

Discharged with IV antibiotics: When issues arise, who manages the complications?

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Case Objectives:

- List key members of the Outpatient Parenteral Antimicrobial Therapy or OPAT team
- Describe the roles of the OPAT team in facilitating outpatient antibiotic therapy
- Discuss what needs to be communicated with the OPAT team before a patient is discharged
- Appreciate the importance of open and clear communication in transitions of care for patient safety

The Case

Patient 1

A 68-year-old male patient was hospitalized and treated with intravenous (IV) antibiotics for bilateral septic knee arthritis with methicillin-sensitive staphylococcus aureus (MSSA) bacteremia as a complication of bilateral corticosteroid knee injections. Other medical problems included type II diabetes mellitus, hypertension, hyperlipidemia, and right lower extremity deep vein thrombosis. He was discharged to a Skilled Nursing Facility (SNF) for continuation of IV antibiotics. There was no recommendation for a follow-up appointment at the Infectious Diseases clinic, and follow-up laboratory tests were recommended but never obtained. The patient was seen in the Orthopedics clinic one month after his transfer to the SNF. At that time, he still had a central venous catheter in place, despite the antibiotic course having been completed two weeks prior to that visit. The patient had no signs or symptoms of infection and his central line was removed without complications.

Patient 2

A 38-year-old male patient was hospitalized and treated with IV antibiotics for a traumatic injury with subsequent abscess of his right knee and osteomyelitis of the distal femur requiring bone resection, antibiotic-impregnated spacer placement, and external fixation of the right leg. Other medical problems included paraplegia and pneumonia. The patient was discharged to a SNF with orders to receive an additional four weeks of intravenous antibiotics with follow up in the Orthopedics clinic in two weeks and in the Infectious Diseases clinic in three weeks. The surgical team also ordered weekly blood counts, metabolic panel, and Vancomycin trough levels. The patient was seen in the Orthopedics clinic 3.5 weeks after discharge, still on intravenous antibiotics with no signs of infection. Despite the discharge orders to schedule a follow-up appointment in the Infectious Diseases clinic in three weeks, the patient was not seen there until five weeks after discharge. Follow-up laboratory tests were either never obtained or were not available for review during these outpatient appointments. The delays in clinic follow up were potentially due to Christmas and New Years' holiday closures or difficulty in obtaining insurance authorization for this referral.

The Commentary

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It is increasingly recognized that patients can safely receive parenteral antibiotics for chronic or well-controlled infections outside the acute care setting. In fact, the practice of providing Outpatient Parenteral Antimicrobial Therapy or OPAT has been in place since the 1970s to help facilitate safer discharge in a timely manner.¹ Early hospital discharge and initiation of OPAT is often beneficial for both the patient and the institution as it reduces hospital days, opens beds for other patients who require acute care, reduces the risk of hospital readmission.² The three primary settings where hospitalized patients can receive parenteral antibiotics after discharge include home, an infusion center, or a skilled nursing facility. An appropriate home infusion therapy candidate is one who can self-administer IV medications at home or with the help of a family member, friend, or care provider. IV antibiotics may also be administered in infusion centers, which serve patients who prefer to receive their IV antibiotics in a clinical setting without being hospitalized. Patients who require a higher level of care may complete their therapy in a skilled nursing facility (SNF).

The Infectious Diseases Society of America (IDSA) recently published an update to their OPAT guidelines and provides an eBook regarding OPAT.^{3,4} The eBook and OPAT guidelines address discharging patients from the hospital on IV therapy and outline the care team members and their roles. The OPAT team is a multidisciplinary team that prepares the patient for a smooth discharge. A typical OPAT team includes the primary care provider, the team treating the patient during the hospital stay, the discharge planner, an Infectious Diseases trained pharmacist, an Infectious Diseases physician if consulted, and those providers who will provide care after discharge. Communication among all members of the OPAT team is critical.

An essential first step in the review of all potential OPAT cases is to assess the need for required therapy to be intravenously administered. Often treatment with an oral antibiotic agent is an appropriate alternative to IV antibiotic therapy. Once a patient is determined to need IV therapy for an extended time period, an evaluation of the appropriateness of OPAT should take place. Some institutions have a full OPAT team to evaluate and prepare patients for discharge. Other institutions require a formal consultation by an Infectious Diseases physician prior to discharge. By utilizing discharge planners as “gate keepers”, hospitals can ensure that patients do not leave the hospital on IV antibiotics without an established treatment and monitoring plan.

Once a patient is deemed appropriate for OPAT, the team must ensure that intravenous access is obtained, and that a monitoring plan is in place with a plan for follow-up care. There needs to be a responsible party to contact in case any complications arise. A lead clinician (pharmacist, advanced practice provider, or physician) must take responsibility to actively review and ensure therapy is appropriate and to identify and respond to any side effects that may develop. Patients and their family members and/or care provider(s) need to be counseled on the medications prescribed and their potential side effects. They need to be aware of what may happen and when to reach out to their physician or go to the emergency department.

Finally, patients selected for home infusion OPAT must be taught to self-administer or asked to identify a family member and/or care provider who can be taught to administer the antimicrobial agent. Education of the patient is very important and is provided by the infusion company. The infusion company usually also supplies the necessary medications, often one week at a time. The patient at home will need to have appropriate storage for the medication; some products need to be refrigerated. Home administration of medication requires the visual ability and hand-eye coordination to connect and disconnect the medication bag from the IV line. The patient or caregiver also needs to maintain the IV access site by flushing the line with normal saline or dextrose before and after administration of the medication. If the patient or care providers do not feel comfortable or competent with the administration procedures, then the patient may need to go to an infusion center or SNF instead, even if they were earlier deemed eligible for OPAT at home.

In the above two cases, we find that safety issues arose in the home setting and SNF after discharge. What was missing and who should be responsible?

In the first case, laboratory monitoring was correctly ordered at discharge but never completed at the SNF. The patient also lacked follow-up with an Infectious Diseases physician and the central venous access remained in place for two weeks after the conclusion of therapy. Fortunately, the patient did not experience

any adverse effects and no signs of infection were noted when he followed-up with the Orthopedic Clinic. If active weekly monitoring of the patient had continued after discharge by the OPAT team, then the SNF would have been reminded to collect necessary laboratory tests, timely follow-up in the Infectious Diseases clinic would have occurred, and the central venous catheter would have been removed at completion of therapy.

In the second case, the patient was discharged to a SNF and the management plan included treatment with IV vancomycin. Vancomycin is specifically addressed in the IDSA OPAT Guidelines and requires at least once weekly therapeutic drug monitoring in patients with stable renal function. Vancomycin is an antibiotic with a narrow therapeutic window; if the dose is subtherapeutic (too low), it may not be effective, and if the dose is suprathereapeutic (too high), the drug may be toxic to the kidneys or ears. This patient was seen for follow-up in the Orthopedic Clinic, but laboratory results were not available for review, even if they were obtained at the SNF. The patient was not seen in the Infectious Diseases Clinic until week five of therapy as opposed to the planned visit at week three. In this case, weekly active monitoring would have ensured that vancomycin levels were collected and interpreted for appropriate dosing.

In both cases, active follow-up care was deficient. An OPAT team providing follow-up care to all patients discharged on IV antibiotics is an effective way to remedy this potential gap in care. Dedicated staffing hours assigned to nursing personnel, an Infectious Diseases physician, and an Infectious Diseases pharmacist are needed for the OPAT program to run effectively and successfully.^{5,6} The OPAT team must ensure active follow-up and management of laboratory tests, drug levels, catheter complications, and antibiotic side effects. Ongoing monitoring of the clinical status of the infection is another responsibility of the OPAT team. With the additional resources dedicated to OPAT, the facility may be able to prevent hospital readmissions, resolve parenteral access issues, and adjust antibiotic therapy as needed.⁷ The OPAT nurse ensures that laboratory tests are collected and ready for review during clinic hours. The physician assesses laboratory tests and follows patients in clinic during the course of treatment. The physician also works with the pharmacist to manage any changes in drug therapy due to dose-related adverse effects or sub- or supra-therapeutic drug levels.

OPAT has been successfully utilized by health systems since the 1970s. In addition to preparing a patient for discharge on IV antibiotics from the hospital, follow-up care needs to be established and communicated. The patient needs a responsible physician, with 24-7 on-call backup, dedicated to their care after leaving the hospital. This physician, with the help of the OPAT team, manages complications, IV access issues, and/or drug related side-effects. Active follow-up may include a required Infectious Diseases consultation or referral to an OPAT team. Discharge planners are valuable members of the healthcare team, and their involvement in the discharge process can ensure adequate review has been completed and follow-up care clearly determined.

Take-Home Points

- OPAT involves antimicrobial stewardship, so the first step is always to ask if the patient requires IV antibiotics or whether oral therapy may be just as appropriate.

- Transition of care from the hospital is successful when the patient is an appropriate candidate for therapy in their home, an infusion center, or SNF. Appropriate IV access must be established, laboratory monitoring must be ordered, and it must be clear that the patient is tolerating and responding to the selected antimicrobial(s). Patients must be able to safely store the antibiotic and supplies if the infusion is being provided at home.
- Patients who will self-administer or have someone help them at home must prove they are competent and able. They are trained by the infusion company providing the medication. They need to be able to store the medication and supplies appropriately. Good eyesight and hand-eye coordination are needed to connect the medication bag to the IV tubing.
- OPAT patients must have access to their care team 24-7, because they may experience catheter-related complications or adverse drug reactions. The patient needs to have an established support system after discharge, which typically includes a household member who can assist with infusions.
- Laboratory monitoring is recommended in the OPAT guidelines and at minimum should be performed once weekly in patients with stable renal function.
- Discharge planners are excellent gatekeepers to ensure patients are not discharged on IV antibiotics without appropriate follow up care.
- An institution may require all patients discharged on IV antibiotic therapy be reviewed by an Infectious Diseases pharmacist and/or have a formal Infectious Diseases consultation.
- An OPAT program can save health care dollars through early discharge from the hospital and allow patients to return to their activities of daily living.⁸

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