January 2011 Case of the Month

Right Elbow Pain

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CC: Right elbow pain

HPI: 22 mo male presents to pediatric sports medicine/ortho office for evaluation of right elbow injury.

Injury occurred one day ago. He was playing with his father. He started to fall backward and the father reached out to catch him. The father grabbed the right wrist as he fell backwards. Father reported hearing a pop. The child immediately cried and refused to move his elbow, keeping it in a flexed, slightly pronated position.

He was taken to the Emergency Department shortly after his injury. Right forearm x-rays were normal. Two attempts to reduce his radial head subluxation (nursemaid’s elbow) were done. The attending ED reports hearing a pop after the first attempt, but the child did not start bending his arm or using his elbow in the ED. He was splinted and sent for follow up with his PMD the next day.

The following day, the PMD noted that he was still holding his arm in a flexed, pronated position. One attempt to reduce a radial head subluxation (nursemaid’s elbow) was attempted in the office. He still refused to use the arm, so he was sent to the pediatric ortho clinic that afternoon.

There is no history of fall or prior trauma. There are no recently or currently illnesses. ROS negative for joint swelling or any previous orthopedic concerns.

Physical Exam:
General Appearance: Well developed, Well nourished and No acute distress

Vital Signs: 98.6 °F (37 °C)
Weight 11.822 kg (26 lb 1 oz) (32.83%)

HEENT: normocephalic/atraumatic, anicteric

Respiratory: Normal effort, no respiratory distress, no cyanosis
Cardiovascular: regular rate and rhythm, intact distal pulses
Examination of the Right Upper Extremity:

Neurovascular status/sensation: 
Normal motor and sensory exam of the ulnar, radial and median nerves, normal radial pulse, fingers well perfused with normal capillary refill.

Swelling/effusions: none noted- lacks spontaneous ROM of right elbow, holding it in a flexed position
Deformity: No Obvious Deformity

Tenderness: pain with supination over radial head, supination is limited slightly- likely secondary to pain

Exam proximal and distal to the injury site is: Normal

Skin: Intact

With the exception of the area of injury, bilateral range of motion, muscle tone, muscle symmetry and coordination are unremarkable.

He is holding his right elbow flexed

He will squeeze right and left hands equally well.

Left UE: normal exam

Past Medical History: born 36 weeks no complications, otherwise healthy and developmentally appropriate

Past Surgical History: none

Meds: Tylenol PRN

Allergies:

Environmental – none

NKDA

Family History: Noncontributory

Social History: lives with Parents

Developmental history: normal

X-rays: ED x-rays of forearm not available- report is normal

Dedicated Elbow x-rays done in office- results below:

A: Normal A/p view
B: posterior fat pad sign (arrow) without visible fracture

DDX: Elbow effusion without visible fracture
Occult fracture (either initial injury or caused by reduction attempts)
Persistent radial head subluxation
Soft tissue injury- annular ligament tear
Interposed soft tissue preventing full reduction
Infectious or post infectious effusion
Inflammatory/autoimmune cause for effusion

Further workup: Due to concern for interposed tissue preventing full reduction, an MRI was ordered.

Results of MRI show normal radial head- capitellar relationship, elbow effusion, no fracture, intact annular ligament and edema/post injury changes to the supinator muscle.
Figure 3 Elbow effusion (arrow) with no visible fracture. Note elbow is mostly cartilaginous with small area of calcification of the capitellum (arrowhead).

Figure 4A, 4B edema in supinator muscle- arrows

**Final Diagnosis:** Nursemaid’s elbow- reduced with associated supinator muscle injury. Unclear if supinator muscle injury occurred at time of initial injury or as a result of reduction attempts

**Case Management:** Patient was treated with a removable posterior arm splint for two weeks. No complications and arm function currently back to normal.
Discussion:
The initial presentation of this case is relatively straightforward. A small child sustains a longitudinal traction injury to the elbow and immediately stops using the arm. However, the persistent symptoms, multiple attempts at reduction and radiographic findings of an elbow effusion add a slight twist. Does the presence of an effusion on x-ray change clinical management? Previous studies have showed a relatively low rate (17%) of periosteal reaction on follow up x-ray (1). Small sample size MRI studies of similar patients have detected a fracture in 54% of patients with elbow effusion without visible fracture (2). So the debate remains if a fracture is present in the above scenario.

The anatomy of this young child favors a radial head subluxation (nursemaid’s elbow) as the initial diagnosis. In young children the radial head is oval in shape. The radial head is kept in anatomic alignment with the ulna in part by the annular ligament which originates from the ulna, encircles the radial neck and reattaches on the ulna. When the forearm is pronated, the anterior aspect of the radial head is more rounded. Longitudinal traction while the forearm is pronated can allow the radial head to slip under the annual ligament (3). This causes a radial head subluxation (nursemaid’s elbow). This injury occurs most in the 1-3 yo age group and rarely after age 6 since the radial head maturation anatomically prevents this from occurring as the child matures.

Treatment traditionally has included closed reduction by forearm supination under traction followed by elbow flexion. The reported success rate is about 84-92%. However, the hyperpronation technique, longitudinal traction followed by hyperpronation of the wrist, has been shown to have a success rate as high as 97.5% and has been successful when the supination-flexion technique has failed (4).

In this case, after several reduction attempts without clinical improvement, iatrogenic injury or inaccurate history were additional considerations. There was some concern that the anatomic relationship between the radial and ulna was still impaired. Both MRI and ultrasound were imaging options. An ultrasound could have been done in the office if the technical expertise and ultrasound equipment were available. The choice to proceed with MRI was in part due to accessibility.

One of the major limitations of MRI in this age group is the need for sedation. U/S offers the advantage of no sedation and being relatively quick. If U/S can show similar sensitively and is easily accessible, then U/S may become the imaging option of choice in the future for difficult cases like the one presented.

Ultrasound is currently being investigated in the ED setting as a fast screening evaluation of pediatric elbow injuries. Ultrasound has identified occult fractures when an elbow effusion was present, but x-rays were otherwise normal (5). Ultrasound has been able to identify elevated and normal posterior fat pads that correlated with X-ray (6). Ultrasound is also starting to detect lipohemarthrosis within an elevated fat pad which correlates with an occult fracture more that an isolated joint effusion (7).
At the current time, MRI remains the goal standard for imaging. But as in-office ultrasound becomes more accessible to the primary care sports medicine physician or orthopedic surgeon, ultrasound may become a better option for young patients.

References


