

Head and Neck Reconstruction using Pectoralis Major Myocutaneous Flap in a Tertiary Care Center

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ABSTRACT

Introduction

The head and neck defects have multiple reconstructive options available among which pectoralis major myocutaneous flap has remained a reliable option for reconstruction. This study aimed to evaluate outcome of pectoralis major myocutaneous flap reconstruction in head and neck surgery.

Methods

This is a retrospective observational study done by analyzing the clinical records of 29 cases with reconstruction of head and neck defects due to various etiologies with PMMC flap from January 2021 to December 2025. The data were analyzed using IBM SPSS statistics version 25.

Results

Out of 29 cases, 21 were males and 8 were females. The most common pathology was squamous cell carcinoma (SCC) (n=27) (93.1%) that involved gingivobuccal sulcus in 12 cases (41.37%). It was followed by buccal mucosa (20.68%), floor of mouth (13.79%), one case each of lip and angle of left mandible (3.45%), tongue (10.34%) and retromolar trigone (6.9%). The PMMC flap had 100% survival rate no partial or total flap loss. However, the flap had complication rates of 34.48% in this study. Gingivobuccal sulcus accounted for most of the complications including four cases (13.79%) and it was followed by two cases each of buccal mucosa and floor of mouth (6.89%), one case each of tongue and lip (3.44%).

Conclusion

The PMMC flap showed complications like wound dehiscence, seroma and surgical site infection. However, it showed promising result regarding its survival rate and coverage of defects in head and neck.

Keywords

Head defect; neck defect; pedicled flap; PMMC flap

INTRODUCTION

The head and neck defects, from reconstructive point of view, can be classified into six anatomical subareas that include intraoral, mandibular, midfacial, cranial, cutaneous and scalp.¹ Head and neck reconstruction is a critical aspect of surgical oncology, trauma management, and congenital defect correction.^{2,3} Numerous options are available for reconstruction of head and neck defects that include: healing by secondary intention, primary closure, skin grafts (split or full thickness), composite grafts, local flaps, distant pedicled flaps and free flaps.⁴

Among the various reconstructive techniques, the Pectoralis Major myocutaneous (PMMC) flap has remained a reliable option due to its versatility, ease of harvesting, and robust vascularity.^{2,3} Despite the increasing popularity of free flaps, PMMC continues to be widely used, particularly in resource-limited settings and cases where microsurgical options are not feasible.^{2,3} While considering for reconstruction, it is usually listed in alternative or in strategic backup after free flap with a survival rate of 100% in head and neck defects.⁶

This retrospective analysis aimed to assess clinical outcomes of PMMC flap reconstruction performed at a tertiary care facility, identifying key factors influencing success rates and complications. The limited presence of contemporary data from tertiary care centers in resource-limited settings and lack of evidences with respect to whether reported rate of complications and outcome from high-income countries can be applied directly to previous practice environment. By reviewing past cases, this study sought to contribute valuable insights to reconstructive surgical practices and enhance patient care standards.^{2,7}

METHODS

This was a retrospective observational study conducted by analyzing the clinical records of all the head and neck reconstructions with PMMC flap from January 2021 to December 2025. Ethical approval was obtained from Institutional Review Committee (IRC) of the Institute of Medicine, Approval number: 546(6-11) E2, (081/082).

The study included total 29 cases including reconstruction of the head and neck defects particularly after the resection of the oncological pathologies. All consecutive patients who underwent PMMC flap reconstruction during the study period were included (Figure 1). The convenience sampling technique was used. The patients were managed by department of Otorhinolaryngology and department of Plastic Surgery and Burns of Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu, Nepal.

The PMMC flap reconstruction was performed under general anesthesia. Reverse planning was performed based on the defect dimensions. The flap design was confirmed followed by marking over skin for flap harvest. The flap was elevated based on the thoracoacromial vascular pedicle and then interpolated to the recipient site through the tunnel created in the subcutaneous plane.

Flap inset was performed after assessing viability of the flap by observing its color, capillary refill and bleeding from its margin. The donor site was closed primarily after securing hemostasis and placement of a drain. Demographic and clinical parameters were noted. The data were calculated using IBM SPSS statistics version 25. The association between categorical variables was assessed with Fisher's exact test.

RESULTS

Among them, 21 (72.41%) were males and 8 (27.59%) were females. Most of the patients were in the age group of 41-50 years and 51-60 years.

The most common pathology was squamous cell carcinoma (SCC) with 27 cases (93.1%) that involved gingivobuccal sulcus in 12 patients (41.37%). There were six cases of buccal mucosa (20.68%), four cases of floor of mouth (13.79%), one case each of lip and angle of left mandible (3.45%), three cases of tongue (10.34%) and two cases of retromolar trigone (6.9%) (Figure 2). The squamous cell carcinoma was followed by one each with verrucous carcinoma (3.45%) (special variant of SCC) and mucoepidermoid carcinoma (3.45%).

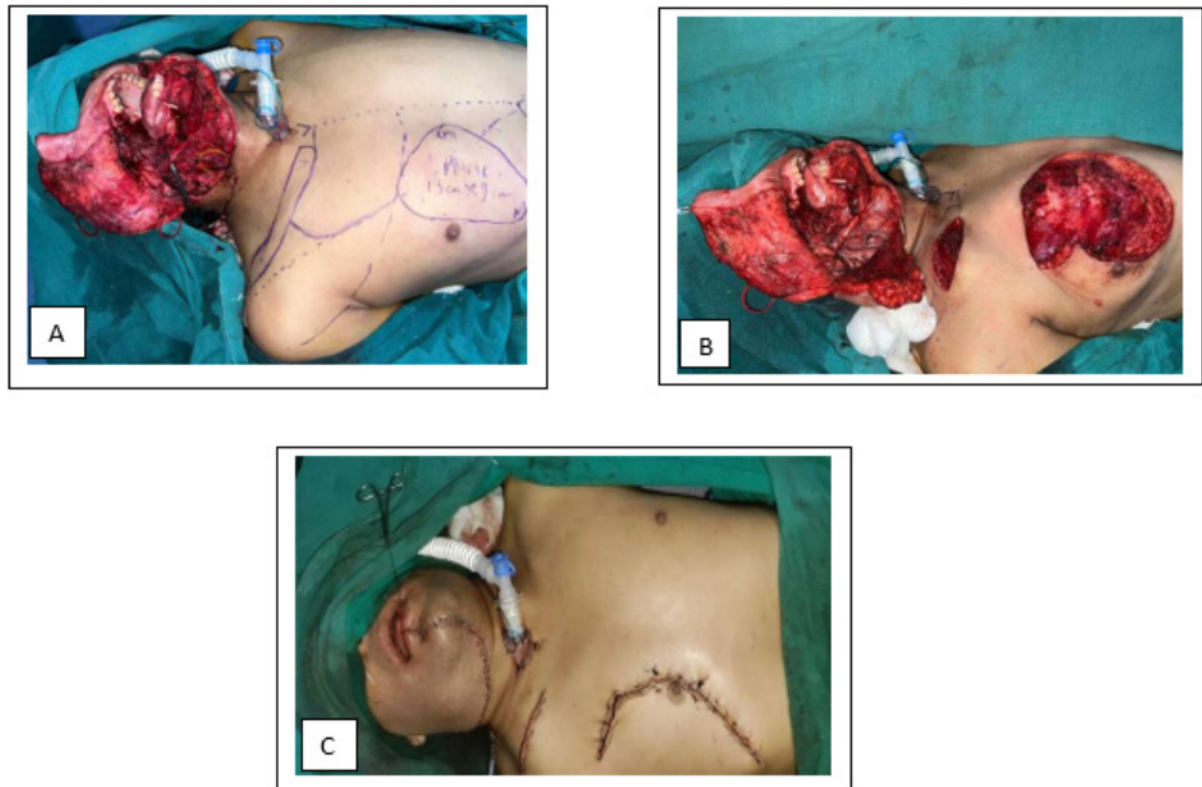


Figure 1. Intraoperative photographs of PMMC flap: A) Planning, B) Flap elevation and C) Final photograph after flap inset

The PMMC flap had 100% survival rate in this retrospective observational study with no partial or total flap loss. However, the flap had an overall complication rate of 34.5%. The gingivobuccal sulcus was responsible for most

of the complications accounting four cases (13.79%) as compared to other cases and it was followed by two cases each of buccal mucosa and floor of mouth (6.89%), one case each of tongue and lip (3.44%).

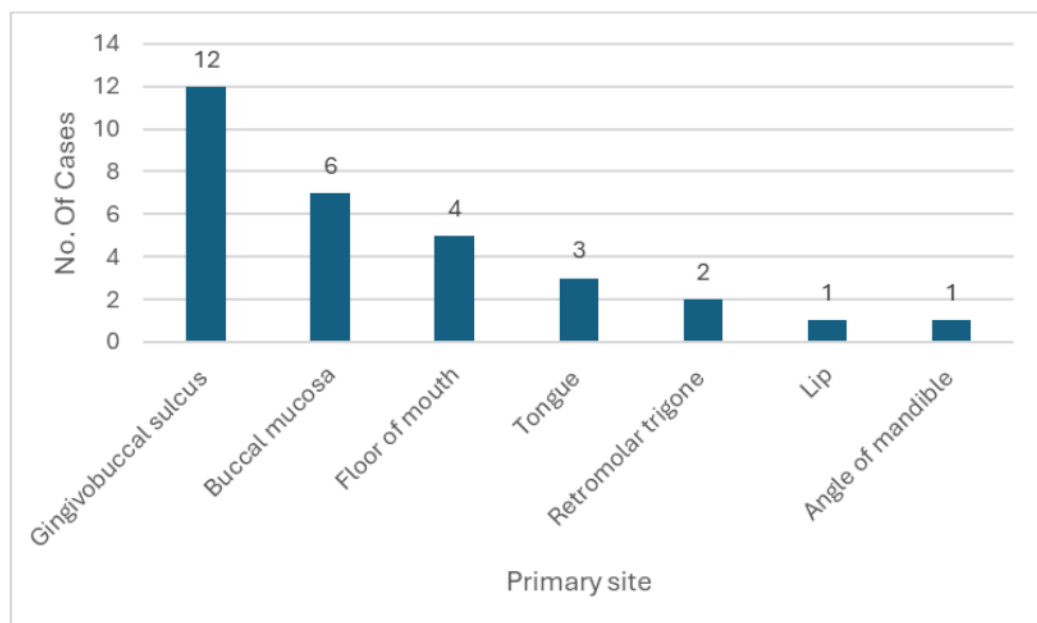


Figure 2. Cancer site distribution

In the postoperative period, three cases had complications of wound dehiscence (10.34%), three cases had donor site complications including two cases with seroma (6.89%) and one with non-healing of donor site (3.45%), two cases developed surgical site infection (SSI) (6.89%), one case developed hematoma (3.45%), one had developed orocutaneous fistula (3.45%) and one case had mortality (3.45%) (Table 1). Also, one patient with the verrucous carcinoma of right buccal mucosa had multiple complications like wound dehiscence and SSI.

Due to the small sample size and the presence of multiple defect sites, the expected cell frequencies were less than five in 92.9% of cells. Therefore, Fisher's exact test was applied. Although complication rates varied by site—ranging from 0% in angle of mandible and retromolar trigone defects to 100% in lip defects—this difference did not reach statistical significance (Fisher's exact test = 3.830, p -value = 0.852).

The relationship between patient age and postoperative complications was analyzed across six age groups. The highest complication rate was observed in patients aged 71-80 years (83.3%, 5/6), followed by the 21-30 years age group (50.0%, 1/2). The lowest complication rate was seen in the 51-60 years age group (14.3%, 1/7). There was no statistically significant association between age group and the occurrence of postoperative complications (Fisher's exact test = 8.377, p = 0.102). Patients with complications had an average hospital stay 3.4 days longer.

Table 1. Complications of PMMC flap reconstruction

Complications	Cases (%)
Wound dehiscence	10.34
Donor site complications	
Seroma	6.89
Non-healing	3.45
Surgical site infection (SSI)	6.89
Orocutaneous fistula	3.45
Haematoma	3.45
Mortality	3.45

DISCUSSION

The PMMC flap has robust vascularity, easy to harvest and, is versatile in nature that has made this flap popular for using during the head and neck reconstruction.^{2,3} Pinto et al. recognized

the use of PMMC flap for reconstruction after resection of oncological pathologies in head and neck.⁸

In this study, the most common pathology was SCC (93.1%). Budhipramono and Ozawa et al. had also mentioned the different types of carcinomas in head and neck other than SCC.^{9,10}

The gingivobuccal sulcus (41.37%) was the most common site for the occurrence of carcinoma. Pradhan et al. stated that it might be possibly because of addiction of tobacco chewing particularly keeping it in the gingivobuccal sulcus.¹¹ However, in this study, the analysis revealed no significant association between the anatomical site of the defect and the occurrence of postoperative complications following pectoralis major myocutaneous flap reconstruction (p = 0.533).

In this study, three patients developed wound dehiscence. Kekatpure et al. had listed tension at suture line as the most common cause of wound dehiscence in PMMC flap reconstruction that might be due to inadequate size or design of the flap, performing inset too tight for closing larger defects and the mobility of neck causing recurrent stress.¹²

The donor sites were primarily closed without the need of any other additional procedures like skin graft in all of 29 cases. Chaudhary et al. did a retrospective study in 62 patients where they had used skin grafting for the donor site coverage that lead to partial graft loss in three patients.¹³ The seroma was developed in two patients for which two stitches were removed followed by secondary suturing to close the defect. Sowa et al. mentioned that the formation of such seroma in donor site were due to damaged lymph vessels and inflammatory exudates caused by more extensive muscle dissection. Additionally, they had also excluded the obese patients (body mass index [BMI] > 23kg/m²) from the study as they were suspecting of having higher risk for the development of seroma.¹⁴ Next, one patient of 78 years of age had non-healing of the wound over the donor site. Swift et al. pointed out that delayed re-epithelialization, collagen synthesis and angiogenesis were responsible for the non-healing of the wound in old age.¹⁵

Although complication rates appeared higher in the elderly population (71-80 years), with

83.3% of patients in this group experiencing postoperative complications, this finding did not reach statistical significance ($p = 0.093$). This lack of significance may be attributed to the small sample size (Type II error) and the uneven distribution of patients across age groups, particularly the small numbers in the younger age categories.

The orocutaneous fistula was developed in one patient with SCC of floor of mouth. Such types of fistulas in PMMC flap reconstruction for head and neck defects could arise due to the different factors like inadequate blood supply to tissue, compromised wound healing, or breakdown at the flap's interface with the oral cavity.¹⁶

The radial artery forearm flap (RAFF) was performed for one case with verrucous carcinoma of the right buccal mucosa. The flap underwent necrosis after wound dehiscence and SSI after which the PMMC flap was used for the coverage of the defect. Zaher et al. performed a retrospective observational cohort study including 44 patients in which they performed five cases with local recurrence after submental flap were treated by wide local excision and PMMC flap reconstruction.¹⁷

The study had one mortality which was a case of SCC lower lip. The cause of the mortality was postoperative pneumonia. Zaher et al. had also mentioned regarding the mortality in two cases with PMMC flap reconstruction in their study. The cause of death in one patient in third postoperative day was due to sudden arrest because of the cardiac co-morbidity and the other was three months later due to pneumonia in postoperative period.¹⁷

Dassonville et al. did retrospective study where they performed microvascular head and neck reconstruction with 213 free flaps. They had identified the different factors such as use of interposition vein grafts to perform microvascular anastomosis, longer operating time and use of skin grafted muscle flaps that might lead to flap failure.¹⁸ However, as the PMMC flap which was utilized in this study was a pedicled one, all such complications related to microvascular anastomosis got omitted leading to minimal morbidity of the patient.

The PMMC flap had complication rates of 34.5% according to this study. This rate would

be comparable to the available literature making PMMC flap a very good option for reconstruction of head and neck defects.¹⁹⁻²²

CONCLUSION

The PMMC flap had showed a significant survival rate in this retrospective observational study with no partial or total flap loss. The patients had developed complications like wound dehiscence, donor site complications which included seroma and non-healing, SSI, hematoma, orocutaneous fistula and even mortality. The complication rate in the study was comparable to the available literature. Despite the observed complication rate, the PMMC flap remains a reliable and practical reconstructive option due to its versatility, ease of harvesting and robust vascularity, particularly in resource – limited settings. Limitations of the study included the single centered study, retrospective design and small sample size.

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CONFLICT OF INTEREST

The authors declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

AUTHOR CONTRIBUTIONS

The first author had concept and manuscript preparation of this research. The first and fourth authors performed the research design. All the authors were responsible for literature review and research experiment. The data were collected by first, second, third and fourth authors. Those data were analyzed by first, fourth and fifth authors.

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