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Website: www.joas.in

DOI: 10.4103/joas.joas_36_17

Congenital dislocation of knee with ipsilateral developmental dysplasia of hip

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Abstract:

We present a rare case of a newborn having congenital knee dislocation (CDK) with ipsilateral developmental dysplasia of hip (DDH). This case report shows how abnormal intrauterine pressure leads to dislocation of various joints *in utero*. We managed this conservatively with Pavlik Harness for DDH and serial corrective casting with manipulation for CDK with a satisfactory result after follow-up of 6 months.

Keywords:

Congenital dislocation of the knee, intrauterine pressure, ipsilateral developmental dysplasia of hip, Pavlik Harness, serial casting

Introduction

Congenital dislocation of knee (CDK) was first reported by Chanssier in 1812 followed by Swiss physician Chatelaine in 1822. It involves hyperextension of the knee joint with an inability to flex the knee, which can be depicted by anterior displacement of proximal tibia over femoral condyles and palpating the femoral condyles.[1,2] The calculated incidence of this anomaly is 1:100,000 live births, second to the incidence of congenital dislocation of hip (CDH).[3] Most of the cases are associated with developmental dysplasia of hip (DDH), club foot, and congenital vertical talus (CVT). Others are spinal bifida, cleft palate, Larsen syndrome, arthrogryposis, fibula hypoplasia, dislocation of the elbow, and chest cage deformities.[4] Furthermore, CDK can be graded into three categories on the basis of severity as follows: grade 1, congenital hyperextension; Grade 2, congenital hyperextension with anterior subluxation of the tibia on the femur; and Grade 3, congenital hyperextension with anterior dislocation of the tibia on the femur.[5] Various theories regarding the etiology of CDK have been described: absent or hypoplastic anterior cruciate ligament, quadriceps contracture, absence of the suprapatellar pouch, lack of intrauterine space, trauma to the mother, and the breech position. However, the exact cause remains unclear.[6] Several extrinsic factors have also been postulated in CDK such as mechanical factors mainly due to abnormal intrauterine pressures, leading to an intrauterine malposition. It usually results in a hyperextension or subluxation of the knee. Reduction is usually successful when the underlying cause is extrinsic. In contrast, intrinsic causes mostly require surgical intervention.[7] We report one such case in a newborn child involving ipsilateral CDK and DDH.

Case Report

A full-term baby girl (weight 3 kg), born by normal vaginal delivery with a breech presentation in the hospital (of a nonconsanguineous marriage), presented with congenital hyperextension of the left knee (Grade III) [Figure 1]. On examination,

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How to cite this article: Kakar S, Gupta V, Gupta P. Congenital dislocation of knee with ipsilateral developmental dysplasia of hip. J Orthop Allied Sci 2017;5:80-3.

the left knee was hyperextended and flexed passively, and a deep crease was noted on the anterior aspect of the right thigh [Figure 2]. Since congenital hyperextension of the knee is associated with DDH, CTEV (congenital talipes equino varus), and CVT, the patient was examined clinically for the three conditions. There was no abnormality noted in the foot; however, there was an abnormality noted in the ipsilateral hip which was evident on X-rays [Figure 3].

A detailed examination of the left hip was carried out, and following were the clinical findings: asymmetrical groin fold, gluteal folds on a higher level, trochanter proximally migrated, limitation of abduction with increase in internal rotation, Galeazzi sign positive [Figure 4], and Ortolani and Barlow's test positive. To confirm the diagnosis of DDH, X-ray pelvis with both hip and ultrasonography (USG) left hip at 2 weeks after birth was performed [Figure 5]. USG left hip showed shallow acetabular cup with increased beta angle and decreased alpha angle. In this case, we addressed the knee deformity first as mentioned by Nogi *et al*., when there is concurrent presence of DDH with this knee abnormality and then knee problem should be treated first as good knee movements can help with correction of hip abnormality.[8] In this case, the newborn baby girl was treated for CDK left knee with sequential correction with serial casting. Initially, an anterior slab was applied with knee in 0 degree of extension followed by serial cast in 30°, 60.90°, and 100° of knee flexion. We applied five slabs which were changed in intervals of 2 weeks and achieved 100° of flexion. The DDH was managed by Pavlik harness with hip in 45° of abduction and 90° of hip and knee flexion. The child was clinically examined and assessed on an outpatient basis on regular intervals. At the end of 3 months, X-ray left knee and X-ray pelvis with both hip and ultrasound were repeated [Figure 6]. Ortolani and Barlow's test was negative. Follow-up of the case was done for 6 months at regular intervals, and a significant correction in the deformity of hip and knee was noted. At the end of 6 months, the child had a stable hip and

Figure 1: Hyperextension of the left knee in a newborn

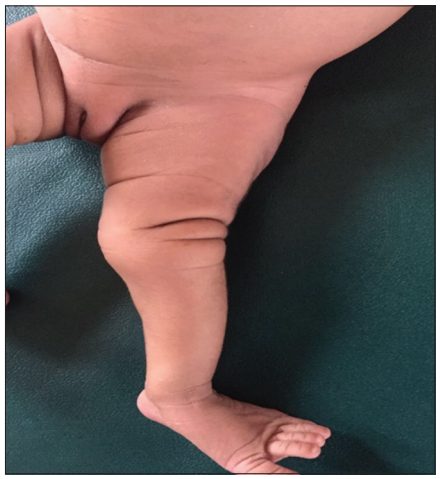

Figure 2: Hyperextension of the left knee with marked anterior deep crease

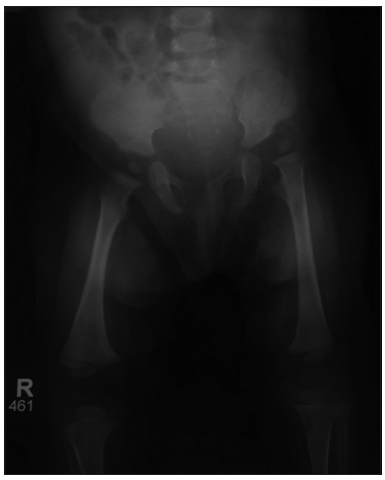

Figure 3: X-ray of pelvic and both hips' anteroposterior view at 3 months

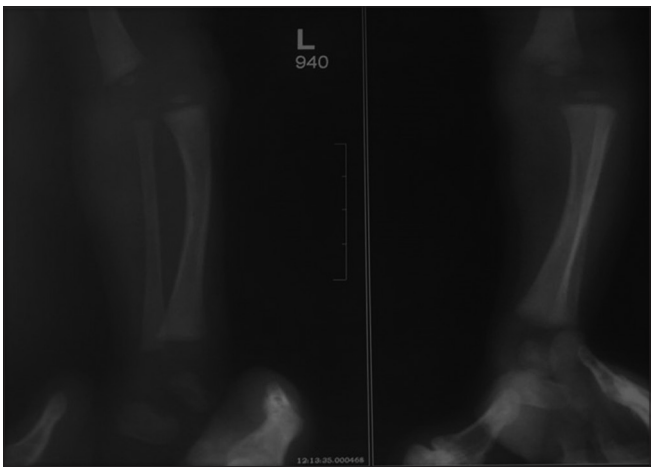

Figure 4: X-ray of the left knee at 2 weeks after birth

knee joint with a good range of motion for both joints [Figure 7]. The knee did not dislocate but there was a slight posterior laxity. After 6 months, follow-up could not be done as the patient did not attend the outpatient department. This is the limitation in our case. A longer follow-up would have been better in determining the right choice of treatment.

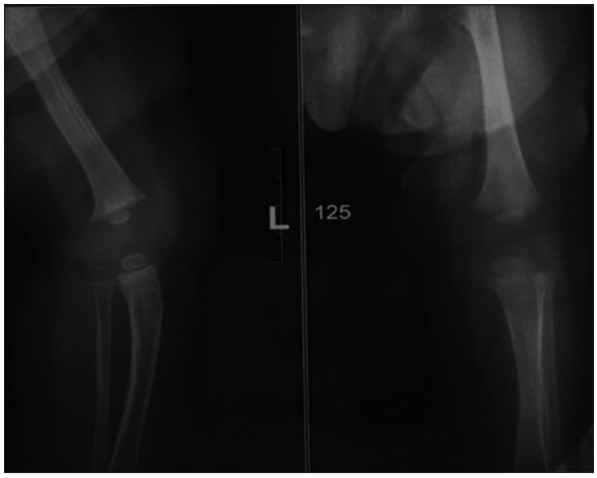

Figure 5: X-ray of the left knee at 3 months

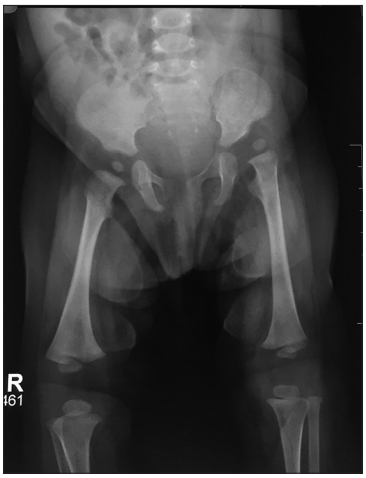

Figure 6: X-ray of pelvic and both hips' anterior view at 3 months

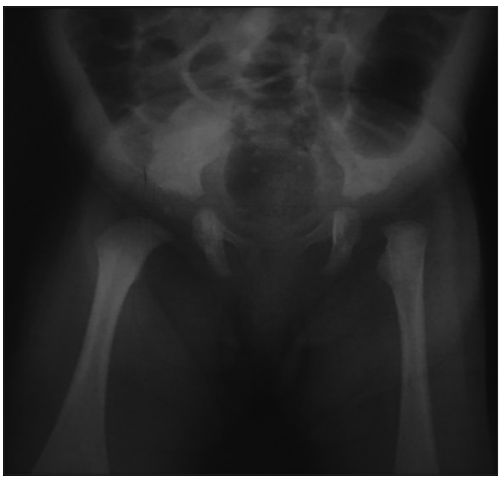

Figure 7: X-ray of pelvic and both hips' anterior view showing developmental dysplasia of the left hip

Discussion

Congenital genu recurvatum is an uncommon condition that presents more commonly in girls than in boys, and in more than half of the cases, it is bilateral. It is mostly associated with other musculoskeletal disorders such as CDH, CTEV, spina bifida, scoliosis, coxa valga, dislocation of the elbow, anomalies of the toes, cleft palate, mongolism, hydrocephalus, facial paralysis, and cryptorchidis, but the incidence of CDH is the most common associated anomaly. A study conducted by Katz *et al*.[10] in 155 children with CDK found that 82 children had other musculoskeletal abnormalities while 45 children had CDH.[9] In our case, deformity of the knee was reducible and was associated with DDH without any other musculoskeletal syndrome which confirmed that it was of extrinsic type. All cases of CDK with extrinsic type are usually treated conservatively with manipulation and serial casting.[10] However, sometimes, reduction is achieved but difficult to maintain in 90° knee flexion after 3 months of conservative treatment. In such cases, it is advisable to change the treatment plan to surgical intervention which involves the following: Z-plasty of the quadriceps mechanism, V-Y advancement, Achilles tendon allograft,[11] release of the anterior capsule, and intra-articular adhesions.[12] According to Ooishi T *et al*., the best time for surgery is approximately 1 year after birth and before the child starts to walk. The common findings in CDK are shortening of the quadriceps tendon, tight anterior capsule, and absence of the suprapatellar pouch. These findings have been described for both the extrinsic and intrinsic types of CDK. This was not seen in our case. We had identified the associated condition early and initiated immediate treatment in the form of serial cast manipulation, which yielded high success rate in correcting and maintaining the reduction.

Conclusion

Hence, the carry-home message is that early identification and early treatment of CDK and its associated abnormalities leads to successful outcome in short time span with conservative treatment.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in

the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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