

Comorbidities Are Not Contraindications to Free Flap Reconstruction in Elderly Patients with Advanced Head and Neck Cancer

Ömer Kokaçya¹, Ali Kuru^{1*}, Gazi Kutalmış Yaprak¹, İbrahim Tabakan¹, Erol Kesiktaş¹

¹ Department of Plastic, Reconstructive and Aesthetic Surgery, Cukurova University, Adana, Türkiye

*Correspondence: Ali Kuru; kuru.ali.ali@gmail.com

Cite as: Kokaçya Ö, Kuru A, Yaprak GK, Tabakan İ, Kesiktaş E. Comorbidities Are Not Contraindications to Free Flap Reconstruction in Elderly Patients with Advanced Head and Neck Cancer. J Cukurova Anesth Surg. 2026;9(3):1128-1135. doi: 10.36516/jocass.1984594

Received: 02.07.2026, Accepted: 23.09.2026, Published: 30.09.2026, CC BY-NC 4.0

Abstract

Aim: Elderly patients with advanced head and neck cancer are often managed with non-surgical treatments due to concerns about comorbidities and perioperative risk, which may result in suboptimal quality of life. This study evaluates the feasibility of surgical excision and free flap reconstruction in this population. **Materials and Methods:** We included 19 patients aged ≥ 70 years with comorbidities who underwent surgical excision and free flap reconstruction between 2007 and 2024. Data on tumor characteristics, flap type and size, comorbidities, ASA and CCI scores, postoperative outcomes, and follow-up were analyzed. **Results:** All patients had stage III–IV head and neck tumors. Reconstruction was performed using various free flaps, most commonly ALT and RFF. The mean age was 75.3 years. Hypertension (n=17) and diabetes (n=9) were the most common comorbidities. The mortality rate was 21%. Flap loss occurred in one patient, yielding a flap success rate of 94.7%. Higher ASA and CCI scores were observed in patients who died; however, this was not statistically significant. The mean follow-up period was 13 months. **Conclusion:** Free flap reconstruction is feasible in elderly patients with advanced head and neck cancer. Advanced age and comorbidities alone should not be considered contraindications. Treatment decisions should prioritize quality of life and incorporate patient preference.

Keywords: Head and neck cancer, Elderly patients, Free flap reconstruction, Microvascular surgery, Comorbidity

1. Introduction

The fastest-growing demographic group in the United States is individuals aged 70 years and older¹. By 2030, this group is expected to comprise approximately 20% of the population¹. Life expectancy has also increased, reaching 77.5 years in Europe². As a result, the number of elderly patients with head and neck cancer requiring microvascular surgery has increased.

Head and neck cancers in elderly patients are often diagnosed at locally advanced stages (stage III–IV)³. Microvascular surgery is the gold standard for defect reconstruction

in these cases⁴. Advances in surgical techniques, reduced operative times, improved perioperative management of comorbidities, and developments in anesthesia have enabled the widespread use of microvascular surgery in the general population, with flap survival rates exceeding 90%^{5, 6}. However, similar progress has been less evident in elderly patients. Prolonged operative and recovery times associated with these procedures contribute to hesitancy in this group. Although advanced age alone is not a contraindication to surgery, reduced physiological reserve and the presence of comorbidities—such as diabetes, hypertension, chronic obstructive pulmonary disease, ischemic heart disease, and chronic kidney disease—may increase perioperative morbidity and mortality⁷. To reduce treatment-related morbidity and mortality, extensive surgical excision—the standard treatment for advanced head and neck cancer—is often avoided in elderly patients. Instead, non-surgical approaches such as radiotherapy, chemotherapy, or combined chemoradiotherapy are preferred^{8, 9}. As a result, many elderly patients experience reduced quality of life due to suboptimal treatment^{8, 9}.

This study shows that surgical excision and free flap reconstruction can be performed successfully in elderly patients with advanced head and neck cancer. Advanced age and comorbidities alone should not be considered contraindications. Treatment decisions should prioritize quality of life, and elderly patients should be offered appropriate surgical options.

2. Materials and Methods

This retrospective study included 19 patients aged 70 years and older with chronic comorbidities who were treated at Cukurova University Hospital between 2007 and 2024. This study was approved by the Cukurova University Faculty of Medicine Ethics Committee (Decision No: 26, Meeting No: 159, Date: 03.10.2025). As no clear age threshold for the elderly population has been established in the literature, 70 years was selected based on previous studies^{6, 8, 9}. All patients had head and neck tumors and underwent surgical excision with free flap reconstruction. When indicated, lymph node dissection, postoperative chemotherapy, and radiotherapy were performed. Postoperatively, patients were monitored in the intensive care unit when necessary and transferred to the ward once clinically stable.

Data collected included patient age, tumor type, free flap type and size, comorbidities, postoperative follow-up duration, ASA (American Society of Anesthesiologists) score, and Charlson Comorbidity Index (CCI). The CCI is a commonly used tool to assess preoperative comorbidity burden¹⁰ and was calculated from patients' medical records. The ASA score, used to evaluate perioperative risk, was determined preoperatively by anesthesiologists¹¹.

3. Results

Five patients underwent surgery for basal cell carcinoma (BCC), and 14 for squamous cell carcinoma (SCC). All tumors were advanced stage (III–IV) and located in the head and neck region. All patients underwent reconstruction with free flaps: five received radial forearm flaps (RFF), eight anterolateral thigh flaps (ALT), two latissimus dorsi flaps (LD), two deep inferior epigastric artery perforator flaps (DIEP), and one each transverse rectus abdominis muscle flaps (TRAM) and rectus abdominis muscle flaps (RAM). Tumor locations and other data are summarized in Table 1.

Table 1: Distribution of tumor types, anatomical locations, and free flap types in patients with advanced head and neck tumors.

Patient no	Age	Type of Tumor	Location of Tumor	Free flap type	Comorbidities	Flap sizes (cm)	Follow up (months)	ASA score	CCI score
1	72	SCC	Left ear	Radial forearm	HT, DM	12 x 18	12	4	7
2	71	SCC	Left ear and left servical	DIEP	HT	25 x 18	10	3	6
3	78	SCC	Lower lip	Radial forearm	HT, Ischemic heart disease	12 x 10	14	4	7
4	74	SCC	Left half of the face	TRAM	HT, DM	25 x 20	9	3	8
5	71	BCC	Right ear and right temporal	Latissimus dorsi	HT	25 x 20	9	4	7
6	71	SCC	Left ear	Radial forearm	HT, DM	12 x 15	12	4	9
7	72	BCC	Left half of the face	Rectus abdominus	HT, DM	25 x 20	36	3	9
8	71	BCC	Entire face	DIEP	COPD	25 x 20	1 (ex)	4	11
9	73	SCC	Left ear	Radial forearm	HT, DM	12 x 15	28	3	7
10	71	SCC	Right ear and right temporal	Latissimus dorsi	HT	30 x 20	12	3	6
11	71	SCC	Frontal	ALT	HT, Peripheral vascular disease	25 x 30	1 day (ex)	4	12
12	80	SCC	Lower lip	ALT	HT, DM, BPH	10 x 15	6	4	11
13	71	SCC	Nasal	ALT	HT, Peripheral vascular disease	6 x 15	24	3	7
14	72	BCC	Left temporal	ALT	HT, Peripheral vascular disease	10 x 15	2	3	8
15	80	SCC	Left gingivobuccal	ALT	HT, DM, Parkinson	14 x 10	12	3	10
16	93	SCC	Left half of the face	Radial forearm	HT, Peripheral vascular disease	10 x 10	3	3	14
17	77	SCC	Palate	ALT	Peripheral vascular disease, Ischemic heart disease, Arrhythmia	10 x 10	1.5 (ex)	4	13
18	83	SCC	Left half of the face	ALT	HT, DM	15 x 15	1	3	13
19	84	BCC	Right lower eyelid	ALT	HT, DM, BPH	15 x 15	2 (ex)	4	12

Abbreviations: BCC, basal cell carcinoma; SCC, squamous cell carcinoma; RFF, radial forearm flap; ALT, anterolateral thigh flap; LD, latissimus dorsi flap; DIEP, deep inferior epigastric artery perforator flap; TRAM, transverse rectus abdominis muscle flap; Ex, exitus.

The smallest flap measured 6 × 15 cm and was used for nasal SCC reconstruction with an ALT flap. The largest flap was performed for a long-neglected frontal SCC with frontal bone destruction, intracranial extension, and pneumocephalus; a 25 × 30 cm ALT flap was used (Figure 1). The second-largest flap was used in a patient with BCC involving the entire face and measured 30 × 20 cm; reconstruction was performed with an LD flap (Figure 2).



Figure 1A



Figure 1B

Figure 1A: Preoperative photo showing a large ulcerated, exophytic mass in the left frontoparietal scalp

Figure 1B: Immediate postoperative photograph of the scalp defect reconstructed with a free ALT flap.

The most common comorbidity was hypertension (n=17), followed by diabetes (n=9). Additional comorbidities included ischemic heart disease (IHD) (n=2), COPD (n=1), arrhythmia (n=1), coronary artery disease (CAD) (n=4), and benign prostatic hyperplasia (BPH) (n=2).



Figure 2A



Figure 2B

Figure 2A: Preoperative clinical photo of advanced BCC involving nearly the entire face.

Figure 2B: Immediate postoperative view following radical tumor excision and reconstruction with a free LD flap.

Nine patients were ASA 4 and ten were ASA 3. Ages ranged from 71 to 93 years, with a mean of 75.3 years. One patient died of heart failure on postoperative day 1, one of renal failure in the second postoperative month, and two of infection in the first and 1.5th postoperative months. The overall mortality rate was 21%. Among the patients who died, ASA

scores were 4 in all cases, while CCI scores were 12, 12, 11, and 13. The mean postoperative follow-up for the remaining 15 patients was 13 months. Flap loss occurred in one patient. Following ALT flap loss in a 77-year-old female patient, a lateral pedicled forehead flap was used for salvage reconstruction; however, the patient died on postoperative day 45. A free flap had been chosen as the primary option because of the large defect, the patient's refusal of a local facial flap due to aesthetic concerns, and the need for bulky, well-vascularized tissue in anticipation of adjuvant radiotherapy.

4. Discussion

Head and neck tumors are more common in older age. With increasing age and comorbidities, radical treatments are often avoided to reduce the risk of mortality and complications^{6, 12}. Instead, non-surgical options such as radiotherapy and chemotherapy are frequently recommended. In this study, we aimed to show that major surgery can improve quality of life in elderly patients with chronic comorbidities who are otherwise managed with non-surgical treatments.

No definitive age cutoff for defining old age has been established in the literature. While some studies use 65 years¹⁰, others use 70 years^{6, 8, 12}. In this study, the cutoff was set at ≥ 70 years. Age alone should not be considered a contraindication for microvascular surgery. Some reports suggest that elderly patients are not suitable candidates for free flap reconstruction^{12, 13}. However, other studies have shown that mortality does not increase in elderly patients undergoing major head and neck surgery, and complication rates are comparable to those in younger populations¹⁴⁻¹⁶. Reported flap survival rates in elderly patients range from 93% to 97%^{6, 10, 12}. In our study, the flap survival rate was 94.7%; however, this was not statistically significant due to the small sample size. In addition, long-term flap survival could not be assessed in one patient who died on postoperative day 1.

Several parameters, including ASA and CCI scores, have been used to predict mortality and complications. A 2005 study reported a positive correlation between these scores and perioperative mortality and medical complications⁶. However, other study found no significant relationship between comorbidities and complications¹⁷. Similarly, in patients undergoing free flap surgery for laryngeal cancer, comorbidities and advanced age were not associated with complications; only tumor stage was significant¹⁸.

In another study, a relationship between ASA score and complications was observed but was not statistically significant¹⁹. In patients with oral cavity tumors, the CCI score was not significant, whereas the ASA score was significant¹⁰.

In our study, the patients who died had higher ASA and CCI scores than the others; however, this difference was not statistically significant due to the small sample size.

Several studies report that elderly patients with head and neck cancer are more likely to receive less aggressive, non-standard treatments than younger patients with the same stage of disease²⁰⁻²². A 2017 study showed that, in patients aged ≥ 70 years with locally advanced disease, radiotherapy alone was often used instead of multimodal treatment²³. Among patients with stage III–IV cancer, 44% of those aged ≥ 70 years received only radiotherapy, compared with 16% in the 50–59 age group²³. Similarly, the rate of trimodal therapy (surgery followed by chemoradiotherapy) was 25% in patients aged 50–59 years, but only 5% in those aged ≥ 70 years ($p < .0001$)²³. Another study showed that chemotherapy did not improve survival in patients older than 70 years²⁴.

The literature includes numerous studies on free flap reconstruction in elderly patients with comorbidities. A 2014 study evaluated 714 patients aged < 70 years and 33 patients aged ≥ 70 years with head and neck tumors. In the elderly group, hypertension was present in 54% and diabetes mellitus in 40%. The mortality rate was 6% in the elderly group and 0.2% in the younger group. No flap loss occurred in the elderly group, whereas

the rate was 3.9% in the younger group. Despite a higher mortality rate in the elderly group, there were no statistically significant differences between the groups in terms of medical complications, surgical complications, or flap loss¹⁴.

A retrospective study by Howard et al. included 197 patients aged ≥ 70 years who underwent free flap surgery. In 95% of cases, reconstruction was performed for head and neck defects. The most common comorbidities were hypertension (45%), CAD (33%), diabetes mellitus (12%), and pulmonary disease (13%). The flap success rate was 97%, with a perioperative mortality rate of 9% and an overall complication rate of 38%. CAD and alcohol use were identified as independent risk factors for surgical complications. The CCI was associated with medical complications and perioperative mortality but not with surgical complications. The ASA score was associated with perioperative mortality but not with other outcomes. These findings support our results and suggest that elderly patients with comorbidities can be suitable candidates for free flap reconstruction¹². The mortality rate in our series (21%) was higher than the rates of 6% and 9% reported in the literature^{12, 14}. This difference is most likely attributable to the small sample size of our study.

As an example from our study, a 72-year-old patient presented with a stage IV tumor involving the left side of the face. The tumor originated from the left cheek, invaded the left eye, and involved the surrounding tissues. Given the patient's advanced age and comorbidities (diabetes mellitus, hypertension), non-surgical treatment might have been preferred. However, after discussing the surgical risks with the patient, tumor excision and reconstruction with a free rectus abdominis muscle flap were performed with the aim of improving quality of life and achieving a tumor-free state (Figure 3). By choosing this approach, the patient was given a chance for cure. No recurrence was observed during the 3-year follow-up period.



Figure 3A



Figure 3B



Figure 3C

Figure 3A: Advanced SCC involving the left hemiface.

Figure 3B: Intraoperative view following radical excision of advanced SCC involving the left hemiface.

Figure 3C: Long-term postoperative photograph following reconstruction with a free rectus abdominis flap.

This study has certain limitations. The retrospective single-center design and small sample size limited statistical power and generalizability, which may explain why differences in ASA and CCI scores between survivors and non-survivors did not reach significance. In addition, the absence of a control group precluded direct comparison with younger patients or those treated non-surgically. Moreover, the follow-up period was insufficient to evaluate 5-year disease-free and overall survival. Larger prospective multi-center studies with longer follow-up and standardized quality-of-life and geriatric assessments are needed to confirm these findings.

5. Conclusion

The literature shows variability in the management of elderly patients with head and neck tumors. While some studies associate perioperative mortality and complications with age, others attribute these outcomes to ASA score or comorbidities.

This study demonstrates that definitive surgical treatment is feasible in elderly patients with advanced-stage head and neck cancer and comorbidities. In patients with high ASA and CCI scores, treatment decisions should not be based solely on minimizing perioperative risk. Instead, the potential for improved quality of life and the possibility of definitive treatment should also be considered. Elderly patients often prioritize quality of life over longevity; therefore, patient preference should be incorporated into treatment planning.

Author Contributions: Conceptualization, O.K. and E.K.; methodology, O.K., A.K. and G.K.Y.; validation, O.K., E.K. and I.T.; formal analysis, A.K. and G.K.Y.; investigation, O.K., A.K., G.K.Y. and I.T.; resources, E.K.; data curation, A.K. and I.T.; writing—original draft preparation, E.K., G.K.Y., A.K., O.K. and I.T.; writing—review and editing, E.K., G.K.Y., A.K., O.K. and I.T.; visualization, A.K.; supervision, E.K.; project administration, O.K. and E.K. All authors have read and agreed to the published version of the manuscript. All authors have read and agreed to the published version of the manuscript."

Conflict of Interest: The authors declare no financial interest related to the content of this article.

References

1. Yancik R, Ries LA. Aging and cancer in America. Demographic and epidemiologic perspectives. *Hematol Oncol Clin North Am* 2000;14: 17-23. doi: 10.1016/s0889-8588(05)70275-6
2. World Health Organization. WHO Methods and Data Sources for Life Tables 1990–2019; World Health Organization: Geneva, Switzerland, 2020; pp. 1–29.
3. Chow LQM. Head and neck cancer. *N Engl J Med*. 2020;382(1):60-72. doi: 10.1056/NEJMra1715715
4. Lutz BS, Wei FC. Microsurgical workhorse flaps in head and neck reconstruction. *Clin Plast Surg*. 2005;32(3):421-430. doi: 10.1016/j.cps.2005.02.006
5. Urken ML, Weinberg H, Buchbinder D, et al. Microvascular free flaps in head and neck reconstruction: report of 200 cases and review of complications. *Arch Otolaryngol Head Neck Surg* 1994;120:633-40. doi: 10.1001/archotol.1994.01880300047007
6. Coskunfirat OK, Chen HC, Spanio S, Tang YB: The safety of microvascular free tissue transfer in the elderly population. *Plast Reconstr Surg* 115(3): 771e775, 2005 doi: 10.1097/01.prs.0000152424.91250.a5
7. Sogaard M, Thomsen RW, Bossen KS et al. The impact of comorbidity on cancer survival: a review. *Clin Epidemiol* 2013; 5:3–29. doi: 10.2147/CLEP.S47150
8. Sanabria A, Carvalho AL, Vartanian JG, Magrin J, Ikeda MK, Kowalski LP. Factors that influence treatment decision in older patients with resectable head and neck cancer. *Laryngoscope*. 2007;117(5):835-840.
9. Derks W, de Leeuw RJ, Hordijk GJ, Winnubst JA (2004) Quality of life in elderly patients with head and neck cancer one year after diagnosis. *Head Neck*26:1045–1052 doi: 10.1097/MLG.0b013e3180337827
10. Katna R, Kalyani N, Agarwal S et al. Impact of comorbidities on perioperative outcomes for carcinoma of oral cavity. *Ann R Coll Surg Engl* 2020; 102: 232–235. doi: 10.1308/rcsann.2019.0155
11. Small LT, Lampkin M, Vural E, Moreno MA. American society of anesthesiologists class as predictor for perioperative morbidity in head and neck free flaps. *Otolaryngol Head Neck Surg* 2019; 161:91–97. doi: 10.1177/0194599819832812.
12. Howard MA, Cordeiro PG, Disa J, Samson W, Gonen M, Schoelle RN, et al: Free tissue transfer in the elderly: incidence of perioperative complications following microsurgical reconstruction of 197 septuagenarians and octogenarians. *Plast Reconstr Surg* 116(6): 1659e1668, 2005 doi: 10.1097/01.prs.0000187135.49423.9f.
13. FangQG, ShiS, LiM, Zhang X, LiuFY, SunCF (2014) Free flap reconstruction versus non-free flap reconstruction in treating elderly patients with advanced oral cancer. *J Oral Maxillofac Surg* 72:1420–1424 doi: 10.1016/j.joms.2014.01.010
14. Spyropoulou GA, Jeng SF, Hsieh CH, Tsimponis A, Shih HS (2014) Microsurgical reconstruction for headandneckcancerinelderlypatients. *JReconstr Microsurg*30:91–96 doi: 10.1055/s-0033-1357277.

15. Peters TT, van Dijk BA, Roodenburg JL, van der Laan BF, Halmos GB (2014) Relation between age, comorbidity, and complications in patients undergoing major surgery for head and neck cancer. *Ann Surg Oncol* 21:963–970 doi: 10.1245/s10434-013-3375-x
16. Teymoortash A, Kunzmann J, Daniel H, Franke N, Werner JA, Hoch S (2014) Clinical aspects of transoral laser surgery and neck dissection for oropharyngeal cancer in elderly patients. *HNO* 62:342–349
17. Peters TT, Langendijk JA, Plaat BE, et al. Co-morbidity and treatment outcomes of elderly pharyngeal cancer patients: a matched control study. *Oral Oncol.* 2011;47:1159–64. doi: 10.1016/j.oraloncology.2011.08.004.
18. Peters TT, van der Laan BF, Plaat BE, Wedman J, Langendijk JA, Halmos GB. The impact of comorbidity on treatment-related side effects in older patients with laryngeal cancer. *Oral Oncol.* 2011;47:56–61. doi: 10.1016/j.oraloncology.2010.10.016.
19. Aksu AE, Üstün GG, Bitik O, Kara M, Sakarya AH, Şafak T. Microvascular tissue transfers in the elderly: safety analysis for a challenging area. *Turk J Med Sci.* 2017;47(1):103-108. Published 2017 Feb 27. Doi: 10.3906/sag-1510-53
20. VanderWalde NA, Meyer AM, Liu H, et al. Patterns of care in older patients with squamous cell carcinoma of the head and neck: A Surveillance, Epidemiology, and End Results-Medicare analysis. *J Geriatr Oncol* 2013;4:262-270. doi: 10.1016/j.jgo.2013.03.002.
21. Camilon PR, Stokes WA, Nguyen SA, et al. Are the elderly with oropharyngeal carcinoma undertreated? *Laryngoscope* 2014;124: 2057-2063. doi: 10.1002/lary.24660.
22. Huang SH, O'Sullivan B, Waldron J, et al. Patterns of care in elderly head-and-neck cancer radiation oncology patients: A single-center cohort study. *Int J Radiat Oncol Biol Phys* 2011;79:46-51. doi: 10.1016/j.ijrobp.2009.10.052.
23. Juarez JE, Choi J, St John M, Abemayor E, TenNapel M, Chen AM. Patterns of Care for Elderly Patients With Locally Advanced Head and Neck Cancer. *Int J Radiat Oncol Biol Phys.* 2017;98(4):767-774. doi: 10.1016/j.ijrobp.2017.01.209.
24. Pignon JP, Le Maître A, Maillard E, et al. Meta-analysis of chemotherapy in head and neck cancer (MACH-NC): An update on 93 randomized trials and 17,346 patients. *Radiother Oncol* 2009;92:4-14. doi: 10.1016/j.radonc.2009.04.014.