

# Five-Year Review Outcome of Microvascular Free Flap in Siriraj Hospital

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**Background:** Microvascular free flap operation has become the preferred reconstructive technique at many medical centers to cover complex defects from tumor ablative surgery or trauma and for reconstructive procedure such as functioning muscle transfer. There are many clinical reports about free tissue transfer since the beginning of microvascular technique in the early 1960s. The overall success rate is about 90 to 98% but there may be postoperative complications.

**Objective:** Retrospectively analyze outcome and complications of consecutive series of microvascular free flap procedures, and compare with series published by other center.

**Material and Method:** The chart review was conducted of all patients that underwent microvascular free tissue transfer in our hospital between January 2007 and December 2011. The age, gender, underlying disease, other risk factors (smoking, obesity, pre-operative radiation on recipient site), American Society of Anesthesiologists (ASA) classification, indication for surgery, location of defect, type of flap, operative time, inflow and outflow vessel, type of anastomosis, vein graft usage, ischemic time, length of hospital stay, length of intensive unit stay, flap success rate, re-exploration surgery, salvage rate, and perioperative complications of all patient were noted. These data were collected in database and were available for statistical analysis.

**Results:** Between January 2007 and December 2011, 153 microvascular tissue transfers were performed to coverage and reconstruct various kind of defects and diseases. There were 102 men and 51 women, age ranged from 11 to 84 years (mean 48 years). There were 50 patients over 60 years old (33%). Among the 153 procedures, there were 124 defects from tumor ablation, 14 procedures for wound coverage including defect from acute trauma in five patients, and other procedure such as functioning muscle transfer and sex reassignment surgery. The microvascular free flap reconstruction of various kinds of indication all over the body showed success rate of 92.8%. Re-exploratory surgery and ASA class more than 1 were significant factors influence with flap failure rate. Only significant factor associated with wound complication was age more than 60 years. ASA class more than 1 and age more than 60 years were significant factors that increasing general medical complication.

**Conclusion:** Microvascular free flap was the versatile reconstructive option. The failure rate of them should not be more than 5%. Factors associated with flap failure were re-exploration, ASA classification and factors that affect complications were preoperative morbidity level (ASA) and elderly patient.

**Keywords:** Microvascular free flap, Factors that influence with flap failure, Outcome of free flap reconstruction

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Microvascular free flap operation has become preferred reconstructive technique at many medical centers to cover complex defects from tumor ablative surgery or trauma and for reconstructive procedure such as functioning muscle transfer. There are many clinical reports for free tissue transfer since the beginning of microvascular technique in the early 1960s<sup>(1-5)</sup>. During this period, refinement in microsurgical techniques and use of various donor sites

has increased the surgical indication for extensive resection of pathologic lesion. Current experience demonstrates that microvascular free tissue transfer frequently allows for reliable, single stage and immediate reconstruction in more complex defect from various etiology<sup>(6-17)</sup>. Many large patient series were reported high flap success rate. However, this type of operation permits advanced disease to be more aggressively treated by surgery in patients with advanced age and high prevalence of coexisting illnesses, complications are common.

The aim of the present study was to retrospectively analyze outcome and complications of consecutive series of microvascular free flap procedures,

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to critical review of so-far result, and compare with series published by other center. We identified the variables that influence both flap success rate and perioperative complications by analyzing series of microvascular free tissue transfer performed at our academic center in the last 5-years.

## **Material and Method**

### ***Study design***

The chart review was conducted of all patients who underwent microvascular free tissue transfer in our hospital between January 2007 and December 2011. The age, gender, underlying disease, other risk factors (smoking, obesity, pre-operative radiation on recipient site), American Society of Anesthesiologists (ASA) classification, indication for surgery, location of defect, type of flap, operative time, inflow and outflow vessel, type of anastomosis, vein graft usage, ischemic time, length of hospital stay, length of intensive unit stay, flap success rate, re-exploration surgery, salvage rate, and perioperative complications of all patient were noted. These data were collected in database and were available for statistical analysis.

### ***Surgical technique***

Two team approaches were performed in almost all cases. Microvascular anastomosis was performed by attending staff or training chief resident under close supervision of attending staff. Most of the patients were given low-molecular weight dextran post-operatively for five days. Flap viability was monitored by close clinical observation and occasional by Doppler ultrasonography.

### ***Data assessment***

Operative time was defined as the time between the first incision and wound closure. Ischemic time was defined as the time from transected of vascular pedicle to complete arterial anastomosis and release vascular clamp. Flap success rate was defined as complete flap viability or partial flap loss that still achieved primary indication of surgery<sup>(18)</sup>. A complication was divided into flap related complications and general medical complications.

Statistical analysis of data was performed using the Statistical Package for the Social Sciences (SPSS). Chi-square and Fisher's exact test were used to statistically compare variable that influence with flap success rate and perioperative complications. A *p*-value of 0.05 or less was regarded as statistically significant.

## **Results**

Between January 2007 and December 2011, 153 microvascular tissue transfers were performed to coverage and reconstruction various kind of defects and diseases. There were 102 men and 51 women ranging in age from 11 to 84 years (mean 48 years). There were 50 patients over 60 years old (33%). Among the 153 procedures, there were 124 defects from tumor ablation, 14 procedures for wound coverage including defect from acute trauma in five patients, and other procedure such as functioning muscle transfer and sex reassignment surgery.

Most of these defects were in head and neck region, 79.7%. The most common flap type was fibula free flap (62 flaps, 41%), followed by the anterolateral thigh (ALT) flap (34 flaps, 22%). Inflow artery that used for anastomoses varied, superior thyroid (40%) was the most common, followed by facial artery and superficial temporal artery (25% and 19%, respectively). For venous anastomoses the superior thyroid vein (21%), facial vein (18%), superficial temporal vein, and external jugular vein were the most common. Most of anastomoses were end to end (95%), and vein graft were used only 4.6%. Mean duration of operation including surgical resection was 11.5 hours (range 4-26.8 hours), mean ischemic time was 90 minutes (range 20-300 minutes). Post-operative admission to intensive care unit in 133 patients (87%) with mean length of intensive unit stay 3.1 days, total hospital stay 34 days (Table 1).

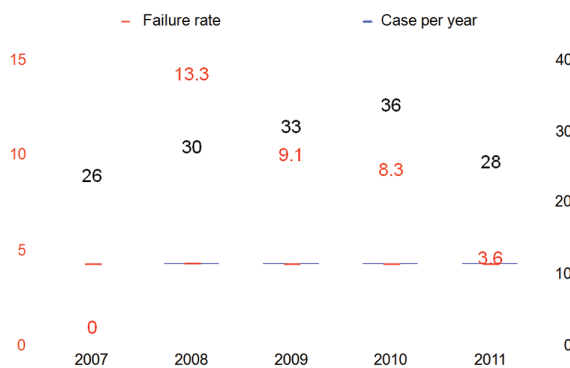
The overall flap success rate was 92.8%. Re-exploration for anastomosis revisions were performed in 12 patients (7.8%) with eight flaps salvaged. Most of re-explorations were only one time but one case received three re-exploration and two cases had two re-explorations. Four of these procedures occurred in the first 24 hours post-operative, which have salvage rate of 67%. This is a better salvage rate than the group that performed re-exploration after 24 hours (62.5%), but not statistically significant. Wound complication including hematoma, infection, and wound dehiscence was 49.7%, general complication including pneumonia, cardiac related, sepsis, and delirium was 27.5% (Table 2).

The amount of microvascular free flap operation in our unit was increased every year from 26 cases in 2007 to 36 cases in 2010, but in 2011, total case was decreased due to major flood problem in Bangkok in the fourth trimester, which affected the amount of elective surgical cases. Flap failure rate

**Table 1.** Patients demographic and clinical data (n = 153)

Sex	
Male	102 (67.0)
Female	51 (33.0)
Age (years)	
Mean age (range)	48 (11-84)
<60	103 (67.0)
≥60	50 (33.0)
ASA class (n = 151)	
I	60 (39.7)
II	78 (51.7)
III	13 (8.6)
Underlying disease and other risks	
Diabetes mellitus	14 (9.2)
Smoking	70 (45.8)
Pre-operative radiation in recipient site	17 (11.1)
Obesity	5 (3.3)
Etiology of defect	
Tumor ablation	124 (81.0)
Wound coverage	14 (9.2)
Functioning muscle transfer	8 (5.2)
Others	7 (4.6)
Recipient site	
Head and neck	122 (79.7)
Scalp	9 (5.9)
Extremity	16 (10.5)
Breast	3 (2.0)
Others	3 (2.0)
Donor site	
Fibula	62 (40.5)
Anterolateral thigh (ALT)	34 (22.0)
Gracilis	19 (12.4)
Radial forearm	18 (11.8)
Latissimus dorsi	7 (4.6)
Rectus abdominis/deep inferior epigastric perforator	7 (4.6)
Others	6 (3.9)
Ischemic time (minutes), mean (range)	89.9 (20-300)

ASA = American Society of Anesthesiologists  
Data are number (%) unless otherwise stated.

**Fig. 1** Amount of case and flap failure rate per year.**Table 2.** Flap outcome and complication

Flap outcome	
Success rate	142 (92.8)
Total flap necrosis/critical partial flap failure	11 (7.2)
Re-exploration	12 (7.8)
Salvaged flap (n = 12)	8 (67.0)
Wound complication	Total 49.7%
(one or more complication)	
Surgical site infection	47 (31.0)
Wound dehiscence	30 (20.0)
Hematoma	27 (18.0)
Others	5 (3.0)
General medical complication	Total 27.5%
(one or more complication)	
Pneumonia	32 (21.0)
Delirium	18 (11.8)
Cardiac relate	5 (3.3)
Sepsis	4 (2.6)
Others	6 (3.9)

Data are number (%) unless otherwise stated.

**Table 3.** Factors associate with flap failure

Factors	Rate of flap failure, n (%)	<i>p</i> -value*
No re-explore (n = 141)	7 (5.0)	0.005
Re-exploration surgery (n = 12)	4 (33.0)	
No vein graft use (n = 103)	4 (3.9)	0.215
Vein graft interposition (n = 5)	1 (20.0)	
ASA class I (n = 60)	0 (0)	0.003
ASA class II/III (n = 91)	11 (12.1)	

\* Fisher's exact test

tended to decrease from overall failure rate of 7.2 to 3.6% in 2011 (Fig. 1).

Significant factors associated with flap failure were need for re-exploration surgery ( $p = 0.005$ ) and ASA class II and III compared with ASA class I ( $p = 0.003$ ). Vein graft interposition and other risk factors were not significantly associated with flap failure (Table 3). Age more than 60 years was the only significant factor associated with wound complication ( $p = 0.034$ ). ASA class II and III compare with ASA class I ( $p = 0.004$ ) and age more than 60 years ( $p < 0.001$ ) were significant factors for general medical complication. Pre-operative radiation and smoking tended to increase both wound and general medical complication but not statistically significant (Table 4).

## Discussion

A major change in the reconstruction of defect in various locations was the introduction of free vascularized tissue transfer in 1960s and 1970s, which

**Table 4.** Factors associated with wound and general medical complication

Factors	Wound complication		General medical complication	
	Complication, n (%)	<i>p</i> -value*	Complication, n (%)	<i>p</i> -value*
Age <60 years (n = 103)	45 (43.7)	0.034	24 (48.0)	<0.001
Age ≥60 years (n = 50)	31 (62.0)		18 (17.5)	
ASA class I (n = 60)	25 (41.7)	0.143	9 (15.0)	0.004
ASA class II/III (n = 91)	49 (53.8)		33 (36.3)	
No DM (n = 139)	67 (48.2)	0.251	40 (28.8)	0.352 <sup>+</sup>
DM (n = 14)	9 (64.3)		2 (14.3)	
No pre-operative RT (n = 136)	66 (48.5)	0.424	36 (26.5)	0.564 <sup>+</sup>
Pre-operative RT (n = 17)	10 (58.8)		6 (35.3)	
Non-smoker (n = 83)	40 (48.2)	0.690	18 (21.7)	0.082
Smoker (n = 70)	36 (51.4)		24 (34.3)	

DM = diabetes mellitus; RT = radiation therapy

\* Chi-square

<sup>+</sup> Fisher's exact test**Table 5.** Free flap failure rate

Author	Number of flaps	Recipient site	Success rate (%)
Present study	153	All area	92.8
Wei et al. <sup>(21)</sup>	3,361	Head & neck & extremity	98.4
Nakatsuka et al. <sup>(12)</sup>	2,372	Head & neck	95.8
Chen et al. <sup>(32)</sup>	1,142	All area	96.4
Chubb et al. <sup>(30)</sup>	1,140	All area	96.9
Kroll et al. <sup>(19)</sup>	854	Head & neck & breast	96.3
Srikanth et al. <sup>(18)</sup>	768	All area	95.0
Acosta et al. <sup>(17)</sup>	675	Breast	90.7-98.2
Pohlenz et al. <sup>(15)</sup>	540	Head & neck	93.8
Eckardt et al. <sup>(14)</sup>	534	Head & neck	95.0
Khoury et al. <sup>(20)</sup>	493	All area	95.9
Suh et al. <sup>(13)</sup>	400	Head & neck	99.7

enabled primary reconstruction of more complex and extensive defect. This procedure has largely replaced traditional surgical concepts of multiple staged reconstruction using pedicle and local flaps<sup>(8,9,11,12,14,16)</sup>.

From the previous studies, the overall failure rate of microvascular free flap reconstruction were 5 to 10%<sup>(12-15,17-21,30,32)</sup>. Most of them were head and neck reconstruction. Our institution had conducted the microvascular free flap reconstruction more than 10 years ago, but we did not have any long-term study about them. The present study was the largest microvascular free flap volume in Thailand that ever had<sup>(34-40)</sup>. This retrospective review presented our last 5-years clinical experience of 153 procedures of microvascular free flap reconstruction of various kinds of indication all over the body, showed success rate of

92.8%, which is approximate agreement with other series with success rate exceeding 90%<sup>(12-15,17-21,30,32)</sup> (Table 5). The majority of patients (81%) suffered from tumor ablative surgery, and majority of defects (79.7%) were in head and neck region. Evaluating the results of diverse reconstruction procedure from difference site of defect was extremely difficult. The functional assessment of each flap was limited for comparative analysis, due to retrospective nature of our review.

During the present study period, fibula osteocutaneous flap was still our preferred donor site for reconstruction of bony defect, because it provides an excellent length of bone, and can tolerate multiple osteotomies. It also can well adapting to mandibular defect<sup>(8,9,11)</sup>. However, today the ALT flap has become our choice for reconstruction of soft tissue defect

compare to previous preferred radial forearm free flap in the early experience in our center similar to many centers. The ALT provides long vascular pedicle, ability to include muscle into the flap, and very low donor site morbidity. Although, there was some series that report the same level of donor site morbidity compare to radial forearm flap<sup>(26-29)</sup>.

Re-exploration rate in our study was 7.8% with salvage rate of 67%, which was comparable to 1.75 to 25.5% re-exploration rate and 27 to 84% of salvage rate in other studies<sup>(1-4,7,9,12-16,19-21,25,30,32)</sup>. Re-exploration that occurred within first 24 hours tend to have more salvage rate compared to group that performed re-exploration after 24 hours, but not statistically significant in our study, which many authors believed that earlier re-exploration had better salvage rate but this topic is still debated<sup>(30-33)</sup>.

With any free flap operation, complication may occur at surgical site or systemically. Report of complications in the literature varied, depending on population of study, definition of complication report, method of data collection, etc. Overall report of complication was 12 to 47%. Our report showed high wound complication rate 49.7%, compared to others study may be due to the inclusion of minor surgical site infection, which was high as 31%. About general medical complication rate of 27.5% was comparable to other studies<sup>(4,13,16,17,19,20,24)</sup>.

Factors that influence with flap failure rate and complications were still debated although many studies try to identified it with prospective or retrospective manner<sup>(7,14,19,20,22-25,32,33)</sup>. Reported factors that related to flap failure were patients pre-operative status, age, smoking, pre-operative radiation, osteomyelitis flap type, surgical expertise, use of vein graft, operative time, and re-exploration for anastomosis revision, but still not have sufficient large prospective data to definitely identified all significant cause<sup>(7,19,20,22-25,32,33)</sup>. About factor that related to wound complication and general complication were age, ASA class, diabetes mellitus, pre-operative radiation, smoking, and alcohol consumption also reported, but lack of large prospective data enough for definitely identified all significant causes as well<sup>(7,14,20,22-25,32,33)</sup>. In our retrospective report, re-explorative surgery and ASA class more than 1 were significant factors influence with flap failure rate. Only significant factor associated with wound complication was age more than 60 years. ASA class more than 1 and age more than 60 years were significant factors that increased general medical complication.

About surgical experience, the incidence of microvascular free flap was tended to increase every year and failure rate was decreased corresponded to the increasing surgical expertise. Although number of our data were still limit for comparative analytic result per year.

## Conclusion

Microvascular free flaps are reliable in achieving successful reconstruction in various defects of body. Factors associated with flap failure were re-exploration, ASA classification and factors that affect complications were preoperative morbidity level (ASA) and elderly patient. These results presented a current baseline for free flap surgery to which future advances and improvement in technique and practice may compared.

## What is already known on this topic?

From the previous studies, the overall failure rate of microvascular free flap reconstruction was 5 to 10%<sup>(12-15,17-21,30,32)</sup>. Most of them were head and neck reconstruction. Our institution had conducted the microvascular free flap reconstruction more than 10 years ago, but we did not have any long-term study about them. The present study is the largest microvascular free flap volume in Thailand ever reported.

Factors that influence with flap failure rate and complications were still debated, although many studies try to identified it with prospective or retrospective manner<sup>(7,14,19,20,22-25,32,33)</sup>. Reported factors that related to flap failure were patients pre-operative status, age, smoking, pre-operative radiation, osteomyelitis flap type, surgical expertise, use of vein graft, operative time, and re-exploration for anastomosis revision, but still did not have sufficient large prospective data to definitely identified all significant cause<sup>(7,19,20,22-25,32,33)</sup>. About factors that related to wound complication and general complication were age, ASA class, diabetes mellitus, pre-operative radiation, smoking, and alcohol consumption also reported, but lack of prospective data large enough for definitely identified all significant cause as well.

## What this study adds?

This retrospective review presented our last 5-years clinical experience of 153 procedures of microvascular free flap reconstruction of various kinds of indication all over the body, showed success



rate of 92.8%, which is approximately agreed with other series with success rate exceeding 90%.

In our retrospective report, re-exploratory surgery and ASA class more than 1 were significant factors influence with flap failure rate. Only significant factor associated with wound complication was age more than 60 years. ASA class more than 1 and age more than 60 years were significant factors that increasing general medical complication.

#### Potential conflicts of interest

None.

#### References

1. Irons GB, Wood MB, Schmitt EH III. Experience with one hundred consecutive free flaps. *Ann Plast Surg* 1987; 18: 17-23.
2. Harashina T. Analysis of 200 free flaps. *Br J Plast Surg* 1988; 41: 33-6.
3. Percival NJ, Sykes PJ, Earley MJ. Free flap surgery: the Welsh Regional Unit experience. *Br J Plast Surg* 1989; 42: 435-40.
4. Schusterman MA, Miller MJ, Reece GP, Kroll SS, Marchi M, Goepfert H. A single center's experience with 308 free flaps for repair of head and neck cancer defects. *Plast Reconstr Surg* 1994; 93: 472-8.
5. Kruavit A, Visuthikosol V, Srimuninnimit V, Punyahotra N. 10-year-free flaps at Ramathibodi Hospital. *J Int Coll Surg Thai* 1998; 41: 45-55.
6. Kelly JL, Eadie PA, Orr D, Al Rawi M, O'Donnell M, Lawlor D. Prospective evaluation of outcome measures in free-flap surgery. *J Reconstr Microsurg* 2004; 20: 435-8.
7. Classen DA, Ward H. Complications in a consecutive series of 250 free flap operations. *Ann Plast Surg* 2006; 56: 557-61.
8. Shpitzer T, Neligan PC, Gullane PJ, Freeman JE, Boyd BJ, Rotstein LE, et al. Oromandibular reconstruction with the fibular free flap. Analysis of 50 consecutive flaps. *Arch Otolaryngol Head Neck Surg* 1997; 123: 939-44.
9. Urken ML, Buchbinder D, Costantino PD, Sinha U, Okay D, Lawson W, et al. Oromandibular reconstruction using microvascular composite flaps: report of 210 cases. *Arch Otolaryngol Head Neck Surg* 1998; 124: 46-55.
10. Hamdi M, Weiler-Mithoff EM, Webster MH. Deep inferior epigastric perforator flap in breast reconstruction: experience with the first 50 flaps. *Plast Reconstr Surg* 1999; 103: 86-95.
11. Cordeiro PG, Disa JJ, Hidalgo DA, Hu QY. Reconstruction of the mandible with osseous free flaps: a 10-year experience with 150 consecutive patients. *Plast Reconstr Surg* 1999; 104: 1314-20.
12. Nakatsuka T, Harii K, Asato H, Takushima A, Ebihara S, Kimata Y, et al. Analytic review of 2372 free flap transfers for head and neck reconstruction following cancer resection. *J Reconstr Microsurg* 2003; 19: 363-8.
13. Suh JD, Sercarz JA, Abemayor E, Calcaterra TC, Rawnsley JD, Alam D, et al. Analysis of outcome and complications in 400 cases of microvascular head and neck reconstruction. *Arch Otolaryngol Head Neck Surg* 2004; 130: 962-6.
14. Eckardt A, Meyer A, Laas U, Hausamen JE. Reconstruction of defects in the head and neck with free flaps: 20 years experience. *Br J Oral Maxillofac Surg* 2007; 45: 11-5.
15. Pohlenz P, Blessmann M, Blake F, Li L, Schmelzle R, Heiland M. Outcome and complications of 540 microvascular free flaps: the Hamburg experience. *Clin Oral Investig* 2007; 11: 89-92.
16. Wettstein R, Schurch R, Banic A, Erni D, Harder Y. Review of 197 consecutive free flap reconstructions in the lower extremity. *J Plast Reconstr Aesthet Surg* 2008; 61: 772-6.
17. Acosta R, Smit JM, Audolfsson T, Darcy CM, Enajat M, Kildal M, et al. A clinical review of 9 years of free perforator flap breast reconstructions: an analysis of 675 flaps and the influence of new techniques on clinical practice. *J Reconstr Microsurg* 2011; 27: 91-8.
18. Srikanth R, Reddy DM, Mosahebi A. A simple classification for standardisation of nomenclature in free flap outcome. *J Plast Reconstr Aesthet Surg* 2006; 59: 1318-24.
19. Kroll SS, Schusterman MA, Reece GP, Miller MJ, Evans GR, Robb GL, et al. Choice of flap and incidence of free flap success. *Plast Reconstr Surg* 1996; 98: 459-63.
20. Khouri RK, Cooley BC, Kunselman AR, Landis JR, Yeramian P, Ingram D, et al. A prospective study of microvascular free-flap surgery and outcome. *Plast Reconstr Surg* 1998; 102: 711-21.
21. Wei FC, Demirkan F, Chen HC, Chuang DC, Chen SH, Lin CH, et al. The outcome of failed free flaps in head and neck and extremity reconstruction: what is next in the reconstructive ladder? *Plast Reconstr Surg* 2001; 108: 1154-60.
22. Kruse AL, Luebbbers HT, Gratz KW, Obwegeser

- JA. Factors influencing survival of free-flap in reconstruction for cancer of the head and neck: a literature review. *Microsurgery* 2010; 30: 242-8.
23. Pattani KM, Byrne P, Boahene K, Richmon J. What makes a good flap go bad? A critical analysis of the literature of intraoperative factors related to free flap failure. *Laryngoscope* 2010; 120: 717-23.
  24. Bourget A, Chang JT, Wu DB, Chang CJ, Wei FC. Free flap reconstruction in the head and neck region following radiotherapy: a cohort study identifying negative outcome predictors. *Plast Reconstr Surg* 2011; 127: 1901-8.
  25. Herold C, Gohritz A, Meyer-Marcotty M, Steiert A, Jokuszies A, Vaske B, et al. Is there an association between comorbidities and the outcome of microvascular free tissue transfer? *J Reconstr Microsurg* 2011; 27: 127-32.
  26. Wei FC, Jain V, Celik N, Chen HC, Chuang DC, Lin CH. Have we found an ideal soft-tissue flap? An experience with 672 anterolateral thigh flaps. *Plast Reconstr Surg* 2002; 109: 2219-26.
  27. Cunha-Gomes D, Choudhari C, Bhathena HM, Kavarana NM. The hemithigh microvascular transfer (combined anterolateral thigh flap and tensor fasciae latae flap) for a full thickness abdominal wall reconstruction: a case report. *Acta Chir Plast* 1999; 41: 71-3.
  28. Farace F, Fois VE, Manconi A, Puddu A, Stomeo F, Tullio A, et al. Free anterolateral thigh flap versus free forearm flap: Functional results in oral reconstruction. *J Plast Reconstr Aesthet Surg* 2007; 60: 583-7.
  29. Kimata Y, Uchiyama K, Ebihara S, Sakuraba M, Iida H, Nakatsuka T, et al. Anterolateral thigh flap donor-site complications and morbidity. *Plast Reconstr Surg* 2000; 106: 584-9.
  30. Chubb D, Rozen WM, Whitaker IS, Acosta R, Grinsell D, Ashton MW. The efficacy of clinical assessment in the postoperative monitoring of free flaps: a review of 1140 consecutive cases. *Plast Reconstr Surg* 2010; 125: 1157-66.
  31. Rozen WM, Chubb D, Whitaker IS, Acosta R. The efficacy of postoperative monitoring: a single surgeon comparison of clinical monitoring and the implantable Doppler probe in 547 consecutive free flaps. *Microsurgery* 2010; 30: 105-10.
  32. Chen KT, Mardini S, Chuang DC, Lin CH, Cheng MH, Lin YT, et al. Timing of presentation of the first signs of vascular compromise dictates the salvage outcome of free flap transfers. *Plast Reconstr Surg* 2007; 120: 187-95.
  33. Kroll SS, Schusterman MA, Reece GP, Miller MJ, Evans GR, Robb GL, et al. Timing of pedicle thrombosis and flap loss after free-tissue transfer. *Plast Reconstr Surg* 1996; 98: 1230-3.
  34. Chaivanichsiri P. Influence of recipient vessels on free tissue transplantation of the extremities. *Plast Reconstr Surg* 1999; 104: 970-5.
  35. Veravuthipakorn L, Veravuthipakorn A. Microsurgical free flap and replantation without antithrombotic agents. *J Med Assoc Thai* 2004; 87: 665-9.
  36. Mahattanasakul P, Kerekhanjanarong V, Apipan P, Sannikorn P, Supiyaphun P. The learning curve in head and neck reconstruction with microvascular free flaps: a retrospective review. *Asian Biomed* 2010; 4: 949-54.
  37. Sananpanich K, Kraissarin J. Descending genicular artery free flaps: Multi-purpose tissue transfers in limb reconstruction. *J Plast Reconstr Aesthet Surg* 2015; 68: 846-52.
  38. Kanchanarak C, Sittitrai P, Charoensil R. Mandibular reconstruction: free flap vs AO plate. *J Med Assoc Thai* 1999; 82: 126-30.
  39. Mahaisavariya B, Songcharoen P, Rojviroj S, Vipulakorn K. Reconstruction of bone and skin defect using the osteocutaneous free fibular graft. *J Med Assoc Thai* 1994; 77: 207-12.
  40. Kruavit A, Visuthikosol V. Temporoparietal fascial free flap for correction of first web space atrophy. *Microsurgery* 2010; 30: 8-12.

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**ผลการศึกษา 5 ปีย้อนหลังของการผ่าตัดย้ายเนื้อเยื่อร่วมกับการต่อหลอดเลือดโดยใช้กล้องจุลทรรศน์ในผู้ป่วยที่ได้รับการรักษาที่โรงพยาบาลศิริราช**

ศิริชัย กำเนิดนิกตะ, ณัฏฐ์ บูชางกูร

**ภูมิหลัง:** ปัจจุบันมีผู้ป่วยจำนวนมากที่มีปัญหาการสูญเสียเนื้อเยื่อโดยสาเหตุพบตั้งแต่อุบัติเหตุไปจนถึงการผ่าตัดมะเร็งต่างๆ ศัลยแพทย์จำเป็นต้องทำการรักษาโดยการเสริมสร้างเนื้อเยื่อการผ่าตัดย้ายเนื้อเยื่อร่วมกับการต่อหลอดเลือดโดยผ่านกล้องจุลทรรศน์เป็นมาตรฐานการเสริมสร้างเนื้อเยื่อชนิดหนึ่งที่มีความนิยมมากขึ้นตามลำดับ แต่ในการผ่าตัดย้ายเนื้อเยื่อร่วมกับการต่อหลอดเลือดโดยผ่านกล้องจุลทรรศน์ เป็นการผ่าตัดที่ซับซ้อน และมีปัจจัยหลายประการที่มีผลต่อความสำเร็จของการผ่าตัด ทั้งในแง่ของปัจจัยที่ตัวผู้ป่วยเอง ไปจนถึงเทคนิคในการผ่าตัด และการดูแลหลังผ่าตัด โดยในต่างประเทศมีการศึกษาถึงความสำเร็จโดยวิธีนี้อยู่ที่ 90 ถึง 98% ซึ่งมีการรายงานการเกิดภาวะแทรกซ้อนที่ตามมาภายหลังด้วยเช่นกัน

**วัตถุประสงค์และวิธีการ:** การศึกษานี้ทำการเก็บรวบรวมข้อมูลของการผ่าตัดย้ายเนื้อเยื่อร่วมกับการต่อหลอดเลือดโดยผ่านกล้องจุลทรรศน์ที่โรงพยาบาลศิริราช สาขาศัลยกรรมตกแต่ง ในช่วง เดือนมกราคม พ.ศ. 2550 จนถึง ธันวาคม พ.ศ. 2554 จำนวน 153 ราย โดยเก็บข้อมูลพื้นฐานของผู้ป่วยโดยทั่วไป โรคประจำตัว ความแข็งแรงร่างกายก่อนผ่าตัด (ASA class) การสูบบุหรี่ น้ำหนัก ส่วนสูง รวมถึงเทคนิคการผ่าตัด ผลความสำเร็จของการผ่าตัด การผ่าตัดซ้ำ การครองเตียง และภาวะแทรกซ้อนหลังผ่าตัด

**ผลการศึกษา:** พบมีจำนวนผู้ป่วยที่ได้รับการผ่าตัดโดยการย้ายเนื้อเยื่อทั้งสิ้น 153 ราย เป็นชาย 102 ราย และเป็นหญิง 51 ราย อายุ 11 ถึง 84 ปี เป็นการแก้ไขหลังผ่าตัดเนื้องอก 124 ราย จากการผ่าตัดปิดบาดแผล 14 ราย จากบาดแผลจากอุบัติเหตุ 5 ราย ที่เหลือเป็นจากการผ่าตัดอื่น ๆ เช่น การแปลงเพศ การย้ายกล้ามเนื้อ เป็นต้น โดยพบอัตราความสำเร็จโดยรวมในช่วงเวลาดังกล่าวอยู่ที่ 92.8% โดยพบว่าปัจจัยที่มีผลต่อการผ่าตัดสำเร็จขึ้นอยู่กับการผ่าตัดซ้ำ และสุขภาพโดยรวมของผู้ป่วยก่อนผ่าตัด (ASA class) ส่วนปัจจัยที่มีผลต่อภาวะแทรกซ้อนทางอายุรกรรม คือ อายุมากกว่า 60 ปี และสุขภาพโดยรวมของผู้ป่วยก่อนผ่าตัด (ASA class) มากกว่าระดับ 1

**สรุป:** การผ่าตัดย้ายเนื้อเยื่อโดยการต่อหลอดเลือดร่วมด้วยเป็นการผ่าตัดที่มีประสิทธิผล โดยความล้มเหลวจากการผ่าตัดพบน้อยกว่า 5% และจากผลการศึกษาพบว่าสิ่งที่มีผลต่อความสำเร็จคือ การผ่าตัดซ้ำ ความแข็งแรงร่างกายก่อนผ่าตัด (ASA class) ส่วนปัจจัยที่มีผลต่อภาวะแทรกซ้อน คืออายุมากกว่า 60 ปี และสุขภาพโดยรวมของผู้ป่วยก่อนผ่าตัด (ASA class) มากกว่าระดับ 1

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