



POSNA

The Core Curriculum

Fractures of the femoral neck

Objectives

1. Describe and draw the blood supply to the immature femoral head; including the infant, the 4 year old, the 10 year old, and late adolescent
2. Discuss the difference in incidence and mechanism of injury of femoral neck fractures in the child and the adult
3. Describe physical findings associated with a fracture of the child's femoral neck
4. List Delbet's classification of femoral neck fractures in children
5. Discuss factors predisposing to an increased risk of sustaining a Type I (transphyseal) femoral neck fracture. Describe diagnosis and management of this fracture
6. Describe a treatment approach to fractures of the immature femoral neck, including all categories of Delbet's classification
7. Discuss complications of femoral neck fractures in children, including incidence and management
8. Describe diagnostic features and management of stress fractures of the immature femoral neck
9. Discuss management strategies for subtrochanteric fractures

Discussion points

1. Why are the infant and patient with a metabolic disorder more susceptible to sustaining a type I fracture?
2. Are there any femoral neck fractures in children that can be managed conservatively? Which ones?
3. What is the role of capsulotomy in reducing the rate of complication of femoral neck fractures?
4. Draw Ratliff's 3 patterns of avascular necrosis complication femoral neck fractures in children.
5. When is open reduction indicated? What is the risk of open reduction?
6. What are the indications for fixing a stress fracture?

Discussion

Fortunately, femoral neck fractures are rare in children, as they are associated with a high complication rate. Knowledge of the blood supply to the immature proximal femoral epiphysis is necessary to intelligently manage these injuries. The medial circumflex femoral artery is the most important vessel, it then divides into branches which traverse the neck to penetrate the head. These

branches are vulnerable when the neck is fractured. In the infant, there are still some metaphyseal vessels penetrating the physis; these diminish markedly after 18 months. The posterior superior branch seems to have critical importance.

Most, but not all hip fractures in children result from severe trauma. A hip fracture, characteristically transphyseal, in an infant should arouse suspicion for the possibility of child abuse. These injuries can be mistaken radiographically for developmental dislocation of the hip if the history is not carefully weighed. MRI or arthrography may be helpful in establishing the diagnosis. Infants can generally be managed with cast. Transphyseal fractures in older children generally have a miserable prognosis, although Jerre has reported favorable longterm results. Transcervical and cervicotrochanteric fractures comprise the most frequent varieties of children's femoral neck fractures. If there is any instability, fixation of the fracture is indicated. The type of fixation (treaded pins, smooth pins, cannulated screws, or compression screws) is dependent on the age of the patient and location of the fracture. Anatomic reduction of the fracture is presently felt to be important in outcome, except for the infant with a type I fracture. Capsulotomy or aspiration has been advocated as an adjunct to fixation of the fracture as a measure to reduce the risk of avascular necrosis.

Subtrochanteric fractures can usually be managed conservatively, although some prefer internal fixation for older children and adolescents.

Complications consist of avascular necrosis (by far the most serious), coxa vara, physeal arrest, and nonunion. Physeal arrest without avascular necrosis in an older child is not difficult to manage, and attempts to avoid fixation crossing the physis are not warranted if there is any question of stability of the fracture. Ratliff has described a classification of avascular necrosis which has proven helpful in predicting outcome. Current modalities for managing avascular necrosis are not very effective.

Stress fractures are quite rare in the immature hip but have been reported. Protection from further displacement is paramount.

References

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