International Journal of Medicine Research
ISSN: 2455-7404
Impact Factor: RJIF 5.42
www.medicinesjournal.com
Volume 3; Issue 4; October 2018; Page No. 73-76

Traumatic patellar dislocation in children: A case report

Driss Hanine[1*], Hanaa Khirallah[2], Zakaria Aboulam3, Fouad Ettayebi[4], Mounir Erraji[5]
[1-5] Department of Pediatric Surgery Emergencies, Children Hospital of Rabat, Morocco

Abstract
Traumatic patellar dislocation is a common injury in the active and young adult populations. MRI of the knee is recommended in all patients who present with acute patellar dislocation. Numerous operative and non operative methods have been described to treat the injuries; however, the ideal management of the acute traumatic patellar dislocation in young adults is still in debate. This article is intended to review the studies to the subjects of epidemiology, initial examination and management.

Keywords: patella, trauma, dislocation, medial patellofemoral ligament

Introduction
Acute traumatic patellar dislocation is the second most common cause of traumatic hemarthrosis of the knee and it accounts for approximatively 3% of all knee injuries [1, 2].
It is typically resulted from a sports injury and occurs about 2/3 of the time in young, active patients under the age of 20. Most patellar dislocations are associated with participation in sports and physical activity [3-5]. The long-term impact of patellar dislocation and the resulting patellar instability can lead to considerable pain, recurrence, and even patellofemoral osteoarthritis [6].

Materials & Methods
We report a case, received urgently in the Pediatric Surgical Emergency Department at the Children's Hospital of Rabat in Morocco, dislocation of patella occurred in a 12-year-old boy with no specific history, who had a direct trauma on the knee, from a fall of its height during a game; and in whom the clinical examination revealed a swollen, painful knee with a patella dislocated in the supero-external, which was confirmed by standard radiography (Figure 1) without any other visible bone involvement (fracture or tearing).

We could not perform an emergency MRI for lack of means.
A reduction under General Anesthesia was performed after puncture evacuating the hematoma for analgesic purposes. Then plaster immobilization with knee at 20 ° flexion (Figure 2) for 45 days (may hope to heal a suspected medial patello-femoral ligament rupture).

Early and progressive rehabilitation was carried out afterwards.
With a decline of 3 months, there is no stiffness or recurrence of dislocation. The resumption of sports activity was started gradually without anomalies.

Discussion
Patellar dislocation, if not otherwise specified, is lateral dislocation; medial dislocation, which is exclusively iatrogenic, and intra-articular dislocation are very rare, but exist and need to be known.
There is an important distinction between inaugural traumatic dislocation (single), recurrent dislocation (several) and habitual dislocation, as definitions and treatments differ. Inaugural traumatic dislocation ruptures previously intact medial para-patellar structures [3, 7, 8], and may remain single. In common to all inaugural traumatic dislocations is knee hemarthrosis, due to medial para-patellar stabilization structure rupture. Dislocation becomes “recurrent” if repeated several times following the inaugural traumatic dislocation. Habitual dislocation is a complex entity defined by patellar dislocation on each movement of flexion of the knee.
The MPFL provides 50–80% of the mechanisms counteracting lateral patellar glide [9, 10]. Lateral patellar dislocation renders it incompetent, promoting recurrence of dislocation [11].
Neighboring structures, such as the patellomeniscal or patellotibial ligaments and the superficial medial retinaculum, make lesser contributions to patellar stability.
The VMO muscle is very important, acting as a dynamic stabilizer, and is intimately related to the MPFL [12].
There have been several studies of incidence of inaugural patellar dislocation in adults [3-5, 7]. Mean annual incidence of patellar dislocation varies with agegroup: it is between 5.8 and 7.0 per 100,000 person-years in the general population, but 29 per 100,000 in 10–17 year-olds; It reaches 69 per 100,000 person-years in military personnel undergoing aptitude testing and very demanding training [7].
Women are at greater risk than men, as are young subjects, whether military or in the general population; risk decreases with age [3-5, 7]. This may be due to young subjects’ more intense physical activity and/or to morphologic and tissue-related factors that make some adolescents more vulnerable.
The typical mechanism underlying patellar dislocation is a movement of the knee in flexion and valgus without direct contact, accounting for 93% of traumatic patellar dislocations [3]. Most patients report a sensation of slippage, intense pain and secondary effusion, often suggestive of

knee sprain. True traumatic dislocation, caused by direct tangential shock dislocating the patella laterally, also occurs. History taking can determine the trauma mechanism.

Recurrence risk is increased 6-fold in case of history of ipsi- or contralateral patellar dislocation [4].

In fresh trauma, clinical examination is essential for diagnosis of patellar dislocation [12].

Patellar dislocation usually resolves spontaneously. Only 20% of patients require reduction of persistent dislocation. Diagnosis is then clear: the patient is in great pain, the knee is deformed by the lateral dislocation of the patella, and there is often flexion contracture. Analgesia or even anesthesia is essential, for the patient to be able to relax. The knee is brought into complete extension and the patella is reduced by lateral medializing pressure to slip it back into the femoral trochlea. Voluminous hemarthrosis can be withdrawn in the same step, to relieve pain and facilitate clinical and radiological examination: the Merchant view in 45° flexion and lateral view in 30° flexion are difficult to take in patients with voluminous hemarthrosis under tension.

In spontaneous reduction, other diagnoses may be considered: severe sprain, joint fracture, etc. The trauma circumstances and immediate post-trauma aspect (lateralized patella) should be determined, with examination for: patellar hypermobility and apprehension when the patella is shifted laterally; then pain on palpation of the MPFL.

Loss of tendon and muscle substance at the patellar insertion of the vastus medialis and/or MPFL and a patella that is easily dislocated are prognostic factors of poor outcome for non-operative treatment [12]. Valgus and abnormal lower-limb rotation, contralateral patellar hypermobility [13], hyperlaxity and familial history of patellar dislocation should also be explored for.

Radiography should comprise an AP weight-bearing view in extension, Merchant view (weight-bearing in 45° flexion), also known as a femoropatellar axial view, and lateral view in 30° flexion.

The Merchant view may reveal bone avulsion of the medial facet of the patella and enables analysis of patellofemoral centering. The avulsion involves either the patellar insertion of the MPFL or the more distal patellomeniscal ligament insertion. Osteochondral fractures of the inferomedial pole of the patella are highly suggestive of traumatic patellar dislocation, but are overlooked on 30–40% of initial radiographs [10, 14].

MRI is more specific in precisely determining involved structures and thus guiding treatment decision-making. It assesses the patellofemoral joint cartilage surfaces and also the medial patellar stabilizing structures (medial retinaculum, MPFL and VMO) [15-17].

In patellar dislocation, MRI reveals: hemarthrosis, bone edema of the medial patellar facet and lateral femoral condyle, osteochondral lesions of the medial patellar facet and the anterolateral part of the lateral femoral condyle. Concave deformity of the infer medial patella, due to impaction, is a specific sign of lateral patellar dislocation [7, 18].

Adapted treatment is essential to limit recurrence of dislocation, painful subluxation and osteoarthritis.

The preventive impact of primary stabilization surgery on secondary instability is a matter of debate.

Treatment guidelines and results are highly variable, with low level of evidence.

Series reporting results on various treatment options combined acute traumatic dislocation and recurrent dislocation [19-23].

Non-operative and surgical management have been compared in a few studies [22, 24], but with only 2 randomized prospective studies [25, 26]. Recurrence rates are high, ranging from 10 to 30% in surgery [1, 23, 24, 26, 27] and 13 to 52% for non-operative treatment [19-22, 24].

Several teams favor non-operative management of inaugural traumatic patellar dislocation [25, 29, 30]. Stefancin and Parker recommended this attitude in a review of 70 articles, except in case of chondral lesion, osteochondral fracture or major lesions of the medial stabilizing structures on clinical and radiological (CT and MRI) assessment [2].

It is all agreed that patients should be immobilized initially for comfort (3–4 weeks) to allow immediate weight bearing as tolerated on crutches after close reduction of the lateral dislocated patella. Early mobilization is important in maintaining articular cartilage health [12]. Patellastabilizing braces were used as soon as comfort permitted, followed by beginning resisted close-chain exercises and passive range of motion in the brace [3]. The efficency of physical therapy after the first patellar dislocation; either the patellar braces or straps on the outcome, has not been reported in any study. There was still some debate for the best model of knee immobilizers. The effects were compared in patients treated with in a posterior splint, cylinder cast, or patellar bandage/brace [19]. Results showed that the posterior splint group had the lowest proportion of knee joint restriction and lowest redislocation frequency per follow-up year.

Surgical intervention for first-time traumatic patellar dislocation is indicated in the following situations: (1) evidence on imaging or clinical examination of osteochondral fracture or major chondral injury; (2) palpable or MRI findings of substantial disruption of the MPFLVMO-adductor mechanism; (3) a patella laterally subluxated on the plain Mercer-Merchant view with normal alignment on the contralateral knee; (4) a patient fails to improve with nonoperative management especially in the presence of one or more predisposing factors to patellar dislocation; and 5) subsequent redislocation [2]. Surgical stabilization significantly reduced the redislocation rate of primary traumatic patellar dislocation in a young adult population than those without surgical treatment, which was addressed in a prospective, randomized, controlled study [25].

There is high prevalence of medial patellofemoral ligament injury in association with acute patellar dislocation [25, 31, 32]. The injuries of the medial patellofemoral ligament and the medial retinaculum as well as hemarthrosis are the definite signs of an acute primary traumatic patellar dislocation [25]. It is reasonable and becomes more accepted to consider that large defects or avulsions are not going to heal or have a good functional outcome with closed treatment especially in individuals with high-level athletic participation and those with evidence of one or more predisposing factors. MPFL injury has been demonstrated as the primary constraint in preventing lateralization of the patella in studies [10, 33]. Immediate surgical repair of the injured medial patellar stabilizers, including the vastus medialis obliqus muscle and

the medial patellofemoral ligament is advocated in this situation.

In our study, we opted for non-surgical treatment given the absence of risk factors and since this is the first time that dislocation appears on an apparently normal anatomical ground and without associated fractures.

Thus, the initial treatment is controversial. The current literature does not allow us to decide categorically for one or the other solution, so there is no consensus clearly established on this subject.

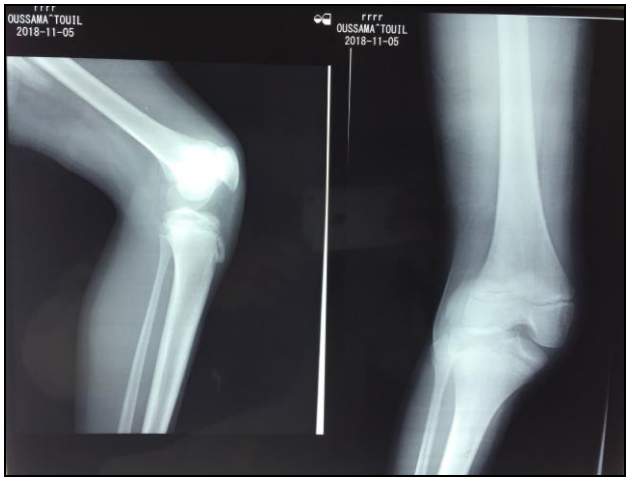

Fig 1: Standard Radiography confirming a dislocated patella

Fig 2: Standard Radiography showing the patella in place after closed reduction

Conclusion

After the routine radiological examination, we advise today to document each dislocation of patella with an MRI to specify the importance of the ligament and muscular lesions, as well as to search for the presence of cartilaginous free bodies.

The healing time of the ligament and muscle lesions is on average six weeks, whether the treatment chosen is orthopedic or surgical. The strict immobilization, in closed plaster, is no longer rigorous. The use of a removable splint is preferred because early rehabilitation is an integral part of the treatment. It is necessary to protect the healing of the injured elements on the inner side of the patella while strengthening the musculature and recovering the joint amplitude.

The repair of MPFL and the muscle vastus medialis obliquus appears as a logical attitude. Correction of dysplasia should be considered to reduce the risk of recurrence but the authors don't recommend doing it urgently, even if deferred.

Conservative treatment is still indicated in cases of traumatic dislocation in a normal anatomical context.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

References

1. Harilainen A, Myllynen P, Antila H, *et al.* The significance of arthroscopy and examination under anaesthesia in the diagnosis of fresh injury haemarthrosis of the knee joint. Injury. 1988; 19(1):21-24.
2. Stefancin JJ, Parker RD. First-time traumatic patellar dislocation: a systematic review. Clin Orthop Relat Res. 2007; 455:93-101.
3. Atkin DM, Fithian DC, Marangi KS, *et al.* Characteristics of patients with primary acute lateral patellar dislocation and their recovery within the first 6 months of injury. Am J Sports Med. 2000; 28(4):472-479.
4. Fithian DC, Paxton EW, Stone ML, *et al.* Epidemiology and natural history of acute patellar dislocation. Am J Sports Med. 2004; 32(5):1114-1121.
5. Sillanpaa P, Mattila VM, Iivonen T, *et al.* Incidence and risk factors of acute traumatic primary patellar dislocation. Med Sci Sports Exerc. 2008; 40(4):606-611.
6. Riedel A, Hartig W, Seeger G, *et al.* Principles of rat subcortical forebrain organization: a study using histological techniques and multiple fluorescence labeling. J Chem Neuroanat. 2002; 23(2):75-104.
7. Hsiao M, Owens BD, Burks R, *et al.* Incidence of acute traumatic patellar dislocation among active-duty United States military service members. Am J Sports Med. 2010; 38(10):1997-2004.
8. Virolainen H, Visuri T, Kuusela T. Acute dislocation of the patella: MR findings; Radiology. 1993; 189(1):243-246.
9. Burks RT, Desio SM, Bachus KN, *et al.* Biomechanical evaluation of lateral patellar dislocations. Am J Knee Surg. 1998; 11(1):24-31.
10. Desio SM, Burks RT, Bachus KN. Soft tissue restraints to lateral patellar translation in the human knee. Am J Sports Med. 1998; 26(1):59-65.
11. Reilly MA, Reilly PM, Bell J. Sonographic appearances of medial retinacular complex injury in transient patellar dislocation. Clin Radiol. 2003; 58(8):636-641.
12. Hinton RY, Sharma KM. Acute and recurrent patellar instability in the young athlete. Orthop Clin North Am. 2003; 34(3):385-396.
13. Stanitski CL. Articular hypermobility and chondral injury in patients with acute patellar dislocation. Am J Sports Med. 1995; 23(2):146-150.
14. Stanitski CL, Paletta GA. Articular cartilage injury with acute patellar dislocation in adolescents. Arthroscopic and radiographic correlation. Am J Sports Med. 1998;

26(1):52-55.
15. Spritzer CE, Courneya DL, Burk DL, *et al.* Medial retinacular complex injury in acute patellar dislocation: MR findings and surgical implications. AJR Am J Roentgenol. 1997; 168(1):117-122.
16. Sanders TG, Morrison WB, Singleton BA, *et al.* Medial patellofemoral ligament injury following acute transient dislocation of the patella: MR findings with surgical correlation in 14 patients. J Comput Assist Tomogr. 2001; 25(6):957-962.
17. Nomura E, Horiuchi Y, Inoue M. Correlation of MR imaging findings and open exploration of medial patellofemoral ligament injuries in acute patellar dislocations. Knee. 2002; 9(2):139-143.
18. Elias DA, White LM, Fithian DC. Acute lateral patellar dislocation at MR imaging: injury patterns of medial patellar soft tissue restraints and osteochondral injuries of the inferomedial patella. Radiology. 2002; 225(3):736-743.
19. Maenpaa H, Lehto MU. Patellar dislocation. The long-term results of nonoperative management in 100 patients; Am J Sports Med. 1997; 25(2):213-217.
20. Cofield RH, Bryan RS. Acute dislocation of the patella: results of conservative treatment. J Trauma. 1977; 17(7):526-531.
21. Larsen E, Lauridsen F. Conservative treatment of patellar dislocations. Influence of evident factors on the tendency to redislocation and the therapeutic result. Clin Orthop Relat Res. 1982; 171:131-136.
22. Cash JD, Hughston JC. Treatment of acute patellar dislocation. Am J Sports Med. 1988; 16(3):244-249.
23. Vainionpaa S, Laasonen E, Silvennoinen T, *et al.* Acute dislocation of the patella. A prospective review of operative treatment. J Bone Joint Surg Br. 1990; 72(3):366-369.
24. Nikku R, Nietosvaara Y, Kallio PE, *et al.* Operative versus closed treatment of primary dislocation of the patella. Similar 2-year results in 125 randomized patients. Acta Orthop Scand. 1997; 68(5):419-423.
25. Sillanpaa PJ, Mattila VM, Maenpaa H, *et al.* Treatment with and without initial stabilizing surgery for primary traumatic patellar dislocation. A prospective randomized study. J Bone Joint Surg Am. 2009; 91(2):263-273.
26. Nikku R, Nietosvaara Y, Aalto K, *et al.* Operative treatment of primary patellar dislocation does not improve medium-term outcome: a 7-year follow-up report and risk analysis of 127 randomized patients. Acta Orthop. 2005; 76(5) . 699-704
27. Hawkins RJ, Bell RH, Anisette G. Acute patellar dislocations. The natural history. Am J Sports Med. 1986; 14(2):117-120.
28. Harilainen A, Sandelin J. Prospective long-term results of operative treatment in primary dislocation of the patella. Knee Surg Sports Traumatol Arthrosc. 1993; 1(2):100-103.
29. Arendt EA, Fithian DC, Cohen E. Current concepts of lateral patella dislocation. Clin Sports Med. 2002; 21(3):499-519.
30. Buchner M, Baudendistel B, Sabo D, *et al.* Acute traumatic primary patellar dislocation: long-term results comparing conservative and surgical treatment. Clin J Sport Med. 2005; 15(2):62-66.
31. Garth WP, DiChristina DG, Holt G. Delayed proximal repair and distal realignment after patellar dislocation. Clin Orthop Relat Res. 2000; 377:132-144.
32. Ahmad CS, Stein BE, Matuz D, Henry JH. Immediate surgical repair of the medial patellar stabilizers for acute patellar dislocation. A review of eight cases. Am J Sports Med. 2000; 28:804-810.
33. Hautamaa PV, Fithian DC, Kaufman KR, Daniel DM, Pohlmeyer AM. Medial soft tissue restraints in lateral patellar instability and repair. Clin Orthop Relat Res. 1998; 349:174-182.