INVITED ARTICLE

DERMATOLOGIC SURGERY - ITS SCOPE AND SOME PRACTICAL ASPECTS

C T Lee

ABSTRACT

Dermatologic surgery is of increasing interest to both dermatologists and other medical practitioners. It includes procedures like biopsy, excisional surgery, laser surgery, electrosurgery, curettage surgery, nail surgery, cryosurgery, minigrafting, sclerotherapy, collagen implant, punch grafting, Moh's micrographic surgery, dermabrasion and hair transplant. This article highlights the important aspects of the various procedures and some of the more important practical points.

Keywords: Dermatologic surgery, methods.

SINGAPORE MED J 1990; Vol 31: 384 - 387

Dermatologic surgery can be defined broadly as any operation that involves mainly the skin and/or its subcutaneous tissues. There is an increasing number of dermatologists who are performing one form or another of dermatosurgical procedures. The types of procedures performed are biopsy, excisional surgery, laser surgery, electrosurgery, curettage surgery, nail surgery, cryosurgey, minigrafting, sclerotherapy, collagen implant, punch grafting, Moh's micrographic surgery, dermabrasion and hair transplant.

There are certain general principles to observe before performing any dermatosurgical procedures. A good knowledge of the basic anatomy especially surface anatomy and anatomy of the head and neck region is essential. One also needs to know the proper techniques of the surgery and the basic technical knowledge of the machines and instruments that one is going to use including the potential hazards and any special precautions to take while using them[1]. There is a list of books on dermatosurgery which should constitute basic reading for those interested in doing dermatosurgical procedures[2-7].

It cannot be overemphasized that the diagnosis is established first either clinically or with the help of histology before any lesion is removed or destroyed. This is especially relevant when one is dealing with the possibility of premalignant and malignant skin tumours. Thorough explanation of the nature and possible complications of the operation and post-operative care should be explained to the patient. A general medical history including diabetes, hypertension and epilepsy should be noted preoperatively. Special enquiry should be made regarding the tendency to hypertrophic scars, keloids and fainting attacks, aspirin ingestion, bleeding tendency and allergy to plasters, local anaesthetics and oral medications. The state of the scars of previous operations, trauma and BCG vaccination should be noted. Patients need to be informed that the tendency to obtain hypertrophic scars or keloids is high on the upper chest, upper back and the upper arms. It is always wise not to guarantee excellent results in response to patient's enquiry in this regard.

Basic rules of sterility should be observed with the wearing of masks, gowns, washing of hands, gloves, cleaning of surgical sites with chlorhexidine for 10 seconds for short operations and cleaning with both chlorhexidine and betadine iodine for longer operations of one hour or more. Most operations on the skin can be performed with the use of a local anaesthetic. 1% lignocaine with adrenaline is generally used in all areas except the toes, fingers, penis, tip of nose and ears where lignocaine without adrenaline is used[8]. As a general rule, not more than 5 mg/kg of 1% lignocaine without adrenaline and not more than 7.5 mg/kg of 1% lignocaine with adrenaline should be employed per patient for any two hour session. In order to reduce the burning sensation of lignocaine, ten millitres of 1% lignocaine can be diluted with one millilitre of 8.4% sodium bicarbonate before injection[9]. Marcaine, a longer acting local anaesthetic, may be employed simultaneously with the lignocaine for prolonged operations lasting more than one to two hours.

Perhaps the most common procedure which

National Skin Centre
1 Mandalay Road
Singapore 1130

C T Lee, MBBS, M Med, MRCP, Dip Derm, Dip Ven, AM
Consultant

dermatologists perform is biopsy which can be a punch biopsy, a shave biopsy, an incisional biopsy or an excisional biopsy. 4mm punches are commonly employed for punch biopsy. It is essential to stretch the lesion perpendicular to the skin tension line before punching in order to convert the rounded shape of the punch to an oval shape orientated along the skin tension line for easier primary closure. Shave biopsies are suitable for lesions confined to the epidermis. In order to perform a good shave biopsy, it is useful to raise the lesion with the local anaesthetic before the shave. Haemostasis is best achieved by pressure alone or aluminum chloride for shave biopsy as the use of Monsel's solution (ferric sulphate) will leave pigmentation at the site of the biopsy, and the use of electrodessication to achieve haemostasis will lead to unnecessary scarring. Incisional biopsy is done for lesions which are too large to be removed totally. The planning of the excisional biopsy or excision is important. The excision should be along the normal skin tension lines. To avoid dog-ears, the length of the incision should be at least three times the width even though in certain areas where the skin is very laxed, the ratio can be slightly reduced. Undermining with a blunt scissor is very important to relieve tension of the wound edges and generally the amount of undermining should equal to half the length of the incision on all sides. Interrupted subcutaneous and dermal stitches are very essential in the primary repair of the wound after excision to prevent spreading scars. Running cuticular stitches with prolene sutures are used to avoid caterpillar-like suture marks. As a general guideline, stitches are removed on the fifth post-operative day for lesions on the face and neck, the tenth post-operative day for lesions on the trunk, and the twelth day for lesions on the limbs.

Ever since its development, laser has found clinical application in many branches of medicine including dermatology[10]. CO2 laser is the workhorse of laser surgery. However, it must be realised that CO2 laser is not the best treatment for all skin lesions which need to be destroyed or removed. It cannot be overemphasized again that diagnosis must be established first before destruction by the CO2 laser. Only certain skin conditions are currently more advantageously treated with the CO2 laser[11]. These include resistant verruca vulgaris, periungal wart, syringoma, tattoo, keloid, trichoepithelioma, xanthelasma, lymphangioma circumscriptum, adenoma sebaceum, rhinophyma, angiokeratoma, actinic cheilitis and bowenoid papulosis.

Before using the CO2 laser machine, it is important to know the machine well including its potential hazards and precautions in operating the laser machine. Appropriate eyeshields must be worn by all personnel including the patient in the theatre. No flammable gases or liquids should be in the theatre. The eyes of the patient should be protected by wet gauzes and goggles or corneal eye-shields when operating near the eyes. It is a good habit to place the CO2 laser machine in the standby mode when it is not in use during the procedure. With the CO2 laser, vaporisation can only be achieved if the irradiance exceeds 150 watts per square centimetre. In order to cut or excise with the CO2 laser, the irradiance must exceed 50,000 watts per square centimetre. The drapes should be protected with wet gauzes to prevent fires which have been reported to burn patients and surgeons.

Sunction system should be used to suck out laser plumes which contains wart virus particles and potentially dangerous and carcinogenic gases[12]. The use of operating magnification loops with a magnification of 3.6-4.5x is necessary to ensure complete eradication of some lesions. On the face as well as in the periorbital region, an operating microscope is essential to complement the great precision of the CO2 laser in achieving maximal preservation of normal tissue while at the same time avoiding destroying important structures such as the lacrimal ducts and important nerves. As far as possible, the CO2 laser should be used in the super-pulse mode to achieve superb control of vaporisation or cutting without significant peripheral heating[13]. Argon laser is now reserved for hypertrophied port-wine stains. Portwine stains which are flat are best treated with the flash-pumped tunable dye-laser which can also be used to treat telangiectasias and angiomas without leaving any scars. The only problem with the flash-pumped dye laser is that it is very expensive.

Electrosurgery refers to the use of electrical current to destroy tissue. Most of the modern electrosurgical equipments are of the high frequency type. There are many types of electrosurgery of which electrodessication is the most common. Electrodessication refers to the use of electric current to dessicate(dry) the lesion, the electrode remaining 'cold' throughout the procedure. This is in contrast to electrocautery which refers to the destruction of lesion by employing an electrode which has been heated by the electric current. Conditions which can be treated with electrosurgery with good results include verruca vulgaris, persistent condylomata acuminatum, molluscum cantagiosum, skin tag, plane wart, bowen's disease and telangiectasia. Pedunculated skin tags can be rapidly and easily treated with a loop electrode. The use of the curette in conjunction with the electrosurgery is often helpful to ensure complete removal of the lesions.

In the use of electrosurgery, it is good practice to start with the lowest setting of the current and increase until the desired result is seen when one is using the machine for the first few times. In the treatment of molluscum contagiosum, the mollusum bodies can be easily curetted after the overlying epidermis is lightly dessicated. In treating telangiectasias, compression dressing in the form of multiple layers of gauzes and crepe bandages is applied whenever possible to prevent recanalisation and ensure better result. It is important not to use electrosurgery in patients who are on demand pacemakers.

Nail surgery[14] includes nail biopsy, nail avulsion and nail maxtrixectomy. A knowledge of nail anatomy is essential in nail surgery. In performing nail surgery, the local anaesthetic should not contain epinephrine and the volume used per finger should not exceed 10 ml per finger. Ring block is commonly employed and it is necessary to wait for at least 10-15 minutes for maximum anaesthesia. Moreover, ring block may not be complete in some cases and it may be necessary to give topical anaesthesia. The tourniquet which is applied to prevent bleeding should be released intermittently every 15 minutes. Oozing of blood is common after any nail surgery which can be controlled by the use of pressure bandage like Coban which should however not be to too tight to compromise blood flow. Many cases of nail dystrophies

need nail biopsy for proper diagnosis and management. Biopsy of the nail bed or nail matrix can be accomplished by 3 mm punches without the need for primary closure. Combined nail bed and nail matrix biopsy can be done by performing a longitudinal 3 mm wide elliptical excision followed by undermining and primary closure.

Ingrown toenail is a common problem. Partial avulsion of the nail plate can be done under digital ring block followed by destruction of the involved matrix with electrosurgery, laser or 88% phenol and removal of the hypertrophied lateral nail wall to prevent recurrence. Partial or total avulsion of nail plates together with partial or total matrixectomy can also be done for recalcitrant onychomycosis, onychogryphosis, disabling psoriatic nails and disabling dystrophic nails. Avulsion can easily be done after digital ring block with a straight blunt-ended haemostat which is used to separate the nail bed from the nail plate which can then be pulled away easily. It is important not to leave any fragment of nail plate proximally.

Autologous minigrafting[15] is suitable for non-progressive segmental and focal vitiligo which does not respond to topical PUVA or steroid therapy. 1.2mm punch-harvested minigrafts are obtained from the gluteal area and transplanted to similar-sized recipient sites placed 4-5mm apart. Micropore adhesive tape is then applied for 15 days. Generally a test area is done two months before the procedure. Patients need to be told that even though repigmentation occurs, the area may assume a cobbled-stone appearance due to different thickness of the donor and recipient sites.

Cryosurgery [16] refers to the destruction of tissue by the application of extreme cold. The most commonly used cryogen is liquid notrogen which can achieve a temperature of -196° Centigrade. Both the cotton swab and spray techniques are commonly used. With much experience, many skin conditions can be treated successfully with cryosurgery. The biggest problem with cryosurgery is that it is difficult to be precise in the freezing without the use of thermocouples and impedance monitors which are not routinely used in cryosurgery.

Punch grafting of acne scars especially the ice-picked scars using grafts from the postauricular regions followed by electrodessication, dermabrasion or laser-abrasion may improve the cosmetic appearance of the patients.

There are many types of collagen implants which include Zyderm I, Zyderm II, Zyplast and Fibrel implants [17]. The main indications for collagen implants are scars due to acne, chickenpox, trauma or surgery, and facial wrinkles. Currently, both Zyderm II or Zyplast can be used to treat scars but the former is used for finer wrinkles and the latter for coarser wrinkles. 50% overcorrection is needed for Zyderm II while only slight overcorrection is necessary for Zyplast. Two intradermal skin tests one month apart need to be done before the actual injection. It is important to inject intradermally and only scars which are soft and distensible can benefit from the injections.

Dermabrasion refers to the creation of a superficial injury to the skin from scraping or rubbing. It is very widely used in the west to treat sun-related facial wrinkles and post-acne scarring with good results. In our local setting, however, the problem of post-abrasion hyperpigmentation is very real and very frequent, occurring in 96% of the patients so treated[18]. The problem of hypopigmentation is also serious. Until such problems can be resolved, it is best not to treat pigmented races with dermabrasion.

Moh's micrographic surgery[19] is the most common operation performed by the dermatologic surgeons in the west, forming about 50% or more of the surgeon's workload. The main indication is large basal cell carcinoma and squamous cell carcinoma in areas which are difficult to cure such as around the orifices on the face. It involves layer-by-layer excision of the tissue of the cancerous area under local anaesthesia with microscopic examination of the entire underside of each exposed layer by the use of frozen section. The procedure is repeated until the last layer is completely free of the tumour. The procedure needs training in taking the layers properly, in sectioning and in interpretation of the stained sections and in repairing the wounds.

Sclerotherapy involves injecting sclerosing agent into telengiectatic vessels, thus obliterating them. The type of telangiectasias which respond best are those on the lower limbs. Those on the face respond less well. In injecting the sclerosing agent, the most common of which is aethoxysclerol, it is important to have very bright light and to swab liberally with ethyl alcohol which make the telangiectatic vessels more prominent so that the sclerosing agent is injected into the vessels and not into the adjacent tissues. Compression dressing is necessary as otherwise the recurrence rate is high.

Hair transplant[20] is done on patients with male pattern baldness which does not respond to topical minoxidil therapy. It involves taking donor grafts from the hair-bearing areas of the scalp and then grafted to the areas of baldness. It gives good results in properly selected patients.

REFERENCES

1. Grande DJ, Neuburg M. Instrumentation for the dermatologic surgeon. J Dermatol Surg Oncol 1989; 3: 288-97
2. Bennett RG. Fundamentals of cutaneous surgery.CV Mosby Company, St. Louis. 1988.
3. Tromovitch TA, Stegman SJ, Glogau RE. Flaps and grafts in dermatological surgery. Year Book Medical Publishers, Chicago. 1989.
4. Epstein E, Epstein E Jr. Skin surgery. WB Saunders Co, Philadelphia. 1987.
5. Swanson NA. Atlas of cutaneous surgery. Little, Brown and Company, Boston/Toronto.1987.
6. Jackson IT. Local flap in head and neck reconstruction. CV Mosby Co, St Louis. 1985.
7. Salasche SJ, Bernstein G, Senkarik M. Surgical anatomy of the skin. Appleton and Lange, California. 1988.
8. Compendium of regional anaesthesia. Astra Pharmaceuticals Ltd. 1987.
9. Stewart JH, Cole GW, Klein JA. Neutralised lidocaine. J Dermatol Surg Oncol 1989; 10:1081-8.

10. Bailin PL, Ratz JI, Wheeland RG. Laser therapy of the skin. A review of principles and applications. WB Saunders Company, Philadelphia 1987.
11. Arndt KA. CO2 laser treatment of cutaneous disorders. Mayo Clin Proc 1988; 63:297-300.
12. Bauman N. The plume hazard:ICALEO panel calls for more suction. Laser Med Surg News Adv 1989:16-8.
13. Hobbs ER, Bailin PL, Wheeland RG, Ratz JL. Superpulsed lasers: Minimal thermal damages with short duration, high irradiance pulses. J Dermatol Surg Oncol 1987; 9:955-64.
14. Siegle RJ, NA Swanson NA. Nail surgery: A review. J Dermatol Surg Oncol 1982; 8:659-66
15. Falabella R. Autologous minigrafting. Arch Derm 1988:124:1649-55.
16. Colver GB, Dawber RPR. Cryosurgery-the principles and practice. Clin Exp Dermatol 1989;14:1-6.
17. Clark DP, Hanke CW, Swanson NA. Dermal implants: Safety of products injected for soft tissue augmentation. J Am Acad Dermatol 1989; 21:992-88.
18. Khoo BC, Mutou Y. Complications after dermabrasion in Asians. Plast Reconstr Surg 1961; 4:413-8.
19. Benett RG. Moh's surgery: New concepts and applications. Dermatol Clin 1987; 5:409-28.
20. Unger WP, Nordstrom REA. Hair transplantation. Marcel Dekker, New York.1988.