TRAUMATIC HIP DISLOCATION IN CHILDREN YOUNGER THAN 3 YEARS: A SERIES OF 3 CASES

Navin Balasubramanian¹, N. Ganesh Babu², Sindhuja P³, G. Ram Kumar⁴

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ABSTRACT: The musculoskeletal anatomy of children is quite different from that of adults. The capsule, periosteum and other soft tissues surrounding the joints is very pliable and dislocations can occur even following trivial injuries. However dislocation occurring in a child population is a rare entity. There are a few case reports of hip dislocations in children < 3 years. We present here a series of 3 cases of paediatric hip dislocations which presented to us for management. The age of the children were between 24-27 months. Incidentally all 3 patients were boys and all 3 were right sided dislocations. None of them had any associated fractures. Two of them had a fall from height and one child fell off a slide. All 3 patients presented within 5 hours following injury. Closed reduction under anaesthesia was performed and post reduction the children were immobilized in a broom-stick plaster for 6 weeks. All children were followed up with serial x-rays and a MRI done immediately following reduction then at 6 and 18 months. There was no evidence of chondrolysis or avascular necrosis in any of the children at the last follow-up. They all had full range of movements with no limitation of function. We conclude that with early recognition and early reduction of the hip within the golden period (6 hours) the occurrence of complications can be prevented. **KEYWORDS:** Closed reduction, paediatric hip dislocation, periosteum.

INTRODUCTION: The musculoskeletal anatomy of children varies remarkably from that of the adult population. The periosteum is thick in children, the bones are soft and elastic and can absorb quite some force because of the soft spongy nature. Hence dislocations are rare in paediatric age group. However with the increasing number of motor vehicles plying on our roads and the ever present risk of road traffic accidents, there is a recent change in the above trend. Most of the paediatric injuries are the result of low velocity accidents. In case of high velocity injuries there is almost always the possibility of associated injuries and multi-system involvement. There is only one documented case report of such a dislocation in Indian population.^[1] There has been case reports of traumatic hip dislocations in childhood mostly in the western world.^[2,3,4,5] Most of the published articles in literature include the adolescent population (12-17 years). There are very few case reports of such dislocations in children < 3 years. Here we present our series of 3 children with traumatic posterior dislocation of the hip following low velocity injury.

MATERIALS & METHODS: Three male children with an average age of 25.3 months presented to us in the emergency with complaints of pain and inability to move right lower limb following injury. One patient fell off the slide while playing at a local park, one patient fell through the gap in the railing in the staircase at his apartment complex and the last patient fell down the stairs while playing with his sibling. They presented to the hospital within 5 hours (range: 2 hrs 45 mts - 4 hrs 20 mts). Radiographs were taken in all of them and emergency closed reduction and broom stick plaster was

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applied in all of them. Care was taken not to manipulate forcibly and plaster cast was removed at 6 weeks following reduction. They were followed up regularly at 2, 4 and 6 months. Follow-up MRI was done in all of them immediately after reduction, then at 6 and 18 months to diagnose any labral tear or physeal injuries and also evaluate for any occurrence of chondrolysis and osteonecrosis. Also at each follow-up, the range of movements were assessed and any disability noted.

PROCEDURE: All children underwent emergency closed reduction under general anaesthesia. Gentle longitudinal traction was sufficient in all cases to achieve reduction. Care was taken not to manipulate with force to avoid iatrogenic chondrolysis and osteonecrosis. Congruency of reduction was checked with image intensifier and once congruency was confirmed, an above knee broom-stick plaster was applied with both hips in about 30® abduction. The broomstick plaster was to ensure that accidental adduction was not possible. The plaster was removed at 6 weeks and children were allowed to walk with tolerated weight bearing from 6 weeks. Immediately after reduction a MRI was taken. No post reduction analgesia was required in any of our cases. The parents of all the children were educated on plaster care and nursing of their children in bed and discharged the next day.

OBSERVATION: Closed reduction was successful in all the cases. There was no case of redislocation. Congruency was achieved in all 3 cases as there was no associated femoral head physeal injury or acetabular fractures. One child had a linear small posterior labral tear which healed in the subsequent MRI. One child had small are of bone contusion in femoral neck which also resolved. All children returned to full weight bearing walking by 8 weeks. One patient had a pressure sore in the left knee which healed once plaster cast was removed at 6 weeks. Child 2 had a restriction of terminal flexion of right knee (>120®) which eventually recovered by 10 week. All 3 children were followed-up with serial radiographs at 6, 12 and 24 weeks. A MRI was done at 6 and 18 months to assess any anatomical change in hip. All 3 children had no evidence of chondrolysis or osteonecrosis at 6 months and they had regained full range of motion within 6 months.

DISCUSSION: The occurrence of paediatric hip dislocation is not common. The reason which could be attributed is that the soft spongy nature of the bone allows some absorbance of the force during the injury. The neutralizing effect to this protective mechanism is the laxity of the ligaments and joint capsule which allow dislocations.

Meena et all^[1] reported a case of a 16 month old child with posterior hip dislocation with excellent functional and radiological outcome following closed reduction. According to them the key in achieving good results lies in early detection and treatment (within 6 hours). All our patients underwent closed reduction within 5 hours in emergency theatre setting and that is why none of our patients developed chondrolysis with good functional outcome.

Vialle et al 2005^[2] published a study on 35 skeletally immature patients with hip dislocations but majority were children older than 5 years. This was much older than our study group. Nine patients had to have open reduction for irreducible hip due to interposition of hip capsules, ligamentum teres. One patient had physeal separation with complete osteonecrosis and one had partial necrosis of femoral head. In our study none of the patients had physeal injury which could explain why there were no osteonecrosis. Also careful gentle manipulation while closed reduction also may have prevented iatrogenic injury to physes.

Vemulapalli et al (2005)^[3] reported a 21 month old child with posterior hip dislocation following trivial fall. The child had good functional outcome.

Zrig et al (2009)^[4] published a study on 7 patients with a mean age of 6.5 years out of which 6 had good results with one patient having a stiff hip with osteonecrosis. They attributed the osteonecrosis to either severity of violence and delay in reduction of hip. Since all our reduction were done within 5 hours and none of our dislocations were the result of road traffic accidents, rather the result of relatively low velocity trauma.

Bressan et al (2014)^[5] reported a retrospective review analysis on 53 acute and 23 neglected dislocations. They concluded that all neglected dislocation (> 4 weeks) almost always required open reduction. Low velocity violence was the cause in 63 % of cases. The occurrence of osteonecrosis was 5.7 % (3 out of 53) in acute cases and 47.8 % (11 out of 23) in neglected cases. Good results were achieved in 42 cases (55 %). Since all our patients were acute cases and did not have a delay in presentation and reduction, we did not encounter either chondrolysis or osteonecrosis.

Murphy et al (2014)^[6] reported a rare case of non-accidental traumatic hip dislocation in a child who had multiple abrasions at different stages of healing. He concluded that the possibility of child abuse should also be considered in such situations.

Furuya H (2014)^[7] reported a 13 year old boy with traumatic hip dislocation who had excellent functional results. Although he is much older than our study group, Furuya emphasized the need for early recognition and prompt reduction.

Baker JF et al (2011)^[8] reported a 3 year old girl with hip dislocation following a skiing accident. She underwent closed reduction within 6 hours and at 18 months she had good functional results with no evidence of necrosis.

Martinez- Guerrero JI et al (2012)^[9] reported a case of 4 year old girl with traumatic hip dislocation which was reduced 8 hours after injury. At 18 months he reported good functional results with no evidence of osteonecrosis.

CONCLUSION: In literature there are case reports of traumatic hip dislocations in childhood (< 3 years) but ours in the first case series of hip dislocations in children < 3 years in Indian population. Paediatric hip dislocations are a medical emergency which requires a great deal of suspicion to detect early and treat appropriately. All our patients had excellent recovery and functional outcome because of early reduction within the "Golden period" (6 hours).Although two patients had either a labral tear or femoral neck edema, they healed without any further intervention with no permanent disability. We therefore conclude that traumatic hip dislocations in children < 3 years is an uncommon injury but a keen lookout is a must for early diagnosis and treatment to ensure good and long-term functional results.

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Sl. No.	Age (months) /Sex	Side	Time of presentation since injury	Type of dislocation	Associated Injuries	Procedure/ Anaesthesia	Follow-up (months)	Chondrolysis/ Osteonecrosis	Remarks
1.	24/ M	Rt	3 hrs 20 mts	Posterior	Nil	CMR/GA	26	-/-	-
2.	27/ M	Rt	2 hrs 45 mts	Posterior	Abrasion over elbow	CMR/GA	23	-/-	Limitation of terminal knee flexion at 6 weeks but regained at 10 weeks
3.	25/ M	Rt	4 hrs 20 mts	Posterior	Contusion scalp	CMR/ GA	21	-/-	-

MASTER CHART: CMR: Closed manipulative reduction





Fig. 3: MRI after reduction



Fig. 4: Follow-up x -ray at 6 weeks



Fig. 5: MRI at 6 months



Fig. 6: MRI at 18 months



AUTHORS:

- 1. Navin Balasubramanian
- 2. N. Ganesh Babu
- 3. Sindhuja P.
- 4. G. Ram Kumar

PARTICULARS OF CONTRIBUTORS:

- 1. Assistant Professor, Department of Orthopaedics, Saveetha University.
- 2. Assistant Professor, Department of Orthopaedics, Sri Ramachandra University.
- 3. Assistant Surgeon, Government Peripheral Hospital.

FINANCIAL OR OTHER COMPETING INTERESTS: None

4. Associate Professor, Department of Orthopaedics, Saveetha University.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Navin Balasubramanian, # 19, 21st Main Road, Anna Nagar, Chennai-600040, Tamilnadu, India. E-mail: drnavin_ortho@yahoo.co.in drnavin.ortho@gmail.com

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