

Kutler's V-Y Advancement Flap versus Atasoy's Triangular Advancement Flap Technique in Fingertip Injuries with Exposed Bone

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ABSTRACT

Objective: To compare the results of Kutler V-Y flap and Atasoy's triangular advancement flap technique in fingertip injuries with exposed bone.

Methodology: Fifty patients were included in this study. The patients were divided into two groups, I and II. Each group includes 25 patients. The patients in group I & II were managed with V-Y advancement flap and Atasoy triangular advancement flap techniques respectively. At the end of six and twenty four weeks assessment for cosmetic appearance, wound healing and joint stiffness was done.

Results: The mean age of the patients was 30 ± 15 years ranging from 12-53 years. Cosmetic outcome was good in 23(92 %) patients in group I and 18 (72%) in group II. There is a statistical difference in the cosmetic appearance between the two groups. The physiology of all fingers was perfect and no joint stiffness was observed in any finger.

Conclusion: Kutler's V-Y advancement flap is better treatment option as compared to Atasoy triangulation flap in terms of cosmetic outcomes.

Keywords: *Atasoy triangular advancement flap technique. Kutler's V-Y advancement flap. Fingertip injuries.*

INTRODUCTION

The human hand is more disposed to domestic and industrial traumas.¹ Among these traumas, the most commonly encountered hand injury is probably fingertip (FT) injuries, which is the part of the finger distal to the plane of major dorsal and volar skin creases. It is highly specific structure.²⁻⁴ In industrial as well as domestic setting the most common injury is the FT trauma. In upper limbs, traumatic amputation of FT constitutes the largest number of patients. This injury can affect almost every age group patients but is more commonly seen in children and industrial workers.^{5,6}

The restoration of digital length and function of the affected finger is of major concern for almost all patients suffering from FT injury. Wider on the spectrum of trauma affecting this part of digit includes crushing, degloving, avulsions, laceration, amputation and tendon rupture.⁷ Based on the integrity of overlying skin this injury can be widely categorized as open or close depending on the integrity of overlying skin. Intact skin and the hematoma are not exposed to the external environment in closed injuries. These injuries can involve the bone or soft tissues also.⁷

The irreversible ischemia leading to gangrene and eventually amputation of the distal portion is a

byproduct for high pressure injection injuries (a subgroup) of FT injuries. For the management of FT injuries, different treatment options are available. They can be conservative or operative.^{6,7} The goal of treatment is to achieve a painless tip with maximum functions and cosmetic results along with intact sensations. In case of complex treatment procedures like VY Plasty and Atasoy triangular, experienced surgeons are required, as they are not routine procedures. This study was carried out to compare the results of Kutler V-Y flap and Atasoy triangular advancement flap.

METHODOLOGY

It was a cross-sectional study conducted at Department of Orthopedics, Sharif Medical and Dental College, Sharif Medical City Hospital, Lahore. The study was completed in six months after approval from hospital ethics committee. Fifty male patients of more than 18 years of age with FT injuries with exposed bone were included in this study. The patients with a history of diabetes, peripheral neuropathy and injuries with exposed bone were excluded from this study. Informed consent was taken from the patients. Patients detailed medical history mentioning the exact mode of injury, physical examination and radiographs were taken and maintained. The patients were given analgesics, tetanus prophylaxis and antibiotics. The wound was thoroughly irrigated with 0.9% normal saline and further management was planned according to the patient groups. All the patients were divided into two groups as per accordance with the mode of treatment they received. Group I included 25 patients which were managed with Kutlers V-Y flap. Group II included 25 patients managed by Atasoy triangular advancement

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flap technique. Proper follow-up was maintained for next six weeks. By the end of the sixth week cosmetic appearance, wound healing and joint stiffness were assessed.

STATISTICAL ANALYSIS

The collected data was analyzed by using SPSS version 20. The mean & standard deviation was calculated by descriptive statistical techniques. Furthermore, the frequency distributions and percentages were calculated for cosmetic appearance, wound healing and joint stiffness. A p-value less than 0.05 was considered statistically significant.

RESULTS

The study included fifty patients. The mean age of the patients was 30 ± 15 years ranging from 12-53 years. Out of fifty patients, 40 (80%) were male and 10 (20%)

controversy exists for the best treatment of fingertip amputations.² The goal of treatment in fingertip injuries is the preservation of useful sensation, maximizing functional length, preventing joint contractures, providing the satisfactory appearance and avoiding donor disfigurement and functional loss. A careful individualization is required for treatment and management of FT injuries. A minimal tissue loss can be closed by debridement. The healing of wound through secondary intentions or open technique is relevant to small volarly directed FT wounds without bone exposure.⁷⁻⁸

Cases with wound greater than 1cm take longer healing time. The V-Y plasty technique preserves the normal contours of the dorsal finger, helps to pad the fingertip and preserves normal sensation.^{9,10}

The original technique, which used a double lateral V-Y pedicle advancement to close a fingertip amputation,

Table 1: Comparison of study groups on the basis of the treatment

	Group I	Group II
Average healing time	12 Days	15 days
Cold intolerance	9 (36%)	7 (28%)
Hypersensitivity	8 (32%)	11 (44%)
Good Cosmetic appearance	23 (92%)	18 (72%)
Wound healing	24 (96%)	22 (88%)
Joint stiffness	0	0

were female. There were total 62 FT injuries in all patients; this also included six patients with two figure tips injuries. The FT injuries are more commonly reported in industrial settings (66%) whereas 34% injuries occurred due to domestic injuries. Kutler's V-Y advancement flap technique applied to treat 25 patients, and the remaining 25 FT injured patients were treated using Atasoy triangular advancement flap technique. Cosmetic outcome was good in 23(92 %) patients in group I and 18 (72%) in group II. The physiology of all fingers was perfect and no joint stiffness was observed in any finger. A summary of FT injury and treatment statistics were tabulated in Table 1.

DISCUSSION

In domestic and industrial trauma, fingertip injury is more susceptible and common. An exciting reconstructive problem for the surgeon is fingertip resurfacing. As the treatment varies widely, an ongoing

has been largely replaced by the single V-Y plasty technique.¹¹ Use of loupe magnification may assist the performance of this technique. Kutler's V-Y advancement flap technique is more adaptable and better in the management of FT injuries without bone exposure. These findings are in line with our study results where the healing time by this technique is almost equal than the Atasoy triangular advancement flap technique. However, few experts consider the second technique as more adaptable and easy. The results of our study clearly indicate the differences in both techniques. These differences are statistically significant also. Similar results were found in other studies.^{10,12}

The most common postoperative complication is cold intolerance and hypersensitivity. A tension closure of wound is attributable to the marginal necrosis. A cold intolerance was observed high in first group patients treated with V-Y advancement flap technique

management. Hypersensitivity found very low in group I patients as compared to group II. Other studies revealed that hypersensitivity and cold intolerance occurs in approximately 50% patients regardless of the modality of treatment.^{8,13}

The critical evaluation of fingertip defect and various techniques is necessary to choose the best possible reconstructive option from esthetic and functional recovery. It is important that as surgeons we are aware of the multitude of possible surgical options for soft tissue reconstruction. According to our results, the healing time and cosmetic appearance were good in Kutler's V-Y technique as compared to Atasoy's triangular advancement flap technique. Another study also revealed similar results which showed that the advantages of the V-Y advancement flap are the preservation of sensation of the finger, good cosmetic appearance and soft tissue coverage.¹⁴ Some other studies found that the post-operative complications like joint stiffness and cosmetic outcomes prevail similar in both operative techniques.^{8,13}

CONCLUSION

Kutler's Y-V advancement flap is better treatment option as compared to Atasoy triangulation flap in terms of cosmetic outcomes.

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