



# Acute Intestinal Obstruction Due to Non-Hodgkin Lymphoma and Incidental Finding of *Klebsiella pneumoniae* Colonisation: A Clinical Case Report

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## Abstract

Acute intestinal obstruction (AIO) is an uncommon but serious presentation of intestinal Non-Hodgkin Lymphoma (NHL). The detection of commensal/opportunistic bacteria such as *Klebsiella pneumoniae* within resected tumour tissue is an atypical event with implications for postoperative management. We present the case of a 68-year-old male patient with 24 hours of abdominal pain, distension, and vomiting, diagnosed with AIO. Computed tomography revealed dilated loops and an ileal mass acting as the transition point. An exploratory laparotomy was performed, identifying an obstructive intestinal lesion. Resection and histopathological analysis confirmed NHL (Diffuse Large B-Cell Lymphoma, according to the WHO classification). Tissue cultures obtained during surgery were positive for *Klebsiella pneumoniae*. This case highlights the need to consider NHL as a cause of AIO, even in the absence of oncological history. The presence of *K. pneumoniae* suggests that the tumor microenvironment (ulceration, necrosis, local immunosuppression) may harbor opportunistic colonization requiring antibiotic prophylaxis and close follow-up to prevent postoperative septic complications.

**Keywords:** Non-Hodgkin lymphoma; Acute intestinal obstruction; *Klebsiella pneumoniae*; Intratumorally microbiome; Oncology

## Introduction

Non-Hodgkin Lymphomas (NHL) comprise a heterogeneous group of malignant lymphoid neoplasms, whose most common extranodal manifestation occurs in the gastrointestinal tract (GIT), with the stomach being the primary site of involvement [1]. Although the clinical presentation of these lymphomas is variable, ranging from abdominal pain and bleeding to palpable masses, acute intestinal obstruction (AIO) represents an unusual and potentially life-threatening form of onset, with a reported incidence that generally does not exceed 5% of cases [2]. This rarity makes each case of AIO caused by NHL a valuable contribution to clinical knowledge, emphasizing the importance of considering atypical oncological diagnoses in the context of an acute abdomen. The present report describes the management and pathological features of a case of primary GIT NHL that

presented as AIO, requiring emergency surgical intervention. Beyond the clinical relevance of this uncommon presentation, the case was distinguished by an incidental microbiological finding: colonization of the resected tumor tissue by *Klebsiella pneumoniae* [3]. This discovery gains particular significance in light of the growing body of evidence surrounding the intratumoural microbiome. Recent studies suggest that bacterial communities residing within the tumor microenvironment are not merely bystanders, but may actively influence carcinogenesis, immune modulation, and, potentially, disease progression and therapeutic response [4,5]. Therefore, this report not only documents a rare clinical presentation but also seeks to contextualise the finding of *K. pneumoniae* within this emerging scientific paradigm, exploring the complex interactions between

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lymphomatous malignancy, the host's local immune environment, and colonization by opportunistic pathogens.

## Case Presentation

### Demographic Data and Medical History

A 68-year-old male patient, with no history of malignancy or known immunosuppression, was admitted to the emergency department with a 48-hour clinical course characterised by generalised colicky abdominal pain, bilious vomiting, and complete absence of bowel movements and flatus.

### Clinical and Diagnostic Evaluation

On physical examination, the patient presented with a distended abdomen, tympanitic to percussion, with hyperactive and high-pitched bowel sounds. Tenderness was noted on palpation of the right iliac fossa, accompanied by signs of peritoneal irritation. Initial laboratory studies showed mild leukocytosis (12,500 cells/ $\mu$ L) with neutrophilia (85%). Contrast-enhanced abdominal computed tomography (CT) revealed findings consistent with mechanical small bowel obstruction, including marked dilation of intestinal loops, air-fluid levels, and an abrupt transition point at the terminal ileum associated with circumferential mural thickening and an adjacent soft-tissue mass.

### Surgical Management and Intraoperative Findings

Given the diagnosis of acute intestinal obstruction and high suspicion of an obstructive organic lesion, an emergency exploratory laparotomy was performed. Surgery revealed a solid tumour mass measuring approximately 5 cm in diameter, with firm consistency and irregular surface, infiltrating the wall of the distal ileum and causing critical luminal stenosis. An oncological segmental resection of the affected bowel loop was carried out, followed by a primary end-to-end anastomosis.

### Microbiological Findings

Before fixation in formalin for histopathological examination, a sample of tumour tissue was obtained under sterile conditions for microbiological culture as part of the standard protocol.

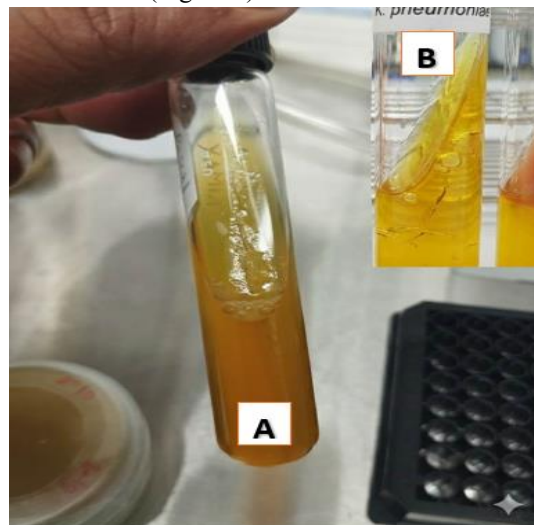
### Sample Processing

**Primary Culture and Macroscopic Observation:** The sample was streaked onto nutrient agar and MacConkey agar plates using the exhaustion technique and incubated at 37°C under aerobic conditions. After 18–24 hours, abundant and pure growth was observed on both media. On nutrient agar, colonies were large (3–5 mm in diameter), circular, convex, markedly mucoid, and with a shiny surface. This mucoid phenotype strongly suggests the presence of a polysaccharide capsule, a characteristic feature of *Klebsiella pneumoniae*. Growth on MacConkey agar showed

pink, mucoid colonies, indicative of lactose fermentation. These macroscopic characteristics were consistent with a presumptive microbiological diagnosis of *K. pneumoniae*.

### Biochemical Characterization

For presumptive confirmation, a stab-and-streak inoculation was performed on Triple Sugar Iron (TSI) agar. The isolate exhibited an A/A fermentation pattern (acid slant/acid butt) with marked gas production (cracks in the medium) and no H<sub>2</sub>S production (absence of blackening). This biochemical profile is classical for the genus *Klebsiella* (Figure 1).



**Figure 1:** In (A), gas production is observed, evidenced by the presence of bubbles within the medium, a characteristic finding associated with the growth of *Klebsiella pneumoniae*. In (B), fracturing of the TSI medium is noted, resulting from the intense gas production generated by the bacterium.



**Figure 2:** Gram staining of the sample demonstrates numerous short, plump Gram-negative bacilli with a characteristic pink-red appearance. The organisms are arranged predominantly in pairs and short chains, with no evidence of Gram-positive contaminants, confirming both the purity of the culture and the morphology consistent with *Klebsiella pneumoniae*.

## Gram Staining and Microscopic Examination

For definitive confirmation of bacterial morphology, a Gram stain was performed using an isolated colony. Microscopic evaluation revealed the presence of short, plump Gram-negative bacilli, frequently arranged in pairs or short chains. The notable absence of Gram-positive cells confirmed the purity of the culture and the morphology consistent with *Klebsiella* spp., thereby consolidating the presumptive diagnosis based on colonial characteristics and biochemical profiling (Figure 2).

## Final Identification and Antibiotic Susceptibility Testing

The identification of *Klebsiella pneumoniae* and the antimicrobial susceptibility profile were confirmed using an automated system (VITEK® 2 or a comparable methodology). The antibiogram demonstrated that the isolate was sensitive to meropenem and ciprofloxacin, among other agents [6].

## Definitive Histopathological Diagnosis

Histopathological examination of the surgical specimen confirmed the diagnosis of Diffuse Large B-Cell Lymphoma (DLBCL), of non-germinal centre origin. The tumour exhibited a transmural growth pattern, with extensive areas of necrosis and ulceration of the superficial mucosa. No diverticular formations or other predisposing pathologies were identified.

## Postoperative Course and Management

The patient completed a 7-day course of empirical antibiotic therapy with meropenem, directed at the isolated *K. pneumoniae*. The postoperative course was favorable, with resolution of the ileus and restoration of gastrointestinal function. Following recovery, he was referred to the Oncology Department for full staging and planning of systemic chemotherapy based on the R-CHOP regimen.

## Discussion

This report describes a case of acute intestinal obstruction (AIO) secondary to primary ileal Diffuse Large B-Cell Lymphoma (DLBCL), an uncommon clinical presentation that poses both diagnostic and therapeutic challenges. Although AIO caused by NHL typically results from extensive tumour infiltration, luminal stenosis, or, less frequently, intussusception [1,3], the most noteworthy finding in this case was the colonisation of the neoplastic tissue by *Klebsiella pneumoniae*, identified through a rigorous microbiological process. The relevance of this microbiological finding extends beyond the incidental. *K. pneumoniae*, a capsulated Gram-negative bacillus, is a common commensal of the human gastrointestinal tract and a well-recognized opportunistic nosocomial pathogen [6]. However, its presence deep within the resected tumor tissue suggests a

biologically meaningful interaction. We propose that the rapid growth of the DLBCL, together with the extensive necrosis and mucosal ulceration documented in the histopathological study, creates an ideal microenvironment for disruption of the intestinal barrier and subsequent bacterial translocation. This niche (characterised by ischaemia, hypoxia, and impaired local immunity) favours the opportunistic colonisation of commensal pathogens such as *Klebsiella* [6,7].

The prognostic and biological implications of intratumoural bacterial colonisation constitute an emerging and increasingly relevant field of research. Preliminary evidence suggests that the intratumoural microbiome is not merely a passive bystander but may actively modulate the host's immune response to cancer, influence disease progression, and even affect the efficacy of antineoplastic therapies, including chemotherapy [7]. Although a direct causal relationship cannot be established in this case, the presence of *K. pneumoniae* raises the question of whether this organism may have influenced the local aggressiveness of the lymphoma or the patient's inflammatory response. Future prospective studies are needed to determine whether specific bacterial species act solely as colonisers or as active modulators of lymphoma biology. From a clinical management standpoint, the identification of antibiotic-sensitive *K. pneumoniae* within the tumour tissue had an immediate and crucial practical consequence. In an oncology patient undergoing extensive intestinal resection, colonisation by an opportunistic pathogen represents a significant risk for surgical site infection, peritonitis, and postoperative sepsis [8]. Early administration of targeted antibiotic therapy (in this case, meropenem guided by susceptibility testing) was a cornerstone of postoperative care and very likely a key factor in the patient's favourable clinical course, allowing timely referral to oncology without intercurrent septic complications. This case serves a dual purpose. First, it underscores the importance of considering lymphoid neoplasms in the differential diagnosis of intestinal obstruction, particularly when more common aetiologies are absent. Second, and perhaps more importantly, it highlights the clinical relevance of microbiological studies performed on tumor tissue and emphasizes the need to integrate the concept of the intratumoural microbiome into the comprehensive assessment of oncology patients. The interaction between malignancy, immunity, and the local microbiota represents a compelling frontier that may open new avenues for diagnostic and adjuvant therapeutic strategies in the future [9].

## Conclusions

This report provides a detailed account of an unusual case of primary ileal Diffuse Large B-Cell Lymphoma (DLBCL), whose initial clinical manifestation was acute intestinal obstruction requiring emergency surgical intervention. This case highlights

the importance of considering lymphomas in the differential diagnosis of intestinal obstruction, especially in patients without apparent benign pathology. Beyond the rarity of the presentation, the critical finding was the colonisation of the tumour tissue by *Klebsiella pneumoniae*, confirmed through microbiological methods. This highlights the importance of routinely performing cultures on tumor tissue, even in the absence of clinical signs of active infection. The identification of this pathogen had a direct and crucial implication for postoperative management, enabling the initiation of targeted antibiotic therapy, which very likely prevented severe septic complications and facilitated the patient's recovery before subsequent oncological treatment.

The presence of *K. pneumoniae* within the tumor microenvironment aligns with the emerging evidence on the intratumoural microbiome. Although its role as a mere opportunistic coloniser cannot be excluded, this finding raises the hypothesis of a potential interaction between specific bacteria and lymphoma biology, an area that warrants deeper prospective investigation to determine its impact on disease progression and therapeutic response. This case integrates a rare clinical presentation with a significant microbiological finding, serving as a reminder of the complexity of oncological patient management and highlighting the intersection of oncology, surgery, and microbiology as a crucial field for optimising clinical outcomes and advancing our understanding of these diseases.

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