Amikacin Intravenous for Adults

Who can administer

May be administered by registered competent doctor or nurse/midwife

Important information

- See under 'Dose' for adjustments required in **renal** impairment
- Monitoring requirements - see over
- **Do not hold dose** in patients less than 65 years, with good renal function (CrCl>80ml/min with good urine output) while waiting for levels to be reported, **unless** there are reasonable grounds for suspecting toxicity
- **However,** in patients **over 65 years**, or with **abnormal renal function** (CrCl <80ml/min) it is generally preferable to await the result of the first amikacin level (before the second dose) before giving the next dose. If the level is satisfactory and renal function is stable, it is not necessary to routinely hold subsequent doses pending levels, unless there are obvious signs of toxicity
- In general, treatment should be reviewed within 24 hours and daily thereafter by consultant/specialist registrar. Courses should **not** usually exceed **3 days.**
- **Reserve antimicrobial**: May only be prescribed following approval by microbiology/infectious diseases

Available preparations

Amikacin 500mg per 2ml vial (NovaPlus/AVET)

Amikacine 500mg vial (Mylan)

Reconstitution

Amikacin (NovaPlus/AVET)	Already in solution
Amikacine (Mylan)	**Water for injection** 4ml per 500mg vial

Infusion fluids

Sodium chloride 0.9% or Glucose 5%

Methods of intravenous administration

Intermittent intravenous infusion (multiple daily dose or once daily doses)

- Add required dose to 100ml infusion fluid and administer over 30 to 60 minutes

Slow intravenous injection (MULTIPLE DAILY DOSES ONLY)

- Administer undiluted or diluted with 10 to 20ml diluent over 2 to 3 minutes [ref 5]

Dose in adults

Usual dose (generally once daily in GUH) (ref 1)

- Give 15mg/kg once every twenty-four hours (maximum daily dose is 1.5g) (but see below re tuberculosis)
- **If obese, use adjusted weight (dosing weight)- see 'Further information'**
- The BNF recommends a maximum total dose of 15g **per treatment course**
- Courses should **not** usually exceed **3 days** (ref 1)
- See overleaf for doses in renal impairment

Tuberculosis (TB) (multi-drug resistant) -on ID/Respiratory/Microbiology advice only - once daily dose

- GUH guidelines available - see below, also WHO guidelines
- Reference Curry TB guidelines

Renal impairment for ONCE DAILY DOSE REGIMEN (ref 1)

- Use with caution
- Monitor renal function daily
- The **daily dose** should be reduced to avoid drug accumulation

Creatinine clearance (ml/minute)- calculate using Cockcroft and Gault equation	**Dose (use Actual Body Weight for non-obese, use Adjusted Dosing Weight for obese patients)**
Greater than 80	15mg/kg every 24 hours (to a maximum of 1.5g)
60 to 79	12mg/kg every 24 hours (to a maximum of 1.5g)
40 to 59	7.5mg/kg every 24 hours (to a maximum of 1.5g)
30 to 39	4mg/kg every 24 hours (to a maximum of 1.5g)
Less than 30	Avoid use if possible. Consider alternatives If essential, give 3 to 4mg/kg (maximum 320mg) as a single dose, check level at 24 hours Discuss with Micro/ID before 2nd dose
Dialysis - consult pharmacy, check GAPP app or see specialist literature	

Monitoring

- Monitor amikacin levels
- Monitor renal function also as toxicity may occur in patients in whom the aminoglycoside levels have never exceeded the acceptable range
- Do not hold doses while waiting for levels to be reported back unless there are reasonable grounds for suspecting toxicity
- **However,** in patients **over 65 years**, or with **abnormal renal function** (CrCl <80ml/min) - it is generally preferable to await the result of the first amikacin level (before the second dose) before giving the next dose
- See BNF for information on monitoring of levels for twice daily regimens

Infections other than TB (once daily dose)

- The **first pre-dose level** should be taken within 1 hour before the 2nd dose is due
- Document on request form date and time sample was taken and date and time of last dose

- **Level should be less than 5mg/l**
- If the level is less than 5mg/L, re-check pre-dose levels **twice per week thereafter, or more often** if impaired or rapidly changing renal function, haemodynamically unstable, elderly, or on diuretic therapy
- Post-dose levels not routinely measured
- Note that **monitoring of renal function** in addition to monitoring of aminoglycoside levels is important as toxicity may occur in patients in whom the aminoglycoside levels have never exceeded the acceptable range
- With respect to **ototoxicity,** vestibular disturbance (vertigo, ataxia) often precedes disturbance of hearing and should not be discounted because the patient has levels within the acceptable range
- Always interpret the result in the light of the patient's clinical condition and available culture and sensitivity results

Interpretation of levels for once daily amikacin regimen (infections other than TB)	
Level	**Advice**
Less than 5mg/L	Is amikacin still needed?
	Is patient responding clinically
	Continue same dose
	Check level as per guidance above
Greater than or equal to 5mg/L	Is amikacin still needed?
	Is it a true trough (taken within one hour before dose)?
	Where was sample taken from? (falsely high levels can occur if taken from same line used to give amikacin)
	Is dose correct for weight and renal function?
	Is renal function stable?
	Dose adjustment required- contact micro/ID/pharmacy to discuss on a case by case basis

TB (multi-drug resistant) (once daily dose) (ref 3,5)

- **Pre-dose (trough) levels** just before second dose
- Level should generally be less than 5mg/L
- **Post-dose** levels required - take the first post-dose level after the second dose (90 to 120 minutes after infusion is complete)
- **Post-dose level ranges for multi-resistant TB treatment only:**
    - 25 to 35 mg/L: acceptable post-dose range for 15mg/kg dose (if prolonged therapy greater than 6/12)
    - 35 to 45 mg/L: satisfactory post-dose range for 15mg/kg dose
    - 65 to 80 mg/L: satisfactory post-dose range for 25mg/kg intermittent dose schedule
- If measured results fall outside these ranges, please discuss continued doses with ID/Respiratory/Microbiology specialists
- For TB treatment weekly monitoring of pre-and post-dose levels if stable renal function
- In renal impairment more frequent monitoring of levels is recommended

Further information

Creatinine clearance may be calculated using the GAPP app calculators

If GAPP not available, the formula below may be used

Use obesity adjustment if actual body weight is greater than 30% above ideal body weight (ref 1)

Calculation of ideal body weight (IBW) and weight to use in obese patients

1: **Ideal body weight (kg)**

Male (IBW kg): = 50 + 2.3 X (inches over 5 foot) **or** 50 +0.9(cm over 152cm)

Female (IBW kg): = 45.5 + 2.3 X (inches over 5 foot) **or** 45.5 +0.9(cm over 152cm)

2: Patient is classed as obese if actual body weight is greater than 30% above Ideal Body Weight

3: **Obesity dose adjustment**

Dosing weight: = Ideal body weight (kg) + 0.4 X (actual body weight - ideal body weight)

Example		
Patient weight (male patient)	120kg	
Patient height	5 ft 7 inches	
Ideal Body weight (IBW) -using formula 1	= 50 + (2.3 x 7) = 66kg	Patient is more than 30% above ideal body weight
Dosing weight - using formula 3	= 66 + 0.4(120-66) = **87.6kg**	

Storage

- Store below 25^{0}C

References

1: GUH Antimicrobial guidelines 2022

2: Package Insert Amikacine Mylan (checked June 2022)

3: Curry TB centre guidelines Drug resistant tuberculosis: A survival guide for physicians 3rd edition 2019

4: The Sanford Guide to Antimicrobial therapy accessed online October 20165: Communication with Antimicrobial Stewardship Team 27th April 2013 (email attached)

5: Injectable medicines information guide, downloaded from Medusa, 02/06/2022

See also WHO guidelines

Therapeutic classification

Aminoglycoside antibiotic

BNF
Bacterial infection