Supracondylar Fracture Of Humerus

Supracondylar humerus fracture is the most common pediatric elbow fracture. It usually follows a fall on an outstretched hand (abbreviated as FOOSH), and patients experience elbow pain and swelling. Diagnosis is made via X-ray showing elbow effusion, an anterior fat pad sign (sail sign), and a posterior fat pad sign. Non-displaced fractures can be treated by splinting and slinging the affected arm, while displaced fractures will require closed reduction with percutaneous pin placement. This type of fracture has numerous potential complications, including brachial artery injury, compartment syndrome with Volkmann ischemic contracture, cubitus varus deformity and median nerve injury.



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Mechanism

Fall On Outstretched Hand (FOOSH)

FOOSH to Fall On Outstretched Hand

A fall on a hyper-extended elbow or fall on outstretched hand (FOOSH) is the mechanism of injury, which most people do reflexively when they are falling forward. The supracondylar region of the humerus is an area of intrinsic weakness, and a fracture will occur when enough opposing force is transmitted down the arm after contact is made with the ground.

More Common In Children

Children

Due to their increased physical activity, children are more likely to fall and experience the type of mechanism to cause a supracondylar fracture of the humerus.

Signs & Symptoms

Elbow Pain & Swelling

Elbow with Pain-bolt and Swelling

Immediately following injury and subsequent fracture, children experience severe elbow pain, swelling, and limited range of motion of the elbow joint. Because of the associated complications, these children should be assessed quickly.

Diagnosis

X-ray Shows Elbow Effusion

X-ray vision showing E-fuse fluid

Soft tissue swelling within the elbow joint can be found on radiographs following supracondylar fracture. A fracture line may or may not be visible.

Anterior Sail Sign

Ant-eater Sailboat

On plain X-ray, an anterior sail sign is observed due to displacement of the anterior fat pad. It can be indicative of an occult fracture.

Posterior Fat Pad Sign

Posts with Fat Pad

On plain X-ray, visualization of a lucent crescent of fat in the olecranon fossa on a lateral view, indicates an elbow joint effusion. Posterior fat pad sign is commonly seen in supracondylar fracture in children or radial head fracture in adults. Normally, the posterior fat pad will not be seen on a lateral X-ray.

Treatment

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Non-displaced: Splint And Sling

Nun-dice using Splint and Sling for Nondisplaced Fracture

A non-displaced fracture refers to a fracture that is partial or complete but allows the bone to maintain alignment and even allow for movement. Non-displaced supracondylar fractures of the humerus can be treated with splinting and slinging of the affected arm.

Displaced: Closed Reduction With Percutaneous Pin Placement

Dice using Pins for Displaced Fracture

A fracture that goes completely through the bone and causes misalignment of the two broken ends is referred to as “displaced.” It is more complicated, but usually can still be treated with closed reduction (no open surgery) with percutaneous placement of a pin for support.

Considerations

Compartment Syndrome

Compartments-man

Direct injury to local vasculature in addition to soft tissue swelling and compression can lead to compartment syndrome. Ischemia allows for development of Volkmann ischemic contracture, a condition that causes extreme pain for the patient and is seen as a claw-like deformity of the hand.

Volkmann Ischemic Contracture

Volt-man showing Contracture

Direct injury to local vasculature in addition to soft tissue swelling and compression can lead to compartment syndrome. Ischemia allows for development of Volkmann ischemic contracture, or simply Volkmann contracture, a condition that causes extreme pain for the patient and is seen as a claw-like deformity of the hand.

Brachial Artery Injury

Brachial Archery-artery Damaged

Distal radial pulses should always be assessed in supracondylar fractures of the humerus. The brachial artery courses anteriorly to the humerus and is prone to injury if the humerus is anteriorly displaced. If absent pulses are identified then emergent vascular surgery is warranted.

Median Nerve Palsy

Median with Nerve Paused

The median nerve in the arm follows the course of the brachial artery so it is also at risk for injury following a supracondylar fracture. The median nerve’s subsequent branches such as the anterior interosseous nerve are also at potential risk of damage. Injury to the median nerve will cause both motor and sensory deficits in the hand, while injury to the anterior interosseous nerve will manifest with only motor deficits in the hand.

Cubitus Varus Deformity

Cube Vampires

If improper healing of a supracondylar fracture of the humerus takes place, then a cubitus varus deformity may occur. This deformity refers to medial deviation of the forearm in relation to the arm.

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