The Benefits and Challenges of Renal Rehabilitation: Some Lessons Learned from Life Readiness Program II

Katherine Tawney, PhD  
Division of Nephrology and Hypertension  
Department of Medicine  
University of North Carolina  
Chapel Hill, NC

Jim Kovach, MS, PT  
Rehabilitation Program Coordinator  
Yorkville and Irving Place Dialysis Centers  
Renal Research Institute  
New York, NY

The incidence of end-stage renal disease is anticipated to grow at a rapid rate pressured by aging baby boomers, increased rates of diabetes, and changing racial distributions. This burgeoning population will push the demand for more physical therapy services. Currently, over 406,000 patients with end-stage renal disease receive dialysis treatment in the United States1. More than half of the population is older than age 60 years and the disease is more prevalent in the minority and lower socioeconomic populations. Older and sicker dialysis patients receive proportionately more physical therapy services than younger dialysis patients in the United States1. However, there are unexplained geographic and population based disparities among those patients who receive therapy. Dialysis center-based rehabilitation and fitness programs may help keep the patients healthier and provide a conduit to outpatient physical therapy services when appropriate. This paper reviews some of the benefits and challenges of renal rehabilitation, along with some lessons learned from the Life Readiness Program II, a demonstration project supported by Renal Research Institute.

Medical treatments increase the longevity and quality of life of patients with end-stage renal disease, but many patients remain encumbered by physical problems that are secondary to uremic toxins, anemia, malnutrition, and other aberrations2-6. Regular exercise training is a novel therapy that can improve maximal exercise capacity, muscle strength and endurance in dialysis patients7-10. Moreover, exercise can improve patient reported functional capacity and health-related quality of life11-13. One study demonstrated that exercising during hemodialysis can even increase solute removal and the efficiency of dialysis, probably via increased perfusion to skeletal muscles14. The benefits of exercise training are well established, yet disparities in the provision of services between population groups are as yet unexplained. Perhaps there are fewer demands for service, fewer providers, lower referral rates or greater distances to travel to therapy clinics in the lower service areas. Most traditional physical therapy services are conducted in-hospital or outpatient settings. Demonstration projects are needed to test ways for combining physical therapy services with regular fitness training, into a continuum of rehabilitative care. With these needs in view, Renal Research Institute supported a renal demonstration project to assess the feasibility of providing exercise-based rehabilitation in the dialysis center. A secondary...
interest was to see how in-center rehabilitation can provide a conduit for other services.

The Life Readiness Program II was a 6-month rehabilitation program administered in-center where patients dialyzed. The program was coordinated by physical therapists and exercise physiologists. Patients were evaluated with performance tests and surveys before they were treated. Each patient was visited by a physical therapist and offered a detailed exercise plan to perform in-center and at home to improve endurance, strength, and joint range of motion. Patients were also given step counters, if appropriate, to provide feedback about walking movement during the day. Stretchy bands, ankle weights, and dumbbells were used for strength training during dialysis and at home. Some patients were referred to outpatient services for new assistive devices and physical therapy.

The United States Surgeon General recommends that Americans should accumulate at least 30 minutes of moderate intensity physical activity on most days of the week. Therefore, the patients in the program were encouraged to perform at least 30 minutes of moderate intensity physical activity each day through in-center exercise, home exercise, or regular daily routines. The lessons that follow illustrate a few of the barriers the therapists negotiated to help patients be active during the Life Readiness Program II rehabilitation program.

The seventy five patients who started the Life Readiness Program II ranged in age from 22 to 88 years. The patients responded to questions on a disability survey called the Health Assessment Questionnaire in order to determine what behaviors were difficult to perform. Several patients had difficulties performing typical daily activities in the realm of self care, such as dressing, hygiene, and eating.

Difficulties with reaching, gripping, walking, arising, and performing errands and chores were also noted. Many patients indicated that pain made the performance of certain activities difficult, especially walking, chore activities, and dressing.

The sources of pain included neuropathic pain, claudication, vascular access, arthritis, and limited joint range of motion. Over 40% of the patients relied on others to help them do daily errands and chores. Several patients felt their functional abilities decline over the year that preceded the rehabilitation program, especially with walking, and doing activities like errands and chores.

An unexpected finding was that older patients and patients with more impairments were especially interested in participating in the program. These candidates included four patients who had below the knee amputations. Another patient was a paraplegic. Four types of cycles were used in-center for those patients who were interested and tolerant of exercise during dialysis. Two styles of cycles accommodated the four patients with below the knee amputations.

Ankle weights were used to increase resistance on the arm cycle. These creative rehabilitation strategies allowed some of the neediest patients to participate in an exercise program.

Several benefits reaped from exercise by these patients may not be captured on standardized disability questionnaires or performance tests. For example, the paraplegic patient who did arm training had an easier time transferring and loading his wheelchair into the backseat of his car by himself. Another patient with bilateral below the knee amputations could shift the weight of his own legs under his dinner table without his wife’s help. These benefits allowed them to retain more independence.

Prostheses, canes, wheelchairs, and other assistive devices need updating periodically. A poor fitting device or worn out equipment put a patient at risk for injury. One patient who had bilateral below the knee amputations had a pressure sore on one stump because his prostheses did not fit well. His homemade solution was to use a handkerchief to fill the loose space. The therapist referred him to a prosthetist for a refitting. Poor balance and a history of falls due to faulty equipment were also problems. One gentleman fell in the parking lot when his prosthesis slipped off as he walked to the car. Another female patient also fell off of the transport bus onto the pavement in the parking lot. When asked why, she said that she stopped using her cane because the rubber tip fell off. Several patients were fit with quad canes or walkers that provided better stability. The paraplegic patient had an extensive history of wound care clinic visits to treat painful pressure sores. He was provided with a new wheelchair.

Medical complications impeded potential functional gains for some patients during rehabilitation. Several patients were hospitalized during the study for conditions such as diabetes, cardiovascular disease, sepsis, access failure or depression. Some of those patients who experienced health setbacks restarted exercise after resolution of the medical problem. A therapist revised a fitness routine to accommodate a patient’s needs. In these instances, a rehabilitation staff member who was familiar with patient’s history was vital to facilitate getting the patient back into the program.

Nurses are in key positions to identify patients who could benefit from a physiotherapy consultation, but their work schedules are monopolized by regular dialysis routines. Rehabilitation and fitness programs are most likely to be sustained if they are coordinated by a dedicated rehabilitation professional. This sentiment was expressed by members of focus groups that were conducted by investigators at an annual National Kidney Foundation meeting in Charlotte, North Carolina prior to the start of the Life Readiness Program II.

The three focus groups were comprised of a mix of nurses, technicians, and dietitians who attended a special session on rehabilitation to discuss barriers to implementing a dialysis center based rehabilitation program. The participants identified several environmental barriers: too little time, inadequate equipment, and inadequate space. Staff related barriers were low staff interest and motivation, and concerns about liability if a patient was injured. Patient related barriers were patient disability, a need for tailored programs, a “disability mindset” among patients, poor adherence, and older age. Investigators compiled a checklist survey of barriers compiled from the focus group comments and they administered it at another professional meeting. The checklist survey was completed by attendees at an annual meeting

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The Role of the Nurse Practitioner in a Large Dialysis Unit with Particular Emphasis on Vascular Access Management

Seth Johnson, FNP, Allen Kaufman, MD, Laura Rosales, MD

Introduction:
Vascular Access is the lifeline for patients with end stage renal disease receiving chronic maintenance hemodialysis. For high efficiency hemodialysis regimens, the vascular access must supply high blood flow rates. Long-term access patency is also critical for adequate dialysis and with that in mind there is a renewed emphasis increasing the incidence of arteriovenous (AV) fistula vs. AV graft or catheters for dialysis access.

A pragmatic approach to the maintenance of vascular access for chronic hemodialysis is challenging and requires teamwork and continual painstaking efforts to prevent any lapse in the management of the patient. This is embodied in the current National Kidney Foundation’s Dialysis Outcomes Quality Initiative (K/DOQI) recommendations relating to vascular access, which target placement of fistulas in 50 percent of new dialysis patients with a goal of maintaining fistulas in 40 percent of the dialysis entire population.16 Access related hospitalizations translate into a huge medical cost, and an increase risk of patient morbidity and mortality. It is estimated that between $10,000 and $15,000 per patient, per year is spent on vascular access complications. In some instances vascular access morbidity in ESRD patients has been reported to be responsible for about 25% of all hospital stays and sustains 50% of total hospitalization costs. Under these circumstances the management of vascular access is crucial in reducing complications to patients and expenses to hospitals.

The general role of the Nurse Practitioner in dialysis
In our program, the primary focus of the nurse practitioner is to work in collaboration with the Nephrologist, and in close association with other disciplines to ensure that the highest quality of care is delivered to our patients in order to achieve the best possible outcomes. While we continue to manage vascular access, we also strive to achieve better outcomes in other areas of managing dialysis patients. Anemia management, bone management, and nutritional management are other key performance indicators that we continually work to improve.

The nurse practitioner treats common episodic and chronic health care problems with emphasis on health maintenance and primary disease prevention through education and counseling. The role also includes routine assessment of patient’s health status during dialysis, diagnosis, developing and implementing treatment plans, evaluations and referrals. The nurse practitioner also functions as a resource person and educator to the dialysis staff.

The role of the Nurse Practitioner with respect to vascular access
The continuous evaluation of the ESRD patient by a detailed clinical and physical examination performed by a nurse practitioner is of the utmost importance for early detection of AV access failure. Similar importance carries the early analysis of results obtained by the tools available at the center such as access recirculation and access blood flow. Results of access recirculation are readily available at the chair of the patient by the nursing staff during the hemodialysis treatment and access blood flow measurements are performed at a monthly basis in each patient. The information obtained is delivered to the nurse practitioner who collaborates closely with the Nephrologist to make the proper decision regarding the procedure needed.

Improving patient education and training in managing vascular access preservation are among the recommendations in every dialysis program and the role of the nurse practitioner again is equally important in helping to accomplish this goal.

Type of access: Native arteriovenous fistulas
This type of access offers the best overall access performance with the fewest complications. The placement of radiocephalic AVF is the preferred procedure, however native fistulas require a period of six to nine months and they cannot be created in some patients because of unsuitable blood vessels. In those cases the options are a brachiocephalic or brachio basilic AVF placement. The use of vascular mapping and meticulous surgery has been of benefit in AVF placement and the common belief that patients with diabetes are poor candidates for AVF placement has been challenged by some investigators and no significant difference was found between diabetic and non-diabetic venous and arterial diameter and peak systolic velocity.8 Techniques such as vein transposition can result in fistula placement in many additional patients. The maturation of AV fistulas needs to be monitored so that intervention can occur in a timely manner and not only after many months of waiting. DOQI guidelines recommend a 1-3 month observation period before first cannulation, but regular reassessment by the surgeon or trained staff can uncover early signs of maturation failure.15 Standardization of measurable parameters tracking access maturation would be of great benefit and are a much-needed area of research.

Good cannulation technique can prolong fistula survival and prevent fistula thrombosis. The most common techniques used are the rotating needle site and the buttonhole.

Synthetic arteriovenous grafts:
These are the preferred vascular access type if a primary arteriovenous fistula cannot be successfully created in a patient. Their average patency is 18 months and even though grafts were introduced 28 years ago, their patency has not improved over the years. Polytetrafluoroethylene (PTFE) tubes are chosen over other synthetic materials. Grafts may be placed in straight, looped, or curved configurations. Designs that provide the most surface area for cannulation are favored. Location of graft placement is determined by each patient’s unique anatomical restrictions, the surgeon’s skill, and the anticipated duration of dialysis (DOQI) typically, grafts can be used within several weeks of placement. However, synthetic grafts have a relatively high incidence of complications such as thrombosis and stenosis and require more interventions than native fistulas.16-18, 24

Catheters:
Preference for the use of catheters is last on the list of choice of vascular access. Catheters may be used on temporary basis for a short duration in patients who have a maturing primary arteriovenous fistula but need immediate hemodialysis. Temporary use of catheters should not be more than 3 weeks.16, 18 Unfortunately, in a small number of patients who have exhausted all other access options, catheters may be used as their permanent vascular access. In these cases, tunneled cuffed catheters that are capable of rapid flow rates are the preferred access of choice.

The preferred insertion site for tunneled cuffed venous dialysis catheters is the right internal jugular vein. Other options include: the right external jugular vein, the left internal jugular, subclavian veins femoral veins, or transcutaneous access to the inferior vena cava. Subcutaneous access should be used only when jugular options are not available. Tunneled cuffed catheters should not be placed on the same side as a maturing arteriovenous access, if possible.16, 19

More than half of prevalent US HD patients receive their dialysis via a synthetic graft, and catheters are used for dialysis in up to 60% of new patients and 30% of prevalent patients. Although there have been a number of approaches to reducing catheter infections (tunneled or antibiotic), the most effective approach would be to reduce the incidence of catheter placement by early fistula placement. The latter requires education of primary care physicians with respect to referral to nephrologists far before patients enter a crisis situation.

At our unit, the AV fistula rate is 51.2%, versus 38% statewide and 35% nationwide. Grafts are 24.6%, versus 65% nationwide and 51% nationwide. Catheter rate is 24% versus 22% statewide and 26% nationwide.25 We are working extremely hard to lower our patient catheter rate. The high rate of fistula placement is a tribute to our concerned, thoughtful nephrologists and technically excellent vascular surgeons.

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HOW TO MANAGE A DIALYSIS CENTER-OPERATIONAL,
ETHICAL AND PROFESSIONAL ISSUES
For Fellows, New Medical Directors, and
Other Healthcare Professionals

ADVANCES IN ESRD 2005
For All Professionals interested in New Technology &
Therapeutics in the field of End Stage Renal Disease
and
Current Issues Facing the Renal Community

DAY 1
WEDNESDAY, JANUARY 19, 2005

“How to Manage a Dialysis Center”
Particularly for Fellows, New Medical Directors, & Other Healthcare Professionals

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<td>7:25-7:30am</td>
<td>Welcome: Nathan W. Levin, MD</td>
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<td>7:30-7:55am</td>
<td>Current Dialyzer &amp; Machine Technologies and Application in Practice</td>
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<td>Prevention of Medical Errors in Dialysis: Design &amp; Implementation Strategies</td>
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<td>8:45-9:05am</td>
<td>How to Setup and Run a Successful PD Program</td>
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<td>9:05-9:30am</td>
<td>Preventing Medical Errors in Dialysis: Design &amp; Implementation Strategies</td>
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<td>9:30-9:50am</td>
<td>Evaluating Medical Literature: Understanding the Basics to Avoid Pitfalls</td>
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<td>Dialysis Kinetics: Q &amp; A</td>
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<td>Understanding the Finances of a Dialysis Facility</td>
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<td>Medical Director Duties: Responsibilities, Quality &amp; Compensation:</td>
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<td>Individual Medical Director Perspectives &amp; Expectations</td>
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<td>Calcium / Phosphorus Metabolism: Old Challenges and New Developments</td>
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<td>2:05-2:25pm</td>
<td>Phosphate Metabolism in Renal Failure: It Ain’t What You Thought It Was</td>
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<td>Non-Calcium Based Phosphate Binders: A review of Strengths &amp; Weaknesses</td>
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<td>Does Vitamin D Affect Survival?</td>
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<td>Cinacalcet: How Does It Affect Vitamin D Use?</td>
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DAY 2
THURSDAY, JANUARY 20, 2005

6:45-7:25am Continental Breakfast

7:25-7:30am Welcome: Nathan W. Levin, MD

7:30-8:15am KEYNOTE ADDRESS—THE NATURE OF EVIDENCE; HOW IT SHOULD BE EVALUATED & ITS APPLICATION TO GUIDELINES
Alison MacLeod, MD

Consensus Topics
Speakers
8:15-8:40am Health Care Research and Policy: The Medicare ESRD Program: Looking Back, Looking Forward Paul W. Eggers, PhD
8:40-9:00am Improving the ESRD Program Strategies Today for a Higher Quality Tomorrow: CMS and the Renal Community Working Together to Improve the Medicare ESRD Program Barry Straube, MD

Break

9:00-10:00am Cardiovascular & ESRD Outcomes
The Unexplained Relationship of Blood Pressure to Survival in the Dialysis Patient: A New Explanation John Daugirdas, MD

10:15-12:00pm DEBATE: Are practice patterns the prime factors responsible for mortality differences between Europe, Japan and USA? Martin Kuhlmann, MD (No) vs. Eric Young, MD (Yes)

12:00-1:00pm Lunch

Technology & Therapeutics Session
Speakers
1:00-1:20pm Nanotechnology: Its Future Role in Ultrafiltration and the Removal of Solutes Gayle Pergamit and Martin Edelstein, PhD
1:20-1:40pm Advances in Elasticity Imaging: The Value of Measuring Compliance in Kidneys and Arteries William Weitzel, MD
1:40-2:00pm A Trial of Detecting Impending Access—Graft Failure by Simplified Weekly Flow Monitoring: Early Results David Wilkenson, PhD
2:00-2:20pm Home Dialysis & Remote Monitoring: Current Technology Requirements & Capabilities Jose Diaz-Buxo, MD
2:20-2:45pm The Impact of Post-Dialysis Weight on Patient Outcomes in Hemodialysis Bernard Charras, MD

6:00-7:00pm Wall Street Symposium Daniel Mahony

DAY 3
FRIDAY, JANUARY 21, 2005

6:45-7:30am Continental Breakfast

7:30-8:15am KEYNOTE ADDRESS—FROM EPO TO GLOBAL OXYGEN SENSING AND BACK TO THE KIDNEY Kai Uwe Eckardt, MD

Consensus Topics
Speakers
8:15-8:35am Novel Therapeutic Concepts for Hemodialysis Vascular Access Dysfunction Prabir Roy Chaudhury, MD, PhD
8:35-8:55am Innovative Approaches to Saving Fistulas Antoine L. Samaha, MD
8:55-9:15am Saving Infected Catheters; Why and How Michael Allon, MD
9:15-9:35am Vascular Access Monitoring: Methods & Approaches; Can We Standardize? F. Lopot, PhD

Break

9:35-10:00am DEBATE: Access Monitoring: Does it really improve outcomes? Jeff Sands, MD (Yes) vs. William Paulson, MD (No)

10:00-11:00am DEBATE IS THERE A DANGER IN THE APPLICATION OF REVERSE EPIDEMIOLOGY IN ESRD? CHOLESTEROL, HOMOCYSTEINE & C-REACTIVE PROTEIN, BODY SIZE K. Kalantar-Zadeh, MD, PhD vs. Josef Coresh, MD

11:00-12:00pm Lunch

1:00-1:25pm The Increasing Importance of Inflammation Statins as Anti-Inflammatory Drugs David C. Wheeler, MD
1:25-1:50pm The Infective Theory of the Atherosclerotic Plaque T. Alp Ikizler, MD

2:00-2:15pm DEBATE: The Predictive Value of CRP: Is it Clinically Relevant? Frank van der Sande, MD, PhD vs. Peter Stenvinkel, MD

2:15-3:15pm DEBATE: Is there a danger in the application of reverse epidemiology in ESRD? Cholesterol, homocysteine & c-reactive protein, body size K. Kalantar-Zadeh, MD, PhD vs. Josef Coresh, MD

Program Committee

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Renal Research Institute

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Role of the Nurse Practitioner...

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Access Monitoring:

The fact that a significant stenosis is found in most of the patients referred for a thrombectomy, it is acceptable to think that a stenosis may preclude graft thrombosis. Even though AV Fistulas require less intervention and are prone to fewer thromboses, some studies have reported that preventative angioplasty reduces AV Fistula thrombosis.14,15 Thus based on several observations surveillance programs have been implemented to monitor vascular access patency. Although information regarding the prevalence of angioplasty between AV Grafts and Fistulas is limited, it is well known that measurement of access blood flow by different methods such as Ultrasound dilution, Doppler ultrasound, static dialysis venous pressure and conductive dialysance have a high predictive value for significant stenosis in fistulas and grafts.14,15

At our unit we have a dedicated consortium that has a proactive approach to the management of vascular access. Maintaining a good working access involves periodic but consistent monitoring. The team involves the nephrologist, nurse practitioner, vascular surgeon, and interventional radiologist along with nurses and dialysis personnel on all levels of care.

Changes in dialysis kinetics can herald problems with access function if there is significant recirculation. However an overall decline in dialysis efficiency could be a late complication of a failing access. Historically Kt/V is monitored on a monthly basis. In our center we use an On-Line clearance monitor system (OLC, Fresenius Medical Care, Germany) during each dialysis that will flag any alteration in expected Kt/V and trigger an immediate evaluation that will include a search for access recirculation or wrong needle placement.

Traditional methods of direct vascular access surveillance include:

1. clinical examination,
2. venous line pressure measurements during dialysis,
3. urea recirculation measurement,
4. continuous wave Doppler methods,
5. duplex ultrasonography, and
6. radiograph angiography.

In our center in addition to clinical examination, we rely heavily on the regular use of recirculation and access flow studies in vascular access monitoring.

Access Recirculation

Efficient use of an access is achieved by the following measures:

- Access blood flow is larger than extracorporeal blood flow
- Blood flow is drawn from the upstream and returned the downstream part of the access.
- Removal and return sites a separated from each other by some distance.

Access recirculation could be defined as the fraction of cleared extracorporeal blood flow that returns to the extracorporeal blood line, taking the short connection between the access needles. In this type of recirculation there is retrograde flow in the vessel in which the access needles are placed. If wrong placement of access needles and reversed placement of blood lines can be excluded, access recirculation is an indicator of an acute access problem.7,8,16,17 On the other hand, absence of access recirculation does not necessarily exclude access problems since the presence of a significant stenosis between arterial and venous puncture sites is not detected by conventional recirculation measurements.7,8,16,17

Due to the importance of thermal balance in hemodialysis, which has been known for long time, at our center every dialysis machine is equipped with a blood temperature monitor (BTM, Fresenius Medical Care, Bad Homburg, Germany) and access recirculation is measured. The temperature of venous blood returning to the access is changed by modifying the dialysate temperature without changing pump flow and without affecting the flow and recirculation conditions in the vascular access. Recirculation is derived from the change in arterial temperatures caused by a change in venous line temperature.7,8,16,17

Access flow

It is performed using a dialysate conductivity clearance technique or dialysance, which measures access flow with the On-Line clearance monitor. (OLC, Fresenius Medical Care, Germany) which requires reversal of the lines. A change in dialysate sodium concentration (and conductivity) causes a corresponding change in the sodium concentration of the blood flowing through the dialyzer. The blood with altered sodium concentration is delivered through the venous line to the vascular access. Dialysance measurements are performed at the normal and reversed line positions. With the reversed line position, analogous to the saline dilution method, the high sodium venous line blood mixes with access flow and a portion of the mixed blood enters the arterial line. These changes in sodium concentration are recorded by electrical impedance sensors in the dialyzer. Access flow can be calculated using dialysance measurements at the normal and reversed line positions. In our unit the latter is done easily with a non-invasive twist device (Twiter) that does not require line disconnection, thus minimizing manual execution and greatly reducing the risk of infection.

Access Flow measurement is our gold standard for predicting potential failure of the hemodialysis access. Our unit uses access flow on all grafts and fistulae on a monthly basis during dialysis. A baseline access flow is recorded on all patients and we keep an individual log. We consistently compare results from baseline readings to subsequent results. Repeat studies are performed after all interventions. Absolute access blood flow in grafts of less than 600 ml/min and in fistula of less than 400 ml/min trigger interventional study, usually a fistulogram and sometimes a duplex Doppler study. The latter is performed by an experienced interventional radiologist with vascular surgeon supervision. A consistent drop of 25% from baseline is also considered significant and results in a diagnostic study.

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The Person Was Inside the Patient, but the Doctors Never Met Him

By JUDITH GROCH
Reprinted with permission from the New York Times.

My late husband was a kidney dialysis patient for the last nine years of his life, which meant that his kidneys had given up the ghost and a machine kept him alive. He was sort of a dead man walking, talking and eating.

On most days, his life was in the hands of a smooth-running machine but a not-so-smooth-running medical system. If Bill had had a broken hip, doctors would have pinned or replaced it. Pneumonia? They’d have doused the bugs with antibiotics. But kidney failure is at best a chronic illness. Bill’s medical records ran to volumes, with more authors than the Old Testament.

Three times a week, rain or shine, an ambulette service delivered Bill to the dialysis unit where he filtering and cleaning his blood. Add to this the time waiting for the dialysis needles to be withdrawn, his blood pressure to ascend from the pits where it had plunged and the ambulette service to pick him up again, and Bill came home from his internal scrubbing a limp, wobbly rag doll. On good days, he was gone from 10 a.m. to 4 p.m.

At the head of the specialist list was the brilliant but overworked nephrologist who manages a dialysis patient’s delicate internal chemistry and is ostensibly the grand choreographer of all physicians on the team. If someone wanted to prescribe a painkiller, an antidepressant, a cardiovascular drug, it was wise to clear it with the nephrologist, who was in charge of what could safely go into Bill’s body. But beyond that, he was the grand referrer-outer. Intolerable itching? Bad bones? See the endocrinologist, who concluded that Bill’s parathyroid glands needed to come out and summoned the appropriate surgeon.

There was a first-rate cardiologist who watched over Bill’s failing heart, but not over his failing legs. The neurology consultant was fascinated by misfitting nerve fibers that were having a nervous breakdown but was less concerned about why Bill’s legs hurt. The physical medicine expert prescribed physical therapy to help Bill’s arthritis, frozen shoulders and unsteady gait, but agreed sadly that other problems were not his department.

It would have been comforting to take Bill off his blood-thinner drug, lest a fall lead to a brain hemorrhage, but the cardiologist demurred: without the medication, Bill was at risk for a stroke or hemorrhage, but the cardiologist demurred: with his heart problems was buried way down in his chart somewhere.

At one point, a urologist signed on to remove a cancerous, but nonworking, kidney, then, satisfied that the cancer and the postoperative danger of infection were contained, sent his bill and dismissed Bill. The years rolled by, but nobody seemed to be concerned that there might be cancer in the other nonworking kidney.

A vascular surgeon repaired or rebuilt the surgically installed dialysis access in Bill’s arm whenever it clogged or were out. (Access failure was always an ugly emergency.) The psychiatrist, specializing in dialysis patients, sighed and agreed that Bill had plenty to be depressed about. He prescribed an antidepressant.

There were also assorted radiologists and other types who did radiological scans, and rescues when blood clots threatened to make a hash of the whole scene. Not on this list, but ever present, were the gnomes who buried the scan and test results where nobody could ever find them.

What the doctors never really seemed to appreciate was that Bill was much more than a dialysis patient. He knew the half-life of radioactive phosphorus, where all the soldiers had fallen at Verdun, when to underlead an ace at bridge. He knew where every country on the map is, or was, and what it was called then or now. He knew the name of the captain of the doomed cruiser Indianapolis, whether the Brahms octaves were being rattled off without a dropped note, how the young Joan Sutherland became a diva.

Bill had a lethal tennis backhand, played the piano beautifully, never got lost while driving, understood the innards of a cancer-therapy machine and had friends in most of the 50 states.

But he couldn’t keep track of which doctor was in charge of what. He couldn’t understand why doctors were so slow to call him back and why they didn’t talk to one another. Why didn’t they check on the medications they had prescribed or someone else had unprescribed? Why did he need this new test, which the other doctor said he didn’t need? Most of all, Bill never understood why all these nice doctors didn’t have a few minutes to talk to him.
Role of the Nurse Practitioner...

**Conclusion:**
Throughout management it is imperative to have a well established surveillance program for vascular access. The monitoring of the program should be performed regularly and the results obtained should be available for immediate analysis to take preventive measures when appropriate. The clinical assessment of the patient that is performed by the nurse practitioner is crucial for a successful vascular access surveillance program. The staff must be educated on the importance of maintaining the patency of a vascular access and dedicated to this course.

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