

# The Risk of Essential Fatty Acid Deficiency on Parenteral Nutrition in Long-Term Hospital Stay: Case Report



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## Background

Essential fatty acid deficiency (EFAD) is a condition that can occur when the body does not have adequate fats from the diet. EFAD can develop in as quick as 10 days and can present with symptoms such as itchy and flaky skin, poor wound healing, elevated liver function tests, and increased susceptibility to infection. EFAD rarely occurs in individuals who eat a balanced diet with a variety of foods and fat sources and is seen most often in patients unable to eat by mouth or tolerate tube feedings. Patients with prolonged poor nutrition are at increased risk of EFAD due to insufficient fat intake. Risk factors of EFAD are inflammatory bowel disease, pancreatic insufficiency, extreme diet restriction, and long-term parenteral nutrition support with limited fat emulsion supplementation. Since clinical markers are challenging to assess in the acute care setting, physical signs and symptoms are used for identifying and treating EFAD. This case report reviews the current nutritional guidelines related to EFAD and parenteral nutrition and highlights a patient at risk for EFAD due to her poor intake, who was receiving long-term parenteral nutrition with supplemental oral intake.

## Nutrition Considerations

To prevent and treat EFAD, many nutritional factors must be considered. The type of diet and oral intake, physical and clinical status of the patient, type of venous access, days without eating, and more can contribute to EFAD.

- Monitor serum triglycerides and ensure they do not exceed 1,000 mg/dL which can indicate excessive fat intake<sup>1</sup>
- Obtain serum triglycerides lab every 3 days when supplementing with fat source
- Monitor: daily fluid intake and output, daily serum electrolytes, glucose, calcium, magnesium, and phosphate, and weekly aminotransferases and bilirubin<sup>2</sup>
- Standard multivitamins for adults on parenteral nutrition: Vit A, Vit D, Vit E, Vit K, Vit C, Niacinamide, Thiamin, Riboflavin, Dexpantenol, Biotin, Folic Acid, Vit B12<sup>3,4</sup>
- Access: Central lines are the ideal line for total parenteral nutrition and preventing EFAD because higher concentrations of formulas are better tolerated
- Consider: the patient's intake, physical signs and symptoms, hospital-available nutritional supplements, and the patient's medical picture and nutritional needs
- At least 10% of total calories from fat<sup>5,6</sup>

## Case Report

### Case Summary

- Patient is a 57-year-old female who presented to the hospital for severe nausea and vomiting 14 days after surgery.
- Physical Assessment: skin intact, no evidence of subcutaneous fat loss or muscle wasting
- Past Medical History: hypothyroidism, essential hypertension, cervical polyp, abdominal uterine and vaginal bleeding (unspecified), arthritis, asthma, back pain, cancer, congestive heart failure, epilepsy, GERD, migraine, neuromuscular disorder, circulatory system disease, seizures, and sleep apnea
- Social History: Lives with her daughter, ex-husband is involved in her care

### Assessment

- Height: 5'8"
- Admit weight: 229 lbs
- Varied weights throughout stay (between 222-254 lbs), expected due to fluid fluctuations during stay

### Nutrition Diagnosis

Inadequate oral intake related to poor appetite, altered gastrointestinal function, and diet order inadequate to meet patient's needs as evidenced by patient is consuming less than 50% of meals with net 3% weight loss in one month (net 7 pound weight loss)

### Interventions

- The main nutritional goals of care for the patient were to increase her intake and ensure she was getting adequate calories, protein, and fat sources
- Nutrition Prescription: Parenteral nutrition meeting 40% of her calorie needs and 100% of protein needs

Nutrition Intervention:

- Oral diet: alternating between no diet, low-fat diet, and liquid diets based on doctor orders
- Parenteral nutrition: increased Clinimix given patient unable to meet protein and calorie needs through oral diet (This patient had a peripheral line, so only Clinimix (protein and calories) were able to be continually provided through her line)
- Supplemental fat: 250 mL of intralipids three times per week to ensure the minimum requirement of 500 mL lipid was being met to prevent EFAD.<sup>1,2</sup> Adding the additional intralipids were to ensure the patient was actually receiving her fat dosage and because her lipid panel laboratory values were in range
- Oral nutrition supplements: offered variety of high calorie, high protein supplements with varying textures and flavors to find one patient liked
- Assessed nutritional adequacy and estimated fat intake through a comprehensive nutrition history

### Outcomes

- Advocated for the patient and collaborated with the interdisciplinary team in order to prevent EFAD from occurring
- Peripheral line discontinued
- Oral intake and nutritional status improved
- Patient was able to discharge from hospital

## Discussion and Application

Through this case study and literature review, the standards of practice and guidelines for meeting nutritional needs while on long-term parenteral nutrition are discussed. For clinical in patient acute care settings, recognizing physical signs and symptoms on patients is most crucial for treatment, and proper advocacy and explanation of treatment options are necessary. For example, in this case, the patient was adamant on not wanting a central line placed, but this would have made her recovery and quality of care in her admission much more effective if the dietitians were able to use total parenteral nutrition with included fat in her nutrition. Perhaps further educating and advocating for the patient could lead to improved outcomes. Ensuring proper communication with healthcare team and risk prevention is essential to provide the best patient care. This case can be used in the future for assessing similar patients and providing the most effective and efficient care while monitoring for conditions such as EFAD.

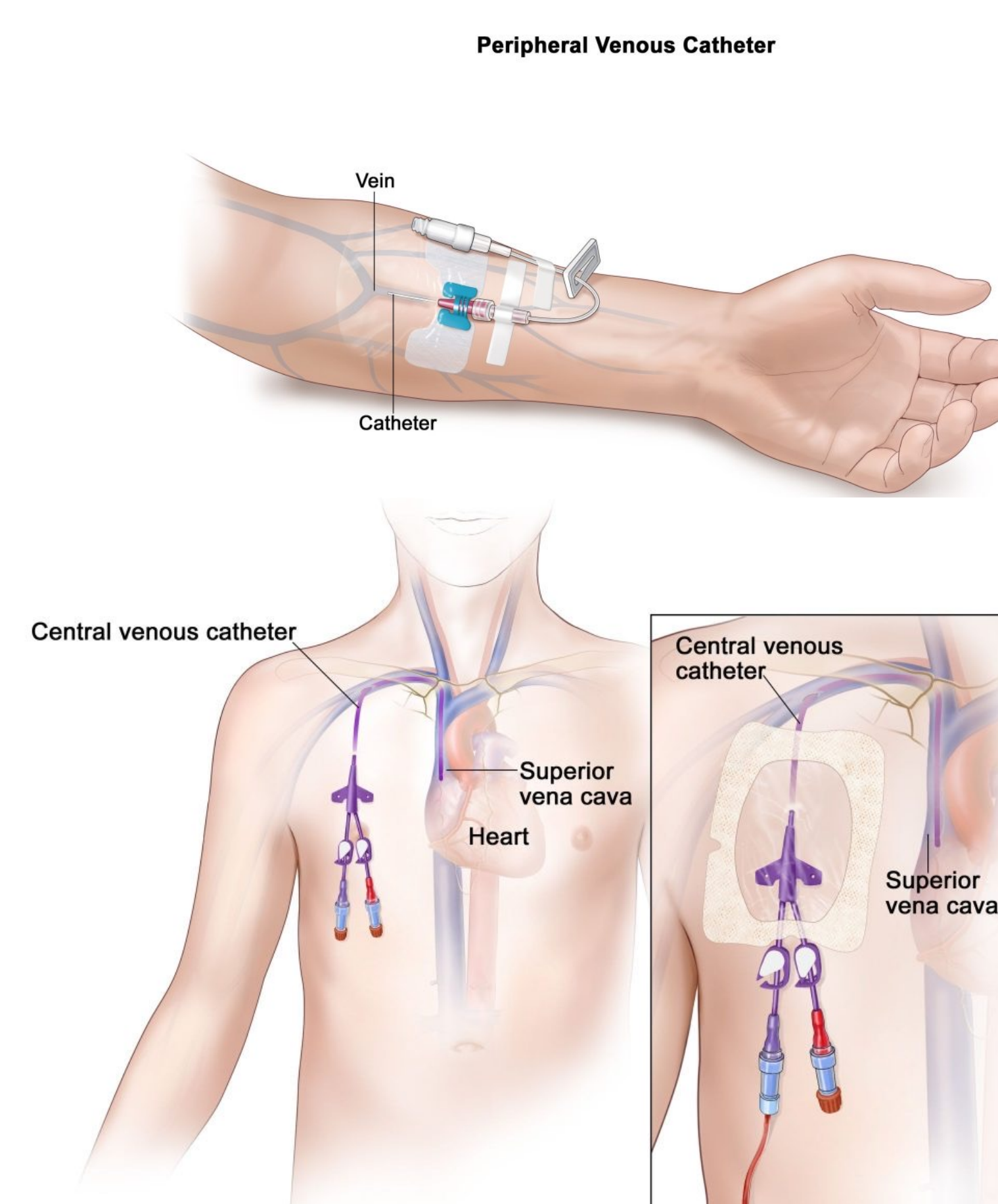
## Conclusions

This case report emphasizes the importance of interprofessional collaboration in the clinical inpatient hospital setting. Working with the Registered Dietitians, Registered Nurses, Doctors, Pharmacists, and the patient were crucial in providing the most effective care for the patient. All in all, anyone who is inadequately meeting their caloric and fat needs is at risk for developing EFAD. Supplementing with fat sources at least twice per week is the best recommendation to prevent EFAD.

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### Images of Peripheral IV vs. Central IV<sup>7</sup>



### Physical Exam Findings of EFAD

Snowflake dandruff on lower leg<sup>8</sup>



Leather-like dry and cracked skin<sup>9</sup>



Inflamed and dry skin<sup>10</sup>

