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Case Report

Impact of Malnutrition on Surgical Management of Recurrent Scalp Squamous Cell Carcinoma with Bony Involvement

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Abstract

Cutaneous squamous cell carcinoma (cSCC) of the scalp accounts for a significant proportion of nonmelanoma skin cancers with bony invasion and is often associated with a poor prognosis. Malnutrition exacerbates immunosuppression and impairs wound healing, presenting unique challenges in the management of this pathology. This case highlights the interplay between severe malnutrition, surgical outcomes, and cancer recurrence in an elderly patient with cSCC of the scalp. An 80-year-old male with a body mass index (BMI) of 16 and history of failure to thrive presented with a 13×13 cm cSCC of the scalp with bony invasion. Despite pre-operative nutrition rehabilitation, Integra graft placement failed requiring latissimus free flap reconstruction. Following initial recovery, cancer recurrence involving the free flap was noted five months postoperatively, requiring re-excision, craniectomy, and rotational flap reconstruction. We believe severe malnutrition compounded this patient's risk of surgical complications and recurrence. Future guidelines for the post-discharge nutrition management of surgical patients with a history of malnutrition that are able to meet caloric requirements via oral route while inpatient could prove beneficial to ensure these patients continue to maintain caloric requirements in the outpatient setting.

Introduction

Cutaneous squamous cell carcinoma (cSCC) is a malignant proliferation of epithelial cells and the second most common type of nonmelanoma skin cancer[1]. Of the diagnosed cSCC cases, 35-75% occur in the head or neck region with the scalp being a common site of presentation[2]. There are several factors that increase risk for cSCC of the scalp including age, ultraviolet light exposure, chronic scarring, history of ionizing radiation and immunosuppression[3]. Patients who are immunocompromised are significantly more likely to develop primary cSCC and also to experience recurrence compared to immunocompetent counterparts[4]. Defects in both the innate and adaptive immune systems have been consistently demonstrated in malnourished patients contributing to a worse prognosis due to increased risk of recurrence and impaired wound healing[5]. The progression of wound healing relies on collective effects of macronutrients including carbohydrates, fats and proteins along with micronutrients such as vitamins and minerals. A substantial supply of nutrients is essential during reparative phases of wound healing to promote proper tissue remodeling. During the inflammation stage, a calorie surplus is needed in order for protein synthesis in granulation tissue to occur along with calcium, vitamins K, A and E, and zinc[6]. The proliferative phase requires high intake of lipids, B vitamins, amino acids, zinc and iron with the final phase, remodeling, requiring vitamins C, E, zinc and water to ensure proper collagen synthesis and skin complications including Integra failure, surgical site dehiscence and ultimately cancer recurrence.

Case Presentation

An 80-year-old male with a past medical history of coronary artery disease status post percutaneous coronary intervention, hyperlipidemia and hypertension presented for evaluation and management of a 13x13 cm SCC mass of the scalp by surgical oncology. Notably, the patient had a BMI of 16 and had been recently hospitalized for failure to thrive (FTT), electrolyte abnormalities, and recurrent urinary tract infections. On this admission, the patient was hemodynamically stable and a Nutrition Risk Screening (NRS) score was calculated and found to be 5. The clinical plan focused on nutritional optimization to prepare for surgical intervention. The patient underwent his index surgical procedure involving excision of the scalp tumor with Integra coverage of the defect. He was discharged with plans for follow-up in the clinic within 1-2 weeks. At his clinic visit, the patient's Integra graft demonstrated poor healing, prompting a return to the operating room where he underwent debridement of the scalp wound and placement of a wound VAC. He was discharged with a plan for continued wound care. However, two weeks later he was readmitted for scalp dehiscence. Given the lack of healing in the setting of his severe malnutrition, plastic surgery recommended a vascularized free flap for reconstruction. The patient again received preoperative

nutrition optimization before undergoing the free flap reconstruction. The patient had an uneventful postoperative course and was discharged on post-op day six after demonstrating he was able to meet caloric requirements via the oral route. The patient presented again five months later with a 5x5 cm scalp wound concerning for recurrence of SCC through the previous free flap (Figure 1).

Figure 1: Recurrence of SCC through the previous free flap.

At presentation, the patient continued to appear malnourished with a BMI < 18. The patient underwent re-excision of the recurrent scalp mass by surgical oncology with a left parietal craniectomy performed in conjunction with neurosurgery (Figure 2), and a rotational scalp flap reconstruction, with placement of Integra to cover the defect by plastic surgery (Figure 3).

Figure 2: Tumor excision with craniectomy.

Figure 3: Rotational scalp flap reconstruction with Integra placement.

Additionally, a modified radical neck dissection was performed. Pathology showed moderate to poorly differentiated invasive squamous cell carcinoma with positive deep margins and no lymphovascular invasion. The patient's postoperative course was unremarkable and he began adjuvant external beam radiation therapy with radiation oncology due to positive dural margins. He was noted to be recovering well at his most recent follow-up with surgical oncology and is also scheduled to follow up with a nutritionist.

Discussion

This is a unique case of recurrent SCC of the scalp with bony invasion in a patient with severe malnutrition. The current standard of care for cSCC is surgical resection with extra care taken to ensure sufficient margins. Local recurrence of cSCC of the scalp following wide marginal excision occurs in approximately 6-16% of cases with nodal metastasis rates estimated to be between 5-14%[2]. Additionally, cSCC occurrence is disproportionately higher in immunosuppressed populations[4]. While the overall rate of bone invasion is not clearly established in current literature, we know it is associated with worse outcomes[3]. A case series of cSCC of the scalp with bone infiltration reported 58.3% of patients had a 2-year, or greater, tumor-free survival rate[8]. Of note, a retrospective study of 53 immunocompromised patients with cSCC of the scalp found 20 of these patients experienced bone invasion[3].

Severe malnutrition, recognized as a form of immunosuppression, likely played a role in our patient's poor Integra healing, surgical site dehiscence, and cancer recurrence. In cases such as this one, perioperative nutritional optimization is extremely important in minimizing complications and improving outcomes. While this patient did receive preoperative nutritional rehabilitation prior to both procedures, he did not follow with a nutritionist post-operatively in the outpatient setting as he was able to meet his caloric requirements orally prior to discharge. This is in accordance with European Society for Parenteral and Enteral Nutrition (ESPEN) guideliens that only advises post-discharge dietary counseling for patients who have received nutrition therapy perioperatively and still do not

cover appropriately their energy requirements via the oral route (strong consensus- 97% agreement)[9]. Unfortunately, it seems that following discharge the patient failed to maintain his caloric requirements. Adequate nutritional supplementation both before and after surgery is vital to proper wound healing, especially in invasive cases requiring extensive surgical treatment.[10] While ESPEN defines the perioperative nutrition period from hospital admission to discharge after surgery[9], further consideration should be given to the management of these patients after discharge.

Conclusion

In conclusion, management of recurrent cSCC of the scalp with bony involvement can be challenging, especially in the context of severe malnutrition. While it is imperative to incorporate nutrition services into the multidisciplinary care team early on, further prospective analysis of post-discharge nutritional interventions is warranted to inform future guidelines and better manage this patient population.

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