

Evaluation of Madigan Procedure in the Treatment of Habitual Dislocation of Patella

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ABSTRACT

This was a clinical trial (quasi experimental) study carried out at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka, between July 2004 to June 2006, involving 16 patients with habitual dislocation of the patella. All these cases were managed by Madigan operative procedure. Aim of this study was to evaluate the effectiveness of the madigan procedure in the treatment of habitual dislocation of the patella. Out of these 16 patients 2 were subsequently lost from follow up. So, the study finally consisted of 14 patients. In this study non-random purposive technique as per inclusion and exclusion criteria was followed irrespective of sex. Most common age group in this study was 6-10 years (62.5%). The mean age of occurrence was 8.25 years. Repeated intramuscular injection on the thigh was the commonest cause of dislocation found in 37.5% cases. The second most common cause of dislocation was history of boil. Abscess or cellulitis on the thigh followed by contracture of the quadriceps muscles. Various postoperative complications like hypertrophic scar constituted (18.75%), stitch granuloma (6.25%), restriction of knee motion (6.25%) and re-dislocation

occurred in (6.25%) cases. Functional outcome in the management of habitual dislocation of the patella was analyzed by using the Hospital for Special Surgery (HSS) knee score. Regarding the final or overall results in this series, there were 71.43% cases were found satisfactory and the remaining 28-57% were found unsatisfactory result.


Keywords: Madigan Procedure, Habitual Dislocation.

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INTRODUCTION

Habitual dislocation of the patella is one of the common problems of knee in our society. It implies that dislocation occurs every time when the knee is flexed. Displacement is painless in contrast to recurrent dislocation which occurs in isolated episodes, often in response to trauma and is accompanied by pain and swelling. Congenital dislocation refers to a persistent irreducible dislocation present since birth and associated with a lateral position of the entire quadriceps mechanism and also have familial predisposition. It may be associated with other abnormalities like arthrogryposis multiplex congenita, down syndrome etc.¹ Before the beginning of twentieth century, the treatment of patellar

dislocation was extremely controversial. Non-operative methods, like extension splintage and rest, were most commonly employed.²

With the knee in extension, the quadriceps and patella tendon are almost parallel, applying a more uniform tensile load across the patella which predisposed it to become dislocated habitually.³

Habitual dislocation of the patella can follow an initial dislocation, but it occurs more often in knees with one or more underlying anatomical abnormalities that predispose the patella to dislocate and subluxated. In these knees, less trauma is needed for the initial dislocation to occur. The underlying pathological condition

causes an abnormal excursion of the extensor mechanism over the femoral condyles. Several anatomical factors should be considered when evaluating a patient with habitual dislocation of the patella. Distinction between recurrent and habitual dislocation in operative procedure are: operation for recurrent dislocation usually involves procedure distal to patella. In case of habitual dislocation Always requires proximal realignment of the patella. The frequent causes of habitual dislocation of patella are subtitled in two groups. Bony causes are: (i) shallow or femoral condyle flattened lateral femoral condyle (ii) hypertrophic medial (iii) gems valgum (iv) increase femoral ante version, (v) external tibial torsion (vi) small patella (vii) rudimentary and laterally positioned tibial tubercle. Soft tissue causes are (i) contracture of the vastus lateralis (ii) atrophic and disoriented vastus medialis (iii) tight lateral retinaculum (iv) more lateral insertion of patellar tendon (v) short vastus medialis obliquus (vi) generalized ligamentous laxity. So both static and dynamic forces tend to displace the patella laterally. Any of these factors can increase the 'Q' angle which is a contributing factor in habitual patellar dislocation.⁴

The management of patellar dislocation has traditionally been difficult. There are no golden standard methods for patellar. Dislocations probably due to the many etiologies. Advancement of the vastus medialis with habitual dislocation no patient experienced redislocation after surgery.⁵ The best treatment for patellar dislocation has been the subject of debate. Surgery has been recommended for all patients or for special subgroups to improve the outcome.⁶ Madigan procedure is a good method of operative treatment for habitual dislocation of patella. The study carried out at the National Institute of Traumatology and Orthopaedic Rehabilitation from July 2004 to June 2006.

OBJECTIVES

- To find out the effectiveness of the madigan procedure in the management of habitual dislocation of the patella.
- To see the effect of the procedure on the function, range of motion and the stability of the knee joint.

METHODOLOGY

Study Design

Clinical trial (quasi experimental) study.

Place of Study

This study was undertaken at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka.

Period of Study

From July 2004 to June 2006.

Selection of Subjects

A total number of 16 cases with habitual dislocation of patella were selected consecutively. Among these cases two patients were bilaterally affected while rest of the cases were unilateral. Out of these 16 cases 2 failed to reappear in the subsequent follow up. So, finally this study included 14 cases.

Inclusion Criteria

- Habitual dislocation without fracture patella.
- Habitual dislocation without infection.
- Both unilateral and bilateral.

Exclusion Criteria

- Acute traumatic dislocation of patella.
- Recurrent dislocation of patella.
- Congenital dislocation of patella.

- Fracture patella associated with dislocation.
- Ligamentous injuries associated with patellar dislocation.

Table 1: Sex differentiation

Sex	n	%
Female	9	56.25
Male	7	43.75

Table 2: Duration of total hospital stay

Hospital stay in days	n	%
7-10	10	62.5
15-28	4	25
29-35	2	12.5

Table 3: Postoperative complication

Incidence	n	%
Hypertrophic scar	3	18.75
Stitch granuloma	1	6.25
Restriction of knee movement	1	6.25
Redislocation	1	6.25

Table 4: Functional outcome

Functional outcome	n	%
Excellent	2	14.28
Good	8	57.14
Fair	3	21.43
Poor	1	7.14

Table 5: Overall result

Results	n	%
Satisfactory	10	71.43
Unsatisfactory	4	28.57

RESULTS

During the period extending from July 2004 to June 2006, a total number of 16 patients with habitual dislocation of the patella were selected. Out of these 14 were involved unilaterally 2 were involved bilaterally. Among these 14 were followed up for at least 6 months upto a maximum of 18 months. 2 cases were failed to reappear in the subsequent follow up. So finally this study included 14 cases. Excellent and good results were taken as satisfactory result. Whereas fair and poor were taken as unsatisfactory result.

Age Incidence

In this study the age of the patients ranges from 4 to 14 years. Maximum incidence was found in the 6 - 10 years age group.

Sex Differentiation

This study comprised with 9 female and 7 male patients.

Side of Involvement

Involvement of the right knee was seen in 8 cases (50%), left knee in 6 cases (37.5%) and bilateral involvement were found in 2 cases (12.5%) in this series.

Cause of Dislocation

In this study, history of repeated intramuscular injection on the thigh accounted for 6 cases (38%), abscess, cellulitis or any infection causes contracture of the quadriceps accounted 5 cases (31%), 4 cases (25%) were due to history of trauma and 1 case (6%) had a family history of dislocation.

Duration of Total Hospital Stay

Maximum patient were stayed in the hospital in this series between 7-14 days group (62.5%), 15 to 28 days group (25%) and 29-35 days accounted for (12.5%) of cases. The mean total hospital stay was 16.25 days.

Postoperative Hospital Stay

Maximum duration of postoperative hospital stay in this series was 27 days (bilateral knees were involved and both were operated at an interval of 14 days) and minimum was 4 days. The mean time

for postoperative hospital stay was 8.25 days.

Postoperative Infection

In this study only one case (6.25%) was infected superficially which was treated by regular dressing and sensitive antibiotic for three weeks.

Postoperative Complication

In this series, hypertrophic scar was seen in 3 cases (18.75%), stitch granuloma was observed in 1 case (6.25%), restriction of knee movement in 1 case (6.25%). Redislocation occurred in one case (6.25%).

Functional Outcome

In this series there were 2 cases (14.28%) with excellent result, 8 cases (57.14%) with good functional outcome. 3 cases (21.43%) with fair outcome while 1 case (7.14%) had a poor functional outcome.

Overall Results

In this study the excellent and good functional outcome were taken as satisfactory result. Whereas fair and poor functional outcome taken as unsatisfactory result.

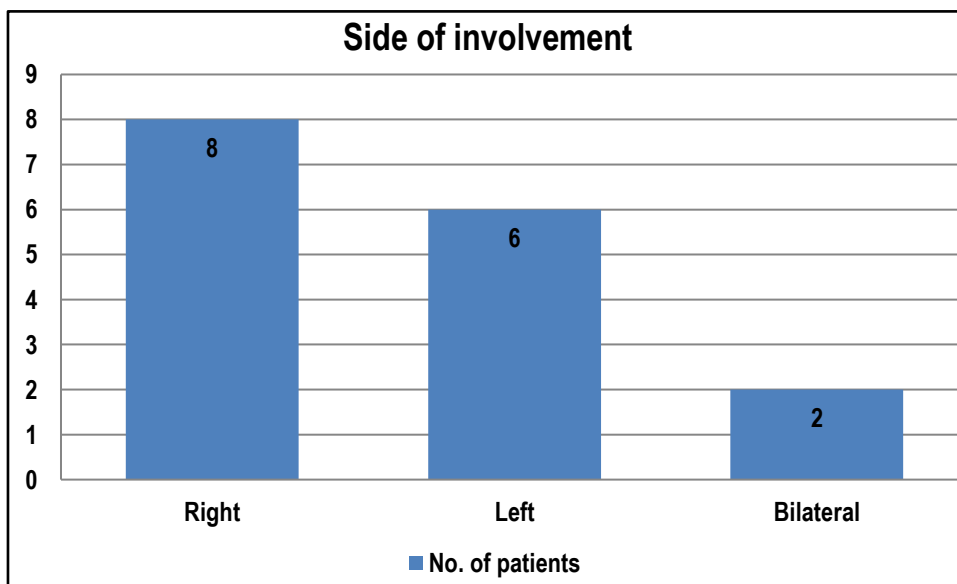


Figure 1: Side involvement

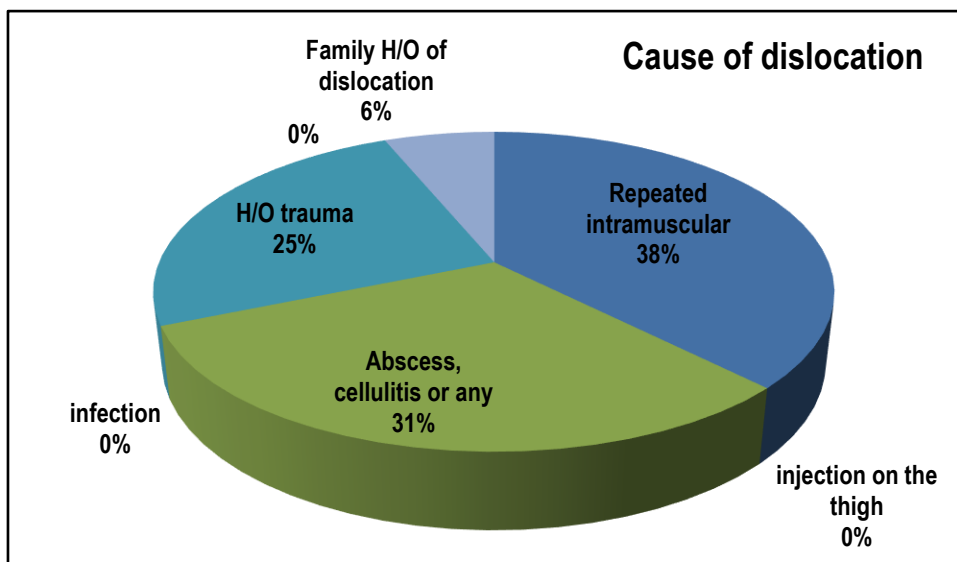


Figure 2: Cause of dislocation

DISCUSSION

Injury or dislocation of the patella is relatively uncommon but in association with fracture of the patella it account for approximately 1 to 2 percent of all skeletal injuries. However, because the patella plays such an important role in knee function, the effective treatment of patellar dislocation is essential.⁷

The objective of operative treatment are anatomical reconstruction and restoration of the extensor mechanism while preserving the patella. Early range of motion of the knee will reduce the incidence of postoperative knee stiffness and shorten the disability after patellar dislocation. Proximal realignment techniques must be strong enough to resist the displacement force across the patella during the post-operative period to allow early motion.⁸

Operative procedure for the treatment of dislocation of the patella said to be satisfactory when it fulfilled the following criteria:

Asymptomatic, primary defect completely corrected, no restriction of any activity, full range of knee motion. Hauser (1983), in this classical paper, described six different type of operation for habitual dislocation. But there are however, only three basic objectives in all these procedures: to release the tight lateral patellar retinaculum, capsule and contracture of vastus lateralis, to correct any abnormal tracking of the patella due to an unduly lateral attachment of the ligamentum patellae and to reef a lax medial patellar retinaculum and capsule. Zimble et al. (1980) advocated an extensive lateral retinacular release. Reefing of the medial retinaculum, however is not devoid of risk; if done to tightly, it can predispose to excessive pressure on the patellofemoral articulation leading to degenerative changes.⁹⁻¹¹

Chen (1984) reviewed the failure rate after procedure like Hauser or the Roux- Golthwait may be due to fact that these are effective only when the Q-angle is more than 14° in such knees proximal realignment operation, such as advancement of the vastus medialis over the medial proximal pole of the patella, are better than above mentioned procedures. In this study proximal realignment also done by advancement of vastus medialis over the centre of the patella with release of tight and contracted vastus lateralis. Bergman (1988) reviewed 35 patients, with 43 affected knees were included. There was even distribution of the sexes with 18 males and 17 females. The average age at presentation was 9 years with a range from 3 to 15 years. The average follow-up was 6 years 9 months with a range from 3 months to 19 years 10 months. Most common cause of habitual dislocation documented with past history of multiple intramuscular injections (commonly antibiotics) during the neonatal period.¹²

This study also shown even distribution of the sex incidence and the common cause of habitual dislocation also same.

John King (2000) reviewed conservative treatment must be tried and taken as the form of trying to build up the VMO plus correction of tibial torsion with orthosis prior to operative procedure like femoral or tibial osteotomy. Conservative treatment prior to operative procedure also tried but any form of bony procedure like osteotomy was not performed in this series. Nakagawa (2002) examined 45 cases who had undergone an Elmslie-Trillat procedure for habitual dislocation of patella. On his study the mean age at the time of surgery was 18.4 years the mean follow up was 161 months. Using Fulkerson's functional knee score, out of which 29 (64%) had an excellent or good result.^{13,14}

This study shown the mean age at the time of surgery was 8.25 years, using the hospital for special surgery knee score (HSS

knee score). 10 knees (71.42%) had an excellent or good result at a mean follow up of 12 months. The postoperative limitation in the range of motion resolved quickly and did not recur yet. Tenderness and crepitus around the patella not seen for a long time after the operative procedure and quadriceps atrophy resolved in most cases in this series.

The present study was under taken at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka the evaluation of madigan procedure in the treatment of habitual dislocation of the patella was studied.

In this series most patient fell between the age of 6-10 years (62.5%), while the next common age group being 11-15 years (25%). The mean age incidence was 8.25 years. Female population in this study constitute 56.25% of cases. While male made up the remaining 43.75%. Event distribution of sexes also seen in other studies. In this series the involvement of right knee constitute 8 cases (50%) while the left knee was involved in 6 cases (37.5%). Two cases (12.5%) were bilaterally involved.

Repeated history of intramuscular injection on the thigh constitute 6 cases (37.5%) in this series. Abscess, boil and cellulitis causes contracture of the quadriceps accounted 5 cases (31.25%). Four cases (25%) were due to history of trauma and 1 cases (6.25%) had a family history of dislocation. Maximum patient stayed in the hospital in this series between 714 days (62.5%). 15 to 28 days (25%) and 29-35 days (12.5%) accounted in this series. The mean hospital stay was 16.25 days. Maximum duration for postoperative hospital stay in this series was 27 days (bilateral knees were involved and both operated at an interval of 14 days) and minimum was 4 days with a mean of 8.25 days.

Postoperative superficial wound infection was observed in 1 case (6.25%) in this series. Regular dressing and sensitive antibiotics controlled it in 3 weeks. Brown and Diduch (2001) had reported an infection rate of 3-10%. The different infection rate found on their series. Postoperative complication like hypertrophic scar were found in 3 cases (18.75%) in this series. In this series stitch granuloma was seen in one case (6.25%) probably due to use of non-absorbable suture (prolene) more superficially in a very lean and thin patient. Restriction of knee motion was seen in one case (6.25%) in this series. Hung et al (1985) reported that 14% of the patients who did not have full range of motion in their study.^{15,16} Redislocation occurred in one case (6.25%) in this study possibly because the patient had given a back slab instead of cylinder cast postoperatively or may be due to use of absorbable suture (vicryl) instead of non-absorbable suture (prolene). Bergman (1988) reported 12 knees out of 43 cases (28%) were redislocated in their study.

In this study excellent and good functional outcome were taken as satisfactory result constituted 71.43%. Fair and poor functional outcome were taken as unsatisfactory result accounted 28.57%.

CONCLUSION

As seen from the result of this study, madigan procedure can be considered as an effective method in the treatment of habitual dislocation of the patella. Less tissue handling, close postoperative monitoring and follow up with active quadriceps muscle exercise and gradual knee bending are very essential for satisfactory result. Long term result is beyond the scope of this study. Long term follow up is necessary to evaluate the final outcome of these patients.

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