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Original Article

Comparison between Groin Flap and Distally Based Radial Forearm Flap in Resurfacing of Acute Soft Tissue Injury on the Palmar Surface of Hand

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Md. Shahadat Hossain Mazumdar[1], Farid Ahmed[2], Abdus Samad[3], Nasrin Chowdhury[4], Tusher Kanti Mozumder[5]

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ABSTRACT

Background: *Hand injury is a common burden in orthopaedic & plastic surgery department. Resurfacing of such injury is commonly done by pedicled groin flap or distally based radial forearm flap.* ***Objective:*** *In this study our main goal is to evaluate the comparison between Groin Flap and Distally Based Radial Forearm Flap in Resurfacing of Acute Soft Tissue Injury on the Palmar Surface of Hand.* ***Method:*** *This is a comparative observational study, conducted at Department of Orthopaedic Surgery and Burn and Plastic surgery Sylhet MAG Osmani Medical College Hospital from January 2018 to October 2019. A total of 16 patients with acute hand injury or pathology in the palm of hand which may create surgical wound, admitted in the study place during the study period were the study population. Where those who had acute wound in palm of hand with exposed tendon, nerve and bones or Degloving hand injury were included in the study. Patient were divided into two group namely Group-A and Group-B. Patient chosen for groin flap were allocated in group-A and for distally based radial forearm flap were in group-B.* ***Results:*** *During the study, the age of the patients ranged from 16 to 55 years with the mean age was 37.25 (SD±14) years in group A, while it was 20 to 55 years and 37 (SD±12) years in group B and 87% were male. mean duration of operation was 113.25 (SD±11) minutes in group A and 95.63 (SD±16) minutes in group B. in addition, It was observed that in almost two third 5(62.5%) of the patients post-operative hospital stay was 25 days in group A and 7 days in group B. The mean (±SD) hospital stay was 26.88 (±2.6) days in group A and 8.13 (±1.6) days in group B. A Single number of patients of*

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1. *Consultant, Department of Orthopaedic Surgery, Sylhet Women's Medical College Hospital, Sylhet, Bangladesh*
2. *Professor, Department of Orthopaedic Surgery, Sylhet Women's Medical College Hospital, Sylhet, Bangladesh*
3. *Associate Professor,Department of Orthopaedic Surgery, Sylhet Women's Medical College Hospital, Sylhet, Bangladesh*
4. *Assistant Professor, Department of Obstetrics and Gynaecology, North-East MedicalCollege Hospital, Sylhet, Bangladesh*
5. *Registrar, Department of Orthopaedic Surgery, Sylhet Women's Medical College Hospital, Sylhet, Bangladesh*

group-A experienced donor site pain, haematoma and marginal necrosis, while none of group B developed such complications. A single patient of group A experienced shoulder joint stiffness in follow-up assessment at 6th & 9th week, which disappeared at final follow-up; while none of group B patient complaints of joint stiffness in follow-up period. ***Conclusion:*** *This study reveals that mean operative time and mean hospital stay was shorter in radial forearm flap compared to groin flap and the difference was statistically significant ($p<0.05$).It is concluded that radial forearm flap has better outcome than groin flap.*

Keywords: *hand injury, Groin Flap, Distally Based Radial Forearm Flap*

INTRODUCTION

The hand is one of the most important points of contact with our environment and has many important functions that include cognitive discrimination, tactile function, and It is crucial for adaptive skills and independent functioning. [1-4]

Many of these functions require an intact palmar skin so that the hand can perform all power grip forms and execute delicate skills. The complexity of these abilities emphasizes that reconstruction of the palm is still one of the more challenging problems in hand surgery. [5]

Many flaps have been described and used for coverage of various soft tissue defects of hand which can be regional or distant. Regional forearm flaps are: reverse pedicled radial forearm flap, ulnar artery flap and the posterior interosseous artery flap. Distant flap may be pedicled or free flap. The standard pedicled distant flaps used in the reconstruction of hand are the groin flap and the abdominal flap. [6]

In this study our main goal is to evaluate the comparison between Groin Flap and Distally Based Radial Forearm Flap in Resurfacing of Acute Soft Tissue Injury on the Palmar Surface of Hand.

OBJECTIVE

To evaluate the comparison between Groin Flap and Distally Based Radial Forearm Flap in Resurfacing of Acute Soft Tissue Injury on the Palmar Surface of Hand.

METHODOLOGY

This was a comparative observational study, conducted at Department of Orthopaedic Surgery and Burn and Plastic surgery Sylhet MAG Osmani Medical College Hospital fromJanuary2018toOctober, 2019.

A total of 16patients with acute hand injury or pathology in the palm of hand which maycreate surgical wound, admitted in the study place during the study period were the study population. Where those who had acute wound in palm of hand with exposed tend on, nerve and bones or Degloving hand injury were included in the study. Patient were divided into two group namely Group-A and Group-B. Patient chosen for groin flap were allocated in group-A and for distally based radial forearm flap were in group-B.

A pre-designed questionnaire, designed for the study was used to collect data. The questionnaire was prepared by reviewing literature and consulting with experts. After admission of patient with palmar surface of hand injury, history was taken and clinical examination was done. Selection criteria were applied. The patients were informed in details regarding the procedure and purpose of the study and written consent were obtained. Data were collected on admission and at follow up visits at 1st, 6th, 9th & 12th week postoperatively.

RESULTS

In table-1 shows age distribution of the study group where shows the age of the patients ranged from 16 to 55 years with the mean age was 37.25 (SD±14) years in group A while it was 20 to 55 years and 37 (SD±12) years in group B, which suggest it an age matched study. The following table is given below in detail:

Table-1: Age distribution

Age group	Group-A, %	Group-B, %
<20 years	12.5	12.5
21-30 years	25	37.5
31-40 years	12.5	12.5
41-50 years	25	25
>50 years	25	12.5

In figure-1 shows gender distribution of the study group where It was observed that majority 7(87.5%) patients were male in both group A and group B. The following figure is given below in detail:

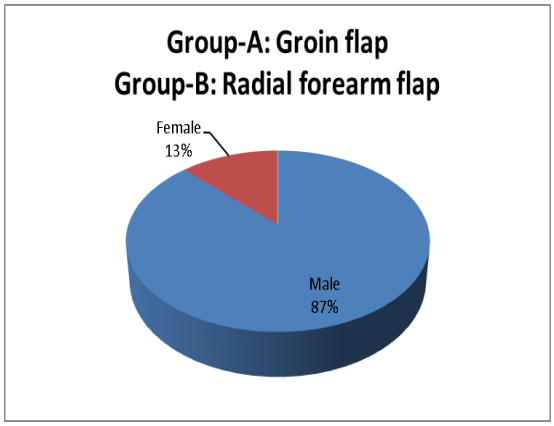


Figure-1: Distribution of the study patients by Gender(n=16)

In table-2 shows distribution of the study patients by duration of operation. It was observed that the mean duration of operation was 113.25 (SD±11) minutes in group A and 95.63 (SD±16) minutes in group B. The difference was statistically significant between two groups as $p<0.05$ (obtained by unpaired t-test; t=0.023). Operative time in groin flap was longer compared to radial forearm flap. The following table is given below in detail:

Table-2: Distribution of the study patients by duration of operation (n=16)

Durationof operation (minutes)	GroupA (n=8)	GroupB(n=8) p
≤120	6 (75.00%)	8 (100.00%)
>120	2 (25.00%)	0 (0.00%)
Mean(±SD) Range(min-max)	113.25 (±10.7) 100 - 130	95.63 (±16.35) 80-120

Group A: Groin Flap; GroupB: Radial Forearm Flap

In table-3 shows distribution of the study patients by hospital stay. It was observed that in almost two third 5(62.5%) of the patient post-operative hospital stay was 25 days in group A and 7 days in group B. The mean (±SD) hospital stay was 26.88 (±2.6) days in group A and 8.13 (±1.6) days in group B. The difference was statistically significant between two groups ($p<0.05$, obtained by unpaired t-test). Patients who underwent groin flap had to stay longer in hospital. The following table is given below in detail:

Table-3: Distribution of the study patients by post-operative hospital stay (n=16)

Post-operativestay (days)	Group A(n=8)	GroupB(n=8) p
7	0 (0. 00%)	5 (62.00%)
10	0 (0. 00%)	3 (37.50%)
25	5 (62.50%)	0 (0. 00%)
30	3 (37.50%)	0 (0. 00%)
Mean(±SD)	26.88	8.13 (±1.55)

Range(min-max)	(±2.59) 25-30	0.001 7-10

Group A: Groin Flap; Group B: Radial Forearm Flap

In figure-2 shows distribution of the study patients by complications. A Single number of patients of group-A experienced donor site pain, haematoma and marginal necrosis, while none of group B developed such complications. The following figure is given below in detail:

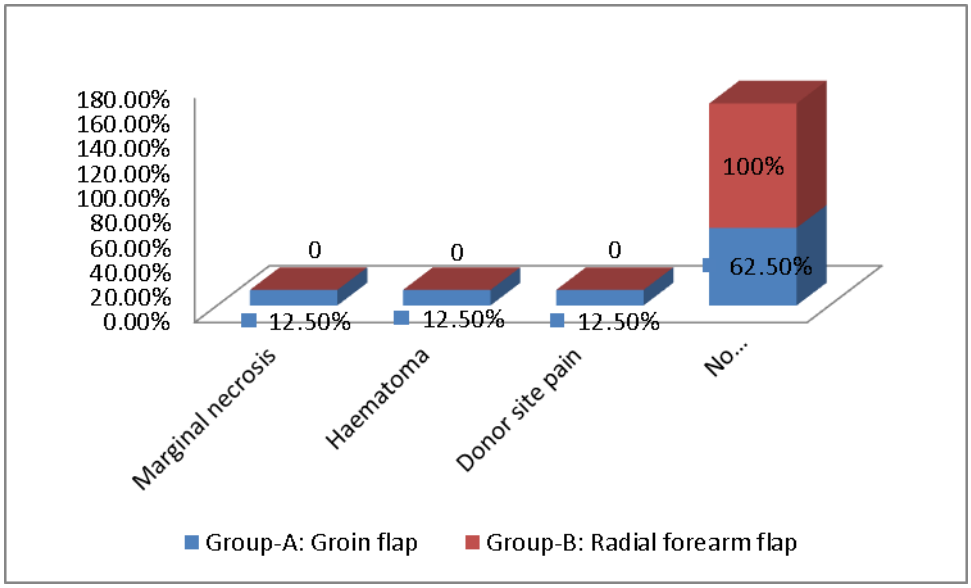


Figure-2: Distribution of the study patients by post-operative complications (n=16), estimated on 7th POD

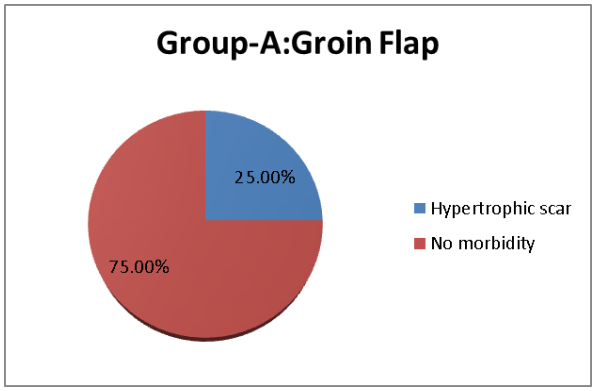
Table-4 shows distribution of the study patients by shoulder joint stiffness in different follow up between two groups. A single patient of group A experienced shoulder joint stiffness in follow-up assessment at 6th & 9th week, which disappeared at final follow-up; while none of group B patient complaints of joint stiffness in follow-up period. The following table is given below in detail:

Table-4: Distribution of the study patients by shoulder joint stiffness indifferent follow up between two groups (n=16)

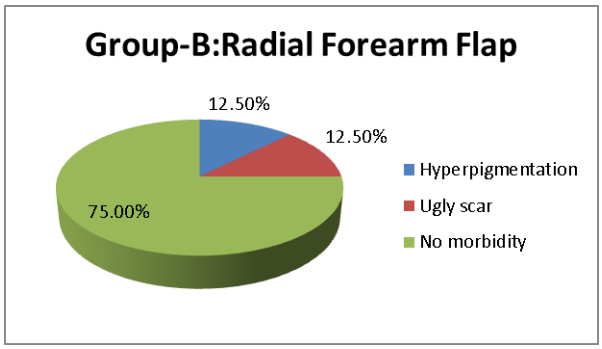
Shoulder joint stiffness	Group A (n=8)	Group B (n=8)
At6th week		
Absent	7 (87.50%)	8 (100%)
Present	1 (12.50%)	0 (0.00%)

At9thweek Excellent		
Absent	7 (87.50%)	8 (100%)
Present	1 (12.50%)	0 (0.00%)
At12thweek		
Absent	8 (100%)	8 (100%)
Present	0 (0.00%)	0 (0.00%

Figure-3 shows distribution of the study patients by donor site morbidity. It was observed that one fourth (25%) patient developed hypertrophic scar in group A and a single number (12.5%) of patient developed hyperpigmentation or ugly scar in group B. The following figure is given below in detail:



(i)



(ii)

Figure-3: Distribution of the study patients by Donor site morbidity in final follow up (At 12th weeks); (i) in group A & (ii) in group

DISCUSSION

It was observed that the age of the patients ranged from 16 to 55 years with the mean age was 37.25 (SD±14) years in group A while it was 20 to 55 years and 37 (SD±12) years in group B, which suggest it an age matched study. One study found age range of 15-50 years, and other study found the mean age of 33 years in Groin flap treated patients. Whereas one study reported average age of 36.07 years (24-62yrs) in distally based radial forearm flap treated patients. It is clear from this study that flap coverage may be done in wide age range.[6-7]

In our study it was observed that majority 7(87.5%) patients were male in both group A and group B.So, it is a sex matched study. One study found male 94.11% and female 5.89% in patients treated by Groin flap.[8] Whereas other study reported male to female ratio of 9:3 indistally based radial fore arm flap treated patients. This study reveals that hand injury requiring flap coverage is more prevalent in male patient. It was probably due to male are engaged in outdoor activities more than female.[9]

In this study it was observed that the mean duration of operation was 113.25 (SD±11) minutes in Groin flap treated group and 95.63 (SD±16) minutes in distallybased radial forearm flap treated group. The difference was statistically significant ($p<0.05$) between two groups. Operative time in groin flap was longer compared to radial forearm flap. One report showed Operative time was 227.4±89.0 in the pedicled groin flap treated patients ($p=0.14$), this long duration was possibly due to large flap size of their patient compared to our study.[10]Other study recorded the operative time 68±3.4 minutes in distally based radial forearm flap treated group. [11]Therefore it may be

concluded from this study that distally based radial forearm flap needs less operative time compared to groin flap.

In this study it was observed that the mean hospital stay was 26.88 (SD±2.6) days in Groin flap treated group and 8.13 (SD±1.6) days in radial forearm flap treated group. The difference was statistically significant ($p<0.05$) between two groups. Patients who underwent groin flap had to stay longer in hospital. One study founded mean hospital stay was 29 ± 13 days in the patients treated with pedicled groin flap.[11]Other study showed that the length of hospital stay was 8.8±0.8 daysin distally based radial forearm flap treated patients.[12]

In our study a single number of patients of Groin flap treated group experienced donor sitepain, haematoma and marginal necrosis, while none of radial forearm flap treated group developed such complications. In the patients treated with pedicledgroin flap one study showed 1 patient developed flap necrosis (20%) &other study found local complications such as partial flap necrosis, infection, and seroma, developed in 11 patients (25%). [13-14]

In our study a single patient of group A experienced shoulder joint stiffness in follow-up assessment at 6th & 9th week, which disappeared at final follow-up; while none of group B patient complaints of joint stiffness in follow-up period. One study found decreased shoulder joint movement in four (17%) patient treated by groin flap. [15]Whereas in radial forearm treated patients one study found One(6.66%) woman, aged 67 years, had shoulder stiffness at review 3 months post-operatively, while another (6.66%), aged 50 years, still had a reduced range of shoulder abduction 16 months after operation. Better result of our study may be due to a smaller number of elderly patients.[16]

This study revealed that one fourth (25%) patient developed hypertrophic scar in groin flap treated group and a single number (12.5%) of patient developed hyperpigmentation and ugly scar in radial forearm flap group. One study found loss of sensibility around the groin scar in 8(33%) and pain in the groin area in 10 (41%) groin flap treated patients.[17]

CONCLUSION

This study reveals that mean operative time and mean hospital stay was shorter in radial forearm flap compared to groin flap and the difference was statistically significant ($p<0.05$).It is concluded that radial forearm flap has better outcome than groin flap.

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