

*Research Article***Role of Multidetector Computed Tomography in Evaluation and Classification of Traumatic Pelvic Fractures**

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**Abstract**

Injuries that involve the pelvic ring have a high morbidity and significant mortality (approximately 6%). Hemorrhage is the leading cause of death in patients with a pelvic fracture (Sadri et al., 2005). There are three main vectors of high-energy force that causes predictable patterns of pelvic injuries. The patterns of injury are: antero posterior (AP) compression, lateral compression, and vertical shear. (Joseph et al., 2009). It also has therapeutic role in some pelvic fractures such as percutaneous screw fixation of acetabular fractures with CT guidance and CT guided fixation of sacral fractures and sacroiliac joint disruptions (Nelson et al., 2001).

**Key Words:** Multidetector, Tomography, Traumatic Pelvic

**Aim of the Work**

The aim of this work is to assess the role of multidetector CT in evaluation and classification of traumatic pelvic fractures.

**Patients and Methods**

This study included 30 patients with traumatic pelvic fractures referred from orthopedic and traumatology outpatient emergency, clinics and inpatient departments in El Minia University hospital.

**All patients will subjected to:**

Full history was taken, Plain film radiography of the pelvis, MDCT examination of the pelvis was performed to all the patients in this study using 16 detector MDCT scanner (Bright speed GE medical systems).

The images performed

- Coronal MPR thin slice 2D reconstructions was performed through the entire pelvis. Used (0.625 X0.625 mm images).
- Sagittal MPR 2D reconstructions was performed through any affected areas.
- Volume rendered 3D reconstruction images.

For each pelvic CT image was evaluated for the following: Site of fractures, Number of fractures, Type of fractures (non displaced, displaced), Displaced bony fragments and its locations, Pelvic joints (symphysis pubis, sacroiliac joints, hip joints) (diastases, disruption, dislocation), Pelvic fracture classification, based on the categories of Young and Burgess classification system (Khurana et al., 2014).

**Results**

**Table I: Demographic Data of the Studied Group (n= 30)**

| Demographic data    | Statistical data |
|---------------------|------------------|
| Age: Range          | 15-55years       |
| Mean                | 35.3 years       |
| Sex: Males (No / %) | 18 / 30 (60%)    |
| Females (No/ %)     | 12 / 30 (40%)    |

**Table II: Cause Of Trauma of The Studied Group (n=30)**

| Cause of trauma        | No. | %     |
|------------------------|-----|-------|
| Motor vehicle accident | 22  | 73.3% |
| Falling from height    | 5   | 16.7% |
| Crush injuries         | 3   | 10%   |

**Table III: Site Of Pelvic Fractures According To Mdct Examination Of The Studied Group (N=30)**

| Joint injury | Sacroiliac | Symphysis pubis | Hip     |
|--------------|------------|-----------------|---------|
| Diastases    | -          | 4               | -       |
| Disruption   | 14         | 9               | 7       |
| Dislocation  | 4          | 3               | 4       |
|              | 18 (60% )  | 16(53%)         | 11(36%) |

**Table IV: Pattern Of Pelvic Joints Injury According To Mdct Examination Of The Studied Group (n=30)**

| Site of fractures | No. | %   |
|-------------------|-----|-----|
| Iliac bone        | 21  | 70% |
| Pubic bone        | 15  | 50% |
| Acetabulum        | 12  | 40% |
| Sacrum            | 12  | 40% |
| Ischial bone      | 3   | 10% |

**Table V: MDCT classification of bony pelvic fractures according to young-burgess classification (n=30)**

| Young-Burgess Classification | No. | %     |
|------------------------------|-----|-------|
| Lateral compression (LC)     | 15  | 50%   |
| - Type 1                     | 7   |       |
| -Type 2                      | 5   |       |
| -Type 3                      | 3   |       |
| Antero-posterior compression | 9   | 30%   |
| -Type 1                      | 5   |       |
| -Type 2                      | 3   |       |
| -Type 3                      | 1   |       |
| Vertical shear (VS)          | 4   | 13.3% |
| Combined mechanism injury    | 2   | 6.7%  |
| Total                        | 30  | 100%  |

## Discussion

The pelvic fractures was evaluated and classified in our study by multidetector CT examination, many other investigators establish the role of MDCT in evaluation and classification of pelvic bone fractures as Khurana et al., 2014 and Gabbe et al., 2013.

In this study the patients ages ranged from fifteen to fifty five years old (adult group), this is in agreement with Gabbe et al., 2013 This can be explained by that, adult males are more liable for motor vehicle accident and this in agreement with Irwin et al., 2006 and (World health organization, road safety in Egypt, 2010). In this study, the most common cause of pelvic trauma result from motor vehicle accidents, followed by falls from a height, and crush injuries, this was in agreement with Schmal et al., 2005. In present study, The most common joint injured was sacroiliac joint LC was the most common type of traumatic pelvic fractures (Khurana et al., 2014). The pelvic bony fractures in this study were classified based on Young and Burgess classification system, the most common type was lateral compression (LC) followed by antero-posterior compression (APC), vertical shear (VS) and combined mechanism injury (CMI) and this was in agreement with Khurana et al., 2014.

## Conclusion

Pelvic injury is regarded as the major cause of death in multiple-trauma patients. Pelvic multidetector CT imaging with 2D multiplanar reconstruction images as well as 3D volume rendered reconstruction images of the pelvis provide more detailed information not available from plain radiographs and potentially improving the capacity for accurate fracture classification. The Young and Burgess classification system based on the mechanism of injury and direction of injury force has allowed correct and timely application of external fixation, thus directly contributing to a more favorable outcome.

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