Guideline for Antibiotic Challenge on Paediatric Day Case or Outpatients – Full Clinical Paediatric Guideline – Derby & Burton

Reference no.: CH CLIN G132/Feb 21/v002

Aim and Scope

To give guidance on how to undertake antibiotic challenges in children with possible allergy including immediate or delayed reactions.

Introduction

All drugs have the potential to cause 'adverse drug reactions but not all of these are caused by a drug allergy. A drug allergy is a reaction caused by an immunological reaction. The majority of drug allergies arise from antibiotics, anaesthetic agents and NSAIDS. It can be a challenge just from the clinical history alone to identify whether someone has had an allergic reaction to a medication and so further investigations maybe required.

Around 10% of the general population claim to have a penicillin allergy, often because of a skin rash that occurred during a course of penicillin in childhood. Patients are then labelled as 'penicillin allergic' when they may not be. True allergic reactions to beta-lactams are less common in children than adults. There are no predisposing risk factors for beta-lactam allergy in children, and only a minority (7-16%) of children with suspected beta-lactam hypersensitivity are found to be allergic following investigation. Beta-lactam allergy is frequently over-diagnosed and may lead to an increase in health costs and antibiotic resistance and potentially places the child at risk when prescribed less effective antibiotics. It is a cause of concern for patients and physicians who fear future reactions. Therefore, penicillin allergy can potentially be excluded in a considerable number of the population.

Children treated with beta-lactams frequently develop skin rashes. Most reactions are in children below 4 years of age and are non-immediate cutaneous reactions (usually maculopapular or urticarial) , occurring >1 hour following administration of a dose, of mild to moderate severity,. Although often assumed to be due to a drug allergy, most are due to viral infections (commonly enterovirus) and the skin rash is rarely reproduced by challenge.

Exclusion criteria for a drug challenge

- Reaction to parental antibiotic
- Severe reaction –(Difficulty breathing/persistent cough/wheeze/ throat swelling, change in voice./ difficult swallowing, drooling, floppy, dizzy or LOC)
- Severe delayed reaction eg TEN/DRESS/ SJS etc
- Uncontrolled asthma
- Uncontrolled urticarial
- On beta blockers

Types of scenarios

1. Low Risk: A child presents with a recent/historical history of a **mild** maculopapular or urticarial rash, **more than one hour** after the dose is given on day 2-6 of treatment. A **single dose** challenge is appropriate with no prior skin testing

2. Medium Risk: A child presents with **immediate** symptoms at **< 1 hour** post antibiotic dose or the history is historical and not quantifiable BUT NOT anaphylaxis or severe delayed reaction.

3. High Risk: A child has immediate angioedema, wheeze or other systemic symptoms then skin tests, RASTS and consideration of BAT may be appropriate followed by high risk challenge **OR** significant asthma/chronic urticaria **OR** other co-morbidities.- **(We are not doing these in Derby as yet but this might be considered in the future**)

4. Severe delayed hypersensitivity reactions are almost never challenged

Location of the challenge

	Oral Drug Challenges (ODC)		Single Dose (SD)
Risk Level	High	Medium	Low
Location	Day Case Unit		Day Case Unit or Paediatric Outpatient Clinic
Nurse:patient	1:1 with consultant present	1:2	1:4
Number of Doses	5* see below	2* split dose	Single Top dose only- consumed as single dose
Observation period	1 hours post top dose	1 hour post top dose	60 min post dose

Challenge Protocols

1. Low Risk: Single Dose: age appropriate dose of the antibiotic is given as a single dose followed by 2 further doses to be taken once a day at home

2. Medium Risk: An age appropriate dose of the antibiotic is divided into two aliquots at 10% and 90% to be given 20 minutes apart. Two further total doses are to be taken once a day at home

3. High Risk: An allergy consultant may wish to devise a protocol (appendix 1) for an individual child but usually 3-5 doses will be used. Two further total doses are to be taken once a day at home.)

Planning the challenge

• Antibiotic challenges must be under the care of an allergy consultant (Dr Traves, Goel or Starkey) – **They will let the daycase/ OP team know which challenge protocol to use**

- The parents must be informed , before arrangements made that:
    - Their child will be taking the treatment which they had a reaction to before
    - There is a chance they may develop a similar reaction
    - Depending on the protocol , the procedure might give increasing doses to minimise any reaction
    - Family will need to sign consent on day of challenge
- When seen, book the challenge into daycase under the correct allergy consultant
- Notify the family of the date and explain it will need to be postponed if unwell.

Prior to starting challenge

- Check the child is well. It should NOT go ahead if any upper respiratory symptoms, fever or worsening of asthma.
- Perform examination (including documentation of any underlying eczema) and undertake baseline observations
- Explain procedure to family and sign consent form.
- Prescribe emergency drugs as per guidance and write on the antibiotic challenge forms

Procedure of the challenge

- Record the baseline observations
- Observe for any symptoms for 20 minutes between doses (when applicable) and perform observations 15 min, 30 min and 60 min after given dose
- Continue if free from symptoms and observations are stable for an hour after the top dose

Following the challenge

- If the child completes the antibiotic challenge without a reaction, provide them with the appropriate number of doses of antibiotics so they can to assess for delayed reaction (some may need upto 7 days if very delayed reaction from history. Ask allergy consultants if not sure).
- Ask the family to contact Dr Starkey's (86826) or Dr Traves secretary (86441) if any reactions with the further doses. Given them a copy of the information sheet.
- A discharge letter following the challenge is needed the family and GP with any results of the challenge.
- Send notes to Dr Starkey /Dr Traves once the day case admission and discharge summary are completed, so that they are aware the challenge and they can follow up the patient.
- They will complete a letter to the parents and GP once the course antibiotics has finished explaining whether the child still needs to avoid that group of antibiotics.

Antibiotic challenge documentation

To be filled in for all antibiotic challenges

and filled in the patients notes

Affix Patient label here

Which Antibiotic protocol is the patient having (please tick)

1. Low Risk: Single Dose: ☐
2. Medium Risk: An age appropriate dose of the antibiotic is divided into two aliquots at 10% and 90% to be given 20 minutes apart. ☐
3. High Risk: An allergy consultant may wish to devise a protocol (appendix 1) for an individual child but usually 3-5 doses will be used. ☐

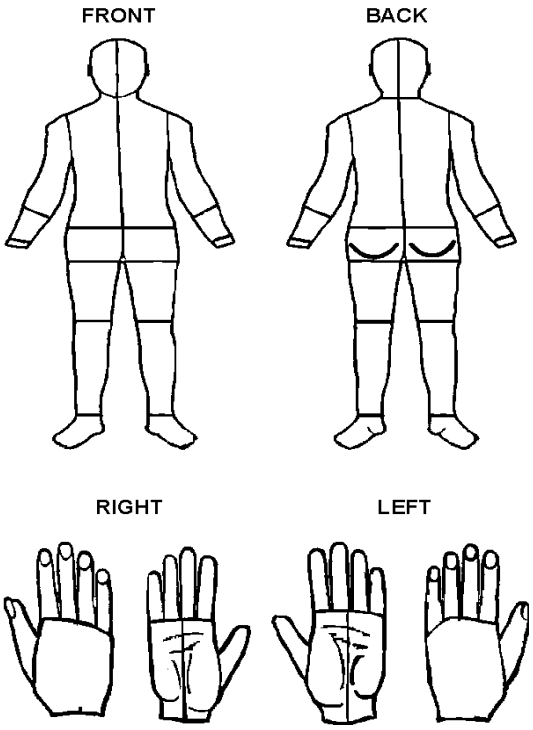
Day of the antibiotic challenge	**DATE:**		
1. Nurse/Doctor assess child fit for antibiotic challenge			
2. Baseline observations taken and listen to chest – risk of wheeze and breathing difficulty			
Temp		Pulse	
O2 Sats		Blood Pressure	
Respiration rate		Weight	
Assessment prior to antibiotic challenge		**Antibiotic to be assessed:**	
History surrounding antibiotic reaction			
Past medical history			
Known allergies:		Drug History	
Patients condition today:			
Examination findings:			
CVS:		Pulse:	BP:

Chest				Wheeze/No wheeze				
				RR				
Skin				Any rash/urticaria				
Oral mucus membranes								
Other Comments:								
Fit for challenge: yes		No		Emergency prescription written: Yes		No		
Parental Consent:Yes		No		Signed: Print name & designation				

Emergency medication		**Weight:**				
Date	**Drug approved Name**	**Dose**	**Route**	**Signature**	**Given By**	**Time**
	Chlorpheniramine (Piriton)		Oral			
	Epinephrine (adrenaline) 1 in 1000		IM			
	Hydrocortisone (max 200mgs		IM			
	Chlorpheniramine (Piriton)		IM			
Ensure the details above are completed before commencing the challenge						

Challenge Protocol

Time	**Drug:**		**Observations**					
	Fraction	Dose	Time	Pulse	Resp	SaO_2	BP	Comments



Details of any reactions and actions

Document rash on the chart

On completion of the challenge					
Result of challenge	**Negative / mild reaction/systemic symptoms**				
Outcome of the challenge					
If passed challenge antibiotic given		Yes		No	
Observe 1 hour post challenge		Time left ward			
Send notes and this result to consultant		Sent to			

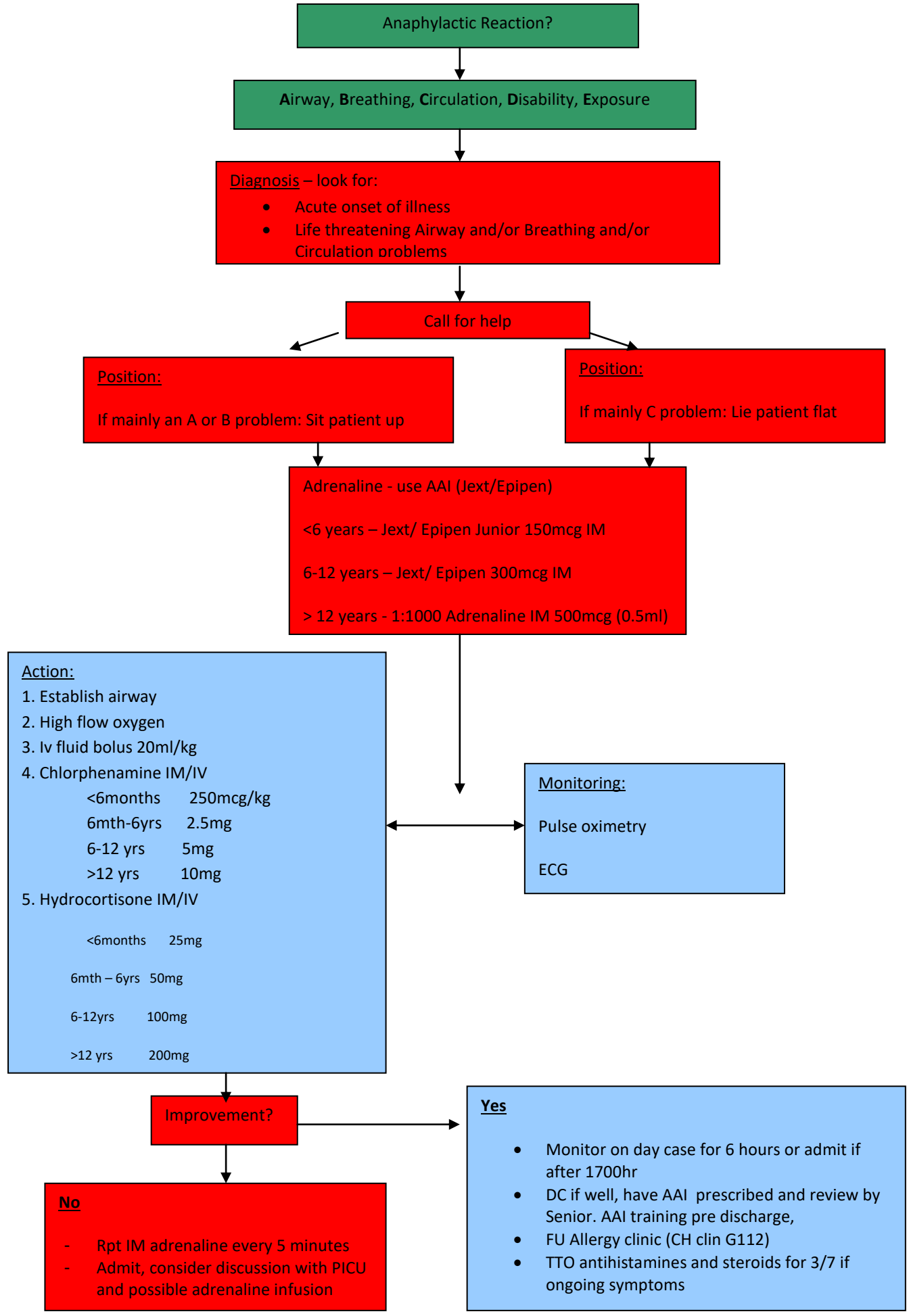
Comments on reactions and actions taken

Nurse Print Name:		Doctor Print Name	
Signature:		Signature:	
Date:		Date:	

Classification of reactions

MILD	Hives/Rash Nausea/Vomiting Swelling of lips Wheezing Hoarse voice.	Stop challenge. Administer antihistamine:
SEVERE	Any worsening of mild symptoms Tightness of throat Severe breathlessness or wheezing Severe dizziness or imminent collapse Abdominal pain/diarrhoea Any difficulty in breathing or swallowing Floppiness Pale, loss of colour Loss of consciousness	Lie child flat and administer IM Adrenaline (Adrenaline Auto-injector if available). **Call: CRASH TEAM -**

Adrenaline	**IM**
Under 6 Years	Jext / Epipen (AAI) 150 micrograms (0.15ml)
6 -12 years	Jext / Epipen (AAI) 300 micrograms (0.3ml)
Over 12yrs	1:1000 Adrenaline IM 500micrograms (0.5ml)
Hydrocortisone	**IM or IV**
<6 months	25mg
6mths – 6 years	50mg
6-12 years	100mg
>12 years	200mg
Chlorphenamine (Piriton)	**Oral**
Up to 2 year	1mg
2 – 6 years	1 – 2 mg
6-12 years	2
12-18 years	4mg
	IM / IV
<6 months	250mcg/kg maximum 2.5mg
6mths – 6 years	2.5mg
6-12 years	5mg
>12 years	10mg


Anaphylactic Reaction?
Airway, Breathing, Circulation, Disability, Exposure
Diagnosis – look for:
Acute onset of illness
Life threatening Airway and/or Breathing and/or Circulation problems
Call for help
Position:
If mainly an A or B problem: Sit patient up
Position:
If mainly C problem: Lie patient flat
Adrenaline - use AAI (Jext/Epipen)
<6 years – Jext/ Epipen Junior 150mcg IM
6-12 years – Jext/ Epipen 300mcg IM
> 12 years - 1:1000 Adrenaline IM 500mcg (0.5ml)
Action:
1. Establish airway
2. High flow oxygen
3. Iv fluid bolus 20ml/kg
4. Chlorphenamine IM/IV
<6months 250mcg/kg
6mth-6yrs 2.5mg
6-12 yrs 5mg
>12 yrs 10mg
5. Hydrocortisone IM/IV
<6months 25mg
6mth – 6yrs 50mg
6-12yrs 100mg
>12 yrs 200mg
Monitoring:
Pulse oximetry
ECG
Improvement?
Yes
Monitor on day case for 6 hours or admit if after 1700hr
DC if well, have AAI prescribed and review by Senior. AAI training pre discharge,
FU Allergy clinic (CH clin G112)
TTO antihistamines and steroids for 3/7 if ongoing symptoms
No
Rpt IM adrenaline every 5 minutes
Admit, consider discussion with PICU and possible adrenaline infusion

What to do after your child's antibiotic challenge

This leaflet explains what happens now that your child has had an oral antibiotic challenge in hospital. If you have any further questions or concerns, please do not hesitate to contact Dr Traves secretary (01332 786441) or Dr Starkey's Secretary (01332 786826) or Dr Goel secretary

What medicines has my child had today?
Today (__/__/__), your child has had a drug challenge to……
……and received a total dose of……

What did today show?
Your child did not show any signs or symptoms of an immediate type allergic reaction whilst on daycase unit today.

What happens now?
In order to capture any signs of a delayed allergic reaction, it is important to take the antibiotic for a **further …… days** at home. Antibiotics will finish on ……/……/….

What happens if my child has an allergic reaction at home?
If any signs of an allergic reaction occur during the next three days at home, such as itching, redness, swelling or a rash, **STOP** the antibiotic and treat with an antihistamine such as chlorphenamine (piriton) or cetirizine as on the medicine packaging.
If you are able, please take some photos of the rash that occurs.
Do not give any more doses of the antibiotic.

Once your child is settled, please call the consultants to report the reaction.

If your child has redness and peeling of the skin, particularly around the mouth, or the eyes, STOP the antibiotic and seek urgent medical help.

What happens if my child has a more severe allergic reaction?
If your child shows any signs or symptoms of a more severe allergic reaction such as coughing, wheezing, breathlessness, throat tightening or collapse (known as anaphylaxis) **dial 999 for an ambulance immediately.**
If your child has ever been issued an adrenaline autoinjector (epipen, Jext or Emerade) for this type of allergic reaction, follow your emergency plan.

References (including any links to NICE Guidance etc.)

Sheffield Guideline , Drug Allergy in children 2020

Documentation Controls

Development of Guideline:	Dr Lizzie Starkey
Consultation with:	Allergy Paediatric Consultants, Pharmacy OP team
Approved By:	*Paediatric Business Unit Guidelines Group, Women and Children's Division – 23rd February 2021*
Review Date:	February 2024
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