with MIPO, none of the patients had iatrogenic radial nerve palsies. It is a major advantage of this technique that the incidence of iatrogenic radial nerve palsies can be reduced. In our 44 cases of mid-distal humeral shaft fractures treated with MIPO, four cases experienced numbness on the anterolateral forearm because of injury to the musculocutaneous nerve, which we considered occurred at the level of the elbow. One patient had dysfunction of internal rotation of the shoulder because of malposition of the plate on the distal fragment.

We consider that biological fracture fixation could be applied to all the long bone fractures, mainly for promotion

of bone healing but also for reduction of the dissection of soft tissue.

According to a postoperative ultrasonographic study of Livani et al. [3], the radial nerve is quite close to the implant material, especially in the transition between the third and fourth quarters of the humeral shaft. But from Apivatthakakul et al., there is brachial muscle between the plate and the radial nerve. Our anatomical study also determined that the plate does not contact the radial nerve directly.

We agree that the indications of MIPO in surgical treatment should be defined. According to Apivatthakakul et al., this technique can be applied for the treatment of simple or comminuted humeral shaft fractures extending from the deltoid insertion down to 6 cm above the trochlea fossa, which allows at least three screw fixation for each proximal and distal fragment. It can also be applied to a humerus with a small canal diameter that is not suitable for intramedullary nailing.

Thank you again.

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