HİTİT MEDICAL JOURNAL
HİTİT ÜNİVERSİTESİ TIP FAKÜLTESİ DERGİSİ

e-ISSN: 2687-4717 Cilt|Volume: 7 • Sayı|Issue: 3 - Ekim|October 2025

Pneumatosis Intestinalis with Thyroid Hormone Abnormality: An Interesting Case

Tiroid Hormon Anormalliği ile Birlikte Pneumatozis İntestinalis: İlginç Bir Olgu

Betül Güzelyüz[1] | Ali Mert Özdoğan[2] | Sefa Ergün[2]

[1]Hassa State Hospital, Department of General Surgery, Hatay, Türkiye
[2]Istanbul University Cerrahpaşa Faculty of Medicine, Department of General Surgery, İstanbul, Türkiye

Sorumlu Yazar | Correspondence Author
Betül Güzelyüz
b.gzlyz1994@gmail.com
Address for Correspondence: Hassa State Hospital, Department of General Surgery, Kahramanmaraş, Türkiye.

Makale Bilgisi | Article Information
Makale Türü | Article Type: Olgu Sunumu | Case Report
Doi: https://doi.org/10.52827/hititmedj.1629375
Geliş Tarihi | Received: 29.01.2025
Kabul Tarihi | Accepted: 26.05.2025
Yayım Tarihi | Published: 13.10.2025

Atıf | Cite As
Güzelyüz B, Özdoğan AM, Ergün S. Pneumatosis Intestinalis with Thyroid Hormone Abnormality: An Interesting Case. Hitit Medical Journal 2025;7(3):465-470. https://doi.org/10.52827/hititmedj.1629375

Hakem Değerlendirmesi: Alan editörü tarafından atanan en az iki farklı kurumda çalışan bağımsız hakemler tarafından değerlendirilmiştir.
Etik Beyanı: Gerek yoktur.
İntihal Kontrolleri: Evet (iThenticate)
Çıkar Çatışması: Yazarlar çalışma ile ilgili çıkar çatışması beyan etmemiştir.
Şikayetler: hmj@hitit.edu.tr
Katkı Beyanı: Fikir/Hipotez: BG; Tasarım: BG; Data Collection/Data Processing: BG, AMÖ; Veri Analizi: BG, SE; Makalenin Hazırlanması: BG, AMÖ, SE
Hasta Onamı: Tüm hastalardan yazılı bilgilendirilmiş onam ve yayın için izin alınmıştır.
Finansal Destek: Bu çalışma ile ilgili herhangi bir finansal kaynaktan yararlanılmamıştır.
Telif Hakı & Lisans: Dergi ile yayın yapan yazarlar, CC BY-NC 4.0 kapsamında lisanslanan çalışmalarının telif hakkını elinde tutar.

Peer Review: Evaluated by independent reviewers working in the at least two different institutions appointed by the field editor.
Ethical Statement: Not applicable.
Plagiarism Check: Yes (iThenticate)
Conflict of Interest: The authors declared that, there are no conflicts of interest.
Complaints: hmj@hitit.edu.tr
Authorship Contribution: Idea/Hypothesis: BG; Design: BG; Data Collection/Data Processing: BG, AMÖ; Data Analysis: BG, SE; Manuscript Preparation: BG, AMÖ, SE
Informed Consent: Written informed consent and consent for publication was obtained from the patients.
Financial Disclosure: There are no financial funds for this article.

Pneumatosis Intestinalis with Thyroid Hormone Abnormality: An Interesting Case

ABSTRACT

Pneumatosis intestinalis is characterized by the presence of gas in the intestinal wall. Although its clinical findings and etiology are not clear, a delay in diagnosis is associated with high morbidity and mortality. Therefore, in cases where pneumatosis in the bowel wall is detected radiologically, aggressive laparotomy is recommended in the presence of a negative prognostic disease. Then, the current approach recommended in the guidelines is second-look laparotomies, in which bowel viability will be re-evaluated before a definitive resection decision is made. This approach is emphasized as an extremely useful option in terms of prognosis and survival in cases of thyroid hormone abnormalities, in cases with underlying diseases such as heart failure, in conditions such as hemodynamic instability and sepsis, where even small changes in the reference range are known to affect systemic vascular resistance and oxygen demand and lead to many cardiovascular effects. In this case report, a patient with a complex history who wasn't detected to have ischemia in the first surgery performed due to pneumatosis intestinalis but was observed to have intestinal ischemia in the second-look laparotomy; the complicated and negative prognosis process, accompanied by a newly diagnosed thyroid hormone abnormality, is presented.

Keywords: Mesenteric ischemia, pneumatosis intestinalis, second-look operation, thyroid hormone.

ÖZET

Pneumatosis İntestinalis, bağırsak duvarında gaz varlığı ile karakterizedir; klinik bulguları ve etiyolojisi net olmamakla birlikte tanıda gecikme yüksek morbidite ve mortalite ile ilişkilidir. Bu nedenle, radyolojik olarak bağırsak duvarında pneumatosis saptanan olgularda, negatif prognostik hastalık varlığında agresif laparotomi önerilir. Daha sonra, kılavuzlarda önerilen güncel yaklaşım, kesin rezeksiyon kararı verilmeden önce bağırsak canlılığının yeniden değerlendirileceği ikinci bakış laparotomileridir. Bu yaklaşım; referans aralığındaki küçük değişikliklerin bile sistemik vasküler direnç ile oksijen talebini etkileyip pek çok kardiyovasküler etkiye yol açtığı bilinen tiroid hormon anormalliklerinde, altta yatan başta kalp yetmezliği gibi hastalıkları olan olgularda, hemodinamik instabilite ve sepsis gibi durumlarda; prognoz ve sağkalım açısından son derece yararlı bir seçenek olarak vurgulanmaktadır. Bu olgu sunumunda, pneumatosis intestinalis nedeniyle yapılan ilk cerrahide iskemi saptanmayan, ancak ikinci bakış laparotomisinde bağırsak iskemisi gözlenen, kompleks bir özgeçmişi olan hastanın; yeni saptanan tiroid hormon anormalliğinin da eşlik ettiği komplike ve kötü prognozla seyreden süreci sunulmaktadır.

Anahtar Sözcükler: Mezenter iskemi, pnömatozis intestinalis, ikincil-bakı operasyon, tiroid hormonu.

Introduction

Pneumatosis intestinalis is a rare entity characterized by the presence of gas in the intestinal wall. Although the etiology isn't clear, there is usually an underlying cause such as inflammation, malignancy, or autoimmune-endocrine events. While it may be the precursor lesion of intestinal ischemia, it may also remain only as a radiological finding without any clinical findings, and diagnosis may be delayed; it is associated with high mortality (1,2). Therefore, aggressive laparotomy is recommended in cases where pneumatosis is detected radiologically in the intestinal wall and in cases of ischemia. After the primary operation, routine re-evaluation of bowel viability with second-look laparotomies before a definitive resection decision is made, as is the current approach recommended in the guidelines (3,4). This approach, in the presence of thyroid abnormalities, underlying cardiovascular and hemodynamic instability, which are known to affect systemic vascular resistance and oxygen demand and cause many vascular effects, even small changes in the reference range, is extremely important for prognosis and survival (5,6).

Figure I. CT section with intravenous contrast; diffuse air densities in the small intestine walls, compatible with pneumatosis intestinalis.

In this case report, a patient with a complex history who wasn't detected to have ischemia in the first surgery performed due to pneumatosis intestinalis but was observed to have intestinal ischemia in the second-look laparotomy; the complicated and negative prognosis process, accompanied by a newly diagnosed thyroid hormone abnormality, is presented.

Figure II. The end of the first surgery; Since second-look was planned, a trocar was placed cranial to the median incision for laparoscopy, taking into account the hemodynamic suitability of the patient in the second surgery and the possibility, albeit low, of not encountering any complicated findings during exploration.

Figure III. Second-look operation; 45 cm necrotic small intestine segment observed 140 cm distal to the ligament of Treitz.

Case Report

A 71-year-old male patient with a medical history of hypertension, coronary artery disease, type 2 diabetes mellitus, chronic renal failure, benign prostatic hyperplasia, rectal cancer, small cell lung

Table I. Laboratory Findings

	WBC (x10^9/L)	CRP (mg/dL)	D-dimer (mg/L)	pH	HCO_3 (mmol/L)	Lac (venous) (mmol/L)	fT_3 (pg/mL)	fT_4 (ng/dL)	TSH (µIU/ml)
Normal range	*(4-10)*	*(<5)*	*(0-0.5)*	*(7.35-7.45)*	*(22-26)*	*(0.5-2.2)*	*(2-4.4)*	*(0.93-1.7)*	*(0.27-4.2)*
8 years ago							**2.59**	**1.31**	**1.59**
4 years ago							**2.34**	**1.49**	**1.6**
1 year ago							**2.72**	**1.45**	**0.816**
On arrival	**0.5**	**128**	**6.68**	**7.45**	**21**	**1.8**			
48 hours later	**1.6**	**382**	**6.81**	**7.32**	**22.4**	**4.1**	**0.98**	**2.21**	**1.36**

cancer; coronary angiography and two stents 10 years ago, coronary bypass surgery 20 years ago, numerous abdominal surgeries, the last of which ended with an end colostomy 6 years ago; oral antiplatelet, insulin, and chemotherapy due to lung cancer 1 week ago. He was admitted to the emergency department with complaints of abdominal pain that started 4 days ago and had worsened over the last 4-5 hours, and diarrhea. On arrival, his vital signs were within normal limits, and on examination, the abdomen was tender to palpation, and there was guarding and rebound tenderness. White blood cell (WBC) 0.5×10^9/L, C-reactive protein (CRP) 128mg/dL, D-dimer 6.68 mg/L, pH 7.45, HCO_3 21 mmol/L, venous lactate (lac) 1.8mmol/L (Table I). The electrocardiogram and abdominal X-ray were normal. Intravenous contrast-enhanced computed tomography (CT) revealed air in the portal vein, diffuse air densities in the small intestine walls, and an appearance consistent with pneumatosis intestinalis (Figure I). An emergency laparotomy was performed; there was widespread venous congestion in the middle ileal loops, and no ischemic findings were observed; a 10 mm trocar was left in the midline incision to monitor intestinal viability with second-look before definitive abdominal closure, and he was taken to the intensive care unit (ICU) after the surgery (Figure II). As the patient's hemodynamic parameters were worsening, noradrenaline was started; WBC 1,6×109/L, CRP 382 mg/dl, D-dimer 6.81 mg/L, pH 7.32, HCO_3 22.4 mmol/L, and lactate 4.1 mmol/L were detected. In addition, in the tests performed on the same day, fT_3 0.98pg/mL, fT_4 2.21ng/dL, TSH 1.36µIU/mL. It was determined through a retrospective examination of approximately 8 years that there was no known history of thyroid disease and that his thyroid hormone levels had always been within the normal range in his previous tests (Table I). Second-look operation was performed 48 hours later; the surgery was started with laparoscopy by creating pneumoperitoneum through the trocar in the midline incision, but relaparotomy was performed due to inadequate exploration due to hemodynamic instability. On exploration, a 45 cm small intestine segment 140 cm distal to the ligament of Treitz was found to be necrotic (Figure III). Resection-ileostomy was performed. However, mortality occurred after 13 days due to ongoing hemodynamic instability. Pathological examination reported transmural infarction, ischemia findings, submucosal edema, and amyloid deposition in the vascular walls in the segmental small bowel resection material.

Discussion

Pneumatosis intestinalis is an entity associated with gastrointestinal diseases, immune suppression, rheumatological, and metabolic events. Although clinical findings are not clear, symptoms such as abdominal pain and diarrhea may occur. A complicated table is mostly associated with inflammatory bowel diseases, lung diseases, some specific medications, and immunosuppression. In addition, although intestinal toxicity and pneumatosis intestinalis due to chemotherapeutics are rare in cancer patients, the condition is usually fulminant in these cases and requires urgent surgical intervention (7). It is important to confirm the diagnosis as soon as possible in order to prevent progression to ischemia; gas bubbles are observed in the intestinal wall on CT, and gas is also found in the portal vein in approximately 25% of cases (1,5,8). Although there are some studies showing that pneumatosis intestinalis has a good prognosis with conservative treatments, a mortality of up to 80% is observed in patients with concomitant gas detected in the portal vein (Liu et al, 2022); it was stated that surgical intervention

should be performed urgently (2,7,8). In a study on portomesenteric venous thromboembolism (Uludağ, 2021), it was concluded that conservative treatment is essential, treatment for the underlying cause is absolutely necessary, and surgical intervention is essential for small bowel necrosis (9). In the patient discussed in this study, cardiovascular, metabolic, pulmonary and gastrointestinal diseases, as well as immunosuppression and recent chemotherapy history were present; although his complaints at the time of admission were nonspecific abdominal pain and diarrhea, it was important to clarify the diagnosis as soon as possible, and emergency laparotomy became the only option in this case with a complicated history, upon detection of pneumatosis intestinalis in the computed tomography. In addition, in a study examining prognosis and mortality in patients without laparotomy and after laparotomy, it is mentioned that effective management of mesenteric ischemia requires early treatment of the underlying disease; monitoring of blood gas and hemodynamic parameters; although there is no specific treatment protocol, planned second-look surgery is recommended in current guidelines after 24-48 hours of observation in the ICU (5). Although the hemodynamic parameters were normal at the time of admission and there were no ischemic findings and no findings other than venous congestion in the intestinal loops in the first laparotomy, second-look surgery was planned due to the presence of multiple comorbidities and many negative prognostic factors for pneumatosis intestinalis. Indeed, the patient's hemodynamics began to deteriorate in the period leading to the planned second-look 48 hours later, and an ischemic bowel segment was encountered in the relaparotomy, and resection was required.
In pathology, in addition to the classical findings of ischemia, amyloid deposition was found in the vascular wall of the resected segment, but it wasn't specifically detailed. It is known that reactive amyloidosis can often occur secondary to chronic inflammation, infection, and neoplasms, and some studies have shown that small intestine involvement is most common when the gastrointestinal system is affected by amyloid (10).

In this case, which contains many of the possible etiological and predisposing factors and negative prognostic factors of pneumatosis intestinalis, a thyroid hormone abnormality that wasn't present before was also detected. It is known that thyroid hormone abnormalities and even emergencies aren't uncommon in intensive care patients. However, it is said that most of these are due to a known thyroid disease, and a small number of them are unknown because they are not examined before admission to the ICU (11). In this case, whose previous thyroid levels were normal, and there was no history of thyroid disease, the cause of this condition couldn't be clarified because of the mortality that occurred. Iodine is an essential trace element absorbed in the small intestine. Decreased iodine intake may result in decreased thyroid hormone synthesis. This may be due to the patient's newly detected thyroid hormone abnormality as a result of diarrheal symptoms (12). Although the cause is not clear, thyroid hormone abnormality may be associated with a negative prognosis and outcome. Because it is known that thyroid hormones protect vascular homeostasis with their positive effects on endothelial and vascular smooth muscle cells, and that when thyroid hormone levels are low, blood and oxygen delivery are impaired, and target organs are affected (13). Moreover, in a study examining whether correction of thyroid dysfunction results in improved cardiovascular outcomes, even the presence of subclinical thyroid disease was associated with increased vascular risk and mortality (14). New studies and a small number of cases have begun to appear in the literature on the association of intestinal microbiota with thyroid diseases through some mechanisms (15). This suggests that thyroid hormone abnormalities may influence intestinal ischemia through the vascular system, as well as other mechanisms.

Conclusion

It is known that cardiovascular diseases and endocrine and metabolic abnormalities in diseases associated with intestinal ischemia lead to high mortality rates. The cardiac and vascular effects of thyroid hormone abnormalities have also been demonstrated, even in the absence of clinical thyroid disease findings. However, further studies are needed

to determine whether thyroid hormone abnormalities can directly affect prognosis in pneumatosis intestinalis and mesenteric ischemia cases.

References

1. Tropeano G, Di Grezia M, Puccioni C et al. The spectrum of pneumatosis intestinalis in the adult. A surgical dilemma. World J Gastrointest Surg 2023;15(4): 553-565.
2. Suzuki T, Murata S, Tsunoyama T, et al. Recanalization using direct stenting before bowel resection for acute-on-chronic superior mesenteric artery occlusion: A case report, International Journal of Surgery Case Reports 2020;68:92-95.
3. Nakamura F, Yui R, Muratsu A, et al. A strategy for improving the prognosis of non-occlusive mesenteric ischemia (NOMI): a single-center observational study. Acute Medicine & Surgery 2019;6:365-370.
4. Acosta S, Kärkkäinen J. Open abdomen in acute mesenteric ischemia. Anaesthesiology Intensive Therapy 2019;51(2):159-162.
5. Murata T, Yamaguchi N, Shimomoto Y, et al. Preoperative prognostic predictors and treatment strategies for surgical procedure focused on the Sequential Organ Failure Assessment score in nonocclusive mesenteric ischemia: A multicenter retrospective cohort study. Int J Surg 2023;109(12):4119-4125
6. Razvi, S. Novel uses of thyroid hormones in cardiovascular conditions. Endocrine 2019;66:115-123.
7. Liu H, Hsieh CT, Sun JM. Pneumatosis intestinalis after systemic chemotherapy for colorectal cancer: A case report. World J Clin Cases 2022;10(16):5337-5342.
8. Ling F, Guo D, Zhu L. Pneumatosis cystoides intestinalis: a case report and literature review. BMC Gastroenterol 2019;19(1):176.
9. Uludağ S. Non-Operative Management of Portomesenteric Venous Thromboembolism After Laparoscopic Sleeve Gastrectomy and the Importance of Long-Term Anticoagulant Prophylaxis. Turk J Diab Obes 2021; 5(1): 19-24.
10. Wu J, Wang Y, Wang C. Amyloidosis: An Unusual Cause of Intestinal Pseudo-Obstruction. Clin Gastroenterol Hepatol 2018;16(5):e53-e54.
11. Bourcier S, Coutrot M, Kimmoun A, et al. Thyroid Storm in the ICU: A Retrospective Multicenter Study. Crit Care Med 2020;48(1):83-90.
12. Shahid MA, Ashraf MA, Sharma S. Physiology, Thyroid Hormone. 2023 Jun 5. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan.
13. Gluvic ZM, Zafirovic SS, Obradovic MM, et al. Hypothyroidism and Risk of Cardiovascular Disease. Current Pharmaceutical Design 2022;28(25):2065-2072.
14. Cappola AR, Fried LP, Arnold AM, et al. Thyroid status, cardiovascular risk, and mortality in older adults. JAMA 2006;295(9):1033-1041.
15. Zhu X, Zhang C, Feng S, He R, Zhang S. Intestinal microbiota regulates the gut-thyroid axis: the new dawn of improving Hashimoto thyroiditis. Clin Exp Med 2024;24(1):39.