

## Original Research Article

# Coverage in head and neck malignancies; our institutional experience

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### ABSTRACT

**Background:** Cancer of the head and neck can have a major impact on patients. It is vitally important that the surgeon appreciate the anatomy of the head and neck, the varieties of tumours and their metastatic patterns of spread, the ablative techniques, the adjunctive treatments, and the potential need for reconstruction. The obvious advantages to immediate reconstruction of a defect after ablation of a tumor have been recognized for more than 3 decades and are still valid today.

**Methods:** Those patients who required reconstructive management were included in the study. The patients with head and neck malignancy were operated in association with ENT surgeon's team or Onco-surgery team. Reconstruction of the defect was done by Plastic Surgeons.

**Results:** In this series various types of reconstructive methods ranging from Split thickness skin graft, full thickness skin graft, fasciocutaneous flaps, fascial flaps, muscle flaps and musculo-cutaneous flaps were used. The defects were primarily sutured in 11% patients. The defects were covered with split thickness skin graft in 6.6% patients. Full thickness skin graft was used in 8.8% patients. Local flaps were used in 6.6% and loco regional flaps were used in 60% for coverage of head and neck defects. Free flaps were used in 6.6% of patients.

**Conclusions:** The study concluded that for management of such defects local flaps were reliable, quick to execute, and capable of covering large defects. It provides skin of excellent colour and texture, and most of the scars are hidden in natural skin folds.

**Keywords:** Free flap, Head and neck malignancies, Pectoralis major myocutaneous flap

### INTRODUCTION

Cancer of the head and neck can have a major impact on patients. The National Cancer Registry Program (NCRP) has indicated that Ahmadabad has the highest incidence of oral cancers in the country with 17.1 per 1 lakh population new cases of cancer registered every year in Gujarat.<sup>1</sup> The obvious advantages to immediate reconstruction of a defect after ablation of a tumour have been recognized for more than 3 decades and are still valid today. Reconstruction of extirpative defects of the head and neck poses some of the most difficult problems

facing the plastic surgeon. Without reconstruction, extirpation would often be not only unreasonable but impossible. External defects may involve challenging aesthetic and functional problems, such as restoring an oral cavity defect that involves the full thickness of the lip and the underlying mandible. Modern reconstructive techniques rely heavily on free tissue transfer and pedicled muscle flaps.<sup>2</sup> The introduction of free tissue transfer has allowed the surgeon the option of tissue of different size, character, components and function. The radial forearm fascio-cutaneous flap has become the workhorse free flap of the head and neck reconstruction. Other soft tissue free flaps described to reconstruct

defects of the head and neck include the lateral arm, lateral thigh and anterolateral thigh flaps.<sup>3</sup> However the technique and expertise to perform free flaps is difficult than locoregional flaps.

**Aims and objectives**

- To study the type and site of distribution of head and neck defects following head and neck carcinoma extirpation.
- To study the merits and demerits of various methods of reconstruction in the management of head and neck defects (post malignancy).
- To study the overall functional and aesthetic outcome of both donor as well as recipient sites following reconstruction.

**METHODS**

This prospective study was conducted at a multi-specialty hospital cum medical college located in western region of India. It was a prospective observational study which was conducted over a period of two years i.e. from January 2016 to December 2017. Management of these patients was done as per following guidelines:

- Patients presenting to OPD basis with biopsy proven of carcinoma
- Patient suspected with malignant lesion/ tumor of head and neck
- Patient admitted with suspected lesion of carcinoma of head and neck or with proven biopsy suggestive of carcinoma
- Those patients who required reconstructive management were included in the study.

The patients with head and neck malignancy were operated in association with ENT surgeon’s team or Onco-surgery team who did the excision of malignancy with necessary neck dissection. Reconstruction of the defect was done by Plastic Surgeons. Sometimes, multi staged surgeries were required.

Patients were followed up regularly after discharge to monitor the outcome of treatment modality, to assess complication emanating in the process of care and to revise certain steps, if necessary.

Written and photographic records were maintained for the purpose of analysis.

**RESULTS**

Present study included 45 cases over a period of two years. In the study 62% of the cases (n=28) were male and 38% (n=17) were female making the sex ratio of 1.68:1. The age distribution pattern is shown in table one which shows a peak of occurrence between 41-50 years of age (Table 1).

Out of 45 cases, 29 had histological diagnosis of squamous cell carcinoma out of which maximum cases (n=17 i.e. 58.62%) presented with stage III cancer, followed by 8 cases (27.58%) with stage IV cancer. One (3.4%) patient was in stage I, 3 (10.34%) patients were stage II. 15 had basal cell carcinoma and one patient was reported to have adenoid cystic carcinoma.

**Table 1: Age distribution.**

Age groups (years)	No. of patients	Percentage (%)
< 30	4	8.8%
31-40	8	17.7%
41-50	14	31.1%
51-60	8	17.7%
61-70	6	13.3%
>70	4	8.8%

**Table 2: Type of defect**

Type of defect	No. of patients	Percentage (%)
Skin/ superficial layer of subcutaneous tissue	17	37.7
Mucosal defect	6	13.3
Skin and mucosa	2	4.4
Skin, mucosa and bone	5	11.1
Mucosa and bone	15	33.3

In present study most common defect was of skin and superficial layer of the subcutaneous tissue with 17 patients (37.7%) followed by combination of mucosal and bony defect with 15 patients (33.3%) followed by skin mucosal and bony defect with 5 patients (11.1%). The skin and superficial layer of the subcutaneous tissue remained most common defect as excision biopsy was taken in the suspected cases and complete excision with negative marginal biopsy was done in documented cases of Basal cell carcinoma which was seen 15 of our cases (33.33%) (Table 2).

**Table 3: Site of defect.**

Sites of defect	No. of patients	Percentage (%)
Scalp	2	4.4
Upper third face	0	0
Middle third face	15	33.3
Lower third face	25	55.5
Ears	3	6.6
Neck	0	0

In the present study, 55.5 % of the defects were present in the lower third of the face followed by 33.3% middle third of the face defects. In the middle third of the face, 33.3 % defects were nasal defects, 16.6% ear defects and

11% cheek defects. The nasal defects were present mainly in the subunit 2 and 3 of nose. Cheek defects were

present mainly in the zone 1 and 2 (aesthetical units by Gonzalez-Ulloa et al) (Table 3).<sup>4</sup>

**Table 4: Type of reconstruction.**

Type of reconstruction	Type	Number	Percentage (%)	
Primary suturing	-	5	11.1%	
Split thickness skin graft	-	3	6.7%	
Full thickness skin graft	-	4	8.9%	
Local flaps	Leimberg flap	1	2.2%	
	Rotation flap	1	2.2%	
	Advancement flap	1	2.2%	
Loco regional flaps	Median forehead flap	1	2.2%	
	Lateral forehead flap	1	2.2%	
	Deltopectoral flap	1	2.2%	
	Pectoralis major flap	Bipaddle Unipaddle	5 11	11.1% 24.4%
	Nasolabial flap		7	15.6%
	Temporalis muscle flap		1	2.2%
	Radial free forearm Flap		1	2.2%
Free flaps	Free fibular Flap	1	2.2%	
	ALT free Flap	1	2.2%	

In this series various types of reconstructive methods ranging from Split thickness skin graft, full thickness skin graft, fasciocutaneous flaps, fascial flaps, muscle flaps and musculo-cutaneous flaps were used. Temporalis muscle flap was used in one case for coverage of post maxillectomy defect. The defects were primarily sutured in 11% patients. The defects were covered with split thickness skin graft in 6.6% patients. Full thickness skin graft was used in 8.8% patients.

The flaps for the coverage of head and neck defects can be divided into local and loco-regional flaps. Local flaps were used in 6.6% and loco regional flaps were used in 60% for coverage of head and neck defects. Free flaps were used in 6.6% of patients (Table 4).

**DISCUSSION**

In the current study the demographic pattern of cancer such as higher male to female ratio, more common occurrence in middle to higher age and higher incidence of squamous cell carcinomas, is similar to the various other demographic studies.<sup>5-7</sup> According to Stenson KM, the higher incidence of squamous cell carcinoma in South East Asia is attributed to demographic differences in the habits of tobacco use and alcohol consumption.<sup>6</sup>

In the current study cheek defects were present mainly in the zone 1 and 2 (aesthetical units by Gonzalez-Ulloa et al, which is similar to Rashid et al.<sup>4,8</sup> His study has shown that zone 1 cheek is the common site of post tumor resection defects.

In present study total of 7 patients were skin grafted. Out of seven 3 were of split thickness skin grafts and 4 were of Full thickness skin grafts. There were no post-operative complications of donor or recipient site in any of the patients. A study conducted by Gurun R et al, in which skin grafting (split as well as full thickness) was used for defects remaining after the excision of basal cell carcinomas in a series of 15 patients.<sup>9</sup> Gurun et al, have found satisfactory results clinically and in patients appreciation at the reconstruction site and the appearance of the donor site in all patients.

In present study, local fascio-cutaneous flaps ranged from limberg flap, rotation flaps and advancement flap. All the flaps were done mainly for middle third face defects. Rashid et al in his study has shown that cheek flaps are reliable, quick to execute, and capable of covering large defects.<sup>8</sup> It provides skin of excellent colour and texture, and most of the scars are hidden in natural skin folds.

In cases where the size of defect was large or where donor site was not available adjacent to the defect due to non laxity of the surrounding skin, loco-regional flaps were used to cover these defects. Most frequently used loco regional flap was pectoralis major myocutaneous flap which was used in 16 patients (35.6%) of total patients followed by nasolabial flap used in 7 patients (15.6%). Other loco-regional flaps were; median forehead flap, lateral forehead flap, deltopectoral flap and temporalis flap (each n=1 i.e. 2.2%).

In this study we did sixteen pectoralis major myocutaneous flaps. Most of the cases were of oral cancer post commando surgery. Five flaps were used for the inner and outer lining both and eleven flaps were used for inner lining only. Donor site was closed primarily after putting the drain in 15 patients and closed with the split thickness graft in one patient. Primary healing occurred in all the patients. No major complication was encountered in the study. In two of the patients there was partial skin necrosis which healed by secondary intention and managed conservatively on outpatient basis. Patients were referred for adjuvant therapy after healing. There was development of orocutaneous fistula in one case which was treated by advancement and readjustment of the flap. In one patient there was partial loss of the flap for which deltopectoral flap was done to cover the defect. There was no donor site morbidity in this study. Milenovic et al, showed in his study that pectoralis major flap is reliable and versatile for reconstruction in the head and neck area.<sup>10</sup> Incidence of donor site complication in their study was 4%. Mehrhof et al, also conclude in their study that attention to flap design, operative technique and postoperative management were useful in reducing the incidence of complication.<sup>11</sup> Withers et al in his study compared pectoralis major flap with deltopectoral flap and concluded that this flap has greater versatility than the deltopectoral flap in one stage head and neck reconstruction.<sup>12</sup>

In this study 7 cases of the nasolabial flaps were done. Six for inner lining of the oral mucosal defect, one for the lip defect. Donor sites in all cases were closed primarily. No complication was encountered. Hagerty et al showed that nasolabial and cheek skin flaps are ideal sources for partial nasal reconstruction.<sup>13</sup>

In this study, median forehead flap was done in 2.2% (N=1) of the nasal defect which was of ala, tip and dorsum of nose. There was no major post-operative complication. Boyd CM et al, also showed in their study that median forehead flap are one of the best methods for repair of extensive nasal defects.<sup>14</sup> Near normal functional and cosmetic results can be achieved. Rotunda et al in their study also concluded that nose is one of the most challenging anatomical facial areas for the reconstructive surgeon to achieve an optimal, esthetic and functional result.<sup>15</sup> Forehead flap provides ample skin, which matches the missing skin in both texture and thickness.

In present study one patient was operated for lateral forehead flap. This patient was previously operated for oral carcinoma with Pectoralis major myocutaneous flap which ended with orocutaneous fistula. There was no post-operative complication and the skin graft was completely taken on donor site. Agarwal et al concluded that Lateral forehead flap is a reliable flap with an acceptable outcome in patients with previous history of radiation and surgery.<sup>16</sup> The disadvantages are the patch

effect of the skin graft over the forehead and inelasticity of flap.

In present study deltopectoral flap was done in one case of post op defect of operated case of PMMC flap to fill the remaining defect over the chin and lip region. No major complication was encountered. Secondary defect was covered with split thickness graft. Bakamjian et al, compared deltopectoral flap with cervical, forehead, temporal and other flaps commonly used for reconstructive procedures of the head and neck.<sup>17</sup> They found deltopectoral flaps better as they can be raised without delay and can easily reach head / neck below orbitozygomatic level. They are unaffected by the resectional incision or by previous radiation therapy. The donor defect on the anterior shoulder does not appreciably hamper function, and it is not serious cosmetic problem. Bey E et al, also showed that deltopectoral flap provides a suitable coverage for head and neck skin defects, especially for the treatment of head and neck carcinoma.<sup>18</sup>

In present study, temporalis muscle flap was done in one case. It was used to cover the maxillary defect. Donor site was closed primarily. The only disadvantage of this flap was that it produces hollowness in the temporal region.

In our study 3 patients were operated for free flaps. One radial free forearm flap, one free fibular flap and one ALT free flap. There were no postoperative complications. A study conducted by Evans et al, at The University of Texas M.D. Anderson Cancer Center of 157 radial free forearm flaps showed that most common recipient site was internal jugular vein and external carotid artery.<sup>19</sup> With total flap loss seen in 7 patients (4.5%) and partial flap loss in 1 case (0.6%). A study conducted by Smolka K et al, of fibula free flap reconstruction of the mandible in cancer patients, in which Data of 56 patients, who had undergone such a mandibular fibula free flap reconstruction, were retrospectively analysed.<sup>20</sup> Early complications were observed in 41.5% of the patients but only in those who had been irradiated. Late complications were found in 38.2%. Jones NF et al, described safe, reliable technique using a double-skin paddle fibular osteocutaneous flap to restore the intraoral lining, mandibular bone, and external skin.<sup>21</sup>

In his study of 16 patients successful reconstruction of large composite defects, with missing intraoral lining, mandibular bone and external skin with 100 percent survival of both skin island in all cases and without development of any orocutaneous fistula. A study conducted by Khadakban D et al, in which total of 194 ALT free flaps were performed in 193 patients over a period of 10 years.<sup>22</sup> The overall flap success rate was 95.8% (8 total flap losses out of 194). Hypertrophic scar was the commonest donor site problem seen in 20 (10.3%) patients.

## CONCLUSION

The present study is a prospective hospital based study which focuses on reconstructive methods of head and neck defects following extirpation of carcinoma of head and neck. According to present study local flaps were reliable, quick to execute, and capable of covering large defects. It provides skin of excellent colour and texture, and most of the scars are hidden in natural skin folds. Pectoralis major flap was a major reconstructive flap used in our study, with advantage of being one stage reconstruction and with no need to change the patient's position. The cutaneous island is large enough to cover most of the defects and also it can be used for defects involving two epithelial surfaces and it is technically less demanding. Although free flaps being considered as gold standard for reconstruction of head and neck defects but pectoralis major flap is still the work horse for the reconstruction.

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