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Congenital knee dislocation: A treatable deformity

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Abstract
We report a case of late pre-term small for gestation girl baby presented with deformities of both knees at birth. X-rays were taken, which revealed dislocation of both knee joints. Treatment of congenital dislocation of knee with serial casting provided satisfactory results. Cases with delayed presentation or which does not improve with conservative treatment needed surgery. Delay in treatment may lead to long-term instability and stiffness. Importance should be given on immediate recognition and treatment of the condition.

Keywords: Congenital dislocation, Knee, deformity

Introduction
Congenital dislocation of the knee (CDK) is a very rare condition that comprises a series of deformities from subluxation to complete dislocation. The incidence of congenital dislocation of the knee is estimated to be 1 in 100,000 live births, i.e., 100 times rarer than developmental dysplasia of the hip (DDH). Moreover, 40 to 100% of patients with congenital knee dislocation have associated musculoskeletal anomalies, the most common being DDH and club foot or maybe in association with a syndrome such as arthrogryposis multiplex congenita or Larsen syndrome or in paralytic conditions such as meningomyelocoele. It involves both sides in one-third of the cases. It has a high association with breech delivery, oligohydramnios, congenital talipes equinovarus (35%), and DDH (45%) [1]. In general, the diagnosis is made immediately after birth according to the position of the genu recurvatum and it is confirmed with help of x-rays. The treatment of this condition with conservative methods at an early stage is likely to yield successful results in most of the cases.

Case Report
A late preterm small for gestational age girl baby with a birth weight 1.5 kg born by cesarean section to a Primi mother presented with deformity of both knees at birth. On examination, both knee joints were hyperextended and rotated. Passive flexion of both knees to an anatomically straight position could not be performed. The movements of the toes were normal. The other examination findings of the newborn were normal.
X-ray of both knee joints were taken and it showed anterior tibial translocation on femur. Gentle manipulation, which is followed by an above knee cast application, the cast was changed every 2 weeks for 6 weeks. The flexion was increased with each cast, After 6 weeks, the knee adapted to a normal shape. Ultrasonography of the hips was done and was found to be normal. The cast was removed and discontinued at 6 weeks of age. Active range of motion was encouraged after six weeks. A follow-up at the age of 4 months showed normal position and range of motion of the knee. Repeat X-ray of both knee joints was normal. Currently, the baby is under a regular follow-up period of 1 year and has attained all motor milestones for her age.

Fig 1: Clinical Picture

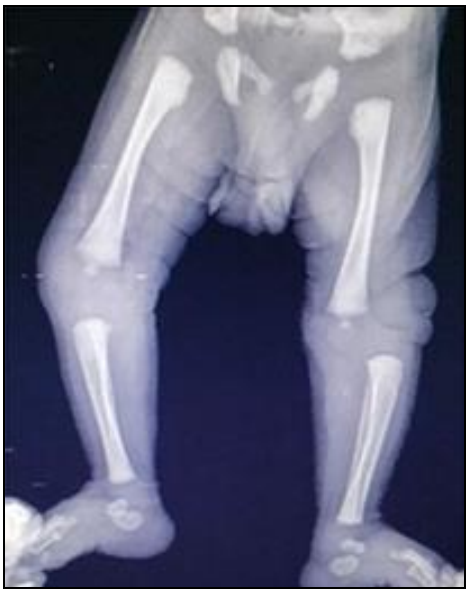

Fig 2: X-ray of patient showing knee dislocation

Fig 3: Corrective POP Cost application

Discussion

CDK was first described by Chatelaine in 1822. It is a rare condition that comprises a series of deformities from subluxation to complete dislocation [2-11]. The incidence is 1 in 100,000 live births without any difference between right and left knees. Studies and case reports do not show any predominance in sex distribution. The etiologic factor is not clearly known. The anatomical abnormality is shorter quadriceps muscle along with subluxation of the hamstring muscles, which lies anterior to the axis of knee flexion.

There are many hypotheses related to the etiology of Congenital dislocation of knee, both extrinsic and intrinsic causes have been suggested. The extrinsic causes are mechanical factors, whereas, the intrinsic causes are genetic abnormalities [9]. In a review of 200 cases by Provenzano, 7 families had a history of Congenital knee dislocation [6]. McFarland [5] reported a case of a family in which a mother and her three children from three different fathers had Congenital knee dislocation. Curtis and Fisher have described "heritable congenital tibiofemoral subluxation" [4], a genetically transmitted syndrome where Congenital knee dislocation is associated with facial and spinal abnormalities. The familial occurrence suggests a possible genetic basis for Congenital knee dislocation, whereas a non-genetic dysplasia etiology is supported with sporadic occurrence of more number of cases. The latter etiology is more in keeping with the present series of patients, who all lacked a positive family history. The extrinsic causes of Congenital knee dislocation includes lack of amniotic fluid, lack of intrauterine space, fetal malposition, fibrotic contracture of the quadriceps and traumatic dislocation during birth [4, 7, 10, 11]. Abnormal intrauterine positioning is implicated by observations of hyperextended knees in association with breech presentation. Fetal moulding due to oligohydramnios or extended breech position was suggested as a cause by Shattuck and supported by Niebauer and King.

Other factors which contribute to Congenital knee dislocation include quadriceps contracture and hvpoplasia of the anterior cruciate ligament [7, 11].

In our case, the exact etiology for Congenital knee dislocation is not known; however, X-rays of both the knees showed anterior tibial translocation on the femur, probably secondary to anatomic abnormality, as stated earlier. As literature states, DDH is the most common association of CDK [1]. CDK

contributes, at least in part, to development of DDH, with contractive quadriceps muscle and dorsally displaced hamstrings potentially rendering the hip joint unstable. In our case, we could not find any association with DDH.

All infants with a hyperextension deformity of the knee should undergo a radiographic examination to differentiate between genu recurvatum and true dislocation of the Knee. In congenital genu recurvatum, the tibial and femoral epiphyses are in proper alignment except for the hyperextension. In subluxation of knee with dislocation, the tibia is completely anterior or anterolateral to the femur. The tibia is shifted forward in relation to the femur and is frequently lateral as well [12].

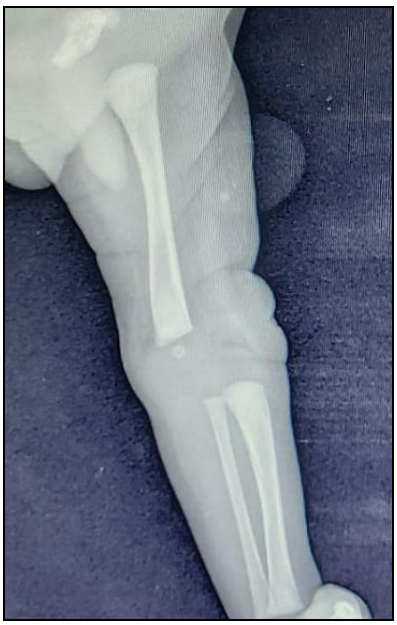

Fig 4: X-ray picture showing malalignment of femoral and tibial epiphyses

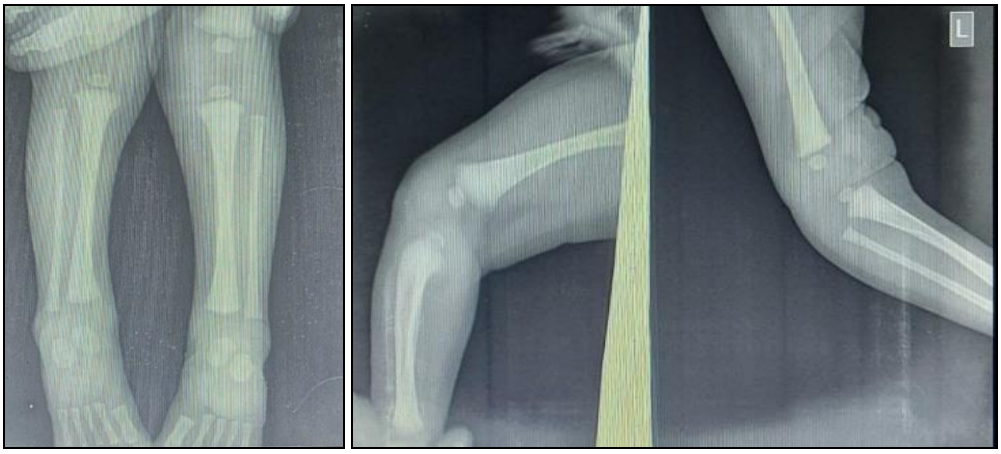

Fig 5: Follow up x-ray picture showing corrected deformity (Aligned femoral and tibial epiphyses)

Serial manipulation and casting are recommended in newborns. POP Cast should be applied in full flexion position as much the knee allows. Forced flexion is not recommended because of potential problems such as epiphyseal damage, fracture and impaired circulation. The cast must be changed once in 2 weeks until perfect reduction is attained. The early conservative treatment is recommended as the therapy of choice and is successful with gentle manipulation, strapping and serial casts if carried out early i.e. within 2-3 months [3, 13].

Cases with delaved presentation or which do not respond to conservative treatment need surgery. Surgical treatment involves lengthening of the quadriceps tendon by V-Y plasty [14]. Prognosis is mostly favorable in unilateral cases [5] and when surgery is performed before 2 years of age. Delay in treatment may lead to long-term instability and stiffness [13]. Importance should be given on immediate recognition and treatment of the condition.

Conclusion

Early detection and timely intervention of congenital dislocation of knee could save the child from long-term disabilities and would help them to attain the normal development motor milestones as in our case.

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