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A CONVENTIONAL APPROACH TO IRREPAIRABLE HEAD AND NECK DEFECTS WITH NON-MICROSURGICAL TECHNIQUES: THE ROLE OF THE ANTERIOR CHEST WALL



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Abstract

Objective: This study aimed to evaluate the role of anterior chest wall pedicled flaps in patients with complex head and neck defects who were unsuitable for microsurgical reconstruction due to advanced age, comorbidities, or prior radiotherapy.

Materials and Methods: A retrospective evaluation was conducted on seven patients who underwent anterior chest wall pedicled flap reconstruction between 2019 and 2024. The selection of flaps, such as deltopectoral, cervicopectoral, and pectoralis major myocutaneous flaps, was determined by the patient's risk profile and defect features. Analysis was done on demographic information, hospital stays, length of stay in the intensive care unit (ICU), and problems following surgery.

Results: The mean age was 68 years. Deep neck infection, radiation-related problems, and oncologic resection were among the indications. Three deltopectoral, one cervicopectoral, and three pectoralis major flaps were used. There was no complete flap loss. Conservative management was used for minor problems. The mean ICU stay was three days, and the mean hospital stay was 13 days.

Conclusion: Anterior chest wall pedicled flaps remain reliable alternatives for complex head and neck reconstruction in high-risk patients, offering stable coverage with acceptable complication rates.

Keywords

Head and neck reconstruction • Pedicled flap • Pectoralis major myocutaneous flap • Deltopectoral flap • Cervicopectoral flap • Comorbidity

INTRODUCTION

Defects of the head and neck region most commonly result from oncologic resections involving the oral cavity, pharynx, larynx, or skin (1, 2). Microsurgical free tissue transfer is accepted as the gold standard for reconstruction, aiming to restore anatomical integrity and achieve functional and

aesthetic outcomes (3). However, microsurgical reconstruction may not be feasible for all patients, as prolonged procedures may not be possible due to advanced age, major comorbidities, prior irradiation, inadequate recipient vasculature, or restricted institutional resources. In these cases, alternate reconstructive techniques may be required (4, 5).

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The anterior chest wall provides reliable pedicled flap options for complex head and neck reconstructions, including the deltopectoral, cervicopectoral, and pectoralis major myocutaneous flaps (PMF) (6, 7). These donor sites are characterized by a dependable vascular anatomy, technical simplicity, and close proximity to the defect region. Although their routine use has decreased in high-volume microsurgical clinics, these regional flaps remain highly useful. Specifically, they provide critical solutions in salvage scenarios and for high-risk patients who cannot endure prolonged procedures.

This study presents our experience with anterior chest wall pedicled flaps in seven patients with complex head and neck defects in whom microsurgical reconstruction was not applicable.

MATERIALS AND METHODS

This retrospective case series analyzes seven patients who underwent anterior chest wall-based pedicled flap repair between January 2019 and January 2024. Comorbidities, previous radiation history, defect characteristics, flap type, length of hospital stay, stay in the intensive care unit, follow-up period, and postoperative complications were all examined. Flap selection was made according to defect size, anatomical location, and patient risk profile. Reconstructive planning prioritized procedural safety and shorter operating times in patients who were older or had major comorbidities.

The deltopectoral, cervicopectoral, and PMMF were harvested using the conventional methods described in the literature (6, 7). Minor technical changes were made where necessary to increase flap reach and perfusion. Muscle denervation was used in PMMF cases to increase contour stability and decrease postoperative muscle mass.

Ethical approval was obtained from the Clinical Research Ethics Committee of Istanbul University, Istanbul Faculty of Medicine (Date: 27.12.2024, No: 25). Written informed consent was obtained from all patients prior to surgery.

RESULTS

Seven patients underwent reconstruction of complex head and neck defects using anterior chest wall-based pedicled flaps. The mean age was 68 years (range: 57–82 years), and four patients were male. Four patients underwent reconstruction after oncologic resection, two patients were treated for radiation-related complications, and one patient underwent debridement of a deep neck abscess.

Three patients received a pectoralis major myocutaneous flap. One patient presented with mandibular plate exposure and fistula formation following radiotherapy for lower lip squamous cell carcinoma. Another patient underwent wide excision and neck dissection for scalp squamous cell carcinoma with invasion of the sternocleidomastoid muscle. The third patient had total lower lip excision and segmental mandibulectomy; reconstruction was

achieved using a pectoralis major flap incorporating the 5th rib as an osteomyocutaneous component. The patient with scalp squamous cell carcinoma developed tumour recurrence four months after surgery and was referred for additional oncologic care. Although there were some minor problems, such as partial necrosis and wound dehiscence, the flap was not completely lost. The surgical stages and postoperative outcomes of this patient are shown in Figure 1.



Figure 1. Pectoralis major myocutaneous flap used for reconstruction of a near-total lower lip squamous cell carcinoma defect. **a.** Preoperative view showing the tumor mass covering the lower lip, **b.** Intraoperative appearance after tumor resection, **c.** Intraoperative appearance after tumor resection (second view from a different angle of the same step), **d.** Intraoperative preparation of the pectoralis major flap, **e.** Immediate postoperative result, **f.** Late postoperative healing.

A deltopectoral flap was used for reconstruction in three patients. Cervical basal cell carcinoma, tracheo-oesophageal fistula after radiation therapy, and soft tissue defect following debridement of a deep neck abscess were the indications. A staged prelaminate approach was performed in the fistula case. One patient developed an epidermal cyst during follow-up, which was removed.

One patient underwent reconstruction with a cervicopectoral flap following wide resection of malar region squamous cell carcinoma combined with parotidectomy and neck dissection. The flap provided stable soft tissue coverage with functional and cosmetic outcomes during follow-up. The flap design is illustrated in Figure 2. Early

and late postoperative appearances are presented in Figure 3 and Figure 4.



Figure 2. Design of cervicopectoral flap for malar region squamous cell carcinoma.



Figure 3. Early postoperative appearance at 2 weeks following cervicopectoral flap reconstruction.

No total flap loss occurred in the series. Minor complications were recorded in three patients and were managed conservatively or with limited revision procedures. The mean hospital stay was 13 days, and the mean intensive care unit stay was 3 days.



Figure 4. Postoperative appearance at 3 months demonstrating flap integration and contour stability.

DISCUSSION

In this series, anterior chest wall-based pedicled flaps were preferred in patients who were not suitable for prolonged microsurgical procedures due to advanced age, significant comorbidities, or prior radiotherapy. In such high-risk patients, these flaps provided reliable soft tissue coverage while reducing operative complexity and perioperative risk.

The PMMF remains one of the most reliable regional flaps for head and neck reconstruction. Strong vascularity, quick harvesting, and sufficient volume for covering exposed critical components are some of its advantages. Three patients in our series had this flap used for reconstruction; in one of them, a rib segment was used for mandibular reconstruction. There was no complete flap loss. Clinical follow-up did not show evidence of bone resorption, instability, or exposure, despite the fact that radiological evaluation of the osteomyocutaneous component would offer an additional objective assessment. Its reliability is further supported by the low reported rates of entire flap loss, especially in salvage settings (9).

The four-month tumor recurrence in one patient was considered to be related to aggressive tumor biology rather than flap insufficiency. Large scalp defects after significant oncologic excision might require careful evaluation of reconstructive solutions, especially when bone involvement is present, even when the PMMF provided sufficient soft tissue coverage. In selected cases without extensive calvarial involvement, PMMF may provide satisfactory soft tissue coverage; however, defects requiring composite reconstruction should be carefully assessed.

Muscle denervation was performed in PMMF cases to reduce postoperative bulk and improve contour stability. Muscle atrophy following denervation has been reported in the literature and may contribute to improved long-term flap adaptation (9).

Radiotherapy significantly affects tissue vascularity and wound healing through fibrosis and vascular damage, increasing the risk of complications in previously irradiated fields (11, 12). In such settings, pedicled flaps with reliable blood supply offer a practical reconstructive option. In our two patients with radiation-related complications, stable coverage was achieved without total flap loss.

The deltopectoral flap was selected in patients in whom shorter operative time and technical simplicity were prioritized. In the patient with cervical basal cell carcinoma, regional flap reconstruction was preferred over local flap options due to defect size and limited surrounding tissue availability following excision. The adaptability of the deltopectoral flap in complex defects was shown in the tracheo-esophageal fistula, where repair of both mucosal and external components was made possible by a gradual prelaminate approach (7).

The cervicopectoral flap provided reliable coverage for a large malar defect following parotidectomy and neck dissection. The fact that a portion of the flap dissection overlaps with the oncologic surgical field is a significant benefit in these situations and may make flap elevation easier. Its wide range of rotation and good colour match produced satisfactory functional and aesthetic results (10).

The mean hospital stay was 13 days and the mean intensive care unit stay was 3 days, showing the relatively limited perioperative burden of these procedures. Reduced operative duration and shorter hospitalization may allow timely initiation of adjuvant oncologic treatment.

This study is limited by its small sample size and retrospective design. Larger prospective studies are required to better define the role of anterior chest wall pedicled flaps in contemporary head and neck reconstruction.

CONCLUSION

Anterior chest wall-based pedicled flaps, including the pectoralis major myocutaneous, deltopectoral, and cervicopectoral flaps, remain reliable alternatives for the reconstruction of complex head and neck defects in selected high-risk patients. In individuals with advanced age, significant comorbidities, or prior radiotherapy, these flaps provide stable soft tissue coverage with acceptable complication rates while avoiding the physiological burden of prolonged microsurgical procedures. Within the limitations of this small retrospective series, our findings support their continued role as practical and effective reconstructive options when microsurgery is not suitable or safe.

Table 1. Summary of demographic characteristics, medical history, defect size, preferred reconstruction options, follow-up period, and postoperative complications

Patient	Age	Gender	Diagnosis	Comorbidities	Prior RT	Defect location	Defect size	Surgical procedure	Reconstruction	Hospital stay (days)	ICU stay (days)	Follow-up	Complications
1	63	F	SCC	Hypertension	No	Malar region	8 × 10 cm	Excision + parotidectomy + neck dissection	Cervicopectoral flap	11	2	2 years	None
2	82	F	BCC	Hypertension	No	Left neck	9 × 10 cm	Excision	Deltopectoral flap	8	1	10 months	Superficial wound infection
3	73	F	SCC	Gastric adenocarcinoma	No	Lower lip	8 × 8 cm	Near-total lower lip excision + bilateral selective neck dissection	Pectoralis major flap with 5th rib	18	4	9 months	Wound dehiscence, partial necrosis
4	74	M	SCC	CKD, DM, CAD, Hypertension	No	Scalp and neck	10 × 12 cm	Tumor excision + radical neck dissection	Pectoralis major flap	16	8	8 months	Tumor recurrence (4 months)
5	57	M	Fistulized skin tract (history of SCC of the lower lip)	Rheumatoid arthritis	60 Gy in 30 fractions	Left submandibular area	6 × 10 cm	Skin debridement + removal of foreign material	Pectoralis major flap	18	3	1 year	Recurrent wound dehiscence, partial necrosis, skin contracture
6	62	M	Tracheoesophageal fistula skin defect	Laryngeal SCC, Hypertension	40 Gy in 20 fractions	Anterior neck	3 × 5 cm	Skin and fistula debridement	Deltopectoral flap	10	1	1 year	Epidermal cyst
7	58	M	Neck abscess	Diabetes mellitus	No	Right neck area	5 × 4 cm	Debridement	Deltopectoral flap	12	0	2 years	None

RT: Radiotherapy, SCC: Squamous cell carcinoma, BCC: Basal cell carcinoma, CKD: Chronic kidney disease, DM: Diabetes mellitus, CAD: Coronary artery disease





Ethical Committee Approval	Ethical approval was obtained from the Clinical Research Ethics Committee of Istanbul University, Istanbul Faculty of Medicine (Date: 27.12.2024, No: 25).
Informed Consent	Written informed consent was obtained from all patients prior to surgery.
Peer Review	Externally peer-reviewed.
Author Contributions	Conception/Design of Study- Ö.F.A., D.A., E.K.; Data Acquisition- Ö.F.A., A.K.A.; Data Analysis/ Interpretation- Ö.F.A., D.A., E.K., A.K.A.; Drafting Manuscript- Ö.F.A., D.A.; Critical Revision of Manuscript- D.A., E.K.; Final Approval and Accountability- Ö.F.A., D.A., E.K., A.K.A..
Conflict of Interest	The authors have no conflict of interest to declare
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