

Case Report on Nutrition Management in Pseudomyxoma Peritonei (Peritoneal Carcinomatosis with Low Grade Appendical Mucinous Neoplasm)

Case Report

Arvind S and Mullachery A

Department of Dietetics, Fortis Hospital, Bangalore, Karnataka, India

***Corresponding author:** : Arvind Shalini, Department of Dietetics, Fortis Hospital, Bangalore, Karnataka, India. E- mail Id: shalini.arvind@fortishealthcare.com

Article Information: Submission: 29/06/2026; Accepted: 27/07/2026; Published: 30/07/2026

Copyright: © 2026 Arvind S, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background: Pseudomyxoma peritonei is a rare mucin-producing malignancy characterized by progressive abdominal distension and poor oral intake. Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy remains the standard treatment; however, perioperative malnutrition significantly impacts outcomes. This case highlights the role of individualized medical nutrition therapy in optimizing recovery.

Materials and Method: A 68-year-old male diagnosed with Pseudomyxoma peritonei underwent nutritional assessment using Subjective Global Assessment. A tailored nutrition plan was implemented, including preoperative carbohydrate loading, perioperative total parenteral nutrition and stepwise progression to oral feeding. Nutritional intake, biochemical markers, and clinical tolerance were monitored throughout hospitalization under a multidisciplinary approach.

Results: The patient presented with severe nutritional risk, hypoalbuminemia, anaemia and poor oral intake. Preoperative carbohydrate loading was successfully administered as per Enhanced Recovery After Surgery protocol. Due to persistent intolerance, total parenteral nutrition was initiated and gradually increased to meet requirements. Postoperatively, the patient remained nil per oral for 48 hours, followed by gradual reintroduction of oral intake alongside total parenteral nutrition. Diet progression from liquids to semisolids and soft high-protein foods was well tolerated. Improvement in gastrointestinal function, clinical stability, and dietary intake was observed, allowing discontinuation of total parenteral nutrition prior to discharge.

Conclusion: Early, individualized nutritional intervention, including perioperative total parenteral nutrition support and gradual diet advancement, played a crucial role in improving nutritional status and recovery in a patient with Pseudomyxoma peritonei undergoing Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy. Continuous monitoring and multidisciplinary care are essential to reduce complications and enhance clinical outcomes.

Introduction

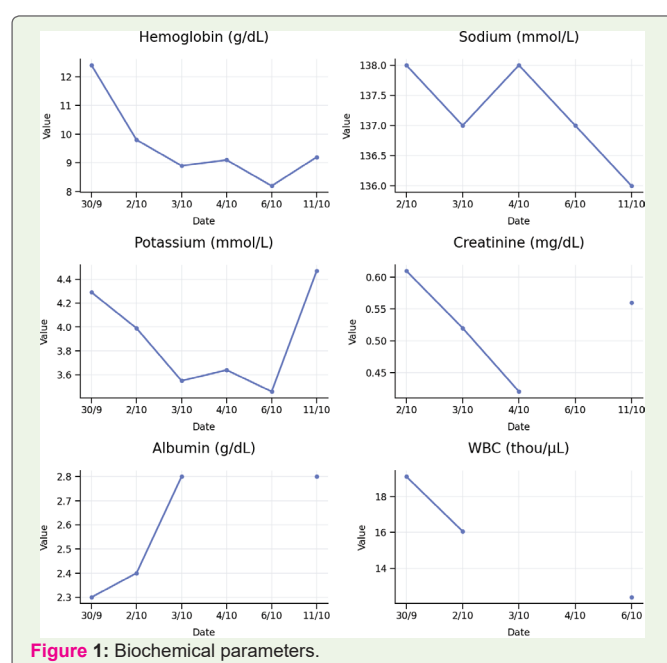
Pseudomyxoma Peritonei (PMP) is a clinical condition caused by cancerous cells (mucinous adenocarcinoma) that produce abundant mucin or gelatinous ascites. The tumour causes fibrosis of tissues and impedes digestion or organ function. Prognosis with treatment in many cases is optimistic, but the disease is lethal if untreated, with death occurring via cachexia, bowel obstruction, or

other types of complications.

The most important treatment for PMP is surgery. A doctor schedules treatment plans depending on the level at which the tumour has progressed and on the patient's health condition. Surgery for PMP can be divided into two types: Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC) and Debulking surgery. [7,11,17]

Table 1: Diet progression during perioperative status.

Date	Pre/Postoperative day	Type of diet
24.09.21 – 27.09.21	Pre-op day 4-6	Soft diet
28.09.21- 29.09.25	Pre-op day 1-2	Liquid diet + TPN + carboload
30.09.21	POD 0	NPO
01.10.21	POD1	NPO
02.10.21- 04.10.21	POD 2-4	TPN + Oral sips of water
05.10.21	POD5	Clear liquid diet + TPN
06.10.21	POD6	Full Liquid diet + TPN
08.10.21- .10.10.21	POD8-10	Semisolid diet+ TPN
12.10.21- 13.10.21	POD12-13	Soft salt restricted iron rich high protein diet

**Figure 1:** Biochemical parameters.

Nutritional support is a key part in optimal management of the patient with peritoneal malignancy. Malnutrition is considered a major contributing factor influencing the clinical outcome and disease progression in patients with pseudomyxoma peritonei, as the progressive accumulation of mucinous tumours within the peritoneal cavity compromises gastrointestinal function and adversely affects nutritional status. A high protein, energy-dense diet is recommended to alleviate carcinoma-associated malnutrition and support tissue repair. A low residue diet can be advised in presence of bowel obstruction or compromised gastrointestinal function. [17,18,20]

Nutritional scope

The accumulation of mucinous ascites and peritoneal tumor deposits may result in abdominal distension, early satiety, nausea, anorexia, altered bowel habits and intestinal obstruction, as a result

reduced dietary intake and compromised nutritional status. In addition, patients with PMP are at risk of weight loss, sarcopenia, micronutrient deficiencies and reduced functional capacity. Cytoreductive surgery (CRS) combined with intra peritoneal chemotherapy (HIPEC), which represents the standard therapeutic approach patients, may further exacerbate nutritional deterioration due to postoperative catabolic stress, prolonged recovery, gastrointestinal dysfunction. Previous studies have demonstrated that poor nutritional status is associated with increased postoperative complications, delayed wound healing, prolonged hospitalization, reduced treatment tolerance and impaired quality of life. Comprehensive nutritional assessment is therefore considered as essential component in the multidisciplinary management of PMP. Early identification of nutritional risk through validated assessment methods, including subjective Global Assessment (SGA), anthropometric evaluation, biochemical markers, dietary assessment and functional parameters, is important for initiating timely nutritional interventions. Depending on the severity of the disease and gastrointestinal tolerance, individualized nutritional management was planned which included high protein and high calorie diet, oral nutritional supplementation, enteral or parenteral nutrition support. [17,18,20]

Physical Examination

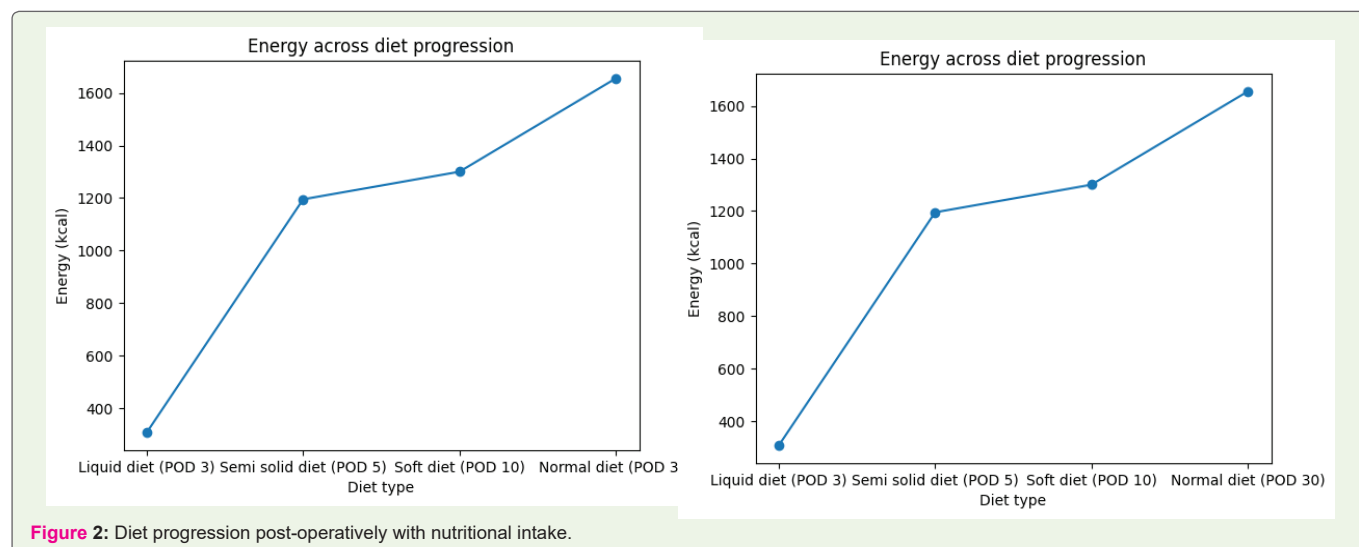
Physical examination in pseudomyxoma peritonei commonly reveals progressive abdominal distension due to mucin accumulation within the peritoneal cavity. Patients may present with a firm abdomen, palpable abdominal or pelvic masses, abdominal tenderness and altered bowel sounds. Advanced disease is often associated with significant weight loss, severe protein energy malnutrition, hernias and respiratory discomfort results to increased intra-abdominal pressure can occur. [18,22]

Case Presentation

A 68-year-old male presented with abdominal distension for one month, associated with pain, loss of appetite and hematemesis with a history of hypertension and hypothyroidism. Clinical evaluation and diagnostic investigation lead to a final diagnosis of pseudomyxoma peritonei. Patient received a treatment course for 20 days and was discharged on 13th April, 2021. Upon admission nutritional screening of patient was done using **Subjective Global Assessment** screening tool. The total score obtained was **8**, indicating **severe nutritional risk**. Drug nutrient interaction monitored for all drugs, were carefully considered while planning diet for the patient.

Pre-operative Management

Preoperative management included optimization of hydration and metabolic reserves through adequate fluid and carbohydrate loading. Carbohydrate loading was administered to the patient the night before surgery and again two hours prior, using 50 grams of a carbohydrate supplement (Carboload) made with 88% malto dextrin



in 400 ml water, providing 190 kcals.

This approach helps to reduce perioperative stress, maintain energy balance and improve postoperative recovery.

Case Progression

Patient was admitted with progressive abdominal distension, anorexia, recurrent vomiting, hypoalbuminemia and anemia. Initial nutritional management included a salt-restricted iron rich soft diet with protein supplement. Proton pump inhibitors and anti-emetics were administered for symptomatic relief. Subsequently, the patient developed esophagitis with worsening oral intake and persistent abdominal discomfort, necessitating the initiation of total parenteral nutrition (TPN) to meet nutritional requirements. PET-CT evaluation revealed malignant ascites. Gradually oral liquid diet was initiated along with TPN support at 60ml/hour, followed by small amounts of soft foods as tolerated. The patient was later posted for laparotomy with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC). As per Early Recovery After Surgery (ERAS) protocol, carbohydrate loading was initiated for the patient. Postoperative, the patient required mechanical ventilatory support and analgesic infusions and was maintained nil per oral for 48 hours. By postoperative day two, the patient was conscious, oriented and hemodynamically stable. Oral sips of water were introduced gradually and TPN was continued at 80ml/hour. With progressive improvement in gastrointestinal tolerance, the patient was able to tolerate clear liquids orally and subsequently passed stools, indicating recovery of bowel function. Antiemetic medicines were continued for nausea management. Nutritional therapy was advanced from a full liquid diet to a semisolid diet while maintaining TPN support. A transient episode of vomiting and hiccups during recovery and was effectively managed with anti-emetics. Following symptomatic improvement and adequate oral tolerance, TPN was gradually stopped and diet was further progressed with more options as per

the tolerance of the patient. By the end of the hospitalization, patient showed marked clinical improvement with no active complaints and was tolerating soft salt restricted high protein iron-rich diet adequately.

Discussion

Nutritional support plays a pivotal role in the multidisciplinary management of patients with peritoneal malignancy. In the present case, the patient exhibited classical features of nutritional compromise, including abdominal distension, anorexia, recurrent vomiting, anemia, and hypoalbuminemia. These clinical findings necessitated early and targeted nutritional intervention to optimize preoperative status and improve postoperative outcomes.

This case highlights the integral role of structured and timely nutritional intervention in the management of patients undergoing complex oncological procedures such as cytoreductive surgery with HIPEC.

The implementation of ERAS-based carbohydrate loading, early initiation of parenteral nutrition, and a gradual transition to tailored oral diets enriched with protein supplementation were critical in addressing the patient's nutritional deficits. The use of palatable, symptom-adapted food options further improved dietary acceptance, particularly in the context of persistent gastrointestinal symptoms.

Timely and tailored nutrition support is fundamental to optimizing recovery, reducing postoperative complications, and enhancing quality of life in patients with peritoneal malignancies. This case reinforces the role of nutrition as a key component of perioperative care in complex oncological management.

Conclusion

Overall, this case underscores that individualized, flexible, and

symptom-oriented nutrition care is essential to optimize recovery, minimize complications, and enhance clinical outcomes in patients with peritoneal malignancy. Ensuring adequate caloric and protein intake through a combination of parenteral and enteral approaches remains a cornerstone of effective perioperative care in such high-risk populations.

Acknowledgements

The authors would like to thank Hexagon Nutrition Limited for supplying Pentasure, standard polymeric formula and Carboload supplements used during this study. Their support was instrumental in enabling this research, and we greatly appreciate their contribution to enhancing patient care and health outcomes.

References

- Yang R, Fu YB, Li XB, Ma R, Su YD, et al. (2023). Long-term survival in patients with PMP: a single-institutional retrospective study from China. *World J Surg Oncol* 21: 347.
- Mohfouz A, Hamed M, Patel A, Tasnim S, Shah P (2022). Pseudomyxoma peritonei: A case report of a 62-year-old female with unexplained abdominal enlargement and appendiceal origin. *Cureus* 14: e22255.
- Touloumis Z, Galyfos G, Kavouras N, Menis M, Lavant L (2013). Aggressive pseudomyxoma peritonei: a case report with an unusual clinical presentation. *Case Reports in Oncological Medicine* 2013: 926963.
- Yu Y, Li XB, Lin YL, Ma R, Ji ZH, Zhang YB, et al. (2021). Efficacy of 1 384 cases of peritoneal carcinomatosis underwent cytoreductive surgery plus hyperthermic intraperitoneal chemotherapy. *Zhonghua wei chang wai ke za zhi [Chinese Journal of Gastrointestinal Surgery]* 24: 230-239.
- Ji ZH, Yu Y, Liu G, Zhang YB, An SL, Li B, et al. (2021). Peritoneal cancer index (PCI) based patient selecting strategy for complete cytoreductive surgery plus hyperthermic intraperitoneal chemotherapy in gastric cancer with peritoneal metastasis: A single-center retrospective analysis of 125 patients. *European Journal of Surgical Oncology: The Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology* 47: 1411-1419.
- Narasimhan V, Tan S, Kong J, Pham T, Michael M, Ramsay R, et al. (2020). Prognostic factors influencing survival in patients undergoing cytoreductive surgery with hyperthermic intraperitoneal chemotherapy for isolated colorectal peritoneal metastases: a systematic review and meta-analysis. *Colorectal Disease: The Official Journal of the Association of Coloproctology of Great Britain and Ireland* 22: 1482-1495.
- Vaira M, Cioppa T, De Marco G, Bing C, 'amico D, et al. (2009) Management of pseudomyxoma peritonei by cytoreduction+HIPEC (hyperthermic intraperitoneal chemotherapy): results analysis of a twelve-year experience 23: 639-644. <https://www.ncbi.nlm.nih.gov/pubmed/19567401>
- Garg P, Garg N, Peer S, Chholak D, Kaur M (2024) Pseudomyxoma peritonei leading to 'jelly belly' abdomen: a case report and review of the literature. *Journal of Medical Case Reports* 18: 296.
- García KM, Flores KM, Ruiz A, González FL, Rodríguez ÁM (2019). Pseudomyxoma peritonei: Case report and literature review. *Journal of Gastrointestinal Cancer* 50: 1037-1042.
- Aulicino M, Santullo F, D'Annibale G, Abatini C, Attalla El Halabieh M, et al. (2024) Efficacy and insights from an extensive series of cytoreductive surgery for peritoneal neoplasms: A high-volume single-center experience. *Cancers* 16: 4229.
- Ansari N, Chandrakumaran, K, Dayal S, Mohamed F, Cecil TD, et al. (2016) Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy in 1000 patients with perforated appendiceal epithelial tumours. *European Journal of Surgical Oncology: The Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology* 42: 1035-1041.
- Huang Y, Alzahrani NA, Liauw W, Traiki TB, Morris DL (2017) Early postoperative intraperitoneal chemotherapy for low-grade appendiceal mucinous neoplasms with pseudomyxoma peritonei: Is it beneficial? *Annals of Surgical Oncology* 24: 176-183.
- Baratti D, Kusamura S, Nonaka D, Langer M, Andreola S, et al. (2008) Pseudomyxoma peritonei: clinical pathological and biological prognostic factors in patients treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC). *Annals of Surgical Oncology* 15: 526-534.
- Kozman MA, Fisher OM, Rebollo BAJ, Valle SJ, Alzahrani N, et al. (2017). CA 19-9 to peritoneal carcinomatosis index (PCI) ratio is prognostic in patients with epithelial appendiceal mucinous neoplasms and peritoneal dissemination undergoing cytoreduction surgery and intraperitoneal chemotherapy: A retrospective cohort study. *European Journal of Surgical Oncology: The Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology* 43: 2299-2307.
- van Eden WJ, Kok NFM, Snaebjornsson P, Jóźwiak K, Woensdregt K, Bottenberg P D, et al. (2019) Factors influencing long-term survival after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for pseudomyxoma peritonei originating from appendiceal neoplasms. *BJS Open* 3: 376-386.
- Narasimhan V, Pham T, Warriar S, Craig Lynch A, Michael M, et al. (2019) Outcomes from cytoreduction and hyperthermic intraperitoneal chemotherapy for appendiceal epithelial neoplasms. *ANZ Journal of Surgery* 89: 1035-1040.
- Sommariva A, Tonello M, Rigotto G, Lazzari N, Pilati P, Calabrò ML (2021) Novel perspectives in pseudomyxoma Peritonei treatment. *Cancers* 13: 5965.
- Rizvi SA, Syed W, Shergill R (2018) Approach to pseudomyxoma peritonei. *World Journal of Gastrointestinal Surgery* 10: 49-56.
- O'Connell JT, Tomlinson JS, Roberts AA, McGonigle KF, Barsky SH (2002). Pseudomyxoma peritonei is a disease of MUC2-expressing goblet cells. *The American Journal of Pathology* 161: 551-564.
- Amini A, Masoumi-Moghaddam S, Ehteda A, Morris DL (2014) Secreted mucins in pseudomyxoma peritonei: pathophysiological significance and potential therapeutic prospects. *Orphanet Journal of Rare Diseases* 9: 71.
- Taflampas P, Dayal S, Chandrakumaran K, Mohamed F, Cecil TD, Moran BJ (2014) Pre-operative tumour marker status predicts recurrence and survival after complete cytoreduction and hyperthermic intraperitoneal chemotherapy for appendiceal Pseudomyxoma Peritonei: Analysis of 519 patients. *European Journal of Surgical Oncology: The Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology* 40: 515-520.
- Bevan KE, Mohamed F, Moran BJ (2010) Pseudomyxoma peritonei. *World Journal of Gastrointestinal Oncology* 2: 44-50.
- Bignell M, Carr NJ, Mohamed F (2016) Pathophysiology and classification of pseudomyxoma peritonei. *Pleura and Peritoneum* 1: 3-13.