Department of Dermatology

Removal of skin tumours using Mohs micrographic surgical technique

One of the doctors or nurses in the dermatology department will have explained to you that you need to have an operation to remove a skin cancer and that this will be performed using the Mohs surgical technique. This leaflet explains the procedure and answers some frequently asked questions.

After your operation you will receive a different leaflet providing information on wound aftercare and, if needed, stitch removal.

What is Mohs micrographic surgery?

Mohs surgery is a specialised technique for removing skin cancers. It tends to be used for tumours where it can be difficult to identify the edges (margins) of the tumour and/or to remove as little skin as possible at sites near to eyes, lips or nose. It differs from other skin cancer treatments in that it allows the immediate and complete microscopic examination of the removed cancerous tissue, so that all “roots” or extensions of the cancer can be found and removed. Mohs surgery has been recognised as the skin cancer treatment with the highest reported cure rate for certain tumours although it is important to emphasise that no cancer surgery has a 100% success rate.

Mohs micrographic surgery was developed in the USA by a surgeon called Frederick Mohs, and hence the name ‘Mohs surgery’.

The steps of Mohs surgery are:

1. The area to be treated is cleansed, marked and made completely numb using an injection of local anaesthetic. You will not be asleep (i.e. you will not have a general anaesthetic).
2. The visible cancer is removed first and then a thin layer of adjacent tissue. The wound is dressed and you return to the waiting room while the tissue is being processed. You may eat or drink during this waiting time.
3. The specimen is processed while you are waiting to allow it to be examined under the microscope to check if the tumour has been completely removed and the margins are clear. This is often the most time-consuming part of the procedure, often requiring over an hour to complete.
4. If the margins are not clear, you will return to the operating theatre and the consultant will remove additional tissue only at points where the cancer is present.
If your anaesthetic has worn off, the consultant will give you a further local anaesthetic injection. Again this tissue will be processed and examined. This process is repeated until all the cancer is removed.

5. Then the wound will be closed, sutured and a dressing applied.

**What should I do before the operation?**

If you are pregnant, please contact the clinic for advice (01223 216091). Please ensure you inform us of your medications and any drug allergies.

If you are taking WARFARIN, please arrange for an INR blood test within five days before the operation. As soon as you have the result, phone the result to the surgery booking office or answer phone (01223 216091). INR results are given as a number (for example 2.3). We normally need your INR to be 2.5 or less before we can operate. If the INR is very high, we may need to postpone the operation until another date, so please phone 01223 216091 if your INR is above 2.5.

If you are taking aspirin or clopidogrel prescribed regularly for your heart or circulation; or an oral anticoagulant (eg. rivaroxaban/dabigatran) you will probably not be advised to stop the tablets, but please discuss this with your doctor.

Otherwise, please avoid non-steroidal anti-inflammatory drugs (such as Nurofen® or ibuprofen), aspirin (unless prescribed- see note above) and all aspirin-containing medicines, such as some cold and flu remedies, for seven days before and for two days after your surgery.

If you have a pacemaker you must inform us of the type as we may need to check this before the operation. Please phone (01223 216091) to inform the surgical co-ordinator.

**What should I do on the day of the operation? What should I bring with me?**

Please bring a list of your current medications with you on the day of your operation.

On the day of surgery please take any regular medications (unless you have been told otherwise) and eat a light breakfast. We suggest you wear loose fitting, comfortable clothes. We recommend that a friend or relative accompany you and drive you home following surgery, although they are not routinely permitted to be in the operating theatre during the operation. You may also wish to bring something for lunch, a snack and drink and something to read to occupy your waiting time.

All operations will take place in one of the theatres in Clinic 7, Level 3, Addenbrooke’s Hospital. Please report to the Clinic Reception Desk when you arrive.

If you have a pacemaker you must inform the doctor before the operation starts.
**How long does the procedure take?**

Most cases can be completed in three or fewer stages requiring less than 8 hours. However, as it can be difficult to predict how extensive a cancer will be, we ask that you reserve the entire day for surgery. Very occasionally, the surgery is not completed in one day and then arrangements will be made to complete the operation on another day.

**What happens after the Mohs surgery is completed?**

When the cancer is completely removed, the consultant will discuss the options of wound closure with you. These may include:

- Allowing the wound to heal naturally, without additional surgery (which may produce the best cosmetic result). In this case the wound will require regular dressing until it is completely healed. These will be performed by hospital staff, your own practice nurse or sometimes yourself or a family member.
- Wound closure using stitches (direct closure of the wound from side to side/closing the wound with a skin flap/covering the wound using a skin graft).
- Referral to the original referring surgeon or to another specialist surgeon for wound repair.

**Benefits of Mohs surgery**

Treating skin cancer with Mohs surgery might be used when:

- it is not clear where the tumour begins and ends
- the tumour is close to important structures such as the nose, lips or eyes
- when the tumour has recurred despite previous treatment

In these cases Mohs surgery is considered to allow the maximum preservation of healthy tissue and complete microscopic examination of the margins around the tumour resulting in a high cure rate.

**Risks of Mohs surgery**

Patients should understand that there is not an absolute guarantee that any given procedure will be totally free of complications or adverse reactions. The risks of Mohs surgery are generally the same as for other surgical procedures carried out on the skin such as ‘ordinary’ skin lesion removal and suturing. These are the sort of problems that may occur with skin surgery:

**Post-surgical discomfort**

Local anaesthetics are usually effective for about two hours. Most patients do not complain of significant pain after the procedure. If there is some discomfort, normally only Paracetamol tablets are required for relief. Some patients may find that the surgical area remains tender for several weeks or months after the operation, especially if large amounts of tissue were removed.
You may experience some bruising and swelling around the wound, especially if the procedure is performed near the eye area. This will clear in a week or two.

**Bleeding**
It is normal for a small amount of blood to come through the dressing. Any heavier bleeding can be stopped by applying firm pressure to the dressing for 15 minutes. If bleeding continues, you should contact your GP or this department.

**Infection**
Rarely, a wound can become infected, and this will show up as increased pain, swelling and redness of the wound after a few days. If you are concerned that the wound has become infected, please contact your GP or this department for advice. In some cases the consultant carrying out the Mohs surgical procedure will prescribe antibiotics for you to take after the operation.

**Scarring**
Any form of surgery will leave a scar. The length and width of the scar will depend on the type of wound closure performed. If the wound was closed using stitches, the stitch line is likely to be red initially but this redness usually fades over a period of weeks to months.

**Nerve damage**
During surgery tiny nerve endings are cut, which may produce a temporary or permanent numbness in or around the surgical site. If a large tumour is removed or extensive surgery is required, occasionally a nerve or muscle may be cut resulting in temporary or permanent weakness in a portion of the face. This is however an unusual complication.

**Need for further surgery**
Skin grafts and flaps used to cover surgical wounds may occasionally not fully survive, in which case additional surgical repair might be required later on. Additionally, the appearance of raised or roughened scars may be improved by surgical or non-surgical techniques some weeks or months after the initial procedure.

**What should I do or not do after the operation? Can I drive home afterwards?**

We suggest that the majority of patients have a companion to escort them home. Patients should not drive after surgery to the face area, as will often be the case in Mohs surgery.

Depending on the type of wound closure performed you may have a number of stitches and a dressing. You will need to keep the wound and dressing dry for 48 hours. This may make it difficult to have a bath or a shower during this time.
Any stitches will usually need to be removed either by the nurse in your GP’s Practice or in the hospital clinic between 5 and 10 days after the procedure. Please let us know before your operation if you anticipate that this may be a problem.

You should avoid activities such as cycling, swimming, other strenuous exercise, bending, straining or lifting heavy objects for at least 14 days following the procedure.

Smoking has been shown to have an adverse effect on wound healing after surgery. We would therefore recommend that you do not smoke for two weeks after your operation.

**Alternatives to Mohs surgery**

It is important to understand, that there are alternative treatment options to MOHS surgery when removing a skin cancer. Your doctor or nurse will generally have discussed these with you in clinic when the diagnosis of a skin cancer was suspected or confirmed. Alternative treatment options may include:

- local radiation
- conventional surgical removal of the tumour
- chemotherapy creams or injections
- cryosurgery (deep freezing)
- photodynamic therapy (uses a type of light and a light-activated chemical called a photosenzitizer).

Depending on the type, localisation and extent or your skin cancer, not all of the above options might be eligible in your case.

**Contacts/Further information**

Should you have any further questions about your procedure, please feel free to ask us when you attend for the procedure or you may contact the clinic nurses on 01223 216091.

**References/ Sources of evidence**

American Society of Mohs Surgery (www.mohssurgery.org)
British Association of Dermatologists (www.bad.org.uk)
British Society of Dermatology Surgery (www.bsd.org.uk)

General Information on dermatology and skin cancer (www.dermnet.nz)
We are now a smoke-free site: smoking will not be allowed anywhere on the hospital site.
For advice and support in quitting, contact your GP or the free NHS stop smoking helpline on 0800 169 0 169.

Other formats:

If you would like this information in another language, large print or audio, please ask the department where you are being treated, to contact the patient information team: patient.information@addenbrookes.nhs.uk.

Please note: We do not currently hold many leaflets in other languages; written translation requests are funded and agreed by the department who has authored the leaflet.

Document history

Authors Shiu-Kwan Chan, Jane Day, Jane Sterling
Pharmacist n/a
Department Cambridge University Hospitals NHS Foundation Trust, Hills Road, Cambridge, CB2 0QQ www.cuh.org.uk
Contact number 01223 216091
Publish/Review date September 2016/September 2019
File name Removal_of_skin_tumours_using_Mohs_micrographic_surgical_technique
Version number/Ref 1/100073