

The Orthopaedic Sequelae of Childhood Meningococcal Septicaemia

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Introduction

Meningococcal infection is the most common infective cause of death in children¹ and causes significant morbidity in survivors. The aim of this study is to use a defined population as a common denominator enabling correct identification of the incidence of orthopaedic sequelae.

Methods

Identify all patients admitted to the Paediatric Intensive Care Unit of the Bristol Royal Hospital for Children from 01/01/2001 to 31/12/2012 with a primary diagnosis of meningococcal septicaemia.

Retrospective clinic letter and radiograph analysis of the cohort identifying orthopaedic complications, defined as any amputation or growth plate abnormality.

Results

- 130 patients were alive following PICU admission with a diagnosis of meningococcal septicaemia.
- Of these, 10 went on to develop orthopaedic complications, representing an incidence in this patient population of:

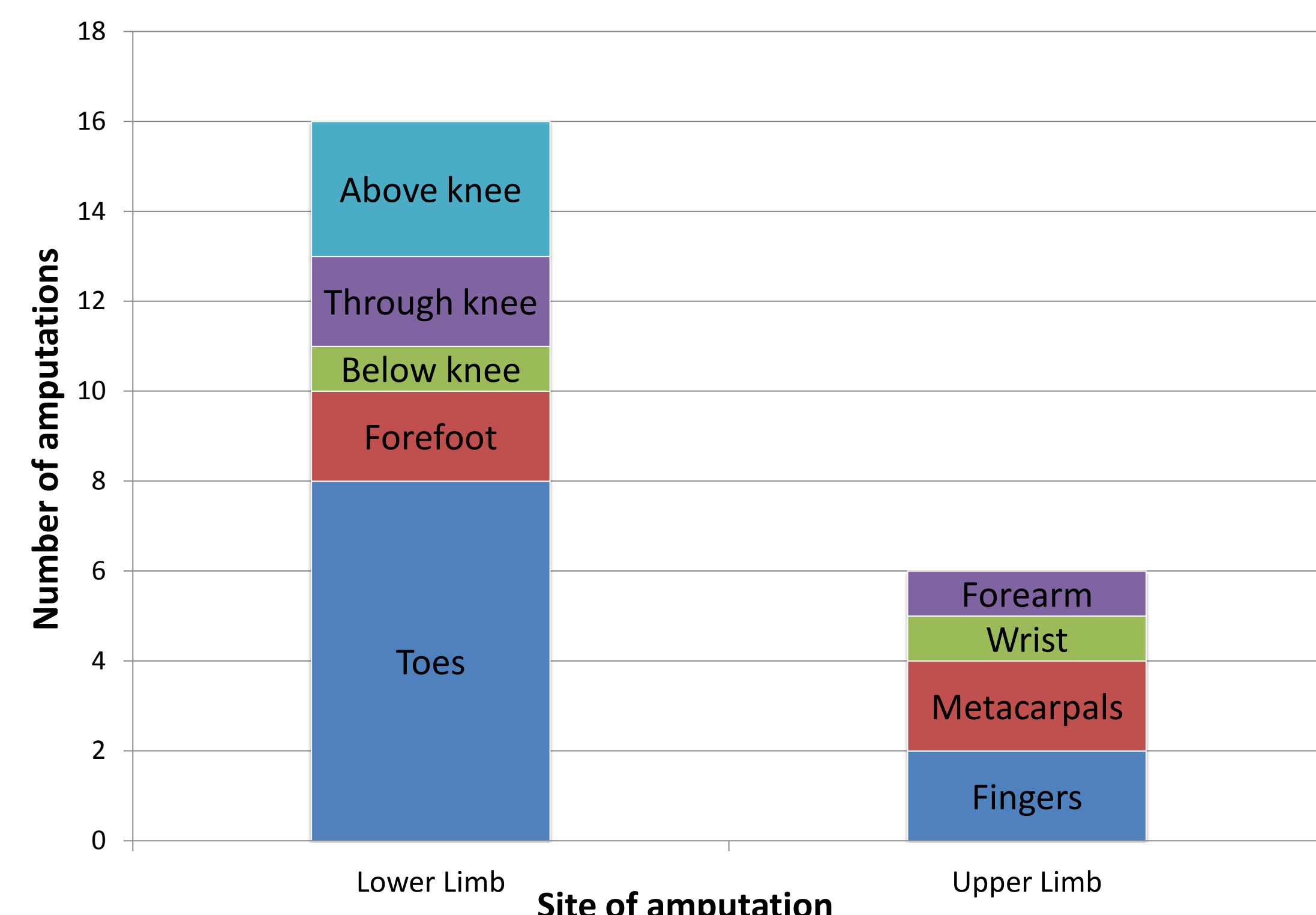
7.7%

- Table 1 compares different parameters between those patients who did, and those who did not develop orthopaedic complications:

	Orthopaedic sequelae	No orthopaedic sequelae	Risk ratio (95% CI) / P value
Total number	10	120	n/a
M:F ratio	4:1	6:5	3.12 (0.69 – 14.14)
Average age at PICU admission (years)	1.5	3.9	<0.001
Average length of PICU admission (days)	15.2	4	<0.05
Skin involvement (%)	100	0.8	<0.001

Table 1. Comparison of those who did and those who did not develop orthopaedic sequelae following meningococcal septicaemia. PICU, Paediatric Intensive Care Unit; CI, confidence intervals.

- 9/10 patients required an amputation. Graph 1 reports their distribution.



Graph 1. Demonstrating the site of amputations. 16/22 (72.7%) were in the lower limb. Multiple amputations were also noted in many patients.

- Most amputations (72.7%) were in the lower limb, and those that required any amputation were likely to have multiple.
- 48 abnormal growth plates were identified in 8 patients. Figure 2 demonstrates the geographical distribution of these.

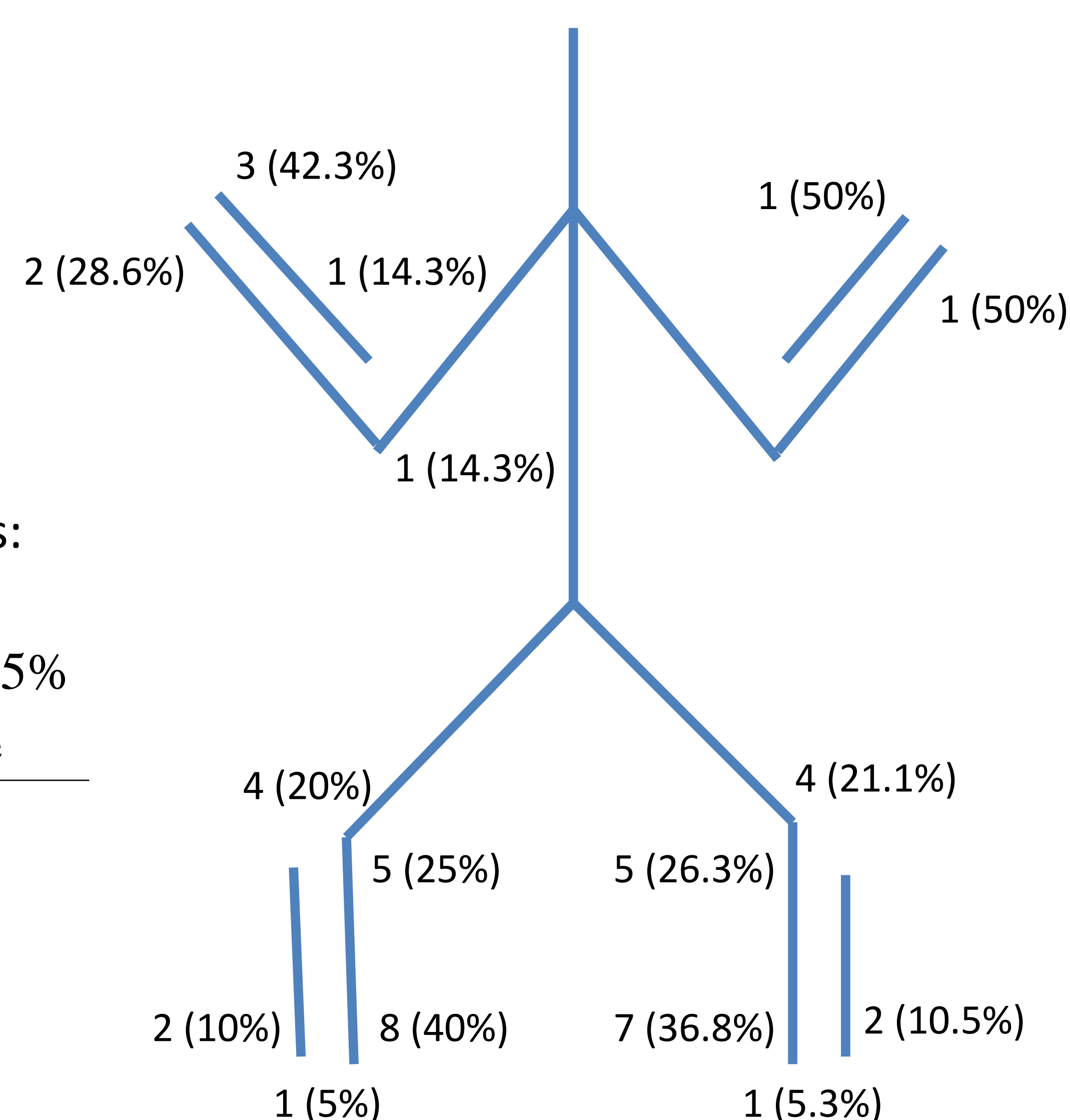


Figure 2. Geographical distribution of growth plate abnormalities. Absolute number and proportion (given as percentage of each limb) of growth plates affected. The ulnar is depicted by the longer line articulating with the humerus. Growth plate abnormality of both right and left base of 1st metatarsal shown at base of tibia and fibula.

- Of the 6 patients with documented angular deformity, 10 ankles were identified as having a varus malalignment. Partial fusion across the distal tibia with relative fibular overgrowth was the most common causative factor.
- 6 patients had documented leg length discrepancy that was most commonly due to significant shortening of the tibia.

Conclusion

- 1) This study has identified a high incidence of musculoskeletal morbidity.
- 2) Boys, being admitted to PICU at a younger age, and for a longer time are more likely to develop orthopaedic complications.
- 3) These complications are likely to be distal amputations and abnormalities of the distal tibial growth plate.
- 4) Close surveillance of these patients is recommended to identify growth arrest before the onset of clinically significant deformity.

References

1. Paize F, Playfor SD. Improvements in the outcome of children with meningococcal disease. *Crit Care* 2007; 11(5): 172.