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Colonic carcinoma with linitis plastica morphology: A rare and aggressive entity with diagnostic and therapeutic implication

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Abstract

Diffuse infiltrating undifferentiated carcinoma of the colon, linitis plastica type, is a rare and aggressive variant of colorectal cancer with a poor prognosis. This case report presents a 38-year-old female with a 3-month history of abdominal pain and vomiting. Imaging revealed a transverse colonic stricture, and histopathology shows a diffusely infiltrative growth pattern with high nuclear-to-cytoplasmic ratio, karyomegaly, and minimal mitosis. Immunohistochemistry (PAN CK- tumors cells are membranous and cytoplasmic positive) supports the diagnosis. Surgical resection and adjuvant therapy was given and patient was followed up. Then she succumbed after three months due to distant metastasis to brain. This case highlights the diagnostic challenges and aggressive behaviour of the tumor.

Introduction

Linitis plastica (LP) is a morphological subtype of carcinoma characterized by diffuse infiltration of the bowel wall, leading to a rigid, leather bottle appearance. While classically associated with gastric cancer, colonic LP is exceedingly rare, accounting for <1% of colorectal malignancies. Its clinical presentation is nonspecific, often mimicking inflammatory or functional bowel disorders, leading to delayed diagnosis.

Histologically, it exhibits poorly cohesive tumor cells with minimal gland formation, resembling signet-ring cell or undifferentiated carcinoma. Due to its aggressive nature and resistance to conventional therapy, prognosis remains dismal.

Case Report

Clinical history and examination

A 38-year-old female presented with 3 months of progressive abdominal pain and 15 days of vomiting. Colonoscopy identified a transverse colonic stricture, and CT revealed circumferential short segment transverse wall thickening with fat stranding and mild shouldering. Exploratory laparotomy showed a rolled up omentum with rigid, thickened colon, stricture in transverse colon and omental nodules. Resection and anastomosis of transverse colon were performed. This patient expired after 3 months.

Gross examination

The resected segment showed diffuse mural thickening without a discrete mass. The cut surface revealed a firm, whitish tumor infiltrating the submucosa and serosa (**Figure 1**).

Figure 1: Gross image of resected bowel segment showing whitish tumor.

Microscopic examination

Haematoxylin and Eosin-stained sections show diffusely infiltrating tumor arising from the mucosa, infiltrating submucosa, muscularis propria and serosa (**Figure 2** and **Figure 3**). These tumor cells have high nuclear to cytoplasmic ratio, anisonucleosis, karyomegaly, vesicular nucleus with prominent nucleoli (**Figure 4**). Noted minimal mitosis, lymphoplasmacytic infiltration and hypertrophied ganglion cells. Thickened serosa with perineural invasion and congested vessels also seen.

Immunohistochemistry

Tumor cells were diffusely positive for PanCK (**Figure 5** and **Figure 6**), CK 20 (**Figure 7**), CK7 (**Figure 8**), confirming epithelial origin.

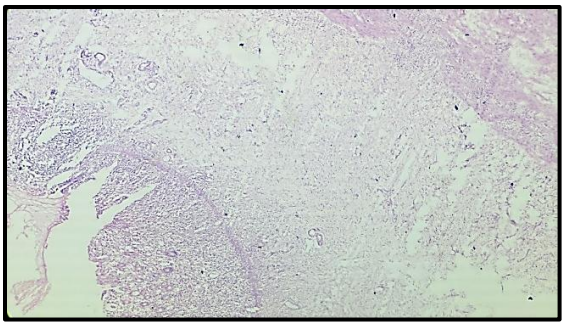

Figure 2: Low magnification (H & E) diffusely infiltrating tumor arising from the mucosa, infiltrating submucosa, muscularis propria.

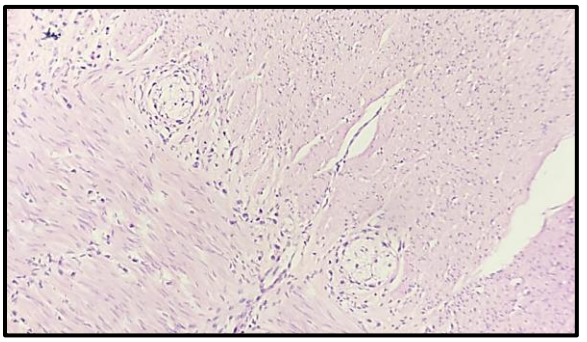

Figure 3: High magnification (H&E) image showing tumor cells infiltrating submucosa and muscularis propria.

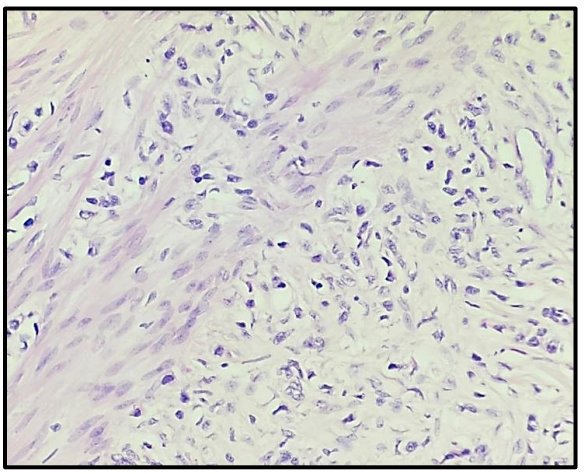

Figure 4: High magnification (H&E) image showing tumor cells anisonucleosis, karyomegaly, vesicular nucleus with prominent nucleoli.

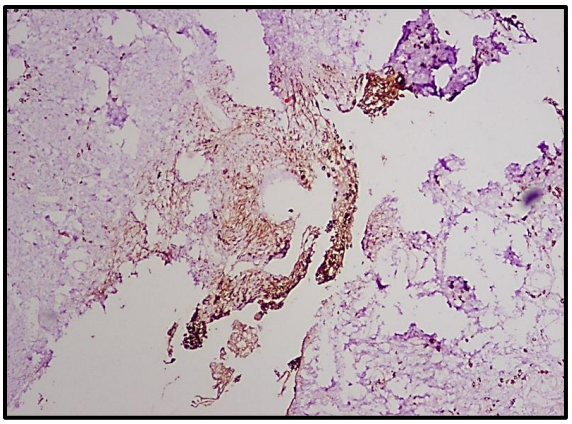

Figure 5: PanCK1 positive

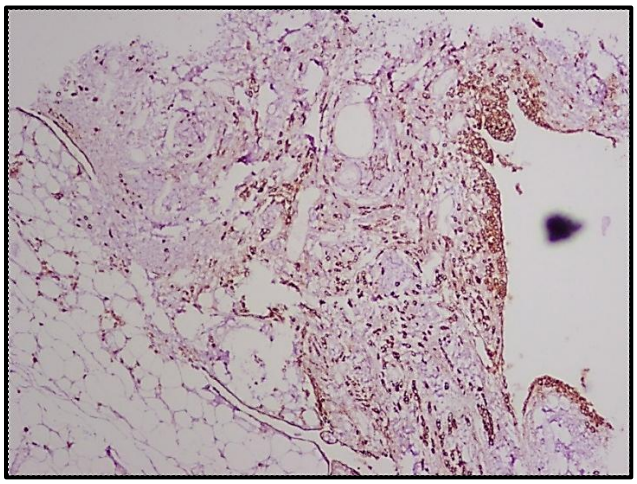

Figure 6: Pan CK2 positive

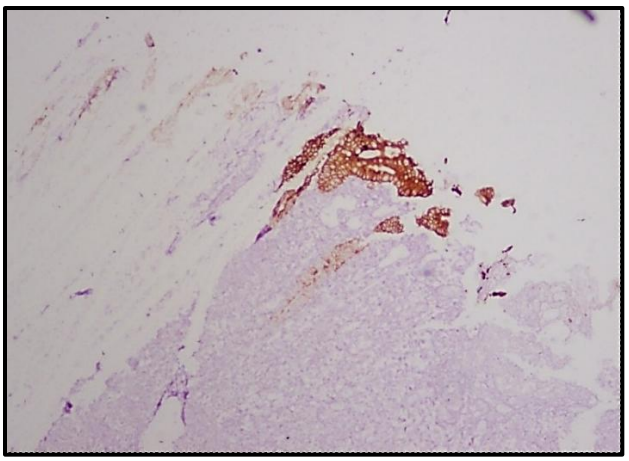

Figure 7: CK 20 positive

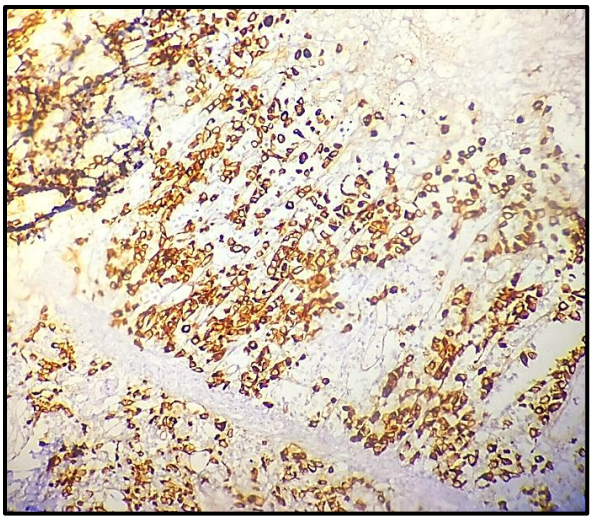

Figure 8: CK 7 positive

Discussion

Colonic linitis plastica (LP) represents an exceptionally rare, yet highly aggressive malignancy characterized by its diffuse infiltrative growth pattern. The 2019 WHO classification emphasizes its diagnostic hallmarks including absence of gland formation and frequent signet-ring cell or undifferentiated morphology.[1] This case demonstrates full-thickness mural infiltration by poorly cohesive tumor cells (**Figure 2** and **Figure 3**)-findings that correlate strongly with Nakahara H et al's study.[2] There is a consistent pattern of late diagnosis which reveals both the tumor's insidious biological behavior and the challenges in early detection.

Histopathological examination in this case revealed characteristic features included high nuclear-to-cytoplasmic ratio, karyomegaly and low mitotic activity (**Figure 4**) despite the tumor's aggressive behavior. These findings align with molecular studies by Alvi et al. demonstrating significant discordance between mitotic indices and proliferation markers in such tumors due to CDH1-mediated cell cycle dysregulation.[3]

Notably, the hypertrophied ganglion cells and perineural invasion seen in our case correlate with Jnawali A et al.'s observation, is a poor prognostic indicator.[7]

Diagnostic challenges are well-documented, with approximately 40% of cases initially misclassified as benign strictures or inflammatory conditions.[2,6] The College of American Pathologists protocol highlights the necessity of deep submucosal biopsies and immunohistochemical confirmation [PAN CK positivity in this case (**Figure 5**-**Figure 8**)] for accurate diagnosis.[4] In this case, the transverse colon stricture, initially attributed to Crohn's disease on imaging, perfectly illustrates this diagnostic pitfall. Most of the colonic LP cases required ≥3 biopsy attempts for diagnosis which was often delayed by 3-6 months[6] a critical window where early intervention might impact the outcome. The rapid postoperative deterioration of the patient in this case mirrors their findings where patients developed peritoneal metastases within 6 months.[5]

Given the diffuse, scirrhous growth pattern in this colonic linitis plastica case, molecular alterations (e.g, CDKN2A loss) may contribute to its aggressive, therapy-resistant behavior.[8] Emerging biomarkers offer cautious optimism. Surgery remains pivotal for enhancing the survival of patients along with adjuvant or postoperative. Future research should prioritize the development of novel therapeutic agents to manage this disease.[9]

This case reinforces three critical points.

1. LP should be considered in differential diagnoses of young patients with fibrotic strictures regardless of benign-appearing imaging.
2. Collaborative decision making through multidisciplinary teams comprising of endoscopy, radiology and pathology specialists are crucial for timely and accurate diagnosis.
3. Comprehensive molecular profiling should guide therapeutic decisions.

4. Conclusion

This case highlights the diagnostic and therapeutic challenges of colonic linitis plastica (LP), a rare and aggressive variant of colorectal cancer. The patient's young age, nonspecific symptoms, and imaging findings initially obscured the diagnosis, emphasizing the need for high clinical suspicion in cases of unexplained colonic strictures.

Histopathology confirmed the tumor's undifferentiated nature, characterized by diffuse infiltration, nuclear atypia and PAN CK positivity, aligning with its poor prognostic profile. Despite surgical intervention, the disease's rapid progression and resistance to conventional therapy led to fatal complications, emphasizing the importance of early endoscopic biopsy with immunohistochemistry to differentiate LP from benign or inflammatory conditions.

Multidisciplinary management, including advanced imaging and molecular profiling, may improve diagnostic accuracy and guide personalized therapy. Future research should focus on identifying targeted

therapies for this chemo-resistant malignancy, particularly exploring biomarkers.

5. Source of Funding

None.

6. Conflict of Interest

None.

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