The Role of Sonography in Detecting Radial Head Subluxation in a Child

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ABSTRACT: Injuries around the elbow joint in children can be difficult to diagnose on the basis of findings on physical examination and radiographs. We present the case of a 4-year-old girl with a probable subluxation of the radial head, based on the findings on physical examination and radiographs. Radiography raised the possibility of a radial head subluxation. Sonography demonstrated displacement of the cartilaginous head of the radius away from the capitellum in the affected elbow. The child underwent corrective surgery. During fluoroscopy, results of an ulnar stress test were positive for lateral ligament tears. The patient’s arm was put in a cast for 6 weeks. At 1-year follow-up, the patient had full range of motion of the elbow without pain. We present the findings of sonographic studies used to confirm the diagnosis.

RADIAL HEAD SUBLUXATION

Radial head subluxation is uncommon in children following trauma to the elbow. Physical findings may not be specific but include tenderness over the radial aspect of the elbow and positive results on a varus stress test. Radiographs alone are usually nondiagnostic, and to make an accurate diagnosis radiographs under stress are usually needed. To perform these stress tests, general sedation or local anesthesia to the joint is often needed. Both of these are associated with the risk of infection, and not easily performed in children. However, sonography has already been used with success to confirm this diagnosis. In this report we describe the case of a 4-year-old girl whose probable diagnosis of radial head subluxation was successfully confirmed by sonography.

CASE REPORT

A 4-year-old girl was admitted to the emergency department at Sapir Medical Center after falling on her extended right elbow. Marked tenderness over the lateral side of the elbow was noted, and the child could not actively move her elbow. Radiography was performed, raising the possibility of radial head subluxation (Figures 1–2). Physicians from Sapir Medical Center, Soroka Medical Center, and Hillel-Yaffe Medical Center consulted by telephone to determine the best noninvasive approach to use to make a diagnosis. A sonographic examination of the injured elbow (with comparison to the uninjured elbow) was performed using an HDI 5000 SonoCT ultrasound scanner (ATL-Philips, Bothell, WA) equipped with a 5–12-MHz transducer. Sonography demonstrated displacement of the cartilaginous head of the radius (with an ossification center) away from the capitellum in the affected elbow (Figures 3A and 3B). After these imaging procedures were completed, the patient had surgery at Sapir Medical...
Center. Under fluoroscopy, results of an ulnar stress test were positive for lateral ligament tears, confirming the sonographic diagnosis. Using a lateral incision, the surgeon reduced the subluxation, and sutured the torn lateral collateral ligament. The patient’s arm was put in a cast for 6 weeks. At 1-year follow-up, the patient had full range of motion of the elbow without pain.

**DISCUSSION**

Fractures and dislocations in the region of the elbow can be difficult to identify on plain radiographs. In very young children, the absence of ossification in the physes and the inability of the patient to communicate well complicate the process of establishing an accurate diagnosis. Even in older children, damage to the elbow joint is difficult to evaluate, and the clinical appearance of an injured elbow may be unremarkable.

For the case of our patient, the possibility of a radial head subluxation became apparent on physical examination and radiography, but a definite diagnosis could not be made with those results alone. One option is to examine the patient under local or general anesthesia and apply varus and valgus forces to elucidate the probable instability that led to the subluxation. However, it is very difficult not only to perform an accurate physical examination of a child using local anesthesia of the joint but also to justify the use of general anesthesia to establish a diagnosis. In the absence of any ossification of the physes, single- and double-contrast arthrography could also be used. This method is invasive.

The use of sonography to assess elbow pain has been described in cases of tendinitis, bursitis, torn tendons, joint effusion, intra-articular bodies, nerve injury, and bone fractures (including fractures of unossified epiphyseal cartilage). In a recent study in baseball pitchers with thickening of the collateral ligament, Nazarian et al used sonography to demonstrate the anterior collateral ligament of the elbow. In the case of our patient, we used sonography to compare the injured elbow with the unaffected elbow. With this comparison,
we accurately demonstrated the loss of contact between the cartilage of the radial head and the capitellum in the affected elbow.

MRI is another noninvasive imaging technique that can be used to confirm a possible diagnosis of subluxation with a ligament tear. However, MRI is more expensive and time consuming than sonography, and it does not permit real time examination of the joint.

We conclude that sonography is a noninvasive, relatively inexpensive, and easily used method for confirming a possible diagnosis of elbow joint subluxation. We advocate its use in such cases if the diagnosis is initially uncertain.

REFERENCES