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# PREVALENCE AND CLINICAL IMPLICATIONS OF INCIDENTALLY DETECTED HIATAL HERNIA ON CHEST COMPUTED TOMOGRAPHY

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**Abstract**

**Background:** Hiatal hernia is a common but often underrecognized condition, and although computed tomography (CT) enables reliable detection, data on CT-based prevalence and diagnostic agreement remain limited.

**Aim:** To determine the CT-based prevalence of hiatal hernia, describe demographic characteristics, hernia size distribution and associated symptoms, and assess interobserver agreement.

**Materials and Methods:** This retrospective study analyzed 1,045 chest CT examinations performed over a 6-month period August-January 2026 at University clinic of Pulmonology and Allergology, Skopje using PHILIPS INCISIVE 128 slice scanner optimized for thoracic imaging. Hiatal hernia prevalence was calculated based on CT findings. Demographic data, hernia size, and associated symptoms were analyzed in patients with hiatal hernia. Interobserver agreement was evaluated in a randomly selected subset of 267 CT examinations independently reviewed by two radiologists using Cohen's kappa (κ) with 95% confidence intervals (CI).

**Results:** Hiatal hernia was identified in 119 of 1,045 CT examinations, yielding a prevalence of 11.4%. The mean age of affected patients was 66.3 years (range: 31–84 years), with female predominance (73.1%). Small hiatal hernias were most frequent (81.5%), followed by medium (11.8%) and large (6.7%) hernias. Chronic obstructive pulmonary disease was present in 21.0% of patients. Interobserver agreement for CT detection of hiatal hernia was substantial (κ = 0.74; 95% CI: 0.59–0.90).

**Conclusion:** Hiatal hernia is a relatively common incidental finding on chest CT, predominantly affecting older female patients, with small hernias being most frequent, while CT demonstrates substantial interobserver agreement, supporting its reliability in detection.

***Key words:*** hiatal hernia, HRCT, incidental chest findings

## Introduction

Hiatal hernia is a common anatomical abnormality characterized by herniation of abdominal contents through the esophageal hiatus of the diaphragm. Its occurrence increases with age and is influenced by structural weakening of connective tissue, altered collagen metabolism, and increased intra-abdominal pressure [1–3]. Hiatal hernia may be asymptomatic or associated with a wide spectrum of gastrointestinal and respiratory symptoms, and it is frequently detected incidentally on imaging studies.

Several risk factors have been associated with hiatal hernia development, including advanced age, female sex, obesity, smoking, and chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) [4–7]. Chronic cough and repeated elevations of intra-abdominal pressure are believed to contribute to progressive widening of the esophageal hiatus and hernia formation [6,8].

Computed tomography (CT) has emerged as a reliable imaging modality for the detection of hiatal hernia, offering high spatial resolution and the ability to identify both symptomatic and asymptomatic cases [9,10]. CT-based studies have reported higher prevalence rates compared with clinically diagnosed hernias, underscoring the importance of imaging in assessing the true disease burden [11]. However, data on CT-based prevalence, hernia size distribution, associated symptoms, and interobserver agreement remain limited in certain populations.

## Aim of the study

The aim of this study was to determine the CT-based prevalence of hiatal hernia, analyze demographic characteristics, hernia size distribution, and associated symptoms, and assess interobserver agreement between radiologists using Cohen's kappa statistic.

**Materials and methods**

Study Design and Population

This retrospective descriptive study analyzed 1,045 chest CT examinations performed over a 6-month period from August-January 2026 at University clinic of Pulmonology and Allergology, Skopje using PHILIPS INCISIVE 128 slice scanner optimized for thoracic imaging. Among these examinations, 119 patients were diagnosed with hiatal hernia and included in the detailed clinical analysis.

**Data Collection**

The following variables were collected:

- Age (years)
- Gender (female or male)
- Hiatal hernia size, classified as:
  - Small
  - Medium
  - Large
- Associated symptoms and comorbid conditions
- Prevalence Assessment

CT-based prevalence of hiatal hernia was calculated as the proportion of CT examinations demonstrating hiatal hernia relative to the total number of CT scans performed during the study period.

**Interobserver Agreement**

For assessment of interobserver agreement, 267 CT examinations were randomly selected. Two radiologists independently evaluated each scan for the presence or absence of hiatal hernia. Interobserver agreement was assessed using Cohen's kappa (κ) statistic, with calculation of 95% confidence intervals (CI).

**Statistical Analysis**

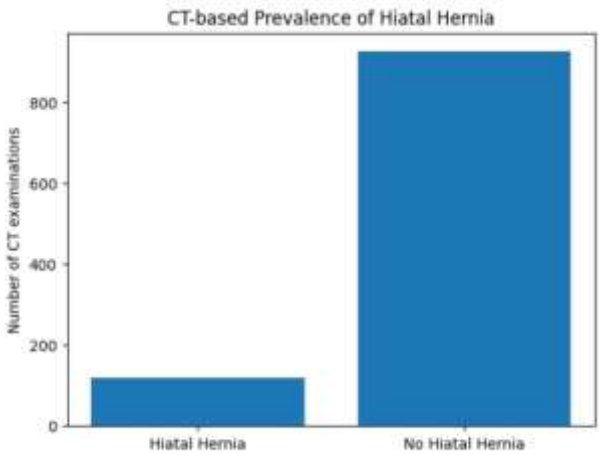
Age was analyzed as a continuous variable and presented as mean, median, and range. Categorical variables were summarized using frequencies and percentages. Descriptive statistical analysis was performed using standard statistical methods.

**Results**

Prevalence of Hiatal Hernia

Out of 1,045 CT examinations, 119 cases of hiatal hernia were identified, yielding a CT-based prevalence of 11.4%.

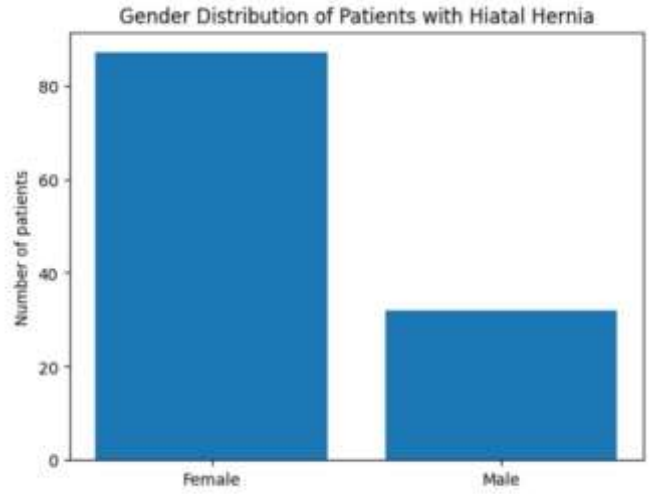
**Figure 1.** CT -based prevalence of hiatal hernia



**Demographic Characteristics**

The mean age of patients with hiatal hernia was 66.3 years (median: 67; range: 31–84 years). Female patients accounted for 73.1% (n = 87) of cases, while 26.9% (n = 32) were male. The mean age was 65.6 years in females and 68.3 years in males.

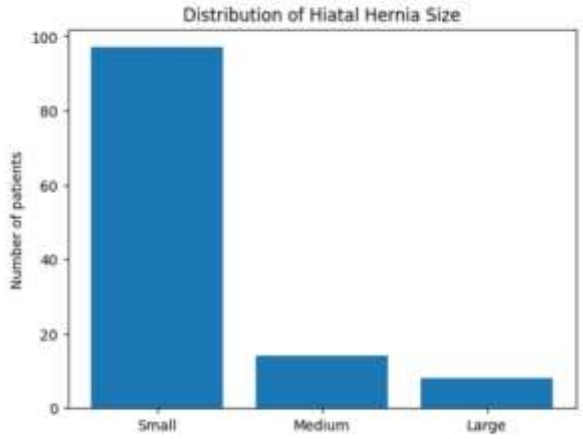
**Figure 2.** Gender distrubution of patients with hiatal hernia




**Hernia Size Distribution**

Small hiatal hernias were the most common finding, present in 97 patients (81.5%). Medium-sized hernias were observed in 14 patients (11.8%), while 8 patients (6.7%) had large hiatal hernias.

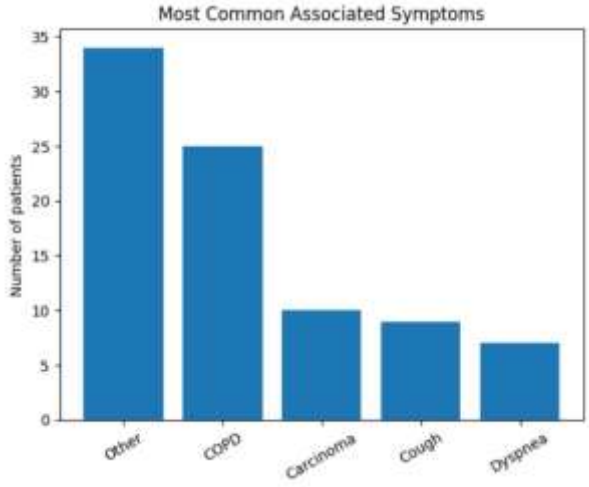
**Figure 3.** Distribution of hiatal hernia size




**Symptom Distribution**

The most frequent clinical presentation was categorized as other symptoms (28.6%). COPD was present in 21.0% of patients. Carcinoma-related conditions were observed in 8.4% of cases. Respiratory symptoms such as cough and dyspnea were present in 7.6% and 5.9%, respectively. Less frequent conditions included asthma, infection, pleural effusion, hemoptysis, embolism, and sarcoidosis.

**Figure 4.** Most common associated symptoms.




**Interobserver Agreement**

Radiologist 1 identified hiatal hernia in 16 of 267 CT examinations, while Radiologist 2 identified 26 cases. Both radiologists identified hiatal hernia in 16 cases.

Interobserver agreement was substantial, with a Cohen's κ value of 0.74 and a 95% confidence interval of 0.59–0.90.

**Discussion**

This study demonstrates that hiatal hernia is a frequent finding on CT imaging, with a prevalence of 11.4% among patients undergoing CT examinations. This prevalence is consistent with previously reported CT-based studies, which describe rates ranging from 10% to 20%, depending on patient population and imaging criteria [9–11].

The predominance of elderly patients supports the concept that age-related connective tissue degeneration and diaphragmatic weakening play a central role in hiatal hernia development [2,3]. The marked female predominance observed in this cohort contrasts with some earlier reports describing male predominance, particularly in inguinal hernias, and may reflect differences in hernia type, referral patterns, or population characteristics [4,12].

A key finding is the high proportion of small hiatal hernias, suggesting early detection and a substantial number of asymptomatic or minimally symptomatic cases. This underscores the value of CT imaging in identifying early-stage disease that may otherwise remain undiagnosed [10].

Respiratory comorbidities were common, particularly COPD and chronic cough, supporting prior evidence that repeated increases in intra-abdominal and intrathoracic pressure contribute to hernia formation and progression [6–8,13]. The association between hiatal hernia and malignancy-related conditions may reflect indirect mechanisms such as malnutrition, muscle wasting, or prior surgical interventions [14].

Importantly, this study demonstrated substantial interobserver agreement for CT-based detection of hiatal hernia ($\kappa = 0.74$), with a narrow confidence interval, confirming the reliability and reproducibility of CT imaging. Although one radiologist identified more cases than the other, agreement remained high, emphasizing the importance of standardized diagnostic criteria and radiologist experience [15–17].

The findings should be interpreted in light of the study's retrospective design and CT-based population, which may not reflect prevalence in the general population. Nevertheless, CT-based prevalence provides valuable insight into the true burden of hiatal hernia in clinical practice.

**Conclusion**

Hiatal hernia was identified in 11.4% of CT examinations over a 6-month period, indicating a high imaging-based prevalence. Affected patients were predominantly elderly and female, with small hiatal hernias representing the majority of cases.

Respiratory comorbidities, particularly COPD, were frequently associated. CT demonstrated substantial interobserver agreement, confirming its reliability for hiatal hernia detection. These findings highlight the importance of CT imaging in both epidemiological assessment and clinical evaluation of hiatal hernia.

**References**

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