

Original Research Article

Open reduction for neglected traumatic hip dislocation in children and adolescents

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ABSTRACT

Background: Neglected traumatic dislocation of the hip is extremely rare in children, and the preferred treatment remains unclear. In this study we studied the role of open reduction in neglected traumatic hip dislocation in children and adolescents as a modality of treatment.

Methods: Eight patients with a neglected, traumatic dislocation of the hip received in the emergency department of GMC, Jammu were managed by open reduction. Types of dislocations, associated lesions, treatment methods, complications, and clinical and radiological outcomes were reviewed in the study.

Results: All patients presented with limp and pain. Six patients had minimal difficulty in squatting while two had marked difficulty. Leg lengths were within 2 cm in 7 of 8 cases at follow-up, and only 1 patient had a discrepancy greater than 2 cm.

Conclusions: Open reduction is a satisfactory treatment for neglected hip dislocation. It restores joint stability, range of motion and limb length.

Keywords: AVN, Harris hip score, Neglected THD, Open reduction, Traumatic hip dislocation

INTRODUCTION

Traumatic dislocation of the hip is relatively rare in children, and the optimal management is a prompt diagnosis and an emergent reduction.¹ Because of various factors, this ideal is rarely achieved in developing countries, where patients often present weeks to months after the initial injury. Although a lots of treatment methods have been reported, the best approach for this challenging condition is yet to be established. Options include no treatment, closed reduction (manual or traction), open reduction or salvage by excisional arthroplasty, realignment osteotomy, arthrodesis, pelvic support osteotomy, or total joint replacement.²

The goal of this retrospective case series was to review the results of open reduction for neglected, traumatic dislocation of the hip in children and adolescents.

METHODS

We received six patients with a neglected, traumatic dislocation of the hip from the year 2017-2020 (4 years) in the emergency department of GMC, Jammu. Furthermore we were able to trace two more patients from the records available in the hospital for retrospective study. All of them were managed by open reduction. Patients with neglected hip dislocation, of either sex, in the age group 0-19 years were included in this combined retrospective-prospective study. Patients with other associated injuries and advanced avascular necrosis of femoral head were excluded from the study.

Each patient's medical record was reviewed, focusing on symptoms, physical findings, and treatment course. The clinical evaluation focused on range of motion, the presence of pain and/or limp, and the ability to squat.



Figure 1: Pre-op x-ray.

Results were graded according to Garrett et al as excellent (no pain, full range of motion, no limp), good (no pain, 75% motion, slight limp), fair (mild pain, 50% motion, moderate limp), and poor (pain, stiffness, abduction or adduction deformity).² A Harris hip score was also calculated for each patient. Leg lengths were

measured from the anterior superior iliac spine to the medial malleolus. The radiographic evaluation included the preoperative (Figure 1) and most recent films obtained. Avascular necrosis (AVN) was graded according to Barquet [type I (normal), type II (minimal coxa magna, no coxa breva, no acetabular changes)], type III (coxa magna, coxa breva, femoral neck widening, varus/valgus angulation of the neck, enlarged acetabulum), type IV (coxa magna with flattening of the femoral head, coxa breva, varus or valgus alignment, and acetabular deformity), and type V (changes similar to AVN in adults, no growth disturbance).³

RESULTS

Out of our eight patients, three were girls and five boys. The average age was 5.5 years (2-11). Five fractures occurred on the right side and three on left. Five patients had associated minor chip fractures. All of these patients had received some form of treatment somewhere else before presentation, mostly traction and/or an attempt at closed reduction.

Table 1: Clinical and radiographic findings.

Age	sex	Side	Dur (mo)	Squat (FU)	Pain B/A	LLD B/A	ROM B/A	AVN	Limp F/U	Harris hip	F/U
9	M	R	4	+	-/-	NA/-	N/↓Flex	+	No	100	3y
4	F	R	5	+	+/-	2.5/3	↓Abd+Ext/↓Abd	+	Yes	78	4y
3	F	L	11	+	+/-	3/1.5	↓Ext+Abd+Rot/↓Global	+	No	76	2.5y
4	F	R	5	-	+/-	4/2	↓Abd + Rot/↓ global	+	No	81	2.5y
11	M	R	7	-	+/-	1/-	↓ Ext/N	+	No	92	2y
5	M	L	1	+	+/-	3/-	N/↓Abd	+	No	92	2y
2	M	L	3	+	-/-	2/2	↓Flex + Abd + Rot/ ↓ global	NA	Yes	81	1y
6	M	R	9	+	-/+	2/-	↓Abd/↓ Flex + Ext + Abd + Rot	+	Yes	80	1y

Dur: duration, F: female, M: male, R: right, L: left, FU: follow up, B/A: before/after, LLD: leg length discrepancy, ROM: range of motion, AVN: avascular necrosis, N: normal, NA: not available, Flex: flexion, Abd: abduction, Ext: extension, Rot: rotation, mo: months y: years.

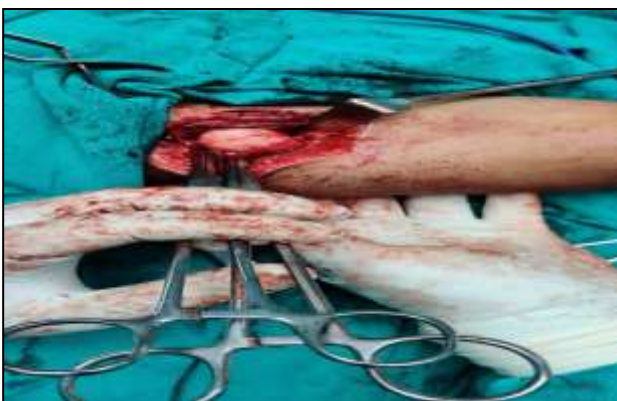


Figure 2: Intra-op manipulation.

Five patients sustained their dislocation after minor trauma (twisting injury), whereas one fell approximately 10 feet from a roof, and 2 sustained injuries when they were struck by a falling object (tree branch, rock).

The patients presented to us at a mean duration of 5.6 months after injury (1-11 months). Four of the patients were initially treated by traction. The approach used for open reduction included posterior and anterior (Figure 2).

Postoperatively, patients were maintained in a spica cast for approximately 6 weeks (Figure 3) and then mobilized as tolerated (Figure 4).



Figure 3: Post-op x-ray.



Figure 4: Picture on follow up.

The patients were on a mean follow-up of 2.25 years. All patients presented with limp and pain. Six patients had minimal difficulty in squatting while two had marked difficulty. Leg lengths were within 2 cm in 7 of 8 cases at follow-up, and only 1 patient had a discrepancy greater than 2 cm. Post-operatively all patients had some degree of restriction in rotation. Radiographs at latest follow-up revealed evidence of varying degree of AVN in all patients. The mean Harris hip score at follow-up was 85.

DISCUSSION

Traumatic hip dislocation (THD) is a rare injury in children, and emergent reduction offers the best chance of a suitable outcome. The risk of AVN (3%-15%) is increased by a delay in achieving reduction.⁴ Unfortunately, this ideal is rarely achieved in many low- and middle-income countries because of difficulties in accessing the health care system and a lack of resources

or trained health care professionals. As such, patients often present for medical evaluation weeks to months after the initial injury. Complaints at the time of presentation include pain and gait disturbance, the latter of which may result from pain, leg length discrepancy, pistoning (vertical instability), abductor insufficiency, and limb malposition from contracture.

THD usually occurs as a result of low energy traumas such as simple falls and sport injuries in children under the age of ten.⁵ Higher energy traumas such as falls from height and traffic accidents are prominent in children over the age of ten.⁶ THD is classified as anterior, posterior, central and inferior. It is three to four times more frequently encountered in boys than girls.⁷ Posterior dislocations are much more frequent than anterior dislocations similar to the adult age group.⁸

The main treatment modality is closed reduction of the THD under sedation or general anesthesia as soon as possible, preferably within the first six hours.⁹ If THD cannot be reduced by closed method, open reduction should be performed. However, open reduction may cause additional vascular injury leading to AVN and posttraumatic arthritis.¹ After closed reduction, the hip should be evaluated for its stability by physical examination and concentric reduction should be confirmed by x-ray imaging.

Conclusions are difficult to draw because prior studies have included more than 1 treatment method in both adults and children and have used different methods to evaluate outcome. Most of our patients elected to proceed with open reduction.

We identified AVN in every case. Barquet studied 145 hips with AVN after traumatic dislocation in children.³ Patients younger than 12 years had changes similar to Legg-Calve-Perthes disease (physeal involvement with associated changes), whereas those older than 12 years had changes similar to adult AVN (collapse, joint space narrowing). Remodeling was observed in patients with sufficient growth remaining. Most of our cases exhibited widening of the femoral neck, coxa magna, and coxa breva, without significant varus or valgus deformity. Kumar et al also identified AVN in 100% at follow-up.¹⁰

Salvage options include arthrodesis, osteotomy, excisional arthroplasty, and prosthetic reconstruction.^{2,11,12} Arthrodesis is undesirable in cultures where sitting and squatting are essential for activities of daily living. Prosthetic reconstruction is an attractive alternative but is impractical in a resource-challenged environment. Osteotomy, to reposition the limb in space, may be desirable in selected cases. Excisional arthroplasty may improve both pain and motion, but persistent problems include instability and leg length discrepancy. Recently, the pelvic support osteotomy has been reported as a salvage for the sequelae of hip sepsis and unreduced developmentally dislocated hips.¹³ Although we have no

experience with this technique, theoretical advantages include the ability to simultaneously treat pain, instability, and leg length discrepancy.

CONCLUSION

We recognize that no firm conclusions can be drawn from a small series; however, our results combined with those from the literature lead us to the following conclusions. Preliminary traction should be considered, and although a concentric reduction is likely to be achieved in a minority of patients, relaxation of the periarticular soft tissues may decrease the technical difficulties in achieving a reduction and potentially decrease the magnitude of avascular changes. We continue to offer open reduction to our patients, despite the challenges involved. If a concentric reduction can be achieved, we feel that an adequate outcome can be expected at short to midterm follow-up, despite the universal presence of AVN. In our opinion, a concentric reduction is preferable to a primary salvage procedure, and a failed open reduction does not preclude salvage by arthrodesis, osteotomy, or prosthetic replacement.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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