ORIGINAL RESEARCH PAPER

Volume-7 | Issue-8 | August-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

SCREENING FOR HIP SUBLUXATION IN CHILDREN WITH CEREBRAL PALSY

Rehabilitation Science

Dr. Ritu Majumdar DNB (PMR) Professor& Head Department of PMR Lady Hardinge Medical College & Associated Hospitals New Delhi. 110001

Dr. Govind Singh* MD (PMR) Assistant Professor Department of PMR Dr Sampurnanand Medical College, Jodhpur. Rajasthan-342003 *Corresponding Author

Dr. Sonal Chauhan D.P.M.R, DNB (PMR) Associate Professor Department of PMR Lady Hardinge Medical College & Associated Hospitals New Delhi. 110001

Dr. V.K.Gupta D.Ortho, DNB PMR Consultant Department of PMR Lady Hardinge Medical College & Associated Hospitals New Delhi. 110001

ABSTRACT

This study was conducted to assess the magnitude of hip subluxation and its correlation with Gross motor function classification scale (GMFCS) and role of combined hip abduction angle (CHAA) in early identification of cerebral palsy children at risk for hip subluxation. This cross sectional study included 114 Cerebral Palsy children (mean age 3.95 years) who were screened for hip subluxation and were classified according to GMFCS scale and correlated with migration percentage. CHAA was measured using goniometer. The magnitude of hip subluxation in our study was 15 % which was more in non-ambulators as its prevalence increases from GMFCS level 1 to 5. CHAA is a useful test for early identification of hip at risk for subluxation as chances of hip subluxation increases with decreased CHAA angle.

KEYWORDS

Subluxation, Cerebral Palsy, Spasticity

INTRODUCTION

Cerebral palsy (CP) is a static disturbance in developing foetal or infant brain but the associated musculoskeletal pathology is progressive. Equinus and hip subluxation are most common musculoskeletal problems affecting children with cerebral palsy.[1]

Hip subluxation prevalence increases with severity of impairment and in children who are unable to walk independently, can result in pain, difficulty in sitting and maintaining pelvic hygiene. It sometimes leads to spinal deformity also.[2,3]

Hip subluxation develops due to spasticity and shortening of muscles around hip joint resulting in muscle imbalance, acetabular dysplasia and increased femoral anteversion[2] leading to hip dislocation, if left untreated. Hence, hip surveillance is important in these children for early identification and management of hip subluxation.

Gross motor function classification scale (GMFCS) is a reliable tool for classification of gross motor function with non ambulators (GMFCS 4 and 5) at higher risk of developing hip subluxation.[4,5]

Migration percentage (MP) is a radiographic measure to quantify hip subluxation on standardised plain Antero-Posterior radiograph of pelvis.[6]

Combined hip abduction angle (CHAA) is a measure of hip range of motion with loss of hip abduction suggesting higher chances of hip subluxation.[7]

AIMS & OBJECTIVES

1) To assess Magnitude of Hip subluxation in children with CP
2) To Correlate Hip subluxation with GMFCS level
3) To assess the role of CHAA in early identification of children at risk for Hip subluxation.

MATERIALAND METHODS

A cross sectional study was conducted in the Department of Physical Medicine & Rehabilitation, Lady Hardinge Medical College & Associated Kalawati Saran Children's Hospital from January 2016 to 0ctober 2016 on children with cerebral palsy in the age group 2 – 7 years. We excluded children who were previously treated with botulinum toxin- A injections, surgical correction of Lower limbs or having other hip pathologies. Children on exercise therapy, orthosis and taking anti spasticity/antiepileptic medication were continued in the study.

163 children were screened for the study; 26 had undergone botulinum toxin-A injection, 20 had undergone soft tissue surgery and 3 had other hip pathology. After excluding them, 114 children (228 hips) were selected for the study. 87 boys and 27 girls with mean age 3.95 formed our study group.

Children were classified with GMFCS scale with 05 in GMFCS 1, 19 in GMFCS 2, 18 in GMFCS 3, 34 in GMFCS 4 and 38 in GMFCS 5 level.

Standardised anterior-posterior view of the pelvis was obtained with the children in supine position, with symmetrical pelvis, hips in neutral position and lumbar spine flat. Migration percentage was calculated using standardised pelvis AP radiograph. (Image 1)

A cut-off of 33% or greater of hip migration index was taken in our study for hip subluxation.

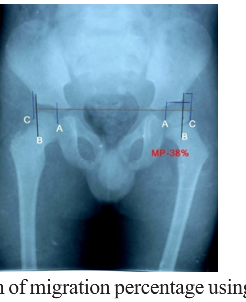


Image 1- Calculation of migration percentage using standardized pelvis AP radiograph

Combined hip abduction angle was measured using goniometer, as the angle made between the axis of both thighs with both hips and both knees in flexion. (Image 2)

Image2-Measurement of CHAA through Goniometer

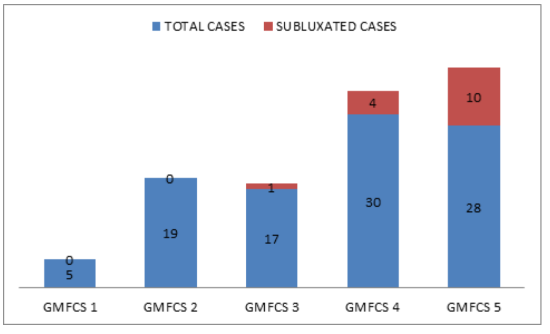
RESULT

There was no statistically significant difference in our groups in age, sex & GMFCS levels.

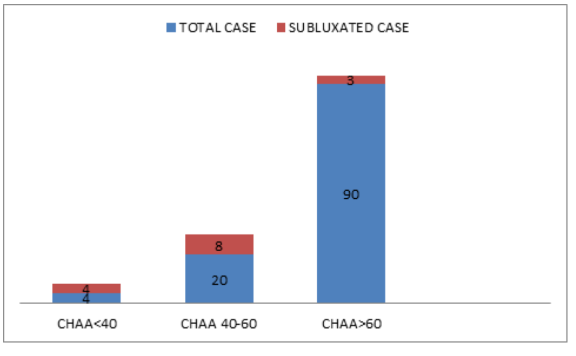
The magnitude of hip subluxation in our study was 15 %.

65% was found in GMFCS 5, 30 % in GMFCS 4, 5% in GMFCS 3 and 0% in GMFCS 1 &2. (P value < 0.05 using Linear-by-Linear Association) (Graph1)

CHAA was also measured in each child and were divided into three groups less than 40 degree, 40 to 60 degree and more than 60 degree. We found that eighty percent of children having hip subluxation were having CHAA value less than 60 degree. The sensitivity was 100 % when CHAA was below 40 degree. (Graph 2) CHAA value also decreased from GMFCS level1 to 5.



Graph 1- Showing increase prevalence of hip subluxation from GMFCS 1 to 5



Graph 2- Showing increase chance of hip subluxation with decreased CHAA angle

DISCUSSION

In children with CP, the degree of femoral anteversion is correlated with GMFCS level; a progressive increase in femoral anteversion has been demonstrated from GMFCS I to III with a plateau in femoral anteversion values from GMFCS III to V.[8] In addition, children with CP have been shown to have increased femoral neck shaft angle when compared with children without cerebral palsy; femoral neck shaft angle increases from GMFCS I to V.[8]

Recent studies have indicated the rate of hip subluxation (>30-33% MP) to be around 27 to 35%[1, 9, 10] and directly related to Gross Motor Function Classification System (GMFCS)4 level with a higher level of incidence in children who have greater neurological involvement (GMFCS I = 0% versus GMFCS V = 90%).1 In children who are ambulatory, 3 to 7% will develop hip subluxation.[11]

In our study, magnitude of hip subluxation was around 15 % .It was directly related to GMFCS level with 0% in GMFCS 1 & 2, 5% in GMFCS 3' 30 % in GMFCS 4 and 65% in GMFCS 5. In children who were ambulatory, around 5 % were having hip subluxation.

Soo etal recommended radiographs every 6 months if hip abduction is restricted[1] and Hogglund suggested that a decreasing hip range of motion in children warrant early radiographic hip screening[9]. Hence, CHAA can be a measure for early identification for children at risk.

Akshay Divecha, Atul Bhaskar conducted a study to assess the utility of combined hip abduction angle for hip surveillance in CP, the overall sensitivity was 74% and specificity was 67% compared to migration percentage.[7] In our study, sensitivity was 80 % when CHAA value was less than 60 degree and 100 % when CHAA value was below 40 degree.

Measurement of CHAA cannot replace the radiographic examination but can be used as screening measure for early identification of children at risk for hip subluxation.

Assessment of spasticity was done using modified Ashworth scale but no correlation was found between increasing spasticity and hip subluxation. Soo et al. in their study found that hip subluxation incidence was equal in all CP subtype whether hypotonic or spastic and suggested to use GMFCS scale.[1]

Conclusion:

- Regular hip surveillance is required in non ambulatory CP Children after 2 Years of age to rule out impending hip subluxation & its early intervention
- Migration percentage & CHAA are useful indicators of hip subluxation
- GMFCS levels, 3 to 5 were found to be associated with hip subluxation in Children with CP as compared to GMFCS levels 1 & 2
- Spasticity was not found to be associated with hip subluxation
- Children undergoing regular rehabilitation had lower incidence of hip subluxation thus early intervention plays an important role along with other therapeutic interventions

Limitation of our study:

Our study included only 114 children and it was a cross sectional study. A longitudinal study with large number of children will further elaborate the study findings.

References

1. Soo B et al. Hip displacement in cerebral palsy. J Bone Joint Surg. 2006; 88-A: 121-129.
2. Pountney, Green, Bard. Repeatability and limits of agreement in measurement of hip migration percentage in children with bilateral cerebral palsy May 2003; vol 8; no 5.
3. Bagg et al. Long term follow-up of hip subluxation in cerebral palsy patients. J Pediatr Orthop.1993; 13:32-36.
4. Palisano et al. Development and reliability of a system to classify gross motor function in children with cerebral palsy. Dev Med Child Neurol. 1997; 39:214-223.
5. Wood E, Rosenbaum P. The gross motor function classification system for cerebral palsy. A study of reliability and study over time. Dev Med Child Neurol 2000: 42:292-6.
6. Reimers J. The stability of the hip in children: a radiological study of the results of muscle surgery in cerebral palsy. Acta Orthop Scan. 1980; 184: (Supp) 1-100.
7. Akshay Divecha, Atul Bhaskar. Utility of combined hip abduction angle for hip surveillance in children with cerebral palsy. Indian Journal of Orthopaedics 2011: 45(6):548-552.
8. Robin J et al. Proximal geometry in cerebral palsy. J Bone Joint Surg. 2008; 90-B: 1372-1379. Vidal J et al. The anatomy of the dysplastic hip in cerebral palsy related to prognosis and treatment. Int Orthop. 1985; 9:105-110.
9. Hagglund G et al. Characteristics of children with hip displacement in cerebral palsy. BMC Musculoskeletal Disorders. 2007; 8:101-107.
10. Connelly A et al. Hip surveillance in Tasmanian children with cerebral palsy. J Paediatric Child Health. 2009; 45:437-443.
11. Morton RE et al. Dislocation of the hips in children with bilateral spastic cerebral palsy, 1985-2000. Dev Med Child Neurol. 2006; 48:555- 558.