

Comparison of Preventive Care Provided to Dialysis Patients by Nephrologists and to Patients Followed in General Medical Clinics: Compliance with American College of Physicians Guidelines

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Most end-stage renal disease (ESRD) patients do not have primary-care providers, and preventive medicine often is provided by their nephrologists. Little has been written about their success in providing this care. We studied all patients on dialysis at our hospital and compared their preventive care to a control group followed in the general medical clinic. The general medical group showed higher compliance with Pap smears (89% vs 48%), mammography (87% vs 62%), fecal occult blood testing (75% vs 50%), and pneumococcal vaccination (55% vs 28%). The ESRD group had better compliance with influenza vaccination (70% vs 55%) and lipid profile (100% vs 75%).

When the subgroup of patients on hemodialysis (HD) was compared with patients on peritoneal dialysis (PD), it was shown that HD patients were more likely than PD patients to receive preventive care. We also compared diabetes-specific care. The ESRD group had a higher rate of HbA_{1c} (100% vs 78%) and lipid monitoring (100% vs 76%), diabetes education (100% vs 84%), and podiatry visits (70% vs 38%). There was no difference in ophthalmologic examination or influenza vaccination. We found that nephrologists provide preventive care to ESRD patients with success approximately equal to primary-care physicians in our institution, although in different parameters. Ready access to dialysis patients and their blood and unit-specific policies contribute to compliance that is above national averages. Further improvements can be made by additional preventative measures policies, by physician and patient education, and by monitoring primary-care compliance in the chart.

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Key words

Peritoneal dialysis, primary care, end-stage renal disease, nephrologist, preventive care

Introduction

There are currently more than 200,000 end-stage renal disease (ESRD) patients on dialysis in the United States. Most of these patients do not have primary-care providers, and pre-

ventive medical care is often provided by their nephrologists [1–6]. Previous surveys have shown that the nephrologist assumes almost full responsibility for medical care of most ESRD patients [1,2]. Additionally, diabetes mellitus is a major health problem, with more than 6% of the United States population affected [7]. Diabetic nephropathy is the leading cause of ESRD [8] and more than 40% of ESRD patients have diabetes at the time of initiation of their dialysis [9]. Like primary care, diabetic care of ESRD patients is provided almost exclusively by the nephrologist [10]. Nespore and Holley [1,2] reported two surveys of nephrologists concerning their provision of primary-care services to dialysis patients. These surveys were self-reports and have been shown to overestimate actual compliance. To our knowledge, no studies have been done to assess actual compliance with primary-care guidelines, and no studies of any kind have been done to assess diabetes care in ESRD patients. We compared the effectiveness of nephrologists in providing primary and diabetic care to ESRD patients to primary-care providers in the general medical clinics at the same institution.

Methods

All patients with ESRD and on dialysis [hemodialysis (HD) or peritoneal dialysis (PD)] at Nassau University Medical Center, a 600-bed hospital in a suburban area, were studied. Consecutive patients who had been followed at the primary-care clinic for at least 1 year were selected as the control group.

Data regarding primary-care issues as recommended by the American College of Physicians (see Appendix) were collected from hospital records and patient interviews. These data included age, sex, race, type of dialysis, Pap smear, mammogram, colon cancer screening [colonoscopy, sigmoidoscopy, fecal occult blood (FOB), as indicated], vaccinations (influenza and pneumonia), aspirin as primary prevention for patients with two or more risk factors for coronary artery disease, and diabetes-specific care (annual eye and foot examinations, measurement of hemoglobin A_{1c} and lipid profile, diabetic education).

As patients had been followed for various periods by their physicians, we included only patients followed for at least 1 year. This was done to ensure that the physician had the opportunity to review and apply the primary-care recommendations.

Data were compared between ESRD and primary-care (control) patients. In addition, we compared PD with HD pa-

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tients. Diabetic-care issues were compared separately between the dialysis and control groups.

Exclusion criteria

The following patients were excluded:

- Patients followed in the general medical clinic for less than 1 year
- Patients on dialysis for less than 1 year
- Patients on dialysis followed by a primary-care provider other than a nephrologist
- Patients on dialysis, with an endocrinologist for management of their diabetes
- Patients on dialysis with human immunodeficiency syndrome if their primary care was managed an infectious disease specialist.

Statistics

Statistical analysis employed t-test and chi-square tests, as indicated. Statistical significance was set at $p < 0.05$. Data are presented as mean \pm SEM, unless otherwise indicated.

Results

ESRD group versus control group

There are 82 patients with ESRD on some form of chronic dialysis therapy at our institution. Ten ESRD patients were excluded because they had been on dialysis for less than 1 year; only 2 patients were receiving primary care from their personal physicians and these 2 patients are included in the 10 patients. One patient was HIV positive and was being treated by an infectious disease specialist, but the nephrologist was taking care of the patient's primary-care issues. Two patients were being treated by an endocrinologist and were excluded. Therefore, 70 dialysis patients and 70 primary-care patients were included in the present study. Age and race were comparable between the two groups. The ESRD group had more males (62.8% vs 37.2%) (Table I). There were 4 nephrologists taking care of the dialysis patients, and 6 primary-care physicians taking care of the primary-care group.

There were significant differences in primary-care compliance. The general medical group had higher compliance with Pap smears, mammography, FOB testing, and pneu-

monia vaccinations, while the ESRD group had better compliance with lipid profile and influenza vaccination. Colonoscopy/sigmoidoscopy and aspirin use were not statistically different (Table II).

Hemodialysis group versus PD group

We studied 49 HD and 21 PD patients. There were no significant differences between the two groups in age (48 ± 2.4 years vs 52.5 ± 2 years) or race (Caucasian, African American, Hispanic, other). There were more male HD patients than male PD patients (75% vs 38%) (Table III).

Patients on HD had better compliance with primary care than did PD patients. There were significant differences in Pap smear, colonoscopy/sigmoidoscopy, FOB test, and pneumonia and influenza vaccinations. Mammograms and aspirin were not statistically different.

Diabetic care in ESRD versus control group

There were 23 patients with diabetes mellitus in the ESRD group and 50 in the control group. Age and race were comparable, but the ESRD group had more males (54% vs 30%). The ESRD group had better compliance overall, and this was statistically significant with pneumonia vaccination, HbA_{1c} monitoring, podiatry visits, diabetes education, and lipid profile monitoring. There were no significant differences in influenza vaccinations and ophthalmologic examinations (Table IV).

Discussion

Primary and secondary prevention have become increasingly important issues. It is desirable, both clinically and economically, to prevent development of disease, to detect disease at an earlier stage when treatment or cure is feasible, and to prevent complications of diseases once established. As the population on dialysis grows, the non-nephrologic care provided to these patients and the adequacy of this care as provided by the sub-specialist become increasingly important. It has been well established that nephrologists take on the responsibility for cancer screening, preventative medicine, and comprehensive diabetes care in their dialysis population [1,2]. Most ESRD patients do not see a primary-care provider or an endocrinologist. In our study, which was limited by the fact that it was in a single center, we found that nephrologists provide, overall, equal or better care than primary-care providers in the same institution, and compare favorably with national statistics.

Although the focus of the primary-care physician is on preventative medicine, cancer screening, and minimizing complications of established diseases, such as diabetes, we hypothesize that the success of nephrologists in providing these services is due to a number of factors:

1. Easy and frequent access to HD patients' blood
2. Availability of patients (HD more than PD)
3. Dialysis unit policies regarding vaccinations and moni-

TABLE I Demographic characteristics of our population (dialysis vs control).

	Control (n=70)	Dialysis (n=70)	p Value
Age (years)	55.2 \pm 1.8	50.5 \pm 2.2	NS
Sex (male)	37.2%	62.8%	<0.05
African American	31.3%	40.5%	NS
Caucasian	23.5%	25.2%	NS
Hispanic	23.5%	26.3%	NS
Other	21.7%	8%	NS

TABLE II Comparison between end-stage renal disease patients (ESRD group) and general medical patients (control group) regarding primary-care issues.

	ESRD (%) (n=70)	Control (%) (n=70)	p Value	National ^a (%)	p Value (ESRD vs National)
Pap smear	48	89	0.001	91.7	0.001
Mammography	62	87	0.02	60.6	NS
Fecal occult blood test	50	75	0.02	17.3	0.001
Lipid profile ^b	100	75	0.03	70.8	0.02
Colonoscopy/flexible sigmoidoscopy ^c	44	35	NS	9.4	0.001
Influenza vaccination ^d	70	55	0.037	31.3	0.001
Pneumonia vaccination ^d	28	55	0.003	18.4	NS
Daily aspirin ^e	57	55	NS	23.3	0.001

^a From Behavioral Risk Factor Surveillance System.

^b Cholesterol screening: *MMWR* 2000 Aug. 25; 49(33):750–5.

^c Cancer screening: *MMWR* 1995 Jan. 26; 45(3):58.

^d Pneumococcal and flu vaccine: *MMWR* 1998 Oct. 2; 47(38):797–802.

^e Aspirin is recommended for patients with two or more major risk factors for coronary artery disease.

TABLE III Comparison between hemodialysis group (HD) and peritoneal dialysis group (PD) regarding primary-care issues.

	HD (%) (n=49)	PD (%) (n=21)	p Value
Pap smear	72	29	0.028
Mammography	75	44	0.15
Colonoscopy/flexible sigmoidoscopy	54	25	0.09
Fecal occult blood test	62.5	25	0.033
Influenza vaccination	80	45	0.002
Pneumonia vaccination	37.5	9	0.014
Lipid profile	100	100	NS
Aspirin	55	61.5	NS

TABLE IV Comparison between end-stage renal disease patients (ESRD group) and general medical patients (control group) regarding diabetes mellitus care.

	ESRD (%) (n=23)	Primary care (%) (n=50)	p Value
Eye examination	78	64	NS
Podiatry visit	70	38	0.01
HbA _{1C}	100	78	0.01
Lipid profile	100	76	0.01
Education	100	84	0.04
Influenza vaccination	70	54	NS
Pneumonia vaccination	37.5	9.5	0.01

toring of blood levels. In our unit, it is a policy to give influenza vaccines and to do regular blood testing (HbA_{1C} and lipid profile). No such policy exists for pneumonia vaccination in our unit.

The preventive care provided to HD patients is superior to that provided to PD patients. Although the number of patients in the two groups is small and might not reach enough power to draw conclusions, the results are likely acceptable due to a number of factors. Frequent opportunities to obtain testing or provide screening exist for HD pa-

tients. Hemodialysis patients are seen, on average, three times per week, whereas PD patients are scheduled to be seen monthly. Access to blood is easier in HD than PD and, although routine blood work is usually done monthly in each group, in PD it is more dependent on patient compliance with follow-up visits. Finally, having policies in place increases compliance. Both the HD and the PD unit have a policy to offer influenza vaccination to all patients. The lower rate of influenza vaccination for PD is likely due to fewer opportunities to vaccinate and non-compliance of patients with follow-up visits. No policy exists for pneumonia vaccine in our unit; this likely explains the lower vaccination rate for this vaccine.

Diabetic patients on dialysis had better routine diabetic care than the control group. The fact that diabetics on dialysis usually have more advanced disease may explain the higher rate of podiatric evaluations. The existence of dialysis unit policies accounts for the other differences. For example, blood testing is routine and it is policy in our HD unit to monitor HbA_{1C} for all diabetics. Such tests are expected to and do have high compliance.

Conclusion

We found that nephrologists provide preventive medicine to ESRD patients with success approximately equal to primary-care physicians in our institution. Ready access to dialysis patients and their blood, as well as unit-specific policies, help to contribute to compliance above national averages. Improvements can be made by additional preventive measures policies, by doctor and patient education, and by monitoring primary-care compliance in the chart.

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Appendix

American College of Physicians Guidelines:

1. Pap smear [11]: For sexually active women aged 25 – 65 years, every 3 years; for women aged 66 – 75 years, every 3 years if not screened within 10 years prior to age 66; for women at increased risk for cervical cancer, every 2 years.
2. Mammogram [12]: Annually beginning age 50 years; increased surveillance for those at high risk; annually starting at age 40 years for high-risk women.
3. Colon cancer screening [13]:
 - a. Fecal occult blood test: annually for age \geq 50 years;
 - b. Sigmoidoscopy: every 3 – 5 years for age \geq 50;
 - c. Barium enema with air contrast every 3 – 5 years.
4. Vaccination [14]:
 - a. Influenza: annually for age 50 – 65 years, or if chronically ill;
 - b. Pneumonia: 23-valent at least once for age \geq 65 years, or with a repeat after 5 years if chronically ill.
5. Cholesterol level [15]: Every 5 years.

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