



## International Journal of Case Reports (ISSN:2572-8776)



# Gas in the Inferior Mesenteric Vein – successful non operative management of a rare complication of diverticulitis

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### ABSTRACT

Septic phlebitis (also known as pyelephlebitis) because of diverticulitis is a rare but important complication. Many previous cases have mandated urgent surgical management for fear of further deterioration. This case report details one of the first cases where septic phlebitis was successfully managed conservatively, and details important clinical lessons clinicians should be aware of.

**Keywords:** Septic phlebitis, pyelephlebitis, diverticulitis, inferior mesenteric vein (IMV) gas.

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#### How to cite this article:

Williams, Ryan; Chuang,Tzu-Yi;  
Choy, Kay Tai; Ranasinghe, Saran-  
ga. Gas in the Inferior Mesenteric  
Vein – successful non operative  
management of a rare complication  
of diverticulitis. International Jour-  
nal of Case Reports, 2021, 5:232.

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## Introduction

Diverticulitis complicated by septic phlebitis is a rare but important condition clinicians should be aware of. We present a case of a 66-year-old female with septic phlebitis from complicated sigmoid diverticulitis which was successfully managed without the need for operative intervention.

## Case Report

A 66-year-old female presented to the emergency department following a two-week history of left lower quadrant abdominal pain, vomiting and diarrhoea with per rectal bleeding. She had known diverticulosis of the sigmoid seen on a recent colonoscopy. She had a previous episode of diverticulitis four years prior which was managed non-operatively with intravenous antibiotics.

She had no past surgical history and no family history of bowel cancer or inflammatory bowel disease. Other past medical history included hypertension, depression and active smoking. On examination, she was haemodynamically stable and afebrile with a soft non-distended abdomen. There was left lower abdominal tenderness on palpation and percussion but no rebound tenderness. Biochemical tests showed elevated white cell count [ $13.1 \times 10^9/L$ ], elevated c-reactive protein level of 33 mg/L and normal kidney and liver function.

With a working diagnosis of sigmoid diverticulitis, a CT scan of the abdomen and pelvis was ordered, which revealed diverticulitis with contained perforation. Worryingly, the CT also revealed extension of gas into the inferior mesenteric vein [IMV] and its tributaries with surrounding fat stranding in keeping with septic phlebitis. No thrombi or gas locules were identified in the IMV, main portal vein or hepatic vasculature.

The presence of septic phlebitis presented a management dilemma. The presence of IMV gas suggested an uncommon but potentially morbid complication of diverticulitis where timely intervention might be needed. However, the

patient remained hemodynamically stable with absence of an acute abdomen. Adopting a trial of conservative management, she was subsequently admitted to the surgical ward and managed non-operatively with intravenous piperacillin/tazobactam. Serial examinations and close observations revealed a gradually improving clinical picture and she remained as inpatient for total of five days of intravenous antibiotics.

Post discharge, an interval CT scan one week later demonstrated that there were no hepatic complications, new thrombi or extension of gas within the IMV.

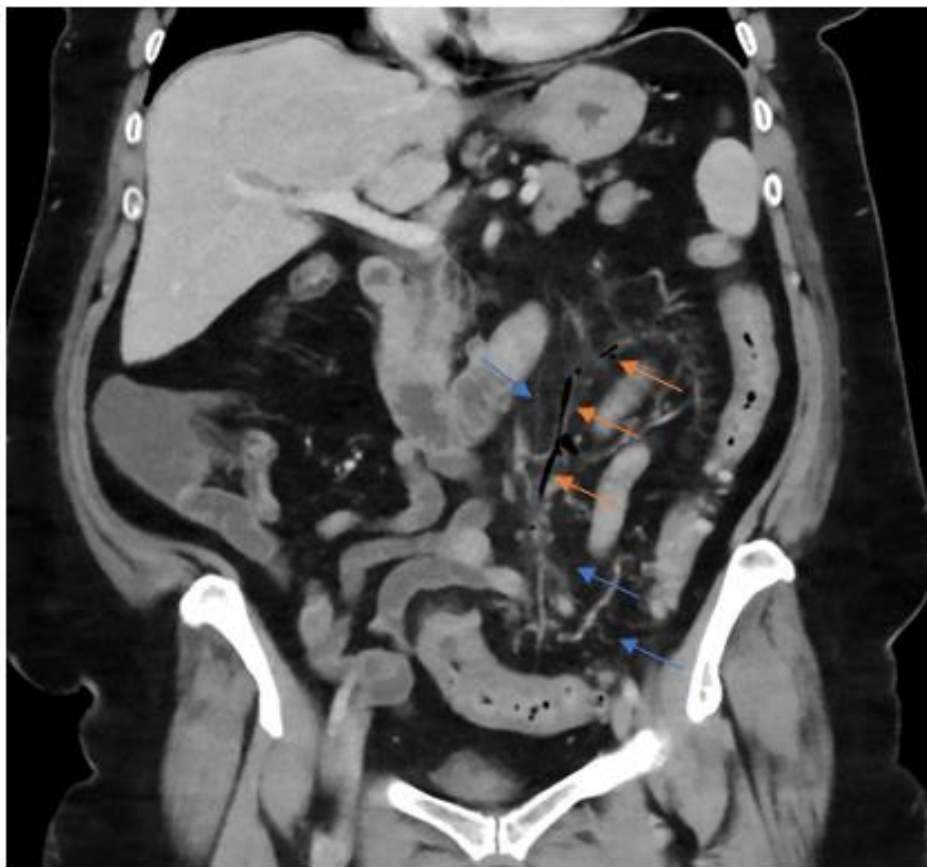
Septic phlebitis is a rare but important complication of diverticulitis that clinicians should be aware of. Diverticulitis of the colon results in local inflammatory changes which extend to the surrounding mesentery – demonstrated in Figure 1 as fat stranding. This has implications for the surrounding vasculature. The IMV arises from small veins that drain the sigmoid. It runs medially to the descending colon within the mesocolon in the left anterior pararenal space. It drains into either the splenic vein, the confluence of splenic vein and superior mesenteric vein [SMV] or into the SMV directly [1]. As demonstrated in Figure 1-3, there was gas extending throughout the length of the IMV. This represents the beginning of the pathogenesis of septic phlebitis/pylephlebitis – ascending septic thrombophlebitis of the portal vein or any of its tributaries [2].

Septic phlebitis is a rare complication of intraabdominal diverticulitis occurring in up to 3% of cases [3]. Patients typically present with additional sequelae from hepatic involvement such as jaundice or hepatomegaly in later stages [4]. Hepatic involvement is indicative of an unwell patient; the presence of hepatic portal venous gas has been reported to carry a mortality rate of 14% [5].

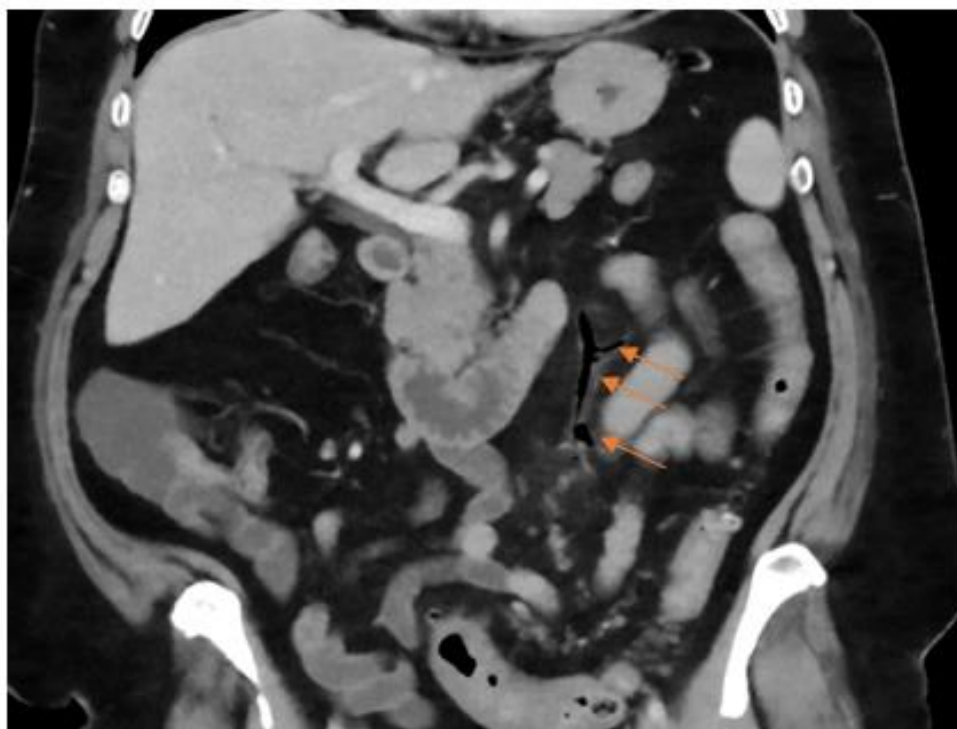
The pathogenesis of septic phlebitis in diverticulitis begins with the invasion of the venous drainage of the colon by colonic bacteria. Bacteraemia is not always

demonstrated in pylephlebitis with reported incidence as low as 44% [6]. Thrombosis occurs due to the release of thrombogenic factors as a result of the adjacent inflammation and intraluminal bacterial invasion [1]. The two most commonly implicated organisms are *E. coli* and *B. Fragilis* [7]. *Bacteroides* specifically increases thrombosis through production of anticardiolipin antibodies which breakdown heparin and the presence of capsular components which accelerate fibrin cross-linking [8, 9]. Regardless of bacteraemia or culture isolates, broad spectrum antibiotic therapy is recommended in the literature [10] – we used intravenous piperacillin/tazobactam 4g/0.5g four times a day. Review of the literature highlights two mechanisms for the bacterial invasion to occur. Firstly, an entero-vascular fistula can form as a result of necrotising vasculitis in the wall of an intramesocolic abscess [5]. This allows for direct passage of intestinal gas into the inferior

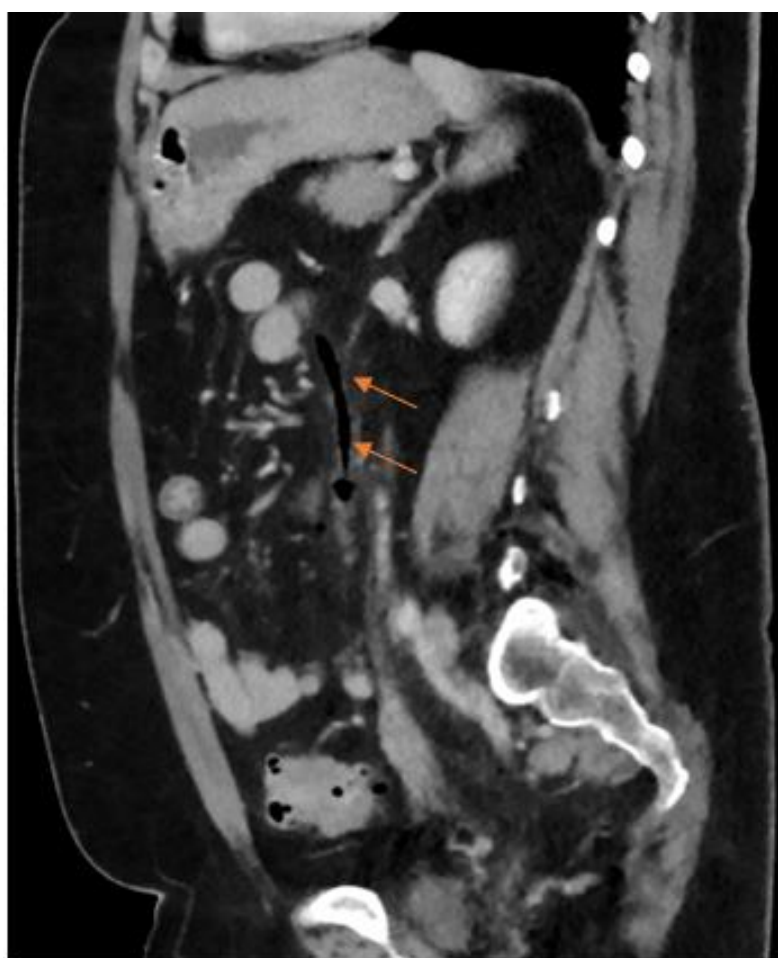
mesenteric vein and has been reported in 55% of cases [5]. Historically, all cases of gas in the portal or mesenteric vasculature would thought to originate from an abscess [11]. Therefore, the radiological finding prompted an immediate sigmoid resection with primary anastomosis or Hartmann's procedure [5, 11, 12]. A second mechanism described is the translocation of the colonic flora due to local inflammatory changes [4]. The local inflammation causes mucosal damage of the bowel leading to intraluminal seeding of the draining small vessels with gas forming bacteria that subsequently metabolise carbohydrates – this is the process captured on our CT scans. In such cases, recent literature suggests that surgery can be reserved unless the pylephlebitis fails to respond to intravenous antibiotic therapy [6, 9, 13]. In our case, the patient responded well to intravenous therapy and was discharged on oral amoxicillin and clavulanic acid.



**Figure 1. Coronal view computed tomography scan of the abdomen with orange arrows indicating the location of gas in the inferior mesenteric vein and blue arrows demonstrating surrounding fat stranding.**



**Figure 2. Coronal view computed tomography scan of the abdomen with arrows further demonstrating the location of gas in the inferior mesenteric vein.**



**Figure 3. Sagittal view computed tomography scan of the abdomen with arrows demonstrating the location of gas in the inferior mesenteric vein.**

The CT images displayed above have captured an interesting stage of the pathogenesis of septic phlebitis that has only been reported in a limited amount of case reports <sup>[14]</sup> – that is the presence of gas without thrombi. To our knowledge, no other CT images have been reported in literature demonstrating this finding. This case demonstrates and adds to the literature of successful non-operative management of a patient with diverticulitis without an intramesocolic abscess and gas in their IMV. Complications we were concerned about, given the patient had septic phlebitis, included thrombosis of the IMV and septic emboli spreading to the portal vein and it's intrahepatic branches with subsequent hepatic abscesses <sup>[1]</sup>. An interval CT scan of the patient one week later showed persisting gas in the IMV but no signs of hepatic complications and no new occlusive thrombi. In our patient, prompt initiation of broad-spectrum antibiotics successfully prevented the progression to fulminant pylephlebitis.

## Conclusion

This case and the images presented capture an interesting junction in the pathogenies of pylephlebitis – that is, the invasion of the IMV with gas forming bacteria without extension to the portal vein and without formation of septic thrombi. This case also demonstrates that in patients without an intramesocolic abscess and without occlusive thrombi, prompt initiation of broad-spectrum antibiotics can prevent both hepatic complications as well as the need for surgical intervention.

## Acknowledgements:

RW and TC were involved in the conception, draft and writing of the manuscript. KC was responsible for manuscript edition and SR provided overall oversight over this project.

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