

## **Routinely Use of computed tomography (CT) scanning in patients with abdominal pain at emergency Department at King Hussein medical center. (KHMC)**

**Abdallah AL- Mherat**

Emergency Department, King Hussein Medical Center  
Royal Medical Services,

### **ABSTRACT**

**Objective:** To evaluate use of abdominal computed tomography in patients with abdominal pain and accuracy of diagnosis, in patients who attend the Emergency Department at KHMC.

**Method:** We conducted a retrospective descriptive case series of consecutive patients who received an abdominal CT scan for abdominal pain. The setting was an Emergency Department at King Hussein Medical Center, from January to September. 2011. All patients who presented to Emergency Department at King Hussein Medical Center with Abdominal pain and who received a CT scan in the ED were included. All CT scans were reviewed by a radiology specialist and all patients examined by an Emergency physicians.

**RESULTS:** The number of patients that attended the emergency Department of King Hussein Medical Center during period of study with abdominal pain was (2060).

930 (45, 1%) of those Patients underwent Abdominal CT scan for abdominal pain. Then the patients were categorized into groups according to abdominal CT scan findings.

Group A: 570 (61, 2%) patients with Abnormal Abdominal CT Scan.

Group B: 360 (38, 7%) patients with Normal Abdominal CT Scan.

The patients with Abnormal CT scan (Group A) were classified into two subgroups:

Subgroup I: (330) (57, 8%) patients had urinary tract stones.

Subgroup II: (240) (42, 1%) Patients with variable conditions.

**Conclusions:** The study showed that the Use of abdominal computed tomography for Abdominal pain in emergency Department may reduce mortality and Hospitals admissions, but the use of abdominal computed tomography as a routine diagnostic tool in patients with abdominal pain is unrecompensed, unless there is an indication. The Clinical assessment remains the most important first step in evaluating patients with an Abdominal Pain to decide on when to use CT scans in patients with abdominal pain.

**Keywords:** Abdominal pain, Abdominal computed tomography, Emergency Department.

### **Speaker and correspondence:**

Dr, Abdallah Al Mehrat MD JBEM.

Emergency department-RMS-KHMC.

PO Box: 1338-11821. Email: abmhairat@hotmail.com. , almherata@hotmail.com,

T. Mobile:00962-777965908,772006555.

### **Introduction:**

Increased utilization of CT technology for medical imaging has raised concerns regarding the cost of health care and increased radiation exposure to the general public *Hani H.et al(2011)*. Consultation before CT of the abdomen leads to an increase in the clinical information provided and a decrease in additional diagnostic examinations *Seltzer. et al(1985)*

Acute abdominal pain can represent a spectrum of conditions from benign and self-limited disease to surgical emergencies. Proper management of patients with acute abdominal pain requires consideration of the patient's history and physical findings, laboratory data, and imaging studies. Clinical assessment remains the most important first step in evaluating patients with an acute abdomen. *Kristy Thurston.et al(2010)*.

Evaluating abdominal pain requires an approach that relies on the likelihood of disease, patient history, physical examination, laboratory tests, and imaging studies. Delays in diagnosis may affect morbidity and mortality, and may have a significant effect on resource utilization *SARAH L.et al(2008)*.

Computed tomography can diagnose a wide range of acute abdominal conditions,

However, few studies have examined the efficacy of computed tomography in patients with acute abdominal pain, and to

our know-ledge no randomized controlled trials have assessed its use as a diagnostic aid for acute abdominal pain *Chaan S Ng,et al(2004)*

The use of early CT in patients with abdominal pain has been shown to reduce the number of serious diagnoses missed. Over the years, diagnostic imaging in the emergency department has been responsible for an increase in hospital costs, and CT has been a growing source of exposure to radiation in adult patients *Wytze Lame'ris ,et al(2009)*.

The outcome of this study may help clinicians to decide on when to use CT scans in patients with acute abdominal pain.

### **Patients and Method:**

We conducted a retrospective descriptive case series of consecutive patients who received an abdominal CT for Abdominal pain, duration between January 2010 and December 2010. The setting was an emergency Department at King Hussein Medical Center, Amman, Jordan.

All patients who presented to ED at King Hussein Medical Center with Abdominal pain and who received a CT in the ED were included. All patients underwent various investigations, which included baseline laboratory testes (complete blood cell count, Temperature, electrolytes, serum urea nitrogen, Amylase, and glucose blood level), Diagnosis was

made on the basis of clinical examinations, relevant past history, biochemical and radiological examination ,patient were followed and final diagnosis was confirmed from` the discharge summaries.

CT scan was performed using adult protocol. All CT scans were reviewed by a radiology specialist and all patients examined by an emergency Doctor At Emergency Department.

The patients were categorized into groups according to abdominal CT scan findings and their examination .The CT scan findings were classified into normal and abnormal CT scan. The CT was considered normal if there was no focal lesion

The CT was considered abnormal, if there was any intrabdominal pathology. Results of the CT scans were recorded and analyzed. Pediatric patients were not enrolled in this study, as all pediatric patients were evaluated at the children's emergency clinic.

## **RESULTS: :**

The number of patients that attended the emergency department **of King Hussein Medical Center** during period of study with abdominal pain was (2060).

930 (45,1% ) of those Patients underwent

Abdominal CT scan. The patients were categorized into groups according to abdominal CT scan findings:

**Group A:** 570 (61, 2%) patients with Abnormal Abdominal CT Scan.

**Group B:** 360 (38, 7%) patients with Normal Abdominal CT Scan.

The patients with Abnormal CT scan (Group A) were classified into two subgroups:

**Subgroup I:** (330) (57,8%) patients had urinary tract stones.

**Subgroup I I:** (240) (42,1%) Patients with variable conditions. These conditions include: 70 (29,1%) patients Non-specific abdominal pain (was the most frequent diagnosis), 42 (17,5%) patients with acute appendicitis ,38 (15,8%) patients with gall bladder disease, 23 (9,5%) Pancreatitis, 21(8,7%) bowel obstruction, 19 (7,9%) diverticulitis, 14 (7,9%) (5, 8%) free fluid, 8 (3, 3%) Abdominal masses, 5 (2, 0%) Mesenteric ischemia). (Table 1).

.We observed that most of Abnormal CT scan are urinary tract stones because most of patients who presented to Emergency department with Loin pain are doing U/S, before CT scan that give an advantage and make it more superior of clinical diagnosis.

**CAUSES OF ABDOMINAL PAIN**

| Causes                      | Number Of Patients | Percentage |
|-----------------------------|--------------------|------------|
| Non-Specific Abdominal pain | 70                 | (29,1%)    |
| Appendicitis                | 42                 | (17,5%)    |
| Gall bladder disease        | 38                 | (15,8%)    |
| Acute pancreatitis          | 23                 | (9,5%)     |
| Bowel obstruction           | 21                 | (8,7%)     |
| Diverticulitis              | 19                 | (7,9%)     |
| Free Fluid                  | 14                 | (5,8%)     |
| Abdominal masses            | 8                  | (3,3%)     |
| Mesenteric ischemia         | 5                  | (2,0%)     |

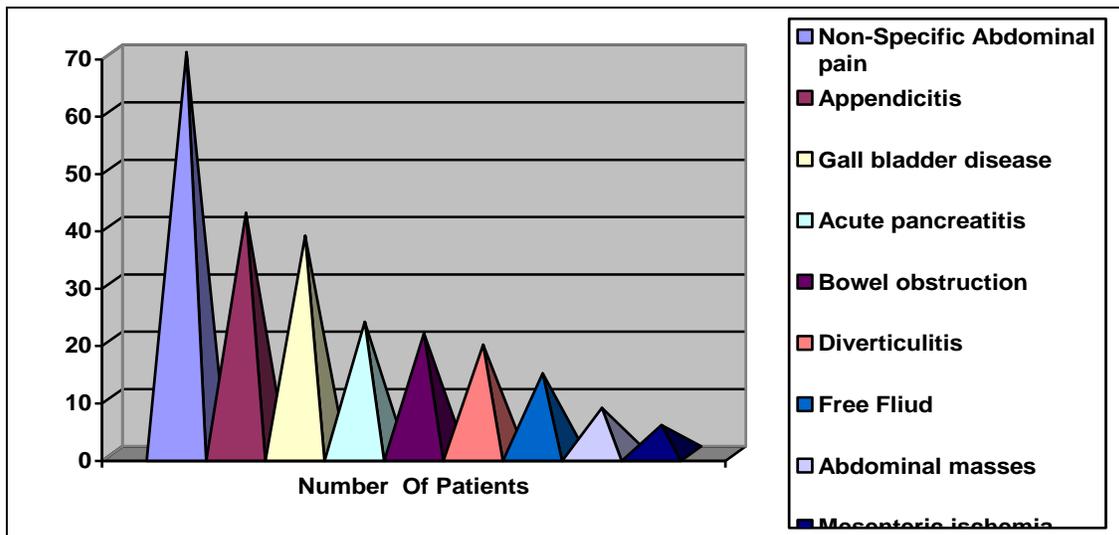


Figure 1

**Discussion:**

Abdominal pain is a common presentation in the Emergency department and is challenging to diagnose. Therefore, a thorough and logical approach to the diagnosis of abdominal pain is necessary.

There are many possible causes, and variety of conditions that can cause abdominal pain, These conditions include patients who had non-specific abdominal pain, acute appendicitis, gall bladder disease, nephrolithiasis, bowel obstruction, diverticulitis. Investigations are often obtained to determine the etiology of abdominal pain when the clinical examination does not provide an underlying cause .CT scan is one of the most frequent investigations that are often requested and most likely overused in our Emergency Department for evaluation patients with abdominal pain. There are mainly 2 schools of thoughts: one supporting its routine use, and the other against it *Adil Ceydeli,et al(2010)*. The point that we wanted to bring up is that, if you use CT scans for all abdominal pain in the Emergency Department and then call the surgeon, whereas you know for sure that it is typical of acute Abdomen, not only are you wasting your time, you are wasting the health care resources *Steven L. Lee et al(2001)*.

Several studies have reported increases in CT use in emergency Departments, although only a small percentage of these scans yield clinically significant findings.

Increased use of advanced radiology procedures is associated with increased health care expenditures, increased length of stay in the emergency Department, and increased exposure to ionizing radiation *Frederick Kofi Korley et al(2010)*.

Use of CT scans in hospital emergency rooms has risen . Raising questions about unnecessary radiation exposure and how healthcare costs can be contained against such fervent use of technology.

This study also confirmed that Abdominal imaging is unlikely to be abnormal in patients who had normal clinical examination or any evidence of certain or suspected Abdominal pathology. Good clinical evaluation is of paramount importance for optimal in emergency management, diagnostic choices, and therapeutic decisions.

CT use in the setting of abdominal pain increased much more than in the setting of head injury and headache. This suggests that the radiation dose likely increased at an even higher rate than the rate of increase in the percentage of visits in which CT was performed, given that CT of the abdomen and pelvis is typically associated with effective doses of radiation of up to seven times that of head CT *David B. Larson et al(2011)*.

Whoever CT scanning has significant radiation dose and it's not always practical or available *Saleh M Abbas et al(2007)*.

## Conclusions:

Use abdominal computed tomography for acute abdominal pain in emergency Department may reduce mortality and Hospitals admissions, but the use of abdominal computed tomography as a routine diagnostic tool in patients with abdominal pain is unrecompensed, unless there is an indication.

The use of CT scanning in patients with abdominal pain is increasing rapidly. This increase cannot be explained by increasing patient acuity and has not changed the admission rate.

## REFERENCES:

**1-Adil Ceydeli, MD, Simon Lavotshkin, Jack Yu, MD, and Leslie Wise, MD et al (2010):** When Should We Order a CT Scan and When Should We Rely on the Results to Diagnose an Acute Appendicitis? Division of Plastic Surgery. Current Surgery ,volume 63,Issue 6, pages 464-468.

**2-Chaan S Ng, Christopher J E Watson, Christopher R Palmer, Teik Choon See et al.(2002).** Evaluation of early abdominopelvic computed tomography in patients with acute abdominal pain of unknown cause: prospective randomised study BMJ .,325:1387.

**3-David B. Larson, MBA, Lara W. Johnson, MHS, Beverly M. Schnell, et al (2011).**Rising Use of CT in Child Visits to the Emergency Department .BMJ,10:1148.

**4-Frederick Kofi Korley, Julius Cuong Pham, MD, et al (2010):**Use of Advanced Radiology During Visits to US Emergency Departments for Injury-Related Conditions,*JAMA*.,304(13):1465-1471.

**5-Hani H. Abujudeh1, Rathachai Kaewlai1, Pamela M. McMahon1,et al (2011):.**Abdominopelvic CT Increases Diagnostic Certainty and Guides Management Decisions: A Prospective Investigation of 584 Patients in a Large Academic Medical Center, *AJR* ., 196 (20): 238-243.

**6-Kristy Thurston Suma Magge Robert Fuller, et al (2010):**Focused versus screening CT scans for evaluation of nontraumatic abdominal pain in the emergency department, University of Connecticut School of Medicin,2: 25-27.

**7-Laméris W, van Randen A, van Es HW, et al.(2009):** Imaging strategies for detection of urgent conditions in patients with acute abdominal pain: diagnostic accuracy study. *BMJ* .,338:b2431.

**8-Margaret J. A. Menoch, MDa, Daniel A. Hirsh, et al .(2012):** Trends in Computed Tomography Utilization in the Pediatric Emergency Department .*Pediatrics* , 129(3): e690-e697.

**9-Mario Morino, Luca Pellegrino, Elisabetta Castagna et al.(2006):** Acute Nonspecific Abdominal Pain: *Annals of Surgery*.244(6):881-888.

**10-Saleh M Abbas,Troy Smithers and Etienne Truter (2007):** What clinical and laboratory parameters determine significant intra abdominal pathology for patients assessed in hospital with acute abdominal pain?. *World J Emerg Surg.*, 2: 26. PMC2116997.

**11-SARAH L. CARTWRIGHT, and MARK P. KNUDSON.et al.(2008):** Evaluation of Acute Abdominal Pain in Adults,Wake Forest University School of Medicine, 1;77(7):971-978.

**12-Seltzer SE, Beard JO, Adams DF.et al. (1985): Radiologist as consultant:** direct contact between referring clinician and radiologist before CT examination. *AJR Am J Roentgenol* ., 144(4): 661–664.

**13-Sтивен L. Lee, Alicia J. Walsh, Hung S. Ho.(2001):** Computed Tomography and Ultrasonography Do Not Improve and May Delay the Diagnosis and Treatment of Acute Appendicitis . *Arch Surg.* ,136(5):556-562.

**14-Susanna I. Lee, Arun Krishnaraj, Manjil Chatterji, et al.(2012).** When Does a Radiologist's Recommendation for Follow-up Result in High-Cost Imaging? *Radiology* , 262:2 544-549.

**15-Wytze Laméris, research fellow ,Adrienne van Randen, research fellow,H Wouter van Es.et al (2009):** Imaging strategies for detection of urgent conditions in patients with acute abdominal pain: diagnostic accuracy study,*BMJ* ., 338:b243.

## دراسة استخدام التصوير الطبقي المحوري بشكل روتيني للمرضى الذين يعانون من آلام في البطن في قسم الطوارئ في مدينة الحسين الطبية. د. عبدالله المهيرات

الخدمات الطبية الملكية - طوارئ مدينة الحسين الطبية

**الهدف:** تهدف هذه الدراسة لتقييم استخدام التصوير المقطعي للمرضى الذين يعانون من آلام في البطن ودقة التشخيص، في قسم طوارئ مدينة الحسين الطبية

**الطريقة:** تم تحليل و دراسته جميع المرضى الذي تعرضوا للتصوير الطبقي المحوري في قسم طوارئ مدينة الحسين الطبية من يناير إلى سبتمبر 2011. تم إدراج جميع المرضى الذين حضروا إلى قسم طوارئ مدينة الحسين الطبية مع ألم في البطن والذين حصلوا على التصوير الطبقي المحوري. واستعرضت جميع حالات من قبل إختصاصي الأشعة وفحص جميع المرضى من قبل أطباء الطوارئ.

**النتائج:** كان عدد من المرضى الذين حضروا إلى قسم طوارئ مدينة الحسين الطبية خلال فترة الدراسة مع ألم في البطن هو (2060) مريض.

وخضع 930 (45,1%) من هؤلاء المرضى لتصوير الطبقي المحوري, وصنفت المرضى إلى مجموعات وفقا لنتائج التصوير الطبقي المحوري.  
المجموعة (أ): 570 (61.2) التصوير الطبقي المحوري غير طبيعي.  
المجموعة (ب): 240 (42.1%) التصوير الطبقي المحوري طبيعي.  
المجموعة (1): 330 (57,8%) المرضى الذين يعانون من حصوة في المسالك البولية.  
المجموعة 2: (240) (42,1%) المرضى الذين يعانون من حالات مرضية مختلفة: وتشمل هذه حالات: 70 (29,1%) من المرضى غير محددة آلام في البطن (كان التشخيص الأكثر شيوعا).  
المرضى الذين يعانون من التهاب الزائدة الدودية الحاد، 38 (15,8%) المرضى الذين (5,17) 42 يعانون من مرض المرارة، 23 (9,5%) التهاب البنكرياس، 21 (8,7%) انسداد الأمعاء، 19 (7,9%) التهاب الرتوج، 14 (5,8%) السائل الحر ، 8 (3,3%) ، و 5 (2,0%) نقص التروية مساريقي.

**الاستنتاجات:** أظهرت الدراسة أن استخدام التصوير الطبقي المحوري لآلام البطن في قسم الطوارئ قد خفض معدل وفيات ودخولات ولكن استخدام التصوير الطبقي المحوري كأداة تشخيصية روتينية في المرضى الذين يعانون من آلام في البطن غير مجدي، ما لم يكن هناك إشارة .  
وإن التقييم السريري لا يزال هو الخطوة الأولى الأهم في تقييم المرضى الذين يعانون من آلام البطن لاتخاذ قرار بشأن متى يمكن استخدام الأشعة في المرضى الذين يعانون من آلام في البطن.

**مفتاح الكلمات:** التصوير الطبقي المحوري, آلام في البطن, قسم طوارئ