



Research Article | Araştırma Makalesi

INCIDENTALLY DETECTED MESENTERIC PANNICULITIS IN THORAX CT SCANS: SINGLE-INSTITUTION EXPERIENCE

TORAKS BT TARAMALARINDA TESADÜFEN TESPİT EDİLEN MEZENTERİK PANNİKÜLİT: TEK MERKEZ DENEYİMİ

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ABSTRACT

Objective: The aim of this study is to report the frequency of incidentally detected Mesenteric Panniculitis (MP) in the field of thoracic Computed Tomography (CT) and to emphasize the importance of examining upper abdomen sections.

Method: In this retrospective study, 300 females, and 414 males, a total of 714 adult patients, with a median age of 44 years (age range: 18-91) who underwent thoracic CT for benign reasons between March and August 2023 were included. Cases with MP were detected in upper abdominal sections in thorax CT. The cases were evaluated according to clinical, laboratory, and radiological findings.

Results: Ten patients (1.4%) with mesenteric panniculitis were detected in the upper abdominal sections of the thorax CT scan. Two of the patients were female and 8 were male. While the MP rate was 0.66% in female patients, it was 1.93% in male patients. There were no abdominal symptoms in 7 of the cases. In one of the other 3 patients, severe abdominal pain, nausea-vomiting, weakness, joint pain, fever, flank pain in one patient, fever, nausea-vomiting, and fatigue in one patient were present.

Conclusion: Careful evaluation of the upper abdominal images in thoracic CT scans results in the detection of MP, and early detection of associated abdominal diseases.

Keywords: Computed tomography, mesenteric panniculitis, abdominal pathology

ÖZ

Amaç: Bu çalışmanın amacı toraks Bilgisayarlı Tomografi (BT) alanında tesadüfen tespit edilen Mezenterik Pannikülit (MP) sıklığını bildirmek ve üst batin kesitlerinin incelenmesinin önemini vurgulamaktır.

Yöntem: Retrospektif olarak yapılan bu çalışmaya Mart-Ağustos 2023 tarihleri arasında benign nedenlerle toraks BT çekilen ortalama yaşı 44 (yaş aralığı: 18-91) olan 300 kadın, 414'ü erkek toplam 714 yetişkin hasta dahil edildi. Toraks BT'de üst karın kesitlerinde MP'li olgular tespit edildi. Olgular klinik, laboratuvar ve radyolojik bulgulara göre değerlendirildi.

Bulgular: Toraks BT'sinde üst batin kesitlerinde 10 (%1,4) mezenterik pannikülit hastası tespit edildi. Hastaların 2'si kadın, 8'i erkekti. MP oranı kadın hastalarda %0,66 iken erkek hastalarda %1,93 idi. Vakaların 7'sinde herhangi bir karın semptomu yoktu. Diğer 3 hastanın birinde şiddetli karın ağrısı, bulantı-kusma, halsizlik, eklem ağrısı, ateş, yan ağrısı, bir hastada ateş, bulantı-kusma, yorgunluk mevcuttu.

Sonuç: Toraks BT taramalarında üst karın görüntülerinin dikkatli bir şekilde değerlendirilmesi MP'nin saptanmasını ve ilişkili karın hastalıklarının erken tespitini mümkün kılmaktadır.

Anahtar Kelimeler: Bilgisayarlı tomografi, mezenterik pannikülit, abdominal patoloji

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Introduction

Mesenteric panniculitis (MP) is a rare disease with a prevalence of 0.16-3.3%.¹ It was first described by Jura in the 1920s as Sclerosing Mesenteritis.^{2,3} Later in 1960 Ogden⁴ defined the term MP.^{4,5} MP is a chronic fibrotic, nonspecific inflammation of mesenteric fatty tissue. Primary small bowel mesentery, rarely mesocolon and omentum may be involved.⁶ The etiology is not yet known clearly. However, it has been associated with trauma, abdominal surgery, obesity, ischemia, vasculitis, granulomatous diseases, autoimmune diseases, various drugs, allergens, infections, and malignancies.⁷

It is mostly seen in middle-aged and older men, clinically it is usually asymptomatic.⁸ The most common clinical finding in symptomatic patients is abdominal pain. However, it may cause symptoms such as nausea-vomiting, weakness, loss of appetite, weight loss, and fever.^{9,10} The physical examination is nonspecific, and findings such as abdominal tenderness and a palpable mass in the abdomen may be encountered.¹¹

Diagnosis with Computed Tomography (CT) has become easier due to the developments in multislice CT technology and the ability of CT to show specific findings for this disease.¹⁰⁻¹²

While CT can make the radiological diagnosis, the histopathological diagnosis is made by examining the biopsy taken during laparoscopy or laparotomy.¹³ Macroscopically, diffuse or nodular enlargement of the mesentery may be seen and may mimic a malignant tumor or lymphoma. Basically, pathological findings consist of chronic non-specific inflammation, fat necrosis, and fibrosis.¹⁴ Pathologically, it can be considered as a single disease with two subgroups. Mesenteric form of panniculitis; It is the group in which inflammation and fat necrosis predominate and are seen more frequently. Retractable mesenteric form; It is the predominant type of fibrosis and retraction and is less common.¹⁵

The physician may not need abdominal CT imaging findings in cases presenting to the health institution with thoracic symptoms. In this case, an existing MP will be overlooked. However, even if it is completely asymptomatic, MP can be easily distinguished by typical CT findings. Heterogeneity, thickening and inflammatory changes in mesenteric fatty tissue on CT, streaks in mesenteric fatty planes, misty mesentery finding, preservation of fatty tissue in the periphery of mesenteric vascular structures, hyperdense pseudo capsule appearance partially enveloping the mass, ring sign, millimetric nodules in the form of soft tissue mass in mesenteric fatty tissue, rarely findings such as mesenteric calcifications are pathognomonic. The coexistence of three of these pathognomonic findings is sufficient to make the diagnosis of MP.¹⁶⁻¹⁸

While thoracic CT is being evaluated by the radiologist, upper abdominal sections that enter the examination area should be carefully evaluated, even if there are no symptoms related to the abdomen. Thus, it is possible to make an early diagnosis and start early treatment for all intra-abdominal pathologies included in the imaging.

The aim of this study is to retrospectively examine a series of cases in which thoracic CT examination was performed for benign reasons such as respiratory complaints and MP findings were detected in upper abdominal sections, and to emphasize the importance of examining upper abdominal sections in thoracic CT scans.

Methods

Patient selection: Adult patients over the age of 18 who applied to our institution due to benign symptoms such as chest pain and respiratory distress were analyzed retrospectively. Patients who underwent thoracic CT were included in the study. Demographic data of the cases, clinical findings including the symptoms of the patients at admission, laboratory data, and results related to treatment plans were checked from the hospital's electronic record system (KG). Patients who have previously been diagnosed with cancer, have received oncological treatment such as chemotherapy and radiotherapy, and patients who have previously undergone major laparotomy for any reason; were excluded from the study due to the effect of abdominal findings.

Thoracic CT examinations: Thorax CT images of all patients were obtained on 64-slice CT (Optima CT 660, General Electric Medical Systems, Milwaukee, Wisconsin, USA). In the scanning protocol; the patient was in the supine position, the tube voltage was 120 kV, tube current was 70-120 mAs. Multiplanar CT images were obtained by adjusting the slice thickness to 1.25 and 5mm. Thoracic imaging was taken in the abdominal area up to the level of both adrenal glands.

Thoracic CT analysis: CT images were reviewed retrospectively by a radiologist (DD) experienced in thoracic and abdominal imaging. Patients with 3 or more of the 5 typical CT findings for MP on upper abdominal sections were included in the study. In our study, cases diagnosed radiologically were examined.

Statistical Analysis

For the statistical evaluation of the study, descriptive analysis methods were used through the SPSS v21.0 (SPSS for Windows, 2007, Chicago, US) program.

Results

Between March 2023 and August 2023, images of 714 adult patients, 300 females and 414 males, whose thorax CT images and reports were registered in our hospital's radiology archiving and communication system, were evaluated retrospectively by a single radiologist. The age range of all patients was between 18-91 with a mean age of 44. It was observed that MP finding was detected and reported in a total of 10 patients (1.4%). Misty mesentery sign, thickening of mesenteric fatty tissue, signs of inflammation, fatty halo sign, pseudo capsule appearance, and millimetric nodular densities were detected on CT images (Figure 1 A, B, C, D).

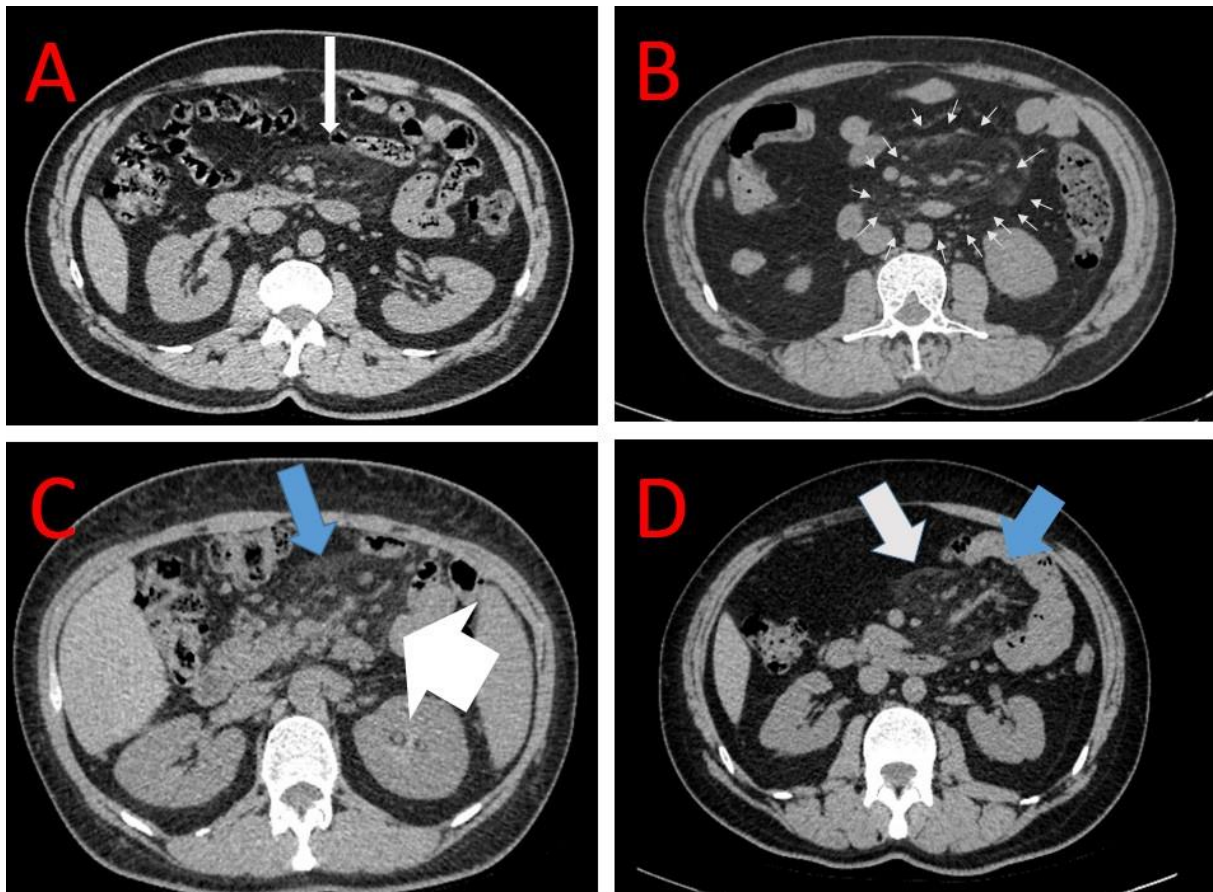


Figure 1. A. Misty mesentery view on axial CT sections (white arrow). B. Misty mesentery appearance and surrounding pseudo capsule (small white arrows) on axial CT scans. C. Significant heterogeneity, thickening (blue arrow), and fat ring sign (white arrow) in mesenteric fatty planes on axial CT scans. D. Heterogeneity, thickening, inflammation findings (white arrow), and millimetric nodules (blue arrow) in mesenteric fatty tissue in axial CT sections.

Two of these cases were female (0.66% of female patients), and eight of them were male (1.93% of male patients). The mean age of female patients with MP was 47.5 years; the mean age of male MP patients was 50.5 years. Six of the patients with MP had a previous symptomatic history of COVID-19. Considering the other intra-abdominal pathologies seen in the sections passing through the upper abdomen; no other intra-abdominal pathology was detected except MP in 7 of 10 cases (Table 1). Cholelithiasis in one of the other 3 cases, kidney cyst and calculi in one, hypodense lesion in the liver primarily compatible with the cyst in one patient; seen as incidental additional findings. One of the patients had a history of bladder cancer. This patient underwent cystoscopic mucosectomy 3 years ago. All of the cases were given outpatient symptomatic treatment. All of the patients with MP were taken to the outpatient follow-up.

Discussion

MP is a rare disease that develops due to chronic inflammation of the mesenteric fatty tissue, which can cause retraction and chronic inflammation-fibrotic changes in the surrounding structures.^{19,20} If the inflammatory component is dominant, it is called MP, if the fibrotic component is dominant, it is called retractile or sclerosing mesenteritis, if fat necrosis is dominant, it is called mesenteric lipodystrophy.²¹

The etiology of MP is not clearly known. It is most commonly associated with abdominal surgery and trauma. The most common surgical treatments associated with MP are; cholecystectomy, appendectomy, hysterectomy, and colectomy.²² It may also be associated with vasculitis, granulomatous disease, rheumatologic disease, malignancy, autoimmune disease, ischemia, and infections.²³ According to the medical records in our hospital; one of the female patients with a diagnosis of MP had a history of laparoscopic appendectomy and cholecystectomy operations, and another had a cesarean section. One of the male patients with a diagnosis of MP had a history of laparoscopic inguinal hernia repair and coronary bypass, and another had a history of laparoscopic cholecystectomy. The remaining 6 cases had no history of operation.

In the literature, cases with MP on abdominal CT have been reported in cases with abdominal pain complaints after COVID-19 infection.²⁴⁻²⁶ Factors such as the fact that the virus causes vasculitis and that it plays a triggering role for autoimmune and inflammatory diseases have been considered. In our study, 6 of 10 cases had a history of symptomatic COVID-19 infection in the last two years. Two of our patients had type-2 diabetes mellitus as a chronic disease. No chronic disease was detected in the others. In a study in which patients with chronic diseases such as hypertension and type-2 diabetes mellitus and diagnosed with MP by CT were followed up for 4 years,

when compared with the control group in terms of its relationship with chronic diseases; As there was no

significant difference, it was concluded that there was no relationship with chronic diseases.²⁷

Table 1. Clinical information and characteristics of patients diagnosed with MP

Patient No	Sex	Age	CT MP Findings	Chronic Disease	Previous Surgery	Diagnosis	Covid History
1	M	45	Misty mesentery, millimetric mesenteric lymph nodes, fat ring sign	None	None	Pneumonia, cholelithiasis	Positive
2	M	54	Misty mesentery, millimetric mesenteric lymph nodes, pseudo capsule	None	None	Upper respiratory tract infection, left kidney micro calculus, and cortical cyst	Positive
3	M	37	Misty mesentery, millimetric mesenteric lymph nodes, fat ring sign	None	Laparoscopic cholecystectomy	Atelectasis, pneumonia in the right lung	Positive
4	M	58	Misty mesentery, millimetric mesenteric lymph nodes, fat ring sign	Type 2 diabetes	None	Upper respiratory tract infection, simple liver cyst	Positive
5	M	49	Misty mesentery, pseudo capsule, mesenteric lymph nodes, heterogeneity with mesenteric thickening, fat ring sign	Coronary artery disease	None	Upper respiratory tract infection	Negative
6	M	75	Mesenteric thickening, mesenteric lymph nodes, misty mesentery	Type 2 diabetes, hypertension	Inguinal hernia repair, coronary artery by-pass	Pleural effusion	Negative
7	M	55	Mesenteric heterogeneity and thickening, mesenteric lymph nodes, misty mesentery, pseudo capsule	Bladder cancer (Treated with mucosal resection and BCG)	None	Atypical pneumonia	Negative
8	M	31	Mesenteric heterogeneity, mesenteric lymph nodes, misty mesentery	None	None	Pneumonia	Negative
9	F	49	Mesenteric thickening, mesenteric lymph nodes, misty mesentery	None	Cesarean section	Pneumonia	Positive
10	F	46	Mesenteric lymph nodes, pseudo capsule, misty mesentery, fat ring sign	Type 2 diabetes	Appendectomy, cholecystectomy	Emphysema, atelectasis	Positive

Although the relationship between MP and malignancy is not known exactly, it has been reported that it may be due to an incidental or autoimmune inflammatory reaction.^{28,29} In various studies aimed at understanding the relationship between MP and malignancy and the prevalence, the prevalence of neoplastic disease was found to be significantly higher in patients with MP. The same authors saw an increased prevalence and risk of future cancer at 5-year follow-up.³⁰ In another study, a five-fold higher risk of malignancy was defined in the presence of MP.³¹ In various studies, it was found that it is most commonly associated with abdominal lymphoma.³² In addition, association with MP has also been demonstrated in urogenital malignancies, gastrointestinal adenocarcinoma, and non-abdominal malignancies such as breast and lung, thoracic mesothelioma, and melanoma.^{33,34} A Bladder tumor was found in only one of our cases.

MP is generally seen between the ages of 50-70 and is more common in males.³⁵ In our study, the incidence of MP in male patients was approximately three times higher than in female patients.

MP is usually asymptomatic. The most common finding in symptomatic patients is abdominal pain. In addition,

loss of appetite, nausea, vomiting, fever, and changes in bowel habits may occur.⁷ In the following period, it may cause clinical pictures such as mass effects in the abdomen, ileus, or ischemic bowel disease.^{19,35} Since our study was related to Thorax CT scans 7 of our cases presented with thoracic symptoms such as cough, chest pain, hoarseness, fever, and shortness of breath. It was observed that one of them had previously applied to our hospital with complaints of pain in the epigastric region, nausea, and vomiting. In the other 3 cases, one had severe abdominal pain, nausea, vomiting, weakness, joint pain, and fever, one had epigastric pain and swelling, and one had additional nonspecific abdominal complaints such as flank pain and epigastric tenderness. Laboratory tests are not helpful in the diagnosis of MP because they are usually normal. Erythrocyte sedimentation rate and C-Reactive Protein (CRP) may increase due to inflammation. May be useful in evaluating response to therapy.^{7,13} In the laboratory data of our cases, there was no specific feature other than CRP elevation in 2 cases and leukocytosis in one case. In the clinical evaluation, it was concluded that leukocytosis and CRP elevation in these 2 cases were caused by lung infection.

A standing plain abdominal X-ray is usually normal. In Ultrasonography (US), an intra-abdominal mass-like finding can be detected rarely, other than that, there may be no obvious finding. There are not many articles in the literature describing the diagnosis of MP with Magnetic Resonance Imaging (MRI) findings. Among the reasons for this is the high rate of diagnostic accuracy in CT examination, so MRI, which is a high-level modality, is not needed. Factors such as the fact that the abdominal MRI is affected by respiratory motion artifacts, it is difficult to access, claustrophobia and the examination takes longer than CT can be counted. In MRI examination, the signal intensity varies according to the histological components and stage of the disease. In the MP inflammatory form, the inflammation in the mesentery is hypointense on T1-weighted images and hyperintense on T2-weighted images. If fibrosis is predominant, it appears hypointense on T1 and T2-weighted images. The pseudo capsule is fibrotic around the mass area, so it appears as a hypointense line on T1 and T2-weighted images. It has a pattern of delayed enhancement due to fibrotic content in post-contrast images.^{7,36} Diffusion-Weighted Magnetic Resonance Imaging (DW MRI) and Apparent Coefficient Diffusion (ADC) maps do not show any obvious diffusion restrictions. The mass effect of the lesion, the presence of vascular invasion, and the difference in intensity in the mesenteric fatty tissue can be found.³⁶

Our study is for the retrospective evaluation of CT images of the thorax, therefore, evaluation with other imaging methods was not performed.

Developments in CT technology in recent years and the increase in the prevalence of MP in the literature show parallelism and typical CT findings for MP have been defined.³⁷⁻⁴⁰ In our cases, misty mesentery signs, thickening of mesenteric fatty tissue, signs of inflammation, fatty halo signs, pseudo capsule appearance, and millimetric nodular densities were detected on CT images.

Positron Emission Tomography (PET)-CT examination is not routinely performed for MP.⁴¹ However, in cases with known malignancy, PET-CT examination is performed especially after neoadjuvant chemotherapy, radiotherapy, and tumor surgery. Studies are showing that MP can be confused with metastasis, as MP shows fluorodeoxyglucose (FDG) uptake just like cancer tissues.⁴²⁻⁴⁴

Mesenteric edema, bleeding, mesenteric lymphadenitis, mesenteric ischemia, inflammatory bowel diseases, and mesenteric neoplasms such as carcinoid tumor, peritoneal tuberculosis, peritoneal carcinomatosis, and peritoneal lymphoma can be considered in the differential diagnosis. Differential diagnosis of this MP from these diseases can be made with clinical findings and radiological methods.¹⁸

MP can be seen as large masses containing necrotic fat.¹⁴ When seen in the form of a mass; can be confused with a carcinoid tumor, lymphoma, and desmoid tumor.⁴⁵⁻⁴⁷ Desmoid tumor is usually associated with trauma and can be seen with Gardner Syndrome and colon polyposis. Depending on omental involvement, MP can be confused

with peritoneal carcinomatosis, tuberculosis, or primary peritoneal mesothelioma.¹² In peritoneal carcinomatosis, multiple nodular implants and thickening of the mesentery may mimic MP but are accompanied by more extensive peritoneal involvement, significant peritoneal thickening, and often ascites.⁴²

It can be seen as a fibrotic infiltrated soft tissue mass due to calcification and desmoplastic reaction in carcinoid tumors and retractile MP. However, the preservation of fatty tissue around vascular structures favors MP. Also, hypervascular bowel mass or hepatic metastases may accompany carcinoid tumors.^{7,18} In our cases, malignant processes such as tumors and metastases were not considered in the differential diagnosis.

It is known that MP can be a precursor of an early-stage solid tumor or early-stage lymphoma. Every MP detected does not mean cancer. Many MPs can develop from benign causes. When MP is detected, it is a matter of debate in which case further examination for cancer will be performed. In a large retrospective study in which MP was diagnosed as a result of CT examination, the relationship of MP with malignancies according to CT features was investigated. Solid malignancies such as pancreatic, liver, colon, and bladder cancers were detected in 8% of the patients with MP. Low-grade B-Cell Non-Hodgkin Lymphoma was observed in 1% of cases. The significant relationship between MP and malignancy; is proven in the presence of soft tissue nodules with a short axis of 10 mm or more or lymphadenopathies in the abdominopelvic region ($P < 0.0001$). In the presence of soft tissue nodules of 10 mm and above or lymphadenopathy, further investigations were required for the possibility of malignancy. PET/CT has a diagnostic value in lymph nodes of 10 mm and above. PET/CT can be used for further examination. Laparoscopic excisional biopsies and, if necessary, gastroscopy and colonoscopy examinations can be performed for patients with a preliminary diagnosis of lymphoma.⁴⁸ One of our male patients with MP had a history of early-stage cystoscopic bladder cancer excision 3 years ago.

If complicated findings such as intestinal ischemia, obstruction, ureteral stenosis, and kidney failure develop due to mass effect in the future in MPs without malignancy, emergency medical and surgical treatment is preferred. In a systematic review including data from articles published as case reports of MP by scanning academic databases (Medline, Pubmed, Google Scholar, Cochrane); it has been reported that regression is mostly seen with steroid treatment. It was observed that the response to treatment was weaker in patients with underlying autoimmune disorders whose symptoms lasted more than 1 month.³⁵ There is no specific treatment for MP. No treatment is applied in asymptomatic MPs. It usually shows regression when followed. In medical treatment, drugs such as steroids, azathioprine, cyclophosphamide, tamoxifen, progesterone, colchicine, and thalidomide can be used.^{10,45} To date, no clear research and follow-up protocol has been established for MP. There is no clear consensus on how to follow up.⁴⁹

MP is usually seen incidentally on abdominal CT.⁵⁰ In our study, MP cases detected in thorax CT scans performed due to thoracic symptoms were examined. Three of our cases had abdominal symptoms related to MP in addition to thoracic symptoms. Symptomatic outpatient treatment was applied to all of the cases depending on the primary cause of presentation. One of our cases underwent follow-up thorax CT imaging and regression was observed in pneumonia and MP findings. Control imaging was not performed in other cases.

Conclusion

MP is a rare chronic progressive pathology with nonspecific clinical symptoms, and early diagnosis and treatment are important. With the advances in multislice CT technology, it has become easier to diagnose MP with CT. It is important for radiologists to carefully evaluate intra-abdominal pathologies that fall into the examination area while evaluating CT examination of the thorax, and to inform clinicians in this sense when they detect MP.

Compliance with Ethical Standards

The study was performed after obtaining the necessary ethics committee permission and institutional approval was received from the Istanbul Okan University Non-Invasive Clinical Research Ethics Committee at the meeting numbered 169 on 18/10/2023 with decision number 16.

Conflict of Interest

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Author Contribution

All authors contributed equally to the article.

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