

World Journal of *Clinical Cases*

World J Clin Cases 2021 June 6; 9(16): 3796-4115



REVIEW

- 3796** COVID-19 and the digestive system: A comprehensive review
Wang MK, Yue HY, Cai J, Zhai YJ, Peng JH, Hui JF, Hou DY, Li WP, Yang JS

MINIREVIEWS

- 3814** COVID-19 impact on the liver
Baroiu L, Dumitru C, Iancu A, Leşe AC, Drăgănescu M, Baroiu N, Anghel L
- 3826** Xenogeneic stem cell transplantation: Research progress and clinical prospects
Jiang LL, Li H, Liu L

ORIGINAL ARTICLE

Case Control Study

- 3838** Histopathological classification and follow-up analysis of chronic atrophic gastritis
Wang YK, Shen L, Yun T, Yang BF, Zhu CY, Wang SN

Retrospective Study

- 3848** Effectiveness of sharp recanalization of superior vena cava-right atrium junction occlusion
Wu XW, Zhao XY, Li X, Li JX, Liu ZY, Huang Z, Zhang L, Sima CY, Huang Y, Chen L, Zhou S
- 3858** Management and outcomes of surgical patients with intestinal Behçet's disease and Crohn's disease in southwest China
Zeng L, Meng WJ, Wen ZH, Chen YL, Wang YF, Tang CW
- 3869** Clinical and radiological outcomes of dynamic cervical implant arthroplasty: A 5-year follow-up
Zou L, Rong X, Liu XJ, Liu H

Observational Study

- 3880** Differential analysis revealing APOC1 to be a diagnostic and prognostic marker for liver metastases of colorectal cancer
Shen HY, Wei FZ, Liu Q

Randomized Clinical Trial

- 3895** Comparison of white-light endoscopy, optical-enhanced and acetic-acid magnifying endoscopy for detecting gastric intestinal metaplasia: A randomized trial
Song YH, Xu LD, Xing MX, Li KK, Xiao XG, Zhang Y, Li L, Xiao YJ, Qu YL, Wu HL

CASE REPORT

- 3908** Snapping wrist due to bony prominence and tenosynovitis of the first extensor compartment: A case report
Hu CJ, Chow PC, Tzeng IS
- 3914** Massive retroperitoneal hematoma as an acute complication of retrograde intrarenal surgery: A case report
Choi T, Choi J, Min GE, Lee DG
- 3919** Internal fixation and unicompartmental knee arthroplasty for an elderly patient with patellar fracture and anteromedial osteoarthritis: A case report
Nan SK, Li HF, Zhang D, Lin JN, Hou LS
- 3927** Haemangiomas in the urinary bladder: Two case reports
Zhao GC, Ke CX
- 3936** Endoscopic diagnosis and treatment of an appendiceal mucocele: A case report
Wang TT, He JJ, Zhou PH, Chen WW, Chen CW, Liu J
- 3943** Diagnosis and spontaneous healing of asymptomatic renal allograft extra-renal pseudo-aneurysm: A case report
Xu RF, He EH, Yi ZX, Li L, Lin J, Qian LX
- 3951** Rehabilitation and pharmacotherapy of neuromyelitis optica spectrum disorder: A case report
Wang XJ, Xia P, Yang T, Cheng K, Chen AL, Li XP
- 3960** Undifferentiated intimal sarcoma of the pulmonary artery: A case report
Li X, Hong L, Huo XY
- 3966** Chest pain in a heart transplant recipient: A case report
Chen YJ, Tsai CS, Huang TW
- 3971** Successful management of therapy-refractory pseudoachalasia after Ivor Lewis esophagectomy by bypassing colonic pull-up: A case report
Flemming S, Lock JF, Hankir M, Reimer S, Petritsch B, Germer CT, Seyfried F
- 3979** Old unreduced obturator dislocation of the hip: A case report
Li WZ, Wang JJ, Ni JD, Song DY, Ding ML, Huang J, He GX
- 3988** Laterally spreading tumor-like primary rectal mucosa-associated lymphoid tissue lymphoma: A case report
Wei YL, Min CC, Ren LL, Xu S, Chen YQ, Zhang Q, Zhao WJ, Zhang CP, Yin XY
- 3996** Coronary artery aneurysm combined with myocardial bridge: A case report
Ye Z, Dong XF, Yan YM, Luo YK
- 4001** Thoracoscopic diagnosis of traumatic pericardial rupture with cardiac hernia: A case report
Wu YY, He ZL, Lu ZY

- 4007** Delayed diagnosis and comprehensive treatment of cutaneous tuberculosis: A case report
Gao LJ, Huang ZH, Jin QY, Zhang GY, Gao MX, Qian JY, Zhu SX, Yu Y
- 4016** Rapidly progressing primary pulmonary lymphoma masquerading as lung infectious disease: A case report and review of the literature
Jiang JH, Zhang CL, Wu QL, Liu YH, Wang XQ, Wang XL, Fang BM
- 4024** Asymptomatic carbon dioxide embolism during transoral vestibular thyroidectomy: A case report
Tang JX, Wang L, Nian WQ, Tang WY, Xiao JY, Tang XX, Liu HL
- 4032** Transient immune hepatitis as post-coronavirus disease complication: A case report
Drăgănescu AC, Săndulescu O, Bilașco A, Kouris C, Streinu-Cercel A, Luminos M, Streinu-Cercel A
- 4040** Acute inferior myocardial infarction in a young man with testicular seminoma: A case report
Scafa-Udriste A, Popa-Fotea NM, Bataila V, Calmac L, Dorobantu M
- 4046** Asymptomatic traumatic rupture of an intracranial dermoid cyst: A case report
Zhang MH, Feng Q, Zhu HL, Lu H, Ding ZX, Feng B
- 4052** Parotid mammary analogue secretory carcinoma: A case report and review of literature
Min FH, Li J, Tao BQ, Liu HM, Yang ZJ, Chang L, Li YY, Liu YK, Qin YW, Liu WW
- 4062** Liver injury associated with the use of selective androgen receptor modulators and post-cycle therapy: Two case reports and literature review
Koller T, Vrbova P, Meciarova I, Molcan P, Smitka M, Adamcova Selcanova S, Skladany L
- 4072** Spinal epidural abscess due to coinfection of bacteria and tuberculosis: A case report
Kim C, Lee S, Kim J
- 4081** Rare complication of inflammatory bowel disease-like colitis from glycogen storage disease type 1b and its surgical management: A case report
Lui FCW, Lo OSH
- 4090** Thymosin as a possible therapeutic drug for COVID-19: A case report
Zheng QN, Xu MY, Gan FM, Ye SS, Zhao H
- 4095** Arrhythmogenic right ventricular cardiomyopathy characterized by recurrent syncope during exercise: A case report
Wu HY, Cao YW, Gao TJ, Fu JL, Liang L
- 4104** Delayed pseudoaneurysm formation of the carotid artery following the oral cavity injury in a child: A case report
Chung BH, Lee MR, Yang JD, Yu HC, Hong YT, Hwang HP
- 4110** Atezolizumab-induced anaphylactic shock in a patient with hepatocellular carcinoma undergoing immunotherapy: A case report
Bian LF, Zheng C, Shi XL

ABOUT COVER

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Old unreduced obturator dislocation of the hip: A case report

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Abstract

BACKGROUND

Obturator dislocation is a rare type of hip dislocation, accounting for about 2%-5% of all hip dislocations. The occurrence of old unreduced obturator dislocation is even more infrequent, with only 17 cases reported in nine studies, most of which were from the 1950s to 1980s in developing countries.

CASE SUMMARY

A 38-year-old woman from Hunan Province, China presented with stiffness of the left hip in abduction, flexion, and external rotation after falling from a 2-meter-tall tree onto her left knee 1.5 mo prior. Pelvic radiograph and computed tomography revealed obturator dislocation of the left hip accompanied by impaction fracture at the superolateral aspect of the left femoral head without associated acetabulum fracture. Open reduction was performed, resulting in restoration of the concentric alignment of the left hip. After surgery, 6-wk skin traction was applied and the patient was kept in bed for an additional 2 wk. At 3 mo after surgery, the patient reported experiencing some pain, which did not affect the function of the affected limb, and some movement restriction but no abduction deformity or claudication was present. An X-ray showed that the left hip was homocentric, and there was no sign of posttraumatic arthritis or avascular necrosis.

CONCLUSION

Open reduction may be an effective treatment strategy for the rare condition of old unreduced obturator dislocation with short neglect time.

Key Words: Hip dislocation; Obturator dislocation; Unreduced; Open reduction; Case report

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Core Tip: Obturator dislocation is a rare type of hip dislocation, accounting for about 2%-5% of all hip dislocations, and there are even fewer cases of old unreduced obturator dislocations. We present a very rare case of old unreduced obturator dislocation treated by open reduction. The patient underwent open reduction *via* the Smith-Peterson approach rather than total hip arthroplasty because of her low income. At the 3 mo follow-up, the patient reported experiencing some pain, which did not affect function, and some movement restriction but no abduction deformity or claudication was present.

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INTRODUCTION

Only 5%-13% of all hip dislocations are traumatic anterior dislocations, which occur less frequently than posterior hip dislocations[1-5]. According to Epstein's classification, anterior dislocation is divided into pubic and obturator dislocation based on whether the femoral head is displaced superiorly or inferiorly[6]. Obturator dislocation is a rare type of hip dislocation, accounting for about 2%-5% of all hip dislocations[7]. The occurrence of old unreduced obturator dislocation of the hip is even more infrequent, with only 17 cases reported in nine studies[8-16], most of which were from the 1950s to 1980s in developing countries. There has been just one reported case of old unreduced obturator dislocation of the hip in an adult in the last 25 years.

We report herein a very rare case of old unreduced traumatic obturator hip dislocation accompanied by superolateral femoral head impaction fracture without associated acetabulum fracture.

CASE PRESENTATION

Chief complaints

A 38-year-old woman from Hunan Province, China presented with stiffness of the left hip in abduction, flexion, and external rotation after falling from a 2-meter-tall tree on her left knee 1.5 mo prior.

History of present illness

Pain and swelling of the left knee, and fixed abduction and flexion of the left hip occurred immediately after falling. Rather than going to the hospital, the patient applied a traditional Chinese medicine herbal ointment of unknown composition. The left knee improved within 2 wk but the left hip remained stiff, so she could only walk with the aid of a stick. Due to the lack of improvement in the left hip, an X-ray was performed at a local clinic at 1.5 mo after the fall, which showed dislocation of her left hip. She was subsequently transferred to our hospital.

History of past illness

The patient had a free previous medical history.

Physical examination

The patient experienced compensatory scoliosis to the left, and the pelvis was lower on the left side. The left hip showed elastic fixation in 40° of flexion, 45° of abduction, and 30° of external rotation (Figure 1). The pressure point was examined near the hip joint, and the range of motion of the hip was limited. The Trendelenburg test was positive. The patient could only walk with the aid of a stick and was not able to load any weight on her left leg. The neurovascular status of the left leg was good.

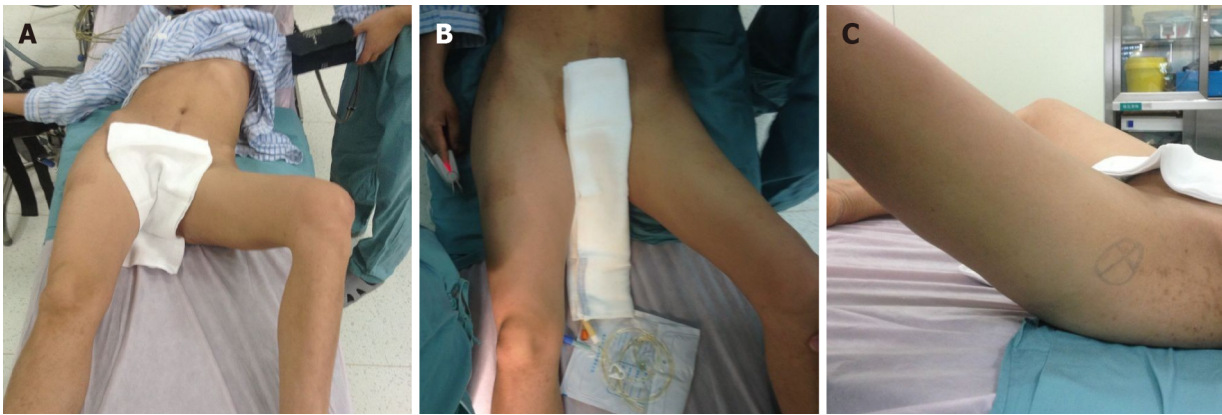


Figure 1 Physical examination. A: Front view of the patient showing that there was compensatory scoliosis towards the left, and the pelvis was lower on the left side; B and C: Front and lateral view of the left hip showing that the hip was fixed in 40° of flexion, 45° of abduction, and 30° of external rotation.

Imaging examinations

Radiographs at admission revealed dislocation of the left hip and femoral head impaction fracture without any injury of the left knee (Figure 2A and B). Computed tomography showed obturator hip dislocation. The femoral head shifted to the inferior and anterior side of the obturator foramen, with impaction fracture at the superolateral aspect of the left femoral head without associated fracture of the acetabulum (Figure 2C-I).

Preoperative diagnosis and treatment plan

The treatment options for old unreduced obturator dislocation of the left hip and impaction fracture of the ipsilateral femoral head were discussed with the patient. She decided to undergo open reduction only, and refused further intervention such as bone grafting or total hip arthroplasty because of her low income, even though she was informed that the incidence of posttraumatic arthritis and avascular necrosis would be high with treatment by delayed reduction alone.

Surgical procedures

The surgery was performed 3 d after admission. After general anesthesia, the patient was placed in the supine position on a radiolucent operating table and the left leg was prepared and draped freely. Open reduction for obturator hip dislocation was performed using the Smith-Peterson approach. Intraoperatively, the femoral head was locked with the superior ramus of the pubis and embedded in the pelvis, so a subtrochanteric Schanz screw parallel to the femoral neck was used as a joystick to help unlock and reduce the femoral head. The acetabulum was completely filled with fibrous tissue, which was separated and removed. After reduction, the anterosuperior aspect of the femoral head showed collapse and articular damage (Figure 3). The hip was completely stabilized without re-dislocation in a full passive range of motion. Intraoperative fluoroscopy was used to evaluate the concentric alignment of the left hip. The hip anterior capsule, subcutaneous tissue, and skin were sutured sequentially. The suction drain was removed 24 h after surgery. After surgery, 6-wk skin traction was applied and the patient was kept in bed for an additional 2 wk. Prophylactic cefazolin was used from 30 min before surgery to 24 h postoperatively. Oral rivaroxaban was applied for 6 wk to prevent deep venous thromboembolism. The patient started toe-touch weight-bearing with crutches 2 mo after surgery. Postoperative X-rays showed satisfactory reduction of the hip (Figure 4).

FINAL DIAGNOSIS

Old unreduced traumatic obturator dislocation accompanied by impaction fracture at the superolateral aspect of the femoral head.

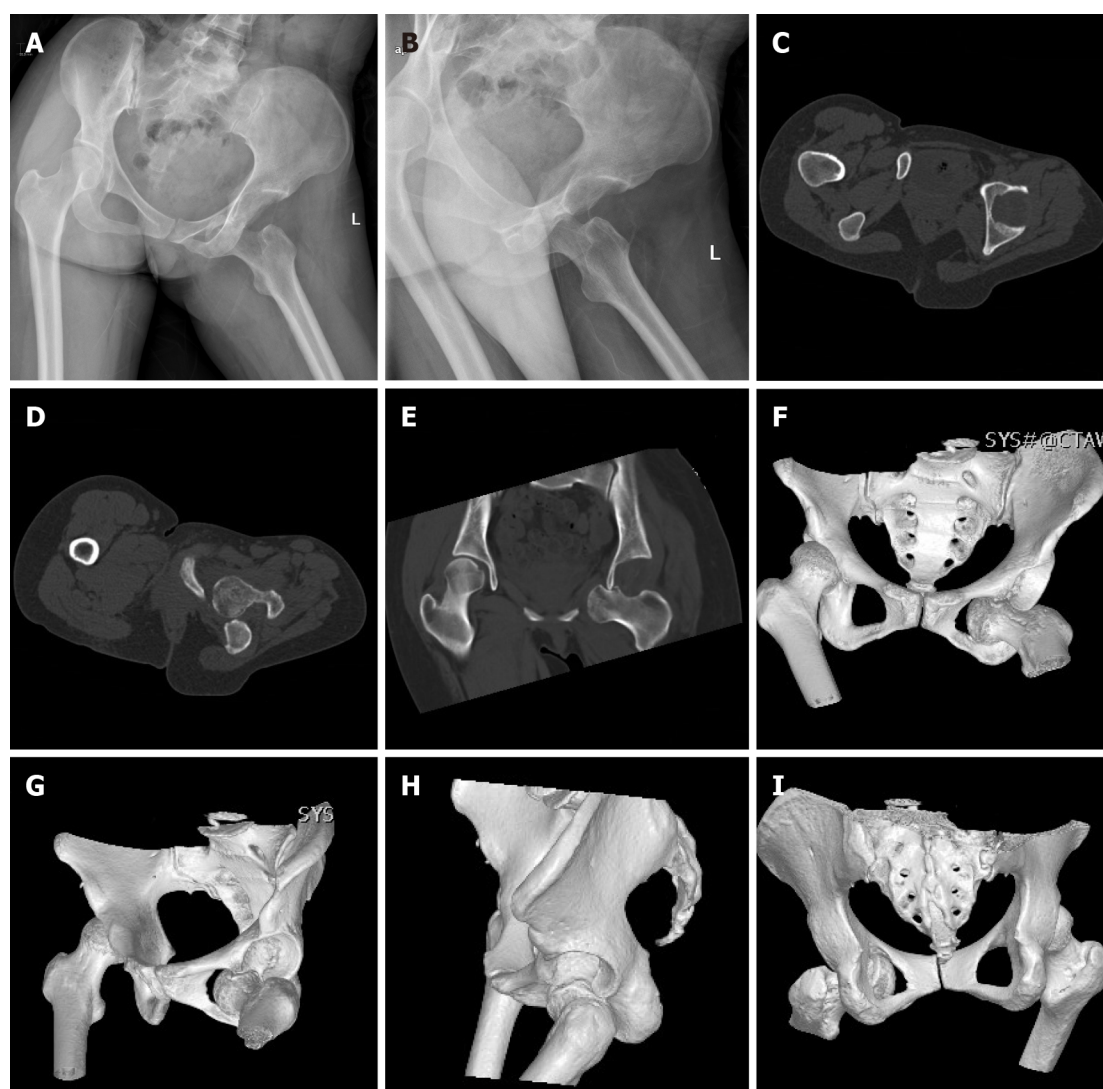


Figure 2 Preoperative plain radiographs and computed tomography scans. A and B: Plain radiographs at the first examination showing obturator dislocation of the left hip; C-I: Axial, coronal, and three-dimensional reconstructed computed tomography images showing that the femoral head lay anteriorly and inferiorly to the obturator foramen, with impaction fracture at the superolateral aspect of the left femoral head without associated fracture of the acetabulum.

TREATMENT

Open reduction *via* the Smith-Peterson approach.

OUTCOME AND FOLLOW-UP

The 3-mo follow-up revealed a fair outcome according to Garret's modification of the Thompson and Epstein classification[17], indicative of some pain that did not affect the function of the affected limb, and some movement restriction but no abduction deformity or claudication. An X-ray showed that the left hip was homocentric, and there was no sign of posttraumatic arthritis or avascular necrosis (Figure 5). The patient refused further follow-up because she could not afford additional treatment, even though she was informed that posttraumatic arthritis and avascular necrosis would occur and seriously affect her daily life.

DISCUSSION

Although the accurate definition of old unreduced hip dislocation is not recognized, any hip dislocation lasting for more than 72 h is considered "old" or "neglected"[18]. Due to poorly organized health services and inadequate means to diagnose and treat

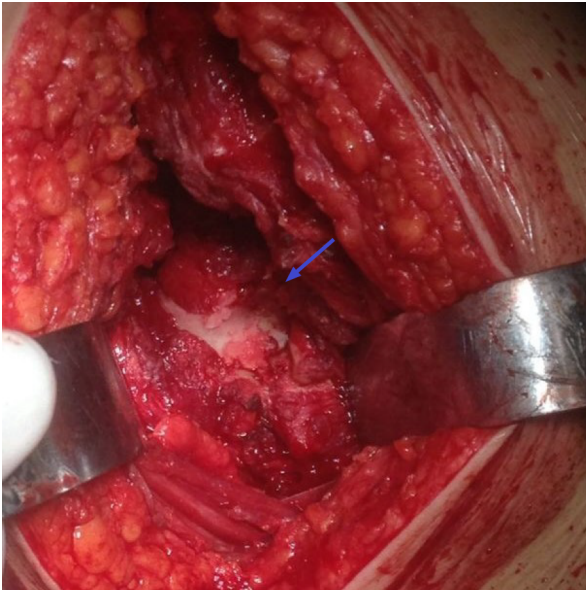


Figure 3 Intraoperative finding. The anterosuperior aspect of the femoral head (blue arrow) showed collapse and articular damage.

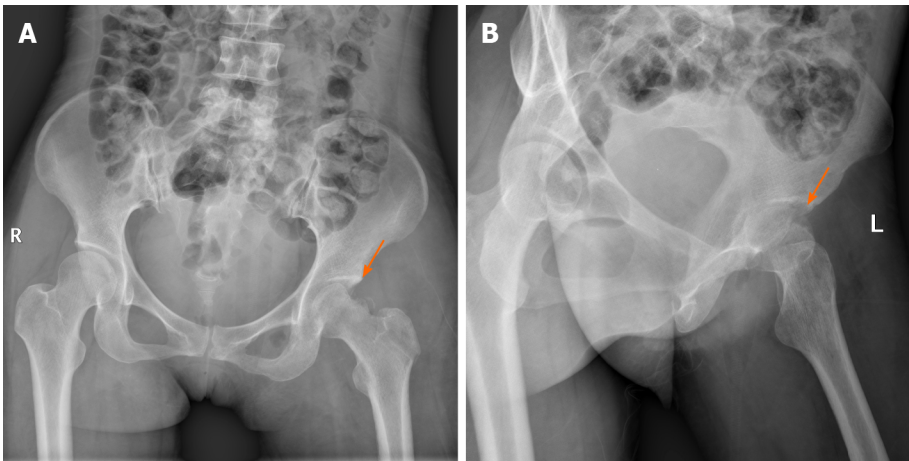


Figure 4 Postoperative plain radiographs. A: Anteroposterior (orange arrow); B: Lateral plain radiographs of the left hip showed concentric alignment of the left hip and impaction fracture (orange arrow) of the femoral head.

injuries, the majority of reports on old unreduced hip dislocations are from developing countries[19]. Little has been reported about old unreduced hip dislocations, and old unreduced obturator dislocations have been even less studied. To the best of our knowledge, only 17 cases of old unreduced obturator dislocation in nine studies have been reported, including just one case reported in an adult in the last 25 years (Table 1).

The hip is a stable joint, and the weakest point is the posteroinferior capsule. Therefore, anterior hip dislocations are more infrequent than posterior dislocations[20], accounting for up to 13% of all hip dislocations[21]. Anterior dislocation occurs as a result of a force acting on an abducted hip joint, which is then flexed and externally rotated to dislocate the femoral head forward[22,23]. The eventual position of the femoral head is determined by the degree of flexion at the time of injury. According to Epstein's classification, the anterior dislocation can be divided into pubic (type I) and obturator (type II) dislocation[2]. Obturator dislocation, which represents 2%-5% of all hip dislocations[7], is the most rare type of hip dislocation and is usually caused by falls[22]. As was the case in our report, obturator dislocation occurs when a force is transmitted from the knee to the femoral head while the limb is in a position of extreme flexion, abduction, and lateral rotation.

Epstein and Wiss[6] further subdivided anterior hip dislocation into three subtypes based on the location of the incidental fractures, of which type B is accompanied by fractures of the femoral head and/or neck. Brumback *et al*[24,25] also proposed an

Table 1 Summary of all studies reporting old unreduced obturator dislocation of the hip

No.	Ref.	No. of cases	Year	Country	Sex	Age	Delay in securing proper treatment (mo)	Treatment	Follow-up in (mo)	Outcome
1	Mikhail[8]	1	1956	Saudi Arabia	Male	24	12	Open reduction	0.5	Walking with crutches
2	Hamada[9]	3	1957	Egypt	Case 1: Female	24	144	Osteotomy of femoral neck	No follow-up	Unknown
					Case 2: Male	12	12	Osteotomy of femoral neck	No follow-up	Unknown
					Case 3: Female	9	5	Osteotomy of femoral neck	No follow-up	Unknown
3	Aggarwal and Singh[10]	6	1967	India	Case 1: Male	45	12	Trochanteric osteotomy	48	Fixed hip in flexion of 25°. Back to his original occupation.
					Case 2: Male	55	9	Trochanteric osteotomy	39	Fixed straight hip. Walking with crutches
					Case 3: Male	20	5	Trochanteric osteotomy	25	Fixed hip in flexion of 15°. Walking without support
					Case 4: Male	22	3	Trochanteric osteotomy	11	Fixed hip in flexion of 20°. Working as a farmer again
					Case 5: Male	35	11	Open reduction	11	A painful hip with limited movements
					Case 6: Male	28	3	Trochanteric osteotomy	10	Fixed hip in flexion of 15°. Able to do his routine work
4	Scadden and Dennyson[11]	1	1978	South Africa	Female	16	1	Open reduction	12	Walking with a slight limp but without any pain. No fixed deformities
5	Younge and Lifeso[12]	1	1988	Saudi Arabia	Male	16	72	Open reduction first, and then hip fusion	3 ¹	Walking no better than before surgery with recurrent flexion contracture
6	Nagi <i>et al</i> [13]	2	1992	India	Case 1: Male	35	7.5	Modified Girdlestone hip arthroplasty	25	2.5 cm shortening. Full range of flexion and rotations with limited abduction of 20°. Some pain present on prolonged walking
					Case 2: Male	28	9.5	Modified Girdlestone hip arthroplasty	33	3 cm shortening. Full range of flexion and rotations with limited abduction of 20°. Some pain present on prolonged walking
7	Pathania <i>et al</i> [14]	1	1995	India	Male	16	4	Open reduction	11	Almost full pain-free movement of hip
8	Albayrak <i>et al</i> [15]	1	2006	Turkey	Male	5	1.5	Open reduction	12	No complaints and no functional restriction
9	Pankaj <i>et al</i> [16]	1	2011	India	Male	33	6	Total hip arthroplasty	18	Walking unsupported without symptom

¹The last follow-up occurred 3 mo after the first surgery and the patient did not return for follow-up after the second surgery.

improved classification of fracture dislocations of the hip to emphasize the importance of individualized therapy, but it does not appear to have prognostic potential. Unreduced hip dislocation is classified into four types by modified Garret's classification according to the duration between injury and diagnosis in the hospital, where the neglect time for type I is 3 d to 3 wk, type II is 3 wk to 3 mo, type III is 3 mo to 12 mo, and type IV is more than 12 mo[19].

Little has been reported about old unreduced traumatic hip dislocations, and old unreduced obturator dislocation has been even less studied. Due to the infrequency of old unreduced traumatic hip dislocations, treatment options and outcome measures are scarce, based on small case series. The options in the literature include closed reduction, heavy traction and abduction, open reduction, osteotomy, and hip fusion to

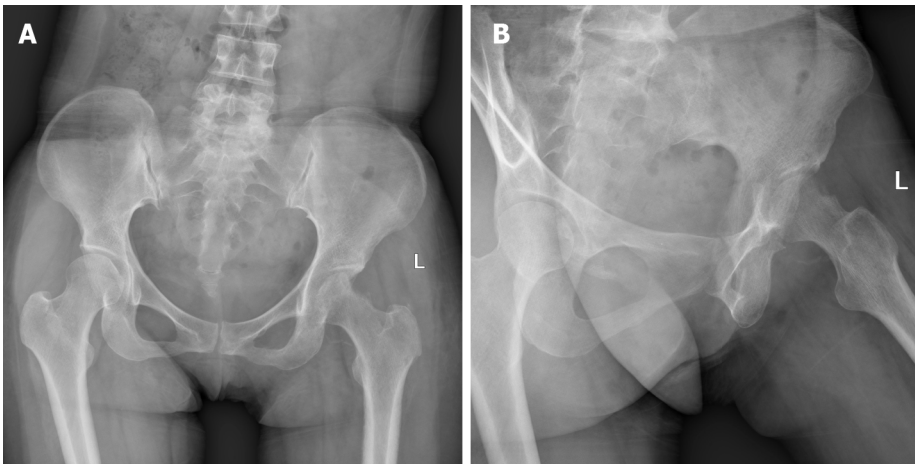


Figure 5 Plain radiographs at 3 mo after surgery. A: Anteroposterior; B: Lateral plain radiographs of the left hip showed that the left hip was homocentric, and there was no sign of posttraumatic arthritis or avascular necrosis.

arthroplasty (Table 1).

Closed reduction has been less applied than open reduction due to the difficulty of reduction, which is usually proportional to the delay in securing proper treatment. Pai[19] reported 3 of 29 old unreduced anterior dislocations but did not define if they were obturator. Closed reduction was achieved in modified Garrett's type I dislocation and heavy traction and abduction failed in modified Garrett's type III dislocation, which then was treated by open reduction. The outcomes of both patients were satisfactory. Another patient underwent a Girdlestone hip arthroplasty but with an unsatisfactory outcome.

Mikhail[8], Aggarwal and Singh[10], Scadden and Dennyson[11], Younge and Lifeso[12], Pathania *et al*[14], Albayrak *et al*[15], and Pankaj *et al*[16] reported seven old unreduced obturator dislocations treated by open reduction. Four of the seven patients made a good recovery and were pain-free for routine work, two had fair outcomes with slight limp and some pain, and one had a poor outcome and needed hip fusion. There was no significant difference in age or gender. However, the neglect time of patients with good outcomes was up to 6 mo, which was much shorter than those with fair or bad outcomes, similar to many studies showing that neglect time is an important prognostic factor[19,21,26].

Osteotomy of the femoral neck or trochanter for the treatment of old unreduced obturator dislocation was reported in studies by Hamada[9] and Aggarwal and Singh[10]. All patients had fixed hips with various degrees of flexion but without any abduction, accompanied by little pain that could be tolerable in daily life. Nagi *et al*[13] reported two patients with unreduced obturator dislocations, who received a modified Girdlestone arthroplasty by taking a subcapital osteotomy to keep the possibility of total hip replacement at a later stage. Both patients had shortened legs and a full range of flexion and rotation with limited abduction. Some pain was reported with prolonged walking at the final follow-up. Total hip arthroplasty was only used for one 33-year-old male patient with unreduced obturator dislocated hip, who presented to the hospital with complaints of deformity of the right hip following a road traffic accident 6 mo prior[16]. At the 18-mo follow-up, he could walk unsupported without any symptoms.

Based on these limited studies, treatment for delayed unreduced dislocation has been somewhat empirical and no method has been proven to be superior. We strongly recommend total hip arthroplasty for our patient because of the high incidence of further complications, such as avascular necrosis, especially along with indentation fracture of the femoral head. The incidence of femoral head necrosis is closely related to the duration between injury and reduction, and is up to 50% if reduction is implemented more than 6 h after injury[27]. Femoral head indentation fractures have been presented to occur in 15% to 55% of patients after anterior hip dislocation[2,28]. Patients with femoral head fractures deeper than 4 mm reportedly have a poor prognosis, which is thought to predispose for posttraumatic arthritis in 88%[21]. However, our patient refused any further treatment except reduction due to economic reasons.

There is no consensus on the management of hip dislocation after either open or closed reduction. Post-reduction immobilization using traction or cast and non-weight-bearing were recommended for the prevention of femoral head necrosis[5,26]. For old unreduced dislocation, traction is not only to reduce the risk of avascular necrosis, but also to ameliorate soft tissue contracture around the hip joint. The time of traction and non-weight-bearing following hip reduction is highly variable, ranging from 1 wk to 6 wk in traction and 2 wk to 12 wk in non-weight-bearing [4,5,7,8,11,14,18,20,22,26]. Although a few studies in recent years have shown that traction did not change the risk of avascular necrosis and prognosis[5], 6-wk skin traction and totally 8-wk non-weight-bearing were applied for our patient.

Our patient was living in a rural area of central China that is remote and has a nearly inaccessible mountaintop, so her last follow-up occurred 3 mo after surgery. The patient reported some pain that did not affect the function of the affected limb, and some movement restriction, but no abduction deformity or claudication was present. Nevertheless, late complications including traumatic arthritis and femoral head necrosis cannot be ruled out as the follow-up period has only been 3 mo.

CONCLUSION

We report an extremely rare case of old unreduced traumatic obturator hip dislocation accompanied by impaction fracture at the superolateral aspect of the femoral head without associated fracture of the acetabulum in a 38-year-old woman. Treatment for old unreduced dislocation has been somewhat empirical and no method has been proven to be superior. Open reduction may be an effective option for rare old unreduced obturator dislocation with short neglect time.

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