Procedures in primary care dermatology

Antonio AT Chuh, MD (HK), FRACGP, MRCP (UK), FRCP (Ire), is Clinical Assistant Professor, Department of Community and Family Medicine, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong. achuh@iohk.com

William CW Wong, DCH (UK), MRCGP, is Assistant Professor, Department of Community and Family Medicine, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong.

Samuel YS Wong, MD (Can), CCFP, FRACGP, is Assistant Professor, Department of Community and Family Medicine, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong.

Albert Lee, MD (CUHK), FRACGP, FHKCFP, FHKAM, is Professor and Head, Family Medicine, Department of Community and Family Medicine, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong.

BACKGROUND
General practitioners can provide a range of diagnostic and treatment procedures for patients with dermatological problems.

OBJECTIVE
This article reviews the use of Wood's light, diascopy, skin scrapings for microscopy, skin biopsy, cauterisation, doppler measurement of ankle-brachial pressure index, and multi-layer compression bandages for venous ulcers.

DISCUSSION
Adequate training and proper equipment is essential for commonly neglected areas including informed written consent, good communication with the histopathologist, a system for handling specimens and reports, action plans for laboratory results, and adequate training and protection for auxiliary staff.

Patients with skin diseases commonly present to their family physician. In Australia, 15.1 per 100 encounters in general practice are related to the skin, with skin rash being the most frequent reason for consultation.[1] Requests for a skin check up and localised or generalised skin swellings are also frequent in general practice.[1] In addition, over 10% of patients attending accident and emergency departments in Hong Kong (but classified as general practice cases) had been related to skin problems.[2]

Upon adequate supervised training, family physicians are capable of performing a range of diagnostic and treatment procedures in dermatology including skin biopsy.[3] Many general practitioners in Australia perform primary care dermatology procedures for their patients.[4] It has been shown that educational intervention improves the surgical techniques of Australian GPs in excising cutaneous lesions.[5] For GPs in rural practice, the provision of such procedural services may save on referrals to distant specialists. Hoping to stimulate the interest of GPs to provide high quality care to patients with dermatological problems, we reviewed several procedures that we believe GPs will find helpful in the initial evaluation and treatment of patients.

Ultraviolet or Wood's light

Wood's light, also known as 'black light', is ultraviolet A light with a wavelength of about 360–365 nm (*Figure 1*). The patient is examined in a darkened room with the light source. The examiner should allow adequate time for visual accommodation in darkness. The presence of a chaperone is highly recommended. The light needs to be held at least 10–15 cm from the skin, and the patient should be warned not to look directly into the light. The examiner should bear in mind that some topical remedies and fibres show fluorescence.

Tinea capitis, *Microsporum audouini*, and *M. canis* may reveal a brilliant green fluorescence, while *Trichophyton schoenleinii* reveals a pale green fluorescence. The absence of fluorescence does not exclude dermatophytic scalp infection, as *T. tonsurans* does not exhibit fluorescence.[6] *Corynebacterium minutissimum* shows a coral red fluorescence in erythrasma.

Pseudomonas aeruginosa infection produces a greenish yellow fluorescence.

Hypopigmented lesions are more evident under Wood's light. Pityriasis versicolor, which gives a yellow or yellow-green fluorescence, can be identified. This is particularly useful for atypical sites of involvement such as intertriginous areas.[7] Ash leaf macules in tuberous sclerosis were believed to be readily identifiable under Wood's light. However, the specificity of such examination is low, and it should not be relied on for the early diagnosis of this genetic condition.[8]

Hyperpigmented lesions including circumscribed hypermelanosis and freckles are also clearly delineated under Wood's light, as are skin lesions such as lentigo maligna with indistinct margins.[9] Melasma on the face can be more readily identified. Based on findings on Wood's light, melasma can also be typed according to the depth of pigment involvement.[10]

Figure 1. Wood's light source

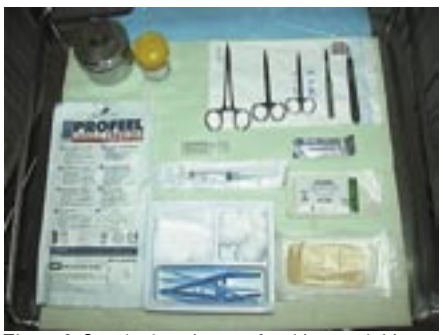

Figure 2. Standard equipment for skin punch biopsy

Figure 3. Basic doppler unit with peripheral arterial pressure probe

Diascopy

Diascopy is the compression of a microscopic slide over a cutaneous lesion. The lesions are then viewed through the transparent slide with the naked eye or a dermatoscope. Caution must be exercised against cut injuries to both the examiner and the patient by the sharp edges of the slide.

Diascopy is a more sensitive method of distinguishing whether a lesion blanches or not. It is useful in distinguishing whether a macule or papule is due to dilatation of capillaries or extravasation of blood. The usual indications for this technique is the detection of small petechiae in thrombocytopaenic states.

Diascopy is virtually indispensable in diagnosing naevus anaemicus. In this congenital condition of skin pallor, localised hypersensitivity to catecholamines leads to vasoconstriction.[11] Upon diascopy on the edge of the lesion, the margin will become virtually invisible. As lesional biopsy for histopathology would reveal no abnormality for naevus anaemicus – one cannot make a definite diagnosis without diascopy.

Diascopy also removes the erythematous hue from large pigmented lesions, rendering their original colour more conspicuous.[12] Cutaneous eruptions in sarcoidosis, tuberculosis, cutaneous lymphomas, granuloma annulare, and urticarial vasculitis are more easily recognised under diascopy, however, their diagnoses are probably outside the realm of most GPs.

Skin scrapings for microscopy

Skin scrapings are usually collected to confirm dermatophyte infections, pityriasis versicolor, and ectoparasitic infestations such as scabies. For dermatophyte infections, the advancing edge of the scaly lesion is carefully scraped with a clean scalpel. The scrapings can be collected by a sheet of clean black paper folded into a bag for microscopy only, or in a routine sterile specimen bottle for microscopy and fungal culture. Special transport envelopes are available from many pathology laboratories to send samples for culture. Nail clippings and hair root samples can also be collected from patients with suspected tinea unguium or tinea capitis.

Skin scrapings incur a minimal risk of minor bleeding and scarring, and the patient should be fully counselled of the indications for such investigation. The patient should also be informed of the possibility of false-negative results, and that the microscopic results might not concur with the fungal culture results.

For suspected scabies, the burrow if identifiable (or papules or vesicles on hands if burrows are not identifiable), can be scraped vigorously. The collected specimen should be sent to a laboratory clearly indicating the suspected diagnosis. Another option is to place the slide under 10X magnification with 10% KOH, directly view, and show the patient. The patient must be informed that false-negative results are common and do not exclude a diagnosis of scabies.[13]

Skin biopsy

Skin biopsy is the removal of a sample of skin for histopathological or other investigation. For caucasian patients, a common indication is to diagnose or exclude cutaneous malignancies. As with other invasive diagnostic and therapeutic procedures, the patient should be counselled on the indications, adverse effects, risks and complications, and alterative diagnostic methods. Informed consent, preferably written, is necessary. The operating room should be well illuminated, and all instruments sterilised.

There are several methods to perform biopsy. For shave and punch biopsies, a sample of the lesion or rash is taken for diagnosis, and as a guide for further management.

Shave biopsy

In a shave excision, the protruding part of a cutaneous growth is shaved off. This

procedure requires the least expertise.[14] It is acceptable if the lesion is small and the risk of malignancy is low. Common indications include seborrhoeic keratoses and skin tags.

Punch biopsy

In a punch biopsy, a cylinder of skin tissue including the epidermis, dermis, and sometimes the subcutaneous fat if indicated, is removed with a biopsy punch (*Figure 2*). This procedure is suitable when all skin layers are to be examined, or when the area of skin to be removed is unacceptably large for an excision. The active edge of a dermatosis is usually chosen as the biopsy site. After intralesional application of a local anaesthetic, the examiner tightens the skin around the biopsy site. The punch is then firmly introduced and rotated to obtain the specimen. Large wounds may need suturing.

Excisional biopsy

In an excision biopsy, the entire skin lesion is removed via an elliptical excision. This is the procedure of choice for relatively small lesions or for larger or deeper lesions in nonexposed skin areas such as the back. Excision may be indicated for lipoma, dermatofibroma, keratoacanthoma, pyogenic granuloma, or epidermoid cysts. The wound is closed by suturing. This procedure can be curative for many lesions, but requires adequate time, expertise, and suitable equipment. It is also the procedure of choice for suspicious pigmented lesions and for definitive treatment of skin cancer after diagnostic biopsy.

Curettage

Curettage is performed by scraping the lesion with a curette and usually precedes the scraping of vesiculobullous lesions. Under trained hands, curettage can also be used to treat superficial nonmelanocytic skin cancers. Haemostasis is achieved by compression, cauterisation, or laser.

General considerations

For any biopsy, including punch biopsy, it is preferable to obtain normal skin, part of the lesion, and the intervening transition zone, unless removal of the entire lesion is being attempted as excisional biopsy. On the other hand, if the appearance of the lesion is such that the centre of the lesion appears to be most severe or malignant, the centre of the lesion or the entire lesion can be biopsied. For the latter case, a clear margin of excision should be made. If this is not possible, a dermatologist or plastic surgeon may need to be consulted.

The tissue sample should be fixed in formalin and submitted to a pathologist, preferably one with special interest in dermatohistopathology. Histopathological changes for many dermatological problems are nonspecific. The clinical history, physical findings – and most importantly – a list of differential diagnoses must be supplied to the pathologist. A clinical photograph accompanying the biopsy specimen may also be helpful to the pathologist.

Other dermatological procedures

Other procedures for obtaining skin tissue samples for diagnostic purposes include removing fluid from vesiculobullous lesions, or scraping cells from the top of such lesions.

Should autoimmune blistering diseases such as pemphigus vulgaris, bullous pemphigoid, or any of their many variants be suspected, it is best to refer the patient to a dermatologist for confirmatory diagnosis. Should the GP elect to confirm the diagnosis before referral, a special arrangement with the pathologist should be made so that the specimen can be sent in normal saline as soon as possible after collection for direct immunofluorescence studies. Serum may be sent for indirect immunofluorescence studies if it is likely to affect the prognosis and management of the suspected disease.

Cauterisation

Cauterisation is the destruction of tissues by heat, electricity, laser, freeze, or chemicals. In this article we limit the discussion to electrocauterisation. Electrocauterisation is commonly used to remove unwanted tissue or to achieve haemostasis. Common indications in primary care include viral warts, cherry angiomas, and sebaceous hyperplasia. Again, adequate counselling and informed consent, preferably written, are mandatory before commencing the procedure. History of anaemia, diabetes mellitus, cardiac disease, cardiac pacing, hypertrophic scars, and keloids should be actively excluded. The use of a hearing aid may be considered a relative contraindication.

After local anaesthesia, a small electrode is applied to the skin. A grounding pad should be applied to the patient's thigh for protection. The electrode has high frequency electricity current at its tip, and each cauterising cycle does not usually last for more than a few seconds. Lesions such as viral warts or seborrhoeic keratoses may be pared away by curettage, and the base then cauterised.

Complications of electrocautery include injury to the neighbouring tissues, injury to blood vessels and nerves, scarring, and interference with pacemakers and implantable cardioversion defibrillators. The use of a fine tip for diathermy and the lowest effective energies to treat lesions may minimise scarring, as healing is always by secondary intention.

It is important to note that with electrocautery, no specimen is available for histopathological examination. Therefore, the treating doctor must be very definite about the diagnosis before considering electrocautery.

Doppler measurement

Many leg ulcers are mixed arterial and venous. A venous ulcer cannot be properly diagnosed and managed without documentation of the ankle-brachial pressure index (ABPI) (*Table 1*). Peripheral arterial diseases cannot be excluded by the absence of symptoms such as intermittent claudication and physical findings such as absence of atrophic signs and intact arterial pulses.[15] The ABPI is reported to be

Table 1. Interpreting ABPI results

Result	Interpretation
>1.0	Large arterial obstruction unlikely (does not exclude obstruction of small vessels, eg. in diabetes mellitus)
<0.9	Indicates arterial disease – consider referral to vascular surgeon
>0.8	Compression bandages can safely be applied without high risk of further compromising arterial supply
<0.5	Severe arterial disease – urgent referral required

Figure 4. Standard four layer compression bandage system

more closely associated with leg function than symptoms such as intermittent claudication.[16] It is also an independent predictor for cardiovascular mortality in patients with peripheral arterial disease.[17]

To document the ABPI, standard doppler equipment with basic peripheral arterial probe (*Figure 3*) is used. A wide enough sphygmomanometer cuff is applied around the right upper arm. Ultrasound contact gel is applied to the skin above the brachial pulse located by palpation. The doppler probe is applied at 45 degrees angulated and moved around to obtain the strongest audible signal. The cuff is inflated until the signal is abolished. The cuff is then deflated slowly. The pressure at which the signal just becomes audible is recorded as the brachial pressure of the right upper arm. The brachial pressure of the left upper arm is then measured. The higher of the two values is the brachial pressure.

A cuff is then applied around the leg so that the distal end of the cuff is just proximal to the malleoli. There is no evidence that measurements with the cuff in such a position are more accurate or predictive of morbidity than more proximal positions. However, a distal position may be more comfortable for the patient. The ulcer should be protected by nonadherent dressings beforehand should it be enclosed by the cuff. The dorsalis pedis pulse is then located by palpation, and its pressure is documented in a similar fashion as for the brachial pulses. Finally, the posterior tibial pulse (posterior to the medial malleolus) is palpated and its pressure documented. The higher of the two pressures taken is the ankle pressure. The ratio of the ankle to the brachial pressure gives the ABPI for that lower limb. The procedure can be repeated for the opposite lower limb.

Multi-layer compression bandages

Multi-layer compression bandage systems (*Figure 4*) are more effective than conventional bandages in healing chronic venous ulcers.[18] Treatment is comfortable, convenient, and cost effective. Four layer bandages incur less withdrawal from treatment, fewer adverse effects, and lower treatment costs, than two layer bandages.[19] The improvement on four layer compression bandages is independent on the depth and pattern of venous incompetence.[20] Offering such care in the general practice setting is safe and effective.

There are many commercially available multi-layer compression bandages. We describe the high pressure four layer bandage 'Profore™' by Smith & Nephew. A specific brand was described as the procedures of application differ for individual manufacturers.

The ankle circumference of the patient should be measured and the appropriately sized set selected. Bony prominences and the ulcer should be covered with sterile wound contact film, the 'layer zero'. Layer one – the natural padding bandage – is applied with no tension from the base of the toes to the knee in simple spirals with 50% overlap. Layer two – the light conformable bandage – is then applied with some tension over layer one from the base of the toes to the knee in simple spirals with 50% overlap. Layer three – the light compression bandage – is then applied with 50% extension over layer two from the base of the toes to the knee, in a 'figure eight' technique with 50% overlap. Finally, layer four – the flexible cohesive bandage – is applied with 50% extension over layer three in simple spirals with 50% overlap.

In cooler climates, these bandages may be worn on the leg for up to 7 days. In warmer climates, we advise the bandages be changed at least every 3–4 days. For patients with ulcers with mixed arterial and venous aetiologies, reduced pressure compression bandaging can be applied,[21] preferably after consultation with a vascular surgeon. Reduced pressure compression bandages are also indicated for patients with pure venous leg ulcers who cannot tolerate high pressure compression bandages.[22]

Discussion

Modern health care emphasises ambulatory care. Procedures in primary care dermatology will enhance the concept of community based care and further enhance the professionalism of doctors practising in primary care.

Adequate training is necessary before GPs contemplate performing the above procedures, particularly invasive procedures. If a GP is uncertain whether they have the necessary skill to do a particular procedure, they probably do not. If a GP has uncertainty about the provisional or differential diagnoses, they are probably not in a position to pursue further and the patient is best referred to a dermatologist.

Adequate preparation in terms of time, space, and equipment is also necessary. Apart from the procedural equipment, and equipment with protocols for sterilisation, at least five other aspects of preparation are easily overseen. These are:

- well drafted, written consent forms for invasive procedures (signed by the patient, GP, and a witness, after appropriate counselling)
- prior arrangements with a laboratory for sending specimens, particularly for specialised investigations such as direct immunofluorescence
- a foolproof system for sending specimens, receiving and filing reports, documenting and executing action plans
- adequate training of auxiliary staff to assist with procedures, and
- adequate protection for staff.

Protocols for handling sharps, prevention and management of needlestick injuries, and correct disposal of sharps boxes are mandatory. General practitioners should encourage all staff exposed to sharps and body fluids to have their hepatitis B status ascertained, and be vaccinated if necessary. Hepatitis B surface antibody status is best documented after the course of immunisation.

Having said that, performing office procedures for dermatological problems can be one of the most rewarding and satisfying clinical experiences.

Conflict of interest: none declared.

References

1. Britt H, Miller GC, Knox S, et al. General practice activity in Australia 2003–04. AIHW Cat. No. GEP 16. Canberra: Australian Institute of Health and Welfare, General Practice Series No. 16.
2. Lee A, Lau FL, Hazlett CB, et al. Analysis of the morbidity pattern of non-urgent patients attending accident and emergency departments in Hong Kong. Hong Kong Med J 2001;7:311–8.
3. Jones TP, Boiko PE, Piepkorn MW. Skin biopsy indications in primary care practice: a population based study. J Am Board Fam Pract 1996;9:397–404.
4. English DR, Del Mar C, Burton RC. Factors influencing the number needed to excise: excision rates of pigmented lesions by general practitioners. Med J Aust 2004;180:16–9.
5. Raasch BA, Hays R, Buettner PG. An educational intervention to improve diagnosis and management of suspicious skin lesions. J Contin Educ Health Prof 2000;20:39–51.
6. Gupta AK, Summerbell RC. Tinea capitis. Med Mycol 2000;38:255–87.
7. Aljabre SH. Intertriginous lesions in pityriasis versicolor. J Eur Acad Dermatol Venereol 2003;17:659–62.
8. Norio R, Oksanen T, Rantanen J. Hypopigmented skin alterations resembling tuberous sclerosis in normal skin. J Med Genet 1996;33:184–6.
9. Robinson JK. Margin control for lentigo maligna. J Am Acad Dermatol 1994;31:79–85.
10. Sanchez NP, Pathak MA, Sato S, Fitzpatrick TB, Sanchez JL, Mihm MC Jr. Melasma: a clinical, light microscopic, ultrastructural, and immunofluorescence study. J Am Acad Dermatol 1981;4:698–710.
11. Ahkami RN, Schwartz RA. Nevus anemicus. Dermatology 1999;198:327–9.
12. Braun RP, Saurat JH, Krischer J. Diagnostic pearl: unmagnified diascopy for large pigmented lesions reveals features similar to those of epiluminescence microscopy. J Am Acad Dermatol 1999;41:765–6.
13. Palicka P, Malis L, Samsinak K, Zitek K, Vobrazkova E. Laboratory diagnosis of scabies. J Hyg Epidemiol Microbiol Immunol 1980;24:63–70.
14. Alguire PC, Mathes BM. Skin biopsy techniques for the internist. J Gen Intern Med 1998;13:46–54.
15. Gey DC, Lesho EP, Manngold J. Management of peripheral arterial disease. Am Fam Physician 2004;69:525–32.
16. McDermott MM, Greenland P, Liu K, et al. The ankle brachial index is associated with leg function and physical activity: the walking and leg circulation study. Ann Intern Med 2002;136:873–83.
17. Hooi JD, Stoffers HE, Kester AD, van RJ, Knottnerus JA. Peripheral arterial occlusive disease: prognostic value of signs, symptoms, and the ankle-brachial pressure index. Med Decis Making 2002;22:99–107.
18. Blair SD, Wright DD, Backhouse CM, Riddle E, McCollum CN. Sustained compression and healing of chronic venous ulcers. BMJ 1988;297:1159–61.
19. Moffatt CJ, McCullagh L, O'Connor T, et al. Randomised trial of four-layer and two-layer bandage systems in the management of chronic venous ulceration. Wound Repair Regen 2003;11:166–71.
20. Guest M, Smith JJ, Sira MS, Madden P, Greenhalgh RM, Davies AH. Venous ulcer healing by four-layer compression bandaging is not influenced by the pattern of venous incompetence. Br J Surg 1999;86:1437–40.
21. Arthur J, Lewis P. When is reduced compression bandaging safe and effective? J Wound Care 2000;9:469–71.

AFP

Correspondence
Email: afp@racgp.org.au