

## Original Article

## Results of Abdominopelvic CT Scan in patient with abdominal pain

Mahboub Pouraghaei<sup>1</sup>, Mohammad Hossein Somi<sup>2</sup>, Payman Moharamzadeh<sup>1</sup>, Samad Shams Vahdati<sup>3\*</sup>, Mahsa Ghanbari<sup>4</sup><sup>1</sup>Associate professor of emergency medicine, Tabriz University of medical science, Tabriz, Iran<sup>2</sup>Professor of gastroenterology, Internal medicine department, Tabriz University of medical science, Tabriz, Iran<sup>3</sup>Associate professor of emergency medicine, Road Traffic Injury Research Center, Tabriz University of medical science, Tabriz, Iran<sup>4</sup>Medical doctor, emergency medicine research team, Tabriz University of medical science, Tabriz, Iran**Corresponding Author:** Samad Shams Vahdati, E-mail: sshamsv@yahoo.com, shams@tbzmed.ac.ir

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## ABSTRACT

**Background:** CT scan is an imaging device that is widely available and is very sensitive to different causes of abdominal pain. The aim of this study was to evaluate the CT scan results role of patients with abdominal pain in diagnosis and future decisions on patient and comparison with patient's history and physical examination. **Methods:** In this descriptive analytical study, 215 patients admitted to the emergency room at Imam Reza Teaching Hospital with non-traumatic abdominal pain were studied over the years regarding the comparison of CT findings with the history, physical examination, plain radiography and ultrasound. Demographic characteristics, patient history, symptoms at the first visit, clinical findings, laboratory tests, imaging findings, diagnosis and treatment of all patients were collected. **Results:** CT scan to confirm the diagnosis or screening patients with abdominal pain has been helpful. The results of 215 CT scan 28.40% was normal, most frequently diagnosis in CT scans was related to pancreatitis 24% and least diagnostic of CT scans related to ileus. Of 215 patients, plain abdominal radiography was requested in 78 patients (36.3%) that the air-fluid level was reported in 18 cases (23.7%). Of 215 patients, abdominal ultrasonography was performed in 117 patients (54.4%) that the most recognizable diagnosis was cholelithiasis in 22 cases (18.8%) an abdominal ultrasound result was normal in 98 cases (83.7%). Finally of the 215 patients, 116 patients (77.2%) admitted and 49 patients (22.7%) were discharged. Of 166 patients, 51 patients (30.72%) were transferred directly from the emergency department to the operating room. **Conclusion:** CT scan play a decisive role in the decision to hospitalize patients and request in right place expedite the handling patients. Our study suggests the balance between the amount of requested CT in patients with non-traumatic abdominal pain and hospitalization rate.

## INTRODUCTION

Abdominal pain is one of chief complaint in patient Referred emergency wards (1) and 5-10% of emergency department visits included it (2) Causes acute abdominal pain variable from life-threatening problems and benign issues (2). abdominal pain occurs in three pattern broad visceral, Parietal and referral (3). For the treatment of abdominal pain a diagnostic approach is important to differentiate between the various causes of abdominal pain. (3)

For compiling differential diagnosis of abdominal pain, a general understanding of the anatomy, physiology and pathophysiology is critical. Abdominal pain requires an appropriate approach Start by taking a detailed history of the patient that this history is not only the evaluation of present problem of patient, Should the underlying problems drug and a family history recent travel, history of substance

abuse and jobs is also mentioned. Important clues to the cause of abdominal pain should be identified in this biography that by asking about quality, Location, Fast start, Time, Spread, Intensity, Aggravating factors and reducing associated symptoms can be obtained. After biographies, Physical examination should be done check of vital signs is necessary. (4)

Diagnosis is based on clinical findings in patients with abdominal pain is often incorrect. (3) Unavoidable limitations of history, Physical examination and laboratory tests, the necessity and benefits of imaging in patients with abdominal problems proposed. (5) Selected imaging studies to assess the differential diagnosis of abdominal pain that directed the initial assessment is obtained. (4)

CT scan is an imaging device that is widely available and for different causes of abdominal pain is very sensitive. A new

way of fast helical scanning, progress in the intravenous and oral contrast material form three-dimensional and advanced software capability, CT is the modality of choice for most evaluating of more complaint of acute abdominal pain. (4)

Repeated CT scans in emergency departments for assessment of non-traumatic acute abdominal pain and In half of the cases led to changes in the diagnosis and in quarter of cases has been a shift in the state of treatment And in combination with other diagnostic tests it is amplified effect. (6)

So the aim of this study was to evaluate the CT scan results role of patients with abdominal pain in diagnosis and future decisions on patient and comparison with patient's history and physical examination.

## METHOD

In this study, all patients referred to Imam Reza Hospital with non-traumatic abdominal pain were studied. (3 February 2013 – 4 February 2014) regarding the comparison of CT findings with the history, physical examination, plain radiography and ultrasound. Demographic characteristics, patient history, symptoms at the first visit, clinical finding, laboratory tests, imaging findings, diagnosis and treatment of all patients were collected.

Patient information at the time of presentation of their file were extracted and the following variables were studied:

1. Demographic characteristics: age, sex, job
2. Previous history of patient: Past medical history, Drugs history, Drug abuse, Risky Behaviors, Recent travel
3. Symptoms during the visit: Quality, Pain, Location, Speed of start, chronic, Diffusion, Severity, Aggravating factors and decreasing factors, Associated symptoms
4. Clinical findings: Vital Signs, Abdominal tenderness, Rebound tenderness, Guarding
5. Laboratory tests
6. Imaging findings: A plain radiograph, Sonography and CT scan
7. The final diagnosis and treatment (Surgical or non-surgical)

## Ethical Considerations

In this study patients did not received additional treatment and unprincipled intervention and each diagnostic and testing methods based on reliable sources and studies and academic methods and none of the measures had no ethical prohibition. All patient information is kept completely confidential. this study's Ethic no (91/1-6/10).

## Data Analysis Method

The data obtained by using descriptive statistics (Mean  $\pm$  SE), frequency, percentage and mean difference test for independent groups, for quantitative variables, chi-square test or Fisher's exact test, Calculation and diagnostic value (Sensitivity, Property, Positive and negative predictive value) for qualitative variables by using statistical software SPSS 17 were studied and analyzed. In this study P value  $<0.05$  was statistically significant.

## RESULT

Information of 215 patients with non-traumatic abdominal pain were collected.

The mean age of patients =  $55.94 \pm 1.27$  (Min = 14, Max = 92)

The average age in men =  $55.62 \pm 1.91$  (Min = 14, Max = 89) and the average age in female =  $56.22 \pm 1.71$  (Min = 14, Max = 92). In terms of age was not statistically significant difference between the sexes. (P value = 0.81)

## Past Medical History

Of the 215 patients studied, 63 patients (29.3 %) with hypertension, 35 patients (16.27 %) with DM, 28 patients (13.02 %) with IHD, 21 patients (9.76 %) have a history of hyperlipidemia, 126 patients (58.6 %) there is no record of previous disease.

## Social Habits

In our study, 57 patients (26.5 %) were smokers, 21 patients (9.74 %) were alcohol use, In 6 patients (2.79 %) were positive for drug use, social habits were negative in 138 patients (64.18 %).

## Location of Pain

Place of pain in 13 patients (6 %) is diffuse, in 37 patients (17.2 %) in RUQ, in 21 patients (9.8 %) in RLQ, in 20 patients (9.3 %) in LUQ, in 16 patients (7.4 %) in LLQ, in 91 patients (42.3 %) in the epigastric and in 17 patients (7.9 %) there was a pain in the flank area.

In statistical analysis of the patient's pain with hospitalization had a significant relationship (p value = 0.03). So here also the importance of early biographies in the approved final diagnosis for admission is determined.

## Type of Pain

Type of pain in 114 patients (53.01 %) continuously and in 101 patients (46.97 %) was colic.

## Physical Examination of the Abdomen

Physical examination of the abdomen in patients with non-traumatic abdominal pain, 202 patients (93.95 %) with tenderness, 10 patients (4.65 %) with rebound tenderness, 15 patients (6.97 %) with guarding, 14 patients (6.51 %) with abdominal distention, 4 patients (1.86 %) with positive murphy sign.

## Vital Sign

Patients' vital signs based on the final results of the CT scan

## ECG

In the study of rhythm and electrocardiogram changes in patients, sinus tachycardia in 14 patients (6.5 %), AF in 13 patients (6 %), ST changes in 5 patients (2.3 %). Study

	O2 Sat	BT	RR	PR	DBP	SBP
CT finding						
Normal	92.4±1.5	37.2±0.1	18.3±0.6	80.5±2.2	75.71±1.7	119.6±3.5
Dilated CBD	88±4.2	37.4±0.2	16.2±0.4	80.7±4.05	77.33±3.05	122.7±4.9
Cholelithiasis	90.1±4.9	37.01±0.1	17.2±1.1	79.7±8.3	78.1±1.8	121.8±2.3
Cholecystitis	93.4±1.6	36.9±0.1	18.2±1.4	89.5±3.8	82.8±4.6	127.1±6.7
Pancreatitis	91.2±1.3	36.9±0.2	18.7±0.8	85.1±1.9	74.4±1.4	119.8±2.9
Liver mass	89.6±3.5	37.2±0.1	17.2±0.9	81.5±2.8	76.6±2.5	120±4.7
Pancreatic mass	95.2±0.6	36.8±0.1	16.5±0.4	71.4±4.5	75.7±3.6	122.8±8.08
Deodenal mass	86.8±3.4	36.8±0.2	20.6±3.4	82.2±6.05	76±6.7	128±10.6
Portal vein thrombosis	95.5±2.5	37.04±0.2	14±2	83.5±1.5	80±10	120±10
SMA, SMV thrombosis	95.6±1.3	36.8±0.1	18±2.02	94.2±6.2	74±6	119±9.7
Mesenteric ischemia	84.7±9.6	37.05±0.1	20.5±0.9	85.5±6.3	67.5±14.3	127.5±17.5
Bowel obstruction	91.4±1.2	37.2±0.1	17.5±0.5	84.3±1.8	75.8±2.2	124.4±3.5
Colitis	89.5±8.5	37.2±0.2	16.5±0.5	79±1.01	75±5	125±5
Liver metastasis	84.5±6.2	36.8±0.1	17.1±1.06	89.7±6.1	71.8±5.1	114.3±6.6

### Laboratory Findings

Blood tests based on the detection of CT scan results

	K	Na	Cr	Urea	Bs	Hct	HGB	WBC
CT finding								
Normal	4.3±0.1	139.6±0.4	1.8±0.6	44.09±12.2	126.6±8.2	35.4±1.7	12.009±0.5	10.96±0.85
Dilated CBD	4.3±0.1	138.8±1.1	1.9±0.6	45.7±6.8	129.3±9.02	73.7±34.4	12.4±1.04	11.5±1.4
Cholelithiasis	4.2±0.2	137.2±1.5	3.9±1.8	42.1±12.06	148.8±24.1	39.8±2.8	13.5±0.8	12.4±2.02
Cholecystitis	4.4±0.1	140±1.6	1.1±0.1	32.5±3.5	144.7±15.3	54.6±14.8	14.7±0.9	10.2±1.4
Pancreatitis	4.1±0.06	140.09±0.5	1.3±0.3	32.2±1.7	130.1±8.5	58.9±11.2	14.1±0.3	12.1±0.7
Liver mass	4.4±0.2	139.3±0.4	3.1±1.2	59±19.7	139.5±24	71.3±22.5	12.7±0.5	9.52±0.7
Pancreatic mass	4.2±0.1	140.6±2.7	0.9±0.1	34±6.2	186±37.5	89.08±31.04	13.1±1.2	8.9±2.05
Deodenal mass	3.6±0.6	139.8±2.1	1.1±0.1	39.4±9.3	147±7.3	42.1±2.3	13.6±0.8	12.5±2.1
Portal vein Sthrombosis	4.4±0.5	140.5±1.5	1.6±0.5	50±25	117.5±20.5	37.9±0.7	10.8±0.2	9.6±4.8
SMA, SMV thrombosis	4.3±0.1	138±2.2	0.9±0.08	47.2±14.3	201±28.1	39.5±1.7	13.3±0.7	24.4±7.06
Mesenteric ischemia	4.1±0.1	140±2.04	0.9±0.08	36.5±8.5	108.5±12.2	32.2±4.5	10.2±1.5	11.8±2.1
Bowel obstruction	4.1±0.09	139±0.6	1.1±0.05	38.7±2.1	129.08±10.9	39.1±1.7	12.6±0.5	11.3±0.8
Colitis	3.5±0.2	142±1	-	31±6	103.5±21.5	34.9±6.7	12.2±3.8	10.4±2.05
Liver metastasis	4.6±0.1	137±2.2	2.3±0.7	83.1±15.7	158±37.5	48.4±13.1	11.2±0.9	14.6±2.6

Liver tests based on the detection of CT scan results

	Direct Bili	Total Bili	ALP	ALT	AST	Amylase
CT finding						
Normal	4.3±3.9	10.3±9.2	227.6±52.7	69.6±12.7	52±15.7	482.3±277.02
Dilated CBD	0.35±0.15	0.9±0.05	312.5±68.5	20.5±11.5	20±4	30.5±16.5
Cholecystitis	2.1±0.6	3.9±1.1	158±33	267±93	213.5±53.5	885±759
Pancreatitis	2.3±0.8	2.4±0.4	421.7±102.5	87.5±14.3	48.2±7.9	1098.4±247.4
Liver mass	1.3±0.8	2.4±1.3	600.3±418.4	66.3±47.5	29±8.1	62.6±11.8
Pancreatic mass	8.1±4.1	20.1±11.8	650±515.1	183±87.3	174.6±71.4	173.3±143.1
Deodenal mass	3.8±1.9	5.6±4.7	191±60	80.5±59.5	43±31	70±1
Bowel obstruction	0.2±0.04	0.8±0.1	173.2±29.5	20.4±5.11	18.71±3.7	-
Liver metastasis	4.1±3.7	7.3±6.05	508±271	79.5±56.5	104.5±85	61±18

of rhythm and electrocardiogram changes in 183 patients (85.1 %) was normal. in search of the heart rhythm of patients and their final diagnosis was not a significant relationship ( $p$  value = 0.12) Maybe the reason most patients with heart problems refer to its center.

### Plain Abdominal Radiography

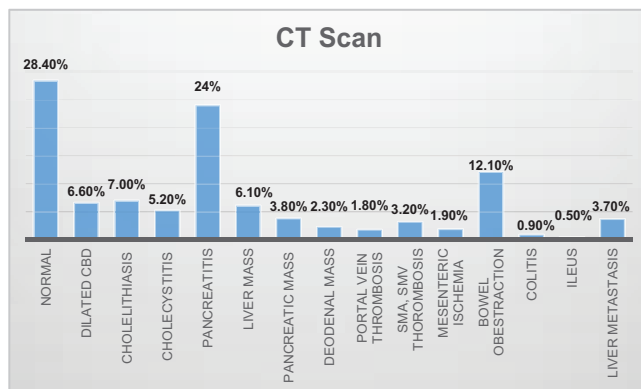
Of 215 patients plain abdominal radiography was requested in 78 patients (36.3 %) that the air – fluid level was reported in 18 cases (23.7 %) results of abdominal radiography was normal in 60 cases (76.92 %)

### Sonography

Of 215 patients, abdominal ultrasonography was performed in 117 patients (54.4 %), in 22 cases (18.8 %) cholelithiasis, in 14 cases (11.96 %) cholecystitis, in 23 cases (19.65 %) CBD was dilated, in 1 case (0.85 %) biliary tract dilatation, in 2 cases (1.7 %) Cirrhosis, in 5 cases (4.27 %) Pancreatitis, in 3 cases (2.56 %) Pancreatic mass, in 2 cases (2.56 %) dilated aorta was Reported. And abdominal ultrasound result was normal in 98 cases (39.2 %).

### CT Scan

CT scans were performed for all 215 patients



215 cases of CT scan was normal (28.4 %), most reports after normal report related to pancreatitis (24%) and the lowest was related to ileus (0.50%).

### Final Status of Patients

Finally of the 215 patients, 166 patients (77.2 %) admitted and 49 patients (22.7 %) were discharged. of 166 patients, 4 patients (2.4 %) in the ICU (ileus, dysentery, Pancreatitis, Portal vein thrombosis), 3 patients (1.8 %) in urology (1 case ARF+ UTI, 2 cases ARF+ history of PCN), 74 patients (44.5 %) in surgery, 80 patients (48.19 %) in gastroenterology and 5 patients (3.01 %) in nephrology ward (3 cases ARF, 1 case cirrhosis+ ARF, 1 case UTI) were admitted. Of 166 patients, 51 patients (30.72 %) were transferred directly from the emergency department to the operating room.

### DISCUSSION

Spread spectrum causes abdominal pain requires an emergency physician examine and assess patients with abdominal pain with wide viewing than other doctors. and the shortest and least expensive diagnostic approach designed to achieve the final diagnosis. The most important step in this direction a careful history of the patient and complete physical examination. the next steps include laboratory testing and radiological studies to evaluate the patients. (7-22)

If the discharge from the emergency to means the absence of a serious problem and life-threatening for the patient's this study shows that which diagnostic action was conducted for discharged patients and what were the results of these actions. thus it can be said, that the percentage of patients with abdominal pain and was finally discharged which diagnosis action was helpful. The other hand high prevalence of doing a diagnostic measures in patients who were discharged indicates this test is not significant effect in the decision of emergency medicine at the discharge of patients.

Many studies on the frequency of diagnostic procedures for patients with acute abdominal pain in emergency centers have been used. This studies considers the role of analysis such as ultrasound, plain abdominal radiography, CT scan to make decisions for patients. (23-24)

According to studies in the different of emergency centers a CT scan was introduced as the most effective method for evaluating patients presenting to the emergency department with abdominal pain.

In our study, after reviewing the results of CT scans in 215 patients with non-traumatic abdominal pain, showed that a CT scan the recovery percentage of 87.3% with an important role in the diagnosis and treatment of the patients. (22)

In this study of 215 patients, plain abdominal radiography was request in 78 patients (36.3%) and the normal result were reported in 60 cases (76.92%).

Of 215 patients, abdominal sonography was request in 117 patients (54.4%) and the normal result were reported in 98 cases (39.2%). The results indicate that Statistics ultrasonography was ordered for patients in this center is much higher than other centers.

It seems diagnostic approach in patients with abdominal pain needing review. to achieve this purpose should be done statistical analysis on larger samples.

Several studies have examined the condition of patients with nonspecific abdominal pain. In the patients who are requires further evaluation use of diagnostic tests such as CT scans and laparoscopy can be useful. (25-28) however, the use of invasive techniques such as laparoscopy caution should be observed.

Management of nonspecific abdominal pain is a multi-step process that achieves the best outcomes with the least cost and the least damage to patients.

Management of nonspecific abdominal pain has a three-step process. The first step involves history taking, clinical examination, evaluation of basic diagnostic and estimated possible diagnoses at this stage, suggested the use of ultrasound and laboratory tests. (29-30) in the absence of a defi-



nite diagnosis at this stage in the second stage using more advanced imaging techniques suggested. In many centers use of CT scans in this case has the first method(25-27). In the absence of a definitive diagnosis and use of any pain killer such as opioids in third stage use of laparoscopy can be useful in determining the cause of pain (25,28,31-33)

## CONCLUSION

Our study suggests the balance between the amount of requested CT in patients with non-traumatic abdominal pain and hospitalization rate. Considering the findings of this study CT plays a decisive role in the decision to admit patients in our center and its request in right place expedite hospitalization time and receiving urgent supportive treatments.

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