

## ORIGINAL PAPER

**THE ROLE OF IMAGISTIC INVESTIGATIONS IN DIAGNOSING ACUTE COMPLICATED DIVERTICULITIS****I. Tănase<sup>1</sup>, S. Păun<sup>1,2</sup>, B. Stoica<sup>1</sup>, I. Negoi<sup>1,2</sup>, M. Beuran<sup>1,2</sup>**<sup>1</sup>The Emergency Hospital of Bucharest, Romania<sup>2</sup>The University of Medicine and Pharmacy "Carol Davila" Bucharest, Romania

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**Abstract**

*Recent progress in medical imaging allowed higher accuracy in diagnosis of acute diverticulitis. Contrast enhanced Computed Tomography (CT) has a high sensitivity and specificity, reaching a diagnostic accuracy over 95%. Although abdominal X-ray and ultrasonography are still used, their utility is limited in this pathology. Retrospective study including patients admitted for acute diverticulitis in the Surgery Clinic of Bucharest Clinical Emergency Hospital between January 2012 and July 2014. From the total number of 29508 admissions, 156 patients were diagnosed with acute diverticulitis staged Hinchey I to IV. The imagistic investigations on admission were plain abdominal X-ray (128 cases), which identified 6 cases of pneumoperitoneum; abdominal ultrasound (112 cases) which identified colonic wall thickening and/or free peritoneal fluid in 29.4% cases. Contrast enhanced CT was performed in 97 cases, successfully establishing the diagnosis in 80% of cases. The mean waiting time interval until CT scan was under 24 hours for the patients with acute complicated diverticulitis. Patients with acute diverticulitis staged Hinchey II-III needed CT reevaluation both for monitoring the response to conservative treatment and identification of postoperative complications. Due to its high diagnostic accuracy and short waiting interval, in the studied cohort, contrast enhanced CT represents the investigation of choice in diagnosing acute diverticulitis. Abdominal ultrasound remains an alternative only in cases where CT scan is unavailable or contraindicated, having a lower accuracy in diagnosis and evaluation of diverticular disease complications*

**Keywords:** *diverticulitis, complications, imagistics, ultrasound, computed tomography***Introduction**

Although the pathogenesis of diverticular disease is not fully understood, fiber deficiency, a diet rich in refined sugars and sedentarism are associated with a higher incidence disease [1,2]. Conservative treatment of acute diverticulitis is successful in the majority of cases, but complicated cases often require immediate surgical treatment. Due to the lack of specificity

of presenting symptoms, imagistic investigations are the key for diagnosing the complicated diverticular disease.

The plain abdominal X-ray is a mandatory investigation for the patients with intense abdominal pain [3], pneumoperitoneum being present in almost 12% of the patients with acute diverticulitis [4]. Unspecific modifications like enteral or colonic distension, or the presence of air-fluid levels being present in almost half of

the patients [4]. The abdominal contrast enhanced CT is the recommended investigation both for diagnosis and establishing the extension and severity of the disease. The presence of diverticula with colonic wall thickening and pericolic fat stranding, the presence of abscesses, pericolic phlegmon, generalized peritonitis or free peritoneal gas on CT, sustain the diagnosis of acute diverticulitis [5]. The sensibility and specificity of the investigation reach 70-97% and 75-100%, [6–9] being significantly improved by the presence of both oral and intravenous contrast [10]. Some prospective studies also report an improving accuracy of the abdominal ultrasonography reaching sensibility and specificity over 95%.

## Material and methods

Retrospective study including patients admitted for acute diverticulitis in the Surgery Clinic of Bucharest Clinical Emergency Hospital between January 2012 and July 2014. Selection criteria included (1) acute diverticulitis, (2) operative or nonoperative management. We collected the following data: demographics, imagistic findings, in-hospital course. Categorical variables were compared by the Chi-square test and continuous variables by the Independent Samples T test or Oneway ANOVA. A level of  $p < 0.05$  was used to declare statistical significance. For statistical analysis we used IBM SPSS Statistics 20 software.

## Results

From the total number of 29508 admissions, 156 (0.52% from all the admissions) patients were diagnosed with acute diverticulitis staged Hinchey I-IV. The male:female distribution was 1:1.8, with a mean age of 63.37. The imagistic investigations at admission were the plain abdominal X-Ray (128 cases) and abdominal ultrasonography (112 cases). Pneumoperitoneum was identified on abdominal X-ray in 6 patients that required emergency surgery. Air-fluid levels and colonic distension were identified in 19 and respectively 10 cases while

the majority of patients showed no modification on abdominal X-ray (Figure 1).

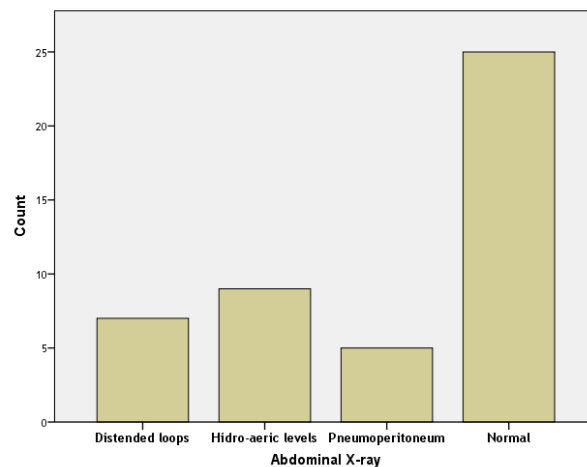


Figure 1 - Abdominal X-ray findings

Abdominal ultrasonography identified colonic wall thickening and/or localized peritoneal fluid in 29.4% of the cases, but with a high percentage of false negatives (50% and respectively 33%). Other non-specific findings like colonic aeric distension or free peritoneal fluid were found in 13 and respectively 12 cases. No ultrasound abdominal viscera modifications that would suggest this pathology were encountered in 53 patients (Figure 2).

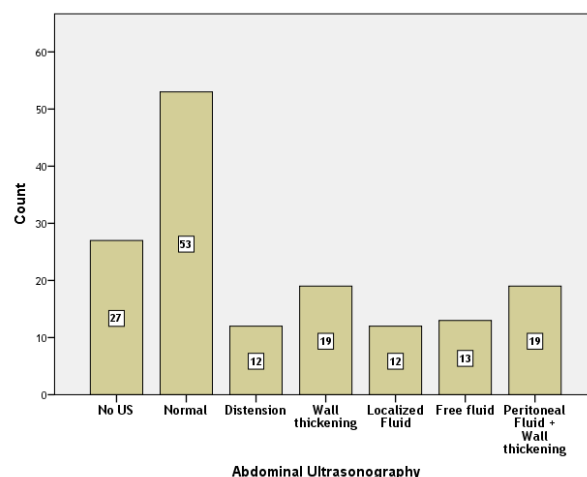


Figure 2 - Abdominal ultrasonographic findings

Contrast enhanced Computed Tomography was performed during the hospitalization in 97 cases establishing the diagnosis in 80% of the cases. The mean time until the CT was performed was under 24 hours in the analyzed group. Highly suggestive modifications like

colonic wall thickening and pericolic phlegmon or fat stranding, or the presence of peridiverticular abscesses were identified in 63 patients, while the rest had non specific modifications. 25% of the admitted patients required surgical intervention, while the rest received non-operative treatment (Figure 3).

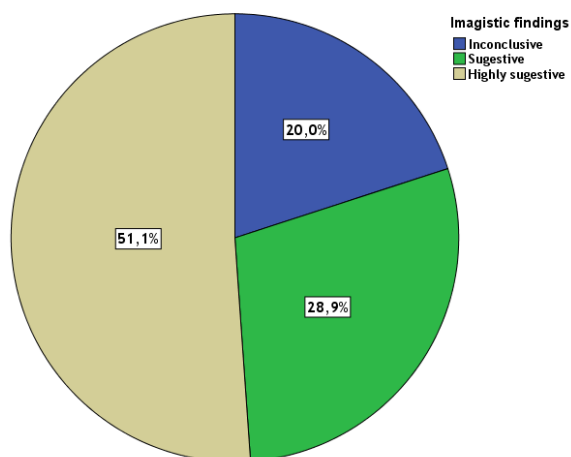


Figure 3 - Accuracy of CT examination

In 10 of these cases, the surgery followed the failure of conservative treatment, prolonging in this way the mean hospital stay to 25.9 days, compared to 13.1 days for the patients that were operated as first choice treatment. Presence of intraperitoneal abscesses identified on abdominal ultrasonography or CT scan, represented the main cause of failure of the conservative treatment. In 2 cases the diagnosis was established intraoperatively.

A total of 18 patients with acute diverticulitis staged Hinchey II and III needed tomographic reevaluation for a proper assessment of the response to medical treatment or for the identification of postoperative complications.

## Discussion

Although CT scan represents the „gold standard” in diagnosing acute diverticulitis, some authors recommend a step-up approach which increases the sensitivity imaging investigations, and decreases unnecessary exposure to ionizing radiation [12,13]. Due to certain imagistic similarities between acute diverticulitis and colonic neoplasia a colonoscopic examination is recommended,

after the inflammatory process has been resolved [14].

Even though we don't have experience with imagistic guided abscess drainage in this pathology, some authors recommend ultrasound or CT guided percutaneous drainage with a high success rate of up to 80 % [15–18] for simple uniloculated abscesses.

The increasing incidence of colonic diverticular disease and its complications in Romania [11] makes the usage of a specific imagistic diagnosis guideline mandatory.

## Conclusion

Contrast enhanced CT represents the investigation of choice in diagnosing acute diverticulitis; due to its high diagnostic accuracy it can be used both for diagnosis and patient reevaluation in order to properly assess the response to treatment. Abdominal ultrasound remains an alternative only in cases where CT scan is unavailable or contraindicated, having a lower accuracy in diagnosis and evaluation of diverticular disease complications.

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