

Out of Sight but Not Out of Mind: Caring for Patients Receiving OPAT During the SARS-CoV-2 Pandemic

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In an effort to “flatten the curve” of SARS-CoV-2, society is urged to practice social distancing. However, the management of other disease states may require some patients to undergo outpatient parenteral antimicrobial therapy (OPAT). Practical considerations for OPAT management during an infectious pandemic are reviewed. These include shortening durations of therapy, utilizing the oral route, avoiding medications requiring therapeutic drug monitoring, selecting antimicrobials with long durations, decreasing frequency of laboratory blood draws, and performing tele-health visits.

Keywords. COVID-19; OPAT; SARS-2-CoV.

INTRODUCTION

Since December of 2019, a novel coronavirus (SARS-CoV-2), stemming from Wuhan, China, has reached global dissemination. Given a significant rate of mortality and primary transmission via droplets, social distancing has been a cornerstone of local viral containment. Discharge of eligible patients from the acute care setting may be of critical importance to both reduce the overall burden on the health care system and minimize viral transmission.

Historically, outpatient parenteral antimicrobial therapy (OPAT) programs have been a key mechanism to facilitate patient discharge. OPAT is generally delivered by home health care, infusion

therapy clinics, or admission to a skilled nursing facility and is accompanied by routine laboratory monitoring and intravenous (IV) access site care [1]. The latter mode is threatened by skilled nursing facilities’ disproportionate affliction with SARS-CoV-2, and the former involves heavy reliance on face-to-face health care resources [2]. Compounding the potential of SARS-CoV-2 transmission is the baseline risk of acute care readmission in patients receiving OPAT [3, 4].

Further, OPAT typically consumes a considerable amount of health care resources, notably personal protective equipment (PPE) used in the preparation of IV medications, blood draws, IV access site care, home health, and clinic appointments. Given these concerns, adaptations to traditional OPAT should be strongly considered as the provision of health care is forced to adapt during pandemic times (Table 1).

THERAPY CHOICE AND DURATION

Administration of antimicrobials via the oral route, whenever possible, can decrease the need for IV lines and care associated with them. Recently, complex outpatient antimicrobial therapy (CoPAT) services have been proposed

for implementation alongside traditional OPAT [5]. These services allow for the monitoring of patients who are receiving oral rather than IV antimicrobial therapy but require close follow-up due to ongoing therapy for the management of complex infectious syndromes. Evidence for oral therapy is particularly strong in the arena of bone and joint and cardiovascular infections, with the OVIVA and POET trials most commonly cited, respectively [6, 7]. The OVIVA trial analyzed the rate of treatment failure and adverse events among patients with bone and joint infections who were managed with oral vs IV antibiotics. Patients were enrolled within 7 days of surgery or 7 days of antimicrobial therapy initiation if no surgery was performed. Oral antibiotics were found to be noninferior to IV therapy with regards to both safety and efficacy outcomes; however, complications of IV access were more common in those being managed with IV therapy [6]. In the POET trial, patients with left-sided endocarditis were randomized to oral or IV antimicrobial therapy after achieving clinical stability and receipt of IV antibiotics for 10 days. The primary end point of the study was a composite of all-cause mortality, unplanned cardiac surgery, embolic events, or relapse of

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Table 1. OPAT Considerations During an Infectious Pandemic

Therapy Choice	Scenario	Benefits
Oral antimicrobials	When oral antimicrobial therapy may be used as initial therapy or step-down therapy for the following indications: bone and joint infection, skin and soft tissue infections, bacterial endocarditis, uncomplicated bloodstream infection treatment	Decrease health care contact and PPE for PICC care and PICC insertion/removal, conserve laboratory resources, prevent line-related complications
Agents with once-daily infusions (ertapenem, daptomycin, ceftriaxone, etc.) or agents able to be infused via continuous infusion on home pump (nafcillin, oxacillin, piperacillin/tazobactam, etc.)	When patient will be attending an infusion therapy center for daily OPAT infusions or receiving home nursing care for infusions or pump setup	Decrease health care contact and PPE used at infusion visit, potentially prevent nursing home admission requirement, potentially allow patient/caregiver ability to administer at home
Long-acting agents (dalbavancin, oritavancin)	When clinically and financially feasible for bone and joint infections, skin and soft tissue infections, bacterial endocarditis treatment	Decrease health care contact and PPE used for PICC care and PICC insertion/removal, conserve laboratory resources, prevent nursing home admission
Agents with no TDM	When patient is at home receiving home health care visits for OPAT	Decrease health care contact and PPE used for serum assay lab draws, prevent need to visit outpatient laboratories
Duration of therapy		
Shortest duration supported by evidence	Chronic osteomyelitis, intra-abdominal infection, cellulitis, pyelonephritis, pneumonia, and uncomplicated gram-negative bacteremia treatment	Decrease health care contact and PPE for PICC care and labs, conserve drug supply, prevent adverse reactions and complications, and may altogether avoid need for outpatient antimicrobial administration
Therapy setting		
Alternative to SNF (ie, home infusions)	When logistically and technically feasible for patient or caregiver to administer infusions	Decreased risk of SARS-CoV-2 transmission from group living
COVID-specific infusion centers	SARS-2-CoV-positive patient requiring OPAT at an infusion center	Decreased risk of SARS-CoV-2 transmission to others
Monitoring and follow-up		
Decreased frequency of lab testing	Standard weekly lab monitoring refused by patient or barriers to lab access	Decrease health care contact and PPE used for serum assay lab draws, prevent need to visit outpatient laboratories
Tele-health	Patient has ready access to technology, faces travel barriers, and/or is SARS-2-CoV-positive	Decrease face-to-face health care contact

Abbreviations: ITC, infusion therapy center; PICC, peripherally inserted central catheter; PPE, personal protective equipment; OPAT, outpatient parenteral antimicrobial therapy; SNF, skilled nursing facility; TDM, therapeutic drug monitoring.

bacteremia within 6 months. Regimens utilized varied, but oral therapy was found to be noninferior to IV therapy, with rates of composite end point achievement of 12.1% of patients managed with IV therapy and 9% of patients managed with oral therapy (3.1% difference; 95% CI, -3.4% to 9.6%) [7]. Though both of these trials have limitations with regards to widespread implementation, weighing the possible benefits of oral in place of IV antimicrobials to patients and society at large in the context of an infectious pandemic may cast the risk/benefit ratio into a new light. Utilization of oral therapies allows patients to avoid the need for visits to infusion centers for antimicrobial administration and may also circumvent the need for in-home nursing care.

When oral antimicrobials are not an option, coordinating with insurance options to select regimens that can be managed by patients or caregivers at home and preventing the need for skilled facility admission may protect patients. These may include agents with infrequent administration (once daily or once weekly) or agents that can be administered as continuous infusions via elastomeric pumps or infusion devices. Simplifying regimens to a single agent (eg, ertapenem instead of ceftriaxone and metronidazole) or using technology to exchange a cartridge once daily (eg, continuous infusion nafcillin instead of q4h dosing) may allow the patient to remain in the home setting rather than commute to an infusion center or reside in a setting with more skilled health care personnel assisting.

In addition, the shortest evidence-supported durations of therapy should be used whenever possible. Challenging a previous mantra, a wide array of literature has begun to emerge demonstrating effective treatment of infectious conditions with shorter durations of therapy than previously used. Central to OPAT, short-course therapy has been shown to be as effective as longer courses in disease states such as hospital-acquired and ventilator-associated pneumonia, gram-negative bacteremia, intra-abdominal infections, and native joint septic arthritis [8–11]. Duration of therapy, whether administered orally or intravenously, should be carefully considered in all patients being managed in the outpatient setting [12]. Minimizing antimicrobial therapy durations may minimize cumulative health

care contact, including SARS-CoV-2 exposure, and the unintended consequences of antimicrobial therapy.

THERAPY SETTING

Avoidance of health care contact to deter the spread of SARS-CoV-2 is a challenge to the OPAT model given reliance upon infusion therapy centers (ITCs) and skilled facility residences as common mechanisms for administration. Patient visits to ITCs, often located on medical campuses and in some institutions housed within emergency departments, can be as frequent as twice per day for OPAT. Skilled facilities have been stricken by SARS-CoV-2 outbreaks, resulting in high exposure risks [2, 13]. Therefore, considering patient- or caregiver-administered at-home OPAT is recommended whenever possible. The decision for OPAT setting is complex, involving drug choice, home nursing availability, patient or care provider ability, and insurance coverage. The urgent need for insurance payers such as Medicare to reimburse home infusions due to the pandemic has been recently called upon by medical practitioners [13, 14]. When ITCs and skilled facility use cannot be avoided, cloistering of SARS-CoV-2-positive patients within these facilities may prove useful in decreasing transmission risks. Additionally, minimizing infusion times to decrease time spent in these settings can be employed, if supported by pharmacodynamics.

MONITORING AND FOLLOW-UP

Minimizing the frequency of infusion administration may also be of benefit when establishing new OPAT patients during the pandemic. The use of agents with dosing intervals ≥ 24 hours may contribute to a patient's ability to better social distance, quarantine at home, minimize frequent health care exposure, and preserve valuable resources. Dalbavancin and oritavancin are 2 long-acting lipoglycopeptide agents that may be beneficial due to their extended

dosing intervals. Given their spectrum of activity, they could replace the need for vancomycin, thereby reducing the need for therapeutic drug monitoring (TDM) and simplifying laboratory blood draw requirements. Emerging evidence for dalbavancin and oritavancin in the treatment of bone and joint infections and endocarditis, alongside their established role in soft tissue infections, position these as strategic options [15, 16].

Patients receiving OPAT require routine health care and clinician oversight to ensure adequate treatment, antimicrobial tolerance, and access to supplies. Whereas weekly laboratory monitoring is standard in many OPAT programs, the optimal frequency of monitoring has not been established. One study demonstrated that availability of monitoring parameters led to fewer hospital readmissions during OPAT courses. Nonavailability of the labs resulted in a 2.53-fold increase in chances of rehospitalization. However, even 1 set of laboratory values was categorized as "available," thereby questioning how extended monitoring periods can be [17]. By staggering laboratory draws, patients can avoid traveling to laboratories, conserve PPE for home health nurses and laboratory technicians, and practice social distancing [17]. In otherwise stable patients not receiving medications requiring TDM, spacing out blood draws to longer intervals or only when critically important may be a consideration. Coordinating with home health services to draw blood at the time of home visits can decrease the need to visit laboratories in person. Additionally, in-person clinic visits may be substituted with telehealth visits, reserving in-person visits for severe or emergent cases. One study demonstrated comparable clinical cure or improvement rates using telehealth compared to historic OPAT programs; however, patients had weekly laboratory draws and participated in weekly video chats with infectious diseases clinicians with the help of local nursing staff and clinics [18]. Partnership with local outpatient laboratories or home health nurses

would be necessary to replicate this process.

Areas for future exploration include determining the utility of SARS-2-CoV patient-only infusion centers, the safety of decreased OPAT lab monitoring, and changes in the utilization of OPAT secondary to the pandemic, including the possibility of an increased need due to deferral of noncritical surgeries, procedures, and/or other medical care.

Multidisciplinary OPAT care providers should apply the growing evidence supporting oral antimicrobial therapy, shorter treatment courses, and long-acting antimicrobial agents to ease the application of social distancing and provide the safest possible care during a pandemic.

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