New-Onset Atrial Fibrillation Is a Red Flag to Microvascular Free Tissue Transfer Failure in Head and Neck Cancer Patients

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Abstract

Background Postoperative new-onset atrial fibrillation (AF) has been shown to be associated with increased surgical morbidity and mortality following cancer ablation surgery. However, evidence of new-onset AF's impact on surgical outcomes in head and neck cancer patients undergoing tumor ablation and microvascular free tissue transfer remains scarce. This study aims to evaluate the association between AF and surgical outcomes in these patients.

Methods We enrolled head and neck cancer patients who underwent tumor ablation reconstructed with microvascular free tissue transfer from the National Health Insurance Research Database (NHIRD). Patients were grouped into the following: (1) without AF, (2) new-onset AF, and (3) preexisting AF. The groups were matched by propensity score based on age, gender, cancer stage, and comorbidities. The primary outcome was postoperative complications, whereas all-cause mortality was the secondary outcome.

Results In total, 26,817 patients were included in this study. After matching, we identified 2,176 (79.24%) patients without AF, 285 (10.37%) with preexisting AF, and 285 (10.37%) with new-onset AF. Our results demonstrated that the free flap failure rate was twofold escalated in patients with new-onset AF (9.8%) compared to those without AF (5.4%) or preexisting AF (5.3%; $p = 0.01$). However, we did not identify significant differences among other postoperative complications across groups. Additionally, we found that the risk of all-cause mortality was significantly elevated in patients with preexisting AF ($p < 0.001$) compared to those without AF or new-onset AF.

Conclusion Our study demonstrated that new-onset AF is associated with an increased risk of flap failure and could serve as a predictor. On the other hand, all-cause mortality in patients with preexisting AF was significantly elevated. Close postoperative monitoring in patients with new-onset and preexisting AF is crucial to identify any potential adverse effects.

Keywords
- new-onset atrial fibrillation
- preexisting atrial fibrillation
- head and neck cancer
- microvascular free tissue transfer
- flap failure

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New-onset atrial fibrillation (AF), referring to the development of AF in patients who did not have a prior history of AF, is prevalent, with up to 10% of noncardiac surgery patients affected.[1,2] This increases the risk of developing stroke, heart failure, and myocardial infarction (MI) postoperatively, especially for those with preexisting cardiovascular issues.[3,4] In lung cancer patients who underwent tumor ablation, it has been shown to be associated with higher rates of postoperative pulmonary complications, sepsis, increased in-hospital mortality, and prolonged hospital stays.[5,6] Additionally, it has been reported with increased risk of pulmonary complications, prolonged hospitalization, and mortality in esophageal cancer patients following tumor ablation.[7–9] Similar consequences have also been observed in other surgeries, such as colorectal surgeries.[10] This evidence suggests that cancer patients who develop postoperative new-onset AF are at high risk of developing adverse events.

Head and neck cancer ranks as the seventh most common malignancy worldwide, with approximately 935,000 new cases and approximately 465,000 deaths annually.[11,12] Surgical resection is the primary therapeutic modality, often leading to significant defects that necessitate microvascular free tissue transfer.[13,14] Despite its complexity and time-consuming nature, microvascular free tissue transfer has been the paradigm for reconstructing defects following head and neck ablative surgery, offering minimized donor site morbidity and providing greater functional and aesthetic results over traditional flaps like pectoralis major or deltopectoral flaps.[15,16] Additionally, timely and effective reconstruction using microvascular free tissue transfer facilitates wound healing and enables the timely initiation of adjuvant therapies. Conversely, postoperative complications, particularly flap failure, can delay subsequent treatments, thereby elevating the risk of mortality.[17]

New-onset AF is frequently overlooked in head and neck cancer patients. It was recently reported that head and neck cancer is a risk factor for postoperative AF.[18] Moreover, in a preclinical study, animals induced with AF demonstrated significantly decreased local and free flap survival compared to those without AF. The success rate of local flaps was reduced by 35%, while free flaps had a 100% reduction in success rate.[19] These findings indicate a potential correlation between new-onset AF and flap failure in both free and local flap procedures. However, clinical evidence is lacking regarding the association between new-onset AF and flap complications in head and neck cancer patients.

This study aimed to investigate whether the presence of new-onset AF affects the outcomes of head and neck cancer patients who underwent tumor ablative surgery and microvascular free flap transfer. Our primary objectives were to investigate flap-related and postoperative complications, while our secondary objective was to analyze the risk of all-cause mortality.

Method

Data Resource

We performed a longitudinal cohort study consisting of enrollees traced from January 1, 2007 to December 31, 2017 by using the National Health Insurance Research Database (NHIRD), which covers approximately 99% of the Taiwan population. The acquired data included patient's demographic characteristics, disease-diagnostic, and surgery-operation code (primarily based on the International Classification of Diseases, 9th and 10th Revision, Clinical Modification [ICD-9-CM and ICD-10-CM]; ►**Supplementary Table S1**, available in online version). Inform consent was waived because the patient's identity is encrypted.[20] This study was approved by the institutional review board of Chang Gung Medical Foundation (approval number: 202300294B0) and the National Health Insurance (NHI).

Study Design and Population Ascertainment

The cohort was included according to the flowchart in ►**Fig. 1**. First, we enrolled patients with head and neck cancer, including cancer of the oral cavity (ICD-9-CM codes: 140, 141, and 143–145; ICD-10-CM codes: C00–C06) and oropharynx (ICD-9-CM codes: 146; ICD-10-CM codes: C09–C10), who were identified from the Registry of Catastrophic Illnesses Patient Database of the NHIRD. We next included patients who underwent tumor ablative surgery (procedure codes: 71001B, 71004B, 71005C, 71006C, 71008C, 71012B, 71013B, 71014B, 71016B, 71017B, 71021B, 71022B, 64104B-64106B, 64149B-64152B) and microvascular free tissue transfer (procedure codes: free flap 62032B-62038B). Take-back surgery is defined as the procedures performed following the primary tumor ablation and microvascular free tissue reconstruction. The procedure codes of take-back surgery include re-exploration (69001B, 69003B, 69005B), debridement (48001C–48006C), bleeding (69029B), or anastomosis of vessels (69008B, 690032C). Flap failure is referred to patients who experienced take-back surgery followed by the performance of another free flap (62032B–62038B) or a local flap (62045B–62047B, 62049B, 62051B–62056B, and 62058B–62060B) within 90 days of initial procedure.[21] Patients younger than 18 years old, less than 1 year of follow-up, or with missing characteristics were excluded. Index date was defined as the admission date for operation. Diagnosis of AF was defined as at least one in-hospital diagnosis or at least two consecutive outpatient diagnoses by using ICD-9-CM and ICD-10-CM codes (ICD-9-CM: 427.31; ICD-10-CM: I48.0, I48.2, and I48.91) in the NHIRD.[22] The accuracy of AF diagnosis was confirmed in earlier studies, which showed 90% positive predictive value.[23,24] Patients with diagnosis of AF before the index date of the microvascular free flap transfer were defined as those with a preexisting AF, while a new-onset AF was defined as the diagnosis of AF within 30 days of the index date of the microvascular free flap transfer. AFs that were diagnosed exceeding 30 days of the index date of the microvascular free flap transfer were excluded in the final analysis.

Outcome Assessments

The primary outcomes were flap-related and postoperative complications, including flap failure, take-back surgery, transient ischemic attack (TIA), stroke, and MI within 90 days, 180 days, and 1 year following surgery. All-cause mortality was the secondary outcome. These outcomes were extracted based

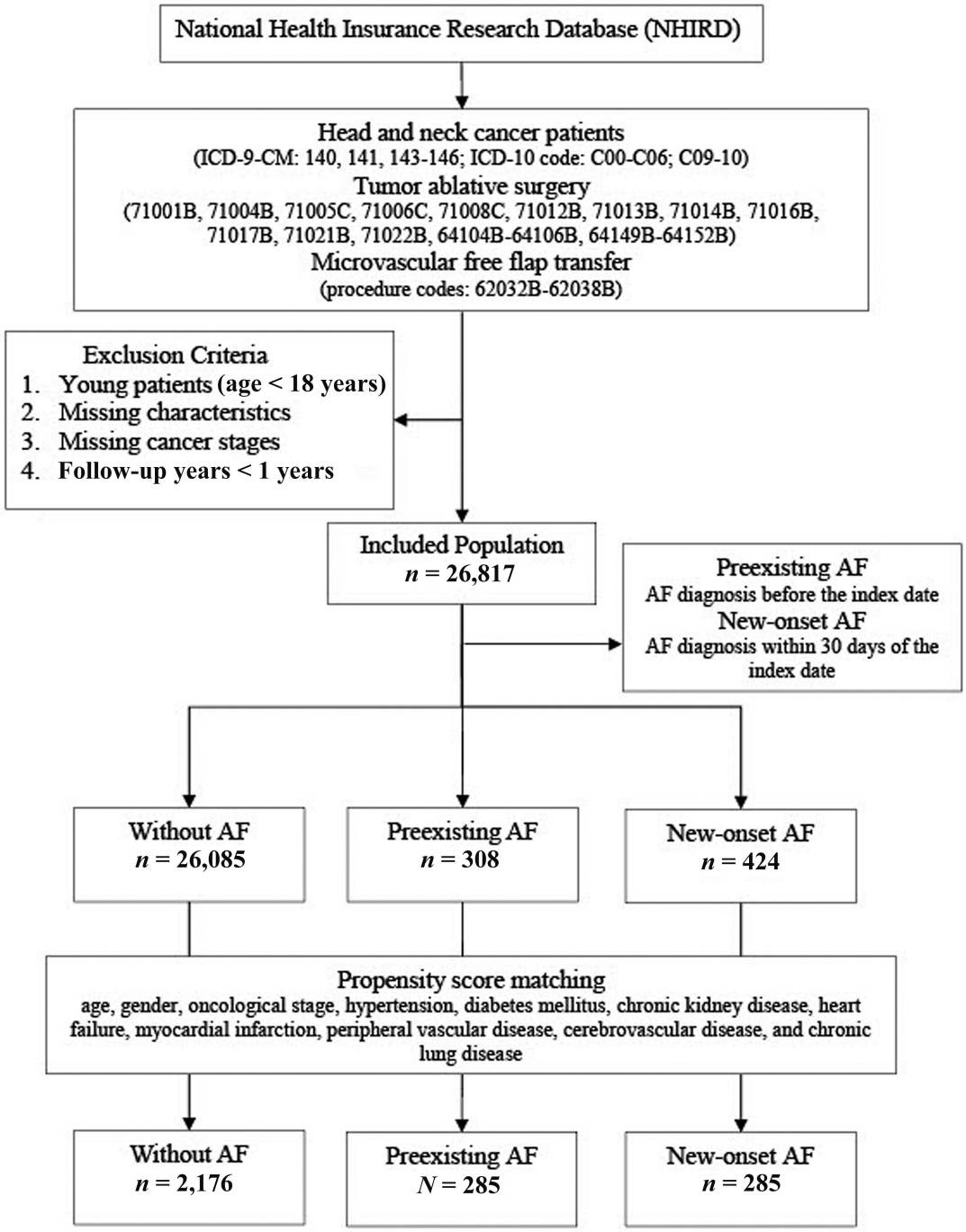

Fig. 1 Flowchart of the study design.
Abbreviations: NHIRD, National Health Insurance Research Database; AF, atrial fibrillation.

on validated ICD-9-CM and ICD-10-CM diagnosis codes and procedure codes (►**Supplementary Table S1**).

Statistical Analysis

Propensity score matching was employed to mitigate the confounding effects between patients diagnosed with non-AF, preexisting AF, and new-onset AF. We used a logistic regression model to calculate the propensity score, representing the predicted probability of AF given certain confounding factors. The confounding factors included age, gender, oncological stage, and baseline comorbidities, including hypertension, diabetes mellitus, chronic kidney disease, heart failure, MI, peripheral vascular disease, cerebrovascular disease, and chronic lung disease. The baseline comorbidities were identified through disease diagnoses prior to the index date. The calculated propensity scores were then used to match patients with preexisting AF and new-onset AF to those without AF. Demographic and comorbidity variables were presented as

either percentages or means ± standard deviation (SD). Continuous and categorical variables were compared using one-way analysis of variance.

The logistic regression model was used to examine the association between flap-related and postoperative complications and AF. Patients with preexisting or new-onset AF were compared with those without AF expressing in odds ratios (ORs) and 95% confidence intervals (CIs). The results were adjusted by the confounding factors associated with postoperative complications.

Cox proportional hazard model was employed to compare the risk of all-cause mortality. We used univariable and multivariable analyses incorporating confounding factors associated with AF. Hazard ratios (HRs) with 95% CIs were calculated for associated risk factors. Statistical significance was set at a *p*-value of less than 0.05. All analyses were performed using R software (version 3.6.0).

Results

Demographic Data of the Study Population

In this cohort, we identified 26,817 patients with head and neck cancer who underwent tumor ablative surgery with microvascular free flap transfer. The majority of patients (97.3%) had no history of AF before or after the surgery, while preexisting AF and new-onset AF were observed in 308 (1.1%) and 424 (1.6%) patients, respectively. To minimize confounding factors, we utilized propensity score matching with a ratio of 8:1:1. Following matching, our study population included 2,176 (79.24%) patients without AF, 285 (10.37%) with preexisting AF, and 285 (10.37%) with new-onset AF (►**Fig. 1**).

The demographic analysis revealed no significant disparities in age, gender, tumor stages, and tumor locations among the three patient groups (►**Table 1**). The mean age of the cohort was 63.27 ± 10.54, with a predominant male representation (92.7%). Regarding tumor stages, our study cohort exhibited an evenly balanced distribution across each group, with a 4:6 ratio between localized (stages I and II, and in situ) and advanced stages (stages III and IV). Regarding tumor location, the distribution was also balanced between the tongue and mouth floor, as well as other oral sites, within each group.

Despite our efforts to control for confounding factors, we were unable to match certain comorbidities due to the limited number of patients. These comorbidities included chronic kidney disease, heart failure, peripheral vascular disease, and chronic pulmonary disease (►**Table 1**). Notably, patients

Table 1 Demographic characteristics after propensity score matching and the incidences of flap failure

	Total	Without AF	Preexisting AF	New-onset AF	*p*-value
Numbers	2,746	2,176	285	285	
Age (mean ± SD)	63.27 ± 10.54	63.12 ± 10.51	64.41 ± 11.11	63.24 ± 10.14	0.150
Gender, *N* (%)					
Male	2,546 (92.7)	2,023 (93.0)	260 (91.2)	263 (92.3)	0.543
Female	200 (7.3)	153 (7.0)	25 (8.8)	22 (7.7)	
Oncological status, *N* (%)					
Stage I + II + in situ	1,143 (41.6)	911 (41.9)	115 (40.4)	117 (41.1)	0.326
Stage III	420 (15.3)	324 (14.9)	41 (14.4)	55 (19.3)	
Stage IV	1,183 (43.1)	941 (43.2)	129 (45.3)	113 (39.6)	
Tumor location, *N* (%)					
Tongue and mouth floor	1,316 (47.9)	1,055 (48.5)	128 (44.9)	133 (46.7)	0.475
Lip + oropharynx + other mouth	1,430 (52.1)	1,121 (51.5)	157 (55.1)	152 (53.3)	
Comorbidities, *N* (%)					
Hypertension	2,046 (74.5)	1,623 (74.6)	217 (76.1)	206 (72.3)	0.562
Diabetes mellitus	1,051 (38.3)	835 (38.4)	113 (39.6)	103 (36.1)	0.675
Chronic kidney disease	562 (20.5)	434 (19.9)	78 (27.4)	50 (17.5)	0.006
Heart failure	901 (32.8)	700 (32.2)	147 (51.6)	54 (18.9)	0.000
MI + CAD	666 (24.3)	522 (24.0)	80 (28.1)	64 (22.5)	0.241
Peripheral vascular disease	222 (8.1)	164 (7.5)	39 (13.7)	19 (6.7)	0.001
Cerebrovascular diseases (stroke/TIA)	610 (22.2)	473 (21.7)	75 (26.3)	62 (21.8)	0.213
Chronic pulmonary disease	1,045 (38.1)	815 (37.5)	134 (47.0)	96 (33.7)	0.002
Thromboembolism (PE/DVT history)	610 (22.2)	473 (21.7)	75 (26.3)	62 (21.8)	0.213
Flap failure	160 (5.8)	117 (5.4)	15 (5.3)	28 (9.8)	0.010

Abbreviations: AF, atrial fibrillation; CAD, coronary arterial diseases; DVT, deep vein thrombosis; MI, myocardial infarction; PE, pulmonary embolism; SD, standard deviation; TIA, transient ischemic attack.

diagnosed with preexisting AF presented with a higher incidence of these comorbidities that could not be matched.

Patients Who Developed New-Onset AF Had a Twofold Increased Risk of Flap Failure

The primary objective of this study was to investigate the occurrence of postoperative complications in patients who underwent tumor ablative surgery with microvascular free flap transfer. Our findings revealed a significant increase in flap failure in patients with new-onset AF (9.8%) compared to those without AF (5.4%) and those with preexisting AF (5.3%; $p = 0.01$; ►**Table 1**). However, take-back surgery was not found to be associated with patients with new-onset AF (OR: 1.20; 95% CI: 0.50–1.79; $p = 0.369$) or preexisting AF (OR: 1.03; 95% CI: 0.67–1.55; $p = 0.886$) within the 90-day postoperative period.

The analysis of postoperative complications revealed no significant rise in postoperative stroke or TIA in patients with preexisting AF or new-onset AF. However, our data showed a nonsignificant trend indicating an approximately twofold increase in the cumulative risk of stroke at 1 year following surgery in patients with preexisting AF (OR: 1.97; 95% CI: 0.79–5.65; $p = 0.169$) and new-onset AF (OR: 1.92; 95% CI: 0.71–6.10; $p = 0.226$; ►**Table 2**). Interestingly, patients with preexisting AF had a substantially lower cumulative risk of MI (OR: 0.20; CI: 0.04–0.96; $p = 0.039$) compared to those without AF at 1 year postoperatively.

Preexisting AF Is an Independent Predictor of Mortality

Our analysis revealed a nonsignificant 5% decrease in mortality in patients with new-onset AF (HR: 0.95; 95% CI: 0.72–1.24; $p = 0.697$). In contrast, patients with preexisting AF exhibited a significant increase in mortality (HR: 1.55; 95% CI: 1.31–1.83; $p < 0.001$). After adjusting for confounding factors in multivariate analysis, new-onset AF was associated with a significant 26% decrease in mortality (HR: 0.74; 95% CI: 0.56–0.98; $p = 0.038$), whereas preexisting AF showed a significant increase in mortality (HR: 1.34; 95% CI: 1.03–1.72; $p = 0.027$; ►**Table 3**). These findings demonstrate a higher cumulative mortality in patients with preexisting AF and a decrease in mortality among those with new-onset AF.

Discussion

We study how new-onset AF impacts outcomes in head and neck cancer patients after tumor ablation with microvascular free tissue transfer. Our results show a strong link between

Table 2 Postoperative complications of head and neck cancer patients following tumor ablative surgery and microvascular free tissue transfer at 90-day, 180-day, and 1-year follow-up

Outcome	90 d		180 d		1 year	
	Adjusted OR (95% CI)[a]	*p*-value	Adjusted OR (95% CI)[a]	*p*-value	Adjusted OR (95% CI)[a]	*p*-value
Take-back surgery						
Without AF	1					
Preexisting AF	1.03 (0.67–1.55)	0.886				
New-onset AF	1.20 (0.80–1.79)	0.369				
MI						
Without AF	1		1		1	
Preexisting AF	0.43 (0.09–2.00)	0.271	0.32 (0.07–1.49)	0.135	0.20 (0.04–0.96)	0.039
New-onset AF	0.58 (0.12–3.17)	0.501	0.43 (0.09–2.35)	0.297	0.27 (0.05–1.51)	0.112
Stroke						
Without AF	1		1		1	
Preexisting AF	1.77 (0.77–4.26)	0.185	1.50 (0.65–3.71)	0.358	1.97 (0.79–5.65)	0.169
New-onset AF	1.50 (0.61–3.85)	0.379	1.31 (0.53–3.46)	0.566	1.92 (0.71–6.10)	0.226
TIA						
Without AF	1		1		1	
Preexisting AF	2.08 (0.31–17.07)	0.446	1.57 (0.24–12.85)	0.639	1.08 (0.16–8.84)	0.936
New-onset AF	0.69 (0.03–7.79)	0.773	2.10 (0.19–47.09)	0.558	1.44 (0.13–32.39)	0.773
In-hospital death						
Without AF	1		1		1	
Preexisting AF	1.81 (0.81–3.65)	0.118	1.62 (0.93–2.70)	0.072	1.16 (0.77–1.71)	0.471
New-onset AF	0.97 (0.33–2.29)	0.958	0.79 (0.38–1.49)	0.501	0.92 (0.60–1.38)	0.691

Abbreviations: AF, atrial fibrillation; CI, confidence interval; MI, myocardial infarction; OR, odds ratio; TIA, transient ischemic attack.
[a]Adjusted OR: multivariable analysis, including age, gender, oncological stage, hypertension, diabetes mellitus, chronic kidney disease, heart failure, myocardial infarction, peripheral vascular disease, cerebrovascular disease, and chronic lung disease.

Table 3 Hazard ratio of all-cause mortality associated with preexisting atrial fibrillation and new-onset atrial fibrillation under single or multiple variant analysis

Single variant analysis	Crude HR[a]	*p*-value
Without AF	1	
Preexisting AF	1.55 (1.31–1.83)	0.000
New-onset AF	0.95 (0.72–1.24)	0.697
Multiple variant analysis	**Adjusted HR[b]**	***p*-value**
Without AF	1	
Preexisting AF	1.34 (1.03–1.72)	0.027
New-onset AF	0.74 (0.56–0.98)	0.038

Abbreviations: AF, atrial fibrillation; HR, hazard ratio.
[a]Crude HR: relative hazard ratio.
[b]Adjusted HR: multivariable analysis, including age, gender, oncological stage, hypertension, diabetes mellitus, chronic kidney disease, heart failure, myocardial infarction, peripheral vascular disease, cerebrovascular disease, and chronic lung disease.

new-onset AF and microvascular free tissue transfer failure. This is the first study to explore the association between new-onset AF and outcomes in head and neck cancer surgery. Our findings imply that new-onset AF could predict flap-related issues in head and neck cancer patients post tumor ablation and microvascular free tissue transfer.

Patients with New-Onset AF Have Higher Risk of Flap Failure Following Tumor Ablation and Microvascular Free Tissue Transfer

New-onset AF can predict a greater likelihood of flap failure in patients undergoing head and neck tumor removal with microvascular free tissue transfer. This onset often precedes multiple postoperative complications, acting as an early warning sign.[5] Flap failure, a severe complication, can postpone adjuvant therapies, potentially leading to worse outcomes.[15,17,25] Our observation showed a 9.8% flap failure rate in patients with new-onset AF, representing a twofold increase compared to those without AF (5.4%) or with preexisting AF (5.3%). These findings align with reported microvascular free tissue transfer success rates of 95 to 98% in head and neck cancer reconstruction.[25–27] Therefore, surgeons should pay special attention to new-onset AF, especially given the era of high microvascular free tissue transfer success rates.

Despite numerous proposed hypotheses, the connection between AF and flap failure remains uncertain. Maintaining proper hemodynamics is crucial for adequate perfusion after microvascular free tissue transfer.[28] A preclinical study on AF demonstrated an increased occurrence of free flap failure and worsened survival area in induced AF animals compared to controls.[19] The authors theorized that AF might reduce cardiac output, leading to peripheral blood vessel constriction in order to uphold blood pressure, which could compromise flap circulation. This concept gains further support from an observational study on medical and noncardiac surgical patients, revealing a higher frequency of hemodynamic instability in those with new-onset AF.[29] These combined findings imply that hemodynamic instability might contribute to flap failure in patients experiencing new-onset AF.

Thromboembolism represents a significant and prevalent complication observed in patients diagnosed with AF. Notably, in microvascular free tissue transfer, thrombosis occurring within anastomosed vessels has been implicated in more than 90% of cases of flap failure or the need for re-exploration, with approximately 10% of cases having unidentified causes.[25,27] Superior thyroid artery and facial artery from external carotid artery are commonly utilized as recipient vessels in microvascular free tissue transfer for head and neck reconstruction.[30] Several studies have indicated a strong association between embolism in the external carotid artery and cardioembolic etiology.[31,32] The proximity and diameter of these vessels may increase the risk of flap obstruction caused by cardiac emboli, implying a higher incidence of flap failure from thromboembolism observed in patients who developed new-onset AF. These studies could imply the plausible association between microvascular free tissue transfer and thromboembolism following new-onset AF. However, we did not observe patients who developed new-onset AF experiencing other thromboembolic events, including stroke, TIA, or MI. Yet our data have provided sufficient evidence to support the notion that blood clot formation is induced by new-onset AF.

Additionally, although prevention of thrombosis by anticoagulation therapy has been adopted in certain clinical practices, the empirical use of anticoagulation therapy has yielded little or no benefit in improving flap survival.[33] This evidence suggests the existence of alternative mechanisms that may contribute to flap failure, in addition to thromboembolism as the predominant cause. However, further investigation is needed to explore the association between thromboembolism related to new-onset AF and the potential risk of flap failure.

New-Onset AF Does Not Increase Postoperative Complications Other Than Flap Failure

New-onset AF does not increase postoperative complications except for flap failure. While various studies have shown that new-onset AF is linked to higher risks of complications and mortality in different cancer patients.[5–10,34] Surprisingly,

our study found no rise in mortality, stroke, or TIA among patients with new-onset AF compared to those with preexisting AF or without AF. This indicates that new-onset AF heightens the risk of flap failure rather than a broader range of complications.

Head and neck cancer patients, distinct from other types of cancer, tend to be younger and have fewer comorbidities. Conversely, lung cancer often affects individuals aged 65 years or older with significant comorbidities.[12] Similarly, esophageal cancer is usually diagnosed at later stages, leading to a poorer prognosis due to challenging early detection.[35]

Consequently, the occurrence of new-onset AF in these patients might lead to higher complication rates. Furthermore, the unique anatomical location of lung and esophageal cancers brings specific challenges and risks not seen in head and neck cancers, adding to the differences in postoperative complications. These distinctions likely contribute to the varied findings regarding the association between new-onset AF and postoperative complications among different cancer types.

Patients with Preexisting AF Have Worse Overall Survival

Patients with preexisting AF experience worse survival. We noted a significant rise in mortality among head and neck cancer patients with preexisting AF, while mortality decreased for those with new-onset AF. This difference could stem from the higher occurrence of comorbidities, including heart failure and chronic kidney disease, in the preexisting AF group after propensity score matching.

Consistent with our findings, a large cohort study involving Medicare beneficiaries found that patients with preexisting AF undergoing noncardiac surgeries, such as those for head and neck cancer, faced heightened risks of heart failure hospitalization, stroke, and 30-day mortality compared to those without AF.[36] The authors attributed the increased mortality to a greater prevalence of comorbidities and polypharmacy in the study group. Atrial fibrosis, linked to reduced compliance, could also heighten susceptibility to fluid overload and consequent heart and respiratory failure during tachycardia.[37] Interestingly, they discovered that preexisting AF served as a protective factor against MI, aligning with our observation of an 80% lower risk of MI within a year after surgery among preexisting AF patients. They further noted a reduced MI risk in a subset of preexisting AF patients with a CHA2DS2-VASc (congestive heart failure, hypertension, age $\geq$75 (doubled), diabetes, stroke (doubled), vascular disease, age 65 to 74 and sex category (female)) score of $\geq$2 who received anticoagulation therapy.[36] These findings imply that anticoagulant use in individuals with preexisting AF may yield benefits by curbing subsequent MI incidence and potentially reducing vulnerability to thrombotic events and major cardiovascular complications.

In general, patients with preexisting AF face a greater cumulative mortality risk. Managing comorbidities becomes a reasonable approach due to the presence of multiple comorbidities and polypharmacy. Additionally, prescribing anticoagulants to preexisting AF patients may offer advantages in diminishing the risk of potential thromboembolic complications, including MI.

Rate Control Is Prioritized to Manage Patients with Postoperative New-Onset AF

It has not been concluded how to properly manage the new-onset AF postoperatively. However, the current consensus has suggested that rate control is prioritized over rhythm control due to extended adverse effects from medications to restore normal sinus rhythm.[2,38] Intravenous amiodarone can be used to manage new-onset AF in symptomatic or hemodynamically unstable patients, while oral metoprolol, diltiazem, or digoxin is generally recommended for asymptomatic patients.[2] Furthermore, it has been suggested to administer anticoagulation therapy for at least 4 weeks after restoration of normal sinus rhythm in patients with persistent or paroxysmal postoperative AF, lasting longer than 48 to 72 hours.[2,38] Although the anticoagulation therapy could potentially reduce the risk of thromboembolism caused by AF, the evidence is of low quality.[38] Additionally, it has been shown that anticoagulants provide minimal benefit to flap survival.[33] Therefore, administering anticoagulation remains debatable in head and neck cancer patients with new-onset AF undergoing tumor ablation and microvascular free tissue transfer. However, we strongly encourage timely control of the heart rate to eliminate the potential hemodynamic instability that may compromise flap survival.

Limitation

There are several limitations to our study. First, despite employing propensity score matching, an uneven distribution of comorbidities related to heart failure, chronic kidney disease, and peripheral vascular disease among patients with preexisting AF persists, which might have contributed to higher cumulative mortality. Second, prior research has shown a 10% misdiagnosis rate when using ICD codes for patient diagnosis from the NHIRD, highlighting the possibility of missing cases due to incorrect coding.[23,24] Additionally, the use of ICD-9-CM 427.31 code for AF does not distinguish between paroxysmal, persistent, and permanent AF subtypes. Although the introduction of ICD-10-CM revision in 2016 improved the subclassification, our study mainly relied on ICD-9-CM codes, limiting our ability to assess distinct risks associated with different AF subtypes. Finally, our study lacked records of prescribed medications, including antiarrhythmic drugs and anticoagulants. Consequently, we could not analyze the potential link between medication usage and outcomes. Further research is needed to explore the impact of these medications on outcomes in patient with both preexisting and new-onset AF.

Conclusion

This study provides the association between AF and outcomes in head and neck cancer patients undergoing tumor ablation and microvascular free tissue transfer. Our study has shown that AF, whether new-onset or preexisting, can lead to detrimental outcomes for patients. New-onset AF increases the risk of flap failure, while preexisting AF leads to higher mortality rates. Hence, future research is required to investigate the optimal therapeutic strategies of preexisting and

new-onset AF and the corresponding outcomes for patients with head and neck cancer undergoing tumor ablation and microvascular free tissue transfer reconstruction.

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Conflict of Interest
None declared.

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