

Postoperative Nursing Care in Head and Neck Reconstructive Surgery: A Prospective Review

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ABSTRACT

Introduction: Reconstruction of head and neck cancer patients is the most challenging areas in the human body.

Patients and Methods: This study is a prospective randomized study of 50 consecutive operated patients for head and neck cancer reconstructive surgeries including pedicled and free flaps (radial forearm and fibula free flaps). All patients were thoroughly monitored postoperatively for its morbidity and surgical outcome.

Results: Although complications are inevitable in a percentage of patients, it is good postoperative care and monitoring that determines the success or failure of the reconstruction and also permits early salvage of a failing flap.

Conclusion: Teamwork and cooperation among members of the reconstructive team are critical. We reviewed significance of clinical care and monitoring of reconstructed head and neck patients in the intraoperative and postoperative periods.

Key words: Postoperative Care, Clinical Care, Monitoring.

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INTRODUCTION

Reconstruction allows unparalleled aesthetic and functional outcomes in head and neck cancer surgeries. However, the advantages of various reconstruction flaps are tempered by risk of postoperative complications such as microvascular thrombosis. In the head and neck, this is particularly important because a single misstep, can easily lead to early thrombosis and subsequent flap failure. Success of flap reconstruction therefore relies on both good surgical technique and vigilant postoperative care and monitoring. After the reconstructive surgery postoperative monitoring of the reconstructed head and neck patient is most critical during the first 24 hours and in general up to 3 to 5 days after surgery. The recommended duration of flap monitoring varies according to locale. However, most series recommend at minimum hourly monitoring for the first 24 to 48 hours.^{1,2}

The success of tissue transfer follows an inverse relation to the time between onset of flap ischemia and clinical recognition³ and the secondary critical ischemia time is the critical period after postoperative flap compromise in which it is still possible to restore flap circulation.⁴ Unrecognized venous thrombosis or compromise from extrinsic compression can progress rapidly to arterial thrombosis and ultimate flap failure. In jejunal flaps, which are particularly susceptible to ischemia, mucosal ulcerations were evident after 3 hours of ischemia, with full-thickness necrosis by 6 hours.⁵ If circulation to a failing flap is not reestablished within 8 to

12 hours, salvage may become impossible due to development of the no-reflow phenomenon,⁶ where restoration of blood flow results in initial hyperemia followed by a gradual decline in perfusion. Reperfusion injury mediated by oxygen free radicals, the complement system, and neutrophils also leads to cellular death and necrosis.⁷ Therefore, early postoperative intervention is most often targeted at the failing venous anastomosis to prevent resultant arterial compromise and subsequent flap failure.

PATIENTS AND METHODS

The study included patients with tongue carcinoma, buccal mucosa, salivary glands carcinoma, carcinoma of floor of the mouth who were operated and treated in GBH Cancer hospital, American International Institute of Medical Sciences, Udaipur (Raj.) from December 2018 to December 2019.

This study is a prospective randomized study of 50 consecutive operated patients for head and neck cancer reconstructive surgeries including pedicled and free flaps (radial forearm and fibula free flaps). These patients underwent simultaneous resection including hemimandibulectomy, hemiglossectomy, total glossectomy, wide excision depending upon the type of the oral cancer and reconstruction with either pectoralis major myocutaneous flap or free flaps. All patients were thoroughly monitored postoperatively for its morbidity and surgical outcome.

RESULTS

Although complications are inevitable in a percentage of patients, it is good postoperative care and monitoring that determines the success or failure of the reconstruction and also permits early salvage of a failing flap. Teamwork and cooperation among members of the reconstructive team are critical. Here we review the significance of clinical care and monitoring of reconstructed head and neck patients in the intraoperative and postoperative periods.

DISCUSSION

A) Preoperative Optimization

Optimization of the head and neck patient undergoing tissue transfer begins in the preoperative period. Patients with coronary artery disease and diabetes mellitus are at higher risk of complications from both anesthesia and surgery. Consultation with a cardiologist or endocrinologist is important to ensure appropriate perioperative medical management, such as administration of beta-blockers and strict control of blood sugar through insulin therapy, respectively. Out of several risk factors in head and neck reconstruction such as hypertension, smoking, use of alcohol and hypercholesterolemia, only diabetes mellitus was found to be significantly associated with an increased incidence of postoperative complications.^{8,9}

B) Intraoperative Optimization and Patient Care

As the head and neck presents an extremely confined space with a multitude of vital structures, technical considerations are key to success or failure of tissue transfer. It is essential to avoid any potential sites of kinking and compression. Tension at the site is to be avoided at all costs. Redundancy of vessels is better tolerated but should be avoided. Where unavoidable, the placement of anchoring sutures in the surrounding tissues to prevent torsion or compression of the anastomosis from movement of the head and neck may prevent potential vascular compromise.

Other simple measures, such as placing a sign on the patient's bed stating "no trach ties," may prevent an accident leading to flap failure. Design and inset of a monitoring paddle or external intestinal segment may be appropriate in many instances of head and neck reconstruction, as buried flaps for pharyngeal or tongue base reconstruction, for instance, cannot be monitored adequately postoperatively on the basis of clinical observation. Late flap failure has been reported to be more common in buried flaps, due to lack of reliable monitoring.¹⁰

Reconstruction of head and neck defects with pedicled regional flaps, although technically less demanding, still requires close intraoperative vigilance to avoid untoward events. Division of intervening skin bridges and liberal use of skin grafts should be performed to avoid vascular compromise of pedicled flaps. Tension at the wound margin during closure should be avoided as this may cause compression of the flap tissue and, particularly in radiated patients, may lead to wound dehiscence.

C) Postoperative Care and Monitoring

Immediate postoperative care of the reconstructed head and neck patient is best performed in a dedicated intensive care unit (ICU). Nursing staff on a normal floor may be unfamiliar with special measures for postoperative flap monitoring. In our practice, we would observe patients in the ICU for at least 24 to 48 hours. Keeping patients "nothing by mouth" and on strict bedrest for the first 24 hours are also routine measures designed to prevent

potential complications and in the event that the patient has to return to surgery for reexploration. The use of routine tracheostomy after head and neck reconstruction is common. Therefore, tracheostomy ties should be avoided, particularly after head and neck reconstruction with both free tissue transfer procedures with recipient vessels in the neck and after regional pedicled flaps from the trunk.

Hourly or half-hourly flap checks in the initial 24 to 48 hours by the nursing or house staff are perhaps the most important measure to assess free flap viability. Keeping the patient well hydrated and preventing anemia are also important steps to prevent microvascular thrombosis. In our unit, we will monitor a complete blood count and chemistry daily in the immediate postoperative period and ensure that the hematocrit is kept between 25 and 30% (30% for patients with a history of heart disease).

Diligent postoperative monitoring is not limited to free tissue transfer techniques alone. Workhorse pedicled flaps commonly used in the head and neck such as the pectoralis major and deltopectoral flap should also be clinically assessed after their transfer to the head and neck. Venous congestion and necrosis in the skin paddle of a pectoralis major myocutaneous flap that is used for reconstruction of a facial defect is as devastating as the loss of a free radial forearm flap used for a tongue defect. A congested flap may require medicinal leech therapy or systemic heparin until venous outflow can be established from the recipient bed. Alternatively, pin pricking the flap may be required until venous outflow is established or adjunctive treatment with hyperbaric oxygen for flaps lacking sufficient blood flow.

Any intervention that may result in flap salvage may not be possible unless clinical postoperative monitoring of the flap is undertaken. Orders may be written for the nursing staff to call the house officer if the flap color begins to change from pink to blue or becomes pale in color. A photograph may be taken of the flap reconstruction at the time of inset and posted on the head of the patient's bed so that the nursing staff is aware of how the flap should appear and notify the house officer if there is a change. Although muscle flaps with or without skin grafts may be more difficult to discern, clinical changes in appearance when compared with a photo will provide a better opportunity for nursing staff to monitor the reconstruction. Residents or physician assistants should also round on these patients in the afternoon so that interventions may be made on these patients in cases of compromise. If flap compromise is evident, a cause should be sought and the appropriate intervention made, whether this means a return to the operating theater for simple evacuation of hematoma or having to place the flap back in its original position without any delay.

Techniques for Postoperative Monitoring

A wide variety of techniques, both clinical and instrumental, exist for postoperative monitoring of flaps. The simplest is clinical observation, where the flap is assessed for color, swelling, temperature, and capillary refill. In the head and neck, this is mostly confined to an intraoral skin paddle or a monitor skin paddle. A healthy flap will be pink and well perfused, minimally swollen in the postoperative period and warm to the touch. Capillary refill is commonly 2 to 3 seconds in duration and is assessed by applying and releasing pressure on a skin paddle with a fingertip and observing the initial pallor from direct pressure followed by return of a pink color from reperfusion. Signs of a

congested (venous compromised) flap include a bluish color, increased swelling and warmth, and shortened capillary refill (<2 seconds). In the case of ischemia (arterial compromised flap), the flap will be pale in color, cold, and will have a delayed capillary refill (>3 seconds). The utility of postoperative monitoring by resident physicians versus nursing staff has been an issue of debate. A recent study showed that monitoring by trained nursing staff did not have a detrimental effect on outcome of free tissue transfer.¹¹ The "pinprick test" is another test used to monitor flaps with a skin paddle. The flap is punctured with a 25- to 30-gauge needle, with immediate flow of bright red blood being an indicator of flap viability. A congested flap, conversely, may result, instead, in flow of dark venous blood. This test is particularly useful in monitoring intraoral skin paddles, where it may be more difficult to assess color, warmth, and capillary refill clinically. Of note is that the pinprick should be performed in an area well away from the vascular pedicle to avoid inadvertent injury of the pedicle.

The various techniques can be used in postoperative flap monitoring such as ultrasound doppler flow detector, laser doppler flowmetry and positron imaging tomography to access the blood flow in head and neck free flaps postoperatively.¹²

In our practice, we most commonly use clinical observation to access the blood flow in head and neck free flaps postoperatively. As techniques continue to develop, it is certain that more modalities will become available for postoperative monitoring in head and neck reconstruction.

CONCLUSION

Vigilant postoperative monitoring in the head and neck patient can mean the difference between success and failure in reconstructive surgeries. Although complications inevitably occur in a percentage of patients, early detection and intervention can result in flap salvage. Coordination and communication among members of the operative and surgical team is essential to ensure optimal outcome in the reconstructed head and neck patient.

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