

PERIPROCEDURAL ANTIBIOTIC PROPHYLAXIS FOR PAEDIATRIC MICTURATING CYSTOURETHROGRAM (MCU) - SCH

PRACTICE GUIDELINE [®]

DOCUMENT SUMMARY/KEY POINTS

- Peri-procedural antibiotic prophylaxis reduces risk of adverse outcomes, e.g. urinary tract infection (UTI) and sepsis, for patients undergoing micturating urethrogram (MCU)
- All patients undergoing MCU should be prescribed appropriate peri-procedural antibiotic prophylaxis by referring doctor, as summarised in Table 1.
- Appendix 1 summarises flow of MCU booking and checkpoints to ensure appropriate peri-procedural antibiotic coverage.
- In some circumstances, where patient is at increased risk for infection, intramuscular gentamicin may be given in addition to oral peri-procedural antibiotics.
- Associated Factsheets:
 - SCHN MCU Factsheet:
https://www.schn.health.nsw.gov.au/files/factsheets/micturating_cystouretherogram_mcu-en.pdf
 - SCHN Nitrous Oxide Factsheet:
https://www.schn.health.nsw.gov.au/files/factsheets/nitrous_oxide-en.pdf

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st April 2019	Review Period: 3 years
Team Leader:	Staff Specialist	Area/Dept: Nephrology

READ ACKNOWLEDGEMENT

- Training/Assessment Required – radiology booking clerk, radiology registrars
- Read Acknowledge Only – general paediatricians, urologist, renal physicians, neonatologist, rehabilitation physicians, general practitioners, paediatric registrars, radiologists, radiographers and nurses

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Abbreviations

IM - Intramuscular

MCU – Micturating Cystourethrograms

PO – Per Oral

SCHN – Sydney Children's Hospital Network

UTI – Urinary Tract Infections

VUR – Vesicoureteric Reflux

1 Aim

- To reduce the risk of urinary tract infections (UTI) and sepsis for patients following micturating cystourethrograms (MCU).
- To standardize booking procedures for MCU.

2 Background

Micturating cystourethrograms (MCU) are an important diagnostic tool in the work up of recurrent or atypical UTIs and the assessment for abnormalities of the urinary tract, such as vesicoureteric reflux (VUR).

However, MCU are invasive and often a stressful procedure for both the patient and the parents, as it involves urethral catheterisation in order to introduce the contrast into the bladder.

Complications of MCU may include and are not limited to: post-procedural UTIs and urosepsis, local trauma, perforation of bladder or urethra from improper placement of catheter, psychological distress and reaction to the contrast used.

Post-procedural UTI is a significant risk for consideration given its estimated 7-42% incidence in patients who did **not** receive peri-procedural antibiotic prophylaxis¹. The risk of developing UTI after the procedure is increased further in patients who are found to have a high-grade VUR or if there is an abnormality known on pre-existing renal ultrasounds¹⁻³.

Appropriate prescription and administration of peri-procedural antibiotic prophylaxis can result in significant reduction of morbidity and mortality related to post-procedural UTI and sepsis²⁻⁴.

3 Procedure for Micturating Cystourethrogram (MCU)

3.1 For Referring Doctors

- Ensure that your patient has been given the SCHN MCU factsheet.
- Ensure that you have provided your patient with an antibiotic prescription, so that your patient will be on the appropriate oral antibiotics on the day before, the day of and the

day after the procedure. (see Table 1) – The procedure will be delayed or rescheduled if your patient is not on the appropriate antibiotic prophylaxis.

- If patient is already on prophylactic antibiotics the dose may need to be adjusted for the MCU procedure.

All children should be on prophylactic antibiotics at treatment dosage on the day before, on the day of and the day after the MCU procedure. (See Table 1 below)

- Advise the parents that if the child shows signs of a UTI within 2 weeks prior to the appointment to seek medical advice. The procedure may need to be rescheduled.
- Educate parents to monitor for signs of UTI after the procedure and to seek medical advice as required.

3.2 Referral and Booking

- A request form is required in order to make a booking for an MCU.
- The request should be shown to a paediatric radiologist to triage the urgency and appropriateness of investigation, unless the request is from a Paediatric Nephrologist, Urologist or Paediatrician in which case a booking can be made at the time.
- If the child is over 1 year and >10 kg, an appointment should be made to perform the MCU on the monthly Nitrous Oxide Sedation List.
- The MCU Fact Sheet (and a Nitrous Oxide Fact Sheet where applicable) should be provided to the parent / carer via mail or email at the time of booking.
 - SCHN MCU Factsheet:
https://www.schn.health.nsw.gov.au/files/factsheets/micturating_cystourethrogram_mcu-en.pdf
 - SCHN Nitrous Oxide Factsheet:
https://www.schn.health.nsw.gov.au/files/factsheets/nitrous_oxide-en.pdf

All children should be on prophylactic antibiotics at treatment dosage on the day before, on the day of and the day after the MCU procedure. (See Table 1 below)

- When making the booking, the clerk should ask **“Have you been instructed by your referring doctor to give your child antibiotics twice a day, the day before, the day of and the day after the test?”** Ensure that child’s parents / carers have been given a prescription for antibiotics by the referring doctor and instructions for use by the referrer prior to booking. If not, send back to original referrer.
- Booking clerk to ask **“What was the last date of a urine infection for your child?”** MCU should not be booked within 2 weeks after a known urinary tract infection
- Appendix 1 summarises flow of MCU booking and checkpoints to ensure appropriate perioperative antibiotic coverage.

3.3 Day of MCU Procedure

Before commencing the procedure, the radiologist should confirm that the child has received antibiotics at treatment dose the day prior and that the child does not have a current or recent UTI in past 2 weeks.

If the child has not received appropriate peri-procedure antibiotics (See Table 1) then the MCU should be re-scheduled to a later date. If the referring doctor is a tertiary referrer then the potential cancellation could be discussed.

Appendix 2 provides a quick summary and overview of questions for clinicians to address prior to commencing the MCU procedure.

For further information about the MCU procedure, please refer to SCHN MCU Factsheet: https://www.schn.health.nsw.gov.au/files/factsheets/micturating_cystourethrogram_mcu-en.pdf

3.4 Post MCU Procedure

Depending on the results of the MCU and certain circumstances, intramuscular gentamicin may be indicated as outlined below in Section 5.

All children should be reminded to complete prophylactic course of oral antibiotics for day post-procedure.

Educate parents monitor for signs of UTI after the procedure and to seek medical advice as required.

4 Peri-procedure Antibiotic Recommendations

Practitioners referring patients for MCU procedure is also responsible for ensuring appropriate prescription of peri-procedural antibiotic prophylaxis to patients.

Table 1: Peri-procedure Antibiotic Recommendations

Antibiotic	Treatment dose recommendation
Trimethoprim and sulfamethoxazole (e.g., Septrin®)	4mg/kg/dose of trimethoprim component (up to 160 mg) 12 hourly orally for 3 days with procedure occurring on day 2 (the second day) i.e., Septrin® suspension (trimethoprim 8 mg/mL and sulfamethoxazole 40 mg/mL): 0.5 mL/kg/dose
Cefalexin	12.5mg/kg/dose (up to 500 mg) 12 hourly orally for 3 days with procedure occurring on day 2 (the second day) ⁵

5 Intramuscular Gentamicin

In some circumstances intramuscular (IM) gentamicin may be given at the end of the procedure in addition to peri-procedural oral antibiotics. The rationale for this is to prevent urinary tract or systemic infections with organisms resistant to the oral antibiotics (such as *Pseudomonas aeruginosa*) in patients at increased risk for infection³. The indication for

administration of IM gentamicin can be determined by either the radiologist and/or referring specialist (nephrologist/urologist).

5.1 Risk and Benefits of Gentamicin

Benefits and Aims

To reduce the risk of urinary tract or systemic infection, including sepsis, from organisms (especially *Pseudomonas aeruginosa*) which are resistant to the usual oral antibiotics.

Risks

Nephrotoxicity and ototoxicity (vestibular and/or auditory) can occur infrequently and the risk is nearly always proportional to the amount of drug and the duration of treatment⁶.

This current protocol recommends only a single dose, and the dose of 2mg/kg recommended is less than the current recommended daily dose for treatment of established infections⁷. In addition, this dose is also suitable for renal impairment⁸.

To further minimize these risks, where possible, avoid concomitant use of other potentially nephron /neurotoxic drugs: e.g. ibuprofen, cisplatin, vancomycin and loop diuretics.

Note: Very rarely, individuals who carry the MT-RNR1 gene variant may develop hearing loss after a single dose of gentamicin (population prevalence estimated to be 1 in 500 to 1 in 1000 persons in UK/US populations)⁹.

5.2 Indications

The relative indications for IM gentamicin include:

- Patients < 3 months of age
- Grade III-V vesicoureteric reflux (particularly if there is failure to empty the upper tracts at end of procedure^{4,10})
- Cloudy or infected looking urine at time of catheterisation

Administration of IM gentamicin is only for those at increased risk of infection and is **not** intended to be an alternative regimen for those who have inadvertently not received oral antibiotics. The radiologist or referring specialist may discuss the rationale for IM gentamicin, including benefits and risks, with the parents (see Section 5.1).

5.3 Dose and Administration

Gentamicin Dose: 2 mg/kg IM (Intramuscular)

- Preferentially use a higher dose/ concentration of the drug to minimise the volume to be injected i.e. 80 mg/ 2 mL instead of 10mg/1mL
- Choice of needle/ site will vary according to age/ weight of child
- Recommended needle size:
 - Infant/ Child for IM injection 23 or 25 gauge x 25mm in length
- The area of choice for injection:

- Infants < 12 months of age: is the vastus lateralis muscle of anterolateral thigh 90° to skin plane
- Children > 12 months the vastus lateralis or deltoid muscle 90° to skin plane
- The order must be prescribed on an inpatient medication chart or electronic equivalent and administered according to hospital policy¹¹.
- The medication chart is to be sent to medical records for filing.
- The baby/child should be observed for at least 20 minutes after the injection of gentamicin to monitor for signs of sensitivity/reaction before being discharged home
- All children should be reminded to complete prophylactic course of oral antibiotics for day post-procedure.

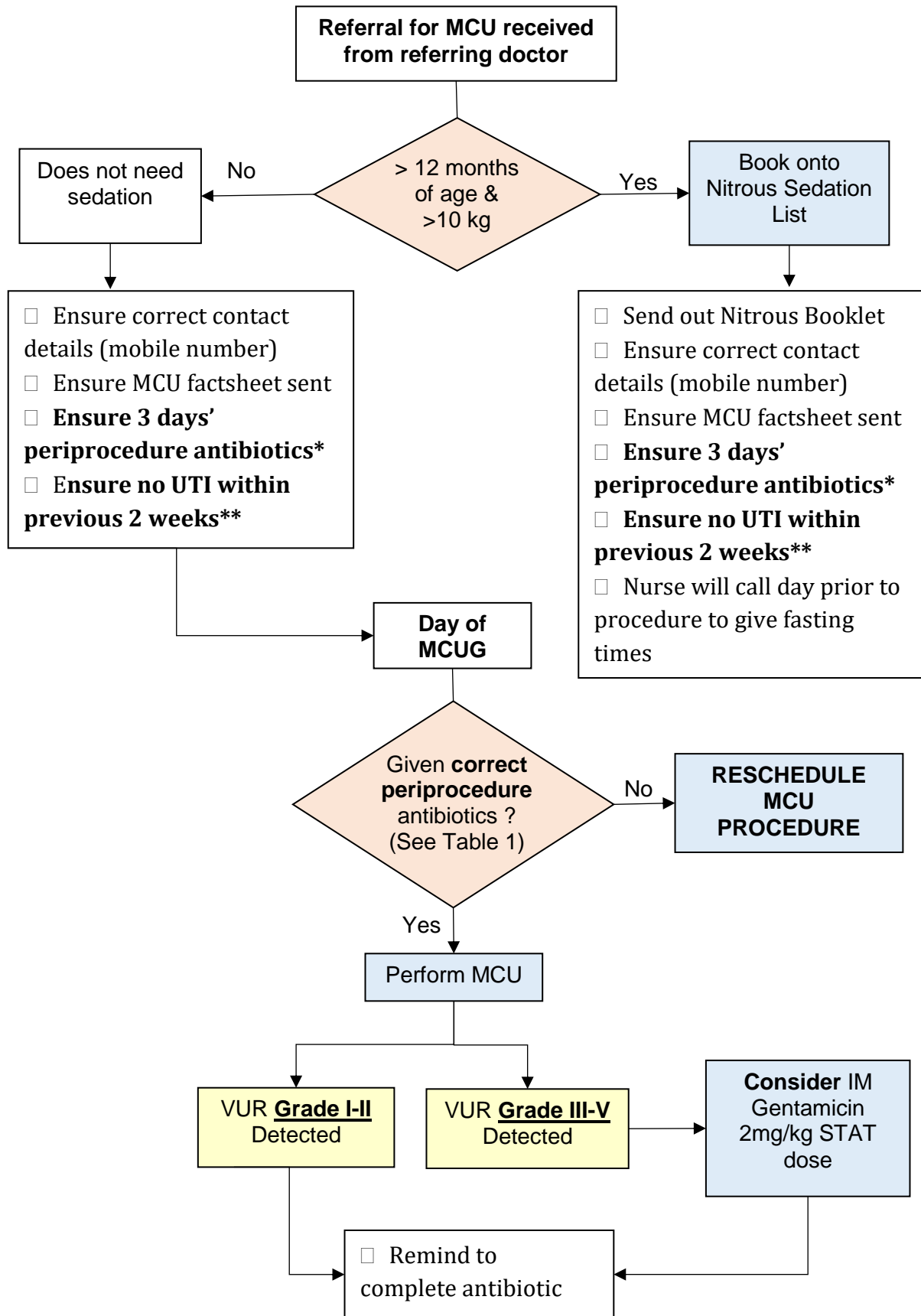
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Appendix 1: Flowchart for MCU Procedure



Guideline No: 2019-043 v1

Guideline: Peri-procedural Antibiotic Prophylaxis for Paediatric Micturating Cystourethrogram (MCU) - SCH

* Booking clerk to ask "Have you been instructed to give your child antibiotics twice a day, the day before, the day of and the day after the test?"

** Booking clerk to ask "What was the last known date of a urine infection for your child?"

MCU should not be done within 2 weeks after a urinary tract infection

Appendix 2: Checklist Form for MCU procedure - Radiology

CHECKLIST FOR MCU

Insert Patient Sticker

Date:

Radiologist / Registrar:

- | | | |
|--|--------------------------|--------------------------|
| <u>Prior to Commencement:</u> | Y | N |
| 1. Confirmed child has not had UTI in past 2 weeks? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Confirmed appropriate antibiotics were given the day prior? | <input type="checkbox"/> | <input type="checkbox"/> |

Type of antibiotics given: _____

- | | | |
|--|--------------------------|--------------------------|
| <u>After the MCU:</u> | Y | N |
| 3. Was vesicoureteric reflux (VUR) detected? | <input type="checkbox"/> | <input type="checkbox"/> |

If yes, what was the VUR Grade? VUR Grade _____

- | | | |
|------------------------------------|--------------------------|--------------------------|
| | Y | N |
| 4. Was IM Gentamicin administered? | <input type="checkbox"/> | <input type="checkbox"/> |

If yes, please select indication: Patient < 3 months old
 Grade III-V VUR
 Cloudy or infected-looking urine on catheterisation
 Other: _____

5. Comments:

Please remind parents to complete course of oral antibiotics and to seek medical attention if there are signs of urinary tract infection.