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Systemic lupus erythematosus with intestinal pseudo-obstruction and polyserositis complicated by pneumatosis intestinalis and pulmonary embolism: a unique challenge posed by a fatal combination

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Abstract

Systemic lupus erythematosus (SLE) is a multisymptomatic autoimmune rheumatic disease. Some complications are well known and can be life-threatening, such as pulmonary embolism (PE) and, in general, thrombotic events due to endothelial dysfunction, platelet activation, and secondary antiphospholipid syndrome. Gastrointestinal (GI) involvement is less prevalent and is not directly associated with a life-threatening risk. Hovewer, lupus mesenteric vasculitis, intestinal pseudo-obstruction (IPO), and enteropathy indicate that closer attention should be paid to these complications. Therefore, the aim of this review is to identify cases of SLE with IPO, pneumatosis intestinalis (PI), and PE in the current literature. The case of a patient with SLE and IPO became the stimulus for this research and discussion. Finally, after the selection process, 49 studies were reviewed and included in the analysis; as a result, the literature typically describes cases of IPO and PI, but only rare reports present an association of these complications with thrombotic events such as PE. In conclusion, research should focus more deeply on SLE patients with complex GI and thrombotic manifestations.

Key words: pulmonary embolism, systemic lupus erythematosus, pneumatosis intestinalis, intestinal pseudo-obstruction.

Introduction

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease marked by immunological dysregulation and generation of autoantibodies against nuclear and cytoplasmic antigens [1]. As a multisystem illness, it predominantly affects the musculoskeletal, renal, and haematological systems; however, gastrointestinal (GI) involvement – although less prevalent – can be severe and life-threatening [2]. Among GI manifestations, lupus mesenteric vasculitis (LMV), intestinal pseudo-obstruction (IPO), and protein-losing enteropathy are particularly important. Lupus mesenteric vasculitis is due to immune complex deposition in mesenteric arteries, resulting in ischaemia and gut wall oedema [2, 3]. Intestinal pseudo-obstruction is characterised by impaired intestinal motility in the absence of mechanical obstruction and may result from myopathy or neuropathy affecting the bowel musculature and nerves, leading to symptoms that mimic mechanical obstruction [4–7].

Epidemiology

The global prevalence of SLE is estimated at 43.7 per 100,000 individuals; adult women are especially affected, with a prevalence of up to 108.75 per 100,000 [8–10]. In India, SLE prevalence is lower, at around 3.2 per 100,000. Asians have a higher genetic predisposition,

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with institutional genes such as *HLA-DR2*, *HLA-DR3*, and *STAT4* overrepresented [11–13]. Known risk factors include ultraviolet exposure, infections, and environmental pollutants. The mortality rate among Asian SLE patients is higher than among Caucasians due to aggressive disease and differences in health care availability [14, 15].

Pathophysiology

Systemic lupus erythematosus-related IPO is considered rare, and its exact aetiology remains unclear. Proposed mechanisms include immune complex deposition in smooth muscle cells, vasculitis leading to ischaemia and hypomotility, and autonomic dysfunction [16, 17]. Gastrointestinal manifestations in SLE may arise from immune-mediated mechanisms, ischaemia, vasculitis, and neuromuscular dysfunction [18]. Systemic lupus erythematosus disrupts the normal neuromuscular control of the GI tract, resulting in impaired peristalsis, which leads to the accumulation of intestinal contents and progressive bowel distension [2, 19, 20].

Thrombosis is a well-established manifestation in SLE, attributed to endothelial dysfunction, platelet activation, hypercoagulability, and chronic inflammation [22–25]. Antiphospholipid antibody positivity further increases the risk of thrombotic events such as deep vein thrombosis and pulmonary embolism (PE) [26]. The pathogenesis of thrombosis involves complement activation and disruption of anticoagulant pathways [27, 28].

Clinical presentation and diagnosis

Patients with SLE-related IPO often present with acute abdominal distension, nausea, vomiting, constipation, and inability to pass gas, mimicking true mechanical bowel obstruction. Imaging, such as computed tomography (CT), typically reveals dilated bowel loops without evidence of physical obstruction. Delayed diagnosis may result in bacterial translocation, sepsis, and multi-organ failure [29–32].

Differentiating IPO from LMV can be challenging due to overlapping symptoms; however, LMV usually features bowel wall thickening, target signs, and ischaemia, while IPO is marked by massively dilated bowel loops without obstruction [33–36].

Material and methods

A thorough review of the literature was carried out to identify cases of SLE with IPO, pneumatosis intestinalis (PI), and PE. The review focuses on an overview of GI and thrombotic problems in SLE, the relationship between LMV and pseudo-obstruction, and the probable role of PI as a severe manifestation of lupus-associated vasculopathy. The Medical Subject Headings and key word search terms associated with SLE were used in each database. In order not to miss potentially useful articles, references cited in relevant reviews were also searched manually. The search terms included the following: "systemic lupus erythematosus", "intestinal pseudo-obstruction", "polyserositis", "pneumatosis intestinalis", "pulmonary embolism", and "lupus mesenteric vasculitis". The literature search was carried out using PubMed, Google Scholar, Cochrane Library, Litmaps and other relevant medical databases. The literature search was limited to 10 years to ensure the inclusion of recent and relevant clinical findings. Studies on SLE patients with GI and thrombotic complications, notably those involving IPO, PI, and PE, were considered. The original database search produced 2,860 items, which were vetted for relevancy and then categorised. The study articles included SLE and its GI and thrombotic manifestations, LMV, the epidemiology and clinical characteristics of SLE-related IPO, and current treatment methods. Several articles were omitted because they lacked SLE specificity or failed to properly explain GI or thrombotic effects. Studies that primarily focused on experimental data and had no direct clinical correlates were also removed. Opinion-based pieces, editorials, and abstracts without full-text were also excluded.

The initial screening comprised examining titles and abstracts to remove papers that did not fulfil the inclusion criteria. Articles that passed this stage were submitted to a full-text evaluation to ensure their relevancy according to pre-set criteria. Following the screening procedure, eligible studies were classified according to SLE disease symptoms such as GI problems, vascular involvement, thrombotic hazards, clinical characteristics, and therapeutic options. The review encompassed case reports, case series, review papers, and original research articles published in English.

A total of 49 studies were reviewed and included in this case-based analysis. Data extraction was limited to studies that provided clinically relevant information about SLE with IPO and related thrombotic events. Two reviewers independently examined the studies' eligibility, extracted data, and determined the risk of bias. Disagreements among reviewers were handled through conversation until agreement was reached. The extracted data comprised general study information (first author, publication year, country, study design) (Fig. 1) [37].

This study was conducted in accordance with the principles of the Declaration of Helsinki (as revised in 2024). Written informed consent was obtained from the patient for participation in the study and publication of the photographs.

Case description

A 24-year-old woman with SLE (diagnosed 7 years earlier, initially presenting with polyarthralgia and pho-

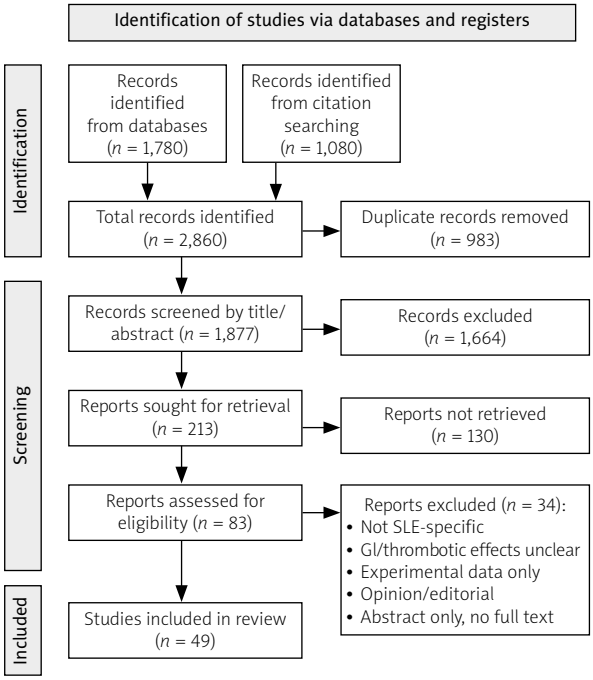


Fig. 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 flow diagram of the study selection process (databases searched: PubMed, Google Scholar, Cochrane Library, Litmaps; plus citation searching) [37].

GI – gastrointestinal, SLE – systemic lupus erythematosus.

tosensitivity) presented with acute-onset diffuse abdominal pain and vomiting for 5 days. Patient prior disease had been well controlled with hydroxychloroquine and low-dose glucocorticosteroids (GCs); however, the patient had discontinued medications upon symptom resolution.

On examination, the patient was hypotensive with a distended, tender abdomen and ascites. Computed tomography imaging revealed fluid-filled dilated jejunal loops and oedematous bowel wall thickening, moderate ascites, and mild bilateral pleural effusion. Laboratory findings showed elevated anti-dsDNA (173.1 IU/ml), low complement levels, and acute kidney injury (serum creatinine 1.4 mg/dl, blood urea 75 mg/dl). Lupus mesenteric vasculitis with polyserositis was initially diagnosed. The patient received pulse methylprednisolone (1 g daily for 5 days), resulting in decreased abdominal distension.

On day 5, patient developed dyspnoea, with imaging showing moderate pleural effusion and a highly elevated D-dimer (4,404 ng/ml) (Fig. 2). The CT pulmonary angiography revealed segmental PE (Fig. 3). Abdominal CT showed duodenal and jejunal dilation and intramural air consistent with PI (Fig. 4).

Laparoscopy, converted to laparotomy, revealed massively distended bowel with pre-gangrenous changes,

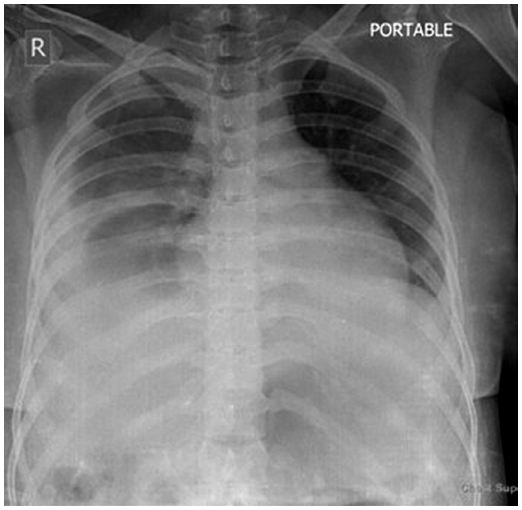


Fig. 2. X-ray showing obliteration of the right costophrenic angle and increased opacity over the lower half of the right hemithorax, suspicious for pleural collection. Photograph was provided by Caritas Hospital and Institute of Health Sciences, Thellakom, Kottayam, India.

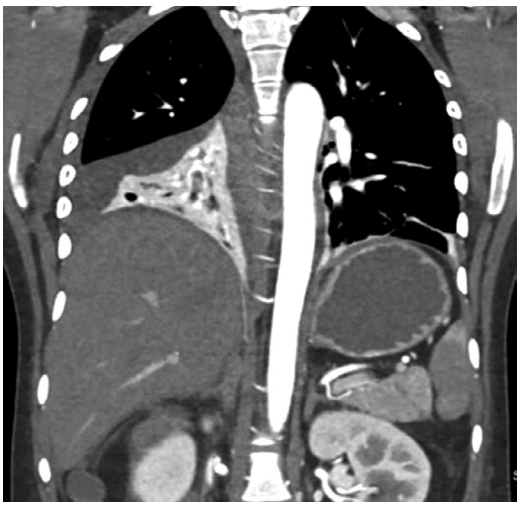


Fig. 3. Right moderate pleural effusion with filling defects in the right lower lobe pulmonary artery segmental branches, suggestive of pulmonary embolism. Photograph was provided by Caritas Hospital and Institute of Health Sciences, Thellakom, Kottayam, India.

intramural air, moderate ascites, and no mechanical obstruction. Appropriate surgical decompression and supportive care were undertaken (Fig. 5).

Postoperatively, the patient was managed with total parenteral nutrition, intravenous GCs (1 mg/kg prednisolone equivalent), broad-spectrum antibiotics, and therapeutic anticoagulation. The phospholipid antibody

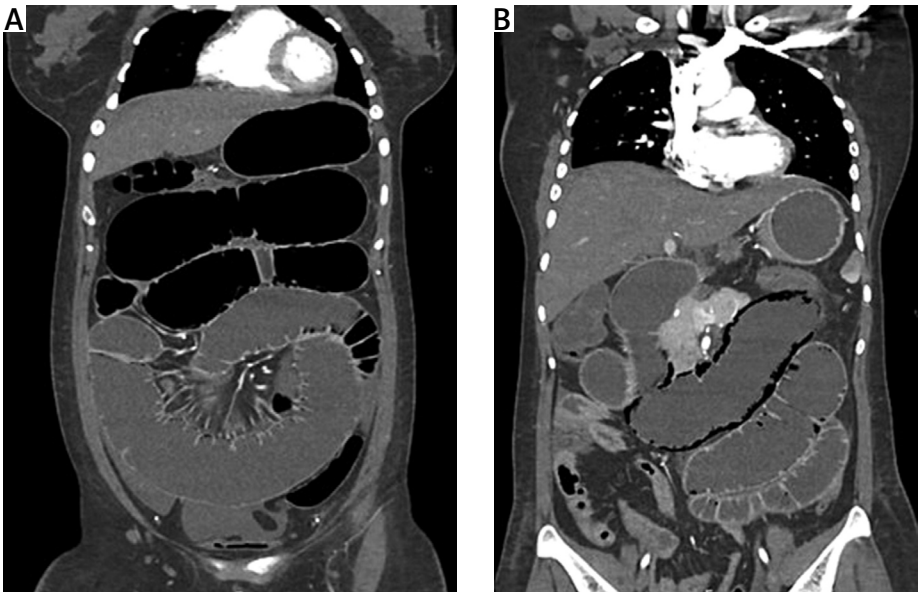


Fig. 4. A) Multiple air pockets within the distal duodenal and jejunal loops, indicative of pneumatosis intestinalis. B) Significant dilatation of the duodenal and jejunal loops with gradual transition to normal-sized ileum. Photographs were provided by Caritas Hospital and Institute of Health Sciences, Thellakom, Kottayam, India.

profile was negative. The patient's condition gradually improved, and she was discharged on hydroxychloroquine, oral GCs, and warfarin. Follow-up included GC tapering and the addition of mycophenolate mofe-til. The patient remains asymptomatic at outpatient follow-up.

Discussion

Systemic lupus erythematosus predominantly affects women of reproductive age and exhibits substantial clinical heterogeneity, making accurate diagnosis challenging. The disease's characteristic immune dysregulation – marked by aberrant B and T cell activation and loss of immune tolerance – underlies its diverse systemic manifestations [21, 38, 39].

This report describes a 24-year-old woman with SLE, who developed a rare combination of IPO, polyserositis, PI, and PE. Severe GI involvement in SLE – particularly when associated with vascular and thrombotic complications – remains uncommon, making this case clinically significant. Through comparison with existing literature, this case underscores the critical need for early recognition, comprehensive diagnostic evaluation, and timely initiation of immunosuppressive therapy for such atypical and life-threatening manifestations. By integrating current pathophysiological insights, diagnostic strategies, and management approaches, this report adds to the growing body of evidence on complex GI SLE and highlights important considerations for multidisciplinary care in similar presentations [13, 14].

Intestinal pseudo-obstruction in systemic lupus erythematosus

Intestinal pseudo-obstruction is a rare but significant manifestation of SLE [40]. A systematic review analysed 60 cases of SLE-related IPO, noting that the mean age of presentation was 30 years, with a female predominance, similar to our case [41, 42]. Studies highlight that IPO often coexists with polyserositis, similar to the present case [43, 44].

Imaging is pivotal in diagnosis and for exclusion of mechanical causes. Differentiation from LMV is essential because the management strategies differ. Aggressive immunosuppression with GCs is first line, with adjunctive immunomodulators (mycophenolate mofetil, cyclophosphamide) for refractory cases [2].

Pneumatosis intestinalis is a condition defined by the presence of gas within the intestine wall. It might be primary (idiopathic) or due to diseases such as ischaemia, infections, mechanical intestinal obstruction, or GC treatment. Pneumatosis intestinalis is a rare manifestation of SLE. The presentation varies from asymptomatic (common) to gut wall perforation, blockage, GI haemorrhage, and death. There are different treatment options for primary and secondary PI. Because PI is not a medical condition but rather a complication, treatment must address the underlying cause. In patients lacking features of life-threatening diseases such as peritonitis or sepsis, a cautious, non-surgical approach is recommended. Conservative therapies include observation, hyper-

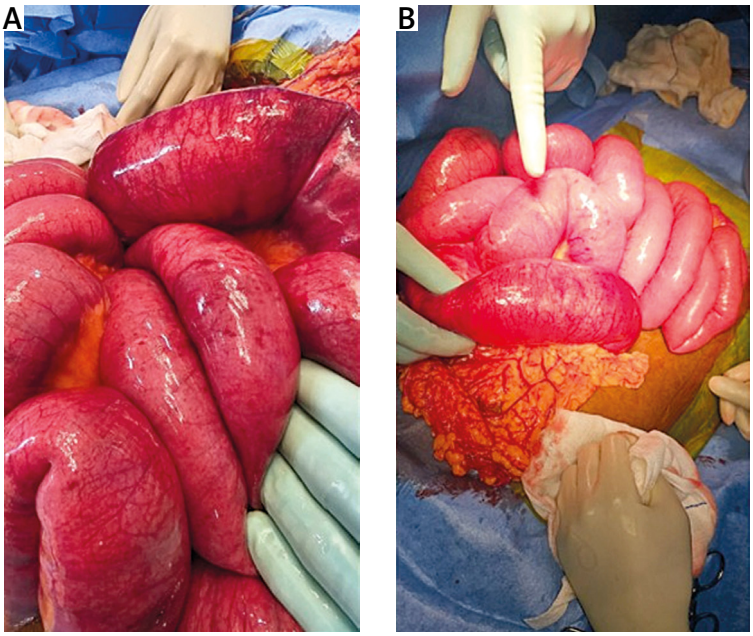


Fig. 5. Intraoperative images showing hugely distended jejunal loops with no obvious transition point. Intramural air is seen in the bowel loops. A, B) Multiple pre-gangrenous patches are present with no evident perforation. Photographs were provided by Caritas Hospital and Institute of Health Sciences, Thellakom, Kottayam, India.

baric oxygen therapy, antibiotics to prevent intestinal bacterial infection, and endoscopy. Elevated white blood cell count, conclusive imaging demonstrating portal venous gas, and clinical signs of sepsis or acidosis are all indicators of PI requiring surgical intervention. Endoscopy with sclerotherapy is another more targeted technique for patients with PI-induced intestinal blockage. Endoscopic treatment entails fine-needle aspiration of the many cysts, to expel the gas and remove the intestinal obstruction. Pneumatosis intestinalis causes a variety of complications, which are classified as intestinal or extraintestinal symptoms. Extraintestinal problems include adhesions and compression of adjacent tissues. Cysts can induce outpouchings that directly squeeze adjacent organs. Rupture of these cysts can cause pneumoperitoneum, which requires immediate surgical intervention [42–46].

The preferred imaging modality is abdominal CT because PI is rarely detected on erect abdominal X-rays or ultrasound. Endoscopy and endoscopic ultrasonography are considered the gold standard in diagnosing PI [47–49].

The importance of multidisciplinary care in systemic lupus erythematosus management

A multidisciplinary approach – including rheumatology, gastroenterology, surgery, and intensive care – is vital for optimal outcomes. Patient education and collaborative decision-making further enhance treatment adherence.

Future directions

This case underscores several important avenues for future research and clinical practice. While both LMV and IPO are recognised complications of SLE, the simultaneous occurrence of PI and PE is exceptionally rare, highlighting the need for further awareness of multisystem involvement in acute SLE presentations. Published literature typically describes IPO and PI individually, with only rare reports of their association with thrombotic events such as PE [19, 32, 48].

Glucocorticosteroids remain the cornerstone of treatment for severe GI manifestations in SLE. However, the value of incorporating GC-sparing immunosuppressive agents – such as mycophenolate mofetil and cyclophosphamide – into long-term management plans warrants additional study, because early introduction may reduce the risk of recurrent GI complications and limit GC exposure. Emerging evidence supports the use of biologics, including rituximab and belimumab, in refractory or severe cases, but larger studies are needed to define their optimal role in this context [49].

Ongoing research should prioritise long-term outcome studies for SLE patients with complex GI and thrombotic manifestations, evaluating the effectiveness of targeted therapies in preventing relapse and improving survival rates. The development and validation of novel biomark-

ers and advanced imaging techniques could facilitate earlier detection of complications such as PI and PE, allowing for more timely interventions.

Finally, clinicians should maintain a high index of suspicion for PI and pneumoperitoneum in any SLE patient with IPO who fails to improve on standard therapy or develops persistent or worsening symptoms. Close collaboration among rheumatology, gastroenterology, surgery, and critical care teams remains essential for improving outcomes in such challenging cases.

Study limitations

This review is limited by the condition's rarity, small case numbers, and restricted long-term follow-up data. The lack of specific diagnostic biomarkers and absence of a control group limit broader conclusions. Further studies focusing on biomarker discovery and the role of biologics are recommended.

Conclusions

Severe GI and thrombotic complications of SLE – including IPO, PI, and PE – require high clinical suspicion, urgent diagnosis, and coordinated multidisciplinary treatment. This case highlights the importance of early immunosuppression, surgical intervention when indicated, and prolonged follow-up for remission maintenance.

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Disclosures

Conflict of interest: The authors declare no conflict of interest.

Consent for publication: Photographs were provided by Caritas Hospital and Institute of Health Sciences, Thellakom, Kottayam, India. Written informed consent for the publication of the photographs was obtained from the patient.

Ethics approval: Not applicable.

Data availability: The data that support the findings of this study are available on request from the corresponding author (A.M.).

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