Journal of Pakistan Association of Dermatologists.2023;**33(2)**:718-724.

Case Report

Flap technique for cutaneus lesion in the face area: A case series

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Abstract Surgical defects that are difficult to close using simple closing techniques, require a more complex variety of surgical procedures, either with flaps or skin grafts. Skin flaps are performed when the primary closure of the wound does not allow the skin to be covered, especially if the defect is too large, stretched too much, or primary closure will cause poor aesthetic results. We reported two cases: the first case is a 23-year-old male who presented with a reddish lump above his left lip with diagnosis of foreign body granuloma folliculitis and a 36-year-old female who presented with a reddish lump on her left temple with diagnosis of capillary hemangioma. We performed advancement flap reconstruction technique for the first case, whereas situational modification resembling Z-plasty was used for the second case. On day-10 of follow-up after surgery, the excision areas of both patients showed complete recovery with minimal scarring. Preoperative planning and surgical technique on skin defects closure, especially on facial skin defects involving a large area, is crucial to produce optimal results.

Key words
Facial lesion; Advancement flap; Modified Z plasty.

Introduction

Some surgical excision procedures in dermatology aim to relieve or remove skin lesion with a certain margin, which may leave visible scar with minimal complications. A clinician needs to plan a correct excision procedure to attain consistent aesthetic results. Although excision procedure and wound closure are a combination of art and science, there are a number of principles to keep in mind and plan.[1]

The key elements of dermatologic surgery procedures are patient preparation, risk control management and prevention, effective local anesthesia, clean and sterile techniques, procedural design and incision techniques in wound defect reconstruction.[1] There are three wound management approaches. The left-open approach requires the wound to be left open deliberately and lets the secondary healing process mechanism to take place. Suturing the wound is meant to accelerate the primary healing process, either with skin flap or graft procedures. The determination of the defects coverage procedure should be based on the patient's general condition, the defect characteristics, and patient's inclination and expectation.[2]

Open wounds, especially in the facial area, often require complex closure techniques for optimal results. The approach to wound closure is complex depending on the nature of the wound, including the location and size of the defect, functional outcome after closure, the patient's medical comorbidities, structures surrounding the defect, and whether the defect is secondary

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to malignancy or trauma. The goals of wound management are optimal esthetic results, maintenance of function, and patient satisfaction.[2]

When the wound defect is difficult to cover using simple closure techniques, a complex variety of surgical procedure is required, with either skin flap or graft. Skin flaps are performed when wound primary closure is not possible to cover the skin damage, particularly if the defect is too large, too stretched or if primary closure will lead to poor aesthetic results.[4] This case report aims to outline the procedures and techniques of advancement flap and modified Z-plasty reconstruction on various lesions, thereby expanding the clinician's insight in determining the management of the patient.

Case Presentation

Case 1 A 23-year-old male college student came to the Department of Dermatology and Venereology Dr. Sardjito General Hospital, and complained of wanting the removal of the lump above his left lip. It started from 1 month prior as a self-manipulated pimple that was pinched. It then squirted blood and a white grain that looked like rice. Furthermore, it never got any medicine nor was checked out by a clinician. The lump got bigger with a tingling feeling but he denied feeling any pain. The patient wanted to remove the lump to improve his appearance. He denied any previous occurrence on himself or his family.

The patient physical examination showed a good general condition, a compos mentis awareness, and normal vital signs range. The dermatovenereology status showed erythematous papules in one-third of the superolateral sinistra labia superior with 0.5cm diameter, smooth surface, solitary supple to touch, and immobile. Complete blood count, bleeding time, and blood clotting marker were within the normal range. Excision planned on the patient was advancement flap technique. This technique aimed to remove the lump lesion and enhance the facial aesthetic function.

Case 2 A 36-year-old female medical personnel came to the Department of Dermatology and Venereology Dr. Sardjito General Hospital wanting to remove a lump on her left temple. It started as a reddish flat spot from a month before, with no itchiness or pain. The lump got enlarged, more prominent, and had apparent reddish color, with recurring itchiness. She denied any pain or easy bleeding. The patient had never consulted anywhere or manipulated the lump herself.

The patient physical examination showed a good general condition, a compos mentis awareness, and normal vital range. The dermatovenereology status showed erythematous papulearound 0.5 cm in size, smooth surface, Complete blood count, bleeding time, and blood clotting marker were within the normal range. Excision planned on the patient was the modified Z-plasty technique. This technique aimed to remove the lump and enhance the facial aesthetic function.

Operation Techniques

The patient was laid in the supine position on the operation table with the face facing upward (case 1) and leaning right (case 2). The lesion was measured with a ruler and in the surrounding area; an Advancement flap and modified Z plasty transposition flap reconstruction was designed using a non-sterile marker. The operating area was cleaned three times with povidone iodine 10%. The face was then covered with a sterile holed surgical towel, followed by one-time sterilization using alcohol 70% on the operating site. The flap design was then redrawn using a sterile gentian violet. The

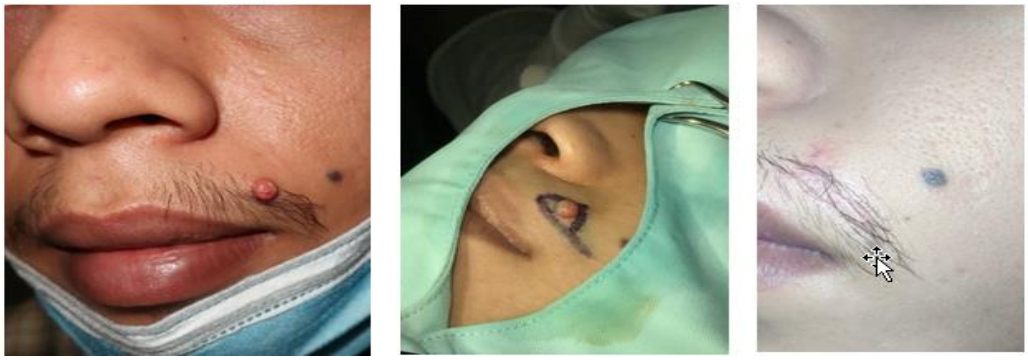

Figure 1 Prior lesion, Advancement flap flap design, and 1-month after (Case 1).

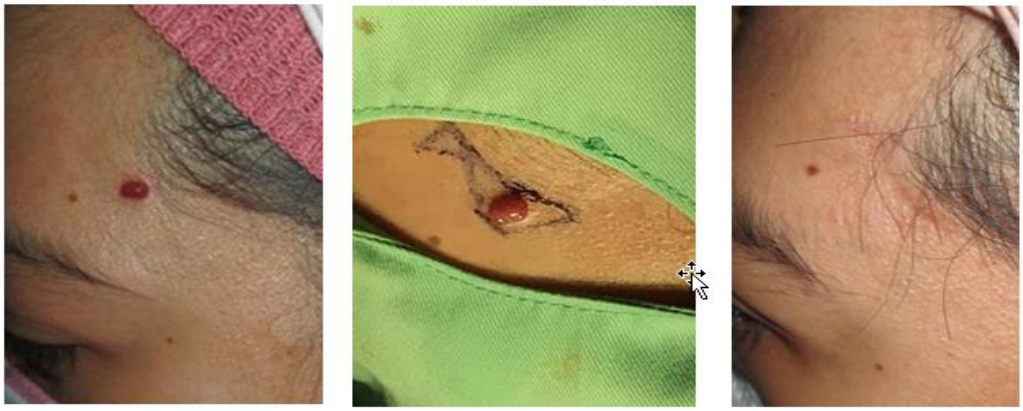

Figure 2 Prior lesion, situational modification resembling Z-plasty design, and 1-month after (Case 2).

infiltration anesthetic was done with tumescent lidocaine 2% and epinephrine 1:250.000 injection. When the anesthetic effect was reached, an incision with scalpel number 15 was done until the subcutis layer as the predetermined pattern. The flap was then lifted and forming a primary and secondary defect that has been designed before according to the advancement flap and modified Z plasty transposition flap. In the case 1, the flap pattern was designed by positioning the primary defect in the form of a triangle in which the inferior side was a flat surface, using Burow's triangle incision pattern where both edges were used for the defect coverage. In the case 2, the flap pattern conforms the primary defect into a triangle at the inferior corner of the triangle.

The procedure began by attaching both side of the defect triangle with simple interrupted suture using a 4.0 ethilon thread. After the triangular defect attachment, anchoring sutures were placed in the flap area to prevent dead space. Subsequent to the suturing, the excision area is cleaned with a sterile gauze moistened with normal saline 0.9% solution, then smeared with 0.1% gentamicin ointment and covered with sterile gauze. Following the procedure, the patients were given 100 mg cefixime and 500 mg tranexamic acid twice daily. The patients were asked to keep the wound sterile (dry) and come back the next day for a bleeding control check-up. The operated tissues were put into a 10% formalin that contained histopot for a histopathological test.

The patients in these two cases came for a check-up 7 days after surgery. The excision area appearance was smooth with several minimal hemorrhagic crusts. There was no edema, active bleeding, dehiscence, or pus. The suture removal was then done to some part of the excision area,

leaving the anchoring suture intact. The excision area was then covered with 0.1% gentamicin ointment, and sterile gauze. The patients were asked to come back in 3 days. On day-10 after surgery, the excision area's skin was intact, with no edema, no active bleeding, dehiscence, or pus; therefore, all the sutures were removed **(Figure 1,2)**. The patient's histopathological test (case 1) showed no abnormality on the epidermis; however, the dermis showed many lobular granulomas around the hair follicles, which consisted of many foreign-type multinucleated giant cells, epithelioid histiocytes, macrophages and lymphocytes, and dilated blood vessels. There was no sign of malignancies. The biopsy from the left upper lips' region showed that the histopathological profile was consistent with foreign body granuloma folliculitis. The patient's histopathological test (case 2) showed no abnormality on the epidermis. However, the dermis showed notable proliferation and dilated blood vessels with erythrocytes in some lumen, monomorphous endothelial cells, adequate fine chromatin cytoplasm, and enlarged stroma filled with lymphocytes. There was no sign of malignancies. The biopsy from the right frontal region indicated a compatible histopathological profile for capillary hemangioma. .

Discussion

Every wound healing process will always leave scarring. The scar can be noticeable if it looks pronounced in contrast to surrounding tissue in terms of contour, color, and texture. Surgical procedures with proper technical planning can minimalize the scarring. Most lesions can be excised with an elliptical pattern by noticing the size and direction of the long axis. Practically, the elliptical length should be 3-4 times wider than the width in order to cover the defect without "dog-ears". Incision techniques can be performed on natural contour line to conceal the scar or often known as relaxed skin tension lines (RSTL).[2]

Defect coverage on the facial area, for instance around the lips area, nasal alae, nose, or eyebrow tips, requires more consideration than others. Some of the considerations in these areas are skin-flap techniques options.

Some important aspectss in designing the facial area flap are: 1) the flap base should be one-third of the length; 2) exert tissue from adjacent facial contour lines, such as nasolabial folds, preauricular area, or glabella; 3) if possible, avoid placing scar on homogeneous areas such as cheek or mentum; 4) pay attention to the facial areas planes, for example a cheek flap placed on the nose would eliminate the natural line where the nose meets the cheek; 5) heed the adequate blood supply for the flap so there is no death tissue; 6) flap rotation often causes "dog-ear," but will naturally flatten over time; if it fails, a revision procedure is needed in a few months; 7) design the flap as close as possible with the defect size and situated the flap so the donor area can cover the defect. Sutures in the skin surface should not be maintained for too long, and generally it would only require 5 to 7 days on the face and 10 to 14 days on the truncus and extremities. It would cause inflammation if maintained for too long, because epidermal cells will grow along the sutures line and infection could come into the scar.[6] The facial area sutures on these two cases were taken out one week after the procedure.

Most of the time, facial lesions need a more complicated surgical technique in order to cover the defect optimally. Some considerations for the defect coverage approach are location and size, patient comorbidity, the lesion surrounding structure, and type of the lesion whether it was a secondary defect from trauma or malignancies. Proper planning of facial defect reconstruction is

very crucial concerning potential scar-tissue visibility and functional deficit possibility.[3]

The flap designs, especially in the facial area, aim to reconstruct the scar to make them appear faint. Most flap classification systems have been designed to assist physician-colleague communication. However, the most important consideration is to communicate to the patient about the action to be taken. Classically, flaps are classified by type of vascular supply, composition, transfer method (donor site), and design.[4] One of the vascular flap are axial pattern flap would adhere based on the arterial supply. Besides the small arterioles and capillaries of the sub-dermal vascular plexus where superficial fat can find would supply the random pattern flap, the most commonly performed flap in the dermatology surgery field. One of the axial pattern flaps is a local flap that transference of a full-thickness portion of skin to the subcutaneous tissue from the adjacent donor site to the surgical defect. The flap was taken when a simple primary defect coverage is impossible to be done because the defect is too large, too stretched, or will leave unwanted scars cosmetically. The flap would maintain a blood supply through a vascular pedicle connected to the donor area. The flap can be classified based on the vascular supply.[3]

Based on the transfer method, it is classified into local flaps and distant flaps. The local flap consists of tissue that had moved adjacent to the area of the defect. The distant flap consists of tissue that has moved away from the defects (recipient location). The local flap can be divided into advancement flap, rotation flap, transposition flap and interpolation flap.[3]

The advancement flap is a linear transfer of skin tissue to the adjacent defect area, flap with a direct forward/ forward movement direction along the linear axis to close the defect without any lateral movement. Theoretically, the length to width ratio for this type of flap are 1:1 or 2:1 even though these guidelines are not absolute.[5] This flap commonly forms "dog ears", so pre-reconstruction planning is necessary. This type of flap frequently covers scars by placing an incision line along the natural crease. Commonly, advancement flaps can be performed on the upper and lower lips, sidewalls of the nose, cheeks, infraorbital, lower eyelids, forehead, temples, and preauricular. This flap technique can actually be performed in all healthy patient conditions and defects due to tumors or previous infections. The most common complications are infection and bleeding with hematoma.[6] This classical pattern flap consist of unilateral flap/single pedicle (U-plasty, L-plasty), bilateral flap/bipedicle (T-plasty, H-plasty), advancement flap flap, V to Y flap, and east-west flap.[4] The lesions in case 1 and 2 were in the facial area, so the incision was following the natural contour lines of the face, namely the lip crease and the hairline area.

The rotation flap means a semicircular flap that involves defect coverage by rotating the adjacent skin tissue on an axis line following an arc line. Rotation flaps use adjacent tissue rotated in an arc to close a defect. Classically, a rotation flap has a design that can mobilize along an arc of 30-degree or less with a distance of two to three times the defect diameter and with an arc about four to five times the defect width. The area of the defect is visualized as a triangle with the base as the shortest side. This flap is usually used to cover relatively large defects such as the cheeks, forehead, or scalp. This flap has more tension than other flaps, so it often causes ischemia or tissue necrosis. The classic rotation flap pattern consists of O to Z and A to C.[4]

The transposition flap is a random pattern flap that borrows skin laxity from an adjacent area in order to fill a defect in an area with little or no

skin laxity. This flap is a design that will form a second defect. The flap is taken from the donor site and rotated over the defect and the donor area is then covered with part of the design. These types of flaps are rhombic, bilobed and Z-plasty.[4] Transposition flap can be perform when the surgical defect evokes malfunction risk and/or a poor aesthetic result if corrected with simple coverage, graft or advancement flap. This type of flap caused less damage than other flaps. The Z-plasty technique can improve the cosmesis of scars on tense areas of the skin. Possible complications of this technique are edema, pain, infection, necrosis, scarring, hematoma, and hypertrophic or keloid scars.[7] Classically, Z-plasty is employed utilizing a 60-degree angle on each part of the triangle resulting in a 90-degree reorientation of the central wound. This flap can be formed with an angle of 30 to 75 degree. A less than 30-degree angle would cause necrosis on the edges, while a wider than 75-degree angle would cause difficulties for rotation and added possibilities of forming "dog ear".[8] This type of flap reconstruction has several design modifications, such as the modification of the Dufourmental and Webster rhombic flaps which are made smaller in rotation angle so that there is less redundancy.[4] Furthermore, the bilobed flap design with a 180-degree rotation arc base has a modification known as the Zitelli flap design which has 90-degree arc base which will produce less stress at the time of defect closure.[9] The lesion on case 2 is in a full tension area namely the right temple. situational modification resembling Z-plasty excision pattern utilizing a wider than 75-degree angle was conducted, the excision pattern accommodates the hairline to minimize apparent scar possibilities.

The interpolation flap is a more complex technique because donor tissue is not immediately adjacent to the recipient defect. This flap is a pedicle (stemmed) flap that traverses or goes under the intact tissue being treated. Interpolation flap is used for a large or deep defect where adjacent local tissue cannot supply donor tissue. This flap is a stem flap that crosses under the tissue being intervened. This type of flap is often associated with or dependent on their axial blood supply.[4] For example, the interpolated flap in the most classic facial area is the closure of the paramedian forehead defect, which gets its blood supply from the supratrochlear artery.[10]

Conclusion

The process of wound closure, especially in the facial area, often requires complex techniques for optimal results. This process very often leaves a scar. The surgeon needs to plan the incision technique as well as the method of wound closure to minimize and disguise the scar. One of the defect closures can be considered with various flap techniques. In these two cases, the surgical techniques on various lesions have been reported. Advancement flap reconstruction technique was used on the first case, whereas situational modification resembling modified Z-plasty was used on the second case. Preoperative planning and surgical technique on skin defects closure, especially on facial skin defects involving a large area, is crucial in order to produce optimal results with minimal scarring.

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