Injury, Int. J. Care Injured 45 (2014) 732–737

Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Management of acetabular fractures with modified posterior approach to spare external hip rotators

Ahmet Y. Sarlak [a,*], Ozgur Selek [a], Murat Inanir [b], Resul Musaoglu [a], Tuncay Baran [a]

[a] Department of Orthopaedics and Traumatology, Kocaeli University School of Medicine, Umuttepe, Kocaeli, Turkey
[b] Department of Physical Medicine and Rehabilitation, Kocaeli University School of Medicine, Umuttepe, Kocaeli, Turkey

ARTICLE INFO

Article history:
Accepted 11 November 2013

Keywords:
Acetabular fracture
Short external rotator sparing
Modified posterior acetabular approach

ABSTRACT

Introduction: In the present study the quality of reduction and incidence of complications in hip external rotator sparing modified posterior approach was assessed in both simple and complex acetabular fractures.
Materials and methods: This retrospective study includes 37 patients (38 hips) with a mean age of 42.1 years (range 21–60), that had been treated for displaced acetabular fractures from June 2007 through May 2011. They were reviewed at a mean of 3 years (20–67 months).
Results: The fractures were classified according to the Letournel–Judet classification. Anatomic reduction and stable fixation of the fracture with less than 2 mm residual displacement was achieved in 28 of 38 hips. At the final follow up the patients were evaluated clinically according to Merle d'Aubigne and Postel scoring system which had been modified by Matta and radiologically based on the criteria described by Matta. The clinical results were excellent in 20, good in 8, fair in 8, and poor 2 hips. Complications included two superficial local wound infection and 10 heterotopic ossification with 7 of the cases having grade I heterotopic ossification. Avascular necrosis of the femoral head was not seen in any of the 38 hips. One patient with preoperative sciatic nerve palsy had complete recovery of neurologic function. There were no cases of deep vein thrombosis or pulmonary embolism.
Conclusion: The functional outcome was satisfactory in most of the cases and comparable with other larger series. Using the limited part of Henry's sciatic nerve exposure skin incision – working in the plane between gluteus maximus and the tensor fascia lata as in the classical Gibson approach and two portal external rotator hip sparing approach resulted in good fracture reduction without approach related complications.

Introduction

The Kocher–Langenbeck (K–L) approach is the most commonly used surgical exposure for the stabilization of acetabular fractures involving a displaced posterior component [1–3].

With the K–L approach access to transverse or posterior column fractures extending cranially to the angle of the greater sciatic notch can be difficult [4]. To address this shortcoming, both the osteotomy of the greater trochanter and K–L modification in the proximal dissection have been described [4–6].

The conventional K–L approach involves splitting of the gluteus maximus and division of the short rotators of the hip [3]. To decrease approach related soft tissue trauma and lessen the incidence of heterotropic ossification, postoperative nerve injury, abductor weakness and joint stiffness; short external rotator sparing modified K–L approach have been described mostly in displaced, isolated posterior wall fractures without marginal impaction [7,8].

We report our experience with short external rotator sparing modified posterior approach in both simple and complex acetabular fractures involving the posterior wall-column or both to assess the quality of reduction and incidence of complications in such patients.

Materials and methods

From June 2007 through May 2011, 41 patients (42 hips) with displaced acetabular fractures were treated with open reduction

* Corresponding author at: Department of Orthopaedics and Traumatology, Kocaeli University School of Medicine, Umuttepe, Izmit, Kocaeli, Turkey. Tel.: +90 2623038771.
E-mail address: kouortopcom@yahoo.com (A.Y. Sarlak).

0020–1383/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.injury.2013.11.010

Table 1
Demographic data of the patients.

Demographic data	
Number of patients	37
Number of hips	38
Male:female	30:8
Average age	42.1 years (range 21–60)
Average follow up	35.8 months (range 20–67)
Mechanism	Traffic accident: 31, falling: 7
Posterior hip dislocation	9

and internal fixation using a modified posterior approach with sparing of short external rotators of the hip. All patients were operated by the senior author. One patient died because of comorbid medical conditions during follow-up; 3 patients were excluded due to incomplete data. 37 patients (38 hips) were enrolled for evaluation. None of these 37 patients had anterior procedure for acetabular fracture. Anterior column posterior hemitransverse, T shape fracture with significant anterior displacement and both column fractures operated with simultaneous anterior–posterior approaches were excluded in our series. The details of the patient demographics and fracture types were given in Tables 1 and 2

Surgical technique

The patients were placed in a prone position on the radiolucent operating table under general anaesthesia. We used only a limited part of Henry's sciatic nerve exposure skin incision [9]. The proximal and distal extremes of the original Henry's incision were not used. An incision beginning a handbreadth superior to posterior superior iliac spine on the iliac crest advancing laterally to the greater trochanter and then curving posteriorly towards the gluteal fold was used (Fig. 1). Gluteus maximus origin was not detached from the iliac crest; the plane between tensor fascia lata and gluteus maximus was used to reflect the gluteus maximus posteriorly. Distal part of the gluteus maximus insertion to femur was not divided. Then gluteus maximus was reflected posteriorly to provide exposure of the entire posterior pelvis and direct visualization of the sciatic nerve. Working in the superficial plane to external hip rotators, fracture site and when necessary the joint capsule were exposed between either gluteus medius and piriformis or piriformis and superior gemellus interval (superior portal) (Fig. 2). The interval between the sciatic nerve and posterior cutaneous nerve of the thigh gives direct access to ischium. Releasing the semimembranosus origin and medial retraction of biceps femoris origin, the posterolateral wall of ischium was reached. Bending template was used for plate contouring. In most fractures gentle

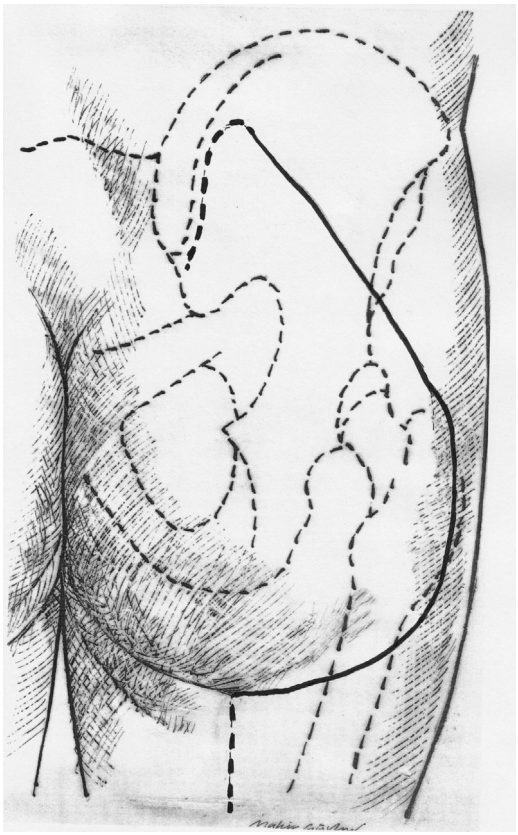

Fig. 1. The skin incision for the modified posterior approach. The thick dotted lines show the proximal and distal extremes of the original Henry's incision which was not used.

retraction of the gluteus medius to widen the superior portal is sufficient to reduce the displaced posterior fragment gently compressing it with a periosteal elevator. In transverse fractures one of the two superior portal may be used to place a reduction clamp from ilium to sciatic notch compressing the fracture (Fig. 3a). A curved 4.5 mm reconstruction plate was passed underneath the spared piriformis and short external rotators extending from lateral ischium to the inferior iliac wing compressing the fractured fragment. The plate was temporarily fixed to ischium by Kirschner wires (Fig. 3b). After reduction of the fracture, fixation was achieved (Fig. 4a and b).

Passive range of motion exercises of the hip was applied to all patients just after the operation. Isotonic (hip flexor, abductor muscle groups) and isometric strengthening exercises (hip adductor and knee extensor muscle groups) were applied. Continuous passive motion (CPM) was applied to those patients having hip joint limitation. The patients were mobilised toe touch weight bearing with a walker or double crutches for 6–12 weeks.

The patients were evaluated clinically and radiographically at an immediate postoperative period of 2 weeks, 6 weeks, 3 months, 6 months, one year and annually thereafter. Clinical and radiological grading was assessed at the final follow-up. Clinical grading was evaluated by Merle d'Aubigne and Postel scoring which has been modified by Matta [10–12]. The radiographic results were graded according to the criteria described by Matta [11–13]. Follow-up reduction was assessed on anteroposterior and Judet views of the pelvis. A displacement of 1 mm or less was considered as anatomic, 2–3 mm as imperfect, and greater than 3 mm as poor [11–13]. Heterotopic ossification was graded according to the criteria established by Brooker et al. [14].

Table 2
Fracture pattern and reduction quality of the patients.

Fracture type	Number of hips	Reduction quality		
		Anatomic	Imperfect	Poor
Elementary				
Posterior wall	16(42.1%)	15	1	
Posterior column	1(2.6%)		1	
Transverse	6(15.8%)	4	2	
Associated				
Posterior column + wall	5(13.1%)	4	1	
Transverse + posterior wall	6(15.8%)	4	1	1
T shaped	4(10.5%)	1	2	1
Total	38(100%)	28(74%)	8(21%)	2(5%)