



Understanding Radiosurgery With Dr. Patrick Treacy

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Radiosurgery removal of an intradermal nevus

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[PR Log \(Press Release\)](#) – Jun 22, 2009 – Moles, warts, skin tags and other so called ‘lumps and bumps’ can be both upsetting to look at and cause social and psychological unease for those whose face is blighted by such growths. With increases in the occurrence of skin cancers we are well advised to seek professional, medical advice about any growths which appear over night or change dramatically in appearance. Thankfully though, most growths are benign and harmless, and removal is often quick and simple with reassuring cosmetic results.

Dr Patrick Treacy, our Guest Writer for this month’s Consulting Room™ newsletter, takes us through the rarely talked about technique of radiosurgery, used to cut and coagulate tissue and remove or destroy harmless growths and malformations that some of us are simply born with and some of us develop with age and environmental exposures.

Background to Radiosurgery

The term Radiosurgery is quite confusing in medicine as the term actually refers to two different surgical modalities. It is worth taking the time to look at the differences between the two to make sure there is no confusion.

The first radiosurgery (Stereotactic Radiotherapy) is a medical procedure which allows non-invasive treatment of benign and malignant conditions as well as vascular malformations by means of directed beams of ionizing radiation, such as gamma rays. This form of radiosurgery was first developed in Sweden in 1949 to irradiate brain tumour lesions.

The second type of radiosurgery (Radiofrequency or Radiowave surgery) is the cutting of tissues using a high frequency alternate current. This surgical modality is very different from traditional electrosurgery and other forms of electrocautery as it can simultaneously cut and coagulate tissues without applying any pressure.

Traditional electrosurgery devices cut skin tissue by passing an electric current through the patient and using the electrode tip (a platinum wire) to provide resistance, effectively causing high temperature heating of the electrode tip and excessive lateral (surrounding) tissue damage. There is also potential risk of shock and burn to the patient as well as post operative pain from unsealed nerve endings.

The principle of radiofrequency or radiowave surgery is that it uses high frequency radiowaves, at 4.0 MHz, to deliver low temperatures through radiofrequency (RF) micro-fibre electrodes. The waveband utilised is similar to the frequency of marine band radios.

The difference between this method and electrosurgery is that the tissue serves as the resistance instead of the electrode. This means there is no heating of the RF micro-fibre electrode by the use of low temperature RF radiowave energy. Instead, the intracellular tissue water provides the resistance and vaporises without the heat and damage seen in electrosurgery. This tissue vaporisation also results in significant haemostasis (stopping of the flow of blood) without actually burning the tissue. In addition, there is no danger of shocking or burning the patient.

Most important is the fact that there is controlled and minimal lateral tissue damage with 4.0 MHz high frequency, low temperature radiowave surgery. This effectively means less damage, less post operative pain, faster healing and less blood loss and better healing.

What is Radiofrequency/Radiowave Surgery Used For?

Radiofrequency or radiowave surgery is extremely versatile and can be used in many medical specialities including General Surgery, Craniofacial Surgery, Oral Maxillofacial Surgery, Gynaecology and Neurosurgery.

In Dermatology and Cosmetic Medicine it is used for minor surgical procedures such as removing telangiectasias (thread veins), sculpting rhinophyma (bulbous growths on the nose), flattening and sculpting nevi (birthmarks and moles), postsurgical irregularities, scars revision, sebaceous hyperplasia (cauliflower shaped growths), "unroofing" cysts, etc.

In Plastic Surgery it is used in many aesthetic procedures such as eyebag removal (blepharoplasty) and facelifts (rhythidectomy).

Many studies have shown the technology also provides excellent results during removal of superficial carcinomas (e.g. skin cancers) as well as debulking and delineating deeper skin cancers as in Mohs surgery.

Uses of RF in dermatosurgery:

Removal of skin tags, warts, seborrheic keratoses (harmless skin growths), syringoma (harmless tumours within sweat glands), and trichoepithelioma (harmless tumours within the hair follicle).

Removal of melanocytic nevi (brown moles), telangiectasias (thread veins), early skin tumours.

Skin biopsies and grafts.

Resurfacing of scars (chicken pox, acne etc.).

Primary resection of keloids (thick, raised scars).

Debulking of skin tumours.

Depilation.

Resurfacing in case of Rhinophyma, Darier's disease etc.

Blepharoplasty.

Hair restoration surgery: scalp reduction, scalp lifting, scalp flaps.

Excision of plantar fibromata (warts on the feet - verrucas), in-growing toe nail.

Non ablative face lift.

Many studies have shown radiowave surgery to be superior to laser incisions and comparable to scalpel incision.

Advantages of radio-surgery include:

Rapid healing.

Minimal or no bleeding.

Aesthetically pleasing scars or no scars.

Lesser operating time.

Office/Clinic procedure.

What Happens During Radiosurgical Treatment?

Radiofrequency surgery involves the passage of radio waves (frequency of 1.5 to 4.5 MHz) into the skin to perform removal or reshaping of a lesion. The commonest frequency used is 4 MHz.

The radio waves are generated by a radiosurgery unit, which creates a very high-frequency radio wave. The radio-surgical unit consists of an electrode, a ground plate and a transformer.

The ground plate or antenna is plastic coated and is usually placed under the patient. The "patient electrode" looks like a small loop and is held by the operating surgeon during the procedure. Different types of electrodes are used depending on the type of lesion e.g. fine needle electrode, wire loop electrode, scalpel blade electrode etc.

The lesion should be touched with the tip of the electrode. It generates very little heat as compared to conventional electro-cautery. This results in negligible collateral damage, resulting in faster healing and minimal scarring. The radiowaves travel from an electrode tip to the lesion and return to the unit through the ground plate. When radio energy passes between the ground plate and the patient electrode, it is concentrated at the electrode end, resulting in the release of energy, which produces steam within the cells, thus vapourising them and dividing the tissues. This occurs because of heat produced by the tissue resistance to the passage of a high-frequency wave. The heat makes the intracellular water boil and thereby increases the cell inner pressure to the point of breaking it from the inside to the outside. This phenomenon is called a cellular volatilisation.

Unlike with electrocautery, the electrode remains cold and no electrical contact needs to be made between the patient and the ground plate.

Many studies have demonstrated significant advantages to the use of electrosurgical incision, including shorter operating time, reduced postoperative pain, and sealing of lymphatics during excision of malignant tumours.

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PHONE +3531 2692255/ 2133 Fax 2692250