ORIGINAL ARTICLE

Evaluation of Various Methods of Treatment for Developmental Dysplasia of Hip Joint

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ABSTRACT

Introduction: Developmental dysplasia of the hip (DDH) is a problem with the way that the hip joint develops. It is usually present from birth and is more common in girls. When DDH is diagnosed and treated early in a young baby, the outcome is usually excellent. If treatment is delayed, the treatment is more complex and less successful.

Objective: To assess and compare the various methods of treatment, below 5 years of age, suffering from developmental dysplasia of hip joint.

Materials and methods: This study was carried out in Department of Orthopaedic Surgery, Mayo Hospital, Lahore between 1995 to 1997 and included 20 patients (27 hips). The patients were thoroughly evaluated on the affected limb and the diagnosis of developmental dysplasia of hip joint was made. All patients were divided in two groups; group I comprised from birth to 18 months and group II from 18 months to 5 years of age. Gentle closed reduction was attempted for confirmation of stable reduction, hip spica was applied in human position (hip joint in 95° of flexion and 40-45° of abduction). After 4 weeks, K-wire removed and pop spica changed. The spica cast was changed at 4 weekly interval, till 12 weeks, followed by physiotherapy sessions.

Results: In the present study of various methods of treatment in developmental dysplasia of hip joint, 15 patients (75%) were females and 5 (25%) were males. Out of 20 patients, 11 (55%) were between 0-18 months and 9 (45%) were between 18 months to 5 years age. Out of twenty patients (27 hips), 4 hips treated with thick nappies, one hip (25%) not relocated. Eight hips treated with hip spica cast, 2 hips (25%) redislocated. Eight hips treated with open reduction, one hip (12.5%) developed avascualr necrosis and 3 hips (37.5%) redislocated. Six hips treated with open reduction combined with Salter's osteotomy, 3 hips (50%) redislocated. Eight hips treated with open reduction combined with Salter's osteotomy and femoral shortening/varus derotation osteotomy, one hip (12.5%) redislocated.

Conclusion: Treatment of developmental dysplasia hip joint depend upon the age, conservative below age of 18 months and operative above that.

Key words: Deveopmental dypslasia, Hip joint, Treatment, Dislocation

INTRODUCTION

Deveopmental dysplasia of the hip has been recognized from the time of Hippocrates. It is a common condition which remains controversial and confusing despite diagnostic and treatment advances. One of the most challenging and important congenital abnormalities of musculoskeletal system is developmental dysplasia of hip. It may even escape from detection until the child has started to walk and leads inevitably to painful crippling degenerative arthritis of the hip in adult life. Indeed at least one third of all degenerative joint diseases of hip in adult and caused by sequelae of developmental dysplasia of hip[1].

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Developmental dysplasia of the hip, previously known as congenital dislocation of the hip, is a common and well-documented condition primarily detected in neonates. The principal abnormality is hip instability affecting both acetabular and femoral development[2]. It is a spectrum of disease, ranging from the unstable hip, where the femoral head is well centered, but which displaces when force is applied, to the fully fixed dislocated hip[3]. Developmental dysplasia of the hip has a complex etiology, although research suggests it is more prevalent among first children, girls, those with a positive family history, and infants who were breech presentation[4-6].

The displacement and dislocation of the hip is also a recognized sequela of neuromuscular conditions such as cerebral palsy and myelomeningocele. This is considered an entirely different clinical entity to DDH, due to the differing underlying pathology and consequently differing expected outcomes. Dysplastic changes occur as a result of altered muscle tone, which causes abnormal

stresses across the hip joint. This will gradually affect the positioning of the femoral head, subsequently impairing acetabular development[7-9].

There is geographic and racial variation in the incidence of dysplastic dislocation of hip joint. Dysplasia of hip is almost unknown in Bantu people except in cases of arthrogryposis and an incidence of unstable hips is approximately 10 percent of average reported for Caucasians[10].

Developmental dysplasia of the hip is one of the most common problems in paediatric orthopaedics, and one of the most fascinating. DDH represents a spectrum of conditions that range from a simple neonatal instability to an established dislocation. The term developmental is now preferred to congenital because it is more encompassing as it is taken in the literal sense of organ growth and differentiation, which includes fetal, neonatal, and infantile periods. This terminology includes all cases that are clearly teratological and those that are developmental, and it incorporates dysplasia of the hip, subluxation, and dislocation[11].

If the diagnosis of DDH is not made early, secondary changes develop that subsequently impair the normal growth and development of the hip and increase the risk for late degenerative joint disease. Therefore attainment and maintenance of a congruent stable joint is critical for normal hip development. Closed reduction is indicated for patients over 6 months of age at diagnosis. In most centres, closed reduction and spica cast immobilization is usually preceded by a period of traction[12-15].

The purpose of this study is to evaluate the results of proposed protocol of treatment in cases of developmental dysplasia of hip in our circumstance and follow-up for at least one year.

MATERIALS AND METHODS

This study was carried out in Department of Orthopaedic Surgery, Mayo Hospital, Lahore from 1995 to 1997. All the cases were admitted through the outpatients department. A total of 20 cases (27 hips) with developmental dysplasia of hip joint were included from birth to 5 years of age. The patients were divided in two groups; group I includes from birth to 18 months of age and group II includes 18 months to 5 years of age. After thoroughly evaluated of the affected limb, the diagnosis of developmental dysplasia of hip joint was made. Parents of the patients were explained about the treatment protocol according to age, successfulness or failure of treatment and duration of treatment. X-ray of pelvis with anteroposterior view, was carried out with hips symmetrically adducted to neutral and flexed 20 to 30 degrees. Gentle closed reduction was attempted with the patient under general anaesthesia. After conformation of stable reduction, hip spica was applied in human position (hip joint in 95 degree of flexion and 40-45 degrees of abduction). A bolus dose of first generation cephalosporin was given preoperatively, half an hour before operation. Capsule of the hip joint dissected out and opened with a T-shaped incision. Acetabulum cleared off the soft tissues and deep transverse ligament incised to enlarge the inferior aspect of the acetabulum. Femoral head reduced, stability checked and safe zone determined followed by capsulorrhaphy. After reducing the femoral head into acetabulum, hip was moved through the complete range of motion (including the flexion, extension, adduction, to determine the safe zone of reduction). Lateral approach used to expose the proximal femur. Reduction of femoral head in internal rotation. Derotation osteotomy and femoral shortening by the amount determined preoperatively. Four holes DCP plate or K-wires used to fix the osteotomy. After 4 weeks, K-wire removed and pop spica changed under general anaesthesia. The spica cast was changed at 4 weekly interval, till 12 weeks, followed by physiotherapy sessions.

RESULTS

There were 15 females (75%) and 5 males (25%) with female preponderance to m ale in the ratio of 3:1. The youngest patient was one day old and the oldest was 4 years and 11 months old. The most common age group was 18-36 months, comprising 30%. The next common group in frequency was 12-18 months which comprised 25%. The mean age 2 years (Table 1).

Table 1: Demographic information of the patients

Demographic information	Frequency	%age
Sex		
Males	5	25.0
Females	15	75.0
Age (months)		
0 – 17	11	55.0
18 – 36	6	30.0
37 – 60	3	15.0

In the present study, 3 cases (4 hips) treated conservatively with thick nappies. Clinically excellent results in 3 hips (75%) and one hip (25%) did not relocate with thick nappies. Clinically results with hip spica was found excellent results in 3 hips (37.5%) and good in 3 (37.5%), no fair and poor results in 2 (25%). In 2 cases (2 hips) that were dislocated, we did open reduction and obtained excellent results in one hip. The hip spica was applied after 3 months

and obtained excellent results. Statistically the difference between the two technique is not significant (>0.9) (Table 2).

Table 2: Clinically treatment of thick nappies and hip spica

Result	Thick nappies (n=4)		Hip spica (n=8)	
	No. of hips	%age	No. of hips	%age
Excellent	3	75.0	3	37.5
Good	-	-	3	37.5
Fair	-	-	-	-
Poor	1	25.0	2	25.0

Clinically we treated 6 cases (6 hips) with open reduction combined with Salter's osteotomy. The excellent results in 3 hips (50%) and poor in 3 (50%). Three hips were redislocated, two were with bilateral hip dislocations and one with unilateral dislocation. In 6 cases (8 hips) open reduction combined with Salter's osteotomy and femoral shortening/varus derotation osteotomy was done. The excellent results in 5 hips (62.5%), good in 2 (25%) and poor in one (12.5%). One his redislocated with unilateral dislocation (Table 3).

Table 3: Clinical results of open reduction combined with Salter's osteotomy and femoral shortening varus derotation osteotomy

Result	Open reduction combined with Salter's osteotomy (n = 6)		Open reduction combined with Salter's osteotomy and femoral shortening varus derotation osteotomy (n = 8)	
	No. of hips	%age	No. of hips	%age
Excellent	3	50.0	5	62.5
Good	-	-	2	25.0
Fair	-	-	-	-
Poor	3	50.0	1	12.5

DISCUSSION

Developmental dysplasia of the hip joint is one of the challenging and important congenital abnormalities of musculoskeletal system. It is almost as common as club foot though not obvious at birth, usually presents late.[1] In our country deformity is usually discovered late when child starts walking[16]. In this study the largest number of patients were in 18-30 months of age group. 14 cases (70%) were walker and 6 cases (30%) were non-walker. This study is comparable to a study reported by Warriach et al[16] from Multan, who reviewed 5 cases of neglected congenital dislocation of hip, age ranged from 4.5 to 7 years. Another study reported by Llano et al17 who reviewed 71 hips, aged ranged from 1-5 years. Tchelebi[18] also reported from Saudi Arabia, 21 patients with 34 hips age ranged from 3-10 years. In the present study, 5 cases (25%) were males and 15 cases (75%) were females with ratio 1:3. This study is comparable to study reported by Warriach et al[16] who reported 5 cases, one (20%) male and 4 (80%) females, with ratio 1:4. The ratio is slightly higher than our study (Table 1). Our study is also comparable to Wong Chung et al[19], who reported 15 Salter's osteotomies in 13 patients, 10 cases (76.9%) were female and 3 cases (23.1%) were males with ratio 1:3.3.

In the present study, we obtained excellent results in 3 hips (75%) and poor result in one case (25%) (Table 3). Mackenzie[20] screening the 53033 live births and 1509 hips were considered not normal and splinted. 38 (2.5%) of them declared failure and needed operation. Lenox et al[21] also screening 67093 infants and detected 3354 infants with unstable hip and 670 patients given the splintage, 21 children not responded to splintage. The result in above both studies are much superior to us but the difference may be due to large number of cases in both studies. In the present study, the excellent results in 3 hips (37.5%), good in 3 (37.5%), and poor results in 2 (25%). Two hips (25%) were redislocated in hip spica and subsequently open reduction was done (Table 2). Forlin et al[22] reviewed 61 children (72 hips) and obtained in 28 hips (39%), fair in 24 (33%) and poor in 20 (28%). Borges et al[23] also reported 29 children (42 hips) treated with closed reduction and immobilization in hip spica, 29 hips (69%) considered stable. 13 hips (31%) were considered unstable after closed reduction and subsequently had an open reduction.

In the present study, 6 cases (6 hips), by open reduction combined with Salter's osteotomy. Two cases were with bilateral hip dislocations but their one hip was operated by this method. Clinically the excellent results in 3 hips (50%) and poor in 3 (50%) (Table 3). Salter[24] reported excellent results in 24 hips (96%) out of 25 hips, and poor in 1 (4%) which developed avascular necrosis of femoral head. Barrett et al[25] also reported 23 patients (25 hips) who had persistent acetabular dysplasia after open reduction and he did the Salter's osteotomy in these cases. They obtained excellent results in 17 hips (68%), good in 2 (28%) fair in 2 (8%) and poor in 4 (16%). In this study, 6 cases (8 hips) of open reduction combined with Salter's osteotomy and femoral shortening /varus derotation osteotomy. We have obtained excellent results in 5 hips (62.5%), good in 2 (25%) and poor in 1 (12.5%). Our results are better than Warriach et al[16] who reported 3 cases (4 hips) from Multan and obtained excellent results in 3 hips (75%) and fair in 1 hip (25%) and no poor. Browne[26] also reported 30 hips and obtained

excellent result sin 3 hips (10%), good in 10 (34%), fair in 7 (22%) and poor in 10 (34%). Our results are better than this study

CONCLUSION

Treatment of developmental dysplasia is varying with age. Conservative treatment is best if patient is less than 18 months. If the patient is above 18 months age open reduction should be performed with inominate osteotomy and femoral shortening/varus derotation ostetomy to improve the lateral coverage and anteversion of femoral head.

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