

PDA
Guide

MISSAN HEALTH
DIRECTORATE

Pediatric Drug Administration Guide

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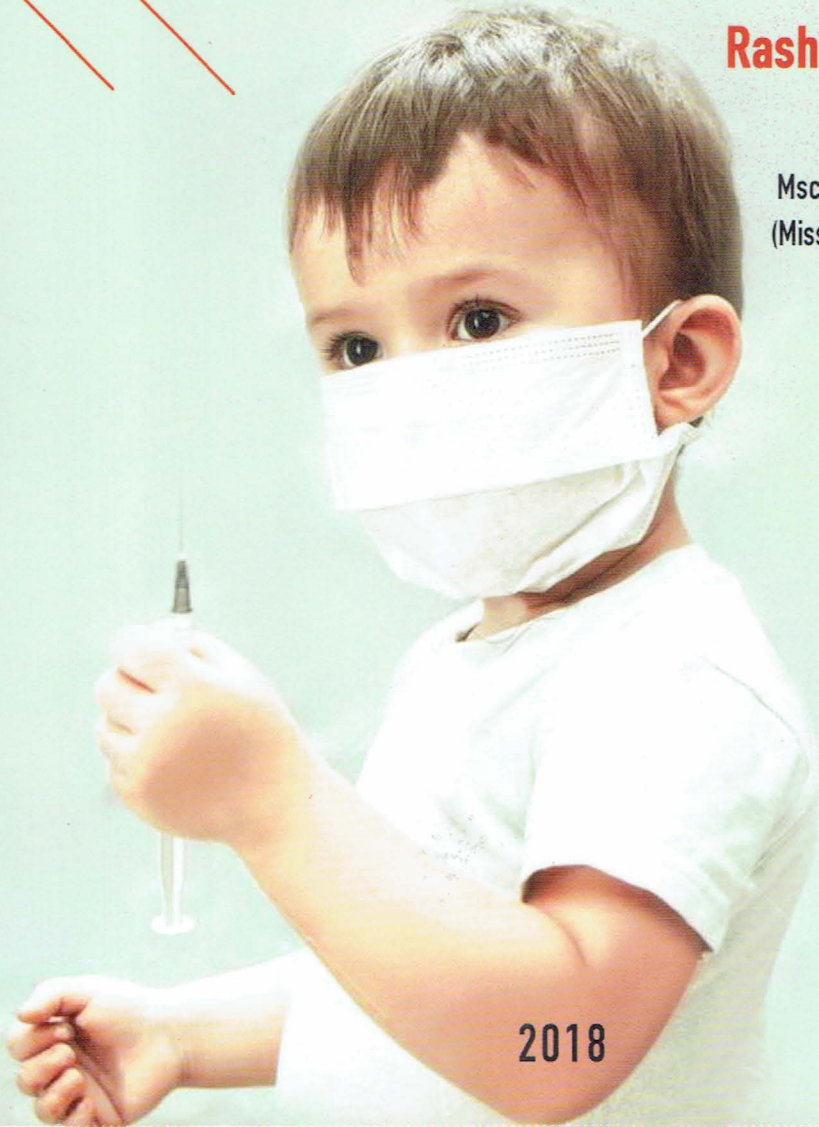
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2018



**Pediatric Drug
Administration
Guide**

Pediatric Drug Administration Guide

Rasha Khalaf Jebur

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
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Pediatric Drug Administration Guide

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My ward:

- ♣ At first point , to all pharmacist be
- ♣ The administration of drugs is one of the important points that must be focused on, because of their impact on the completion of the therapeutic process, as well as the risk on the patient's life.
- ♣ The basis for clarify the administration of drugs is given by the pharmacist. As one of the medical teams.



This guide explain in a simplified and accurate manner:

- ❖ the administration , stability in addition to important note of common, especially low therapeutic index drugs , In a simplified and accurate manner.
- ❖ Intravenous fluid, differentiate between type and preperation of in available iv fluid.
- ❖ Antibiotic simple classify, age ,stability and important note.

September 2018

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Prescribing for children: weight, height, and gender

Derived from UK-WHO growth chart

Age	Weight (kg)	Height (cm)
Full-term neonate	3.5	51
1 month	4.3	55
2 months	5.4	58
3 months	6.1	61
4 months	6.7	63
6 months	7.6	67
1 year	9	75
3 years	14	96
5 years	18	109
7 years	23	122
10 years	32	138
12 years	39	149
14 year-old boy	49	163
14 year-old girl	50	159
Adult male	68	176
Adult female	58	164

Pharmacy measurement

Measurements of weight.

1000 micrograms (μg or mcg) = 1 (mg)
 1000 milligrams (mg) = 1 gram (g)
 1000 grams (g) = 1 kilogram (kg)

1 pound (lb, Avoirdupois) = 454 g
 1 kilogram (kg) = 2.2 lb

Measurements of volume.

1 liter (L) = 1000 ml
 1 deciliter (dL) = 100 ml
 1 centiliter (cL) = 10 ml
 1 L = 10 dL
 Fluid ounce (Oz) = 29.57 \approx 30 ml (US unit)
 = 28 ml (IS unit)

pint (16 fl. oz.) = 473 mL
 1 quart (32 fl. oz.) = 946 mL
 Drop (gtt) = 0.05 ml
 = 20 drop

Measurement of Length

1 inch = 2.54 cm
 1 meter (m) = 39.37 inch



2 FTU = 1g

FTU = Fingertip unit / 1FTU = 0.5g of cream or ointment

ointment, cream
unit

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Pharmacy abbreviation

tbsp.	tablespoonful
<i>tsp.</i>	<i>teaspoonful</i>
<i>a.c.</i>	<i>before meals</i>
<i>b.i.d.</i>	<i>twice a day</i>
dil.	Dilute
<i>d</i>	<i>day</i>
q	every
<i>p.o.</i>	<i>by mouth (orally)</i>
qAM	every morning
<i>q4h, q8h, etc.</i>	<i>every — hours</i>
<i>q.i.d.</i>	<i>four times a day</i>
mcg	microgram
s.i.d.	once a day
<i>t.i.d.</i>	<i>three times a day</i>
<i>gtt</i>	<i>drop</i>
<i>Sol.</i>	<i>Solution</i>
<i>Oz</i>	<i>ounce</i>

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Drug dose per kg

((According to pediatric BNF))

Drugs	Dose	Notes
pencillins		
Amoxicillin vial 500mg	30 mg\kg q 12-8hr	Age <20 day ,q 12 hr
cephalospins		
<i>Cefotaxime (claforan)</i>	25 mg\kg, q 12,8,6 hr, According to age	Double dose (50 mg) in meningitis
<i>Ceftriaxone vial</i>	50-80 mg\kg\day Daily	Contraindication in: jaundice, hypoalbum. ,IV calcium *act in MERSA
<i>Ceftazidim (fortum)vial</i>	25-50 mg\kg, q 24,12,8 hr, According to age	Act on pseudomonas
Aminoglycoside		
<i>Amikacin vial 100,500mg</i>	15 mg\kg\day divide q 12 hr.	In Neonate once daily regime *Side effect paralysis with high dose - ototoxicity-nephrotoxicity
<i>Gentamycin(garamycin) amp 20,80mg</i>	5 mg\kg once in neonate >1 month, 2.5 mg\kg,q 8 hr	
Glycopeptide antibiotic		
<i>Vancomycin vial 500 mg</i>	15 mg\kg\dose every 8 hr. In premature q 24,12 hr	Infusion in 1 hr to avoid sudden hypotension and cardiac arrest
<i>Teicoplanin (targocid) vial 200,400 mg</i>	10 mg\kg\dose q 12 at first day then once daily	Similar to vancomycin but longer duration
Carbapenems		
<i>Meropenem vial 500 mg</i>	20-40 mg\kg , q 8. Neonate < 7 day q 12 hr	Act on G+ve,G-ve, aerobic and an aerobic but may resist by staph MERSA
Macrolide antibiotic		
<i>(used in whooping cough, alternative in paencillin allergy)</i>		
<i>Erythromycin Suspension 125,250mg</i>	12.5 mg\kg divide q 6hr	Not used under 2week Sudden death (cardiac causes)if use with drugs inhibit CYP3A4
<i>Azithromycin susp. 200mg</i>	10mg\kg once daily	Use in age over 1month
<i>Clarithromycin 25,250 mg</i>	15 mg\kg\day divide every 12hr	
Bronchodilator		
<i>Aminophylline Amp 250 mg\ 10 cc</i>	5mg\kg (1cc\5kg)	rapid infusion cause tremor. *avoid combination with salbutamol ,risk of hypokalemia
<i>Hydrocortisone Vial 100 mg/ 2cc</i>	10-15 mg\kg Divide q 12,8 or ,6 hr	

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Dexamethasone (decadron) amp 8mg /2cc	0.3 mg\kg\day divide q 12hr	Rapid iv cause vomiting
Prednisolone Tab 5 mg, oral so.	1-2mg\kg\day	Max (60 mg daily)
Methylprednisolone Vial 125,500,1000 mg	10-20 mg\kg once daily for 3day	Max (1g)
antiviral		
Acyclovir (zovirax) vial 500 mg	10 mg\kg\dose q 8 hr	contraindication> 10mg/ml,increase risk of phlebitis, usually 7 mg / ml G5W. AVOID RAPID INFUSION(RENAL DAMAGE)
Anti anaerobic and protozoa		
Metronidazole (flagyl) Vial 500mg/100ml Susp200mg/5ml	7.5 gm (1.5cc)\kg\dose q 8 hr	Disulfiram- like reaction with alcohol ,metallic tast s/e
Tinidazol Tab 250,500 mg	>3 years 50 mg/kg/day for 3 day	Max 2g
antiulcer		
omeprazole 20,40 mg vial ,cap.	0.7 mg\kg once, increase if necessary to3mg\kg	PPI, at first should resolve drugs by DW, then add to 100 ml fluid
Cimetidine (Tagamet) Amp 150 mg/ml	5-20 mg\kg\day divided q6-12 hr	infusion, not documented in paediatric BNF 2015 , bec. Cardiac problems
Ranitidine (zantac) Amp 50 mg/ 2ml	2-4 mg\kg twice daily	(Max(150 mg twice
others		
Hyoscine butylbromide (buscopan) amp 20mg/ lm	0.3-0.5 mg\kg	Max 5 mg, dilute with G.W or N.S if IV
Diazepam(valium) Amp 10 mg/2ml	0.3-0.4 mg\kg (1\4 cc / 5 kg)	Max 10mg
Phenobarbital (luminal) Amp 15,30,60,200mg/ml	LD- 15 mg\kg MD- 5 mg\kg q 12hr.	
Carbamazepine (tegreto) Sus. 100mg/5ml	5-10 mg/kg/day In 2-4 divided dose	
Alermine amp.	0.2 mg\kg\day	Diphenhydramine recommended to age>6year, but chlorpheniramine to> 1month,,, if iv diluted with G5W
Albumin vial 20%	0.5-1 g\kg (2.5—5 cc\kg)\day, q 12 h	
Mannitol 20% (20 g/100 ml) (1g/ 5ml	initial 0.5 – 1 g / kg (2.5 -5 cc/ kg) , MD (0.25-0.5 g/kg q 4-6 hr)	

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Paracetamol	10-15 mg/ kg/ dose	May be use every 4 hr in sever fever
Furosemide(Lasix) Amp 10 mg/ml	1-2 mg\kg\day Divide q 12 hr	Diluted iv with G5W
Adrenaline Amp. 1mg/ml(1:1000) 0.1 mg/ml(1:10,000)(100µ/ml)	0.1 mg\ kg	
Atropine Amp. 100, 200 µ/ml	0.01-0.02 mg\kg	
digoxin amp 0.5/ 2ml	LD 0.01 mg\kg MD 0.005 mg\kg	Divide result on 0.0025 to result number of unit
Dopamine 40 mg/ml	1-20 µg/kg/min	Excess urine output(dose<5 µg/kg/min),,oliguria (dose> 10 µg/kg/min)

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The stability of parenteral drugs

Drugs name	Stability
Ampicillin	1 hour in WFI / 9h in N.S/ 2h in D5W
Amikacin	24 h
Amiodarone	24h ,protect from light
Albumin	Store $\leq 30^{\circ}\text{C}$, use within 4 hr after opening vial.
Fator VIII	3h, store under refrigeration 2-8C, avoid freezing
Atropine	Protect from light
Calcitriol	Protect from light
Cefepime	24 h \ 7 days (refrigerated)
Cefotaxime(ciaforan)	12-24 h \ 7-10 days(refrigerated)
Ceftriaxone	2-3 days\10 days(refrigerated) Note\ premixed powder protect from light
ceftazidime	12h\3 day refrigerated
Ciprofloxacin	14 days, (Protect from light)
Dexamethasone(decadron)	24h \2days (refrigerator) ,(protect from light)
Diazepam (valium)	3 month , (protect from light) , do not mix I.V. with other medication.
Diphenhydramine	Protect from light
Dopamine	Protect from light ,sol. Darker than slightly yellow should not used
Adrenaline	The 1:1000 sol. 30 days\ the parenteral admixture 24 h.\ protect from light and air, not used if discolored with pink or brown color
Furosemide	Protect from light\not use if yellow\ refrigeration cause crystallization may be performed without affecting stability
Heparin	Are colorless to slight yellow\protect from temp. $>40\text{C}$
Imipenem	4h at room t.\24 h refrigerated \not dilute $>5\text{mg}\ 1\text{ml}$
Mannitol	Stored at room temp(15-30C), crystallization occur at low temp. not use sol. With crystal until cool to body temp. by heating in a hot water bath and vigorous shaking
Methylprednisolone	48 h.
Metronidazole (flagyl)	Prolong exposure to light will cause a darkening of the product
Meropenem	Reconstituted (50mg/ml): in WFI 2h\12h refrigeration In N.S. 2h\18 h refrigeration In D5W 1h\8h refrigeration Infusion 1-20 mg/ml : In N.S. 4h\ 24 h refrigeration
Vancomycin	4 days
Acyclovir	24 h. \ reconstituted to $\leq 7\text{mg}\ \text{ml}$, if $>10\text{mg}\ \text{ml}$ increase risk of phlebitis.
erythropoietin	Undiluted in plastic syringe 2 week\ for iv inf. Diluted ,24 hr

Reference : Lexi-Comp , Drug information (American pharmacists association), 2009-2010

Micromedex Neofax Essential 2014



Part one

Drug administration notes

- ✚ Preparation
- ✚ Administration
- ✚ Concentration
- ✚ Stability
- ✚ Important notes

1.1 Acyclovir (zovirax)

Antiviral agent

administration

10 ب 500 mg vial-تحل
ماء مقطر ml

250 mg vial, ب 5 ml
ماء مقطر

ml في كل 50 لينتج

٢- نحسب جرعة المريض ✓

10 \kg\dose(max 20)

every 8 hr

٣- لمعرفة كم مل نسحب من الفياال و نقسم
الجرعة على

÷ 50

٤- اما كمية المغذي الي نخفف فيها
العلاج لتركيز ٥ ملغم/مل فتحسب
بتقسيم جرعة المريض في خطوة ٢

÷ 5

Stability:

24 hr at room temperature

Avoid refrigeration as they may precipitate

Note:

Infusion concentration

> 10 mg

Increase the risk of **phlebitis**,

So should low concentration

Ex: patient required 200 mg acyclovir, you have vial 250 mg.

What volume of drug and fluid?

-250 vial reconstitute in 50 ml distal water = 50 mg/ml

200mg required dose
hand dose 50mg in ml = 4 ml (take from vial)

* Volume of fluid to give concentration 5mg/ml

$$\frac{\text{required dose } 200 \text{ mg}}{\text{required concentration of dilution } 5 \text{ mg in ml}} = 40 \text{ ml}$$

(so take 4 ml from vial and add fluid GW or NS to reach to 40 ml and give as iv infusion over 1 hour by use regulator

1.2 Aminophylline

Xanthines, relaxes smooth muscles of RT, and suppress the response of the airways to stimuli
Used to treat pulmonary condition (asthma, COPD), and apnea in neonate

Administration :

للتقطير الوريدي خلال على الأقل نصف ساعة

يجب تخفيف الجرعة الى

(1mg \ ml)

Vials available (250 mg \ 10 ml)

So each ml = 25 mg

Dose

Neonate, LD = 8mg \ kg iv infusion over 30 minute

„MD = 1.5-3 mg \ kg \ dose q 8hr

>month = 5 mg \ kg (1 ml \ 5kg)

max. per dose 500 mg),

بما ان كل مل يحتوي 25 ملغم
بالامكان حساب الجرعة للسهولة بالطريقة

(1 ml \ 5 kg)

Basic calculations

Desired dose (D)
Known dose on hand (H) x Unit of measure or volume on hand (Q)

= volume or unit of measure to be administered (X)

$$\frac{D}{H} \times Q = X$$

Example :

Patient weight 5 kg , need aminopylline in dose 5 mg \ kg

♣ Dose = 5 * 5 = 25 mg aminophylline

♣ Ampoule 250 mg in 10 ml

♣ What volume required???

♣ $\frac{\text{you want 25 mg}}{\text{you have 250 mg}}$ it is in 10 ml

♣ = 1 ml (25 mg)

♣ Dilute to 1mg \ ml, so add 24 ml fluid (GW or NS)

Or use basic formula

notes

- ❖ Its narrow therapeutic index
- ❖ Its IV **incompatible** with ceftriaxone, ciprofloxacin , epinephrine, amiodarone, methylprednisolone, dobutamine

Aminophylline over dose

Overdose symptome

Seizure , hypotension,
hypomagnesemia, hypokalemia,
(hypo or hypercalcemia),
tachycardia, arrhythmia,
vomiting, abdominal pain ,
hyperglycemia

Treatment toxicity :

Activated charcoal 1g/kg as a slurry
by gavage tube every 2-4 hr

***the aminophylline(theophylline + ethylenediamine), its **parenteral form** of theophylline (oral form ,rapid absorption " present in **exdil syrup**".

** avoid give oral theophylline to patient on iv aminophylline in same day.

its hepatic metabolism, so **increase serum level in combination **with hepatic inhibitors drugs** as ((cimetidine, macrolid, ketoconazole, valboric acid , omeprazole and ciprofloxacin))

** **its have narrow therapeutic index** ,ie; therapeutic serum level (10-20 mcg/ml),,, while toxic levels >20 mcg/ml,, however adverse effect appear within normal level .

1.3 digoxin

Its **cardiac glycoside**,
increase Ca through inhibition
 of $\text{Na}^+/\text{K}^+ \text{ATPase}$,
treat systolic heart failure
 and **supraventricular**
tachyarrhythmias

Dose

$$\text{LD} = 0.01 \text{ mg/kg}$$

$$\text{MD} = 0.005 \text{ mg/kg}$$

Stability:

Protect from light

Basic calculations

$$\frac{\text{Desired dose (D)}}{\text{Known dose on hand (H)}} \times \text{Unit of measure or volume on hand (Q)}$$

= volume or unit of measure to be administered (X)

$$\frac{D \times Q}{H} = X$$

Administration way 1

Common available ampule concentration

$$0.5 \text{ mg} \setminus 2 \text{ ml} = ((0.25 \setminus \text{ml}))$$

As each ml = 100 unit so,,,,,,1 unit = 0.0025

وهذا ما يسهل معرفة كمية العلاج التي يجب سحبها من
 الامبول

وذلك بتقسيم الجرعة المحسوبة على

0.0025

Desired dose of digoxin \div 0.0025 = number of
unit should take from ampule (0.5 \setminus 2ml)

Or by use basic calculation

Example: child weight 10 kg,, need LD digoxin = 0.01 * 10 = 0.1 mg digoxin

Ampule = 0.5 mg \setminus 2ml

What is volume required???

* you want 0.1
 you have 0.5 * it is in 2ml = 0.4 ml (=40 unit as each ml=100 unit)

Or by direct way as each unit in digoxin ampule =0.0025

$$\frac{\text{you want 0.1}}{\text{you have 0.0025 in each unit}} = 40 \text{ unit}$$

Iv administration over 5-10 min.,
 undiluted or diluted at least 4-fold in
 compatible fluid(GW,NS,or SWFI).

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Digoxin toxicity

*hypokalemia predispose the child to digitalis toxicity and should be avoided ; it manage by a potassium –sparing diuretic or , if necessary , potassium supplement.

***if toxicity occur:**

1-digoxin withdrawn

2-give digoxin –specific antibody fragments (**digoxin immune Fab**) , powder for injection 38 mg

إذا كانت جرعة الديجوكسين معروفة

So the Fab dose:

Treatment of Life-Threatening Digoxin Toxicity:

Digibind® Digoxin Immune Fab. IV over 30 minutes through 0.22-micron filter

Dose (# of vials) = (weight [kg]) x (serum digoxin concentration)/100

Each vial of digibind contains 38 mg (enough to bind 0.5 mg Digoxin).

اما اذا كانت الكمية غير معروفة

Fab dose in adult and child= 20 vial as single dose or give 10 vial observe response and a second 10 vial if indicated

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1.5 ALBUMIN

Its plasma volume expansion , replacement of plasma protein, increase intravascular oncotic pressure , mobilize fluids from interstitial into intravascular space.

The solution may be

#-- **isotonic (containing 3.5 – 5 % protein) , used in acute loss of plasma volume (e.g. in burn, pancreatitis, trauma plasma exchange)**

#--or **concentrated (containing 15-25 % protein) , most available (20%) , used in severhypoalbuminaemia associated with low plasma volume and generalized oedem in nephrotic syndrome, adjunct in the treatment of hyperbilirubinaemia by exchange transfusion in the newborn.**

Stability

Store in $\leq 30^{\circ}\text{C}$

Use within 4 hour
after opening vial

Administration

Most available vial **20 %**

20 g \ 100

= **1 gram \ 5 ml**

Dose

0.5- 1 g \ kg \ dose

Max (1g \ kg \ 24hr)

20%albumin وهذا ما يعادل في

2.5-5 ml \ kg q 12 hr

Ex: patient wt. 10 kg, need 1g \ kg , so dose= 10 g albumin

♣ Available vial 20%(20 g in 100 ml)

♣ What volume required???

$\frac{\text{required dose}}{\text{amount on hand}} * \text{volume of vial} = \text{dose(ml)}$

$\frac{10 \text{ g}}{20\text{g}} * 100 = 50 \text{ ml}$ **take from vial and infusion within half hour**

Infusion rate should not exceed 1 ml \ minute

Notes :- If need 5% albumin, if unavailable , it may prepared by dilute avialble albumin with 0.9 N\ S or 5%GW. Do not use distal water as this associated with hypotonic – associated hemolysis... while 5% albumin not diluted

1.6 adrenaline

Adrenaline (epinephrine) is a major hormone secreted by adrenal medulla, **alpha\beta adrenergic agonist**, strong α -effect cause increase cardiac output and HR, decrease in renal perfusion and variable effect on BP. Strong B1 and moderate B2 effect, resulting in bronchial smooth muscle relaxation.

Adrenaline provide physiological reversal of the immediate symptom associated with hypersensitivity reaction as **anaphylaxis and angioedema**.

concentrations

1:1000 = 1 g \ 1000 ml

=1000 mg \ 1000ml

=1mg/ml or 1000mcg/ml

1:10,000 = 0.1 mg/ml

=100 mcg \ ml

Stability

Light and air sensitive,

The 1:1000, discard after **30 day**
after initial use

Admixture injection stability **24**
hr.

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- ♣ Classes : diuretics, osmotic agent
- ♣ Promotion of diuresis, reduction of increased intracranial pressure associated with cerebral edema

1.7 Mannitol

Intravenous infusion over 30-60 minute

$$10\% = 10 \text{ g} / 100 \text{ ml} = 100 \text{ mg/ml}$$

$$20\% = 20 \text{ g} / 100 \text{ ml} = 200 \text{ mg/ml}$$

Dose

0.25-1.5 g/kg

repeated if necessary 2-3 time after 4-8 hr

Stability

- ❖ Stored at room temp. (15-30 °C)
- ❖ Crystallization may occur at low temp.

Administration

- ❖ Examine infusion for crystal
- ❖ Do not use solution that contain crystals.
- ❖ Should heating in a hot water bath and vigorous shaking may utilized for resoulbilization
- ❖ Cool solution to body temp. befor use
- ❖ For mannitol 20% or more , an in line filter is recommended (15-micron filter used)

من فضلك



لحظة

وجود جزيئات كريستال شفافة لا يعني عدم صلاحية العلاج، وإنما تحدث بسبب انخفاض درجة الحرارة.

وتحل هذه المشكلة بوضع العبوة في ووتر باث ثم رجها لحين ذوبانية الكريستال

ولا تعطيه مباشرة للمريض بعد التسخين انا ينظر الى ان يبرد لدرجة حرارة الجسم،

وفي حال استخدام التركيز ٢٠ %، فعندها يجب استخدام فلتر

Ex ; patient need 5 gram mannitol

- You have 20% mannitol bottle
- What is volume required

$$\frac{5}{20} * 100 = 25 \text{ ml iv infusion over 30 min.}$$

- ❖ Check crystal befor administer

Evaluate urine output at least 1ml/kg/hr for 2-3hr

For increased intracranial pressure check serum osmolality

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1.8 PHENOBARBITAL (LUMINAL AMPULE)

Dose

Loading dose = 15-20 mg/kg

Maintenance dose = 3-5 mg/kg/24 hr, q12, (given after after 8-12 hr of bolus dose time)

administration

- ♣ injection 30,60,90,200 mg/ml
- ♣ Contain propylene glycol as excipient, irritate vein.
- ♣ Must dilute to 5-20 mg/ml with water for injection or normal saline
- ♣ Give over 20 minute, not more than 1mg/kg/minute

♣ Anticonvulsants Short-acting barbiturate.

- ♣ has no analgesic effects
- ♣ Sedative/hypnotic
- ♣ Act on GABA receptor

Adverse effect

Hypotension, drowsiness,
respiratory depression
,paradoxical hyperactivity

Example : patient require 300 mg luminal as LD, you have ampule 200 mg/ml

♣ What volume required from ampule? And volume of fluid to dilute to 20 mg/ml?

$$\frac{\text{required dose}}{\text{hand amount}} * \text{volume of hand amount}$$

$$\frac{300}{200} * 1\text{ml} = 1.5\text{ml take 1.5 ml from ampule}$$

♣ To dilute this dose to 20 mg/ml, the amount of fluid NS or water for injection calculate by:

$$\frac{\text{required dose}}{\text{required dilution}} = \text{amount of fluid}$$

$$\rightarrow \frac{300}{20} = 15 \text{ ml of fluid}$$

Take 1.5 ml from luminal ampule and complete volume to 15 ml by WFI or NS and administer by intravenous infusion through at least 20 min

1.9 Phenytoin

- Anticonvulsant often used to treat seizures refractory to phenobarbital.

Dose

- ✓ **Loading dose:** IV infusion over at least 30 minutes

→ **Neonate** 15 to 20 mg/kg (max 0.5 mg/kg/min)

→ **Children and adult** 15-18 mg/kg (max 1-3 mg/kg/min)

- ✓ **Maintenance dose:** IV slow push, or orally.

4 to 8 mg/kg every 24 hours, q12-24 hr

iv injection:

- ♣ Store at room temp (15-30°C)
- ♣ use only clear solution
- ♣ precipitation may occur if refrigerated

after dilution to 1-10 mg/ml for iv infusion use within **1 hr**

tablet, capsule, store <30°C, protect from light

suspension store at 20-25°C, protect from light

stability

- ❖ **Flush IV with saline** before and after administration to prevent irritation
- ❖ Phenytoin is highly unstable in any IV solution (**only normal saline 0.9%**).
- ❖ Avoid using in central lines because of the risk of precipitation.
- ❖ **IM route** not acceptable; drug crystallizes in muscle.
- ❖ **Oral** absorption is erratic.
- ❖ **Injectable** solution available in a concentration of **50 mg/mL**
- ❖ Give into large vein through an in-filter (0.22-0.5 micron)
- ❖ **in rate** not exceeding **1 mg/kg/min (max 50 mg/minute)**
- ❖ For **iv infusion dilute to 10 mg/ml with normal saline 0.9%**

1.10 Magnesium sulfate

Dose

- ♣ **Neonate:** 100 mg/kg every 6–12 hours
- ♣ **Child 1 month–11 years:** 50 mg/kg q 12 hr

As required, to be given over at least 10 minutes

maximum 5 g per day

stability

- ♣ **Prior to use**, store at room temp. of **20-25 °C**
- ♣ **Refrigeration** of solution may result in **precipitation and crystalization**

administration

Available : **50 %** magnesium sulfate injection

This mean: $\frac{50}{100} = 0.5 \text{ g/ml}$ (**1g \ 2ml**)

$0.5 \text{ g} * 1000 \text{ mg/g} = 500 \text{ mg/ml}$



If you need dose 500 mg magnesium sulfate (wt. 5kg)

$\frac{\text{required dose}}{\text{hand dose}} * \text{hand volume}$

$$\frac{500}{500} * 1 = 1 \text{ ml}$$

Must be diluted prior to IV administration (10% to 20% solution (**100 to 200 mg/mL**)).

❖ If dilute to 100 mg/ml
 $\frac{\text{required dose}}{\text{required dilution}} = \frac{500 \text{ mg}}{100 \text{ mg in each ml}} = 5 \text{ ml}$

So take volume of dose (1ml) and complete to 5 ml fluid GW 5% or N.S.

❖ Rate of administration should not exceed 10 mg/kg/minute = $10 * 5 = 50 \text{ mg/min}$

So rate in this example 10 minute



Part two

Intravenous fluid

- ✚ Fluid Osmolality calculation
- ✚ Differentiation between type of fluids
- ✚ Preparation require percent of fluid from available percent .

Intravenous fluid

Plasma osmolality is normally between 275-290 mOsm/kg

Intravenous fluid can be classified according to its osmolality relative to plasma:-

- 1- isotonic fluid..... same plasma osmolality
- 2-hypertonic fluid> plasma osmolality
- 3-hypotonic fluid..... Less than 150 mOsm/l

2.1 calculating the Osmolality of IV fluids in milliosmole/liter

This can be simply understanding by examples

Salt	osmoles
NaCl	2
KCl	2
CaCl ₂	3

Calculation for normal saline NS 0.9%

Mw	Osmoles	Osmotic coefficient
58.5 g/mol	2	0.93

$$\frac{0.9 \text{ g}}{100 \text{ ml}} \times \frac{1 \text{ mol}}{58.5 \text{ g}} \times \frac{2 \text{ mOsm}}{1 \text{ mol}} \times \frac{1000 \text{ mOsm}}{1 \text{ Osm}} \times \frac{1000 \text{ ml}}{1 \text{ L}} \times 0.93 = 287 \text{ mOsm (isotonic)}$$

Note: 93% from NaCl dissociate in solution (thus the osmotic coefficient is 0.93)

Calculation for D5W

5 g	1 mol	1000 mOsm	1000 ml	=	278
100 ml	180 g	1 mol	1L		

	m.wt	valence	Eq.w.
Na	23	1	23
K	39	1	39
Cl	35.5	1	35.5
mg	24	2	12

Osmolarity of D5W\NS(glucose saline)=

$$287 + 278 =$$

565 mOsm\l (hypertonic).

While 1\5 glucose saline (0.18%) isotonic

$$57.4 + 222.2 = 279.6$$

Tonicity of IV Fluids

- Isotonic
 - 0.9% saline (NS)
 - 5% dextrose in water (5% DW)
 - 5% dextrose in 0.225% saline (5% D/1/4NS)
 - Lactated ringer's solution
- Hypotonic
 - 0.45% saline (1/2 NS)
- Hypertonic
 - 5% dextrose in lactated Ringer's
 - 5% dextrose in 0.45 saline (5% D/1/2NS)
 - 5% dextrose in 0.9% saline (5% D NS)
 - 10% dextrose in water (10% D/W)

2.2 Type of glucose saline IV fluid

يمكن التمييز بينها بالاعتماد على

NaCl concentration in iv fluid

Standard normal saline percent = 0.9 % NaCl

لذا فالأنواع تكون كالآتي:

Glucose saline

Contain standard

Nacl 0.9%

Glucose 5%

1\2 glucose saline

$$\frac{\text{standard NaCl } 0.9}{2} = 0.45$$

عند ملاحظة

0.45% on iv fluid bottle

يدل على انه نصف سلاين

1\5 glucose saline

$$\frac{0.9}{5} = 0.18$$

لذا عند ملاحظة

0.18 % on iv fluid bottle

نعرف انه خمس سلاين

2.3 Preparation of glucose water 10 %

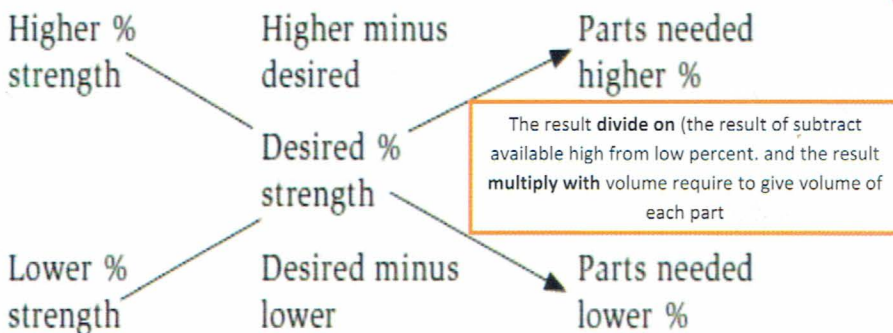
Twa way in preparation fluid 10% from hypertonic 50% and glucose water 5% :

1. **The first** way, direct and simple way , depend on reference , **British inherited metabolic disease group (BIMDG)** . **subtract and add method (9.5% from require volume)**

نقسم الحجم المطلوب على عشرة

Ex: to prepare 500 ml 9.5 % glucose water , the British group detect this by **subtract 50 ml** from (500 ml GW 5%) and **add 50 ml** (dextrose 50%).

2. **The second** way, depend on reference, **Math for pharmacy Technicians; Lorraine C** and Pharmaceutical Calculations 13th Edition . by method called **Alligations method** (is the method used to determine the volume necessary for each ingredient combined (i.e., same ingredient, different percent strength) to produce a new percent strength. This new percent strength must be in-between the two being combined. It resembles a **tic-tac-toe board** .



Pediatric Drug Administration guide (PDA guide)

The difference between two method

The difference between two method can be detected by example :

prepare 100 ml (10% glucose water, GW), from available 50% dextrose (hypertonic), and 5% glucose water

By first way (subtract and add method):

نقسم الحجم المطلوب على عشرة ، والناتج هو كمية الهايبرتونك (٥٠ %) ثم نكمل الى الحجم المطلوب بواسطة

Glucose water 5%

$100 \setminus 10 = 10$,, take

10 ml 50% dextrose

90 ml of 5% GW

By second method (allegation method):

5%		$\frac{5}{45} \times 100 \rightarrow 11.11\%$	of 5% Dextrose
	10%		
5%		$\frac{40}{45} \times 100 \rightarrow 88.88\%$	of 5% Dextrose

This example give notice that the difference **0.05 %** between them:

The second method give accurate percent result **10% and osmo. 555.6** ,, while the first method give **9.5 % and osm 527.8** ,, so both hypertonic ,

في اكثر من مستشفى تم الاعتماد على الطريقة الاولى في تحضير ١٠ % ، فضلا عن كونها سريعة ولا تحتاج لعملية حسابية ،

فان مقارنة نسبة الخطأ الذي قد يحصل مع الفارق الضئيل في النسبة (٠,٠٥) وكذلك كون النتيجة

Hypertonic

مما يرجح استخدام الطريقة الاولى

ويبقى الخيار لكادر المستشفى من الاختصاص والصيدلاني وفي هذه الحالة يجب متابعة الحسابات

أعداد : د. الصيدلانية الاختصاص رشاد خلف جبر

BSc pharmacy, MSc clinical biochemistry

Pediatric Drug Administration guide (PDA guide)

Calculation of Osmolality for 10% GW, and 9.5 % GW

Calculation for D10W

10g	1 mol	1000 mOsm	1000 ml	=	555.6
100 ml	180 g	1 mol	1L		

Calculation for D 9.5 W

9.5 g	1 mol	1000 mOsm	1000 ml	=	527.8
100 ml	180 g	1 mol	1L		

Calculate new percent strength,,, after mix 10 ml 50 % dextrose with 90 ml 5 %.

$$50\% = 0.5 \cdot 10 \text{ mL} = 5 \text{ mL}$$

$$5\% = 0.05 \cdot 90 \text{ mL} = 4.5 \text{ mL}$$

$$\text{Totals: } 100 \text{ mL} = 9.5 \text{ mL}$$

$$9.5 \text{ mL} \div 100 \text{ mL} = 0.095 \cdot 100 = 9.5\%$$

EX:Preperation hypertonic G\W in different percent


Method add and subtract give 9.5% GW:

If 50% glucose and 5% dextrose is available

- Remove and discard 50 ml from a 500ml bag of 5% glucose .
- To the remainder of the bag add 50ml 50% glucose.

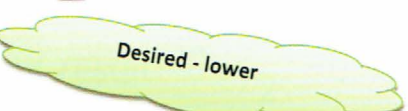
This mean mix 450 ml (5% glucose) + 50 ml (50% glucose)

Second method: allegation method give 10 % G



$$50-10=40 \div 45=0.89 \times 500\text{ml} = 444.4 \text{ ml (5\% GW)}$$

$$10-5=5 \div 45 = 0.111 \times 500 = 55.6 \text{ ml (50 \% glucose)}$$



Desired - lower

This mean mix 444.4 ml (5% glucose) +
55.6 ml (50% glucose)

2.4 Preparation $\frac{1}{5}$ glucose saline

Required :

- ☒ $\frac{1}{5}$ glucose saline (0.18 % NaCl + 4 % glucose)

Available :

- ❖ glucose water (5% glucose)
- ❖ normal saline (0.9 % NaCl)



preparation :

- ✓ can prepare required fluid by using ratio **4:1 (glucose water 5% : normal saline 0.9 %)**
- ✓ i.e. for each 80 ml G.W5% add 20 ml N.S 0.9%
- ✓ i.e. **subtract** 100 ml from fluid bottle (500 ml) contain GW 5%, and replace this volume by **add** 100 ml N.S.
- ✓ result $\rightarrow \frac{0.9 \text{ NaCl}}{5} = 0.18$ fifth saline

2.5 Preparation $\frac{1}{2}$ glucose saline

0.45 % NaCl +2.5 %

Required :

- ♣ $\frac{1}{2}$ glucose saline (0.45% NaCl+2.5% glucose)

Available:

- glucose water (5% glucose)
- normal saline (0.9 % NaCl)

preparation:

- ✓ can prepare required fluid by using ratio **(2.5):(2.5)**
(glucose water 5% : normal saline 0.9 %)
- ✓ i.e. for each 50 ml G.W5% add 50 ml N.S 0.9%
- ✓ i.e. **subtract** 250 ml from fluid bottle (500 ml) contain GW 5%, and replace this volume by **add** 250 ml N.S.
- ✓ result $\rightarrow \frac{0.9}{2} = 0.45$ half saline

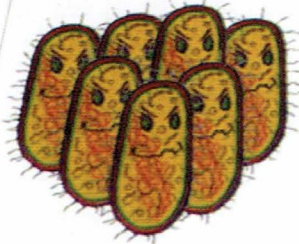


Part three

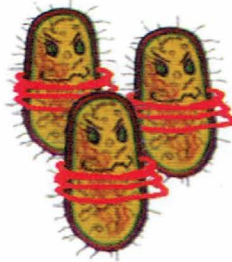
Antibiotic

- + Simple Classification
- + Mechanism of action
- + administration according to age
- + course of treatment

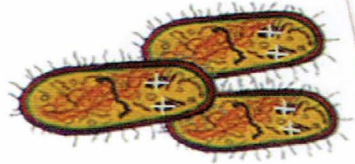
Bacteriocidal and bacteriostatic antibiotic



**No antibiotics
bacteria multiply**

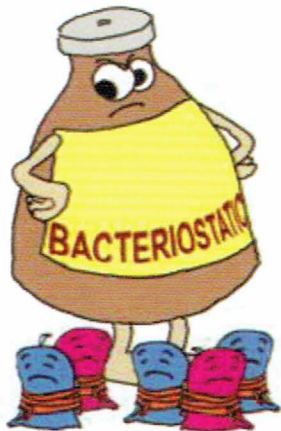


**Bacteriostatic
antibiotics
prevent bacteria
multiplying**

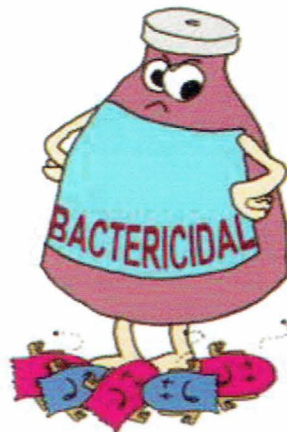


**Bactericidal
antibiotics
kill the bacteria**

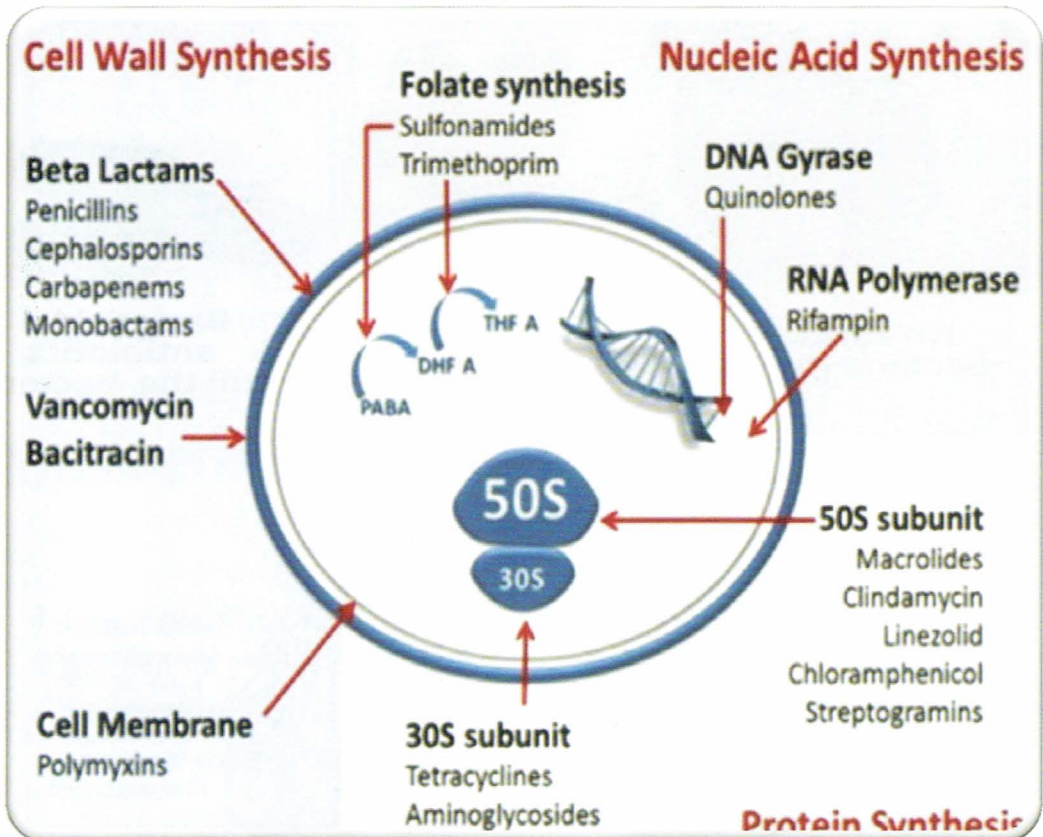
EXAMPLES:
Chloramphenicol
Erythromycin
Clindamycin
Sulfonamides
Trimethoprim
Tetracyclines



EXAMPLES:
Aminoglycosides
Beta-lactams
Vancomycin
Quinolones
Rifampin
Metronidazole



Antibiotic mechanism of action



3.1 Macrolides antibiotic

The macrolides have an antibacterial spectrum that is similar but not identical to that of penicillin; they are thus an **alternative in penicillin-allergic patients.**

Indications for the macrolides include campylobacter enteritis, respiratory infections, penicillin resistance staph. (including pneumonia, **whooping cough**, Legionella, chlamydia, and mycoplasma infection), and skin infections.

Azithromycin

10 mg/kg once daily (3-5 day)

To child > 6 month

Clarithromycin

7.5 mg/kg twice daily (14-21 day)

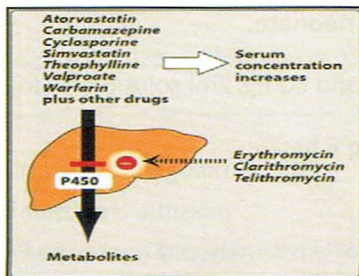
To child > 1 month

Erythromycin

12.5 mg/kg q 6 hr (14 day)

Risk of hypertrophic pyloric stenosis in age < 2 weeks

Dose and age



- ☒ *Epigastric distress side-effects are mild and less frequent with azithromycin and clarithromycin than with erythromycin.*
- ☒ *Jaundice (especially with estolate erythromycin)*
- ☒ *Ototoxicity (transient deafness with high dose erythromycin).*

3.2 Aminoglycoside antibiotic

All are **bactericidal** and active against **some Gram-positive and many Gram-negative** organisms. Amikacin, gentamicin, and tobramycin are also active against *Pseudomonas aeruginosa*; streptomycin is active against *Mycobacterium tuberculosis* and is now almost entirely reserved for tuberculosis.

- ❖ **Treatment should not exceed 7 days**, as the side effect are dose-related .
- ❖ **A once daily, high dose regime of an aminoglycoside** Should be **avoided** in children with **endocarditis or burns of more than 20%** of the total body surface area. and pregnancy.

Caution in :

Myasthenia gravis

(it may impair neuromuscular transmission)

Interaction

should **not be given with potentially ototoxic** drugs (e.g. cisplatin).

If with **ototoxic diuretic (e.g. furosemide)** should **be separated by as long a period as practicable.**

- ✓ **Amikacin** (as Amikacin sulfate) 500mg/2ml and 100mg/2ml solution for injection vials

15 mg/kg/day (divide q 12 hr), once regime in neonate.

- ✓ **Gentamicin** (as Gentamicin sulfate) 20mg/2ml and 80mg/2ml solution for injection

<1month 5 mg/kg once, >month ,2.5 mg/kg q 8 hr

Streptomycin , 400 mg/ml

In TB treat : 15 mg/kg once daily by deep IM

Aminoglycoside course possible treatment should not exceed 7 days.

3.3 CARBAPENEMS

- ❖ are beta-lactam antibacterials with a broad-spectrum of activity which includes many Gram +Ve and Gram -Ve bacteria, and anaerobes.

imipenem (imipenem with cilastatin) and meropenem have good activity against *Pseudomonas aeruginosa*.

- ❖ The carbapenems are not active against methicillin-resistant *Staphylococcus aureus* (MRSA) and *Enterococcus faecium*.

Imipenem (imipenem with cilastatin) and meropenem are used for the treatment of: severe hospital-acquired infections and polymicrobial infections caused by multiple antibacterial resistant organisms including:

- ✚ septicaemia,
- ✚ hospital-acquired pneumonia,
- ✚ intra-abdominal infections,
- ✚ skin and soft-tissue infections
- ❖ complicated urinary tract infections).

Imipenem is partially inactivated in the kidney by enzymatic activity .

therefore administered in combination with **cilastatin (imipenem with cilastatin)**, a specific enzyme inhibitor, which blocks its renal

Meropenem

250, 500mg powder for solution for injection vials

20-40 mg/kg/dose q 8 , only age <7 day q 12 hr

Imipenem with cilastatin

Imipenem 500mg / Cilastatin 500mg vial

20 mg/kg q 12, 8 and 6 hours.

CAUTIONS:

CNS disorders
—risk of seizures,
epilepsy

Note: **Avoid** if history of immediate hypersensitivity reaction to beta-lactam antibacterials. Use with **caution** in patients with sensitivity to beta-lactam antibacterials.

3.4 CEPHALOSPORINS

are broad-spectrum antibiotics which are used for the treatment of :

- ❖ septicaemia
- ❖ pneumonia
- ❖ meningitis (especially cefotaxime and ceftriaxone
- ❖ biliary-tract infections
- ❖ peritonitis
- ❖ urinarytract infections.

0.5–6.5% of penicillin-sensitive patients will also be allergic to the cephalosporins.

❖ 1-st:

- ✓ Cefadroxil > 6 year 500 mg twice
- ✓ Cephalexin (Keflex) ,, 25 mg/kg/6hr

❖ 2-nd generation:

- ✓ Cefaclor > 12 years 375 mg 12 hr (double in pneumonia)

❖ 3-rd generation:

- ✓ Cefotaxime (claforan), 25 mg\ kg q 12, 8, 6 -hr (double in meningitis)
- ✓ Ceftriaxone , 50-80 mg/kg\day – daily. (Contraindication in: jaundice, hypoalbum. ,IV calcium *act in MERSA)
- ✓ Ceftazidim(fortam), 25-50 mg/kg\dose q 24, 12, 8 hr according to age
- ✓ Cefixime susp 100 mg\5ml (>6month, 75 mg daily)(> 1year 100 mg daily)

Note :some drug dose graduate q 3 time \hr , this depend on age (up to 6 days)(7–20 days)(>20 day)

3.5 GLYCOPEPTIDE ANTIBACTERIALS

The glycopeptide antibiotic have bactericidal activity against **aerobic and anaerobic Gram positive bacteria** including **multi-resistant staphylococci (MRSA)**.

However, there are reports of *Staphylococcus aureus* with **reduced susceptibility** to glycopeptides and **increasing reports** of glycopeptide-resistant enterococci.

Teicoplanin is similar to vancomycin, but has a significantly **longer duration of action**, allowing **once daily** administration after the loading dose.

Teicoplanin

(targocid) vial 200,400 mg

10 mg/kg\dose q 12 at first day then once daily

(max. per dose 400 mg)

Vancomycin

250,500 mg vial

15 mg/kg\dose every 8 hr.

Neonate :

- ✓ < 29 weeks corrected gestational age , 15 mg/kg once
- ✓ 29 - 35 weeks corrected gestational age: 15 mg/kg q 12h
- ✓ >35 weeks corrected gestational age: 15 mg/kg q8hr

Notes in vancomycin

**** With intravenous use** Avoid rapid infusion (risk of anaphylactoid reactions) and rotate infusion sites. intravenous infusion, the reconstituted preparation should be further **diluted in sodium chloride 0.9% or glucose 5%** to a concentration of up to 5 mg/mL; give over at least 60 minutes .

****With oral use** Injection can be used to prepare solution for oral administration; **flavouring syrups** may be added to the solution at the time of administration(**in case of *Clostridium difficile* infection**)

****When used by inhalation** For nebulisation administer required dose in **4 mL of sodium chloride 0.9%** (or water for injections). Administer inhaled bronchodilator before vancomycin.(**in case of respiratory tract in cystic fibrosis**)

3.6 DIAMINOPYRIMIDINES

CO-TRIMOXAZOLE**Treatment of Pneumocystis jirovecii**

- ♣ **Oral suspension** Sulfamethoxazole 400 mg, Trimethoprim 80 mg
Sulfamethoxazole 800 mg, Trimethoprim 160 mg
- ♣ **CAUTIONS**
 - ✓ Asthma .
 - ✓ *avoid in infants under 6 weeks (except for treatment or prophylaxis of pneumocystis pneumonia) because of the risk of kernicterus disorders)*
 - ✓ *G6PD deficiency (risk of haemolytic anaemia)*
- ♣ **SIDE-EFFECTS**
 - ✓ *rash (including Stevens-Johnson syndrome, toxic epidermal necrolysis, Photosensitivity)*
 - ✓ *blood disorders (including leucopenia, thrombocytopenia, megaloblastic anaemia, eosinophilia)*
- ♣ **Dose :**
 - ✓ **BY MOUTH: > 6 week age , 120 mg\12 hr, > 6 month , 240 mg\12 hr**
 - ✓ **IV infusion : > 6 week age , 18 mg/kg every 12 hours**

Trimethoprim

- ❖ **Indicate** in: UTI, RTI .
50mg/5ml oral.
- ❖ **Dose;** 2 mg/kg twice daily.

Fusidic acid

- 📖 its salts are narrow spectrum antibiotics used for staphylococcal infections
- 📖 **Dose :** tab. Susp.
15 mg/kg 3 times a day.
>1y, 250 mg * 3 time

3.7 NITROIMIDAZOLE DERIVATIVES

Tinidazole:

It has a longer duration of action than metronidazole.

Tab: 250-500 mg

Dose:

>month , **50–60 mg/kg once** daily (max. per dose 2 g) for **3 days**

Side effect:

darkening of urine
 .dizziness . drowsiness .
 erythema multiforme .
 headache .hepatitis .
 jaundice . leucopenia.

Metallic taste.

Darkening of urine

METRONIDAZOLE (flagyl)

iv: each 1ml contain 5 mg

لذا نحسب الجرعة (وزن الطفل + نصفه) مثلا الوزن ١٠ كغم

So dose = 15 ml each 8 hr

Dose:

7.5 mg/kg every 8 hours (max. per dose 400 mg)

- ✓ IV treated for **7 days** (for 10–14 days in Clostridium difficile infection.
- ✓ By mouth
 - **3 time daily for 3 day**, then **twice** daily until complete 7 days
 - 1-11 month: 125 mg * 3 time
 - > 1 year 250 mg * 3 time
- ✓ **Helicobacter pylori eradication**; in combination with clarithromycin and omeprazole. Or with amoxicillin and omeprazole :**100-200 mg twice daily**



3.8 OXAZOLIDINONE ANTIBACTERIALS

Linezolid (Zyvox)

Is active against Gram-positive bacteria including **methicillin resistant Staphylococcus aureus (MRSA)**, and **glycopeptide resistant enterococci**.

Resistance to linezolid can develop with prolonged treatment or if the dose is less than that recommended.

Indicate in

Pneumonia, Complicated skin and soft-tissue infections. when other antibacterials cannot be used

DOSE

BY MOUTH OR BY INTRAVENOUS
INFUSION:

10 mg/kg every 8 hours.

(max. per dose 600 mg)

Infusion to be
administered over 30–120 minutes.

- ✓ 2 mg per 1 ml,
600mg/300ml
infusion bags
- ✓ **100mg/5ml**
granules for oral
suspension | 150 ml
- ✓ 600mg tablets

Important safety information

Severe **optic neuropathy** may occur rarely, particularly if

linezolid is used for longer than 28 days.

Close monitoring is recommended in patients

who:

. receive treatment for more than 10–14 days

3.9 PENICILLINS (BROAD-SPECTRUM)

PENICILLINS (ANTIPSEUDOMONAL)

Piperacillin with tazobactam

(Tazocin)

(2 gr+250mg) (4 g + 500 mg)

Indication:

- ✓ Hospital-acquired pneumonia
- ✓ Septicaemia
- ✓ Complicated infections involving the urinary-tract or skin and soft tissues.

Dose:

- ✓ 90 mg/kg q 8-6 hours

Common side effect :

- ✓ Nausea . vomiting

Administration:

For intravenous infusion, dilute reconstituted solution to a concentration of **15–90 mg/mL**, infuse over 30 minutes.

Ticarcillin with clavulanic acid

(timentin)

3 gram + 200 mg

Indication:

- ✓ Infections due to Pseudomonas and Proteus spp.

Dose:

- ✓ 80 mg/kg q 12,8,6 hr

side effect

- ✓ Stevens-Johnson syndrome . toxic epidermal necrolysis . vomiting

Administration:

For infusion, dilute reconstituted solution further to a concentration of **16–32 mg/mL**, infuse over 30–40 minutes.

Stability:

24 hr ,,,,,,,7 days if refrigerated

3.10 PENCILLINS

PENCILLINS (BETA-LACTAMASE SENSITIVE)

Amoxicillin:

- ❖ 30 mg/kg 3 times a day (max. per dose 125 mg)...> 1years 250 mg , 3 time daily . (note: neonate less 20 day age q 12 hr)

Co-amoxiclav(Augmentin)

Dose :--

- Iv over 4 minute : 30 mg/kg every 12 hours,,,,,> 3 month q 8 hr
- By mouth : 0.25 mL/kilogram 3 times a day.

Side effect:--

- Cholestatic jaundice . hepatitis .
- Phlebitis at injection site

nausea . vomiting

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Ampicillin:

30 mg/kg 4 times a day (max. per dose 125 mg).... > 1years 250 mg.

(note: neonate less 7 day age q 8 hr..... while more than 7 day q 12 hr).

Because (increased risk of erythematous rashes) , give with caution in :

Acute lymphocytic leukaemia . chronic lymphocytic leukaemia . cytomegalovirus infection .glandular fever

Co-fluampicil

Ampicillin 250 mg, Flucloxacillin 250 mg

❖ Used in Mixed infections involving **beta-lactamase-producing staphylococci.**

❖ Dose

❖ Child 1 month–1 year: 125/125 mg every 6 hours

▶ Child 2–9 years: 250/250 mg every 6 hours

▶ Child 10–17 years: 500/500 mg every 6 hours

(Administration for 2 weeks)

Note:

- ✓ flucloxacillin should not be used in patients with a history of hepatic dysfunction associated with flucloxacillin;
- ✓ . flucloxacillin should be used with caution in patients **with hepatic impairment;**

3.11 QUINOLONES

quinolones may induce convulsions in :

- ❖ patients with or without a history of convulsions;
- ❖ taking NSAIDs at the same time may also induce them.

Ciprofloxacin

active against Gram-negative bacteria, including:
salmonella, shigella, campylobacter, neisseria, and
pseudomonas.

has only moderate activity against Gram-positive
such as Streptococcus pneumoniae and Enterococcus
faecalis

Pseudomonal lower respiratory-tract infection in cystic fibrosis

BY MOUTH

- ▶ 20 mg/kg twice daily (max. per dose
750 mg)

BY INTRAVENOUS INFUSION

- ▶ Child: 10 mg/kg every 8 hours (max.
per dose 400 mg),
to be given over 60 minutes

Complicated urinary-tract infections

✓ BY MOUTH

10 mg/kg twice daily.

✓ BY INTRAVENOUS INFUSION

- ▶ Neonate: 6 mg/kg q12 , Child q 8 hr
to be given over 60minutes.

3.12 vancomycin

Its glycopeptide antibiotic, inhibit cell wall biosynthesis **bactericidal** against aerobic and anaerobic G+ve bacteria including **staphylococci (MRSA)**

Bacteriostatic
against
enterococci

Administration :

1- 500 mg vial + **10 ml** distal water \rightarrow 50 mg \ ml

1 g vial + 20 ml distal water \rightarrow

- 1- كل 500 mg vial تحل ب 10 ml ماء مقطر وكل 1g تحل ب 20 ml لتكون النتيجة **50 mg في كل مل**
- 2- نقسم ناتج الجرعة المضبوطة للمريض (15 mg \ kg \ dose) ، على 50 ليكون الناتج جرعة المريض بالمل

$$[\text{patient dose (in mg)} \div 50 = \text{patient dose (in ml)}]$$

- 3- ثم نضيف الجرعة الى ال fluid ويفضل normal saline او 5% glucose water ، للحصول على تركيز 5mg/ml ، ويستخدم جهاز تقطير خلال على الاقل ساعة

$$[\text{patient dose in mg} \div 5 = \text{amount of fluid (N\ S or GW5\%)}]$$

Example \ patient wt (10 kg) ,

Dose; 15 mg \ kg \ dose

Premature, once daily

<month,, each 12 hr

>month ,each 8 hr

500 mg vancomycin اذا كان المتوفر

1-) 500 mg + 10 ml distal water = 50 mg \ ml

2-) Dose = 10 (wt) \times 15 = 150 mg vancomycin in each dose (each 8 hr)

3-) 150 mg \div 50 = 3 ml (take 3 ml from vial , 50 mg in each ml)

4-) 150 \div 5 = 60 (add 3 ml vancomycin to 60 ml fluids N\ S or GW5\%) through two hour

(red man syndrome)

characterized by skin rash and hypotension , ia not an allergic reaction but rather associated with too rapid infusion

التقطير السريع للفانكوميسين يؤدي الى

Sever hypotension , shock , Cardiac arrest

Stability

4 days

at refrigeration

Red man syndrome

Red Man Syndrome

→ A rate-dependent infusion reaction (*not a true allergic reaction*)

Clinical

- Flushing
- Erythema
- Pruritus
- Affecting upper body, neck and face > lower body
- Myalgia, dyspnea, hypotension

Management

- Stop infusion
- Administer antihistamine (diphenhydramine)
- Can restart at slower rate once symptoms resolve

Vancomycin

Directly activates mast cells



Histamine release →

Other antibiotics (e.g. ciprofloxacin, amphotericinB, rifampicin and teicoplanin) or other drugs that stimulate histamine release can result in red man syndrome.

3.13 Meropenem

The carbapenems, beta-lactam antibacterial with broad –spectrum, against many G-ve and G+ve , and anaerobic, **good activity** against *pseudomonas aeruginosa*, **not active** against *MRSA* and *enterococcus faecium*

>month= each 8 hr
<month = each 12 hr

١-تحل 500 mg vial ب 10 ml ماء مقطر
و 1 gm vial ب 20ml ماء مقطر
لينتج 50 mg في كل ml

٢- نحسب جرعة المريض
20-40 mg\kg\dose

Ex –patient wt 10 kg (meningitis)

- 1-500mg vial + 10 ml DW = **50mg/ml**
- 2-dose in meningitis $40\text{mg} \times 10\text{kg} = 400\text{mg}$
- 3-Then $400\text{ mg} \div 50 = 8\text{ ml}$ (dose meronem)
- 4- $400 \div 5 = 40\text{ ml}$ (amount of fluid)

نأخذ ٨ مل من فيال الميرونيم ونضيفها الى ٤٠ مل من
المغذي وتحقن خلال نصف ساعة

٤- نقسم جرعة المريض
 $\div 5$
والناتج هو كمية المغذي الي
نضيفها للعلاج للحصول
على التخفيف بتركيز

5mg/ml

٣- نقسم جرعة
المريض
 $\div 50$
فنعرف عدد المل
التي نسحبها من
الفial

Note ;

Iv incompatible with
metronidazole (flagyl),
acyclovir, sod. Bicarbonate,
ca gluconate

Stability:

In WFI= 2hr\ 12 hr in
refrigeration
In normal saline= 2hr\ 18
hr in refrigeration

3.14

abstract

الخلاصة:

الطريقة الاولى لحل العلاج (توحي التركيز الى ٥٠ ملغم لكل مل

١- كل الادوية التي تكون بهيئة باودر

(vial powder)

لكي نحصل بالنتيجة على تركيز موحد

50 mg \ ml "

فإنها تحل اما بالطريقة:-

١- كل فيال ٢٥٠ ملغم نحلها في ٥ مل ماء مقطر

٢- كل فيال ٥٠٠ ملغم تحل في ١٠ مل ماء مقطر

٣- كل فيال ١٠٠٠ ملغم (١ غرام) تحل في ٢٠ مل ماء مقطر

وبكل الحالات الثلاث حصلنا على تركيز ٥٠ ملغم في كل مل

وبذلك يسهل علينا معرفة كم مل نسحب من الفيال بعد معرفة جرعة المريض

وذلك بتقسيم جرعة العلاج الموجودة في فيال المريض على ٥٠ والناتج هو كمية العلاج الي يتطلب سحبها من الفيال

على الصيدلي السريري

تثقيف الكادر التمريضي

في الردهة

حول المعلومات اعلاه

أعداد : د. الصيدلانية الاختصاص رشا خلف جبر

BSc pharmacy, MSc clinical biochemistry

الطريقة الثانية لحل العلاج

هي طريقة عامة لكل انواع العلاجات

Powder vial or ampules at any volume or concentration , by use equation



Basic calculations

$$\frac{\text{Desired dose (D)}}{\text{Known dose on hand (H)}} \times \text{Unit of measure or volume on hand (Q)}$$
 = volume or unit of measure to be administered (X)

$$\frac{D}{H} \times Q = X$$

Home

Example 1

Digoxin 125 microgram in 100ml sodium chloride 0.9% is prescribed over 1 hour.
500 microgram digoxin in 2ml ampoules are available.

The volume to be added to 100ml sodium chloride 0.9% is:

$$\frac{125 \text{ micrograms} \times 2 \text{ ml}}{500 \text{ micrograms}} = 0.5 \text{ ml}$$

Example 2

300mg aminophylline injection is prescribed. 250mg in 10ml ampoules are available.

The volume of injection required is:

$$\frac{300 \text{ mg} \times 10 \text{ ml}}{250 \text{ mg}} = 12 \text{ ml}$$

3. 15 Amikacin

3. 15 Amikacin

Its aminoglycoside, bactericidal against some G+ve and many G-ve organism, active against

pseudomonas aeruginosa (also other aminoglycoside as gentamicin and tobramycin, except streptomycin active against *mycobacterium tuberculosis*, should administer by infusion 5mg/ml

Administration

Stability
24 hour

إذا كان تركيز الفيال (250 mg/ml) فأنها تخفف الى 50 ml بالمغذي فتحصل على تركيز 5mg/ml

١- إذا كان تركيز الفيال (50 mg/ml) تخفف الى 10 ml بالمغذي فتحصل على تركيز 5mg/ml

= جرعة المريض (مل) 5 جرعة المريض (ملغم) ÷

Dose

Neonate 15 mg/kg/24 hr ,,,,,,,,,,Child : 15 mg \ kg \ day, then divide every 12 h

important note :

- * aminoglycoside side effect include nephrotoxicity and irreversible ototoxic
- * administration of aminoglycoside and other ototoxic diuretic (furosemide " lasix"),, should be separated by long period.
- ** parenteral treatment should not exceed 7 days

الى جميع الملاكات الطبية في قسم الأطفال

بين ايديكم هذا الدليل الذي بُذل فيه جهد لمدة سنة لكي تصلكم المعلومة بصورة مبسطة ودقيقة لمعظم الادوية المستعملة في قسم الاطفال والمتضمن:

اسهل واسرع العمليات الحسابية للجرع حسب الاوزان

طرق تحضير وإعطاء العلاج للمرضى

الفترات الزمنية لثباتية العلاج

إضافة الى طرق تحضير المغذيات

حيث صمم هذا الدليل ليسهل للخريج الجديد وخاصة الصيدلي والمتدرب في قسم الاطفال الاحاطة وبأقل فترة ممكنة بالمعلومات المشار اليها اعلاه ليكون عنصر فعال ضمن الكروب الطبي لإيصال الفائدة الممكنة للمريض ودفع خطر الاخطاء العلاجية عنه.

اذا لديكم أي اضافة او اقتراح فيما يخص الدليل

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مع خالص تمنياتي لكم بالتوفيق

الصيدلانية رشا خلف جبر

Pediatric Drug Administration guide (PDA guide)







أعداد: د. الصيدلانية الاختصاص

رشا خلف جبر

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