

VEIN PRESERVATION STRATEGIES TO IMPROVE THE SURVIVAL RATE OF THE INFRAHYOID MUSCULOCUTANEOUS FLAP

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Abstract

The infrahyoid musculocutaneous flap (IHMCF) is a good alternative in the reconstruction of moderate-sized oral cavity surgical defects. Insufficient venous drainage can significantly affect the survival rate of this flap. Objectives Identify the survival rates of the IHMCF and evaluate the functional capacity of reconstructed patients. Design We report a case series. Setting This study took place at the department of Head and Neck surgery of Oncology Hospital Ho Chi Minh City, the largest oncology center in South Vietnam. Participants We have 112 patients with defects after oral cavity resection for cancer that underwent IHMCF reconstruction from November 2013 to November 2018. In the raising of the flap, our technical approach specifically attempts to preserve more secondary veins for IHMCF. Main outcome measures Postoperative vitality of the flap was checked by clinical observation. The last examination was performed at 1 month after reconstructive operation. The functional capacity of our patients was evaluated by three doctors (head and neck surgeon, radiation oncologist, physiatrist) with understandability of speech scale and the functional oral intake score items. Results Two cases of partial skin necrosis (1.8%) were experienced. The majority of patients demonstrate favorable functional rehabilitation at long-term follow up. Conclusions. The IHMCF is a reliable flap suitable for medium-sized defects of the oral cavity. Altering the surgical approach to specifically preserve more venous outflow can improve the survival rate of the flap. Key words: infrahyoid musculocutaneous flap oral cavity defect

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Results

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Key words:

infrahyoid musculocutaneous flap

oral cavity defect

Key points

- *The infrahyoid musculocutaneous flap (IHMCF) is a good alternative in the reconstruction of moderate-sized oral cavity surgical defects.*
- *The skin flap necrosis rate could reach 47% because of venous drainage.*
- *Postoperative complications can result in an increase in the length of hospital stay.*
- *Modified surgical approach to specifically preserve more venous outflow can improve the survival rate of the flap.*
- *The majority of patients demonstrate favorable functional rehabilitation at 3 months after reconstructive operation.*

Introduction

In 1980, Wang and Shen first reported the infrahyoid musculocutaneous flap (IHMCF). This flap has proven to be useful in the reconstruction of moderate-sized (T2-T3) intraoral defects. The main blood supply of the IHMCF is from the superior thyroid artery, the first branch of the external carotid artery.

Within the surgical literature, the complication rate is very variable, ranging from 3% to 47%¹. The insufficient venous drainage is the major factor related to the survival of the skin paddle². We report on our variation in the surgical technique of raising the flap with the intent to improve the postoperative survival rate.

Materials and methods

From November 2013 to November 2018, 112 patients with oral cavity squamous cell carcinoma (SCC), 79 men and 33 women, underwent infrahyoid flap reconstruction after tumor ablation procedures. The age of patients ranged from 29 to 76 years, with median of 58 years. The primary sites of patients in the series were oral tongue (68), floor of mouth (31), and alveolar ridge (13) (table 1).

The functional capacity of reconstructed patients was subsequently evaluated by three doctors (head and neck surgeon, radiation oncologist, physiatrist) with the scores averaged (table 2^{3,34}). This assessment was conducted at 3 months after reconstructive operation (28 patients not require adjuvant radiotherapy) or after radiotherapy (84 patients).

Modified surgical techniques

In this series, the techniques suggested by Dolivet et al⁵ and Deganello et al¹ were used in all patients. Dolivet et al³ tried to preserve venous drainage towards digastric triangle network and mylohyoid muscle. Deganello et al¹ left fascial connections between the superficial and median cervical fascia intact because of microvascular venous return. In addition to these techniques, we also preserve a minor venous tributary to

internal jugular vein, below the superior thyroid vein, and the communicating vein to external jugular vein when possible. While performing the incision for the lateral border of the skin flap, we dissect through the platysma meticulously preserving the communicating vein to external jugular vein that is immediately below this muscle. The IHMCF is usually raised from the bottom-up. During the dissection along the internal jugular vein a minor venous tributary at the level of upper thyroid pole is also identified and preserved.

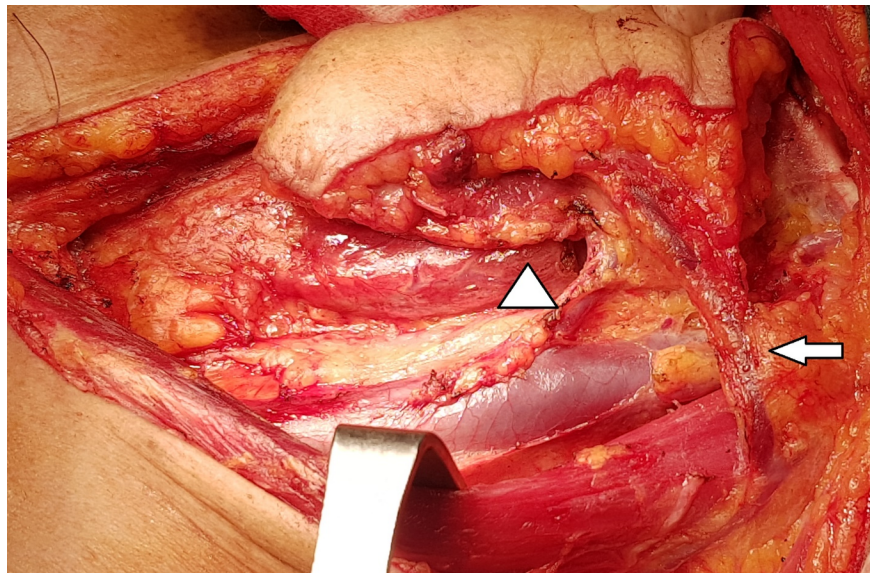


Figure 1. The IHMCF has both the minor venous tributary to internal jugular vein (arrow head) and the communicating vein to external jugular (arrow).

Results

There were only two cases of partial skin necrosis (1.8%) and no cases of complete flap loss. The average dimension of the flaps in or series is 8 x 3.5 cm. The average length of hospital stay is 7.6 ± 1.2 days. Postoperatively, the majority of our patients can communicate on the phone (understandability of speech score 3 – 4), with only two cases of oral tongue cancer receiving a score of 2. All of patients have the capacity for oral diet (swallowing function score 6 – 7). One case oral tongue T4 carcinoma had a score 5 (table 1).

We detected and preserved the minor vein below the superior thyroid in 87 cases (78%). The communicating vein to external jugular vein was recorded in 28 cases (25%). We were able to preserve both veins in 12 cases. In 9 of our cases (8%) had neither of these veins capable of preservation.



Figure 2. Patient with right oral tongue reconstruction with IHMCF at 3 months postop.

Discussion

In comparison with the other flaps for oral reconstruction, there are only a limited number of original articles concerning the IHMCF. This flap is fairly robust, predominantly hairless, and is adequate option for modest-sized oral cavity defects. Raising IHMCF does not carry the same risk of violating the principles of an oncologic dissection as may occur with the dissection required for a pedicled submental island flap⁶.

Flap failure with the IHMCF is typically a result of venous insufficiency. Many authors have modified surgical techniques to improve the survival of the skin paddle^{1,2,5}. The importance of avoiding partial skin flap necrosis cannot be under estimated. Postoperative salivary fistulas as a result wound dehiscence can result in an increase in the length of hospital stay.

With our modified surgical techniques, the survival rate of IHMCF is 100%. None of patients in our series developed a salivary fistula. The main disadvantage of our technique is the resultant shortening of the flap arc rotation for the flap because of a wider vasculature pedicle. With our technique, our flaps were able to easily reach the floor of mouth and alveolar ridge defects, however reconstruction of the anterior tongue at the tip can be challenging.

Conclusion

The IHMCF can be a very reliable alternative for the reconstruction of specific moderate-sized oral cavity defects. Modifications to the technique of raising the flap, with attention to more aggressively preserving venous drainage pathways (potentially at the expense of limiting the arc of rotation for inset) can improve the viability rate of the flap.

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