

Technical Factors that Affect Anastomotic Integrity in Pharyngoesophageal Reconstruction Using Microsurgical Free Skin Flap for Hypopharyngeal Cancer: A Single Institute Experience

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“Nothing to disclose

Objective

- Due to the significant contribution of anastomotic leak in pharyngoesophageal reconstruction for hypopharyngeal cancer patients following cancer resection, with its disastrous consequences to patients' morbidity and mortality, the purpose of this retrospective study was to examine the main technical parameters that impact on anastomotic integrity.

PATIENTS AND METHODS

- A retrospective review was conducted on all patients who underwent pharyngoesophageal reconstruction with ALT or radial forearm flap (RFF) after laryngopharyngectomy for hypopharyngeal carcinoma between July 1993 and May 2010 at Chang Gung Memorial Hospital (CCMH), Taiwan
- Free radial forearm flap: suprafascial dissection technique, donor site split / full thickness skin graft

- The design and harvest of ALT flaps
 - Fasciocutaneous ALT
 - Vastus lateralis (VL) muscle: chimeric to provide volume
 - Anterior neck resurfacing—> separate skin island
Based on independent perforator
- Tubularized or combination with residual mucosa—> Neoesophagus
- Dissection of ALT simultaneously by plastic surgeons
- Harvest of RFF followed tumor ablative surgery

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- Specialized microsurgery intensive care unit for monitoring , routinely transferred to wards postoperative day 8
- Liquid diet and contrast esophagogram postoperative day 10 to check the leakage of the tube
- Fistulae on contrast esophagogram: conservatively treatment first, surgical treatments: conservative management failed
- All data described as mean \pm SD All P values: 2-sided and statistical significance $P < 0.05$

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RESULTS-1

Patients' demographics and clinical details

Table 1. Patients' details between radial forearm flap and anterolateral thigh flap used for pharyngoesophageal reconstruction

	RFF (n = 35)	ALT (n = 49)	p value
Period	1990-2002	2001-2010	
Age (years)			
<u>Mean ± SD (Range)</u>	55.2±10.1 (39-75)	56.8±10.6 (36-82)	0.732
Sex			
Male	34	48	1.000
Female	1	1	
Tumor			
Hypopharynx	30	42	1.000
Larynx	4	5	1.000
Others	1	2	1.000
Stage			
II	5	4	
III	9	11	
IV	21	34	
OP time			
Mean ± SD (Range)	690±100.5 (420-900)	723.5±120.3 (436-970)	0.538
Defect			
Circumferential	29	45	0.307
Patch/ near-circumferential	6	4	
Flap size			
Length (cm)			
Mean ± SD (Range)	11.2±2.8(8-12)	14.2±5.8 (8-25)	0.132
Width (cm)			
Mean ± SD (Range)	7.5±1.3 (6-10)	8.6±1.6 (6-12)	0.376
Flap loss			
Partial	4	5	1.000
Total	1	1	1.000
Donor site closure			
<u>Primary</u>	0	40	<0.001
Skin graft	35	9	
ICU stay	10.2±7.5 (7-45)	10.1±8.2 (6-41)	0.857
Hospital stay	55.6±23.8 (27-80)	39.2±22.5 (13-92)	0.027*
In-hospital mortality	1	1	1.000

RESULTS-2

Comparison between the fasciocutaneous ALT skin tube and the chimeric ALT skin tube

Table 2. Patients' details and outcome measures between anterolateral thigh flap and anterolateral thigh flap with chimeric vastus lateralis muscle for pharyngoesophageal reconstruction

	ALT (n = 22)	ALT with chimeric VL muscle (n = 27)	p value
Age (years) Mean ± SD, range	54.6±7.4 (42-68)	60.4±10.9 (39-79)	0.106
Sex			
Male	21	27	0.449
Female	1	0	
Tumor			
Hypopharynx	19	23	1.000
Larynx	3	2	0.646
Others	0	2	0.495
Stage			
II	2	2	1.000
III	5	6	1.000
IV	15	19	1.000
OP time (min) Mean ± SD (Range)	700.0±132.3 (436-965)	752.8±112.6 (570-970)	0.226
Defect			
Circumferential	20	25	1.000
Near-circumferential/ patch	2	2	
Flap loss			
Partial	2	3	1.000
Total	1	0	0.449
Donor site closure			
Primary	17	23	0.712
Skin graft	5	4	
ICU stay (days) Mean ± SD, range	11.3±10.4 (7-41)	7.9±2.3 (6-15)	0.202
Hospital stay (days) Mean ± SD, range	42.1±24.3 (13-92)	33.1±15.1 (15-70)	0.041*
In-hospital mortality	0	1	1.000

RESULTS-

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The comparison of anastomotic leak

Table 3. Technical predictors of postop leak

Variables	Postop leak (%)	<i>p</i> value
Skin flap		
<u>ALT</u> (n = 49)	15 (<u>30.6</u>)	0.04*
<u>RFF</u> (n = 35)	19 (<u>54.3</u>)	
ALT flap		
With VL muscle (n = 27)	6 (22.2)	0.22
Without VL muscle (n = 22)	9 (40.9)	
Defect		
<u>Circumferential</u> (n = 74)	33 (<u>44.6</u>)	0.04*
<u>Near-circumferential/ patch</u> (n = 10)	1(<u>10.0</u>)	

Technical Factors-1

- The type of the free flaps used, as previous data
 - Superiority of outcomes using ALT over RFF
 - Postoperative anastmotic leak: less than RFF
 - 30.6%: post-op anastmotic leak (ALT) v.s. 54.3% (RFF): significant difference
 - the abundance and diversity of tissues provided by ALT flap allows surgeon to use many of the modified anastomotic techniques

- ALT: shorter hospital stays: 39.2; RFF: 55.6
- Thickness plays a significant role in postoperative anastomotic leak
- The skin territory of ALT: big, reliable , one perforator supply 9 cm, increase as perforators
- RFF: up to 10 cm, but the more big flap is the blood supply of the distal parts less. Folding make compromise of the perfusion.
 - Decreasing perfusion—> leak and future strictures

- RFF: very thin skin: ease of design
- ALT: very bulky for some reconstruction
 - Head and neck cancer: malignancy and starvation
 - > Loose subcutaneous fat
 - > Easy to handles with less tension
- The donor site morbidity: RFF less favorable
 - Always skin graft, affects aesthetically and physically

Technical Factors-2

- ALT myocutaneous versus fasciocutaneous flap
- No difference in leak, but significant difference in the ICU and hospital stay
- role of muscle in protection of the anastomosis and the decrease of the severity of the leak thereafter
- ALT-MC flap, volume to obliterate dead space
 - > Decrease possibility of collection and anastomotic leak

Technical Factors-3

- The type of defect
 - Circumferential or near circumferential/patch defects
- Significant difference in postoperative anastomotic leak
 - Circumferential, 33 (44.6%) vs near circumferential, 1(10.0%)
- Circumferential: high predictability of postoperative anastmotic leak due to tension on the repair lines
 - > Surgeons should act proactively, provide the best available reconstructive technique

CONCLUSIONS

- The rate of anastomosis leak in pharyngoesophageal reconstruction is affected by reconstruction option and defect type
- Anterolateral thigh flap: viable option for hypopharyngeal reconstruction
- The more technical demand with the anterolateral thigh flap must be weighed against an easily harvested radial forearm flap.