Essential reading in this month's issue

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The Practitioner

The essence of general practice
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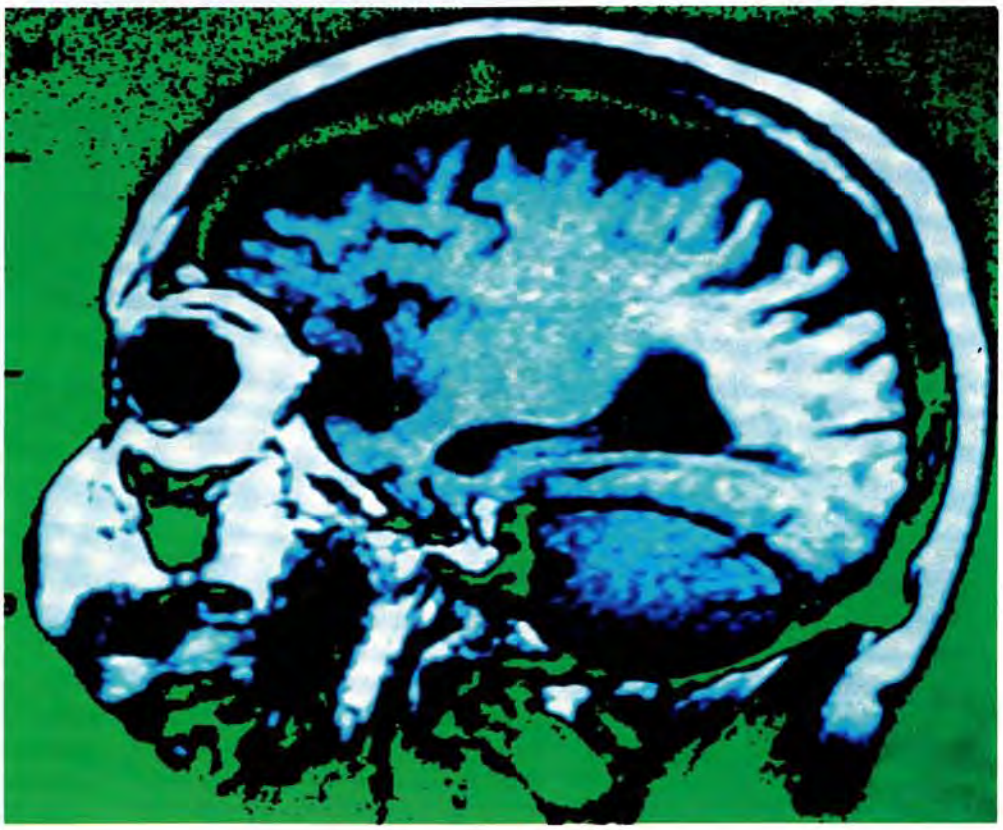

The advances of 1995

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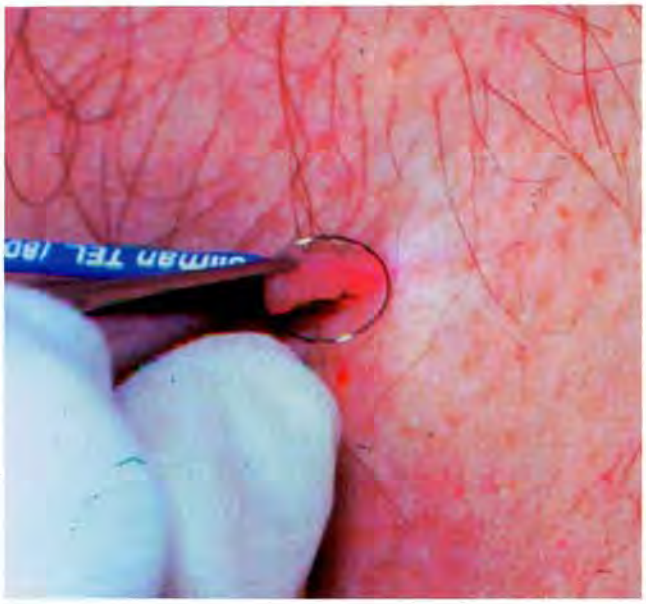

Figure 1
Removing a shallow intradermal naevus by radiosurgery is atraumatic

Radiosurgery: a

Issues in practice

- What are the advantages of radiosurgery?
- How is it used to get the best results?
- When can it be used?
- How much does it cost?

THE ADVANTAGES of a new radiosurgical instrument make it particularly suitable for use in minor surgery in both hospitals and general practice. Exceptionally quick and simple to use, it is lightweight, portable, low-priced and, above all, produces less trauma and pain than conventional treatment – there are said to be some 17,000 doctors in the USA currently using the Ellman International radiosurgical instrument I now use.

Most GPs will be familiar with electrical equipment in minor surgery. Traditional electrocautery, in which a platinum wire is heated to red heat with an electric current, is now standard in many GPs' surgeries. It can both coagulate and cut tissues, but it can cause considerable tissue charring and make subsequent histological diagnosis difficult, particularly in very small skin lesions.

Unipolar diathermy has been used in general practice for destroying superficial skin lesions and for haemostasis, although it is not good for cutting.

However, unlike electrocautery and unipolar diathermy, radiosurgery is an atraumatic method of cutting and coagulating soft tissues (figure 1). This is

Care of the electrodes

THE ELECTRODES are made of surgical-grade tungsten wire, and need to be handled with care to avoid breakage. Some electrodes are bendable to make for easier access, and these should be bent only at the insulated shaft.

The electrodes may be sterilised and 'steam cleaned' after each operation using full power and moist gauze swabs, following the maker's instructions. Blood and secretions may be removed either this way, or by immersion in hydrogen peroxide or an ultrasonic cleaner.

Electrodes, handles and wires may be autoclaved, or immersed in a solution of Cidex or similar antiseptic.

Figure 2 Pigmented intradermal naevus on the upper lip

Figure 3 Post-operative result two months later

new instrument for minor operations

because the heat is generated within the tissues themselves by resistance. The electrode remains 'cold' and no pressure is needed: the cells are vaporised in the path of the radiowaves causing them to split apart. This results in less fibrous scarring and less post-operative pain. Radiosurgical instruments are also self-sterilising.

With modern radiosurgical units, waveforms can be generated with characteristics suitable for a variety of tasks including incision, excision, coagulation, fulguration and mixtures of excision and coagulation.

The procedure

As with hospital diathermy units, two electrodes are used: a passive electrode (ground plate) or dispersive electrode; and treatment electrodes.

In practice, the first electrode is a small plastic-coated plate that is placed in close proximity to the patient. This dispersive electrode should be connected to the radiosurgical instrument and placed under the patient. It is not necessary to make a direct metal-to-skin contact: in fact, the electrode is coated with plastic to prevent accidental burning.

The second is a single-wire electrode or a loop electrode for cutting (electrosection), or alternatively a ball-ended electrode for haemostasis.

For a simple squamous papilloma, skin tag or intradermal naevus (figure 2), a fine wire-loop electrode and a cutting current should be chosen. The power-level is critical; if too low, the electrode will stick and 'drag' in the tissues; if too high, sparking and tissue-charring will occur. The optimum power level will allow the wire to glide through the tissues with no resistance and no sparking (figure 3).

It helps to moisten the lesion with a swab soaked in water or saline before applying the electrode to reduce the resistance, sparking and tissue charring. The unit must also be activated before the electrode touches the skin.

No resistance

A smooth, continuous action gives better results because there is absolutely no resistance, and no force is needed: the strokes made with the electrode are analagous to the brush

Clinical focus

- **Radiosurgery causes less fibrous scarring and less postoperative pain than conventional methods**
- **The instruments are simple to use, light-weight and portable**
- **A smooth continuous action gives best results. No force is needed**
- **As with other surgical procedures, local anaesthesia is necessary**
- **The main disadvantage is the smell of burning**
- **Radiosurgery instruments cost between £1,000 and £2,000**

Treating in-growing toenails, spider naevi and telangectasia

RADIOSURGERY has been used very successfully for treating ingrowing toe-nails: the technique is known as radiosurgical matrixectomy and it is very similar to the well-known nail matrix phenolisation that is used by both chiropodists and doctors.

A special one-sided insulated electrode – an insulated matrixectomy electrode – is used. Anaesthesia is provided in exactly the same way as with any surgical treatment of ingrowing toe-nails.

However, unlike other toe operations, a tourniquet need not be used as any bleeding may be stopped using the radiowave electrode. The usual power setting is between two and three using the coagulation waveform, and applying the current for five seconds.

Cure rates of 98 per cent have been reported using this technique. It is exceptionally quick, easy to learn, causes less tissue-damage than phenol, and is also more precise.

Examination of specimens removed by radiosurgery shows coagulation of cells for distances extending for between 0 and 5mm from the skin edge. This can be an advantage to the histopathologist because the skin edges can then be readily identified.

Spider naevi can be very easily treated with the radiosurgical instrument and a needle electrode. One single treatment is often successful, but the procedure may be repeated at six-weekly intervals if the lesion persists.

Use a needle electrode when treating spider naevi

strokes an artist makes. Practice is essential and it may take a little time to learn this new technique: the easiest way to gain experience with the radiosurgical instrument is to practice using a piece of raw beef laid on the dispersive electrode.

Small skin lesions are removed remarkably easily, and excisions are equally quick and simple. The fine wire-electrode should be chosen, and the lesion excised using a smooth, continuous action, avoiding pausing as this will generate lateral heat-damage to cells. If histological confirmation is needed, a representative piece of the lesion is first removed with the wire-loop electrode. Any surplus remaining lesion may then be 'planed' down using a wire-loop gently 'brushed' over the tissue.

For most situations, the cutting or cutting/coagulation waveform should be chosen, and will produce adequate haemostasis for all blood vessels under 2mm diameter. Any bleeding may be stopped with either a ball-ended electrode and haemostasis waveform or the bipolar forceps. The wound may be sutured as normal or closed with skin-closure adhesive strips.

As with other surgical procedures, local anaesthesia is necessary. This will usually be infiltration with lignocaine, with or without added adrenaline. Aqueous chlorhexidine or povidone-iodine may be applied to the skin. Spirit-based skin antiseptics should never be used in case of ignition from a spark.

Avoiding accidental burns

To let the doctor know that the current is switched on, the radiosurgical unit has an audible warning bleep. This is a very definite advantage and it reduces the risk of accidental activation, with possible risk of burns.

The main disadvantage is the smell of burning, and the patient should be warned of this. A good extractor-fan is essential, and a special filtered vacuum unit that removes smoke and fumes is recommended if more than a few radiosurgical procedures are undertaken.

Wire-loop excision of cervical dyskariosis is now fairly common in many hospitals. Cervical 'erosions' and ectropion can be treated using the coagulation or fulguration waveforms.

Finally, radiosurgery instruments will cost between £1,000 and £2,000 depending on the power output. This compares very favourably with unipolar diathermy instruments, but is more expensive than electrocautery instruments. The main power unit itself should give very many years of trouble-free service; the most fragile pieces are the tungsten-wire electrodes, but these are quite cheap to replace.

Further reading

1 Hettinger D, *et al.* Nail matrixectomies using radio-wave technique. *J Am Podiat Med Assoc* 1991:**81(6)**;317–21
2 Pollack SV. Electrosurgery of the skin. New York: Churchill Livingstone, 1991
3 Waldman SR. Management of superficial skin lesions in a cosmetic surgery practice. Plastic and reconstructive surgery of the head and neck. *Proceedings of the 5th International Symposium*, chapter 120