



Letter to the Editor regarding: “Preoperative Prediction of Gartland IV Supracondylar Fractures of Humerus: Is it Possible?” Barik S, Singh G, Maji S, Azam Q, Singh V. *Rev Bras Ortop* 2021;56(2):230-234.

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We read with interest the publication by Barik et al.¹

Leitch et al.² stated that Gartland type IV fractures may occur iatrogenically during attempted reduction of an extension-type fracture. Such an intraoperative conversion of a type III to a type IV would preclude a preoperative radiographic prediction. The possibility of an iatrogenic creation of a multidirectional type-IV instability was not mentioned by Barik et al.¹ but is supported by their finding that 64.7% of type-IV fractures had attempts of closed reduction in other units.

Barik et al.¹ stated that there is scant literature regarding the optimum treatment for type-IV fractures, but Leitch et al.² described a clear step-by-step treatment protocol, which was listed by Skaggs and Flynn³ as the recommended technique to treat type-IV fractures.

Barik et al.¹ reported a 7 to 10% incidence of type-IV fractures for all operated supracondylar fractures, referencing Leitch et al.,² but the latter documented an incidence of

only 3% (9 of 297 fractures). Mitchell et al.⁴ identified an incidence of 1.3% (3,040 fractures) with a type IV/III ratio of 39/156, which is much lower than the IV/III ratio of 17/16 reported by Barik et al.¹ The latter authors reported that one important limitation of their study is that a few surgeries were performed by pediatric orthopedic fellows, which might have influenced the fracture classification. A possible misclassification of type IIIs as type IVs could have contributed to the large discrepancy between the authors' high type-IV rate of 51.5% and the 20% reported by Mitchell et al.⁴ in addition to the possibility of type IVs having been created during multiple reduction attempts by less experienced pediatric orthopedic fellows.

If multidirectional instability is caused by the initial trauma because of more extensive soft-tissue disruption than we would expect to find a higher associated neurovascular injury (NVI) rate with type-IV fractures, as shown by Mitchell et al.⁴ (III: 15%; IV: 28%). Ho et al.⁵ identified a

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significant association between soft-tissue injury severity and neurovascular injury based on 636 fractures treated operatively (174-II; 320-III; 25-IV; 30-flexion; 87-unknown), with 20% of type IVs and 15% of type IIIs having had a neurological injury. Barik et al.¹ reported the opposite, with a NVI rate of 18.8% for type-III and 5.9% for type-IV fractures.

All fractures reported by Leitch et al.² for the period 1996 to 2002 were operated on by 4 pediatric orthopedic surgeons who succeeded to manage all type-IV fractures by closed reduction using their dedicated technique. The same unit⁶ then recorded 541 surgically treated supracondylar fractures for the period 2003 to 2012 (227 type II; 314 type III) treated by 6 pediatric orthopedic surgeons who did not identify a single type-IV fracture.

The above supports that type-IV fractures are more likely a problem created intraoperatively, possibly less experienced surgeons, with the identification of type-IV fractures from preoperative radiographs not being reliable.

We recommend developing referral systems which facilitate surgical management of displaced supracondylar humerus fractures in centralized units by surgeons with the appropriate expertise who manage these difficult fractures regularly.

Authors' contributions

Each author contributed individually and significantly to the development of this article: A. R.: literature review, manuscript preparation. L. G.: literature review, manu-

script preparation. E. A.: literature review, manuscript preparation.

Conflict of Interests

The authors have no conflict of interests to declare.

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