Neuroscience

North Bristol NHS
NHS Trust

Convection-enhanced delivery of carboplatin for brainstem glioma

Information for Parents

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Convection-enhanced delivery of carboplatin for brainstem glioma

Your child's multi-disciplinary care team, including specialist oncologists and neurosurgeons, believes that your child may be suitable for a novel treatment known as convection-enhanced delivery of carboplatin. This leaflet aims to give you some background information on this novel procedure, to explain why your child's brain tumour might be suitable for treatment, and what the treatment involves.

1. Why is this novel treatment being considered for my child?

Brainstem gliomas are rare in the UK, and affect approximately 25 to 30 children per year. The mainstay of treatment has been radiotherapy, with a minority of children receiving chemotherapy. If a child's brainstem tumour continues to progress after such treatment the alternative options are very limited. Some children may be suitable for enrolment in a clinical trial, however, no clinical trial to date has proven effective in improving outcomes in this disease. Your child is being considered for convection-enhanced delivery because we believe that this novel treatment has the potential to benefit your child.

2. What is convection-enhanced delivery of carboplatin?

Convection-enhanced delivery, or CED, describes a method of delivering a drug directly to the brain through one or more very small tubes which are surgically placed into the brain tumour. By infusing carboplatin into the tumour it is possible to deliver the drug more effectively and accurately than if the drug where to be given through a vein or in tablet form. The doses of carboplatin we plan to infuse have been shown to be very effective in killing brain tumour cells in laboratory studies, but do not cause damage to normal brain cells.

3. Is CED being used in other hospitals?

CED is a novel technique and is not currently used in routine practice. A number of centres are undertaking research in this area around the world, but Frenchay Hospital is the only place in the UK in which this procedure is being performed.

4. What does the procedure involve?

The first stage of the procedure is for your child to undergo a very detailed MRI scan of the brain. This is likely to be under general anaesthetic. This MRI scan is used to plan how the surgery can be most safely and effectively performed, and to manufacture one or more catheters (the very small tube used to deliver carboplatin) which meets the specific requirements of your child's tumour. Your child will be discharged home later the same day.

Once we have planned the surgery and the catheter has been manufactured, we will arrange for your child to be admitted to Frenchay Hospital. Under general anaesthetic a frame will be placed on your child's head which allows us to complete the final stages of surgical planning. Your child will have a CT scan of the brain which shows the blood vessels in great detail, allowing us to complete the surgical planning. The catheter is implanted through a small incision in the scalp. We do not need to shave any of your child's hair to do this. Using a neurosurgical robot, the catheter is implanted through a small hole in the skull. The first stage of the surgery involves the implantation of a plastic "guide tube" into the brain. The guide tube is approximately 1mm in diameter. The catheter is then implanted through the guide tube and connected to a filter which stops air or bacteria being pushed into the brain. A length of connection tubing is attached to the catheter and pulled through a separate small incision in the scalp (Figure 1).

Figure 1. Diagram of the external filter and tubing after catheter implantation

While your child is still asleep under general anaesthetic he or she will be taken to the MRI scanner to begin the infusions of carboplatin. A number of scans will be repeated whilst the chemotherapy is infused to allow us to understand how carboplatin distributes through the tumour. This will allow us to determine how much carboplatin will need to be delivered to give the best chances of treating the whole tumour. At this point your child will be woken up from general anaesthetic and returned to the Barbara Russell Children's Unit, where he or she will be monitored in the high dependency area.

Your child will receive infusions of carboplatin on 3 days in a row. After a break of one or two days, we will remove the catheter under a short general anaesthetic. We leave the guide tube in place to allow us to implant further catheters, if required. We would expect your child to be ready for discharge the following day. After an interval of 4 to 6 weeks, we will arrange for you to come in for a follow-up MRI scan as a daycase procedure.

5. What are the risks?

We have planned the surgical procedure for CED to be as similar as possible to a neurosurgical procedure called deep brain stimulation (DBS). DBS is commonly performed throughout the UK, and we have experience of performing over 800 cases at Frenchay Hospital. In DBS surgery, we implant two small electrodes into the brain using guide tubes in a very similar way to how catheters are implanted for CED. Based on our extensive experience with DBS we estimate the following risks:

- **Bleeding in the brain:** approximately 1-2%
- **Stroke:** approximately 1-2%
- **Wound infection:** less than 1% - we will give your child antibiotics during the operation to minimise this risk
- **Meningitis or brain abscess (infection):** less than 1% - we connect a bacterial filter to the catheter to try to minimise this risk
- **Seizures (fits):** less than 1%

6. Who should I contact for further information?

Please contact Professor Steven Gill (Consultant Neurosurgeon) or Mr Neil Barua (Registrar in Neurosurgery) via Professor Gill's secretary:

Maureen Wiltshire

Tel: 0117 3403957

Email: Maureen.Wiltshire@nbt.nhs.uk

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How to contact us:

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If you or the individual you are caring for need support reading this leaflet please ask a member of staff for advice.

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