

New Onset of Acne Associated With Dietary Supplements Post-Metabolic Bariatric Surgery: A Case Report and Review of the Literature

Journal of Pharmacy Practice
2026, Vol. 0(0) 1-5
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DOI: 10.1177/08971900261448131
journals.sagepub.com/home/jpp
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Abstract

Metabolic bariatric surgery is the most effective long-term treatment for patients with obesity and obesity-related comorbidities. However, despite substantial health benefits, these procedures also pose a significant risk of nutrient imbalances. It is well established that postoperative patients are prone to vitamin and mineral deficiencies. Conversely, excessive supplementation may result in elevated levels of certain micronutrients, which can also produce adverse effects. Patients may self-treat with different supplements, e.g., for hair loss, and may not be aware of possible duplications with their bariatric vitamins. The objective of this work was to examine the potential risk of dermatologic manifestations associated with the use of inappropriate vitamin formulations and overlapping supplementation in a post-bariatric patient. We present a 45-year-old post-bariatric female patient, who developed new onset-acne. Clinical pharmacist intervention identified inappropriate use of a multivitamin containing provitamin A instead of retinol and a relatively high amount of vitamin B1, along with an additional “hair-growth” multivitamin rich in vitamin B6, leading to overlapping supplementation. After initiating an appropriate multivitamin regimen, the dermatologic condition completely resolved with no need for acne medications. An overview of the literature relevant to dietary supplementation-related acne is provided as well. In conclusion, this case highlights the essential need for monitoring and education of bariatric patients regarding appropriate use of vitamins. Through proactive questioning of supplement use, detection of nutrient imbalances, and patient education, clinical pharmacists and other healthcare professionals can prevent and reduce the risk of complications after surgery.

Keywords

provitamin A, acne, metabolic bariatric surgery, excess vitamin B, clinical pharmacist

Introduction

Impaired absorption of vitamins and minerals is a well-documented complication after metabolic bariatric surgery (MBS).^{1,2} This complication is affected by various factors, such as surgical technique, pre-existing deficiencies, suboptimal nutrient intake, weight loss, alterations in gastrointestinal (GI) anatomy, and patient adherence.^{3,4} Fat-soluble vitamins (A, D, E, K) are particularly at risk due to impaired absorption in procedures with a mal-absorptive component, including biliopancreatic diversion (BPD), biliopancreatic diversion with duodenal switch (BPD/DS), and Roux-en-Y gastric bypass (RYGB).^{1,5} Clinically, alterations in vitamin A absorption are common in post-gastric bypass patients and may affect vision, immune function, reproduction, and skin health,

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Table 1. Laboratory Parameters at Baseline and Three Months After the Clinical Pharmacist Consultation

Laboratory parameters	July 2023 (post-RYGB, Pre-consultation)	March 2024 (post-RYGB, Pre-consultation)	September 2024 (3 months post-consultation)
Vitamin A [30-70 µg/dL]	58	51	69
Vitamin B1 [33.1-60.7 µg/L]	87	93	82
Vitamin B6	No result	No result	No result
Vitamin B12 [211-911] pg/mL]	696	554	721
Zinc [55-165] µg/dL]	153	153	124
Folic Acid [>5.4 ng/mL]	10	10	>10
Copper [65-165 µg/dL]	143	143	112
Ferritin [7.3-270.7 ng/mL]	36	12.9	26
Vitamin D [30-50 ng/mL]	29	29	23

especially in acne vulgaris.^{6,7} Slater et al reported deficiencies (defined as serum levels below the reference range) of vitamins A, K, and D in 69%, 68%, and 63% of patients undergoing BPD by the fourth year after surgery, respectively. Hypocalcemia increased from 15% to 48%, accompanied by a rise in serum parathyroid hormone levels in 69% of patients. No cases of night blindness or visual abnormalities were observed.^{5,8}

On the other hand, excess intake of certain vitamins can also lead to adverse effects. High doses of vitamin B6 (pyridoxine), B12 (cobalamin) and B1 (thiamine) found in hair-growth or energy supplements, have been linked to acneiform eruptions that typically resolve after the supplement is discontinued. In addition, iodine, whey protein supplements, as well as antidepressants (lithium, imipramine), antiepileptics (phenobarbital), oral contraceptives, corticosteroids, and others have also been linked to acne.⁹ These risks – deficiencies and excesses of certain vitamins – are especially relevant in patients who have undergone MBS and are managing their nutrition with various supplements, as use of life-long supplementation is highly recommended by the leading organizations and guidelines.^{1,10}

Dermatologic manifestations have been described following MBS, often in association with micronutrient deficiencies.³ However, the prevalence of acne in post-bariatric patients remains unknown, and current evidence is limited to case reports. In this case report, we present how adult-onset acne in a post-bariatric patient was clinically associated with nutritional issues (suboptimal formulation of vitamin A and relatively high intake of vitamins B6 and B1), and how clinical pharmacist intervention addressing these issues led to resolution of the skin condition.

Case Presentation

We present a case report of a 45-year-old woman who visited the clinical pharmacist clinic for a pre-operative consultation before undergoing excess skin removal surgery. The patient underwent RYGB in June 2023, achieving a successful weight reduction of 52 kg since the surgery (122 kg, BMI [Kg/m²] = 43 before the surgery).

Approximately 5 months post-surgery, the patient developed acne on her face, predominantly in the cheek area. A dermatologist initiated isotretinoin therapy at a dose of 20 mg daily, which was subsequently increased to 40 mg daily, with no clinical improvement in acne condition. It was recognized that isotretinoin needed to be discontinued at least 6 months before surgery to prevent wound healing complications and scarring.¹¹ The patient also reported using a multivitamin supplement and a hair growth product. Notably, the acne appeared for the first time in her life, and she reported no prior history of acne before initiation of dietary supplements.

This case prompted a comprehensive evaluation of the potential causes of acne and a review of the patient's post-bariatric nutritional management.

Further Assessment and Findings:

- **Type of Multivitamin:** Following MBS, the patient reported taking a daily multivitamin containing beta-carotene (provitamin A), 2500 IU and did not contain any preformed retinol. The multivitamin also contained a relatively high level of vitamin B1 (25 mg).
- **Additional Supplements:** The patient also reported using a daily “hair growth” supplement to address postoperative hair loss. This supplement was rich in vitamin B6 (20 mg). She was also advised to take 4000 IU/day vitamin D and liposomal iron supplements.
- **The patient was asked to provide laboratory test results at the consultation.** Results showed vitamin A within the normal reference range [58, 51 µg/dL, 30-70] and elevated levels of vitamin B1 [87, 93, 33.1-60.7 µg/L]. The vitamin D level was slightly below the reference range [29, 30-50 ng/mL]. No blood level results for vitamin B6 were available. Other laboratory values were within normal limits. The laboratory results are shown in [Table 1](#).

The assessment suggested that inadequate vitamin A intake, combined with excess vitamin B6 and B1, may have contributed to the onset of acne post-RYGB.

Management

The clinical pharmacist recommended several changes to address the identified causes:

- Vitamin A supplementation: The patient's multivitamin was switched to a formulation containing vitamin A (retinol) instead of only beta-carotene. This change was made to ensure adequate absorption of vitamin A. According to the National Institutes of Health (NIH), the absorption of vitamin A from supplements ranges from 70% to 90%, whereas beta-carotene absorption is highly variable, ranging from 8.7% to 65%, and requires enzymatic conversion to retinol.¹² This multivitamin also contains a lower amount of vitamin B1 (5 mg).
- Stopping the hair supplement: The patient's hair supplement was discontinued. She was counseled that high-dose vitamin B6 and other components in such supplements could be aggravating her acne. To address hair loss, she was advised to take a collagen supplement.
- Isotretinoin therapy was discontinued, given the need to be off it for more than 6 months before her skin-removal surgery.¹¹
- Maintain adherence to vitamin D and liposomal iron supplements due to decreased vitamin D and ferritin levels.
- It was recommended that the patient maintain routine follow-up with her MBS dietitian and have her vitamin levels monitored every 3-6 months until stable levels are achieved, and thereafter every 12 months.

Outcome: The patient reported adherence to the clinical pharmacist's recommendations, with good tolerability. Over the following weeks, the patient's skin gradually improved. At 3 months after the clinical pharmacist's intervention, her acne had completely resolved. She did not require resumption of acne medications.

Discussion

This case report highlights a clinically relevant presentation of post-bariatric acne in the context of micronutrient imbalance; specifically, inadequate intake of vitamin A and excess vitamin B1 from a bariatric multivitamin, as well as excess vitamin B6 intake from non-prescribed supplementation for hair loss. Post-bariatric acne is uncommon, but when present, it should raise clinical suspicion for nutritional imbalances.

After malabsorptive procedures, fat-soluble vitamin deficiencies are common due to anatomical alterations that bypass the duodenum and proximal jejunum, where these vitamins are solubilized into micelles and absorbed by mucosal cells. The human diet contains two sources of vitamin A: preformed vitamin A and provitamin A carotenoids. Vitamin A can be found in foods from animal sources including dairy products, fish and organ meats and most dietary provitamin A comes

from leafy green vegetables, fruits, etc.¹² Restricted intake of foods rich in vitamin A or its pro-vitamin beta-carotene, may cause insufficient plasma concentrations of this vitamin.⁶

While many bariatric-specific multivitamins include vitamin A, some rely solely on beta-carotene, a provitamin A carotenoid, as the source. The patient reported taking a multivitamin containing 2500 IU of beta-carotene. This presents a clinical concern, as the intestinal conversion of provitamin A (eg, beta-carotene) to active retinol is limited—particularly in post-gastric bypass patients with impaired fat absorption, and bypass portions of the intestine. Therefore, patients may remain functionally vitamin A deficient despite adherence to multivitamin regimens. Dermatologically, vitamin A deficiency may present with xerosis, follicular hyperkeratosis, and acne.⁵

According to the American Society for Metabolic and Bariatric Surgery (ASMBS), and bariatric surgery nutritional guidelines, it is recommended to take 5000-10,000 IU/day of vitamin A supplementation after RYGB¹³ and also screening for nutritional deficiencies every 3 to 6 months during the first year and annually thereafter.¹ For patients who have had RYGB or biliopancreatic diversion with duodenal switch (BPD/DS), this includes measuring serum levels of vitamins A, B1, B12, D and folate as well as zinc, copper and iron.¹³⁻¹⁵

In this case, the patient was not under regular monitoring of vitamin levels as recommended. However, before the clinical pharmacist's intervention, the vitamin A levels were 58 and 51 µg/dL. It is possible that a decline in vitamin A levels occurred due to the low vitamin A content in the multivitamin supplement combined with postoperative malabsorption. After the intervention and modification of the multivitamin formulation, the vitamin A level increased to 69 µg/dL. Additionally, the patient's relatively low vitamin D levels may be explained by the fact that she was receiving only 1000 IU daily through her bariatric multivitamin and did not consistently take additional vitamin D supplementation, as recommended. This dose may be insufficient in post-RYGB patients.¹

In addition, the bariatric multivitamin contains a high dose of vitamin B1 (25 mg). Rare cases of skin eruption were caused by the association of vitamins B combination,¹⁶⁻¹⁸ as shown in Table 2. In our case report, the patient had a combination of B vitamins with relatively high intake of vitamin B1 as well as elevated B1 levels since the MBS, which can also support a possible association between thiamine excess and acne. However, causality cannot be established based on a few case reports.

Further contributing to this issue was the patient's use of a hair-growth supplement containing relatively high doses of vitamin B6 (20 mg). The recommended dietary allowances (RDA) for vitamin B6 in adults is 1.3 mg/day.¹⁹ According to the European Food Safety Authority (EFSA), the upper limit of vitamin B6 is 12 mg/day for adults, making the amount of vitamin B6 in the supplement markedly higher than recommended and exceeding this threshold.^{19,20} Although vitamin

Table 2. Literature Summary of Acne Related to Vitamin Deficiencies and Dietary Supplements

Supplement features	Key clinical findings	References
Vitamin A	Studies report that low plasma levels of vitamin A lead to the development of acne and the aggravation of this condition.	5,6
High-dose vitamins B6 and B12	Eruption resembling acne rosacea failed to respond to the usual treatment. Clinical improvement occurred when the vitamin supplements were discontinued.	16
Vitamins B (B12 [1 g/day], B6 [500 mg/day], B1 [500 mg/day])	A 38-year-old woman developed a rosacea-like eruption 5 days after starting a B complex supplement. The lesions resolved completely within 3 weeks after discontinuation.	17
Vitamins B (B6, B1, B2 and B12)	A 21-year-old woman developed a papulopustular eruption on the face, neck, shoulders, chest, and back. Eruption appeared 4 weeks after the beginning of vitamins B. Discontinuation of therapy led to complete remission within 6 weeks.	18
B12 injection	A 37-year-old woman developed an acneiform eruption on the chest, back, face, and neck. The onset occurred within 12 hours after the second dose of a vitamin B12 injection. Discontinuation of vitamin B12 and initiation of clindamycin/benzoyl peroxide topical gel resulted in resolution within 2 weeks.	22
B12 injection	A 67-year-old woman with pernicious anemia developed an acneiform eruption after intramuscular vitamin B12. The eruption resolved within 2 weeks with the use of clindamycin gel and ketoconazole cream, but similar acneiform eruptions recurred after every subsequent vitamin B12 injection.	23

B6 is involved in neurotransmitter synthesis, amino acid metabolism, gluconeogenesis, etc.,⁵ excessive intake has been associated with acne. The literature on this association remains limited, mostly to case reports, but available evidence suggests that high B6 levels may induce acne.^{9,21} In our case, the hair growth supplement was discontinued, but serum B6 levels were not available due to health insurance considerations.

To complete this case report, we summarized the published literature on acne outbreaks related to vitamin deficiencies and supplement use. However, the literature on acne attributed to dietary supplements after MBS is very limited.

This case reinforces the value of clinical pharmacist-led medication and supplement review in the postoperative setting. By identifying inappropriate supplementations and recommending a formulation containing preformed vitamin A and a lower amount of vitamin B1, as well as discontinuing the hair-growth supplement containing excess vitamin B6, the patient's acne resolved without the need to continue systemic isotretinoin therapy or other acne medications. The relationship between supplement use and symptom onset, and resolution after discontinuation, with the lack of relapses during more than 1 year of follow-up supports a likely contributory role in this case. Furthermore, cessation of isotretinoin allowed safe scheduling of the patient's planned skin removal surgery, minimizing risks of impaired wound healing.

This study has several limitations that should be acknowledged. First, the association between vitamin supplementation (e.g., vitamin B1, B6) and acne is largely based on case reports and small case series. Therefore, the evidence is limited, and further prospective studies are needed to clarify the role of supplement use after MBS in the pathophysiology of acne. Second, precise information regarding the timing of initiation of the hair growth product relative to acne onset was

not available. However, the acne resolved completely following discontinuation of the hair-growth product and the patient reported that acne appeared after supplementation initiation. Third, the patient was not under regular follow-up with blood tests after MBS, and the blood test for vitamin B6 was also not available; therefore, it is not possible to determine with certainty the levels of all vitamins before and after the clinical pharmacist consultation.

Conclusion

This case suggests that inappropriate vitamin formulations and overlapping supplementation may contribute to dermatologic manifestations in post-bariatric patients. While bariatric patients require lifelong multivitamin supplementation, suboptimal formulations and use of additional supplements can lead to clinical adverse effects. It is essential that healthcare providers proactively inquire about supplement use, as this information is not always included in medical records, and educate patients on the potential risks, such as possible dermatologic changes following MBS.

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Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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