



ORIGINAL RESEARCH ARTICLE

PULLED ELBOW: A PAEDIATRICIAN'S EXPERIENCE

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ABSTRACT

Pulled elbow is a common condition but may not be recognized by most of the paediatric physician. The purpose of this study is to evaluate the common age, mechanism, site of pain, reduction maneuver and its efficacy among paediatric population. Among 40 patients, 31 patients meeting the inclusion criteria were included in this study. Simple analytical method was used to analyze the data due to small number of patients. Supination-flexion maneuver was used for reduction. Among 31, 15 (48.38%) were male and 16 (51.61%) were female. The mean age was 3.12 years, mean arrival time was 13.03 hours. 32.25% of patients had history of pulling the child up and 41.93% of patient complained of pain around forearm. All patient underwent supination- flexion maneuver and was successful in first attempt, except one, that required second attempt. There were no recurrences. There should be a high index of suspicion among paediatricians, so that they can correctly diagnose and treat this condition satisfactorily.

Keywords: Pediatrics, Pulled elbow, Supination - flexion maneuver

INTRODUCTION

Pulled elbow is one of the most common upper extremity injury in young children where the head of the radius is pulled partially through the annular ligaments.⁶ Though it commonly affects children under 5 years of age it can be seen in children as old as 7 years.⁷ Even Infants and adults are not immune to this condition.¹⁰ Traction of a hyperextended elbow with forearm pronation results in subluxation of radial head in children due to the eccentric shape of radial head.¹¹ Annular ligament slips over the radial head into the space between radial head and capitellum causing a pulled elbow. Active supination is hindered by a true mechanical block¹²

The condition mostly affects young children. There is an acute onset of considerable pain, and excessive cry and parents are alarmed because the child suddenly loses the use of an arm. The child holds the elbow by the side in slight flexion with the forearm pronated. Passive flexion and extension of the elbow

may be in normal range, but supination of forearm is limited and voluntarily resisted.

It is a common condition which is well known for many years and is well recognized by orthopedic surgeon, however it is often unrecognized / misdiagnosed by paediatricians. Even though paediatricians encounter many such cases, children are often thought to have brachial plexus injury⁶

Children with pulled elbow are usually easily recognized by the typical history, clinical presentation and complete relief of the symptoms immediately after the reduction that satisfies both the parents and the paediatrician.

Material and method:

This is a prospective (observational) study carried out in the office of paediatrician from January 2014 to June 2015 at Chitwan Om hospital Pvt Ltd,

Bharatpur -10, Chitwan. Patients younger than 7 years of age with suggestive history of pulled elbow were included. Patients with marked deformity, local swelling, abrasion and ecchymosis at elbow, patients of polytrauma and patients with history of recurrent pulled elbow were excluded from the study. After complete physical examination of the patients, who met the study criteria were reduced with supination-flexion maneuver without analgesia and without anaesthesia. If the child started to use the injured arm, reduction was accepted as being successful. All the data were recorded and analyzed.

RESULTS

A total of 31 patient were included in this study for analysis. The youngest was 0.5 years old and eldest was 7 years with mean age of 3.12 years. There was no patient below the age of 0.5 years. Among them 15(48.39%) were male and 16(51.61%) were female.

Table 1: showing age group and sex

| Age group | <1yr | 1 to 3 yr | >3 yr | Total (%) |
|-----------|------|-----------|-------|------------|
| Male | 1 | 10 | 4 | 15 (48.39) |
| Female | 3 | 7 | 6 | 16 (51.61) |
| Total | 4 | 17 | 10 | 31 (100) |

Out of 31 patient enrolled, 4(12.9%) were 1yrs or less, 17(54.83%) were between 1 to 3 years of age and 10(32.25%) were >3 yrs of age.

Among 31 patients, 18(50.06%) had left arm and 13(41.93%) had right arm involvement. The duration of symptom on arrival ranges from 0 to 48 hours. The mean arrival time was 13.03 hours from the event.

Site of pain:

Table 2: Site of pain and age group

| Site of pain | <1 | 1 to 3 | 3 to 6 | >6 | Total (%) |
|-------------------|----|--------|--------|----|------------|
| Unknown | 6 | 3 | X | X | 9 (29.09) |
| Elbow alone | X | x | 1 | X | 1 (3.2) |
| Forearm alone | x | 11 | 2 | X | 13 (41.93) |
| Wrist alone | X | 1 | 1 | 2 | 4 (12.90) |
| Forearm and wrist | X | 2 | 2 | X | 4 (12.90) |
| Total | 6 | 17 | 6 | 2 | 31 (100) |

Maximum percentage (41.93%) of patient located their site of pain around the forearm alone. Among the studied population 29.09% of patients had a feature of pseudoparalysis eg. elbow was extended and forearm was in pronated position and were unable to locate the site of pain.

Mechanism of injury:

Table-3: Showing mechanism of injury

| Mechanism | <1yr | 1-3yr | 3-6y | >6yr | Total (%) |
|-----------------|-------|-------|-------|------|------------|
| Roll over | 2 | 1 | x | x | 3 (9.6) |
| Jerk on arm | 2 | 4 | 3 | x | 9 (29.03) |
| Breaking fall | X | 4 | 3 | 2 | 9 (29.03) |
| Pulled child up | 1 | 8 | 1 | X | 10 (32.25) |
| Total | 5 | 17 | 7 | 2 | 31 (100) |
| % | 16.12 | 54.89 | 22.58 | 6.4 | 100 |

In our study, 58.89% of patients diagnosed as pulled elbow belongs to the age group of 1 to 3 years. The commonest mechanism was pulling the child up (32.25%). Left arm (58.06%) was involved more than right (41.93%).

Once they were diagnosed clinically, manipulation was done with supination-flexion maneuver without any form of anaesthesia and analgesia. All reductions were successful in the first attempt except one case, which was recognized and re-manipulated after 15 minutes and was successful. 23.4%(7 of 30) recovered within less than 10 minutes and 76.6% (23 of 30) were recovered after 10 minutes, except one, in whom re-manipulation was needed after 15 minutes on the same day.

Successful reduction was labeled, when initial clunk was felt during manipulation and supination-pronation, flexion-extension of involved forearm was fully achieved.

DISCUSSION

Pulled elbow is a low velocity injury common in early childhood. Toddlers and preschoolers are at high risk. It is also referred to as Nursemaid elbow or subluxation of radial head⁷

Several studies showed that the children are at greater risk in their toddler and preschooler age.

In our study, 54.83% children were toddlers (1 to 3 years) and 22.58% preschooler (3 to 6 years) age group, this result is consistent to other studies.^{6, 7} this is because during this age children are at their most awkward and recalcitrant and do not obey to their parents, grandparents and seniors.⁶

Whatever may be the mechanism, pulled elbow is basically caused by a traction injury where force is applied longitudinally to a pronated elbow⁹. Among 31 patients, 9.6% had a history of roll over, 29.03% had history of Jerk on arm, 29.03% had history of breaking a fall and 32.25% had history of pulling the child up and 9.6% had a confusing history of rolling over. In N Sai Shanker series about 30% had no history of traction.⁵

All together 19.35% cases arrived within 0 to 6 hrs after the incident, whereas 22.58% of cases arrived within 6 to 12 hrs, 51.61% arrived within 12 to 24 hrs, and 6.45% of patient after 24 hrs in the office with painful and dangling arm. In Illingworth series, they have reported that 62% of cases were attended office within 6hrs, whereas in our study, only 19.35% attended office within 6 hours. It may be due to late incident time, unavailability of transportation or simply ignorance of parents.

In this study 51.61% of patients complain of pain around forearm alone and 12.90% pointed pain around the wrist. In Illingworth series 53% of patient out of 64 complained of pain around elbow and 15 (23%) were predominantly complaining of pain in the wrist. In contrast to these study out of 115 patient, Serafin Garcia-Mata, 30.4% of patient had pain in the wrist⁷ in their study. So the site of pain may be in wrist, forearm, elbow or may be in shoulder or may be in combination of one or other site and not consistent.⁶

Those attended, were subjected to supination-flexion maneuver. Because it is the standard reduction maneuver mentioned in the majority of publications.⁷ we did not attempt another method known as Hyperpronation maneuver. In this study, 30 cases were successful in first attempt and only one case needed second attempt and was successful with this supination-flexion maneuver.

Parents were explained regarding the manipulation procedure beforehand. The child's confidence was

won by gently holding and supporting the injured arm. During the procedure, the operator held the child's wrist with one hand and palpated the radial head. The child's attention was diverted, then the forearm was gently and forcibly supinated with quick motion, together with upward pressure on the radial head. A palpable click in the region of radial head or sometimes audible click signals successful reduction.

In our study, after the procedure, elbow was flexed and extended fore arm was supinated and pronated to confirm an unobstructed range of motion. After reduction parents were instructed to breast feed the child below 2yrs of age and syrup paracetamol was given in case of pain. They were asked to wait for 15 minutes and if they were able to move their forearm and wave their hands, were taken as successful reduction and were discharged. They were not given any form of forearm support in contrast to Assad M,Taha series. In our series, no one reported as recurrence but in Assad M.Taha series recurrence was reported as high as 13%, 2-5 days after reduction.^{1, 2, 3}

Radiographs:

Use of radiographs for the diagnosis and management of Pulled elbow has been questioned. There is no radiographic abnormality associated with this problem¹² many authors have suggested that no radiographs are necessary with a history consistent with the diagnosis of pulled elbow^{8, 10} So, in our study, children with a history of axial traction on a pronated arm suggestive of pulled elbow underwent reduction without any radiographic examination.

Minagawa was the first man to report J-sign as the specific ultrasonography finding of a pulled elbow.¹³ However, no ultrasonography examination was done in our patients.

CONCLUSION

Pulled elbow is a common problem observed in children in routine medical practice. In cases of sudden unexplained excessive crying in otherwise healthy infants and young children, one has to consider a differential diagnosis of pulled elbow. If the pediatrician is sure about the diagnosis and is well versed with the reduction technique, there is no harm in attempting reduction. A successful

reduction will provide the doctor and the parent great satisfaction but more importantly provides instant relief to the child who is usually in great deal of pain. Therefore this simple reduction technique should be in the armory of every paediatrician.

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