Pulled elbow in children

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Abstract

Question Our practice is seeing children with relatively minor injuries to their elbows, with a history of "swinging" them when their hands are being held to cross the road. Nothing is usually found on a physical examination. I know that this is likely a "pulled elbow." Can we manage this in the clinic setting rather than sending the family to the emergency department? What would be the best course of action in the clinic setting?

Answer Pulled elbow, also called *nursemaid's elbow*, is a radial head subluxation caused by axial traction or a sudden pull of the extended pronated arm, and it is a very common phenomenon. The practice of swinging children while holding their hands should be abandoned. In the case of pulled elbow, the child usually avoids moving the affected arm, holding it close to his or her body, without considerable pain, and no obvious swelling or deformity can be seen. While a fracture should be excluded, pulled elbow can usually be identified based on this presentation. The reduction procedure can easily be done in the office setting, with an 80% success rate and no complications. The hyperpronation maneuver (holding the elbow at 90° and then firmly pronating the wrist) to reduce pulled elbow has been found to be better than a supination-flexion maneuver (holding the elbow at 90° with one hand, supinating and flexing the elbow rapidly with the other) and should be exercised first. When 2 trials of reduction are unsuccessful, the child's arm should be splinted and the family should be sent for further evaluation.

Pronation douloureuse du coude chez l'enfant

Résumé

Question Notre clinique reçoit des enfants souffrant de blessures relativement mineures au coude, après avoir été « balancés » par les mains en traversant la rue. Nous ne trouvons habituellement rien à l'examen physique. Je sais que c'est probablement une pronation douloureuse du coude. Pouvons-nous prendre en charge une telle blessure à la clinique au lieu d'envoyer la famille à l'urgence? Quelle serait la meilleure marche à suivre sur place, à la clinique?

Réponse La pronation du coude, aussi appelée *coude de nourrice,* est une subluxation de la tête radiale causée par une traction axiale ou une traction soudaine du bras tendu en pronation. C'est un phénomène très courant. Il faudrait cesser l'habitude de balancer les enfants en les tenant par les mains. Dans le cas d'une pronation douloureuse du coude, l'enfant évite habituellement de bouger le bras blessé, en le tenant près de son corps, sans douleur considérable ni enflure ou déformation évidente. Il faut exclure la possibilité d'une fracture, mais la pronation douloureuse du coude peut généralement être reconnue en se fondant sur cette présentation. La procédure de réduction peut aisément être effectuée en clinique, avec un taux de réussite de 80 % et sans complications. Pour réduire la subluxation du coude, il a été démontré que la manœuvre de l'hyperpronation (tenir le coude à 90° avec une main, puis effectuer une ferme pronation du poignet) était supérieure à la manœuvre de supination-flexion (tenir le coude à 90° avec une main, puis effectuer rapidement avec l'autre une supination et une flexion). L'hyperpronation doit donc être exécutée en premier. Lorsque 2 tentatives de réduction ont échoué, il faut mettre le bras de l'enfant en écharpe et diriger la famille en consultation pour une évaluation plus approfondie.

Radial head subluxation is the most common cause of upper extremity immobility in preschool children and accounts for two-thirds of upper extremity injuries.[1] It is also known as *pulled elbow* or *nursemaid's elbow*. Children between the ages of 1 and 4 are most susceptible to this type of injury, and it is slightly more common in girls and in the left arm.[2,3] Pulled elbow is defined as a radial head subluxation caused by axial traction or a sudden pull of the extended pronated arm.[4] The radial head moves out of the weak annular ligament and capitellum, resulting in slipping over and subluxation of the radial head into the supinator muscle and annular ligament.[5,6] Presentation of pulled elbow might include sudden acute elbow, wrist, and shoulder pain.[7] The child will avoid moving the affected arm, holding it close to his or her body. No obvious swelling or deformity can be seen in the injured elbow. Typical history might include pulling the child along by the hand or the child tossing and turning with his or her arm under the body.[3] In a recent large US study using the National Electronic Injury Surveillance System

(an estimated 430 766 children aged 5 or younger were treated for this indication in emergency departments [EDs] from 1990 to 2011), falling down from a high place or tumbling were reported as the most common mechanisms of injury.[8] In such cases, it could be difficult to distinguish pulled elbow from an elbow fracture and dislocation.

Assessment

Initial assessment should distinguish a radial head subluxation from a more substantial injury such as a dislocation of the elbow bones or a fracture. An x-ray scan can exclude fracture, dislocation, and other bony abnormalities such as osteochondritis dissecans, but it is usually unnessasary[9] owing to typical history at presentation. However, supracondylar humerus fractures are frequently missed injuries.[10] Hence, a detailed history and physical examination should be done to think about a differential diagnosis. Practitioners should consider imaging of the elbow if the history consists of falling from a high place or tumbling, or if the precise history is unclear and there are abnormal physical examination findings.[3]

Reduction procedure

Once pulled elbow is highly suspected, a simple office-based procedure should be performed. Two main techniques are available for immediate reduction. In the supination-flexion (SF) technique, the physician holds the child's elbow at 90° with one hand while rapidly supinating the child's wrist and flexing the elbow with the other. In the hyperpronation (HP) technique, the physician holds the child's elbow at 90° with one hand while firmly pronating the child's wrist with the other.[11]

A debate regarding the choice of procedure is ongoing in the scientific literature.[12,13] As early as 1886, J. Hutchinson reported the HP technique to be more successful.[14] In a recent meta-analysis with 9 studies and 906 participants in EDs or ambulatory care centres, the HP method was considered more effective at first attempt.[11] The failure rate of HP ranged from 4.4% to 20.9% (mean failure rate was 9.2%), and the SF failure rate ranged from 16.2% to 34.2% (mean failure rate was 26.4%). The estimated number needed to treat was 6 (95% CI 5 to 9).[11]

A recent systematic review and meta-analysis[15] with 7 randomized trials from 1998 to 2016, including 701 patients having primary and recurrent pulled elbow in any health care setting, revealed similar results. It also demonstrated that HP was more effective than SF was (risk ratio of 0.34; 95% CI 0.23 to 0.49; number needed to treat was 3.8).

Two studies reported that practitioners can reduce most pulled elbows at first attempt using either maneuver.[16,17] Success at first attempt was reported in 80.7% and 87.8% of children in prospective, pseudorandomized, controlled, non-blinded studies from an urban Turkish tertiary ED (150 children)[17] and a Spanish tertiary pediatric orthopedic unit (115 children), respectively.[16]

Successful reduction is confirmed by a satisfying "click" sound at the time of reduction (70% of the time).[3] The child will usually start using full movement, including pronation and supination, in 10 to 15 minutes after the reduction,[18] with no concerns about adverse effects related to the reduction maneuver.[11] If the first try proves unsuccessful, further attempts are to be considered. The second attempt using HP was more successful (70%) than SP (30%) in a recent meta-analysis with 6 studies and 624 participants in EDs or ambulatory care centres.[11]

While a second attempt appears suitable for many children with a clear history and physical examination findings that suggest a pulled elbow, alternative diagnoses should be considered after multiple failed attempts. A plain x-ray scan or ultrasound of the injured elbow might be helpful.[19]

Recurrence

Recurrent pulled elbow is common and estimated at 27% to 39%,[20,21] mostly among children in the first 2 years of life.[22] If neglected, it might in rare cases result in a permanent functional disability, and repetitive occurrence of the pulled elbow might ensue.[22,23] On rare occasions, pulled elbow might be one of the causes of osteochondritis dissecans of the radial head,[24] and an irreducible pulled elbow might need surgical reduction.[25] One small US prospective randomized study (N=64) suggests that a 2-day cast application after manual reduction is effective to reduce recurrent pulled elbow.[26] In this study, the recurrence rate of pulled elbow in a control group (without cast application) was 13% at 2 to 5 days after manual reduction. Recurrence dropped to 0% when the elbow was left in a functional position with flexion at 90°.

Conclusion

Pulled elbow is usually caused by a fall, tumbling, or a sudden pull of the arm. The HP method is more successful for reduction. Practitioners should consider imaging of the elbow when the history is unusual or physical examination findings are abnormal. Reduction is successful on first attempt for most children, and a 2-day cast application might be needed for children after several trials of reduction and after imaging shows no fracture or other pathology.

Competing interests
None declared

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