

## Bevacizumab (Avastin) in NF2 (NF2-related schwannomatosis)

This leaflet is for patients under the care of the NF2 Team at Addenbrooke's. It aims to tell you more about Bevacizumab (also known as Avastin) and how it may help control the growth of some tumours in NF2. If you would like more information about NF2, please ask the nurse practitioner.

### History

Bevacizumab was first shown to help people with NF2 in 2009 where it was found to reduce the size of vestibular schwannomas (tumours on the nerve of balance) and in some cases improve hearing.

Follow up research in 2012 has demonstrated good responses at one and three years for over half the patients. Further research in 2016 shows that the majority of patients treated with Bevacizumab have had either stabilisation or reduction in size of their vestibular schwannoma and in those with recent hearing loss, hearing has improved. Patient reported quality of life has improved and surgical intervention has decreased.

Additionally, research in 2017 suggests that patients with symptomatic cystic spinal cord ependymomas may obtain clinical benefit from treatment with Bevacizumab.

### What is Bevacizumab?

Bevacizumab is a type of drug called a monoclonal antibody or an angiogenesis inhibitor. It is also used to treat some types of cancer. The reason that we think it is effective in the treatment of growing schwannomas in NF2 is that it stops the development of new blood vessels in tumours. This reduces the supply of oxygen and nutrients, which means that the tumour shrinks or stops growing. It does not prevent blood vessels from growing in other parts of your body as it works specifically on a chemical secreted by tumour cells (similar to how your antibodies work when attacking an infection).

### Criteria for treatment

Care of patients with NF2 in England is funded by NHS England Highly Specialised Services which is the part of the NHS which manages how we treat rare diseases. Treatment is also available to people living in Scotland and the Republic of Ireland, and may be available to patients from Wales, the Isle of Man and the Channel Islands.

Due to the results that have been shown in the USA, since 2010 Bevacizumab has been available in the UK for treatment of rapidly growing schwannomas and symptomatic cystic ependymomas in NF2 via specialist NF2 multi-disciplinary clinic providing strict clinical criteria are met.

Our experience is that tumour response in the first six months of treatment is helpful in predicting future stability.

## Consent

The doctor who is treating you will go through the Bevacizumab consent form with you to make sure that you understand why you have been offered this treatment, and so that you can decide if this is the best option for you. Bevacizumab has not specifically been licensed for the treatment of tumours in NF2 and so it is important that you fully understand the benefits and risks of treatment.

## How we review Bevacizumab

The four lead NF2 centres in England (Cambridge, Manchester, Guys and St Thomas' in London and Oxford) meet once a year and review all of the cases where Bevacizumab is being given to people with NF2. We also examine the results of people having Bevacizumab elsewhere in the world, so that we can offer the best options for treatment.

This treatment is not a trial, as NHS England Highly Specialised Services will only fund treatments that have been proven to work. However, as the drug has only been administered to a small group of people with NF2 worldwide, it is very important that we collect information as this will help us to direct future research into the treatment of NF2.

## Tests needed before treatment

In order to make sure that it is safe for you to take Bevacizumab, and in order that we know that you meet the criteria for treatment, you will need to have various tests prior to a decision being made. These are:

- An up to date MRI scan Blood tests
- A urine sample
- An X-Ray of your arm (if you are still growing) Blood pressure
- Height and weight
- An assessment of how you walk (10 metres) Hearing tests
- Complete a quality of life questionnaire

Although we have no evidence that Bevacizumab affects future fertility, male patients are offered sperm preservation (sperm banking) and female patient's egg / embryo preservation if they wish.

## Tests needed during treatment

We are asked to keep very specific records of treatment for people with NF2 who receive Bevacizumab. This means that we can see that the treatment is working and the outcomes influence how future treatment is delivered.

Before and during your treatment (every six to twelve months), you will be asked to:

- Have a hearing test
- Have an MRI scan of your head and / or spine complete a quality of life questionnaire
- Have an assessment of how you walk (10 metres)
- Complete a 10 hole PEG test

You will be asked to provide a blood and urine sample at every clinic appointment and your blood pressure and weight will also be checked. It is also advised that you monitor your blood pressure at home and keep a record of this to bring with you to your Avastin appointment.

## Delivery of treatment

Bevacizumab is given in the Oncology Unit for adults, C9 for TYA (teenage and young adult) patients or PDU for children at Addenbrooke's hospital in Cambridge. You will be asked to attend to provide blood and urine samples and then you will see the doctor in the clinic prior to the administration of the drug. Bevacizumab is given as a drip into a vein (intravenous infusion) and takes approximately an hour to be given.

For the first six months of treatment, Avastin is given every two or three weeks and is then generally reduced to every four weeks. You will have MRI scans of your head and / or spine every six months with a review in the NF2 clinic every six months.

If you continue on the treatment with minimal side effects and your tumours are stable, after two years the scanning frequency may be reduced to annually and you may be offered an elective break in treatment. This will be discussed with you at the appropriate time.

## Benefits

The aim of receiving Bevacizumab in NF2 is to try to stop the growth of some NF2 related tumours. In some cases, patients have also found that their hearing improves. If the Bevacizumab stops the tumour(s) from growing, this may delay your need to have surgery.

## Risks and side effects

As with all medications, there is a risk that you may experience some side effects during treatment, and every person's reaction to a drug is different. The side effects listed below will not affect everyone who has Bevacizumab, as every person's reaction can be different.

Acute infusion-related reactions:

These reactions may occur during infusion, or for up to 24 hours afterwards.

These are usually mild, but please tell the doctor or nurse if you experience flu-like symptoms, a rash, a feeling of swelling in the lips, tongue, or throat, any difficulty breathing and back, stomach or chest pain as these could be signs of an allergic reaction to the drug.

There are other side effects which may occur days or weeks later. The most common side effects of Bevacizumab are:

- Tiredness feeling sick headaches bleeding
- High blood pressure
- Sore mouth or mouth ulcers altered taste
- Delayed wound healing constipation or diarrhoea
- Loss of appetite
- Blood clots
- Lowered resistance to infection
- Changes in the way your heart works
- Changes in the way your kidneys work
- Pain around the area of the tumour

Most of these side effects can be controlled so please discuss any side effects that you are having with the doctors or the nurse practitioner. There are other rare side effects not listed in this leaflet that are very unlikely to affect you. However, it may be that you experience side effects not initially predicted or indicated on this form. If this is the case please discuss this with the staff treating you.

## Serious side effects

The risks of serious or fatal side effects in Bevacizumab are very small. The side effects below are very rare and have often occurred in people who are being treated for cancer not for benign tumours as in NF2.

- Bevacizumab causes delayed wound healing and for this reason we ask that you do not receive treatment for 28 days before or after surgery.
- If you were to require surgery, you would need to stop the Bevacizumab for at least 28 days prior to any operation as Bevacizumab increases the risk of bleeding and delays wound healing.
- Gastrointestinal perforation: this is where a hole forms in the stomach or intestine. Symptoms of this might be abdominal pain, nausea, vomiting, constipation and fever. If this were to occur, Bevacizumab treatment would be stopped.
- The risk of serious bleeding (haemorrhage) is much higher in people being treated with Bevacizumab so it is very important to contact your doctor or nurse if you are experiencing unusual bleeding, e.g. from your nose, vagina, anus or gums, or you notice blood when you cough, in your vomit or in your stools.
- Please call if you experience chest pain, breathlessness / light headedness, changes in your eyesight, difficulty speaking / moving or any swelling / pain in an arm or leg as these could potentially be signs of a blood clot which would need urgent treatment.
- There may be a risk of impaired growth in children or young adults who receive Bevacizumab. We will discuss this with you if we feel this may apply to you.
- In a small number of patients, Bevacizumab has had a temporary effect on the strength of the heart muscle or caused irregular heart rhythms.

## Contraception

It is important to use an effective method of contraception during treatment with Bevacizumab and for at least six months following discontinuation of Bevacizumab due to the potential risk of harm to the foetus.

## Where can I get help and advice?

You have 24-hour access for help and advice.

### Non urgent issues

If your question is not urgent then please contact your specialist nurse during regular working hours. Your doctors and the nurses/radiographers involved in your treatment will give you advice about which number to ring. You will also be given details about your specialist nurse and how to contact them. Specialist nurses have answer phones and pick up their messages regularly throughout the working day. If your nurse is unavailable another specialist nurse will pick up and deal with your message.

Please **DO NOT** use the specialist nurses numbers in an emergency. Where possible, a direct number has been given. Please note that phone calls will not be answered if your specialist nurse is away.

Please leave a message on the answer machine and this will be picked up and dealt with.

### Urgent or emergency issues

If you experience unusual bleeding, a high temperature (over 38° C), rigors (shakes or chills), severe headaches, persistent or severe abdominal pain, severe constipation or severe vomiting, for adult patients, please contact the oncology day unit on [01223 217099](tel:01223 217099)

Link: tel://01223 217099  
for advice.

In an **emergency** or out of the above hours, please contact Addenbrooke's oncology service on [01223 274224](tel:01223 274224)

Link: tel://01223 274224

For paediatric patients please contact PDU Monday to Friday 8am to 6pm on [01223 257157](tel:01223 257157)

Link: tel://01223 257157

or Ward C2 on [01223 217231](tel:01223 217231)

Link: tel://01223 217231

outside of these hours. For TYA patients please contact Ward C9 on [01223 274222](tel:01223 274222)

Link: tel://01223 274222

Finally, if you do become admitted to hospital then we would appreciate being informed.

After contacting the hospital, you will either be:

- Given advice on the telephone about what to do
- Asked to come to a Day Unit / Ward Area so that your treating team can assess you
- Asked to contact your GP
- Given arrangements for your admission to hospital if needed

## Oncology patients

### Contacts and further information

Juliette Buttimore, Nicky Gamazo (skull base and NF2 Nurse Practitioners): [01223 348672](tel:01223348672)

Link: tel://01223 348672

We are happy to correspond with you via e-mail but you will need to sign a consent form to do this.

[E-mail Juliette Buttimore](mailto:juliette.buttimore@nhs.net)

Link: [mailto://juliette.buttimore@nhs.net](mailto:juliette.buttimore@nhs.net)

[Email Nicky Gamazo](mailto:nicola.gamazo1@nhs.net)

Link: [mailto://nicola.gamazo1@nhs.net](mailto:nicola.gamazo1@nhs.net)

## Information

If you have not received information about your treatment with Bevacizumab and what side effects to expect, or have any questions about information that you have been given, please speak to either the doctor or nurse who is caring for you. It is very important to us that you have all the information you feel that you need, together with the answers to any questions or concerns. It would help us if you brought any information you have been given about your treatment into hospital with you when you come to receive your Bevacizumab.

## References / sources of evidence

Bevacizumab for Progressive Vestibular Schwannoma in Neurofibromatosis Type 2: A Retrospective Review of 31 Patients *Otology & Neurotology*. Plotkin, S. Merker, V. Halpin, C. Jennings, D. McKenna, M. Harris, G. Barker, Fred G. *Otol Neurotology* 2012 August 33: 6: 1046–1052

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Bevacizumab induces regression of vestibular schwannomas in patients with neurofibromatosis type 2. Mautner VF, Nguyen R, Kutta H, Fuensterer C, Bokemeyer C, Hagel C, Friedrich RE, Panse J. *Neuro Oncol*. 2010 Jan; 12(1):14-8

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## We are smoke-free

Smoking is not allowed anywhere on the hospital campus. For advice and support in quitting, contact your GP or the free NHS stop smoking helpline on 0800 169 0 169.

## Other formats

Help accessing this information in other formats is available. To find out more about the services we provide, please visit our patient information help page (see link below) or telephone 01223 256998. [www.cuh.nhs.uk/contact-us/accessible-information/](http://www.cuh.nhs.uk/contact-us/accessible-information/)

## Contact us

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CB2 0QQ

Telephone +44 (0)1223 245151  
<https://www.cuh.nhs.uk/contact-us/contact-enquiries/>

This document was correct at the time of printing

This leaflet is for patients under the care of the NF2 Team at Addenbrooke's and the most up to date version. The specialist team at Cambridge University Hospital has kindly allowed us to distribute this leaflet to support NF2 patients. Please note there might be slight variations in different regions around the UK.

