Telehealth in the Delivery of Home Dialysis Care: Catching up With Technology

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Geographic and socioeconomic barriers may pose a significant difficulty in delivering home dialysis care to remote underserved populations leading to low utilization rates and poor outcomes. Telehealth may serve as a solution to overcome geographic barriers in delivering home dialysis care. Although technologic advances in telehealth have progressed rapidly making it accessible and inexpensive, it has been underused by nephrologists. Components of a regular face-to-face visit that can be successfully accomplished remotely using telehealth techniques include physician-patient communication, physical examination, laboratory and treatment data monitoring, nursing and nutrition education. Regulatory and reimbursement-related policies continue to present barriers that need to be overcome in operationalizing telehealth and widespread adoption of telehealth solutions. Although more quality evidence is needed to study the impact of telehealth on home dialysis outcomes and uptake, telehealth holds the promise of increasing access to care, improving quality of life, and improving quality of care for current and would be home dialysis patients.

Key Words: Telehealth, Home dialysis, Peritoneal dialysis, Quality of life, Modalities education

INTRODUCTION

Home dialysis is underused in the United States accounting for less than around 11.5% of the total dialysis population.[1] One potential barrier to home dialysis is access to home dialysis care which can be impeded by both geographic and socioeconomic factors.[2,3] Prakash and colleagues[4] recently demonstrated that only 55% of dialysis units are certified to provide home dialysis. In more rural networks such as Network 8 (Alabama, Mississippi, and Tennessee), this percentage can be even lower.[5] Because of the relative paucity of home dialysis units, patients on home dialysis living remotely from their dialysis units can face long commutes for which they must take days off of work, spend time away from family, and suffer financially from lost wages and transportation costs. Although data are lacking, telehealth and remote patient monitoring may provide a means to address geographic barriers to care, thus improving access to home dialysis care, patient quality of life, and outcomes.

Unfortunately, telehealth technologies have been similarly underused by nephrologists largely because of regulatory and reimbursement issues. Early studies using telehealth in remote in-center dialysis care suffered from high costs of implementing secure T1 lines and expensive technology.[6,7] Since these initial studies and conceptualization of telehealth, technology has increased at a very fast pace. Videoconferencing technology has become smaller, easier to use, and more inexpensive making it a mainstay in daily life including applications, such as Face Time and Skype. Technology literacy as well has continued to increase since early 2000. A recent survey among peritoneal dialysis (PD) patients showed that 88% owned a computer and 94% knew how to use a computer.[8] Furthermore, 83% of patients wished to participate in telehealth.[8] It is within this environment that telehealth and remote patient monitoring may begin to transform home dialysis care. Specifically for the purposes of home dialysis, telehealth may be used for 3 main purposes: (1) replacement for the monthly face-to-face visit, (2) remote monitoring of patients vitals, and (3) provision of remote modalities education.

REPLACING THE MONTHLY FACE-TO-FACE WITH TELEHEALTH

To understand some of the barriers to providing telehealth visits, a basic knowledge of telehealth terminology is needed. Telehealth is a broad term encompassing the use of electronic communication to provide clinical care. This term encompasses interactive videoconferencing, remote monitoring, e-mails, etc. To replace the face-to-face visit, interactive videoconferencing must be used. To do this, the provider (physician or nurse practitioner) is located at what is called the provider site or distant site. The patient must also present to a location which is called the originating site. Criteria to be designated as an appropriate distant or originating site are dictated by third-party payers, and in most cases, meeting these requirements is prerequisite for reimbursement purposes.

As of January 2016, Centers for Medicare and Medicaid Services approved the outpatient monthly capitated payment codes for outpatient PD care (90963-90966) as covered telehealth codes, but many barriers as will be noted below must be overcome to ensure compliance with current Medicare regulations. Home hemodialysis has been excluded from coverage as the vascular access must still be examined

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in person per Medicare regulations. As the majority of dialysis patients are Medicare beneficiaries, the remaining discussion will focus on Medicare regulations. By current Medicare policy, an appropriate originating site cannot be the patient's home or another dialysis facility. An originating site must be another medical facility. Furthermore, the originating site must be located in a rural area defined as being outside a metropolitan statistical area unless it is designated as a health care provider shortage area. Thus, one of the largest barriers to provide telehealth is establishing a network of appropriate originating sites. Because of the likely need for multiple originating sites, the most efficient way to connect with these sites is to become part of a pre-existing telehealth network. Many states have pre-existing telehealth networks that require a monthly subscription fee. This obviates the need to provide telemedicine equipment for each and every patient and limits the time needed to establish and verify multiple originating sites individually. For the PD telemedicine program at the University of Alabama at Birmingham, the Alabama Department of Public Health established a growing telemedicine network within the county health departments. These telemedicine equipped sites are used as the originating sites for PD patients. Because of the difficulties in establishing a network of originating sites, the patient's home, although currently not an accepted telehealth originating site, may have multiple potential advantages over medical facilities.

Once appropriate originating sites are established, all the components of a complete face-to-face visit can be accomplished. This has recently been shown to be feasible as part of a pilot study at University of Alabama at Birmingham where telemedicine is being successfully used as a substitute for 2 of 3 monthly face-to-face visits per quarter, completing all the components of the standard "hands-on" visit remotely as outlined later.

CLINICAL SUMMARY

- Telehealth for home dialysis can primarily be used for 3 purposes: (1) replacing the monthly face-to-face visit, (2) remote patient monitoring, and (3) providing remote modalities education.
- Telehealth has the potential to increase access to home dialysis care, thus increasing utilization by overcoming geographic and socioeconomic barriers and improving patient and physician comfort with the home modalities.
- Telehealth technologies have been underused by nephrologists because of multiple barriers largely regulatory and reimbursement related. However, because of the rapidly changing face of telehealth policy, telehealth may soon become a viable and important part of home dialysis care.

Vital Signs, Weights, and Treatment Data

PD patients are currently responsible for recording sitting and standing blood pressures taken before and after therapy and details of the therapy itself including ultrafiltration, initial drain, tonicity of the dialysate, etc. These are recorded on a flow sheet which the patient then brings to the dialysis unit on a monthly basis. Paper flow sheets are faxed by the originating site to the distant site at the time of the visit. Likewise, electronic data capture of therapy monitoring can be collected on a media card and mailed to the dialysis unit before the telehealth encounter. More recently, real-time data can be collected via Bluetooth-enabled blood pressure cuffs and weight scales. Furthermore, the capability exists to provide real-time therapy monitoring.

Physician/Patient and Nurse/Patient Communication

Communication is necessary and just as important between the nurse and patient as it is with the physician. Interactive videoconferencing can provide a similar experience for the patient as in-person communication. It is important to note that videoconferencing platforms and the environment of both distant and originating site must comply with HIPAA requirements, thus eliminating the use of platforms such as Face Time and Skype. Furthermore, the telehealth encounter must be provided in a private room with similar privacy requirements as an examination room. There must be appropriate bandwidth to sustain a seamless videoconference which may pose a problem in remote areas most in need of telehealth solutions.

Remote Physical Examination

Of primary importance in a PD telemedicine visit is a physical examination that includes an assessment of volume status and assessment of the exit site. The auscultatory examination can be performed remotely using Bluetooth-enabled stethoscopes. Standard cardiac and pulmonary examination can be performed using this innovative technology as well. The PD catheter exit site can easily be evaluated using a handheld high-definition camera. Pitting edema can be assessed as well by having the provider on the distant site press on the lower extremities while videoconferencing.

Laboratory Evaluation

Monthly labs are needed to monitor PD patients. PD patients, many of which do not have permanent vascular access, are not accustomed to auto-phlebotomy. Phlebotomy and centrifugation of samples can be performed at the originating site by trained staff and labs shipped to a central processing laboratory. This may be provided for with the originating site fee which originating sites can bill separately from the clinical visit. In this way, labs are standardized and are maintained within the electronic medical record.

Anemia Management

Administration of erythropoietin and intravenous iron usually occurs in the home dialysis unit. Patient's occasionally present multiple times a month for administration of erythropoietin. This can be accomplished remotely by training patients to self-administer erythropoietin. Iron administration is more difficult to achieve. Oral iron