Pediatric IV to PO Conversion

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Most patients admitted to the hospital with suspected infection are initiated on an intravenous (IV) antibiotic regimen. After a short course (usually 2-4 days) of IV therapy, patients may be able to transition to oral (PO) therapy.[1] Switching to PO antibiotics is an important step in therapy for patients, as oral administration of medications is considered to be the most acceptable method of administration and is often times a sign that patients are getting better.[2] Transitioning from an IV to PO antibiotic regimen is considered a part of good antibiotic stewardship and economic responsibility. Pharmacists can play a key role in evaluating patient-readiness and medication selection to ensure patients are switched appropriately from IV to PO therapy and monitored for clinical progress afterwards.

Transitioning from IV to PO therapy occurs mainly in 3 ways:

1. Sequential therapy, which refers to the switch from an IV drug to an oral version of the same drug. Doses may be different to account for the difference in bioavailability. **An example would be switching from Clindamycin 600mg IV Q 6 hours to Clindamycin 600mg PO Q 8 hours.**[1]
2. Switch Therapy refers to changing from an IV form of one drug to an oral form of another drug in the same class with the same potency. **An example would be Unasyn 1.5g IV Q 6 hours IV to Augmentin 500/125mg PO Q 12 hours.**[1]
3. Step-down therapy refers to changing from an IV to an oral compound that has a different frequency, dose, or spectrum of activity. **An example would be Piperacillin-Tazobactam 3.375g IV Q 8 hours to clindamycin 600mg PO Q 8 hours.**[1]

Bioavailability

One of the most important factor in determining if a patient can be switched from IV to PO antibiotics is bioavailability. Oral bioavailability is the approximate amount of drug that enters systemic circulation after being ingested orally. Without adequate drug concentration in the bloodstream, antibiotics cannot exert their target action and eliminate infection. If the given oral medication achieves blood concentrations to the same extent as that of the IV formulation, then there is little difference between IV and oral medications.

Levofloxacin, azithromycin, doxycycline, fluconazole, metronidazole, bactrim, and rifampin, are just a few antibiotics that are available for IV to PO conversion, due to their oral bioavailability being at or close to 100%.

Advantages & Disadvantages

Oral administration of antibiotics offers many advantages over IV, listed in the table below. However, there are some important issues to consider with PO administration, such as the inability to monitor adherence or the relative time to exert therapeutic effect compared to IV administration. Despite these issues, when oral medication achieves tissue and blood concentration to the same extent as that of the IV medication, then there is little therapeutic

difference between IV and oral medications—permitting even more reason to make the transition from IV to PO medications in the hospitalized patient.

Advantages	Disadvantages
• Decreased hospital stay • Less expensive than IV therapy • No risk of intravenous catheter associated bloodstream infections or thrombophlebitis • Less invasive to the patient • More convenient than IV medications	• Inability to monitor adherence • Not ideal in emergent situations • Unpredictable absorption/Medications are exposed to first-pass metabolism

Who can switch from IV to PO? [2]

Generally, pediatric patients may be switched from IV to PO antibiotics as soon as they show signs of clinical improvement, develop the ability to swallow or receive enteral feeds, have a functional gastrointestinal system or unimpaired drug absorption, and an orally bioavailable medication is available. Duration of antibiotic therapy varies based on the severity and type of infection, however studies have shown that in many infections, especially those where clinical improvement is rapid, the IV to PO switch can occur earlier.[3]

Indications for switching from IV to PO Antibiotics

- Clinical improvement
  - Stabilized vital signs
    Respiratory rate < 20 breaths per minute
    Stable blood pressure and mean arterial pressure
    Afebrile (T < 100 F) at least 24-48 hours
  - Resolving leukocytosis; WBC count decreasing towards normal range
  - Symptomatic improvement

- Ability to swallow or receive enteral feeding
  - Eating food and drinking fluids or receiving nutrition via tube feeds
  - Tolerating other oral medications

- Absorption and bioavailability of oral counterpart is comparable to that of parenteral form

When can a switch from IV to PO be considered? [4]

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With antimicrobial resistance growing, the need for more direct antimicrobial prescribing and shorter durations of antibiotic regimens to help minimize the development of resistance is increased. Several types of infections can be treated just as effectively with oral as they are with IV antibiotics. In the case of severe or widely disseminated infections, the IV route is still the most appropriate route of administration.

Infection type that may be **appropriate** to treat with PO antibiotics	Infection types **inappropriate** to treat with PO antibiotics
• Intra-abdominal infections • Bone and joint infections • Pneumonia • Skin and soft tissue infections • Urinary tract infections	• CNS infections/Bacterial meningitis • Blood stream infections • Deep abscesses • Intravascular infections • Endocarditis

References

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