CASE SERIES

Mesenteric panniculitis associated with non-alcoholic fatty liver disease: A case series

Mehreen Siyal, Zaigham Abbas, Alina Saeed, Muhammad Ali Qadeer

Abstract

Mesenteric panniculitis (MP) is a benign inflammatory condition of the abdominal mesentery, which presents with a wide variety of symptoms. It is diagnosed non-invasively through computed tomography (CT) scan, whereas biopsy is still considered the gold standard. Steroids are the first line of treatment. Here, we report four cases who presented with abdominal pain. These patients were overweight and the CT scan findings were suggestive of mesenteric panniculitis. Three cases had concomitant non-alcoholic steatohepatitis with elevated alanine transaminase levels, dyslipidaemia, and insulin resistance. FibroScan showed moderate to severe steatosis. PNPLA3 rs738409 genotype was homozygous positive (GG) in one patient, whereas two patients were heterozygous positive (CG). This association has not been well-described so far and warrants further investigation. There may be some common predisposing factors.

Keywords: Mesenteric panniculitis, Non-alcoholic steatohepatitis, Dyslipidaemia, Insulin resistance.

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Introduction

Mesenteric panniculitis is an uncommon idiopathic benign inflammatory condition of the abdominal mesentery, specifically affecting the root of the mesentery. Its prevalence is up to 2.5%,[1] which is slightly higher in males and the Caucasian population between the fifth to seventh decades of life.[2,3] It presents with nonspecific gastrointestinal (GI) symptoms like abdominal pain/discomfort, abdominal bloating/distention, nausea, vomiting, anorexia, weight loss, constipation, diarrhoea, and rarely as intestinal obstruction, hence, making it a less likely option while reaching a diagnosis. Nowadays, MP is widely diagnosed through CT scan, whereas biopsy is still considered the gold standard. Steroids are the first line of treatment. The cases were dealt by the Department of Gastroenterology and Hepatology, Dr. Ziauddin Hospital, Clifton Campus Karachi, Pakistan, during the year 2022. Four cases of MP are being reviewed after taking approval from the Ethics Review Committee of the hospital.

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Case Series

Patient-1: A 42-year-old male, with a history of recurrent episodes of abdominal pain for five years, presented to the emergency department (ED) with complaints of vomiting and abdominal pain for one week. His abdomen was soft with tenderness noted in the epigastric, umbilical, right hypochondriac, and bilateral flank regions. The liver edge was palpable on deep inspiration.

Laboratory workup revealed impaired liver function tests (LFTs) and deranged fasting lipid profile (FLP). FibroScan was suggestive of moderate steatosis and f2 fibrosis. PNPLA3 rs738409 genotype was GG (Table 1).

Abdominal CT scan showed significant mesenteric fat stranding in the umbilical, infra, and supra-umbilical locations, with few enhancing lymph nodes in the inflamed mesentery. The appearance was suggestive of MP. The liver had fatty infiltration. The rest of the abdominal viscera were grossly unremarkable. A mesenteric biopsy was carried out which revealed chronic inflammatory cells with a few polymorphonuclear leukocytes and some fibrosis.

The patient was prescribed Prednisolone 40 mg/day for four weeks with gradual tapering, vitamin E 400 mg twice daily, Rosuvastatin 10 mg, and Pioglitazone 15 mg once a day, which led to improved LFTs and FLP along with symptomatic relief.

Patient-2: A 40-year-old male patient, with no significant past medical history, presented to the outpatient department (OPD) with complaints of abdominal pain and retrosternal burning on and off for 1.5 years. Previous endoscopy had revealed moderate chronic helicobacter (H) pylori-associated active gastritis, but the patient's symptoms persisted despite taking eradication therapy. The abdomen was soft and mildly tender overall. Laboratory workup revealed deranged LFTs and FLP. FibroScan divulged severe steatosis and f2-f3 fibrosis. PNPLA3 rs738409 genotype was CG (Table 1).

Because of the patient's persistent symptoms, a CT scan of

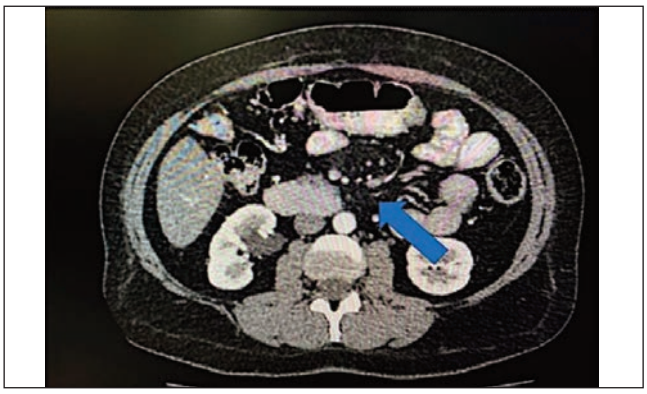

Figure-1a: CT scan of the abdomen with contrast axial view of Case no. 3 showing an area of increased density of mesenteric fat at the root of mesentery which appeared misty with small mesenteric lymph nodes within it.

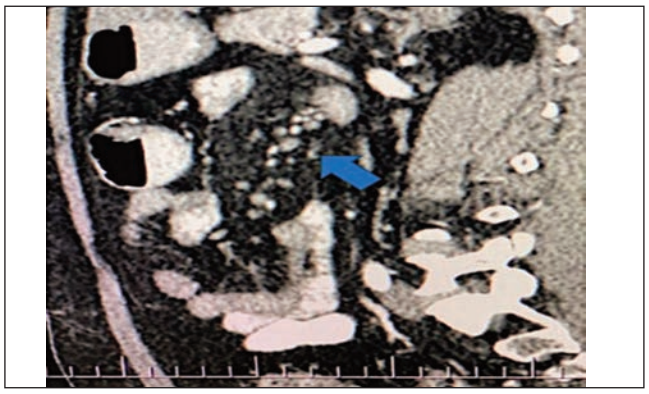

Figure-1b: CT scan of the abdomen with contrast sagittal view of Case no. 3 showing an area of increased density of mesenteric fat at the root of mesentery which appeared misty with small mesenteric lymph nodes within it.

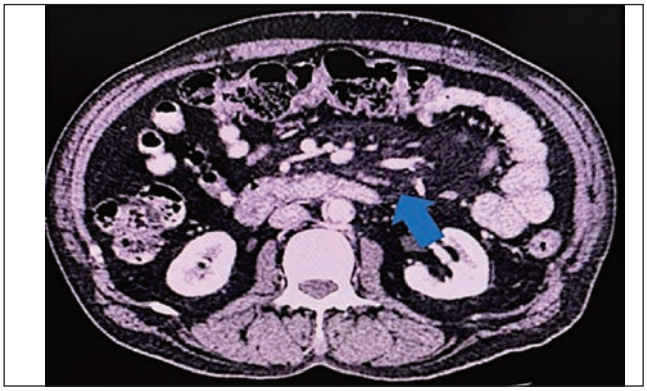

Figure-2a: CT scan of the abdomen with contrast axial view of Case no. 4 showing significant fat stranding within the mesentery in the mid and left side of the abdomen with few sub-centimetre lymph nodes.

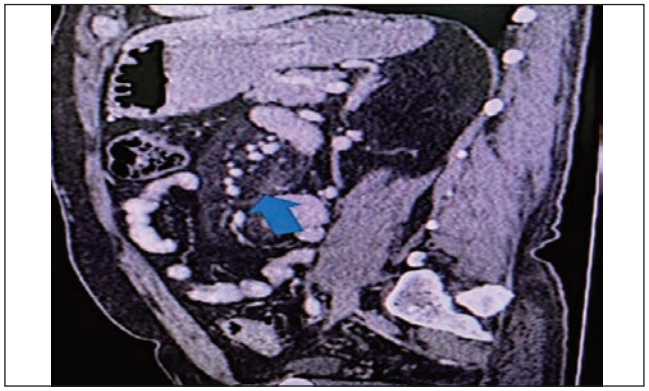

Figure-2b: CT scan of the abdomen with contrast sagittal view of Case no. 4 showing significant fat stranding within the mesentery in the mid and left side of the abdomen with few sub-centimetre lymph nodes.

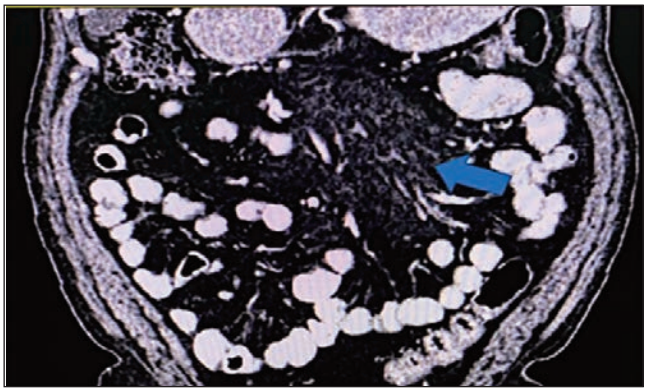

Figure-2c: CT scan of the abdomen with contrast coronal view of Case no. 4 showing significant fat stranding within the mesentery in the mid and left side of the abdomen with few sub-centimetre lymph nodes.

the abdomen was done which displayed multiple prominent enhancing lymph nodes in the root of the mesentery with the adjacent halo of fat stranding, extending up to the right iliac fossa. The liver showed fatty infiltration.

The patient was prescribed Prednisolone 40 mg/day for four weeks followed by gradual tapering, along with proton pump inhibitors and Rosuvastatin, from which the patient's symptoms improved.

Patient-3: A 45-year-old female with no known prior co-morbidity presented to the ED with complaints of recurrent epigastric pain, nausea, and heartburn. On examination, the abdomen was soft with a moderately tender epigastric region and palpable liver edge on deep inspiration.

Laboratory workup revealed elevated LFTs, serum cholesterol, and c-reactive protein (CRP) levels. Upper GI endoscopy and colonoscopy were unremarkable. Given the patient's history, a CT scan of the abdomen with contrast was advised which revealed mild fat stranding with a few small sub-centimetre (<1 centimetre) lymph nodes at the root of the mesentery (Figure 1a,1b). The liver showed diffuse fatty infiltration. FibroScan suggested moderate steatosis and f2-f3 fibrosis. PNPLA3 rs738409 genotype was CG (Table 1).

The patient was prescribed Prednisolone 40 mg/day for four weeks with gradual tapering, which provided

Table: : Laboratory parameters of the study patients.

	Patient 1	Patient 2	Patient 3	Patient 4	Reference range
Age (years)	42	40	45	65	-
Gender	Male	Male	Female	Male	-
BMI	29.7	28.9	29	26	kg/m^2 below 18.5=underweight between 18.5 and 24.9=healthy weight between 25 and 29.9=overweight between 30 and 39.9=obese
Haemoglobin	15.4	15.4	12.6	12.7	13-17 gm/dl
Total leucocyte count	13.3	7.6	9.5	8.1	4-10 x 10^9/L
Platelet count	356	248	358	165	150-440 X 10^9/L
ESR	11	9	69	18	0 - 20 mm/1st hour
CRP	24.3	0.47	23.6	3.75	Upto 5.0 mg/L
Total bilirubin	1.46	0.5	0.2	0.26	0-2 mg/dl
Direct bilirubin	0.37	0.2	0.1	0.11	<0.3 mg/dl
Indirect bilirubin	1.09	0.3	0.1	0.15	0.2-0.8 mg/dL
ALT	65	77	53	10	Male: 29 to 33 U/L Female: 19 to 25 U/L
AST	38	37	36	14	Male: less than 35 U/L Female: less than 31 U/L
ALP	51	77	111	72	Male: 53-128 U/L Female: 42-98 U/L
GGT	98	37	54	24	Male: less than 55 U/L Female: less than 38 U/L
Albumin	4.1	4.0	4.2	4.17	3.5-5.2 gm/dl
Serum amylase	101	85	80	65	28 - 100 IU/L
Serum lipase	52.5	56	54	44	13-60 IU/L
Urea	24	34	35	23	17-49 mg/dl
Creatinine	1.04	1.1	0.8	1.31	Male: 0.9-1.3 mg/dl Female: 0.6-1.1 mg/dl
Sodium	137	139	140	141	136-149 MEq/L
Potassium	4.3	4.0	4.2	4.5	3.8-5.2 MEq/L
HbsAg	Negative	Negative	Negative	Negative	-
Anti-HCV	Negative	Negative	Negative	Negative	-
FBS	110	106	104	123	Less than 100 mg/dl
Fasting insulin	18.2	21.1	13.7	-	3.3 - 17.5 uU/ml
HOMA-IR	4.9	5.5	3.5	-	>2 suggests insulin resistance
HBA1C	6	6.4	5.3	7.3	<6.5%
KPA	8.3	11	9.8	-	F0-F1 : ≤7.3 F2 : 7.4-9.7 F2-F3 : 9.8-12.4 F3-F4: 12.5-17.5 F4 : >17.5
CAP	270	347	291	-	Normal : ≤240 Mild : 241-265 Moderate: 266-295 Severe : >295
PNPLA3	GG	CG	CG	-	-
Cholesterol	240	225	236	195	Without known CAD <= 200 mg/dl With known CAD <= 160 mg/dl
Triglycerides	230	101	117	117	70 – 150 mg/dl
TSH	1.74	1.60	2.97	0.78	21-54 Years =0.4 - 4.2 µIU/ml 55 - 87 Years =0.5 - 8.9 µIU/ml

BMI, body mass index; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; GGT, gamma-glutamyl transferase; HbsAg, hepatitis B surface antigen; Anti-HCV, HCV antibody test; FBS, fasting blood sugar; HOMA-IR, homeostasis model assessment-estimated insulin resistance; HBA1C, glycosylated haemoglobin; KPA, kilopascals; CAP, controlled Attenuation Parameter; PNPLA3, patatin-like phospholipase domain-containing protein 3; TSH, thyroid stimulating hormone.

symptomatic relief. Rosuvastatin 10 mg at night and Metformin 250 mg twice a day was also given.

Patient-4: A 65-year-old male, known case of diabetes mellitus type 2, came to the OPD with the complaint of episodic diffuse abdominal pain on and off for six months. The last episode occurred 15 days before presentation, which resolved after taking symptomatic treatment. The pain was gradual in onset, mild to moderate in intensity, generalised, and non-radiating. Each episode lasted for a few days, and was relieved by taking symptomatic treatment. There was no history of altered bowel habits, weight loss, or blood in stools. The patient had upper GI endoscopy and colonoscopy done previously which were grossly unremarkable. Baseline investigations were within normal ranges (Table 1).

Because of the patient's recurrent symptoms, a CT scan of the abdomen was done which disclosed significant fat stranding within the mesentery in the mid and left side of the abdomen. A few sub-centimetre mesenteric lymph nodes were also seen. (Figure 2a-2c). Fatty liver was excluded by normal liver attenuation index (LAI).

The patient was pain-free at the time of presentation in OPD, thus no treatment was advised and the patient was asked to follow-up in the OPD if pain recurs.

Discussion

MP may be an asymptomatic condition, with patients being incidentally diagnosed on CT scan. However, patients can present with a wide range of GI symptoms.[4] It has been associated with a variety of conditions such as vasculitis, autoimmune disorders, granulomatous diseases, abdominal surgery or trauma, gallstone, infections, and malignancies.[5]

All the cases discussed here presented

with recurrent mild to moderate abdominal pain. Due to the persistence of symptoms, a CT scan of the abdomen was advised, which, in each case, revealed characteristic findings of MP. CT scan findings in MP can reveal the appearance of a 'fat ring' (halo sign) that is formed by the preservation of fat around the mesenteric vessels, and a tumoural 'pseudo-capsule' representing a band of soft tissue that surrounds the mesenteric adipose tissue.[6] Ground-glass appearance of the mesenteric fat, misty mesentery, and calcifications due to adipose tissue necrosis can also be seen.[1] These findings may sometimes be difficult to appreciate on a CT scan and may require a biopsy of the tissue to rule out peritoneal malignancy, lymphoma, carcinoid tumour, or mesenteric oedema.[7]

All four patients were overweight. Three of them had non-alcoholic steatohepatitis (NASH) with elevated liver enzymes, dyslipidaemia, and insulin resistance as evidenced by increased homeostasis model assessment-estimated insulin resistance HOMA-IR values[8] and moderate to severe steatosis on fibroScan. Patient 4 had no evidence of NASH, as evident by normal laboratory parameters and normal LAI which is a non-invasive method to correctly evaluate hepatic steatosis.[9] Future case series on patients with lean NASH and associated mesenteric panniculitis are warranted.

Vibration controlled transient elastography (FibroScan) was used to delineate the severity of liver fibrosis and steatosis. Chaidez A et al suggested that liver stiffness measurement (LSM) and controlled attenuation parameter (CAP) measurement by fibroScan correlates with liver histologic fibrosis stage and steatosis grade respectively.[10]

PNPLA3 rs738409 gene is the most common and most potent gene associated with hepatic steatosis, steatohepatitis, fibrosis, and cirrhosis, indicating its pivotal role in the development of NAFLD. Salari N et al suggested that individuals with CG genotype have 19% greater risk, whereas those with GG genotype are 105% more likely to develop NAFLD.[11] PNPLA3 rs738409 genotype analysis was homozygous positive (GG) in one patient, whereas two patients were heterozygous positive (CG) (Table 1). PNPLA3 rs738409 genotype analysis was not done in Patient 4 because there was no evidence of NAFLD.

Association between mesenteric panniculitis and liver involvement has been reported previously by Morii K et al, who suggested possible cholestatic liver dysfunction in a patient with MP.[12] It is hypothesised that MP may also be linked to NAFLD and a dyslipidaemic state, whereas leaky gut syndrome could be the root cause.[13] Further studies should be done at molecular level to establish this link.

With increased recognition, among radiologists, of the typical MP findings on CT scan, most reported symptomatic cases are being diagnosed on CT.[4] All four of the study cases were diagnosed through a CT scan. Mesenteric biopsy is not routinely carried out based upon MP's mostly benign and predominately asymptomatic clinical presentation, however, it can be performed if the clinical suspicion of any underlying malignancy is high.[5] One of the patients underwent mesenteric biopsy due to prolonged history, which showed predominant chronic inflammatory infiltrates with some fibrosis, correlating with the histopathological finding of MP.[14]

Multiple treatment options are considered for treating MP; steroids being the first line, while other options include Colchicine, TNF inhibitors, or Thalidomide.[15] All four study patients were followed-up in the OPD at an interval of one month after establishing the diagnosis and starting treatment. The first three patients were effectively treated with Prednisolone, in accordance with the recommended steroid regimen for treating patients with MP.[5,15] Patient 4 was advised symptomatic treatment as required. He was not given steroids because pain had already settled down. Due to benign nature of MP, treatment decisions are guided by the severity of symptoms.

As evident by previous studies, radiological follow-up is not warranted and, hence, management should be guided by symptoms.[15] Therefore, repeat CT was not sought as the patients had marked symptomatic relief on follow-up visits. All the four patients were followed-up for an average duration of two years, and remained symptom free.

Conclusion

These cases highlight the fact that MP should be kept in the differential diagnosis of recurrent abdominal pain in patients in whom other common causes have been excluded. CT scan of the abdomen is sufficient to confirm the diagnosis. Herein, rare cases of mesenteric panniculitis presenting in connotation with non-alcoholic fatty liver disease are reported. This case series highlights a possible association between the two conditions. However, further studies with larger cohorts are needed to establish this link.

Consent: Informed consent was obtained from the patients for reporting their case series.

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References

1. van Putte-Katier N, van Bommel EF, Elgersma OE, Hendriksz TR. Mesenteric panniculitis: prevalence, clinicoradiological presentation and 5-year follow-up. Br J Radiol 2014;87:20140451. doi: 10.1259/bjr.20140451
2. Ferrari TC, Couto CM, Vilaça TS, Xavier MA, Faria LC. An unusual presentation of mesenteric panniculitis. Clinics (Sao Paulo) 2008;63:843-4. doi: 10.1590/s1807-59322008000600023
3. Issa I, Baydoun H. Mesenteric panniculitis: various presentations and treatment regimens. World J Gastroenterol 2009;15:3827-30. doi: 10.3748/wjg.15.3827
4. Gunduz Y, Tatli AP, Kara RO. Mesenteric panniculitis: a case report and review of the literature. Maedica (Bucur) 2012;7:344-7.
5. Alsuhaimi MA, Alshowaiey RA, Alsumaihi AS, Aldhafeeri SM. Mesenteric panniculitis various presentations and management: A single institute ten years, experience. Ann Med Surg (Lond) 2022;80:104203. doi: 10.1016/j.amsu.2022.104203
6. Horton KM, Lawler LP, Fishman EK. CT findings in sclerosing mesenteritis (panniculitis): spectrum of disease. Radiographics 2003;23:1561-7. doi: 10.1148/rg.1103035010
7. Sheth S, Horton KM, Garland MR, Fishman EK. Mesenteric neoplasms: CT appearances of primary and secondary tumors and differential diagnosis. Radiographics 2003;23:457-73. doi: 10.1148/rg.232025081
8. Majid H, Masood Q, Khan AH. Homeostatic Model Assessment for Insulin Resistance (HOMA-IR): A Better Marker for Evaluating Insulin Resistance Than Fasting Insulin in Women with Polycystic Ovarian Syndrome. J Coll Physicians Surg Pak 2017;27:123-6.
9. Atef HM, Korayem EM, Ahmed NA, Houseni MM, El-Refaie AM, Gomaa MI. Assessment of hepatic steatosis of potential living donor before liver transplantation using liver/spleen CT attenuation ratio compared to liver biopsy. Egypt J Radiol Nucl Med 2023;54:212. Doi: 10.1186/s43055-023-01165-z
10. Chaidez A, Pan Z, Sundaram SS, Boster J, Lovell M, Sokol RJ, et al. The discriminatory ability of FibroScan liver stiffness measurement, controlled attenuation parameter, and FibroScan-aspartate aminotransferase to predict severity of liver disease in children. Hepatol Commun 2022;6:3015-23. doi: 10.1002/hep4.1983
11. Salari N, Darvishi N, Mansouri K, Ghasemi H, Hosseinian-Far M, Darvishi F, et al. Association between PNPLA3 rs738409 polymorphism and nonalcoholic fatty liver disease: a systematic review and meta-analysis. BMC Endocr Disord 2021;21:125. doi: 10.1186/s12902-021-00789-4
12. Morii K, Hatono T, Okushin H, Watanabe T, Sato S, Uesaka K, et al. Mesenteric panniculitis presenting as liver dysfunction. Clin J Gastroenterol 2012;5:113-8. doi: 10.1007/s12328-011-0281-2
13. Poeta M, Pierri L, Vajro P. Gut-Liver Axis Derangement in Non-Alcoholic Fatty Liver Disease. Children (Basel) 2017;4:66. doi: 10.3390/children4080066
14. Akram S, Pardi DS, Schaffner JA, Smyrk TC. Sclerosing mesenteritis: clinical features, treatment, and outcome in ninety-two patients. Clin Gastroenterol Hepatol 2007;5:589-96. doi: 10.1016/j.cgh.2007.02.032
15. Nyberg L, Björk J, Björkdahl P, Ekberg O, Sjöberg K, Vigren L. Sclerosing mesenteritis and mesenteric panniculitis - clinical experience and radiological features. BMC Gastroenterol 2017;17:75. doi: 10.1186/s12876-017-0632-7

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