Original Research Paper

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Orthopaedics

RADIOLOGICAL AND FUNCTIONAL OUTCOME OF MANAGEMENT OF CONGENITAL DISLOCATION OF HIP IN A 4 YEAR OLD CHILD: A CASE REPORT

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ABSTRACT Congenital dislocation (CDH) of the hip joint (now falling under the umbrella term Development Dysplasia of hip (DDH) has a high incidence in the Indian subcontinent.

KEYWORDS : CDH

INTRODUCTION

Developmental dysplasia of the hip is a spectrum of structural abnormalities that involve the growing hip and represents a wide spectrum of pathologic conditions, ranging from subtle acetabular dysplasia to irreducible hip dislocation with proximal femoral displacement. The culprit is the acetabulum[1], in such cases biomechanics of the normal hip is disturbed secondary to acetabular dysplasia or malformations. Sensitivity[2] increases when clinical examination is associated with ultrasonography.

Associated Malformations

1. Spina bifida
2. Arthrogryposis multiplex congenita
3. Lumbosacral agenesis
4. Chromosomal abnormalities
5. Diastrophic dwarfism
6. Larsen syndrome and other rare syndromes

Predisposing Factor

1. Breech presentation
2. Postnatal positioning
3. Ligament laxity
4. Primary acetabular dysplasia
5. Female new born
6. Oligohydramnios[3,4]

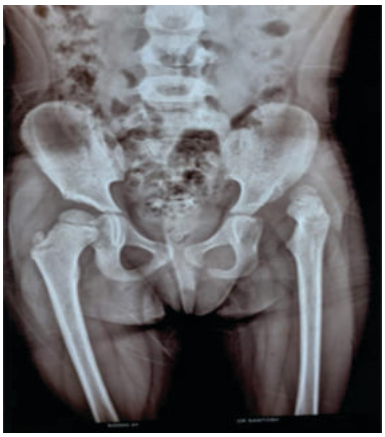
CASE REPORT

A 4 year and 2-months old female child was brought to the OPD by her parents, with complaints of walking with limp. Upon examination, it was noted that the attitude of left hip was in flexion and adduction along with restricted extension, external rotation and abduction. On plain radiography of pelvis with both hips it was noted that the epiphysis of left the hip were displaced from their respective acetabulum and situated in the supero-lateral quadrant formed by the intersection of Perkin's and Hilgenreiner lines. The heads on left side appeared to articulate with a false acetabulum superiorly in the frog-leg view (Severin type IV)

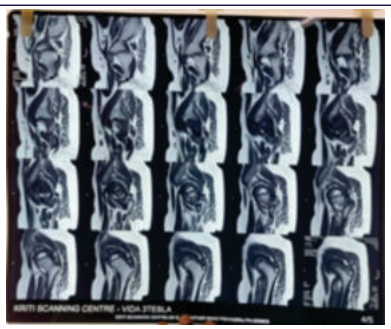
Having taken the severity of the condition into consideration, surgical intervention was planned. The patient was managed by open reduction by Salter osteotomy with varus de-rotation osteotomy with primary femoral shortening using anterior approach with fixation with k wire fixation and plating and screws. After the surgical site were closed, a hip spica was applied to the patient with left hip flexed and abducted and knees flexed.

The patient was discharged from the hospital in stable condition and no complications. After 1 and half month the spica was removed under short general anesthesia and the patient was placed in a high groin slab for further 2 months. The slab the removed and patient was made to walk.

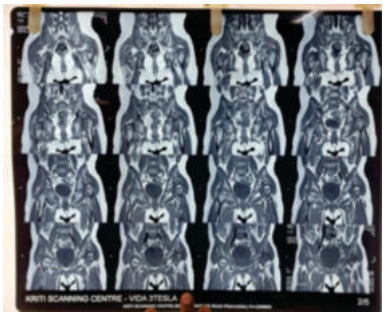
At 3 and half months follow-up, the epiphysis of the head was well contained in the acetabulum along with healing of the osteotomy site. The patient started walking without limp. The patient has shortening of left limb of 0.5 cm. The patient follow-up is intended to be continued for a period of 1 year. Functional outcome was assessed by the range of motion at both hip joints and ability of the child to ambulate with a normal gait.



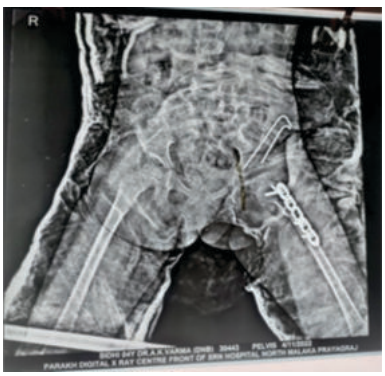
AP X-ray Of The Pelvis With Bilateral Hip Of The Patient (Pre-op)



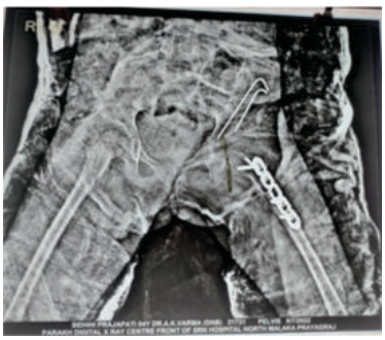
MRI Of The Patient (Pre-op)



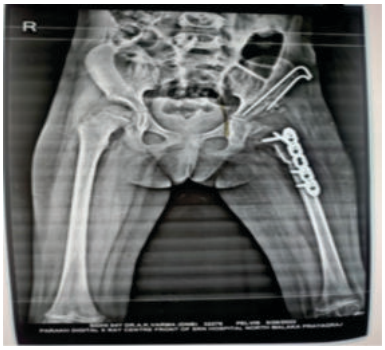
MRI Of The Patient (Pre-op)



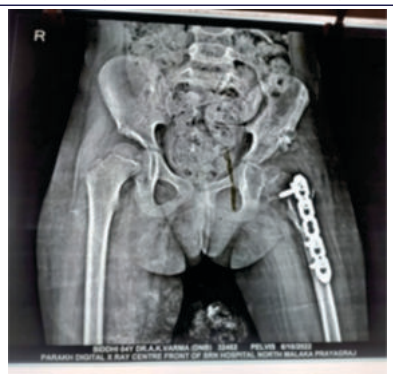
Post-op X-ray Of The Patient



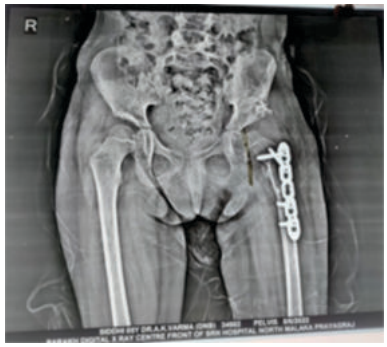
Post-op X-ray After 1 Month



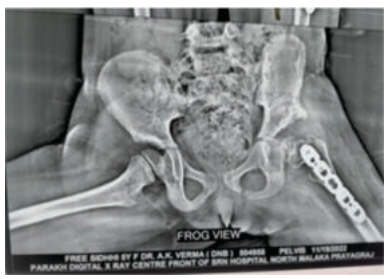
Post-op X-ray After Removal Of Hip Spica (1½ months)



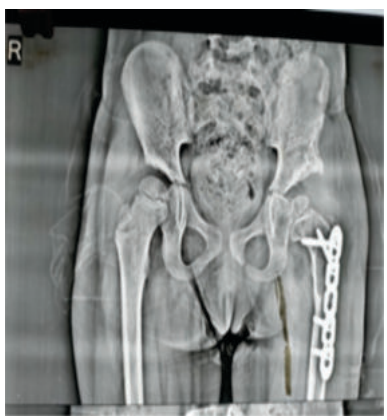
Post-op X-ray After Removal Of K-wire



Post-op X-ray After 5 Months

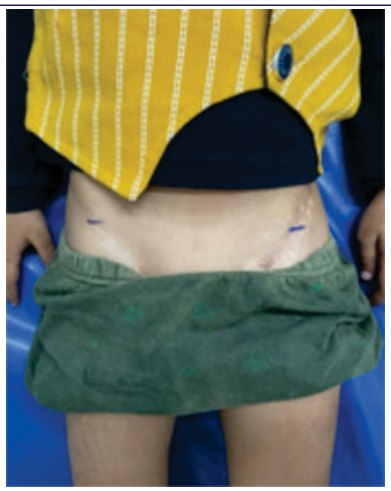


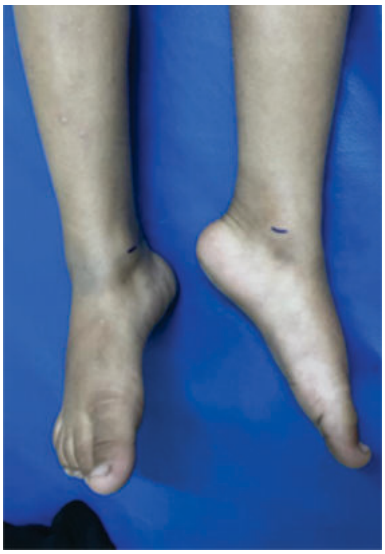
Post-op X-ray After 8 Months

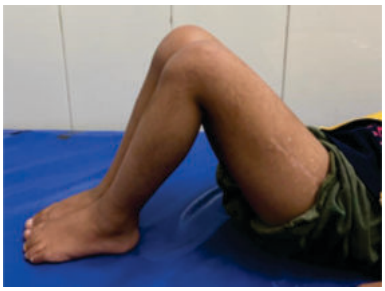


Post-op X-ray After 8 Months

Patient Examined From Right Side







DISCUSSION

In older child, careful examination of extremities are done for
(A) Leg length discrepancy
(B) Asymmetric skin folds
(C) Limited abduction

In neglected cases, DDH is diagnosed when child approaches the walking age due to limp on the affected side. In a normally located hip, the medial beak of the femoral metaphysis lies in thelower, inner quadrant produced by the intersection of Perkin's and Hilgenreiner's lines, whereas in dislocated hips, it lies in the superior and lateral quandrant. In the dislocated hips, Shenton'sline is broken because the femoral neck does not lie in continuity with the public rami.

The treatment of DDH is duration and the goal is to achieve and maintain concentric reduction of the femoral head into the acetabulum. The outcome has direct correlation to how early the treatment is initiated. While going for conservative management, the child is to be re-evaluated both clinically and by ultrasonography at 3 weeks of age to confirm concentricity. Hips that are still dislocated need further treatment. Orthoses, such as Erlanger, Thübinger or Pavlik, can reduce the incongruous pressure to the anterolateral acetabulum and is preferred in this age group. Application of an orthosis should be followed by bi-weekly clinical examination, and ultrasonography, if required. If the hip is reduced at three weeks follow-up, the patient may continue to wear it for a further three weeks. After six weeks, if the hip is reduced then the orthosis can be discontinued. The dislocated hip, even after 3-4 weeks of orthosis use, should be evaluated and may be treated with an abduction brace.[5,6]. If the hip fails to reduce with orthosis then other options should be considered, such as an abduction (Von Rosen) splint. The main aim of treatment is to achieve concentric reduction and to prevent complications such as avascular necrosis. Nakamura et al. reported his results of 115 patients with 130 hips. The mean age was 4.8 months and there was a mean follow up of 16 years. Patients were treated with a Pawlik harness with a mean duration of treatment of 6.1 months. Twenty- two hips required supplementary surgery for residual dysplasia, the choice of surgery depending on the state of joint and surgeon's preference. A satisfactory outcome (Severin classes I and II) was achieved in 119 patients.[7] Children of age group 6 months to 2 years may be treated with either closed or open reduction, followed by a spica cast, as has been done in our case. The aim is to achieve reduction without damaging the femoral head. We undertook this procedure as there are several studies favouring a reduction of hips after the appearance of the ossific nucleus.[8]Segal et al. reported 57 hips in 49 children under 12 months of age. Thirty-eight hips were reduced closed while 17 were reduced by an open method. One patient with bilateral hip dislocation was treated initially by closed means and later treated by open reduction at three months. Avascular necrosis (AVN) developed in only one of 25 patients in which a nucleus was present while 17 of 32 patients developed AVN when a reduction was performed before the appearance of an ossific nucleus at a mean follow up of 59 months.[9]There are studies which contradict this approach too such as that by Konigsberg et al. wherein 40 patients in whom an open reduction through a medial approach was performed. The average age was 7.7 months, ranging from 2.4 to 18.9 at the time of surgery, with a mean follow up of 10.3 years. Only one of 20 hips which was reduced before the age of six months, went into AVN.[10] Belated reduction of hips leads to unsatisfactory remodelling due to reduced growth potential.[11]

Open reduction may be achieved through a medial (preferred due to minimal dissection and ease of contracture release).[12]Disadvantages of the medial approach include inadequate exposure, risk to medial circumflex femoral vessels and inability to perform capsulorrhaphy. Post-operatively, a cast is recommended for a total period of 3 months and changed after six weeks. A medial approach is recommended for children with a maximum age limit of 18 months in expert hands. Treatment of older child (two years of age and older). In older children, the femoral head lies more proximally. Sankar et al. studied the factors predicting the need for femoral shortening in 72 hips which underwent open reduction. He concluded that the patients over the age of 36 months and patients with a vertical displacement greater than 30% of the width of the pelvis were more likely to require femoral shortening.[13] The aim of femoral de-rotation varus osteotomy is to achieve concentric reduction. Spence et al. compared two groups of patients undergoing open reduction through an anterior approach either with a femoral de-rotation osteotomy (38 patients with 47 hips) or innominate osteotomy (33 patients with 37 hips).[14] Adequate post-reduction coverage of the femoral head is essential which was achieved in both the procedures. If femoral head coverage is inadequate, then pelvic osteotomy (Salter innominate or Pemberton) should be considered.[15] In cases of areduction under 18 months of age, the child should be followed up untill the age of 3.5-4 years. The incidence of AVN varies widely from 0-73% depending on the age, mode of treatment and criteria used to describe AVN.[16] Four per cent incidence was reported by Weiner et al. in children under the age of three months.[17] Literature says that AVN can easily be prevented by performing femoral shortening in addition to reduction of hip.

Inability to diagnose DDH may lead to any of the following four sequelae: the hip may reduce spontaneously, it may subluxate, it can develop frank dislocation, or it can develop dysplastic features whilst remaining located.[18] Long-term follow up of treated subluxated and dysplastic hips also revealed a higher incidence of degenerative joint disease in hips. The reasons behind this phenomenon are probably mechanical and related to a high degree of contact stress over-time on a relatively small surface area.[19]

CONCLUSION

To diagnose DDH, high degree of suspicion is needed in early stages to prevent surgical management. In delayed cases, despite there being many schools of thought on the management of bilateral DDH in

children, there is little consensus as to which is the most appropriate approach. In this case, we operated the patient at 4 year and 3 months of age, owing to the severity of displacement and soft tissue contracture. The weakness in the reporting of this case is that it is to be viewed as a separate entity and a further research on a larger population is warranted.

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