

Original research article

**BILATERAL TRAUMATIC HIP DISLOCATION:
SYSTEMATIC REVIEW AND REPORT OF A RARE CASE
OF BILATERAL ANTERIOR HIP DISLOCATION**

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Abstract

Background: Bilateral hip dislocations are rare injuries with asymmetric dislocation being the commonest type. Bilateral anterior hip dislocation and bilateral posterior hip dislocation are even rarer. Due to the paucity of cases, there are few literature reviews critically evaluating various aspects of bilateral hip dislocation.

Methods: In this study, a case of post-traumatic bilateral anterior hip dislocation was presented. A detailed literature search of PUBMED, MEDLINE and EMBASE and the corresponding backreference were done. The articles were then systematically evaluated for incidence, mechanism of injury, associated injuries, treatments, and outcome of bilateral hip dislocations.

Results: A total of reported 110 asymmetric dislocations, 19 bilateral anterior hip dislocations and 17 bilateral posterior hip dislocations were evaluated. Obturator type was the most common variety among the bilateral anterior hip dislocations and anterior components of asymmetric dislocations. The bilateral anterior hip dislocation was most probably due to sudden relative forward movement of the pelvis while both hips were in flexion, abduction and external rotation. Whereas in bilateral posterior hip dislocation the mechanism may be multifactorial, and asymmetric dislocation may be due to two different dislocations occurring in quick succession or due to asymmetric positioning of the hips during the impact. While hip injuries (femoral head and neck fractures) were common among bilateral posterior hip dislocation (43.7%), acetabular fractures and other skeletal and non-skeletal injuries were more frequent in asymmetric dislocation (44%) indicating a higher degree of initial impact in these dislocations.

Conclusion: Bilateral hip dislocations are rare injuries and may be associated with other skeletal or systemic injuries. The presence of associated acetabular or femoral head fracture significantly increases the risk of poorer outcome. Bilateral anterior hip dislocations have lesser associated injuries and better outcomes in comparison to other types.

Keywords: Bilateral hip dislocation, bilateral anterior hip dislocation, bilateral posterior hip dislocation

Introduction

Traumatic hip dislocations are relatively common orthopaedic emergencies and are mostly unilateral ^[1]. Bilateral presentation is rare and may be either asymmetric dislocation (ASD) with one hip anterior and another posterior or bilateral anterior hip dislocation (BAHD) or bilateral posterior hip dislocation (BPHD) ^[2]. ASDs are relatively common while, BAHD and BPHD are exceedingly rare ^[3, 4, 5]. Given the paucity of the literature, in the present report, we describe a case of BAHD and analyse available literature on various aspects of the bilateral traumatic hip dislocations.

Case report

A 65 years old male presented to the emergency department with a history of a vehicular accident. While he was waiting at a traffic signal sitting on a motorcycle with both feet resting on the ground, a speeding heavy vehicle hit him from behind, so that his motorcycle moved forward. Along with the motorcycle, his pelvis also moved forward and he fell on the ground with considerable pain in both hips. In the emergency room his both hips were in flexed, abducted and externally rotated position (Fig. 1A). Radiography revealed bilateral obturator type of anterior hip dislocation (Fig. 1B). There were no associated injuries. He was immediately taken to the operation theatre and the closed reduction was done under general anaesthesia with Allis manoeuvre. Post reduction CT scan revealed concentric reduction without any associated pelvi-acetabular or femoral head fractures. Bilateral Buck's traction was applied in the bed for 3 weeks after which and he was mobilized. At the follow up of 25 months, both hips had a full range of motion and without any signs of avascular necrosis.



Fig 1: Pre-reduction clinical picture (1A), radiograph (1B)

Discussion

Hip dislocations are mostly unilateral and either of posterior, anterior or central variety [1, 2]. Anterior hip dislocation is relatively uncommon (10%) due to a stronger capsule and reinforced iliofemoral ligament [4, 6, 7]. Bilateral hip dislocations are rare and constitute 1-2% of total hip dislocations in high volume centres [1, 2, 8, 9].

A detailed literature search was done in PUBMED, MEDLINE and EMBASE using the keyword “bilateral hip dislocation”. Backreferences of these articles were also searched and included in the study. Only native dislocations were included in the study and those associated with pathological conditions or post-arthroplasty of hips were excluded from the study. As per the available literature, ASD is the most common type of bilateral hip dislocation with 110 reported cases. BAHD and BPHD are relatively rarer with 19 and 17 previous reports respectively (Supplemental file). As in 10 cases of ASD, no data was available, the rest of the 100 cases were considered for analysis. Two of BPHD and 1 BAHD were also excluded from the analysis due to the unavailability of the data [2, 8]. A detailed review of the reports were done including demographics, mechanism and pattern of injury, associated injuries of acetabulum, hip (head and neck), pelvic ring, femur, other skeletal and non-skeletal injuries. The need for open reduction and outcome of the hip functions were also evaluated (Table 1).

Table 1: Details of the patients in each type of dislocations

	ASD	BAHD	BPHD
Patients	100	19	16
Male: Female	87:13	16:3	7:8*
Age (years)	32.4±12.9	39.3±16.5	42.1±25.8
Acetabulum fractures	44[55] [†]	1[1] [†]	3[4] [†]
Hip injuries	12[15] [†]	1[1] [†]	7[11] [†]
Pelvis fractures	12	0	2
Femur fractures	12	0	1
Other fractures	21	0	1
Nerve palsy [‡]	7 [‡]	0	4
Other injuries	22	0	2
Open reduction hip	9[11] [†]	1[2] [†]	1[1] [†]
ORIF acetabulum	14	1	1
Poor hip function	18	1	5
Total	100	19	15

*Sex of one the patient was not mentioned in the available data, [†] x[y] – patients [hips], [‡]Consists of 6 cases with sciatic palsies and 1 femoral nerve palsy

The mechanisms of these dislocations have been unclear. In general, the unilateral posterior dislocations are due to direct force applied at the knee and getting transmitted via a femoral shaft to a flexed, adducted and internally rotated hip when the head is maximally uncovered posteriorly [11, 12]. The unilateral anterior dislocations are mostly

due to indirect forces with the position of the hip deciding the type, i.e. obturator, when the hip is in flexion, abduction, external rotation and iliac, when the hip is in extension, abduction and external rotation [7, 12, 13, 14].

The obturator types of BAHD occur when both the hips are in the horseback position (flexion, abduction and external rotation) and the pelvis moves forward [6]. In the present case, the patient was on the motorcycle and waiting at the traffic signal thus both hips were in identical flexion, abduction and external rotation position. His feet were also resting on the ground. He was then hit by another vehicle from the back, producing a forward acceleration of the pelvis which resulted in both femoral heads popping out of the acetabulum anteriorly. Similar modes were also described by other reports where the relative motion of the pelvis and femoral heads were produced by either an accelerating or decelerating force [4, 6, 12, 15, 16, 17, 18, 19, 20].

No mechanisms were described for BPHD. However, as the frontal collision was the commonest mode of injury, we assume that there may be direct forces being applied to both the lower limbs transmitted through the femur to cause posterior dislocation. For that, both hips require to be in flexion, adduction and internal rotation, the position which is commonly adopted by the females during sitting in a car [5, 21, 22, 23, 24]. Factors like wider pelvis, ligament laxity and degree of femoral anteversion would have also contributed to BPHD [5, 11, 25, 26].

For ASD Kanojia *et al.* have proposed it to be two different dislocations occurring in quick succession [27]. ASD may also be possible during the collision when both hips are in two different positions and the direct force results in posterior dislocation of one limb while the indirect abduction and external rotation force can result in anterior dislocation of the other hip [3]. As asymmetric positioning is more common during travel or work, it might be the reason for the higher incidence of ASD in bilateral hip dislocations.

Both in ASD and BAHD showed a significant male preponderance of 86.8% and 84.2% respectively, probably due to their higher association with outdoor activities. The patients with ASD were relatively younger (32.4 ± 12.9 years) as compared to those with BAHD (42.1 ± 25.8 years) [3]. On other hand, BPHD has bimodal age distribution and was equally distributed among the sexes.

There was a significant variation among the groups in terms of the patterns of injuries (table 1). Details of the direction of injury were available in 42 of the ASD patients of which 41 (97.6%) had obturator type in the anterior component and the only one had an iliac type [3, 10]. Obturator type was also the most common variety in BAHD accounting for 18 of 19 patients (94.7%) and only one patient had bilateral iliac dislocation [4, 14]. Most of these bilateral dislocations were treated conservatively and an open reduction was required only in 9 patients of ASD, 2 in BAHD and 1 in BPHD. There was no significant difference among the groups in terms of the need for open reduction.

Acetabular fractures were relatively common among the ASD (44 patients) of which 29 were associated with only the posterior components, 4 with only anterior component and 11 had bilateral involvement. Fourteen of these acetabular fractures were large enough to be treated by open reduction internal fixation and all were associated with posterior components. Compared to ASD, acetabular fractures were significantly less common among the BAHD (odds ratio 14.1, p-value 0.01) [4] and BPHD (odds ratio 4.2, p-value 0.03) [28, 29, 30]. Of these only one patient of BPHD needed bilateral open

reduction and fixation [29]. There was no significant difference between BAHD and BPHD in terms of acetabular fractures (p=0.24). The cause of this significantly higher involvement of acetabulum in ASD needs further study.

Hip injuries (head and neck fractures) were most common among the BPHD (43.7%) as compared to ASD (12%) or BAHD (5%). Of these associated hip injuries, femoral head involvement was always observed in BPHD, in comparison to ASD where 75% hips had femoral head and neck fractures. Also, head fragments in BPHD were relatively larger as 25% of them needed surgical intervention [26, 30, 31]. This could be probably because of BPHD occurring at a much faster pace and the impact getting directly and quickly transmitted to the head and neck, breaking a part of it, which gets caught up inside the acetabulum. On other hand, in ASD or BAHD the dislocations occur with indirect force at a slower pace leaving enough time for the head to come out [9]. This rapid force also could have contributed to the higher incidence of sciatic nerve palsies in BPHD as compared to ASD (odds ratio 5.22, p-value 0.02).

The incidence of associated fractures of pelvis and femur were similar between ASD and BPHD. However as the other skeletal and non-skeletal injuries were more common in ASD, this could be due to association with higher energy impacts in ASD.³ The ASD group had high rates of poor hip function, evident from a painful or arthritic hip and/or need of joint replacement. Patients with BPHD also had a considerable risk of poor hip function as many femoral head fractures ended up in total or partial replacement of the hip. On other hand, almost all patients in BAHD had good hip outcome and only one had some radiological reduction of joint space which was not significant clinically.

Conclusion

Bilateral hip dislocations are rare injuries. It is important to rule out associated fractures around the hip or beyond and other systemic injuries, especially in presence of posterior dislocations. The presence of associated acetabular or femoral head fractures can significantly increase the risk of additional procedures and/or poor hip outcome. Bilateral anterior hip dislocation has the least risk of associated injuries with a better prognosis as was seen in our case.

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