CICU
Drug Handbook

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CARDIAC

Adrenaline

Continuous infusion: IV/IO 0.01 - 0.5 mcg/kg/min
- Any dose >0.2mcg/kg/min to be discussed with ICU consultant
- Central access: (0.3 x BW) mg in 50ml → 1ml/hr = 0.1mcg/kg/min
- Max peripheral conc = 30mcg/ml

Bolus (resus): IV/IO 0.1ml/kg of 1:10,000
Bolus (pre-arrest dose): IV/IO 0.01ml/kg of 1:10,000
[Max dose = 1mg/dose or 10ml/dose]

ETT 0.1ml/kg of 1:1000 (resus)
[Max dose = 2.5mg/dose or 2.5ml/dose]

IM 0.01ml/kg of 1:1000 (anaphylaxis)
[Max dose = 0.5mg/dose or 0.5ml/dose]

Adenosine

Bolus (as per APLS): initial IV 0.1mg/kg (max 6mg/dose), if not effective, increase to 0.2mg/kg (max 12mg/dose)

Amiodarone:

Continuous infusion: IV/IO 5 -15 mcg/kg/min
- Central access: (30 x BW) mg in 50ml → 1ml/hr = 10mcg/kg/min
- Max peripheral conc = 2000mcg/ml

Slow bolus (loading): 25 mcg/kg/min for 4 hours

Fast bolus (pulseless VT/VF): IV/IO 5mg/kg
[Max dose = 300mg/dose]

Atropine

Bolus (bradycardia): IV/IO 0.02mg/kg
[Min dose = 0.1mg/dose; max dose = 0.6mg/dose]

ETT 0.04-0.06mg/kg/dose (may repeat once if needed)

Bosentan

PO 1-2mg/kg/dose BD
[Max dose = 125 mg/dose]

May be initiated at 0.5mg/kg/dose and uptitrated gradually as per hemodynamics and discussion with CVM

Bumetanide

Continuous IV infusion: IV 1-10mcg/kg/hour
- Central access: (0.25 x BW) mg in 50ml → 1ml/hr = 5mcg/kg/hr
- Max peripheral conc = 250mcg/ml

PO 0.01 to 0.1 mg/kg/dose Q6-24H
[Max dose: 10mg/day]

Captopril

Infants: PO 0.3-3.5mg/kg/day Q6-12H
Children: PO 0.9-3.9mg/kg/day Q8-12H
[Max = 6mg/kg/day or 150mg/day]

Usually start at 0.1mg/kg/dose and up-titrate based on BP response and in discussion with CVM

Use with caution in renal failure and hyperK

Dopamine

Continuous infusion: IV/IO 5-20 mcg/kg/min
- Central access: (30 x BW) mg in 50ml → 1ml/hr = 10mcg/kg/min
- Max peripheral conc = 3200mcg/ml

No bolus dosing

Dobutamine

Continuous infusion: IV/IO 5-20 mcg/kg/min
- Standard dilution: 250mg in 50ml (5mg/ml)
- Max peripheral conc = 5mg/ml

No bolus dosing

Enalapril

For heart failure/hypertension
PO 0.1–0.5 mg/kg/day Q12H
[Max dose = 1mg/kg/day or 40 mg/day]

Esmolol

Continuous infusion: 50-500mcg/kg/min
- Peripheral/ central access = 10mg/ml (neat)

To check with ICU con if loading dose of 100-500mcg/kg over 1-2mins required before continuing infusion at IV 25-100mcg/kg/min (not commonly done)

Frusemide

Continuous infusion: IV 0.1 - 0.5 mg/kg/hr
- Central/peripheral access: (10 x BW) mg in 50ml → 1ml/hr = 0.2mg/kg/hr
- Max conc (central/peripheral) = 10mg/ml

Bolus: 0.5-1mg/kg/dose Q6-8H
[Max dose: 40mg/dose]

GTN

Continuous infusion: IV 0.5 -10 mcg/kg/min
- Central access: (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 400mcg/ml

No bolus dosing

Heparin (for shunt thrombosis)

Bolus:
50-100 units/kg (shunt thrombosis)
25-50 units/kg (ECMO initiation)

Max peripheral conc = 100units/ml

For infusions refer to KKH guidelines for anticoagulation therapy in children and ECMO/CRRT protocols

Hydralazine

Bolus 0.1 to 0.5mg/kg/dose q4H-q6H
[Max dose = 20mg/dose]
Max conc (central/peripheral) = 1mg/ml

Not usually run as continuous infusion

Hydrochlorothiazide

PO 1–2 mg/kg/day Q12–24H
[Max total dose = 200 mg/day]

Hydrocortisone (for catecholamine resistant shock)

IV bolus 100mg/m2/day Q6H
[Max dose = 100mg/dose or 400mg/day]

Iloprost

Inhalational 2.5 – 5 mcg x 6-9 times/day
No oral or IV preparation

Isoprenaline

Continuous infusion: IV 0.025 – 1mcg/kg/min
- Central access: (0.3 x BW) mg in 50ml → 1ml/hr = 0.1mcg/kg/min
- Max peripheral conc = 20mcg/ml

No bolus dosing

Labetalol

Continuous infusion: IV 0.25 - 3 mg/kg/hr
- Central access (max conc): 5mg/ml (neat)
- Peripheral access (max conc) = 1mg/ml

Bolus: 0.2 to 1mg/kg/dose
[Max dose = 40mg/dose]

Levosimendan

Continuous infusion: Start at 0.1 mcg/kg/min
If tolerated for 6 hours, increase rate to 0.2 mcg/kg/min. If becomes tachycardic or hypotensive, reduce dose to 0.05 mcg/kg/min
- <15kg: dilute 2.5mg into 50ml D5% (50mcg/ml)
- ≥15kg: dilute 12.5mg into 250ml D5% (50mcg/ml)
- Max peripheral conc = 50mcg/ml

No bolus dosing

Refer to Annex A in the "Low Cardiac Output State and Pharmacological Support of Cardiovascular System" on Infopedia for full dilution guide

Lignocaine

Continuous infusion: IV 20-50 mcg/kg/min
- Central access: (60 x BW)mg in 50ml → 1ml/hr = 20mcg/kg/min
- Max peripheral conc = 1000mcg/ml

Bolus (pulseless VF/VT): 1mg/kg
[Max dose = 100mg/dose]

Methylene Blue
(for refractory vasoplegia)

Loading dose: IV 1-2mg/kg over 20 - 60mins
Continuous infusion: IV 0.25mg/kg/hr up to 1mg/kg/hr about 1-2 hrs after the loading dose

Central access is recommended due to the risk of extravasation injury

Milrinone

Continuous infusion: IV 0.3 - 1 mcg/kg/min
- Central access: (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 200mcg/ml

No bolus dosing

Nicardipine

Continuous infusion: 0.5 to 5 mcg/kg/min
- Increase rate Q15-30mins
- Central access (max conc): 3.6mg/ml
- Peripheral access (max conc) = 0.1mg/ml

Bolus dosing available – to check with ICU con if needed

Nifedipine

PO 0.25–0.5 mg/kg/dose Q6–8H (max 10mg/dose)
[Max total dose = 3 mg/kg/day or 120 mg/day]

Nitroprusside

Continuous infusion: IV 0.5-5 mcg/kg/min
- Central access: (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 200mcg/ml
- Watch for cyanide toxicity

No bolus dosing

Noradrenaline

Continuous infusion: IV 0.05 – 0.5 mcg/kg/min
- Any dose >0.2mcg/kg/min to be discussed with ICU consultant
- Central access: (0.3 x BW) mg in 50ml → 1ml/hr = 0.1mcg/kg/min
- Max peripheral conc = 30mcg/ml

No bolus dosing

Octreotide

For chylothorax:
Continuous infusion: IV 1-4 mcg/kg/hr
[Case reports of up to 5-10mcg/kg/hr – to discuss with ICU consultant]

For variceal bleed
Continuous infusion: IV 1-2 mcg/kg/hr

Max peripheral/central conc = 1mcg/ml

Phentolamine

Continuous infusion: IV 0.5 - 6 mcg/kg/min
- Central/peripheral access: (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Recommended conc: 1mg/ml (central/peripheral)
- Suggested frequency of titration: >1hour from prev dose change

No bolus dosing

Phenylephrine

Bolus (Tet spell): 5 mcg/kg
Bolus (hypotension): 5-20mcg/kg/dose
[Max dose = 500mcg/dose]

Continuous infusion: Not usually done in our unit but recommended dosing range IV 0.1 - 0.5 mcg/kg/min

PGE

Continuous infusion: IV 0.01 - 0.1 mcg/kg/min
- Central access: (30 x BW) mcg in 50ml → 1ml/hr = 0.01mcg/kg/min
- Max peripheral conc = 5mcg/ml

No bolus dosing

Propranolol

Slow bolus (SVT): IV 0.01-0.15 mg/kg over 10min
[Max dose = 1mg/dose - infants, 3mg/dose - children]
Administer undiluted by slow IV injection/infusion over 10 minutes

PO 0.5-4mg/kg/day Q6-8H
[Max = 16mg/kg/day or 60mg/day]

Sildenafil

PO 0.25-3mg/kg/dose Q6-8H
[Max dose = 40mg TDS (120mg/day)]
May be initiated at 0.1mg/kg/dose and up-titrated as guided by hemodynamics and in discussion with CVM

Spironolactone

PO 1–6 mg/kg/day Q12–24H
[Max total dose = 400 mg/day]

Tranexamic acid

Continuous infusion: IV 2.5-10mg/kg/hr
- Central access
  - ≤40kg: (50 x BW) in 20ml → 1ml/hr = 2.5 mg/kg/hr
  - >40kg: Give neat 100mg/ml
- Peripheral access [suggested conc] = 1mg/ml

Bolus: 10mg/kg Q8H

Vasopressin

Continuous infusion: IV 0.02 - 0.06 unit/kg/hr
- Central access: 1unit/kg in 50ml → 1ml/hr = 0.02unit/kg/hr
- Peripheral access (max conc) = 1 unit/ml

No bolus dosing
[For DI dosing see below]

RESPIRATORY

Note: refer to orderset RES.Asthma.KKH

*Caution on route of administration
- *Inhalational* = for nebulised solutions (includes patients on NIV/tracheostomy/intubated)
- *Intra-tracheal* = direct instillation of medication intro trachea

Adrenaline (nebulised)

Dose: inhalational 0.5ml of adrenaline 1:1,000 with 3.5ml NaCl 0.9% Q4-6H

Aminophylline

Loading dose: 5mg/kg in 50ml N/S over 20 mins
Maintenance dose: 15-20mg/kg in N/S over 24h
Weaning: Half rate, then off
Max peripheral conc = 2.5mg/ml

Dexamethasone (for airway edema)

Dose: IV 0.2mg/kg Q8H (3 doses)

Glycopyrrolate

Starting dose: IV/PO 5-10mcg/kg/dose TDS
Dose titration: Increase dose by 10mcg/kg/dose in weekly interval as tolerated, until desired effect is reached; watch for mucus plugging from thickened secretions
[Max dose = 100mcg/kg/dose or 2mg TDS-QDS]

Hydrocortisone

Dose: IV 4mg/kg/dose Q6H
[Max dose = 100mg/dose or 400mg/day]
For catecholamine resistant shock, refer to dosing above in Cardio section

Ipratropium MDI (20mcg)

<10kg: 2 puffs/dose
>10kg: 4 puffs/dose
Frequency depending on severity

Ipratropium nebulizing solution (500mcg/2ml)

<10kg: 0.25ml/dose
10 – 20kg: 0.5ml/dose
>20kg: 1ml/dose
Frequency depending on severity

MgSO4 for bronchospasm (please use orderset under RES.Asthma.KKH)

Loading dose: 50mg/kg diluted in 100ml N/S over 30 mins [Max dose = 2g/dose]
Maintenance dose: start at 20mg/kg/hr (range: 10 - 40mg/kg/hr) [Max daily dose: 40g/day]

Target serum magnesium: 1.5-2.5mmol/L
Max peripheral conc = 200mg/ml

Prednisolone (for asthma exacerbation)

PO 1-2mg/kg/day OD [Max dose = 40mg/day]

Salbutamol (MDI)

0.3 puffs/kg/dose [max 10 puff/dose], frequency depending on severity

Salbutamol nebulizing solution

0.1 - 0.15 mg/kg or 0.01 - 0.03 ml/kg, frequency depending on severity

Salbutamol (IV)

Loading dose: 5 mcg/kg in 10ml of N/S over 10min (not always given)

Maintenance dose: 1 - 5 mcg/kg/min in 50ml NS
- Central access = (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 200mcg/ml

Surfactant

Types available: Calfactant, Poractant alfa (Curosurf)
Refer to "Neonatal Drug Dosing Booklet" on Infopedia for updated dosing for surfactant

SEDATION/ANALGESIA/PARALYSIS

Chloral hydrate

Procedural sedation
PO 25-50 mg/kg/dose 30 minutes prior to procedure (max = 1000 mg/dose); may repeat after 30 minutes with 25-50 mg/kg/dose if necessary.
[Max total dose = 100 mg/kg/procedure or 2000 mg/procedure]

Sedation
PO 10-50 mg/kg/dose Q6-8H (max 500mg/dose)
[Max total dose = 60mg/kg/day or 2000mg/day]

No IV formulation available

Clonidine (for sedation and hypertension)

Continuous infusion: IV 0.3-2 mcg/kg/hr
[Max = 9mcg/kg/hr for status dystonicus]

IV intermittent: 1-5 mcg/kg/dose over 15min Q4-8H

Oral
PO clonidine 0.5-5 mcg/kg/dose Q4-12H
[Max dose = 1200mcg/day for hypertension, can be higher for dystonia but no absolute max dose reported in literature]

Dexmedetomidine:

Continuous infusion: IV 0.2 -1 mcg/kg/hr (can go up to 2mcg/kg/hr – to check with ICU con before any increment >1mcg/kg/hr)
- Standard dilution 200 mcg in 50ml
- Max peripheral conc = 4mcg/ml

No bolus dosing

Fentanyl:

Continuous infusion: IV 1 - 5 mcg/kg/hr
- Central/peripheral access = 50mcg/kg in 50ml → 1ml/hr = 1 mcg/kg/hr
- Max central/peripheral conc = 50mcg/ml

Bolus: 2-5 mcg/kg/dose
[Max dose = 10 mcg/kg]

**Caution: rapid boluses/high conc causes chest wall rigidity*

Ketamine:

Continuous infusion: IV 5 - 20 mcg/kg/min
- Central access = 15mg/kg in 50ml → 1ml/hr = 5mcg/kg/min
- Max peripheral conc = 1000mcg/ml

Bolus: IV 1-2mg/kg (sedation)
IM 3-5mg/kg/dose (sedation)
Both IV/IM can repeat dose in 10min if inadequate sedation

Midazolam

Continuous infusion: IV 1 - 4 mcg/kg/min (can go up to 24mcg/kg/min for status epilepticus – to check with ICU con before any increment >5mcg/kg/min)
- Central access = (3 x BW) mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 1000mcg/ml

Bolus: IV 0.1 - 0.2mg/kg/dose (max total 10mg)

Morphine

Continuous infusion: IV 5 - 40 mcg/kg/hr (to check with ICU con if any increment >40mcg/kg/hr rqd)
- Central access = 1mg/kg in 50ml → 1ml/hr = 20mcg/kg/hr
- Max peripheral conc = 1000mcg/ml

Bolus: IV/SC 0.05 – 0.2mg/kg/dose Q3-4H
[Max dose = 10mg/dose paeds, 0.1mg/kg/dose neonates]

Oral
PO morphine 0.2 – 0.5mg/kg/dose Q3-4H
[Max dose = 20mg/dose]

Oxycodone

PO oxycodone 0.1 – 0.2mg/kg/dose Q4-6H
[Max dose = 10mg/dose]

Propofol

Continuous infusion: IV 1-3 mg/kg/hr (sedation); 7-15mg/kg/hr (general anesthesia), 1.5-10mg/kg/hr (refractory status epilepticus)
- Central/peripheral access: run neat at 10mg/ml

Bolus: 1-2 mg/kg/dose (sedation)

Rocuronium

Continuous infusion: 0.1 - 0.7mg/kg/hr
- Central access: 50mg/kg in 50ml → 1ml/hr = 1mg/kg/hr
- Max peripheral conc = 5mg/ml

Bolus: 0.6-1mg/kg then 0.15mg/kg boluses (repeat as needed)

Succinylcholine / Suxamethonium

Bolus
Initial stat dose: 1-2 mg/kg
Maintenance: 0.3-0.6 mg/kg every 5-10 minutes as needed

Not usually run as continuous infusion

ANTIDOTES

Dantrolene

Refer to "Management of Malignant Hyperthermia and NMS in Paediatric Patients" document on Infopedia for latest dosing protocol

Flumazenil

For benozodiazepine overdose
IV 0.01mg/kg (max 0.2mg) q1min x 5
[Max total cumulative dose: 0.05mg/kg or 1mg]

N-Acetylcysteine

For paracetamol overdose
1st dose: 200mg/kg over 4hrs
2nd dose: 100mg/hr over 16hrs

Use order set "*Acetylcysteine Injection - [Paracetamol Poisoning].KKH"*

Naloxone

Opioid overdose: IV/IO 0.01mg/kg/dose; repeat Q2-3min as required

Reversal of respiratory depression from therapeutic opioid dosing: IV/IO/IM/SC 0.001-0.02mg/kg/dose q2-3min (max dose 2mg/dose)

NEURO

Hyperosmolar therapy

3% NaCl
Dose:
- IV intermittent 2-5ml/kg over 10-20 min, repeated dosing may be required
- IV infusion 0.1-1ml/kg/hr
- Central venous line preferred due to high osmolarity and tonicity

[Up to limit of serum osm 360 mOsm/L and achieving Na targets for neuroprotection]

20% Mannitol
Dose: IV 0.5g-1/kg/dose over 30 min
[Up to limit of serum osm 320 mOsm/L]

Cerebral Edema (role of steroids controversial – main indication: mass effect assoc with tumour)

IV Dexamethasone
Dose: IV bolus 1mg/kg (max 10mg) stat, then 0.25mg/kg Q6H (max daily dose= 16mg/day)

Seizures

Levetiracetam (Keppra)
Loading dose: IV 20- 60 mg/kg/dose
Maintenance dose: IV: 30–60mg/ kg/day BD
- Dilute in 100 mL NaCl 0.9% or D5%
- Recommended conc: 15 mg/mL
- Max concentration: 50 mg/mL

[Max daily dose = 3000mg/day]

Oral: Initiate at 20mg/kg/day BD

$MgSO_4$ (Refer to Magnesium Sulphate for Refractory Status Epilepticus protocol)

Loading: IV 50 mg/kg over 30 minutes [Max dose = 4g/dose]
Maintenance: 20 - 40mg/kg/hr
- Recommended maximum daily dose= 40g/day
- Max peripheral conc = 200mg/ml
- Target serum magnesium: 2-4 mmol/L

Midazolam
Continuous infusion: IV 1-4 mcg/kg/min (up to 24mcg/kg/min for status epilepticus)
- Central access: (3 x BW)mg in 50ml → 1ml/hr = 1mcg/kg/min
- Max peripheral conc = 1000mcg/ml

Phenobarbitone: *(in less than 1 year of age)*
Loading dose: IV 20mg/kg over 30 mins (Max: 1g/dose). May repeat another 5-10mg/kg/dose (Dilute 1:10 dilution with N/S)

Maintenance dose:
IV/PO 3-5 mg/kg/day in 1-2 divided doses
Dilute 1:10 dilution with NaCl 0.9% or WFI
Maximum concentration= 20mg/ml

Phenytoin:
Loading dose: IV 20 mg/kg/dose over 20 mins, give neat
- Max central/peripheral rate: 1 mg/kg/min
- Max dose: 1500mg

Maintenance dose:
IV/PO 3–10 mg/kg/day BD or TDS
IV may be diluted to 25 mL with NaCl 0.9%
Maximum peripheral conc = 50 mg/ml

Thiopentone

Continuous infusion: IV 1-5 mg/kg/hr
- Central access = 50mg/kg in 50ml → 1ml/hr = 1mg/kg/hr
- Max peripheral conc = 4mg/ml
- Check with ICU con if loading 10-30mg/kg over 1 hour required prior for barbiturate coma

Acute ICP increase: consider IV intermittent 1 - 2mg/kg/dose over 10min, repeat PRN

Central line is preferred for continuous infusion as drug is a vesicant.

Watch for hypoK when initiating and rebound hyperK when weaning.

ENDOCRINE

Desmopressin (for diabetes insipidus)
PO DDAVP 25-500mcg Q8-12H
Intranasal DDAVP not available

Vasopressin (for diabetes insipidus)
Continuous infusion: IV 0.5 – 10 mU/kg/hr
- Standard dilution (central/peripheral access) = 10,000mU in 500ml N/S (20mU/ml)

Hypoglycemia
Bolus: IV 2-5ml/kg of D10%
Ensure adequate GIR
GIR calculation: Rate (ml/hr) x Dextrosity (%) x 0.167 / Weight (Kg)

Insulin
Continuous infusion: Insulin soluble (Actrapid) 50 units in 50ml NaCl 0.9%
- < 5 yo: 0.05 units/kg/hour
- >/=5yo: 0.1 units/kg/hour

Steroid conversion
Equivalent dose:
1mg Dexamethasone = 25mg Hydrocortisone

1mg Methylprednisolone = 5mg Hydrocortisone
1mg Prednisolone = 4mg Hydrocortisone

ELECTROLYTES

Potassium
Deficit (mmol) = 0.3 x Wt (kg) x (4-serum K) [half correction]

For correction of deficit:

- **Always opt for ORAL route first if no contraindications**

- **Fluid restricted patients (eg: post op cardiacs) with central line**
  Dilute 1:1 for central line intermittent infusion
  *Use order set *CICU.[Rx] Concentrated KCl infusion.KKH*

- **Non-fluid restricted patients or peripheral access only**
  Dilute 0.8:10 for intermittent infusion
  *Use order set *PAM.[Rx] KCL Replacement(0.8:10)*

Maintenance: 2 – 5 mmol/kg/day

Rules for administration

- Max peripheral conc = 80 mmol/L
- Max central conc = 200 mmol/L
- Usual rate = 0.2 – 0.5 mmol/kg/hr
- Max rate 1 mmol/kg/hr or up to 40 mmol/hr (whichever lower)

Sources:

- IV: both 1ml = 1 mmol K+
  - Potassium Chloride 7.45% (KCl)
  - Potassium Dihydrogen Phosphate (KH2PO4)
- PO:
  - Mist KCl: 1.34mmol/ml
  - Span K: 600mg KCl = 8mmol/tab

Sodium
Na deficit (mmol) = 0.6 x BW (kg) x [135 − (current Na)]

Emergency correction: 2-3ml/kg of 3% NaCl slow bolus over 20min (preferably central access or large peripheral vein) [max dose: 150ml/dose]
[main indication for severe symptomatic hypoNa eg seizures; beware of central pontine myelinolysis with rapid Na correction]

Maintenance: 1 – 4 mmol/kg/day

Rules for administration:

- Max 100 – 150 mmol/day
- Max peripheral conc = 0.9% (0.15mmol/mL)
- Max central conc = 0.5 mmol/mL
- Max rate = 1 mmol/kg/hr

Sources:

- 0.9% NaCl – 1ml = 0.15 mmol Na
- 3% NaCl – 1 ml = 0.51 mmol Na
- 20% NaCl – 1ml = 3.4 mmol Na

Sodium bicarbonate 8.4%

For resus
IV/IO bolus 1ml/kg of 8.4% NaHCO3 (can be given undiluted)

For non-resus correction of metabolic acidosis

- Calculate deficit $HCO3^-$ deficit (mmoL) = 0.3 x weight (kg) x base deficit (mmol/L)
- Max rate 1 mmol/kg/hr
- Recommended dilution:
- Neonate and Infant < 1yo
  - Dilute 1:1 in WFI
  - Max peripheral/central line conc = 0.5mmol/ml (4.2% NaHCO3)
- Children ≥ 1yo and Adult
  - Max peripheral line conc = 0.5mmol/ml (4.2% NaHCO3)
  - Concentration >0.5mmol/ml (8.4% NaHCO3) should be run via central line

Calcium
Corrected Ca (mmol/L): Total Ca(mmol/L) + [0.02x(40-Alb(g/L))]

Maintenance: 0.5-1 mmol/kg/day

PO replacement:
Neonate: 50-75mg/kg/day elemental calcium in 4-6 doses
Child: 30-75mg/kg/day elemental calcium in 4 doses (max 1g/dose)
Adult: max 1200mg elemental calcium

IV replacement: (preferably via central unless emergency situation then large peripheral vein)

- 10% CaCl2: 0.2 ml/kg slow bolus (max 10ml)
- 10% Ca gluconate: 0.5ml/kg slow bolus (max 10ml)
- 10% CaCl2 continuous: run neat 7.2ml over 24hrs → start at 0.3ml/hr

Preparation:

- Calcium Lactogluconate Syrup = elemental Ca 300mg/15mL
- Calcium Carb 450mg, Vitamin D 200unit Tablet = elemental Calcium 180mg/tab

- Calcium Carbonate 625mg = elemental Calcium 250mg/tab
- Caltrate tablet = elemental calcium 600mg/tab
- Calcium Acetate 667mg Tablet = elemental Calcium 168.8mg/tab (for phosphate binding)
- Ca gluconate 10%: 0.23mmol/ml of Ca
- CaCl2 10%: 0.68mmol/ml of Ca

Magnesium
Average deficit can be assumed to be 0.5-1mmol/kg

PO replacement:
10-20 mg/kg elemental Mg/dose QDS

IV intermittent replacement (if Mg<0.5):
49.3% MgSO4 0.2ml/kg/dose (max 4ml)
Max conc 200 mg/ml (0.8mmol/ml)
Max rate 12.5mg/kg/hr or 0.05 mmol/kg/hr
[Note: 0.2ml MgSO4 49.3% = 0.4mmol = 98.6mg]

Preparations:
- Magnesium (elemental) tablet: 250mg (10mmol)
- Magnesium (elemental) effervescent tablet: 240mg
- 49.3% MgSO4=2mmol/ml

Phosphate
Maintenance 0.5-1.5mmol/kg/day

PO replacement: 2-3mmol/kg/day
IV replacement: 0.1-0.3mmol/kg/day

IV: Max concentration
Peripheral – 0.08mmol/ml
Central – 0.18mmol/ml
Max rate 0.2mmol/kg/hr

Preparations:
- PO Sodium Phosphate solution = 0.52mmol/ml of PO4
- PO Sodium phosphate tablet: 1 tablet = 16.1mmol of PO4 = 500mg phosphorus (also has Na 20.4mmol; K 3.1mmol)
- IV Na2PO4 = 1mmol/ml of PO4
- IV/PO KH2PO4 = 1mmol/ml of PO4

NOTE
Electrolyte preparation rules:
- Calcium salts are not compatible with phosphate salts
- Mg Sulphate is not compatible with CaCl