

<p>Title:</p> <h2 style="text-align: center;">Intrathecal Antibiotic Administration Procedure (Paediatrics)</h2> <p style="text-align: center;">Version: 3</p>			
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<b>Supersedes:</b>	Training for Medical Staff & Senior Nurses on: Tapping of VADs, External Ventricular Drainage & Administration of Antibiotics via the Intrathecal Route, Nov 2013		
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## Change Record

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# Intrathecal Antibiotic Administration Procedure

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## 1.0 Aim of Procedure

This procedure details the competency required in order to safely 'tap' a ventricular access device (VAD) using strict aseptic, non-touch technique (ANTT); the ability to measure intracranial pressure (ICP) and the collection of cerebrospinal fluid (CSF) samples. This skill should be expected of all the doctors who may come in contact with paediatric neurosciences patients with a ventricular access device who may need an urgent 'tap'. It is envisaged that all Clinical Coordinators/Senior Nurse Practitioners/senior nurses on the Paediatric Neurosciences ward also become competent in this procedure.

## 2.0 Scope of Procedure

The cohort of patients under the Paediatric Neuroscience services (e.g. hydrocephalus), Royal Hospital for Sick Children, Edinburgh. Relevant consultants, doctors in training and relevant senior nurses. This procedure covers **only intrathecal vancomycin and gentamicin**. Medical staff are **not** permitted to administer any other medicines via the intrathecal route without authorisation from the Clinical Director.

## 3.0 Clinical Reference/s

Bettina et al (2002) Treatment of Staphylococcal Ventriculitis associated with external cerebrospinal fluid drains: a prospective randomised trial of intravenous compared with intraventricular vancomycin therapy. *Journal of Neurosurgery*. Vol 98/May 2003.

External inquiry into the adverse incident that occurred at Queens Medical Centre, Nottingham, 4<sup>th</sup> January 2001. Professor Brian Toft 19<sup>th</sup> April 2001.

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P R Reynolds, S Banerjee, J H Meek. Alcohol burns in extremely low birthweight infants: still occurring. *Arch Dis Child Fetal Neonatal Ed*. 2005 Jan;90(1):F10

Sathiyamurthy S, Banerjee J, Godambe SV. Antiseptic use in the neonatal intensive care unit - a dilemma in clinical practice: An evidence based review. *World J Clin Pediatr* 2016 May 8; 5(2): 159-171

Zabramski et al (2003) Efficacy of antimicrobial-impregnated external ventricular drain catheters: a prospective randomised controlled trial. *Journal of Neurosurgery* 98:725-730, 2003.

Protocol for the safe handling of Intrathecal and Intraventricular Injections. RHSC Edinburgh

## 4.0 Procedure

### CSF tapping and sampling

#### Infection present:

CSF sampling may be performed daily (depending on the Consultant's advice), if infection is present, and sent to microbiology. Analysis of CSF includes cell count, gram stain, cultures (Microbiology), protein, glucose (Biochemistry) and cytospin for differential cell type (Haematology).

Once trained and assessed as competent, staff can sample CSF from the patient's EVD on a daily basis (or as required), for gram stain, culture and cell counts. This is important in monitoring the response to treatment. The results should be documented on a separate CSF results chart (available on the RHSC Paediatric Neurology ward) and should be placed with the observation charts at the foot of the patient's bed or in patient's medical notes.

#### No infection present:

If the patient does not have ventriculitis or meningitis but is on EVD or lumbar drainage for hydrocephalus/CSF leak etc., sampling can be performed as requested by the consultant, or every 48 hours as is appropriate and determined by the clinical situation (e.g. a VAD in an oncological patient who awaiting surgery but has no infection). Sometimes the VAD has to be accessed simply to measure the ICP.

### Ventriculitis and its treatment with intrathecal antibiotics

Ventriculitis may be defined as inflammation of the ventricles of the brain. Infection is often secondary to shunt infections or long term external ventricular drainage. The incidence of shunt-associated ventriculitis varies according to age, being common in premature babies and neonates (up to 70% of cases) and less common in adults (5-15% of cases). The responsible organisms are usually gram positive, coagulase negative cocci; commonly *Staph epidermidis* or sometimes *Staph aureus*. Occasionally gram negative bacilli are responsible, and rarely other organisms such as *corynebacterium*, *E Coli* or *candida*. These can be seen on gram stain and culture and there is usually a reactive CSF with lots of white cells.

CSF penetration of many intravenous antibiotics is poor because of a failure to cross the blood-brain barrier and therefore direct administration of antibiotics into the intrathecal (intraventricular) space is often considered. Intraventricular antibiotics have been used at RHSC for over 20 years with no reported profound adverse effects.

The majority of patients will receive intrathecal antibiotics via a VAD, however where this route is not available, the intrathecal antibiotic may be given via a lumbar drain.

Vancomycin and gentamicin are the only two antibiotics currently used for intrathecal administration in RHSC. The usual antibiotic of choice is vancomycin with the decision often being made by the consultant and may be guided by the microbiologists. Treatment is usually for at least seven days, but may be shorter or longer depending on the patient's clinical response and CSF cell counts

## Procedure for the administration of intrathecal antibiotics

This procedure should be read in conjunction with the RHSC 'Protocol for the safe handling of Intrathecal and Intraventricular Injections' for general requirements of prescribing and who may administer and check intrathecal medicines.

This procedure covers **only intrathecal vancomycin and gentamicin**. Medical staff are **not** permitted to administer any other medicines via the intrathecal route without authorisation from the Clinical Director.

### Supply of intrathecal injections from pharmacy

The intrathecal antibiotic will be prepared in the Pharmacy Department Aseptic Suite. The dose will be delivered to the area where administration will take place, by an authorised person immediately prior to the time required wherever possible. Where the injection cannot be given immediately, it should be stored in the ward or theatre in the **DEDICATED intrathecal fridge** until required.

It is important that the practitioners who manage and administer intrathecal antibiotics:

- Observe strict adherence to aseptic technique to minimise the risk of hospital acquired infection for the patient.
- Minimise delay in patient treatment to ensure intrathecal concentration of antibiotics remains within the therapeutic range at all times.
- Provide continuity of patient care and careful documentation of all procedures and CSF results, as the duration of treatment can be lengthy.

### Product, Packaging and Labelling

Intrathecal injections will be delivered from pharmacy as a pre-prepared syringe, in a sealed, red plastic bag, clearly marked "FOR INTRATHECAL USE ONLY". Each syringe will be individually packaged and individually labelled (with patient name and CHI number, drug, dose, date of preparation and expiry date and time) for the patient. Each patient will have an antibiotic dose and a saline flush prepared, for intrathecal use.

### Note

- The antibiotics and the saline prepared in the RHSC pharmacy department are prepared under aseptic conditions and are pre-filtered using a 0.22micron filter, therefore there is no need to use the filter again during administration.
- Whilst the syringes contents have been prepared aseptically, the syringes are not sterile and therefore should not be mixed with the sterile equipment before the tap.

The products should be checked and signed for as detailed in the 'Protocol for the safe handling of Intrathecal and Intraventricular Injections'.

Practitioners preparing to administer the injection must perform the following with the **SECOND AUTHORISED** professional (i.e., **TWO PEOPLE MUST CHECK**):

- Check that the details on the prescription match the labelled product supplied
- Check the name and date of birth of the patient with the patient (if possible) and parent (if around): this step may not always be possible in the paediatric setting

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- Check that the patient's wrist band details match the prescription and product label
- Check that the product is still within its expiry date
- Check the patient has no allergy to the product
- Ensure the two checks are recorded on the prescription chart

### Administration

The administration of intrathecal drugs is a sterile procedure. If the intrathecal drug becomes contaminated, or is out of date, then it must be disposed of appropriately and pharmacy immediately informed and a replacement dose requested.

A sample of CSF is taken from the patient on a daily basis for microbiology prior to the administration of the intrathecal drug. Practitioners administering an intrathecal must follow the administration procedure below. The drugs are administered via an external ventricular catheter, EVD drainage, VAD or lumbar drain.

### Equipment

Prescription and Administration Chart (Kardex)

2 x 5ml luer lock syringes

Pre-prepared syringe containing the intrathecal injection

Alcohol wipes

Smart site (if required)

1 x universal container

Sterile surgeon's gloves

Sharps bin

*Note: Consider having an additional syringe and a needle (to draw up sodium chloride) along with sterile 0.9% sodium chloride if saline is not supplied with the intrathecal antibiotic*

Under sterile conditions, with patient lying flat and procedure explained (if possible/applicable),

1. Make sure patient has identifying name bands in place on wrist or ankle.
2. Put on apron, wash hands thoroughly with chlorhexidine or betadine scrub, dry and apply sterile gloves.
3. Locate external ventricular drainage instillation port or the end of the butterfly needle if EVD is not in place or the end of the lumbar drain. Ensure EVD port has a three-way tap. Clean three-way tap port or end of lumbar drain with a sterile alcohol wipe for 60 secs and allow to dry.
4. Attach syringe and aspirate 2ml of CSF and discard. Aspirate a further 2ml CSF and send for microscopy and cell count.
5. Check intrathecal syringe against the prescription as per LUHD policy (see "checking of intrathecal injections"). Remove sterile gloves and apply alcohol gel to hands.
6. Apply sterile gloves when hands dry.

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7. Attach the syringe and filter on to smartsite connector (or end of lumbar drain, as appropriate). Instil the intrathecal antibiotic slowly through the filter over a 1 minute period.
8. Flush slowly with 2ml of sterile 0.9% sodium chloride.
9. Following administration of antibiotic, **switch off** the EVD or lumbar drain for 30-60 minutes (as planned) and inform nurse looking after the patient. Ask nurse to switch drain back on at the required time.
10. Dispose of sharps.
11. Document the procedure in the notes and stick one of the pharmacy drug labels into the notes.
12. Both practitioner administering and second witness must sign the prescription and administration chart (Kardex).



## Competency certificate Stage 3

### Intrathecal/Intraventricular administration of antibiotics

Observed administration of intrathecal antibiotics (minimum of 1)

	<b>Print name</b>	<b>Sign</b>
<b>Trainee/Practitioner</b>		
<b>Supervisor</b>		
<b>Date</b>		

Supervised practice: The procedure carried out competently

	<b>Print name</b>	<b>Sign</b>
<b>Trainee/Practitioner</b>		
<b>Supervisor</b>		
<b>Date</b>		

I have undergone the above training and I have successfully completed the administration of INTRATHECAL antibiotic (VANCOMYCIN/GENTAMICIN) into an established access device. I am familiar with the procedure and I feel competent to undertake this procedure in a safe and skilled manner under supervision.

**Signature of trainee/practitioner:**

**Date:**