

Introduction

- Head and neck cancers, particularly oral squamous cell carcinoma (SCC), affect over 275,000 patients globally each year.^{1,2}
- Advanced disease often requires extensive surgical resection with reconstruction using complex flaps, followed by adjuvant therapy.³
- **Oral mucositis may occur following extensive oral surgery, chemotherapy, or radiation, limiting quality of life** ⁴
- Methylene blue oral rinse (MBOR) has emerged as a promising adjunct for mucositis-associated pain in outpatient settings, though its use in inpatient settings remains limited.⁵

Case Overview

- A 53-year-old male with recurrent T4aN0M0 squamous cell carcinoma of the floor of mouth underwent a 13-hour composite oral cavity resection with free flap reconstruction, complicated by infection and flap failure requiring pectoralis major rotational flap reconstruction.
 - Received 29 rounds of XRT and Chemotherapy in 2020. Did not receive any radiation or chemotherapy when cancer relapsed.
- Readmitted to the ICU for wound dehiscence and refractory pain despite extensive multimodal therapy.
 - His initial pain regimen included Oxycodone 10mg q6h PRN, Tylenol 650mg PO q6h, Tramadol 100mg q8h, Methocarbamol 750 mg QID, gabapentin 800mg TID, and Duloxetine 60mg BID.
 - Initial interventions included IV morphine for dressing changes, increased oxycodone frequency (q6h → q4h), followed by a 25 mcg/hr fentanyl patch for baseline coverage.



Figure 1: Squamous Cell Carcinoma, invading Left Mandible



Figure 2: One month post-operatively. Patient representing to ICU for wound dehiscence



Figure 3: Left oral mucosa at ICU readmission

Management

- At the time of fentanyl patch initiation, patient was on **147 morphine milligram equivalent (MME) a day**.
- Pain was persistent and described as 10/10 jaw pain radiating ear-to-ear with concurrent neck and back pain.
- Given this information, the decision was made to start methylene blue 0.05% oral rinse TID PRN.
- Methylene blue 0.05% oral rinse (1cc of 0.5% diluted with 9cc normal saline) was initiated 48 hours later, three times daily as needed.
 - Extensive interprofessional coordination with pharmacy for off-label preparation to ensure safe concentration and administration.
- Within 24 hours, pain scores improved to [B-W-N: 0-8-2/10]. **The MME dropped to 80 MME/day**.
- This significant improvement was sustained over 48 hours, enabling successful transfer to long-term acute care.

Discussion

- While our patient had not received recent radiation or chemotherapy, we postulate that **surgical trauma + poor nutrition triggered similar inflammatory cascades involving ROS production and cytokine release → mucosal breakdown and severe oral pain that clinically resembled radiation or chemotherapy-induced mucositis**.
- Studies have proposed MBOR as an adjuvant therapeutic option to manage uncontrolled pain in outpatient settings.⁶
- **Mechanism of Methylene blue:** peripheral axon inhibition, anti-inflammatory activity, and sodium channel blockade, which collectively reduces neural firing and prolong pain relief. ⁷
- **Topical application** as an oral rinse denatures nociceptive nerve endings, suppresses nitric oxide-mediated inflammation, and blocks NMDA receptors.⁵
- **Advantages:** wide availability, low cost, and high safety profile.
- **Disadvantages:** transient side effects such as burning sensation in 4.6% of patients and inability of access to esophagus and larynx with the oral rinse.⁵

Conclusion

This case study demonstrates an example of how the use of inpatient MBOR can drastically improve pain levels of postoperative HNSCC, specifically when complicated by refractory mucositis.

The use of MBOR can serve as a valuable complement to traditional opioid-based regimens, highlighting the room for innovative approaches in complex oncologic pain management in the acute, inpatient setting.

References

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