

# CONCLUSIONS

## CONCLUSIONS

- Digital radiography and Computed Tomography are valuable for evaluating pelvic fractures.
- MDCT is the first imaging study today in most poly traumatic patients.
- MDCT decrease the uncomfortable positions in order to obtain diagnostic images. This is high value in patients who are already in pain.
- MDCT Multi-planar (MPR) and the 3-D capabilities improving, detection, characterization, staging of pelvic fractures and the pre-surgical planning.
- MDCT provides detailed information about the soft tissues in and around the pelvis.
- MDCT very important component in the pre-operative assessment of pelvic fractures.
- MDCT is the most suitable technique for assessment of fractures of pelvic and their classification.
- MDCT is more sensitive than plain radiography in detection and diagnosis of the pelvic fractures and can change the stability diagnosis of the fractures.

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# PROTOCOL

**ROLE OF MULTI-DETECTOR COMPUTED TOMOGRAPHY  
IN EVALUATION OF PELVIC FRACTURES**

دور الأشعة المقطعية متعددة المقاطع في تقييم كسور الحوض

Protocol of a thesis submitted  
to the Faculty of Medicine  
University of Alexandria  
In partial fulfillment of the  
requirements of the degree of  
**Master of Radiodiagnosis and  
Intervention**

by

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2012

خطة بحث مقدمة  
لكلية الطب  
جامعة الإسكندرية  
إيفاء جزئياً  
لشروط الحصول على درجة  
الماجستير في الأشعة التشخيصية  
والتدخلية

من

**فراس احمد خلف**  
بكالوريوس الطب والجراحة ، اليمن  
طبيب مقيم زائر  
مستشفيات جامعة الإسكندرية  
قسم الأشعة التشخيصية  
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مدرس الأشعة التشخيصية

كلية الطب

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For his experience in MDCT Imaging

وذلك لخبرته في فحوصات

الأشعة المقطعية متعددة المقاطع

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مركز البحوث

## INTRODUCTION

The pelvis is a complex bony ring comprised of multiple components. The sacrum and ilia make up the posterior portion of the ring, with the ischia and pubic bones anteriorly providing a connection between the lower limbs and trunk. However, the bony articulations, sacroiliac and pubic symphysis, are not inherently stable.<sup>(1)</sup>

Pelvic fracture is a serious injury that is associated with significant morbidity and mortality. This is a result of the high energy transfer to the pelvic region. Road traffic accidents and falls from height are by far the most common mechanisms of injury.<sup>(2)</sup>

Fractures of the pelvic ring have been reported to comprise 2% to 8% of all skeletal injuries.<sup>(3-5)</sup> Patients are most often young males in their early 30s, and motor vehicle collisions are the most common inciting cause.<sup>(6,7)</sup> Because of the high energy involved, patients with pelvic ring disruptions usually have multiple injuries.<sup>(6)</sup> Morbidity and mortality is also high, with overall mortality rates of 17% for patients with pelvic fractures.<sup>(7)</sup>

Pelvic fractures were classified according to pelvic instability; if a pelvic fracture is stable, it is Type A; a fracture that is unstable to rotation but vertically stable is termed Type B; severe pelvic ring disruption that is unstable to both rotation and vertical displacement is Type C.<sup>(8)</sup>

حزین علی محمد

24/2/2024

Detection and assessment of pelvic fractures is a critical component of the initial evaluation of any major trauma patient.<sup>(9)</sup> pelvic fractures are frequently complex and the precise pathological anatomy is not easily demonstrated by routine radiographs.<sup>(10)</sup> Plain radiographs alone have limited sensitivity for detection of pelvic fractures compared with CT.<sup>(11)</sup> Fractures of the sacrum and acetabulum are most easily overlooked.<sup>(10, 11)</sup>

Digital radiography and Computed Tomography are valuable for evaluating pelvic fractures.<sup>(12)</sup> In most polytrauma patients, the first imaging study today is MDCT. Although axial CT images have a higher diagnostic accuracy in detecting and characterizing pelvic injuries than radiography, evaluation with MPR images has been shown to increase diagnostic accuracy.<sup>(13)</sup> Pelvic trauma is where 3-D imaging first made a significant clinical impact, and it is now a standard requisite for surgical planning, being a valuable complement to axial and MPR images.<sup>(14)</sup>

CT is useful for detecting intra-articular fragments, fragment interposition, marginal impaction, occult pelvic ring fractures and evaluating the sacroiliac complex to determine if vertical instability is present.<sup>(15, 16)</sup>

MSCT detected additional fractures in 17% of patients not seen on conventional radiographs. In some patients, MSCT changed the fracture classification by delineating the full extent of the fracture. MPR visualize sacral fractures better than axial source images. MSCT of the pelvis is required for correct fracture detection.<sup>(17)</sup> MSCT has increased the speed, efficiency and accuracy of computed tomographic imaging in musculoskeletal trauma. Added advantages such as MPRs and 3D imaging have greatly enhanced the ability to evaluate complex anatomical areas such as the spine, pelvis and foot.<sup>(18, 19)</sup>

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MPR technique proved to be superior in the detection of fractures of the pelvis, leading to significantly better results than conventional radiographs and markedly better results than transverse slices alone.<sup>(20)</sup> In severe trauma patients MDCT proved to be far superior in the detection and classification of traumatic fractures of the spine and the pelvis. Particularly thin-slice technique combined with multiplanar reformation leads to significantly better results than conventional radiographs or transverse images alone.<sup>(21)</sup>



سرزنش و اصلاح شد



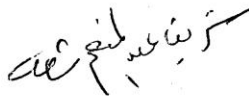




7.

### AIM OF THE WORK

The aim of this work will be directed to study the role of Multi-Detector Computed Tomography (MDCT) over Conventional Radiography in evaluation and clearing the diagnosis of osseous injuries of the pelvis.



## PATIENTS

A prospective study will be conducted on 30 patients presenting with pelvic trauma referred to the radiology department at Alexandria university Hospitals.



## METHODS

### Selected patients will be subjected to:

- Full history taking.
- Thorough clinical examination.
- Plain X-ray of the pelvis:
  - AP view.
  - Oblique views (external , internal ).
  - Inlet / Outlet views.
- Non enhanced MDCT of the pelvis:
  - Multi-planar volume reformation (MPR).
  - Three-dimensional VR.
- The medical ethics will be considered. The patient has to get benefit from the examination [An informed consent will taken from patient in case of incompetent patient the informed consent will be from the guardians].

## Ethics Of Research

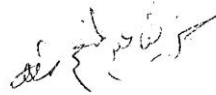
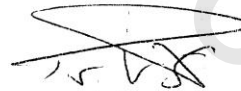
### Research on human or human products:

- ☒ **Prospective study:** informed consent will taken from patient. In case of incompetent patient the informed consent will be from the guardians.
- ☐ **Retrospective study:** Confidentiality of record will be considered.
- ☐ **DNA/ genomic material:** informed consent for DNA/ genomic test and for research will be taken from patients. No further tests will be carried out except with further approval of committee and patients. If the samples will travel outside Egypt the researcher will be responsible for transportation and security approval.
- ☐ All drugs used in the research is approved by the Egyptian ministry of health.

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### Research on animal:

- ☐ The animal species is appropriate to the test.
- ☐ After test, if the animal will suffer it will be euthanized and properly disposed.
- ☐ After operation, it will have a proper postoperative care.

## RESULTS

The results of this study will be calculated, tabulated and statistically analyzed according to the appropriate methods.



سید ذکریا علی شاہ

## DISCUSSION

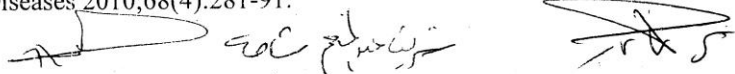
The results will be discussed in view of achievement of the aim, their significance and their comparison with other available previous related researches.



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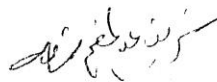
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# **ARABIC SUMMARY**

## الملخص العربي

شملت هذه الدراسة ٣٠ مريضا باشتباه سريري بكسر في الحوض والمحولين من قسم الأشعة التشخيصية في مستشفى جامعة الإسكندرية، حيث انه تم فحص جميع المرضى بواسطة الأشعة المقطعية . فكان العدد ٢١ من الذكور و ٩ من الإناث ٣٠٪ مع نسبة الذكور إلى الإناث من ٢,٣:١. وتراوح أعمارهم بين ١٣ و ٨٥ عاما مع متوسط عمر ٣٦ عاما.

كان الهدف من هذا العمل هو دراسة دور التصوير المقطعي متعدد المقاطع على الأشعة التقليدية في التقييم وتأكيد تشخيص الإصابات في عظم الحوض.

في هذه الدراسة ، تم أخذ التاريخ الكامل والفحص السريري الدقيق للمرضى، تصوير الحوض بالأشعة السينية كلما امكن ذلك (امامي خلفي ، "مدخل / مخرج"، مائل ، "داخلي / خارجي") وتصوير بالأشعة المقطعية متعدد المقاطع بدون صبغة للحوض (الفحص الثلاثي الابعاد والصور ثلاثية الابعاد).

وقد أجريت الفحوصات على ضوء سرعة جي اي رباعي المواسح وسيمينس سداسي المواسح. كانت عوامل الفحص ١٤٠ كيلو فلت و ١٤٥ مللي أمبير لكل مقطع ودوران الأنبوبة ٠,٥ ثانية وسمك المقطع ١ مم .

كسر الحوض هو إصابة خطيرة ذو معدلات الاعتلال والوفيات كبيرة. هذا هو نتيجة لنقل الطاقة العالية إلى منطقة الحوض. وقد تم الإبلاغ عن كسور في الحوض لتشمل ٢٪ إلى ٨٪ من جميع إصابات الهيكل العظمي. غالبا ما تكون الحالات من الشباب الذكور في العقد الثالث ، السبب الأكثر شيوعا هو حوادث السير . بسبب الطاقة الهائلة، المرضى الذين يعانون من اضطرابات في حلقة الحوض عادة ما يكونو ذو إصابات متعددة بمعدل المرض والوفيات مرتفع أيضا، مع معدلات الوفيات الإجمالية بنسبة ١٧٪ للمرضى الذين يعانون من كسور الحوض.

التصوير الشعاعي الرقمية والتصوير المقطعي ذات قيمة لتقييم كسور الحوض. في معظم مرضى متعددي الاصابة تعتبر الأشعة المقطعية متعددة المقاطع هي الخيار الاول في التصوير. بالاضافة الي أن الصور المقطعية المحورية لديها أعلى دقة التشخيص في الكشف وتوصيف إصابات الحوض من التصوير الشعاعي، قد تبين ان زيادة التقييم ودقة التشخيص تأتي مع الصور في الابعاد الثلاثة وثلاثية الابعاد. في اصابات الحوض التصوير ثلاثي الابعاد يعتبر ذو تأثير سريري كبير، وتعتبر الان المعيار الاول لتخطيط العمليات الجراحية.

# الملخص العربي

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# دور الأشعة المقطعية متعددة المقاطع في تقييم كسور الحوض

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رسالة علمية

مقدمة إلى كلية الطب - جامعة الإسكندرية  
إستيفاء للدراسات المقررة للحصول على درجة

الماجستير

فى

الأشعة التشخيصية

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