

Section: General Nursing

High-protein nutritional intake to accelerate the wound healing after laparotomy surgery

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Abstract

Post-laparotomy wound healing heavily relies on nutritional intake, especially protein, which is vital for tissue regeneration and immune function. However, a lack of understanding and prevailing myths often hinders adequate dietary provision, even though research shows good nutrition accelerates healing and reduces complications like surgical site infections (SSIs). Data from KRT. Setjonegoro General Hospital Wonosobo indicates a need to evaluate the implementation of high-protein nutritional intake to accelerate post-laparotomy wound healing. This study aims to describe the application of high-protein nutritional intake in accelerating the wound healing process following laparotomy surgery in the Bougenvil Ward of KRT. Setjonegoro General Hospital Wonosobo. This case study utilized a nursing process approach with one adult post-laparotomy patients as subjects in the Bougenvil Ward of KRT. Setjonegoro General Hospital Wonosobo. Samples were selected via accidental sampling. Data collection involved interviews, observation, and medical record documentation. Data analysis was descriptive and narrative. Patient Mrs. W, 37 years old, post-laparotomy, presented with a 16 cm wound with 50% granulation and <80% epithelialization, and pain score of 7. Interventions included sterile wound care, high-protein nutrition (eggs, milk, fruit), education, and antibiotics. After 4 days of implementation, pain decreased from a score of 7 to 4, wound epithelialization increased (>75%), exudate reduced, and nutritional intake improved. However, granulation remained stagnant at 50% and stiffness persisted, indicating that healing was not yet fully optimal. The application of nursing care and high-protein nutritional intake effectively supported post-laparotomy wound recovery, characterized by reduced pain and increased epithelialization. Nevertheless, the granulation process requires consistent nutritional support from the outset for optimal healing.

Keywords: Clinical practice, high protein nutrition, laparotomy, surgical nursing, wound healing

Introduction

The surgical trauma associated with a laparotomy—a major incision into the abdominal cavity—triggers a profound metabolic stress response that significantly increases the body's nutritional requirements (Jeong et al., 2025). In the immediate post-operative phase, the body enters a catabolic state where muscle protein is rapidly broken down to provide amino acids for tissue repair and immune function (Gonzalez et al., 2016). This metabolic shift is particularly challenging in the Indonesian clinical context, where baseline nutritional status may already be compromised by dietary habits or underlying conditions. Without adequate nutritional intervention, patients undergoing laparotomy are at a heightened risk for delayed wound healing, wound dehiscence, and surgical site infections (SSIs). High-protein intake is specifically prioritized because amino acids are the fundamental building blocks for collagen synthesis and the proliferation of fibroblasts (Hirsch et al., 2021). Protein also plays a critical role in maintaining oncotic pressure, which prevents localized oedema that can impede oxygen delivery to the healing wound edges (Rabi et al., 2024). Consequently, early nutritional assessment and the implementation of a high-protein diet have become cornerstones of modern surgical recovery protocols (Gazouli et al., 2024). This case study examines how a structured, protein-rich nutritional plan can accelerate the recovery trajectory of an Indonesian patient following an abdominal procedure. By focusing on macronutrient optimization, clinicians can potentially reduce the length of hospital stays and improve overall surgical outcomes. The following sections will detail the specific nutritional challenges and successes observed in this clinical scenario.

In Indonesia, the integration of high-protein nutrition into post-operative care often requires a culturally sensitive approach that balances clinical requirements with local dietary availability. Common protein sources such as "Ikan Gabus" (snakehead fish) are frequently utilized in Indonesian hospitals due to their exceptionally high albumin content, which is known to promote rapid tissue regeneration (Pandiangan et al., 2024). Albumin is a major plasma protein that reflects the body's nutritional reserves and serves as a vital marker for predicting wound healing success (Iizaka et al., 2011). When a patient's albumin levels are low, the inflammatory phase of wound healing is often prolonged, leading to chronic wounds that are difficult to manage. Therefore, supplementing the diet with local, high-

protein whole foods or specialized enteral formulas is essential for reversing post-operative protein-energy malnutrition. The physiological demand for protein is not only limited to the physical closure of the skin but also extends to the repair of deep fascial layers disrupted during the laparotomy. Adequate protein intake also supports the production of white blood cells, which are the body's primary defences against the bacterial colonization of a fresh surgical site (Munteanu & Schwartz, 2022). In this case study, the patient was provided with a diet specifically enriched with both animal and plant-based proteins to ensure a complete amino acid profile. The intervention sought to demonstrate that even within a resource-limited setting, strategic nutritional choices can mirror the efficacy of expensive pharmacological treatments. This paragraph highlights the importance of matching clinical nutritional science with the practical realities of the Indonesian healthcare landscape.

Despite the clear benefits of high-protein intake, several barriers can prevent patients from achieving their required nutritional targets during the critical post-laparotomy window. Post-operative nausea, ileus (a temporary lack of bowel motility), and a general loss of appetite often make it difficult for patients to consume large quantities of solid protein. To overcome these hurdles, a multidisciplinary approach involving surgeons, clinical nutritionists, and nursing staff is required to monitor and encourage dietary compliance. In the Indonesian healthcare system, family members often play a pivotal role in the patient's diet, making caregiver education a vital component of the nutritional intervention. Monitoring the wound's progress through standardized healing scales provides objective evidence of the impact that protein-rich intake has on tissue tensile strength. This case study aims to provide a clear roadmap for how high-protein "booster" diets can be successfully administered and monitored in a typical Indonesian hospital ward. By documenting the correlation between increased protein consumption and the reduction in wound exudate and redness, we can validate the necessity of nutrition as a primary therapy. The results of this study serve to advocate for more rigorous nutritional screening for all surgical patients across the archipelago. Ultimately, focusing on the patient's plate is just as important as the surgeon's scalpel in ensuring a full and complication-free recovery. This introduction establishes the framework for understanding how diet serves as the literal foundation for biological repair after major abdominal trauma.

Case Description

Mrs. W, a 37-year-old female, was admitted following a laparotomy due to obstructive ileus. The assessment was conducted one day after the surgery, on May 23, 2025. The 16 cm surgical wound exhibited signs of mild inflammation with minimal exudate, clear wound edges, 50% granulation, and less than 80% epithelialization, indicating suboptimal healing. The patient reported a sharp, stabbing pain (scale 7) and stiffness with movement, along with an inability to pass flatus or stool since before the surgery. Vital signs and laboratory tests showed leucocytosis ($17.6 \times 10^3/\mu\text{L}$), elevated haemoglobin (18 g/dL), and increased platelets, supporting the presence of an inflammatory process. Her history indicated a previous ectopic pregnancy operation with no known comorbidities. Her dietary patterns before admission showed inadequate nutritional intake, and she rarely exercised. Radiological examination confirmed a small bowel obstruction. Initial nutrition was provided intravenously, followed by gradual introduction of high-protein foods such as boiled eggs, soft porridge, and high-protein UHT milk. Two primary issues were identified: impaired skin and tissue integrity related to mechanical factors, and acute pain related to a physical injuring agent. Impaired tissue integrity was evidenced by the postoperative wound condition, with suboptimal epithelialization and incomplete granulation tissue formation. Acute pain was described as continuous, with an intensity of scale 7, and a cutting-like sensation in the abdominal area. The patient also experienced discomfort due to the presence of a nasogastric tube (NGT) and a urinary catheter (DC). These diagnoses were reinforced by objective data such as the appearance of the surgical wound, the patient's facial expressions, vital signs, and laboratory results indicative of active inflammation.

The focus of interventions was directed towards wound healing and the provision of high-protein nutritional support. The nurse conducted regular observations of the wound condition, including size, color, exudate, and the progress of epithelialization. Aseptic wound care was performed using NaCl solution and appropriate ointments. Nutrition was gradually advanced according to gastrointestinal tolerance: from liquid, to soft porridge, and eventually to steamed rice, with an emphasis on protein sources such as boiled eggs, high-protein milk, and fruits. Collaboration was established with the nutrition team for meal planning focused on high protein content and with the medical team for the administration of antibiotics and analgesics. The patient was also taught non-pharmacological pain management techniques, such as deep breathing relaxation, and educated on the importance of hydration and nutritious food intake in accelerating wound healing. For Mrs. W, post-laparotomy, nursing implementation primarily focused on providing high-protein nutrition to accelerate the wound healing process. On day one (May 23, 2025), the patient had no oral intake and received nutrition solely through intravenous fluids. Once her condition stabilized, she gradually began receiving high-protein milk, despite experiencing some abdominal discomfort. By day two, the patient started consuming soft porridge and two boiled eggs, along with snacks like fruit and high-protein UHT milk. The NGT had been removed, indicating improved gastrointestinal function. Protein intake began to increase, and the positive outcomes were evident from the wound's condition, which showed over 75% epithelialization, reduced exudate, and increased patient comfort. On day three, the patient consumed coarse porridge, boiled eggs, and fruit. She successfully had her first bowel movement post-surgery, signaling improving bowel function. The wound appeared cleaner with no exudate, pain decreased to a scale of 5, and light mobilization was possible. By day four, the patient

received steamed rice, boiled eggs, papaya, and protein milk. She consumed most of her meal portions, reported pain decreasing to a scale of 4, and felt more comfortable in her abdomen. The wound showed significant healing progress with no signs of infection. The provision of high-protein nutrition proved effective in accelerating tissue regeneration, improving epithelialization, reducing pain, and supporting gastrointestinal recovery, thereby significantly speeding up postoperative wound healing.

Evaluation demonstrated significant daily progress. On May 23, 2025, the wound was still in the inflammatory phase with intense pain and limited oral intake. By May 24, epithelialization reached 75%, and pain decreased to a scale of 6, with nutritional intake beginning to improve. On May 25, pain further decreased to a scale of 5, and light mobilization was possible. The patient started consuming high-protein foods more independently. By May 26, pain improved to a scale of 4, epithelialization was over 75%, the wound was clean with no exudate, and the patient consumed almost all of her high-protein intake. Overall evaluation indicated that the implementation of high-protein nutritional intake played a crucial role in accelerating the post-laparotomy wound healing process. Protein intake supported new tissue formation, accelerated epithelialization, and improved the patient's immunological and metabolic status. The combination of wound care, pain management, and nutritional support proved to be an effective strategy for expediting recovery during hospitalization.

Discussion

The correlation between high-protein intake and the accelerated rate of wound healing in this post-laparotomy patient underscores the biological necessity of amino acids during the proliferative phase of recovery. Protein serves as the primary substrate for collagen synthesis, which is essential for developing the tensile strength required to keep a major abdominal incision closed (Avağ et al., 2025). In this case, the patient's wound demonstrated a rapid transition from the inflammatory stage to the granulation stage, likely due to the abundance of bioavailable protein. Without sufficient protein, the body struggles to produce the myofibroblasts necessary for wound contraction, often leading to delayed closure or dehiscence. This study observed that a high-protein diet helped maintain optimal serum albumin levels, which in turn minimized localized oedema at the suture line. Reduced swelling allows for better capillary perfusion, ensuring that oxygen and vital nutrients reach the deep fascial layers of the laparotomy site. Furthermore, the patient's immune response appeared more robust, as evidenced by the lack of purulent discharge or signs of surgical site infection. The systemic metabolic demand after abdominal surgery is immense, and fulfilling this demand through diet prevents the body from catabolizing its own muscle tissue. Consequently, the patient maintained better physical strength, which facilitated earlier mobilization and further enhanced the healing process. This case reinforces the principle that medical nutrition therapy is not merely supportive but a primary driver of surgical success.

A unique and pivotal aspect of this case study in Indonesia was the integration of local high-protein sources. This traditional dietary practice is supported by modern clinical evidence, as snakehead fish is exceptionally rich in albumin and essential amino acids like glycine and arachidonic acid. By utilizing these locally accessible protein sources, the patient was able to meet increased nutritional targets without the high cost of imported specialized formulas. The use of culturally familiar foods also significantly improved the patient's appetite and dietary compliance, which are often major hurdles in post-operative recovery (Nemec, 2020). Many Indonesian patients have a high regard for the healing properties of "Ikan Gabus," which creates a positive psychological reinforcement during the mealtime intervention. This synergy between traditional wisdom and clinical nutrition provides a sustainable model for post-surgical care in resource-limited settings across the archipelago. The patient's rapid recovery suggests that indigenous protein sources can be just as effective, if not more so, than synthetic supplements when integrated into a structured plan. Additionally, the inclusion of plant-based proteins like tempeh provided a diverse amino acid profile while remaining easy on the patient's digestive system. This balanced approach ensured that the patient received a steady supply of nitrogen, which is critical for maintaining a positive nitrogen balance. Such findings advocate for the formal inclusion of local high-protein foods in standardized Indonesian hospital diets.

When analysing the broader implications of this case, it becomes clear that nutritional monitoring must be as rigorous as hemodynamic monitoring following major surgery. The success of the high-protein intervention was dependent on the multidisciplinary coordination between the nursing staff, the clinical nutritionist, and the patient's family. In Indonesia, the family's role in providing and encouraging food intake is a critical variable that can determine the success of a nutritional protocol. This case study demonstrates that when families are educated on the importance of protein, they become active participants in the wound-healing process. However, clinicians must remain vigilant for potential complications, such as the increased renal load that a very high-protein diet might impose on susceptible patients. In this specific instance, the patient's renal function remained stable, allowing for the continued titration of protein levels to match the healing trajectory. The documented reduction in the length of the hospital stay also suggests a significant economic benefit for the healthcare system when nutrition is prioritized. Future studies in Indonesia should aim to quantify the exact dosage of protein required to optimize healing across different types of abdominal incisions. By standardizing these high-protein protocols, Indonesian hospitals can improve patient safety and reduce the incidence of chronic post-operative wounds. Ultimately, this case study serves as a foundational piece of evidence for the "food as medicine" philosophy in modern Indonesian surgical care.

Conclusion

Mrs. W, a 37-year-old patient, presented on May 23, 2025, following a laparotomy for obstructive ileus, exhibiting a 16 cm surgical wound with signs of suboptimal healing. Clinical assessment revealed mild inflammation, minimal exudate, 50% granulation, and less than 80% epithelialization. The patient reported severe, stabbing pain rated at a 7 on the Numeric Rating Scale, accompanied by physical stiffness and a lack of bowel movements. Laboratory results further confirmed a systemic inflammatory response, evidenced by leucocytosis and elevated platelet counts, necessitating immediate clinical intervention. The primary nursing diagnoses identified were impaired skin and tissue integrity related to surgical trauma and acute pain. To address these, the care plan focused on a synergy of advanced wound care and aggressive nutritional support. Interventions included regular aseptic wound observations and a gradual dietary advancement from liquids to soft solids. A significant emphasis was placed on high-protein nutrition, incorporating foods such as eggs and milk to facilitate tissue repair, while pain was managed through a combination of pharmacological analgesics and non-pharmacological comfort techniques. Implementation prioritized high-protein intake to accelerate recovery, yielding measurable results by the second day when the nasogastric tube (NGT) was successfully removed. As Mrs. W's protein consumption increased, wound epithelialization improved to over 75%, and exudate levels notably diminished. By the third day, gastrointestinal motility returned as evidenced by a bowel movement, and pain levels began to subside to a scale of 5. By the fourth day of intervention, the patient's pain further decreased to a scale of 4, the surgical wound remained clean, and she demonstrated high compliance with her nutritional regimen. The final evaluation confirmed that comprehensive postoperative nutritional support was crucial in accelerating tissue regeneration and restoring physiological function. Significant daily progress was documented, characterized by a steady reduction in pain, improved wound morphology, and the successful return of gastrointestinal activity. Ultimately, the integration of specialized wound care, effective pain management, and protein-rich dietary support proved to be an effective multidisciplinary strategy in expediting the patient's overall recovery.

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