



## FUNCTIONAL OUTCOME OF UNSTABLE PELVIC FRACTURES: A RETROSPECTIVE STUDY

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### Abstract

A retrospective study was conducted in different hospitals in Iraq, where 80 patients were collected, and this study was assigned to patients with Unstable Pelvic Fractures.

All the patients having pelvic fractures were classified and have divided into three types A, B, and C by the Tile classification adopted by the OTA outcomes according to pelvic injuries, which found in this study is lower extremity fractures with 25%, upper extremity fractures (%18.75) and Acetabulum fractures for 14 patients (17.5%), and the least frequent injury type was Urogenital injury for nine patients (11.25%)

As for the most frequent complications, it was represented by heterogeneous ossification, which is a rare problem that may occur after surgery where the bone grows in the muscles, tendons, and ligaments around the pelvic cavity.

**Keywords:** Pelvic, fractures, heterogeneous, ossification, OTA, Unstable.

### Introduction

Pelvic injury is one of the most difficult problems in trauma surgery; its prevalence is 3% of the total number of injuries of the musculoskeletal system [1]. Pelvic fractures usually occur in young patients and are characterized by a high overall score on the ISS severity scale (from 25 to 48 points) [2]. Mortality remains high, especially in patients with unstable hemodynamics, due to rapid bleeding, difficulty in achieving hemostasis, and the presence of concomitant injuries [3,4,5]. In this regard, a multidisciplinary approach is a key aspect of conducting intensive care, stopping bleeding, and treating



bone fractures, which is especially important in the first hours after injury. In the treatment of pelvic injuries should involve specialists in the field of trauma surgery, To date, no clinical guidelines have been published to address this problem. There is no relationship between the type of anatomical damage to the pelvic ring and the physiological state of the patient [6]. Moreover, over the past decades, the treatment of pelvic injuries has undergone drastic changes with significant improvement in outcomes due to improvements in diagnostic and treatment methods [7]. To select the optimal treatment tactics, the anatomical nature of the damage should be supplemented by the patient's hemodynamic state and the presence of concomitant injuries. The anatomical description of the damage to the pelvic ring is fundamental when choosing a treatment algorithm but is not a determining factor [8].

In clinical practice, the first tactical decisions are made, as a rule, on the basis of data on the clinical condition and the presence of concomitant injuries and, to a lesser extent, on the basis of damage to the pelvic ring. [9]

Ultimately, treatment of pelvic injuries requires an evaluation of the anatomy of the injury and the physiological changes caused by the injury [10].

In this article, the functional results of unstable fractures, which usually accompany severe accidents, often require surgical intervention to fix the fractures in their proper position and avoid injury to the internal organs or blood vessels. Also, surgery is resorted to if the fracture extends to the right of the thigh joint so that the joint returns to its proper shape to avoid the occurrence of roughness in the hip joint. And fixation is usually using metal strips and screws or using external fasteners [11].

## **Material and Method**

### **Patient Sample**

A retrospective study was conducted in different hospitals in Iraq, where 80 patients were collected, and this study was assigned to patients with Unstable Pelvic Fractures.

### **Study Design**

Eighty patients of type were included in this study Unstable Pelvic Fractures. As all patients were subjected to surgical intervention and were treated through the use of an external fixator, The electronic record in the hospital was used for the purpose of collecting information and demographic data for patients. The age group ranged from 30 to 60 years. Patients were distributed according to gender. It was noted that the male category was 20% more than the female category.

All the patients having pelvic fractures were classified and have divided into three types A, B, and C by the Tile classification adopted by the OTA, as shown in the figure below.

### **Study Period**

This study was conducted for two years, which included (diagnosis, treatment, data analysis, and results for patients) from 22-4-2019 to 27-5-2021



### Aim of Research

It is to provide a classification of unstable pelvic injuries and clinical guidelines and knowledge Functional Outcome of Unstable Pelvic Fractures: A Retrospective Study.

### Results

Table 1- Distribution of patient according to age

	F	P%
30-39	30	37.5
40-49	28	35
50-60	22	27.5

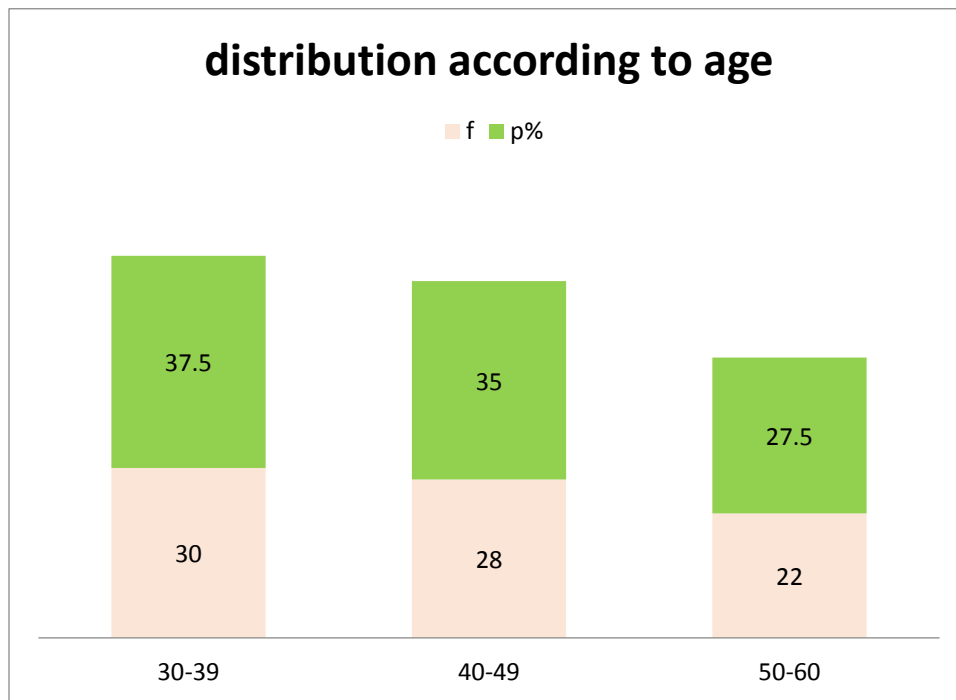


Figure 1- Chart title of distribution patient according to age

Table 2- Distribution of patient according to sex

P	M	F	P value
30-39	15	15	0.00
40-49	16	12	0.04
50-60	14	8	0.066
Total	45	35	---

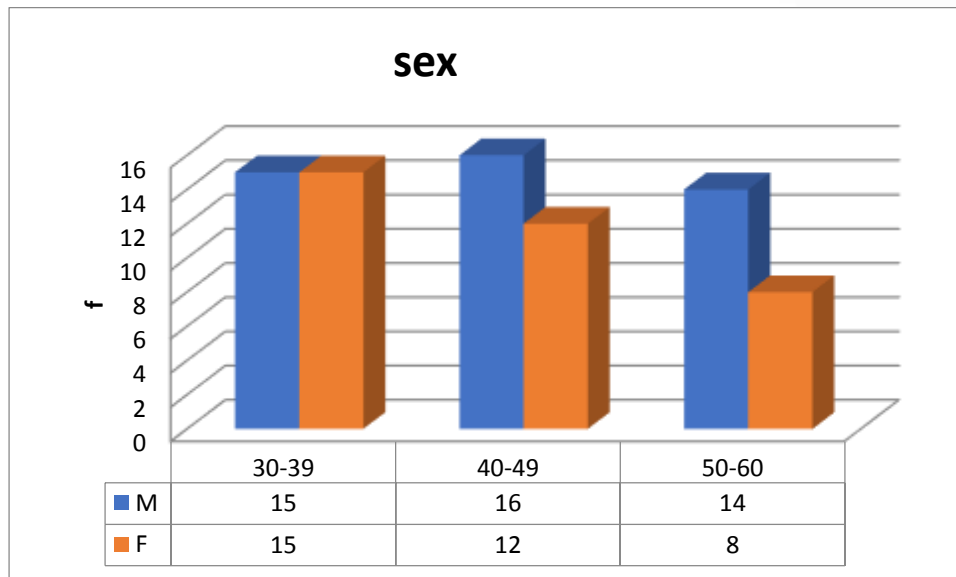


Figure 2- Chart of distribution of patient according to sex

Table 3- Classification of pelvic fractures Unstable

Type	All patient classification
C1 Unilateral	15
C1-1 Iliac fracture	10
C1-2 Sacroiliac fracture-dislocation	14
C1-3 Sacral fracture	12
C2 Bilateral, with one side type B, one side type C	15
C3 Bilateral	14

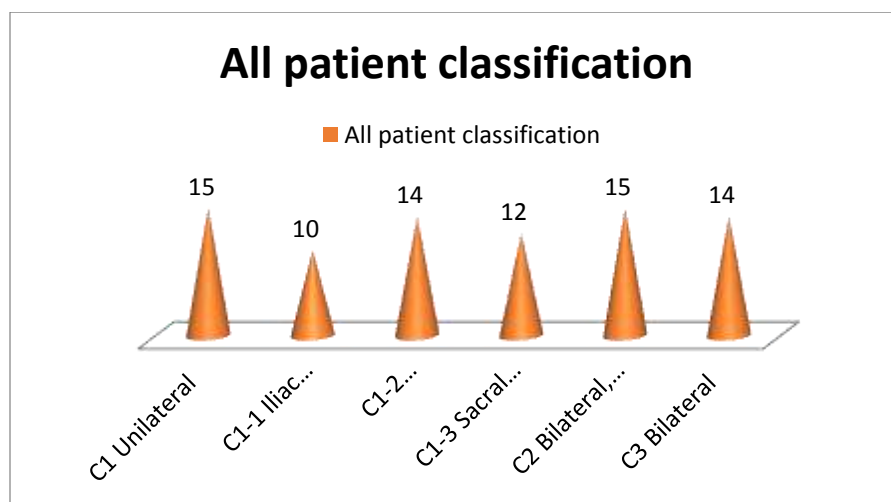


Figure 3- Classification of patients according to OTA

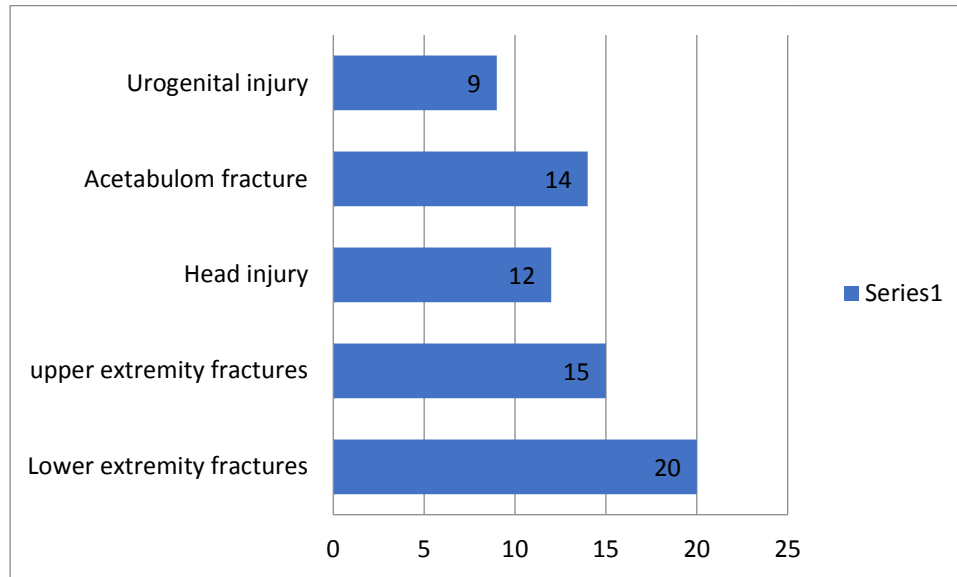


Table 4- Outcomes results according to pelvic injuries

Table 4- Complications unstable pelvic fractures

P	N	P %
Nonoperative	2	2.5
Loss of reduction	1	1.25
Screw bone interface loose	3	3.75
Heterotopic ossification	4	5
Lateral femoral cutaneous nerve.	1	1.25
Mortality	1	1.25

Table 5- Logistic regression for treatment

treatment Variable	CI	
	95% CI FROM	TO
Nonoperative	2.34	5.23
Angioembolization	1.01	3.3
Preperitoneal packing	10.34	12.66
Angioembolization + preperitoneal packing	13.8	18.8



## Discussion

In this study, 80 patients were included, they were distributed at different ages from 30 to 60 years, and the most frequent age group was 30-39 years for 30 patients with 37.5% and 40-49 years for 28 patients with 35% and 50-60 years old for 22 patients with 27.5% of the population as shown in Table 1

Patients were distributed according to gender, as shown in Table 2, and male patients were more than female by 2%. The patients were distributed as follows (45 male patients, 35 female patients), and no statistical differences were found between gender to patients, where they were p-value in patients 50-60 years old at (0.066)

In Table 4, which shows outcomes according to pelvic injuries, The most frequent lower extremity fractures with 25%, upper extremity fractures (%18.75) and Acetabulum fractures for 14 patients (17.5%), and the least frequent injury type was Urogenital injury for nine patients (11.25%).

External pelvic ring fixation provides rigid temporary stability of the pelvic ring and creates conditions for early cessation of intra-pelvic bleeding in hemodynamically unstable pelvic ring injuries. In addition, it provides reliable back pressure required for pelvic ring stabilization prior to extraperitoneal pelvic obturation and identifies the biomechanics of pelvic injuries and the underlying mechanism Injury Indications for External Fixation In dynamically unstable patients, pelvic ring injuries should be temporarily immobilized to prevent further bleeding and to enhance the effectiveness of other hemostasis methods.

The main source of acute retroperitoneal bleeding in patients with hemodynamically unstable pelvic ring fractures is venous bleeding, present in 80-90% of all cases. Bleeding occurs from the presacral and paravertebral venous plexuses and from the spongy bone bleeding surfaces in the region of fractures of the sacrum, iliac, and sacroiliac joints [12]. Damaged arteries are the source of intra-pelvic bleeding only in 10-20% of cases [13]. Arterial bleeding can cause hemodynamic instability despite the mechanical stability of the pelvis [14]. Moreover, arterial bleeding is accompanied by venous bleeding in about 100% of cases [15]. Because venous bleeding cannot be controlled by vascular embolization, some studies have shown that the traditional ATLS-enhanced approach to treating hemodynamically unstable pelvic injuries by vascular embolization leads to poor outcomes, with a mortality rate exceeding 40%.

The presence of the predominant venous nature of retroperitoneal bleeding determines a rational method in the form of extraperitoneal pelvic tamponade for urgent surgical control of bleeding [16].

## Conclusion

We conclude from this article that The most frequent complication was heterogeneous ossification, which is a rare problem that may occur after surgery where the bone grows in the muscles, tendons, and ligaments around the pelvic cavity, that is, the bone grows where it should not be causing stiffness not directly related to the condition of the cartilage of the hip cavity, and in Cases in which the amount of additional bone is large enough to interfere with flexibility and function and this leads to the surgical removal of these bones.





### Recommendation

1. Complex pelvic injuries are among the most serious traumatic injuries. There are many classifications, some based on the mechanism of damage, others on the form of damage, and others on the violation of mechanical stability that requires surgical fixation. However, the optimal treatment strategy should take into account the patient's dynamic condition, anatomical abnormality of the pelvic ring, and the presence of concomitant injuries.
2. Treatment of patients with pelvic trauma is aimed at definitively restoring the normal balance and normal pathophysiology associated with the mechanical stability of the pelvic ring. Therefore, treatment of pelvic injuries must be based on a multidisciplinary approach and ultimately on the patient's physiology and anatomy of the injury.

### References

1. Lunsjo K, Tadros A, Hauggaard A, Blomgren R, Kopke J, Abu-Zidan FM (2008) Associated injuries and not fracture instability predict mortality in pelvic fractures: a prospective study of 100 patients. *J Trauma* 62:687–691
2. Durkin A, Sagi HC, Durham R, Flint L. Contemporary management of pelvic fractures. *Am J Surg.* 2006;192 (2):211–23.
3. Khanna P, Phan H, Hardy AH, Nolan T, Dong P. Multidisciplinary management of blunt pelvic trauma. *Semin Intervent Radiol.* 2012;29 (3): 187–91.
4. Holstein JH, Culemann U, Pohlemann T. What are predictors of mortality in patients with pelvic fractures? *Clin Orthop Relat Res.* 2012;470 (8):2090–7
5. Bakhshayesh P, Weidenhielm L, Enocson A. Factors affecting mortality and reoperations in high-energy pelvic fractures. *Eur J Orthop Surg Traumatol.* 2018;28 (7):1273–82.
6. Black SR, Sathy AK, Jo C, Wiley MR, Minei JP, Starr AJ. Improved survival after pelvic fracture: 13-year experience at a single trauma center using a multidisciplinary institutional protocol. *J Orthop Trauma.* 2016;30 (1):22–8.
7. Biffl WL, Smith WR, Moore EE, Gonzalez RJ, Morgan SJ, Hennessey T, Offner PJ, Ray CE Jr, Franciose RJ, Burch JM. Evolution of a multidisciplinary clinical pathway for the management of unstable patients with pelvic fractures. *Ann Surg.* 2001;233 (6):843–50
8. Coccolini F, Stahel PF, Montori G, Biffl W, Horer TM, Catena F, Kluger Y, Moore EE, Peitzman AB, Ivatury R, et al. Pelvic trauma: WSES classification and guidelines. *World J Emerg Surg.* 2017; 12:5
9. Ghaemmaghami V, Sperry J, Gunst M, Friese R, Starr A, Frankel H, Gentilello LM, Shafi S. Effects of early use of external pelvic compression on transfusion requirements and mortality in pelvic fractures. *Am J Surg.* 2007; 194 (6):720–3 discussion 3.
10. Toth L, King KL, McGrath B, Balogh ZJ. Factors associated with pelvic fracture-related arterial bleeding during trauma resuscitation: a prospective clinical study. *J Orthop Trauma.* 2014;28 (9):489–95.
11. Magnone S, Coccolini F, Manfredi R, Piazzalunga D, Agazzi R, Arici C, Barozzi M, Bellanova G, Belluati A, Berlot G, et al. Management of hemodynamically unstable pelvic trauma: results of the



first Italian consensus conference (cooperative guidelines of the Italian Society of Surgery, the Italian Association of Hospital Surgeons, the Multi-specialist Italian Society of Young Surgeons, the Italian Society of Emergency Surgery and Trauma, the Italian Society of Anesthesia, Analgesia, Resuscitation and Intensive Care, the Italian Society of Orthopaedics and Traumatology, the Italian Society of Emergency Medicine, the Italian Society of Medical Radiology -Section of Vascular and Interventional Radiology- and the World Society of Emergency Surgery). *World J Emerg Surg.* 2014;9 (1):18

12. Tsai CH, Fong YC, Chen YH, Hsu CJ, Chang CH, Hsu HC. The epidemiology of traumatic humeral shaft fractures in Taiwan. *Int Orthop.* 2009;33 (2):463–7
13. . Kuo PJ, Wu SC, Chien PC, Chang SS, Rau CS, Tai HL, Peng SH, Lin YC, Chen YC, Hsieh HY, et al. Artificial neural network approach to predict surgical site infection after free-flap reconstruction in patients receiving surgery for head and neck cancer. *Oncotarget.* 2018;9 (17):13768–82
14. Costantini TW, Coimbra R, Holcomb JB, Podbielski JM, Catalano R, Blackburn A, Scalea TM, Stein DM, Williams L, Conflitti J, et al. Current management of hemorrhage from severe pelvic fractures: results of an American Association for the Surgery of Trauma multi-institutional trial. *J Trauma Acute Care Surg.* 2016;80 (5):717–23 discussion 23-5.
15. Lustenberger T, Meier C, Benninger E, Lenzlinger PM, Keel MJ. C-clamp and pelvic packing for control of hemorrhage in patients with pelvic ring disruption. *J Emerg Trauma Shock.* 2011;4 (4):477–82.
16. Yang NP, Chan CL, Chu D, Lin YZ, Lin KB, Yu CS, Yu IL, Chang NT. Epidemiology of hospitalized traumatic pelvic fractures and their combined injuries in Taiwan: 2000-2011 National Health Insurance data surveillance. *Biomed Res Int.* 2014; 2014:878601.