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Accuracy of emergency physicians' interpretation of computed tomography for urgent-emergent diagnoses in nontraumatic cases

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Abstract:

OBJECTIVE: The aim of this study is to evaluate the accuracy levels of the emergency physicians (EPs) managing the patient in the interpretation of the urgent-emergent pathological findings in thoracic and abdominal computed tomography (CT) scans.

METHODS: The EPs interpreted the CT scans of patients who visited the emergency department because of nontraumatic causes. Then, a radiology instructor made final assessments of these CT scans. Based on the interpretation of the radiology instructor, the false-positive rate, false-negative rate, sensitivity, specificity, positive predictive value, negative predictive value, and kappa coefficient (κ) of the EPs' interpretations of the CT scans were calculated.

RESULTS: A total of 268 thoracics and 185 abdominal CT scans were assessed in our study. The overall sensitivity and specificity of the EPs' interpretation of the thoracic CT scans were 90% and 89%, respectively, whereas the abdominal CT interpretation was 88% and 86%, respectively. There was excellent concordance between the EPs and the radiology instructor with regard to the diagnoses of pneumothorax, pulmonary embolism, pleural effusion, parenchymal pathology, and masses (κ: 0.90, κ: 0.87, κ: 0.71, κ: 0.79, and κ: 0.91, respectively) and to the diagnoses of intraabdominal free fluid, intraabdominal free gas, aortic pathology, splenic pathology, gallbladder pathology, mesenteric artery embolism, appendicitis, gynecological pathology, and renal pathology (κ: 1, κ: 0.92, κ: 0.96, κ: 0.88, κ: 0.80, κ: 0.79, κ: 0.89, κ: 0.88, and κ: 0.82, respectively).

CONCLUSION: The EPs are successful in the interpretation of the urgent-emergent pathological findings in thoracic and abdominal CT scans.

Keywords:

Abdomen, chest, computed tomography, emergency department, emergency physician, interpretation, thorax

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Introduction

Patients who visit the emergency department (ED) with complaints of dyspnea, chest pain, stomachache, etc., may suffer from life-threatening disorders, such as pulmonary embolism, pneumothorax, aortic dissection, and gastrointestinal perforation. Early and accurate diagnosis of these disorders is crucial for reducing morbidity and mortality rates. Therefore, emergency physicians (EPs) should manage such

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Box-ED section

What is already known on the study topic?

- The use of computed tomography (CT) in emergency departments (EDs) is widespread, as CT is a fast imaging method and expedites ED procedures
- To avoid misinterpretations, the radiologist interpreting the CT scan needs to be familiar with the clinical condition of the patient.

What is the conflict on the issue? Has it important for readers?

- EPs play a critical role in the management of patients. They are primarily responsible for patients from admission to the ED to discharge
- In our study, we aimed to determine the accuracy levels of EPs in identifying pathological findings on the CT scans of patients who were admitted to the ED because of nontraumatic causes and underwent thoracic or abdominal CT imaging.

How is this study structured?

- This was a single-center, prospective cohort study that includes data from approximately 453 patients.

What does this study tell us?

- EPs are generally highly accurate in the diagnosis of the urgent-emergent pathological findings in thoracic and abdominal CT scans.

patients accordingly. Physical examination, laboratory tests, and imaging are the methods used in the ED for the diagnosis of life-threatening diseases. EPs prefer the least invasive methods for diagnosis.[1] X-ray radiography, ultrasonography, computed tomography (CT), and magnetic resonance imaging are frequently used in EDs. The use of CT in EDs is widespread, as CT is a fast imaging method and expedites ED procedures.[1,2] Although CT has become increasingly common, the accurate interpretation of CT requires a high level of knowledge. To avoid misinterpretations, the radiologist interpreting the CT scan needs to be familiar with the clinical condition of the patient. However, this is not often the case. Studies on this issue have concluded that the number of radiologists is limited and that on-call radiologists do not have sufficient clinical information of the patients.[2,3]

EPs play a critical role in the management of patients. They are primarily responsible for patients from admission to the ED to discharge. Moreover, EPs provide the most detailed information on the clinical condition of patients. Therefore, EPs in charge should be able to interpret CT scans and recognize pathologies those are life-threatening and require quick intervention.[3]

In our study, we aimed to evaluate the accuracy levels of EPs in identifying urgent-emergent pathological thoracic (aortic aneurysm or dissection, emphysema, bronchiectasis, bullous lung disease, etc.,) and abdominal (cholecystitis, pancreatitis, liver abscess, splenic infarction, renal infarction, diverticulitis, ileus, etc.,) findings in the CT scans of patients who were admitted to the ED because of nontraumatic causes and underwent thoracic or abdominal CT imaging.

Methods

Study design and setting

This prospective, observational, cross-sectional, single-center study was conducted in the ED of a tertiary hospital between November 2017 and September 2018. The study was approved by Antalya Education and Research Hospital Clinical Research Ethics Committee with the number of 11/02 on June 23, 2017.

Definitions

The participants in the study were eight resident EPs with at least 2 years of experience in the ED. The EPs received theoretical and practical training from an instructor in the radiology department on the interpretation of thoracic and abdominal CT scans. These trainings were given on weekly training day of ED for a total of 8 h for 2 consecutive weeks. The practical training was given for a total of 16 h in 2 days. CT scans of the patients were performed at the CT unit of the ED with a Hitachi® 16-slice CT scanner. Thoracic CT scan angiographies were obtained in patients with suspected pulmonary embolism. Arterial phase imaging was performed in patients with suspected aortic pathologies. In patients with suspected renal stones, abdominal CT scans were unenhanced. Other patients, abdominal CT scans were enhanced using intravenous contrast agents.

Selection of participants

The power analysis was performed using G*Power version 3.1.9.7 (2020) for Windows 10 (Universitat Düsseldorf, Germany), referencing similar studies in the literature. With a power of 0.95 and a Type 1 error rate of 0.05, the sample size was calculated as 147. Patients who were admitted to the ED for nontraumatic reasons during the shifts of the EPs participating in the study, who underwent thoracic or abdominal CT imaging, and who were aged 0–99 were included. Patients who underwent thoracic or abdominal CT scans during the shift of resident EPs were included in the study consecutively. Written informed consent was obtained from each patient or patient representative participating in the study at the time of enrolment. Patients whose thoracic or abdominal CT scans were performed in another health institution and patients who had a CT scan due to trauma were not included in the study.

Data collection

A data collection form consisting of four pages was filled out for each patient included in the study. The first page was the patient consent form. The demographic information, complaints at the time of admission, vital signs, physical examination findings, and clinical outcomes of the patients were recorded on the second page of the form. The third and fourth pages of the form consisted of tables detailing the life-threatening pathologies for each organ according to the interpretation of CT scans. The pathologies of the thoracic organs are listed in Appendix A, while the pathologies of the abdominal organs are listed in Appendix B [Supplementary Materials 1 and 2].

The pathologies of each thoracic and abdominal organ were defined as follows:

- Vascular pathologies: Aortic aneurysm, aortic dissection, pulmonary embolism, pulmonary artery aneurysm, and mesenteric ischemia
- Lung pathologies: Emphysema, bronchiectasis, bullous lung disease, honeycomb lung, pneumonia, pneumothorax, pleural effusion
- Mediastinum pathologies: Pneumomediastinum, hiatal hernia
- Gallbladder pathologies: Gallstones, cholecystitis, cholangitis, and choledocholithiasis
- Pancreas pathologies: Pancreatitis, pancreatic cysts, and pancreatic abscess
- Hepatic pathologies: Hepatic infarction, liver cysts, metastatic liver mass, and liver abscess
- Splenic pathologies: Splenic infarction, splenic rupture, and splenic cysts
- Renal pathologies: Urinary tract stones, hydronephrosis, renal cysts, renal infarction, and renal artery embolism
- Intestinal pathologies: Intestinal hernia, diverticulitis, intestinal wall edema, appendicitis, and ileus
- Gynecological pathologies: Ovarian cysts, ovarian torsion, uterine diseases, and pelvic inflammatory disease.

Study protocol and follow-up evaluation

In CT scans, the collimation slice thickness is 5 mm and 3.75 mm, and the reconstructive slice thickness is planned as 1.25 mm. In addition, 430 field of view, 225 mA/120 kV values were taken in the sections.

The thoracic and abdominal CT scans were initially interpreted by the EPs who were responsible for patient care. Then, the radiology instructor who trained the interpretation of thoracic and abdominal CT scans made final interpretations of these CT scans. The EPs and radiology instructors were blind to each other during the assessment of CT scans.

Statistical analysis

Data were analyzed using the IBM SPSS Statistics program version 22.0 software package (SPSS Inc., Chicago, IL, USA). Based on the interpretation of the radiology instructor, the false-positive rate, false-negative rate, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio, and negative likelihood ratio values and kappa coefficient (κ) of the EPs' interpretations of CT scans were calculated. Concordance was determined according to κ values. A κ value of >0.75 was regarded as perfect concordance, 0.40–0.75 as moderate concordance, and <0.40 as weak concordance.[3] Finally, the interpretation accuracy levels of EPs were compared. For the analysis of demographic data, frequency distribution and the Chi-squared test were used. A $P < 0.05$ was considered statistically significant.

Results

A total of 479 forms were completed for the study. Twenty-three patients were excluded because of CT scans were performed due to trauma, 3 patients were excluded because of CT scans were performed in other centers. 453 patient forms were included in the study. Thoracic CT scan was performed in 268 patients and abdominal CT scan in 185 patients.

Thoracic computed tomography evaluation results

The mean age of the patients who had thoracic CT scans was 61 ± 19 years (min: 19 years, max: 94 years). Among these patients, 160 (60%) were male and 108 (40%) were female. The complaints of the patients in descending frequency were dyspnea 161 (60%), chest pain 69 (26%), overall poor medical condition 31 (12%), and other complaints 7 (2%). The prediagnoses of these patients before thoracic CT imaging were as follows: Pulmonary embolism 122 (45%), pneumonia 66 (25%), aortic dissection 50 (19%), pneumothorax 9 (4%), aortic aneurysm 4 (1%), and other pathologies 17 (6%). Intravenous contrast agents were used in 217 (81%) of the patients. The most common finding on the thoracic CT scans was pleural effusion [Table 1].

In the interpretations of the thoracic CT scans by the EPs, the highest false-positive rate was in the diagnosis of pneumonia (35%), while the highest false-negative rate was in the diagnosis of aortic pathology (17%). There was perfect concordance between the EPs and the radiology instructor regarding the diagnoses of masses (κ: 0.91), pneumothorax (κ: 0.90), pulmonary embolism (κ: 0.87), pleural effusion (κ: 0.85), and lung parenchymal pathology (κ: 0.79). Moderate concordance was observed in the diagnoses of aortic pathology (κ: 0.75), pneumonia (κ: 0.72), pericardial effusion

(κ: 0.71), mediastinum pathology (κ: 0.70), and cystic lesions (κ: 0.70) [Table 1].

The sensitivity of the thoracic CT scan interpretation by the EPs was 90%, specificity was 89%, NPV was 79%, and PPV was 94%. The EPs achieved a sensitivity of 70% or lower when diagnosing pericardial effusion, aortic pathology, and mediastinum pathology [Table 2].

A total of 158 (59%) patients who underwent thoracic CT imaging were discharged from the ED, 63 (23%) were admitted to a ward, 37 (14%) were admitted to the intensive care unit, and 9 (3%) were transferred to another hospital. Among the patients, 268 (76%) were discharged with planned treatment, 34 (13%) were discharged with sequelae, 15 (6%) were discharged after full recovery, and 13 (5%) died.

Abdominal computed tomography evaluation results

The mean age of the patients who had abdominal CT scans was 56 ± 20 years (min: 7, max: 98 years). Among the patients who underwent abdominal CT imaging, 95 (51%) were male and 90 (49%) were female. The complaints of these patients were as follows: Abdominal pain 113 (61%), chest and epigastric pain 38 (20%), overall poor medical condition 17 (9%), vomiting 5 (3%), constipation 4 (2%), and other complaints 8 (4%). The prediagnoses before the abdominal CT scan were as follows: Acute abdomen 72 (40%), aortic dissection 51 (27%), ileus 22 (12%), acute appendicitis 10 (5%), gallstones 10 (5%), aortic aneurysm 4 (2%), mesenteric artery embolism 4 (2%), intraabdominal hemorrhage 4 (2%), gynecological pathology 2 (1%), and other pathologies 6 (4%). Among the patients, 167 (90%) were scanned with contrast.

Table 1: Final diagnoses of patients that underwent thoracic computed tomography and accuracy of emergency physicians

Final diagnosis	*n* (%)	False positive (*n*)	False negative (*n*)	κ
Pneumothorax	6 (2)	0	1	0.90
Pneumonia	60 (22)	21	7	0.72
Pulmonary embolism	28 (10)	7	0	0.87
Cyst	8 (3)	1	3	0.70
Mass	39 (15)	3	3	0.91
Lung parenchymal pathology	21 (8)	1	6	0.79
Pleural effusion	102 (38)	7	11	0.85
Aortic pathology	47 (17)	2	17	0.75
Pericardial effusion	20 (7)	4	6	0.71
Mediastinum pathology	23 (9)	0	10	0.70

κ: Kappa value

Pancreas pathology was detected in the abdominal CT scans of one patient. The false-negative rate was high in the diagnoses of intestinal pathology (28%). There was perfect concordance between the EPs and the radiology instructor regarding the diagnoses of intraabdominal free fluid (κ: 1.00), aortic pathology (κ: 0.96), splenic pathology (κ: 0.96), intraabdominal free gas (κ: 0.92), appendicitis (κ: 0.89), gynecological pathology (κ: 0.88), renal pathology (κ: 0.82), gallbladder pathology (κ: 0.80), and mesenteric artery embolism (κ: 0.79). Moderate concordance was observed in the diagnoses of intestinal pathology (κ: 0.74), hepatic pathology (κ: 0.72), and intraabdominal mass (κ: 0.54) [Table 3].

The specificity, sensitivity, NPV, PPV, and area under the curve values of the interpretation of the abdominal CT scans by the EPs are presented in Table 4. In the EPs' interpretation of the abdominal CT scans, sensitivity, specificity, NPV, and PPV were 88%, 86%, 72%, and 94%, respectively. When diagnosing splenic pathology, hepatic pathology, gynecological pathology, mesenteric artery embolism, intraabdominal mass and intestinal pathology, the EPs achieved sensitivity values of 80% or lower [Table 4].

Among the patients who underwent abdominal CT imaging, 100 (54%) were discharged from the ED, 63 (34%) were admitted to a hospital ward, 19 (10%)

Table 2: Accuracy of emergency physicians' interpretation of thoracic computed tomography scans

CT finding	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	PLR	NLR	AUC	95% CI
Whole thorax	90	89	94	79	8	0.11	0.89	0.849-0.943
Pneumothorax	83	100	100	99	83	0.17	0.91	0.740-1.000
Pneumonia	88	90	71	96	9	0.13	0.89	0.838-0.944
Pulmonary embolism	100	97	80	100	34	0.001	0.98	0.973-0.998
Cyst	63	100	93	98	63	37	0.81	0.602-1.000
Mass	92	99	92	98	92	0.08	0.95	0.906-1.000
Lung parenchymal pathology	71	99	94	98	71	0.014	0.85	0.738-0.973
Pleural effusion	89	96	92	93	21	0.11	0.92	0.886-0.964
Aortic pathology	66	99	96	97	66	0.34	0.82	0.843-0.912
Pericardial effusion	70	98	78	97	44	30	0.84	0.720-0.964
Mediastinum pathology	56	100	100	96	56	0.44	0.78	0.654-0.911

PPV: Positive predictive value, NPV: Negative predictive value, PLR: Positive likelihood ratio, NLR: Negative likelihood ratio, AUC: Area under the curve, CI: Confidence interval, CT: Computed tomography

were admitted to the intensive care unit, and 3 (2%) were transferred to another hospital. Among the patients, 144 (78%) were discharged with planned treatment, 10 (5%) were discharged with sequelae, 23 (12%) were discharged after full recovery, and 8 (4%) died.

There was no difference between the thorax (p: 0.270) and abdominal (p: 0.995) CT interpretation abilities of EPs [Table 5].

Discussion

In this study, in patients who underwent thoracic or abdominal CT scan in the ED; the accuracy levels of the EPs managing the patient in the interpretation of the urgent-emergent pathological findings in the CT scan was evaluated. When all of the thorax pathologies were evaluated together; the sensitivity and specificity of EPs were found out to be 90% and 89%, respectively. In terms of particular pathologies, perfect concordance was found between the EPs and the radiology instructor in the diagnoses of pneumothorax, pulmonary embolism, pleural effusion, parenchymal pathology, and masses. Moreover, the sensitivity values in the diagnosis of these pathologies were >80%. Conversely, moderate concordance was achieved in the diagnoses of aortic pathology, pericardial effusion, pneumonia, cysts, and mediastinum pathology. The sensitivity values in the diagnoses of aortic pathology, pericardial effusion, and mediastinum pathology were 70% or lower.

When all of the abdominal pathologies were evaluated together; the sensitivity and specificity of EPs were found out to be 88% and 86%, respectively. In terms of particular pathologies, perfect concordance was found between the EPs and the radiology instructor in the diagnoses of aortic pathology, appendicitis, intraabdominal free gas, and intraabdominal free fluid. Moreover, the sensitivity values in the diagnosis of these pathologies were above 90%. Conversely, moderate concordance was achieved in the diagnoses of intraabdominal mass, hepatic, and intestinal pathologies. In addition, the sensitivity values in the splenic pathology, hepatic and intestinal pathologies, gynecologic pathology, intraabdominal mass, and mesenteric artery embolism were 80% or lower. According to these findings, it was concluded that the interpretation errors of EPs were in rarer diseases.

Interpretation errors have been investigated in many studies.[4-8] Studies investigating the inconsistencies in the CT evaluation of consulting radiologists found that such rates varied between 1.2% and 10%.[4-6] The most common misinterpretations were found to be in blood clots (13.8%) (e.g., pulmonary embolism and deep vein thrombosis), colitis (8.3%), misplaced tubes and other devices (6.9%), and pyelonephritis (5.5%).[4] In a study involving patients with nontraumatic abdominal pain, the discrepancy rates of emergency medicine and

Table 3: Final diagnoses of patients that underwent abdominal computed tomography and accuracy of emergency physicians

Final Diagnosis	*n* (%)	False positive (*n*)	False negative (*n*)	κ
Intraabdominal free fluid	6 (3)	0	0	1.00
Intraabdominal free gas	39 (21)	3	2	0.92
Intraabdominal mass	12 (6)	3	6	0.54
Aortic pathology	13 (7)	1	0	0.96
Splenic pathology	5 (2)	0	1	0.88
Hepatic pathology	11 (6)	1	4	0.72
Gallbladder pathology	23 (12)	4	4	0.80
Mesenteric artery embolism	3 (2)	0	1	0.79
Intestinal pathology	36 (19)	4	10	0.74
Appendicitis	10 (5)	1	1	0.89
Renal pathology	41 (22)	3	8	0.82
Gynecological pathology	15 (8)	0	3	0.88

κ: Kappa value

Table 4: Accuracy of emergency physicians' interpretation of abdominal computed tomography scans

CT finding	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	PLR	NLR	AUC	95% CI
Whole abdomen	88	86	94	72	6.2	0.13	0.87	0.805-0.935
Intraabdominal free fluid	95	98	92	98	45	0.05	0.96	0.922-1.000
Intraabdominal free gas	100	100	100	100	100	0.001	1.00	1.000-1.000
Intraabdominal mass	50	98	66	96	25	0.51	0.74	0.558-0.925
Aortic pathology	100	99	92	100	100	0.001	0.99	0.990-1.000
Splenic pathology	80	100	100	99	80	0.20	0.90	0.691-1.000
Hepatic pathology	63	99	87	97	63	0.37	0.81	0.639-0.991
Gallbladder pathology	83	97	82	97	33	0.18	0.90	0.808-0.993
Mesenteric artery embolism	66	100	100	99	66	0.33	0.83	0.506-1.000
Intestinal pathology	77	97	86	93	26	0.34	0.84	0.758-0.938
Appendicitis	90	99	90	99	90	0.10	0.94	0.838-1.000
Renal pathology	83	97	89	95	20	0.18	0.90	0.831-0.971
Gynecological pathology	80	100	100	98	80	0.20	0.90	0.779-1.000

PPV: Positive predictive value, NPV: Negative predictive value, PLR: Positive likelihood ratio, NLR: Negative likelihood ratio, AUC: Area under the curve, CI: Confidence interval, CT: Computed tomography

Table 5: Interpretation accuracy levels of emergency physicians

Interpreter	First EP	Second EP	Third EP	Fourth EP	Fifth EP	Sixth EP	Seventh EP	Eighth EP
Abdominal CTs (κ)	0.642	0.642	0.635	0.773	0.725	0.516	0.792	0.727
Thorax CTs (κ)	0.920	0.928	0.763	0.772	0.745	0.604	0.667	0.658

CTs: Computerized tomography scans, κ: Kappa value, EP: Emergency physician

radiology residents in CT interpretation compared with the final reports of radiologists were found to be 16.7% and 12.2%, respectively. The same study concluded that the discrepancy rates of EPs were high in terms of the pathologies of female genital organs, peritoneum, adrenal glands, and musculoskeletal system, which could be explained by the fact that these organs are difficult to interpret in general.[9] A study investigating the accuracy ratios of evaluation of thoracic CT scans showed that EPs diagnosed spontaneous pneumothorax and aortic pathologies with 100% sensitivity and pulmonary embolism with 74.1% sensitivity.[10] In a study that compared thoracic radiologists with radiology residents and EPs with regard to the diagnosis of pulmonary embolism, high levels of agreement were found between the thoracic radiologists and radiology residents, whereas moderate levels of agreement were found between the thoracic radiologists and EPs.[7] Another study assessing the accuracy of CT scan interpretation in trauma patients found that EPs achieved 100% sensitivity in the diagnosis of pneumothorax and 94% sensitivity in the diagnosis of hemothorax.[3] In another study evaluating the accuracy of EPs when interpreting abdominopelvic CT scans, the κ value was found to be 0.77.[11]

In parallel with the increase in the numbers of ED visits, the number of performed imaging method has also increased.[12] CT imaging is widely used in EDs, as it facilitates differential diagnosis and is considered the gold standard in various disorders.[10-12] A quick and accurate interpretation of CT scans is crucial for treatment decisions, especially in emergencies. Interpretation of CT scans can sometimes be complicated. In this situation, joint interpretation of the CT scan by the radiologist and clinician may make the recognition of significant abnormalities relatively easy. Clinicians' interpretation of imaging results allows radiologists to provide more careful and urgent reports, enables early referral to other medical specialties, and accelerates the necessary emergency surgery.[13]

Conclusion

When interpreting thoracic CT scans, EPs are highly accurate in the diagnoses of pneumothorax, pulmonary embolism, pleural effusion, lung parenchymal pathology, and masses and moderately accurate in the diagnoses of aortic pathology, pericardial effusion, pneumonia, cysts, and mediastinum pathology. In terms of interpreting abdominal CT scans, EPs are highly accurate in the diagnoses of intraabdominal free gas and free fluid, aortic pathology, and appendicitis and moderately competent in the diagnoses of mesenteric artery embolism, abdominal mass, splenic pathology, hepatic and intestinal pathologies, and gynecological pathology. The moderate accuracy of EPs may be improved through longer periods of training.

Limitations

The limitations of our study include the small number of trained EPs and the cross-sectional sampling of the study patients. Longer and more detailed training programs may improve the accuracy of EPs.

Author contributions statement

Karakoyun OF: conceptualization (equal), data curation (equal), investigation (equal), methodology (equal), project administration (equal), resources (equal), supervision (equal), validation (equal), visualization (equal), writing-original draft (equal) and writing-review and editing (equal); Kozaci N: conceptualization (lead), data curation (equal), formal analysis (lead), investigation (lead), methodology (lead), project administration (lead), resources (lead), software (lead), supervision (lead), validation (equal), visualization (lead), writing-original draft (equal) and writing-review and editing (equal); Avci M: conceptualization (equal), data curation (equal), investigation (equal), methodology (equal), project administration (equal), resources (equal), supervision (equal), validation (equal), visualization (equal), writing-original draft (equal) and writing-review and editing (equal); Uzunay H: data curation, editing, investigation.

Conflicts of interest

None Declared.

Ethical approval

This study was initiated in the emergency department of Antalya Education and Research Hospital following the hospital's own ethics committee approval (No: 11/02 Date: 23.06.2017).

Consent to participate

Verbal and written consent was obtained from all participants.

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Supplementary Materials 1 (Appendix A): Thoracic computed tomography scan findings

Pathological finding	Present	Absent
Pneumothorax		
Pleural effusion:		
Pneumonia:		
Pulmonary embolism		
Aortic pathology:		
Lung parenchymal pathology		
Pericardial effusion		
Thoracic mass:		
Thoracic cyst:		
Mediastinium pathology:		
Other (……)		

Supplementary Materials 2 (Appendix B): Abdominal computed tomography scan findings

Pathological finding	Present	Absent
Gallbladder pathology:		
Pancreas pathology:		
Hepatic pathology:		
Splenic pathology:		
Abdominal aortic pathology:		
Mesenteric artery embolism:		
Renal pathology:		
Gynecologial pathology:		
Acute appendicitis:		
Intestinal pathology:		
Free abdominal fluid:		
Free abdominal gas:		
Intraabdominal mass:		
Other (……)		