

Chest High-resolution Computed Tomography Findings in 601 Patients with Inflammatory Bowel Diseases

Haruka Sato, MD, Fumito Okada, MD, Shunro Matsumoto, MD, Akira Sonoda, MD, Kazunari Murakami, MD, Tetsuya Ishida, MD, Hajime Takaki, MD, Masaki Wakisaka, MD, Kouhei Tokuyama, MD, Ryuichi Shimada, MD, Hiromu Mori, MD

Rationale and Objectives: Pulmonary involvement in inflammatory bowel disease may reflect the common embryonic origin of the gastrointestinal tract and the bronchial tree. No studies have compared pulmonary high-resolution computed tomography (HRCT) findings between ulcerative colitis (UC) and Crohn disease (CD). This study aimed to assess the relationship between pulmonary HRCT findings and inflammatory bowel disease activity and to compare HRCT findings between UC and CD.

Materials and Methods: We retrospectively identified 601 consecutive patients (350 with UC and 251 with CD) who had undergone chest HRCT examinations at our institutions between April 2004 and April 2016. Parenchymal abnormalities, enlarged lymph nodes, and pleural effusion were evaluated on HRCT.

Results: One hundred sixty-seven patients (94 men, 73 women; aged 12–86 years, mean: 47.2 years) with UC and 93 patients (61 men, 32 women; aged 12–71 years, mean: 37.9 years) with CD had abnormal findings on chest HRCT. The HRCT findings of UC and CD mainly consisted of centrilobular nodules (in 49.1% and 45.2% of cases, respectively) and bronchial wall thickening (in 31.7% and 54.8%, respectively). There was no relationship between HRCT findings and disease activity. Bronchial wall thickening was significantly more frequent in patients with CD than in those with UC ($P < .001$).

Conclusion: The main chest HRCT findings in UC and CD are centrilobular nodules and bronchial wall thickening. There are differences in HRCT findings between UC and CD.

Key Words: High-resolution computed tomography; inflammatory bowel disease; ulcerative colitis; Crohn disease; chest.

© 2017 The Association of University Radiologists. Published by Elsevier Inc. All rights reserved.

INTRODUCTION

The inflammatory bowel diseases (IBDs) (Crohn disease [CD] and ulcerative colitis [UC]) are widely recognized disorders of the gastrointestinal tract that may have a variety of extraintestinal manifestations. These manifestations include pyoderma gangrenosum, erythema nodosum, arthritis, uveitis, and various types of pulmonary disease (1). Colonic and respiratory epithelia share an embryonic origin from the primitive foregut. Unexplained bronchopulmonary disease was first reported in six patients with IBD in 1976

(2). Pulmonary involvement in IBD has since been recognized with increasing frequency in the literature.

There have been several reports of pulmonary computed tomography (CT) findings in patients with IBD. However, only nine English-language studies have used high-resolution CT (HRCT) to evaluate these findings. Tunc et al. investigated associations between chest HRCT findings and IBD activity in 52 patients with IBD (3). They found that 50% of patients with UC and 60% of patients with CD had abnormal chest HRCT findings and that these abnormalities were not significantly different between UC and CD. Yilmaz et al. reported that IBD activity was not correlated with chest HRCT findings in 39 patients (4).

No other reports have documented the relationship between IBD activity and chest HRCT findings. Furthermore, to the best of our knowledge, no other studies have compared chest HRCT findings in patients with UC to those with CD.

Therefore, this study aimed to assess the relationship between pulmonary HRCT findings and IBD activity and to compare HRCT findings between UC and CD.

Acad Radiol 2017; ■■■■■■

From the Department of Radiology, Oita University Faculty of Medicine, 1-1 Idaigaoka, Hasama-machi, Yufu (H.S., F.O., S.M., K.T., R.S., H.M.); Department of Gastroenterology, Oita University Faculty of Medicine, Yufu, Oita, Japan (A.S., K.M.); Department of Gastroenterology, Oita Red Cross Hospital (T.I.); Department of Radiology, Oita Red Cross Hospital (H.T.); Department of Radiology, Arita Gastrointestinal Hospital (M.W.). Received July 12, 2017; revised September 20, 2017; accepted October 9, 2017. **Address correspondence to:** F. Okada e-mail: fumitook@oita-u.ac.jp

© 2017 The Association of University Radiologists. Published by Elsevier Inc. All rights reserved.
<https://doi.org/10.1016/j.acra.2017.10.010>

MATERIALS AND METHODS

Patients

Our institutional review board approved this study and waived the requirement for informed consent because of the study's retrospective design.

From the patient populations at our institutions, we retrospectively identified 603 consecutive patients with IBD (351 with UC and 252 with CD) who had undergone chest HRCT examinations between April 2004 and April 2016. The chest HRCT examinations were performed to detect latent tuberculosis infection, active infection, or malignant disease. Two patients were subsequently excluded, including one patient with UC who was diagnosed with *Streptococcus pneumoniae* pneumonia and one with CD who was diagnosed with old tuberculosis on the basis of serological tests and clinical findings. Therefore, the study group finally comprised 601 patients (350 with UC and 251 with CD). No patients in our study had a history of colectomy.

All of the patients had an established diagnosis of UC or CD, based on history, clinical and endoscopic findings, and pathologic findings. Clinical activity in patients with UC was assessed according to the Guidelines for the Management of Ulcerative Colitis in Japan, which are a modification of True-love and Witts' criteria. Clinical activity in patients with CD was assessed according to the International Organization of the Study of Inflammatory Bowel Disease assessment score. Activity was classified into three groups: mild (score = 0–1), moderate (score = 2–6), and severe (score = 7–10).

Fifty-one patients (8.5%) presented with respiratory symptoms, including cough (in 20 with UC and 17 with CD), breathlessness (in three with UC and two with CD), and both of these symptoms (in five with UC and four with CD). No patients with either disease presented with productive cough or chest pain.

CT Examinations

HRCT examinations were performed with a variety of scanners. These examinations were performed volumetrically with a multidetector CT scanner with 1-mm reconstruction from the apex of the lung to the diaphragm. The scans were obtained with the patient in the supine position at full inspiration. Images were captured at window settings that allowed viewing of the lung parenchyma (window level, –600 HU; window width, 1500 HU) and the mediastinum (window level, 30 HU; window width, 300 HU).

CT Image Interpretation

The first chest CT scan performed after the diagnosis of UC or CD was assessed. Two chest radiologists, who were unaware of the underlying diagnoses, retrospectively and independently interpreted the CT scans. Conclusions were reached by consensus.

CT images were evaluated for the presence and extent of abnormalities, including ground-glass opacity (GGO), consolidation, bronchial wall thickening, centrilobular nodules, crazy-paving appearance, nodules, bronchiectasis, interlobular septal thickening, cysts, and lymph node enlargement. Additionally, the CT diagnostic pattern was assessed, including nonspecific interstitial pneumonia (NSIP), organizing pneumonia, usual interstitial pneumonia (UIP), and indeterminate pattern, according to the criteria of the American Thoracic Society/European Respiratory Society IIP classification (5,6). The presence or absence of pleural effusion was also recorded. The combination of abnormalities was assessed. Radiologic features were defined according to the Glossary of Terms established by the Fleischner Society (7).

The distribution of parenchymal disease was also noted. We assessed whether abnormal findings were located unilaterally or bilaterally. If the main abnormality was predominantly located in the inner third of the lungs, the disease was classified as centrally distributed. If the main abnormality was predominantly located in the outer third of the lungs, the disease was classified as peripherally distributed. If the abnormality showed no predominant distribution, the disease was classified as randomly distributed. Additionally, zonal predominance was classified as upper, lower, or random. Upper-lung zone predominance indicated that most abnormalities were observed at a level above the tracheal carina, whereas lower-zone predominance indicated that most abnormalities were located below the upper zone. When abnormalities showed no clear zonal predominance, the lung disease was classified as randomly distributed.

Statistical Analysis

Statistical analysis of the frequency of symptoms and CT findings was conducted with Fisher exact test and the chi-square test. Comparison of mean age was conducted with Student *t* test.

RESULTS

Patients' Characteristics

Chest HRCT scans showed abnormalities in 167 of the 350 patients with UC (47.7%; 94 men, 73 women; aged 12–86 years, mean: 47.2 years) and in 93 of the 251 patients with CD (37.1%; 61 men, 32 women; aged 12–71 years, mean: 37.9 years) (Table 1). At the time of CT examination, none of the patients were diagnosed with infectious disease according to serological tests and clinical findings. Additionally, no patients had positive antinuclear antibody or positive human T-lymphotropic virus type 1 antibody, human immunodeficiency virus, or malignant disease.

There was one current smoker and 11 ex-smokers among the patients with UC and one current smoker and nine ex-smokers among the patients with CD (Table 1). Twenty-seven

Download English Version:

<https://daneshyari.com/en/article/8820959>

Download Persian Version:

<https://daneshyari.com/article/8820959>

[Daneshyari.com](https://daneshyari.com)