

Study On Malrotation In Children Treated With Nonoperative Treatment Of Fracture Femur

Hazizul Helmy HA, Liau CJ, Abdul Razak S, Ahmad Tarmizi M, Ismail M
 Department of Orthopaedics, ²Department of Radiology School of Medical Sciences,
 Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan.

INTRODUCTION:

The aim of this study was to determine the accuracy of clinical measurement of malrotation compared to measurement by Magnetic Resonance Imaging in children with fracture femur treated non operative. The clinical measurement were used to determine the occurrence of malrotation in children with fracture femur treated with traction followed by hip spica.

MATERIALS & METHODS:

This was a cross-sectional study conducted on 22 patients who aged 3-10 years old and had fracture femur treated with skin traction and Thomas splint for 2-3 weeks followed by hip spica in year 2009--2014. Malrotation was measured using Magnetic Resonance Imaging by comparing anteversion angle of affected and non affected femur. Malrotation was measured clinically by comparing the amount of hip internal rotation between affected and non affected limb. Accuracy of clinical measurement was compared with Magnetic Resonance Imaging on 14 patients. The clinical measurement was used to assess the occurrence of malrotation in 22 patients. Relationship between level of fracture, types of fracture and age of patient with malrotation were analysed.

RESULTS:

ICC agreement on clinical measurement and Magnetic Resonance Imaging measurement was near excellent with reading of 0.746. The differences between clinical and Magnetic Resonance Imaging measurement, range 1° to 22° with median of 6°. Out of the 22 patients, only 4 patients had malrotation of 15° or more. Excessive internal rotation was found in 12 patients (median 10, range 3-35°). Excessive external rotation was found in 9 patients (median 10, range 5-35°). Analysis of relationship between fracture level, fracture types and ages and malrotation were not significant.

DISCUSSIONS

Braten et al found that upper normal limit of differences of anteversion angle of both right and left leg in 100 of normal adults was 10 degree using ultrasound measurement(1). Brouwer et al found physiological differences in rotation 0 to 15 degree in the control group of normal volunteer (2). We used malrotation 15 degree or more as a true rotational deformity and found 4 patients had 15 degree or more malrotation. Thus, there was only 4 patients out of 22 patients (18%) had true malrotation deformity . Indirectly, this finding was comparable to what was reported by Brouwer et al in a study on 50 patients treated with Bryant and Russel traction that only 6 out of 50 patients had more than 10 degree difference in malrotation using radiograph measurement(2). . In contrast Verbeek et al reported about one third of the patients had rotational deformity of 10-33° using radiograph Rippstein method Puttaswamaiah et al , in a study on 30 patients treated with immediate hip spica reported 30% patients had more than 20 degree malrotation in their study using CT measurement(3,4).

CONCLUSION:

Clinical measurement by comparing hip internal rotation in assessing malrotation of femur was accurate and comparable with Magnetic Resonance Imagine measurement. There was only 18% of patients had malrotational deformity of 15° or more. Level of fracture, pattern of fracture and age of patients did not have influence on the occurrence of malrotation in this study of 22 children treated with skin traction for 2-3 weeks followed by hip spica.

Keywords: *fracture femur, children, non-operative, malrotation, clinical measurement*
 References

1.Bråten M, Terjesen T, Rossvoll I. Femoral anteversion in normal adults: ultrasound measurements in 50 men and 50 women. Acta Orthopaedica. 1992;63(1):29-32.