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Gentle manipulative reduction and percutaneous fixation with a single screw in slipped capital femoral epiphysis: A case series

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Abstract

Slipped capital femoral epiphysis or SCFE is the most common hip disorder documented in the 9-15 year age group [1, 2, 3]. The goal of treatment is the reduction of the initial epiphyseal displacement, proper dependable stabilization, prevention of additional slippage, along with rapid epiphysiodesis. We report here the results of 5 of our patients and their follow up results that we treated using gentle reduction manoeuvres and percutaneous pinning using a single screw. The IOWA Score of the 5 patient after the clinical evaluation were good in 4 cases and fair in 1 case. We conclude that preoperative reduction with very gentle manipulation and percutaneous pinning with a single screw is a satisfactory and acceptable treatment for SCFE.

Keywords: slipped capital femoral epiphysis, case series, percutaneous screw fixation

Introduction

Slipped capital femoral epiphysis or SCFE is the most common hip disorder documented in the 9-15 year age group [1, 2, 3]. The approximate prevalence of SCFE has been estimated to be 10.8 cases per 100,000 [4]. The aetiology of SCFE still remains unclear but what is clear, is the multifactorial nature of the risk factors for the development of the condition which includes obesity, male gender and endocrine abnormalities [5, 6], renal failure osteodystrophy [7] and radiation therapy to the pelvis [8]. It is primarily the separation of the epiphysis and the metaphysis of the proximal femur resulting in a slip with the epiphysis remaining in the acetabulum while the femur usually rotates outwards and in extension [9]. The goal of treatment is the reduction of the initial epiphyseal displacement, proper dependable stabilization, prevention of additional slippage, along with rapid epiphysiodesis. It is also important to mobilize early and start weight bearing in 2-3 weeks. Of the many treatment modalities, appropriateness of the procedure depends on the predictive prognostic factors like stability of the slip, severity of the slip, aetiology of the slip and age of the child. We report here the results of 5 of our patients and their follow up results that we treated using gentle reduction manoeuvres and percutaneous pinning using a single screw. The underlying premise is that minimally aggressive reduction techniques and single percutaneous screw preserves the blood supply and does minimal damage to the future growth potential.

Material & Methods

5 patients were treated at our tertiary care centre between 2017 January and December 2018. These patients underwent operative fixation of the slip.

4 of these children were boys and 1 was a girl. The mean age at surgery was 11 years. The time of onset of symptoms to the 1st clinical presentation was an average of 5 months (range 3-7 months). The mean follow-up was 18 months. Pain, function and range of motion were evaluated at the follow-ups and used for calculation of the IOWA score. X-ray findings were evaluated as per the method of Boyer *et al.* The severity of the slips was graded into mild, moderate and severe as per the head, shaft angle on anterior-posterior and frog lateral views. The 5 patients were managed operatively with gentle manipulation and percutaneous pinning with a single screw. (Figure 2)

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Results

Table 1 shows the list of complications that were anticipated or met with in our 5 cases. None of the 5 patients developed and skin infections either superficial or deep. We are yet to document chondrolysis or osteonecrosis although we believe the follow-up period reached presently is inadequate to draw any conclusion on the future incidence of chondrolysis or osteonecrosis.

Table 1: Complications after treatment of SCFE after gentle manipulative reduction and single percutaneous pinning.

Incidence of complications in the SCFE patients treated with single percutaneous screws	
Infections (Superficial or deep)	0
Chondrolysis	0
Osteonecrosis	0
Other complications	0

The IOWA Score of the 5 patient after the clinical evaluation is shown in Table 2. The results were good in 4 cases and fair in 1 case.

Table 2: IOWA hip score of the 5 patients on follow up.

IOWA hip score of the 5 patients			
Score	Good	Fair	Poor
No of patients	4	1	0

Discussion

If untreated the slip can progress and worsen [15]. The worsening may result in complications such as avascular necrosis of the femoral head, chondrolysis and late degenerative arthritis of the hip. Although a small proportion of unstable SCFEs can progress despite seemingly adequate treatment & result in complications. The aim of treatment is 4-fold. (1). Halt progression of the SCFE, (2) Minimize the risk of AVN, (3) Minimize the risk of chondrolysis and (4) Minimize the risk of degenerative arthritis. The progression of the disease can be halted by either stable fixation of the epiphysis or early fusion of the epiphysis. The risk of AVN may not always be in the hands of the surgeon but the risk of chondrolysis can be minimised by taking care that the implant does not penetrate the joint. Finally, it has to be kept in mind that the risk of degenerative arthritis can be reduced by restoring the anatomy of the proximal femur to as near normal as possible. Mild and moderate degrees of unstable SCFE may simply require In situ fixation with the placement of a single cannulated screw in the centre of the epiphysis in both anteroposterior (AP) and lateral views. The results are excellent in terms of preventing the progression of the disease as well as minimizing the risk of Chondrolysis [16]. For more severe grades of SCFE reduction by gentle repositioning and internally fixed with cannulated screws is commonly indicated. Carney *et al* had reported a high incidence of aseptic necrosis and chondrolysis in a large series of patients who were subjected to forceful reduction manoeuvres [17]. We treated all our patients with gentle reduction manoeuvres with no rotational manoeuvres. De Sanctis *et al* suggested that this preserves the blood supply well and doesn't cause any damage to the remodelling potential of the femoral head.



Fig 1: Radiographs pre operatively, post operatively at 3 months and at 6 months follow up in patient no 2



Fig 2: Radiographs pre operatively, at 3 months follow up and 6 months follow up.

Conclusion

There is a dearth of literature regarding the treatment of unstable slipped capital femoral epiphysis (SCFE). In our study, we found that percutaneous screw fixation after gentle manipulation is a stable, safe and reliable method of achieving satisfactory results. There is only a small incision, leaving only a small scar, with practically no blood loss along with short operative time, hospitalization and easy post-operative nursing care. We conclude that preoperative reduction with very gentle manipulation and percutaneous pinning with a single screw is a satisfactory and acceptable treatment for SCFE. Although a study with a larger study population and a longer duration of follow up period would go a long way in confirming it conclusively.

Declaration

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