
INTRAVENOUS (IV) TO ORAL SWITCH THERAPY: A REVIEW OF CLINICAL PRACTICE, OBJECTIVES, INDICATORS, AND EXPECTED OUTCOMES

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ABSTRACT

Intravenous (IV) to oral (PO) switch therapy is a well-established antimicrobial stewardship strategy that involves changing a patient's medication from the intravenous route to an oral formulation once the patient's clinical condition improves. This practice enhances patient comfort, reduces healthcare costs, shortens hospital stay, and minimizes complications associated with prolonged IV catheter use without compromising treatment effectiveness. Successful implementation requires careful assessment of the patient's clinical status, gastrointestinal function, and availability of effective oral alternatives. This review summarizes the principles, objectives, indicators, benefits, challenges, and expected outcomes of IV to oral switch therapy.

KEYWORDS: Intravenous therapy, Oral therapy, Switch therapy, Anti-microbial stewardship, Hospital pharmacy, Clinical pharmacy.

INTRODUCTION

Intravenous therapy is commonly initiated in hospitalized patients with severe infections because it provides rapid drug delivery and predictable absorption. However, prolonged IV therapy may increase the risk of catheter-related infections, thrombophlebitis, patient discomfort, and healthcare costs.^{[1][2]}

As patients recover, many medications—particularly antibiotics—have oral formulations with excellent bioavailability that produce comparable therapeutic effects. Therefore, switching from IV to oral therapy at the appropriate time has become a standard practice supported by clinical guidelines and antimicrobial stewardship programs.^{[3][4]}

CORE OBJECTIVES

The major objectives of IV to oral switch therapy are:

1. Achieve equivalent therapeutic efficacy while using oral medications.
2. Improve patient safety by reducing IV catheter-related complications.
3. Promote early patient mobility and comfort.
4. Reduce hospital length of stay.
5. Minimize healthcare expenditure.
6. Support rational use of antimicrobials.
7. Improve utilization of hospital resources.
8. Reduce nursing workload associated with IV medication administration.^{[1][3][4]}

PRINCIPLES OF IV TO ORAL SWITCH THERAPY

The switch should be considered only when:

- The patient is clinically stable.
- Infection is responding to treatment.
- Oral medications have adequate bioavailability.
- Gastrointestinal absorption is intact.
- The patient can safely swallow oral medications.
- No contraindications exist for oral administration.^{[1][2][4]}

TYPES OF IV TO ORAL SWITCH THERAPY

1. Sequential Therapy

The same drug is changed from IV to oral formulation.

Example:

- Levofloxacin IV → Levofloxacin oral

2. Switch Therapy

A different oral drug with similar antimicrobial activity replaces the IV drug.

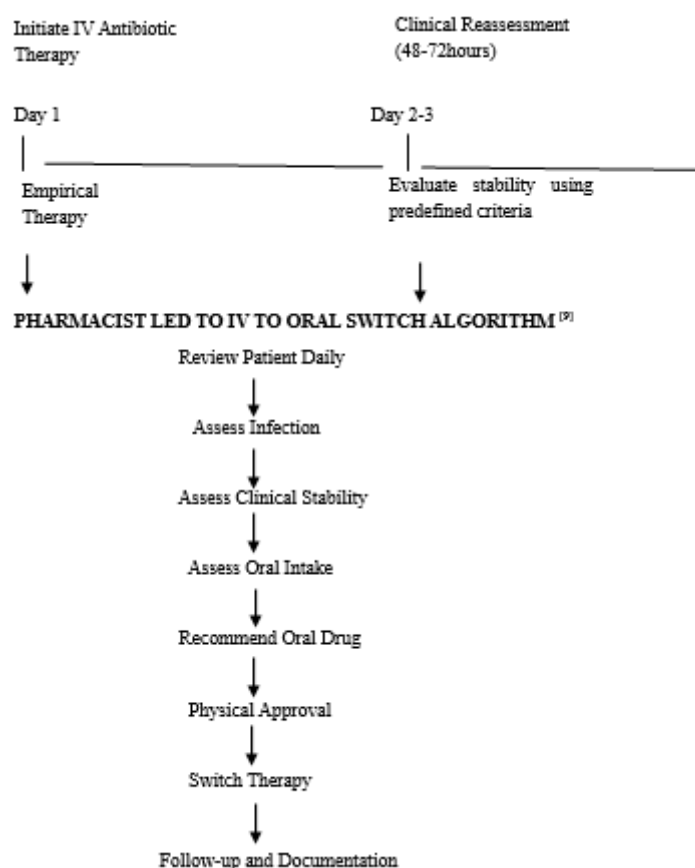
Example:

- Ceftriaxone IV → Cefixime oral

3. Step-down Therapy

The patient is switched to a narrower-spectrum oral antibiotic after clinical improvement.^{[1][2]}

TIMELINE OF IV TO ORAL SWITCH THERAPY ^[8]



METHODOLOGY

This is a narrative review. Relevant literature was identified through searches of PubMed, Google Scholar, and Scopus, supplemented by hand-searching of national and institutional antimicrobial stewardship guidance (including UKHSA, NHS Scotland, Oxford University Hospitals NHS Foundation Trust, NICE, and IDSA/SHEA publications). Search terms included combinations of “intravenous to oral switch,” “sequential therapy,” “antimicrobial stewardship,” and “IV-to-oral conversion.” Articles and guidelines published in English between 1999 and 2024 addressing switch criteria, clinical indicators, outcomes, or implementation of IV-to-oral switch therapy were considered for inclusion. Given the narrative (non-systematic) design, findings were synthesised qualitatively rather than through formal quality scoring or meta-analysis.

INDICATORS FOR IV TO ORAL SWITCH THERAPY

The following clinical indicators suggest that switching is appropriate:

Clinical Indicators

- Afebrile for 24–48 hours.
- Stable vital signs.
- Improvement in infection symptoms.
- No evidence of clinical deterioration.

Laboratory Indicators

- Decreasing white blood cell count.
- Improving inflammatory markers.
- Stable renal and liver function.

Gastrointestinal Indicators

- Patient is conscious and alert.
- Able to swallow.
- No persistent vomiting.
- No severe diarrhea.
- Functional gastrointestinal tract.

Infection-related Indicators

- Bloodstream infection controlled.
- Source of infection identified and managed.
- No infections requiring prolonged IV therapy (e.g., infective endocarditis, meningitis).^{[2][3]}

PATIENTS SUITABLE FOR SWITCH THERAPY

- Community-acquired pneumonia
- Urinary tract infection
- Skin and soft tissue infections
- Intra-abdominal infections after source control
- Mild bone and joint infections (selected patients) ^{[4][5]}

PATIENTS NOT SUITABLE FOR EARLY SWITCH

IV therapy should generally be continued in patients with:

- Septic shock
- Hemodynamic instability
- Persistent fever

- Severe immunosuppression
- Meningitis
- Infective endocarditis
- Severe malabsorption
- Continuous vomiting
- Inability to swallow ^{[4][5]}

ADVANTAGES OF IV TO ORAL SWITCH THERAPY

Clinical Benefits

- Lower risk of catheter-related bloodstream infection
- Reduced thrombophlebitis
- Increased patient comfort
- Early ambulation

Economic Benefits

- Lower drug administration costs
- Reduced equipment uses
- Shorter hospitalization
- Better allocation of healthcare resources

Healthcare Benefits

- Improved antimicrobial stewardship
- Reduced nursing workload
- Better patient satisfaction
- Increased bed availability ^{[2][6][7]}

COMMONLY SWITCHED DRUGS IN IV-TO-ORAL THERAPY

The choice of an oral antimicrobial depends on its oral bioavailability, antimicrobial spectrum, site of infection, microbiological susceptibility, and the patient's clinical condition. Drugs with high oral bioavailability achieve plasma concentrations comparable to intravenous formulations and are ideal candidates for IV-to-oral conversion. ^{[1][5]}

INTRAVENOUS DRUG	ORAL DRUG	APPROXIMATE ORAL BIOAVAILABILITY (%)	COMMON CLINICAL INDICATORS
Linezolid	Linezolid	~100	Pneumonia, skin and soft tissue infections, MRSA infections
Metronidazole	Metronidazole	~100	Intra-abdominal infections, anaerobic infections, Clostridioides difficile infection
Levofloxacin	Levofloxacin	~99	Community-acquired pneumonia, urinary tract infections, skin infections
Ciprofloxacin	Ciprofloxacin	~70	Urinary tract infections, gastrointestinal infections, Pseudomonas infections
Fluconazole	Fluconazole	>90	Candidiasis and other susceptible fungal infections
Doxycycline	Doxycycline	90-100	Respiratory tract infections, atypical pneumonia, skin infections
Clindamycin	Clindamycin	~90	Skin and soft tissue infections, anaerobic infections
Amoxicillin-clavulanate	Amoxicillin-clavulanate	~70-75	Respiratory tract infections, skin infections, bite wounds
Cefixime	Cefixime	~40-50	Urinary tract infections, uncomplicated respiratory tract infections
Trimethoprim-Sulfamethoxazole	Trimethoprim-Sulfamethoxazole	90-100	Urinary tract infections, Pneumocystis jirovecii pneumonia, skin infections

ROLE OF THE CLINICAL PHARMACIST

Clinical pharmacists play a key role by:

- Identifying eligible patients.
- Reviewing culture and sensitivity reports.
- Assessing clinical stability.
- Recommending appropriate oral alternatives.
- Monitoring treatment outcomes.
- Educating healthcare professionals and patients.
- Documenting interventions. ^{[1][3]}

EXPECTED OUTCOMES

Successful IV to oral switch therapy is expected to produce:

- Clinical cure without loss of treatment efficacy.
- Reduced duration of IV therapy.
- Lower incidence of catheter-related complications.
- Shorter hospital stays.
- Reduced healthcare costs.
- Improved patient compliance and satisfaction.
- Better antimicrobial stewardship outcomes.
- Reduced antimicrobial resistance through appropriate antibiotic use. ^{[2][6][7]}

LIMITATIONS

Common barriers include:

- Physician reluctance to discontinue IV therapy.
- Delayed clinical review.
- Lack of standardized switching protocols.
- Concerns about oral absorption.
- Limited awareness among healthcare professionals. ^{[1][6][7]}

CLINICAL CONSIDERATIONS

- Develop institutional IV-to-oral switch guidelines.
- Establish antimicrobial stewardship programs.
- Conduct daily assessment for switch eligibility.
- Involve clinical pharmacists in patient review.
- Educate healthcare providers regarding evidence-based switch practices.

- Audit and monitor compliance with switching protocols. ^{[3][4]}

DISCUSSION

One of the important strategies to optimize the patient care is the IV to oral switch therapy. It allows conversion from IV to oral medications in clinically stable patients without necessarily compromising the outcomes of treatment. Several studies have demonstrated that this switch, if done at the right time, can have similar results to continuing with IV, but with less risks of prolonged intravenous use.^{[6][7]}

Not every patient is a suitable candidate, though. Generally, the switch is considered appropriate when the patient shows stable vital signs, improving clinical symptoms, absence of persistent fever, and an ability to tolerate oral intake. Antibiotics with high oral bioavailability - linezolid, levofloxacin, metronidazole, and fluconazole, among others - tend to work well in this setting, since their oral forms can reach therapeutic levels similar to their IV equivalents.^{[3][4]}

The advantages of early conversion go beyond simple convenience. A shorter catheter dwell time seems to decrease the risk of catheter-related complications. A shorter hospital stay usually reduces the cost of treatment and increases the overall comfort of the patient. It's also worth mentioning a stewardship perspective – switching from IV to oral in a timely fashion can help support more judicious use of antibiotics – and is aligned with broader efforts to help curb antimicrobial resistance.^{[1][7]}

Clinical pharmacists are often well positioned to identify eligible patients and assist in safely guiding this transition, due to their close involvement in monitoring medications.^{[1][2]}

However, in practice the lack of standardisation of protocols and delays in clinical decision making can hamper timely switching. Filling these gaps with clearer, evidence-based, hospital-specific protocols could go a long way in improving both patient outcomes and antibiotic stewardship efforts overall.^{[1][3]}

CONCLUSION

The use of the IV to oral switch therapy approach is considered a safe and effective approach that is both supported by scientific research and results in improvements in the quality of care as well as cost savings. It is important to select patients carefully based on their stability, gastrointestinal functions, and infection state. The cooperation of various specialists and the use of standard approaches can significantly enhance outcomes of the process. ^{[5][7]}

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