Case Report

The Use of an Arginine-Enriched Oral Nutrition Supplement to Enhance Wound Healing from a Cesarean Section

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Keywords

Cesarean section · Enteral nutrition · Lifestyle · Pregnancy · Wound healing

Abstract

Background: Surgical wounds can directly hinder daily activities and leave scars that can have long-term impacts on a patient. Cesarean sections account for over one-third of all baby deliveries, resulting in women faced with a wound needing rapid healing to take care of their baby. **Case Presentation:** The patient received an arginine-enriched oral nutrition supplement twice daily for 14 days as a therapeutic intervention to aid in wound healing and recovery. At the 2-week postpartum visit, validated scar assessment scales were completed to determine how the surgical wound was healing. It was shown that this therapeutic intervention improved wound healing as indicated by low scar assessments. **Conclusion:** This woman showed that consuming an arginine-enriched oral nutrition supplement could optimize healing following a cesarean section. Future research needs to be conducted on a larger sample size to determine whether these results can be generalized to the broader population.

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Introduction

Wound healing is a complex bodily process which requires specific nutrients to promote the healing process and repair the tissue. Optimal wound healing demands that a person consume adequate nutrition, as nutrient deficiencies have shown a delay in the healing process and potential for infections [1, 2]. Malnutrition and micronutrient deficiencies can negatively affect wound healing due to the missing building blocks for tissue repair [3]. The main goal for adequate wound healing is to optimize recovery in the shortest time, with minimal discomfort, scarring, and pain for the patient [4]. Protein and carbohydrates are the main macronutrients needed to stimulate tissue synthesis. High-protein diets have been shown to aid in healing of pressure ulcers and other open wounds [5, 6]. Some nutrients in particular that have been shown to enhance the healing process include vitamin C, vitamin E, zinc, and two important amino acids, arginine and glutamine [7, 8]. Research has shown that arginine, vitamin C, and zinc may be among the most important nutrients to promote wound healing. Arginine is a conditionally essential amino acid that, when used as a therapeutic intervention, has been shown to decrease infections after major surgeries [9, 10]. Glutamine is one of the most abundant amino acids and is essential under stressful conditions to improve nitrogen balance and target oxidative stress [3].

In the dietetics realm, oral nutritional supplements are often used to aid in wound healing. Commonly seen in the clinical setting for wound healing are the three main arginine-enriched beverages: Resource Arginaid® (Novartis Nutrition, Minneapolis, MN, USA), Juven/Abound® (Abbott Nutrition, Columbus, OH, USA), and Cubitan® (Nutricia, Gaithersburg, MD, USA). Numerous studies support the notion that high-protein, arginine, and micronutrient oral nutrition supplements promote improved pressure ulcer healing [11–14].

Although arginine-enriched oral nutrition supplements have been shown to be effective for pressure ulcer wound healing, they may be optimal sources of nutrition for other types of wound healing as well. In the United States, approximately 1,258,581 (31.9%) of all births are delivered via cesarean section [15]. Cesarean section has been documented as the most common operation in operating rooms across US hospitals [16]. This procedure overall has nearly 50% higher costs for both maternal and newborn care compared to vaginal birth [17]. In addition to the increased cost, the minimum recovery period is significantly longer for a cesarean than a vaginal birth (6 vs. 2 weeks). Women have reported pain, decreased mobility, abdominal wound issues, and concerns of infection when giving birth via cesarean section [18]. This case report examines the impact of consuming an arginine-enriched oral nutrition supplement on surgical wound healing from a cesarean section.

Case Presentation

The patient was a 28-year-old female who was considered to be in a healthy BMI range before pregnancy. She had no past medical history of any chronic illnesses. Table 1 presents anthropometric measurements from pre-pregnancy to 2 weeks postpartum to indicate the health of the patient. At 32 weeks, the patient discovered that her baby was in the frank breech position. At 36 weeks, the patient had a failed version attempt; therefore, to ensure the safety

of both mother and baby, she elected for a scheduled cesarean section. In this cesarean section, the patient's wound was closed by the use of sutures.

The patient consumed an overall healthy diet which regularly consisted of 2–5 servings each of fruit, vegetables, whole grains, protein, and dairy. No dietary records were collected during the writing of this case report. On top of the standard dietary intake, an arginine-enriched oral nutrition supplement was consumed daily to promote wound healing. The nutritional intervention is a popular oral supplement which provides 90 kcal, 7 g of L-arginine, 7 g of L-glutamine, 2.5 g of collagen protein, 300 mg of vitamin C, 15 mg of vitamin E, 9.5 mg of zinc, and 1.5 g of β -hydroxy- β -methylbutyrate (Juven®, Abbott Nutrition). Twice daily for 14 days, a packet of Juven® powder was dissolved in 500–1,000 mL of water and consumed.

Results

Cesarean section is considered to be a major surgery, which results in a horizontal scar on the lower abdomen. Rapid healing of surgical wounds has the potential to play a significant role in decreasing hospitalizations and more rapid return to daily function [19]. At her 2-week postpartum follow-up visit, the obstetrician performed a scar evaluation using the Stony Brook Scar Evaluation Scale (Table 2) and the Manchester Scar Scale (Table 3). These two assessment scales were selected due to their assessment in the short term of scars and applicability to a wide range of scars [20]. Assessment measures showed that the scar had been healing properly as indicated by low scar assessment values. An image was captured 2 weeks postpartum to provide a visual scar assessment (Fig. 1). In addition, when the obstetrician was asked, "How does this scar compare to other postpartum patients at this practice who had a cesarean section?" she responded, "It appears to be healing better than most patients." The patient was ambulatory at day 2 postpartum and was reported to be feeling that she was recovering quickly. Qualitative assessment from the patient indicated that she had nominal discomfort and had an optimal recovery from her cesarean section due to the arginine-enriched oral nutrition supplement.

Discussion and Conclusion

Women who undergo a cesarean section face many barriers that hinder their recovery. It is crucial for a woman to recover quickly in order to take care of her newborn baby, to prevent rehospitalization, and to get back to everyday activities. In this case report, the use of an arginine-enriched oral nutrition supplement has been shown to improve healing of the surgical wound. Both the Stony Brook Scar Evaluation Scale and the Manchester Scar Scale have been used to assess the physical characteristics and esthetics of scars [21]. Both scales include components of the visual analog scale in addition to more attributes analyzed [20]. The Stony Brook Scar Evaluation Scale has been validated for other surgical incisions, with a total score of 5 indicating "best possible scar" on the visual cosmetic scale [22]. A large prospective trial used the same scar scale and found that a suture skin closure method resulted in only 16% of all women having a score of 5; moreover, a majority of women (67%) had a score of 3 or less [23]. A low score of 8 out of possible 18 on the Manchester Scar Scale as a subjective scar

assessment indicates optimal healing [24]. While these oral nutrition supplements are regularly used for pressure ulcer healing, similar wound healing mechanisms take place recovering from surgical wounds.

As this is just one case, the findings cannot be assumed to improve wound healing for all cesarean section patients. Additionally, this patient was a healthy female who consumed what is considered a healthy diet. While limitations are clearly present, this is an opportunity to enhance recovery of women around the world who undergo a cesarean section. More research needs to be conducted with women of different body types, ages, and dietary intakes to determine whether these findings are applicable to the generalizable population. This case report is an important example of how therapeutic nutrition can play a role in the recovery from surgical wounds.

Statement of Ethics

The patient provided consent to inclusion in this case report and publication of the data.

Disclosure Statement

There is no financial conflict of interest; however, the author of the paper is the patient.

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Fig. 1. Scar assessment 2 weeks postpartum.

Table 1. Anthropometric measurements

	Pre-pregnancy	1st pregnancy visit (week 9)	Midpregnancy visit (week 20)	Delivery date	2 weeks postpartum
Weight, kg	62.3	63.6	68.6	79.1	71.8
BMI, kg/m ²	23.5	24	25.9	29.9	27.1
Systolic/diastolic blood pressure, mm Hg	–	108/68	106/64	108/70	112/62

Table 2. Stony Brook Scar Evaluation Scale

Attribute	Scar characteristic	Score
Width	>2 mm	0
	≤2 mm	1
Height	elevated/depressed compared to surrounding skin	0
	flat	1
Color	darker than surrounding area	0
	same or lighter than surrounding area	1
Hatch marks	present	0
	absent	1
Overall appearance	poor	0
	good	1
Total		5

Bold indicates selection by physician for each category.

Table 3. Manchester Scar Scale

Attribute	Scar characteristic	Score
Color	perfect	1
	slight mismatch	2
	obvious mismatch	3
	gross mismatch	4
Matte versus shiny	matte	1
	shiny	2
Contour	flush with surrounding skin	1
	slightly proud/indented	2
	hypertrophic	3
	keloid	4
Distortion	none	1
	mild	2
	moderate	3
	severe	4
Texture	normal	1
	just palpable	2
	firm	3
	hard	4
Total		8

Bold indicates selection by physician for each category.