

A Propensity-Score-Based Evaluation of the IMPACT™ Program Demonstrates Decreased Mortality

John A. Robertson, MD, FRACP, FACP¹; Grace Chen¹; Steve Wilson, PhD¹; T. Christopher Bond, PhD¹; Tracy Mayne, PhD¹; Mahesh Krishnan, MD, MPH, MBA, FASN¹
(1) DaVita, Inc., Denver, CO

INTRODUCTION

IMPACT™ (Incident Management of Patients, Actions Centered on Treatment) is a comprehensive clinical program designed to reduce mortality in incident hemodialysis patients by improving patient outcomes in nutrition, vascular access, anemia, and dialysis adequacy. Initiated in October 2007, IMPACT standardizes intake, education, management, and monitoring of patients during the first 90 days of dialysis.

METHODOLOGY

- We undertook a propensity-score matched retrospective study of the effect of the IMPACT program on 90-day and 1 year outcomes.
- Subjects included incident patients (those whose first day of DaVita dialysis was within 30 days of their first day of any dialysis) in either the IMPACT program or non-IMPACT patients at 55 dialysis facilities.
- We used logistic regression to create a propensity score (the probability of a patient being in the IMPACT group) based on Charlson Index, vascular access at first dialysis, antibiotic use in 1st week of dialysis, age, race, gender, diabetes, body mass index (BMI), cause of ESRD, Kt/V, hemoglobin (Hb), albumin, parathyroid hormone (PTH), corrected calcium, and phosphorus. Vascular access was marginally significant and controlled for in the analysis.
- We selected a 2:1 sample of matched controls based on the propensity score.
- Inferential analyses were conducted via independent t-tests for continuous variables and chi-square tests for categorical variables.
- Between-group analyses were conducted comparing results for IMPACT and control patients at baseline, at 90 days, and at 1 year.
- Laboratory measures were analyzed categorically by the number and percent of individuals within clinically acceptable ranges.
- The mortality rate was expressed in terms of the number of deaths per 100 patient-years of treatment. Patients were censored as of the last recorded date of dialysis if they stopped dialysis for any reason other than death. The expressed mortality rate is bounded by the 95% confidence interval derived from normal approximation of the data. Non-overlap in the 84% confidence interval for the two groups was considered statistically significant at the p=.05 level.

RESULTS

Table 1. Baseline Patient Characteristics Following Propensity Score Matching

	IMPACT (N=1212)	Non-IMPACT (N=2424)	p value
	Mean ¹ (SD)	Mean (SD)	
Age (years)	63.77 (15.13)	63.58 (15.12)	0.72
Charlson Score	5.29(1.81)	5.28(1.92)	0.95
BMI	29.6 (8.09)	29.56 (8.02)	0.88
Facility DQI Score	55.73 (8.13)	55.42 (7.56)	0.26
<i>Initial Lab values</i>			
Kt/V	1.33 (0.48)	1.33 (0.48)	0.90
Hemoglobin (g/dL)	10.19 (1.3)	10.19 (1.3)	0.24
Albumin (g/dL)	3.37 (0.58)	3.37 (0.58)	0.78
PTH (pg/mL)	382.0	364.0	0.88
Calcium (mg/dL)	9.12 (0.75)	9.12 (0.75)	0.84
Phosphorus (mg/dL)	4.78 (1.56)	4.78 (1.56)	0.77

	%	%	
Male	58.1	57.8	0.87
<i>Ethnicity</i>			
Caucasian	44.6	45.0	
African American	34.8	33.8	
Hispanic	12.5	13.3	
Asian/Pacific Islander	5.1	4.3	
Native American	0.4	0.6	
Other	2.6	3.0	
<i>Primary Cause of ESRD</i>			
Diabetes	45.6	45.1	.98
Hypertensive Kidney Disease	34.9	35.6	
Polycystic Kidney Disease	1.0	1.0	
Other	18.5	18.4	
AVF or AVG Placed	20.0	17.5	0.06

¹Median PTH values are reported; p-value comes from analysis of log-transformed data.

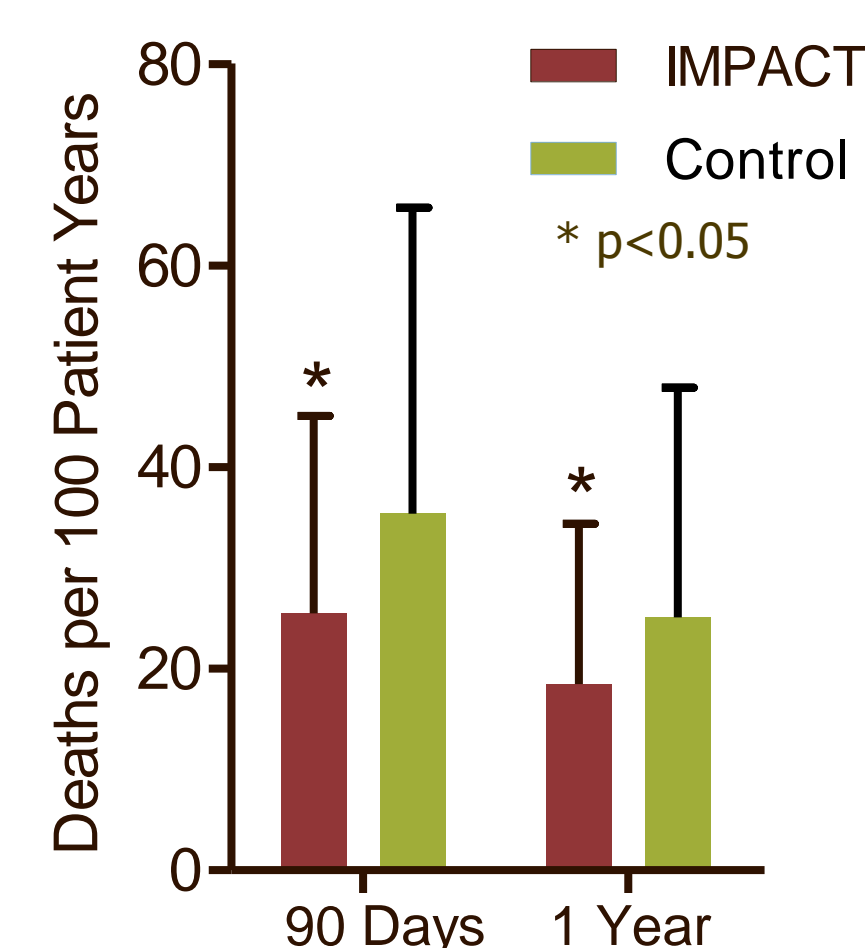


Figure 1. Mortality Rates between IMPACT and control patients

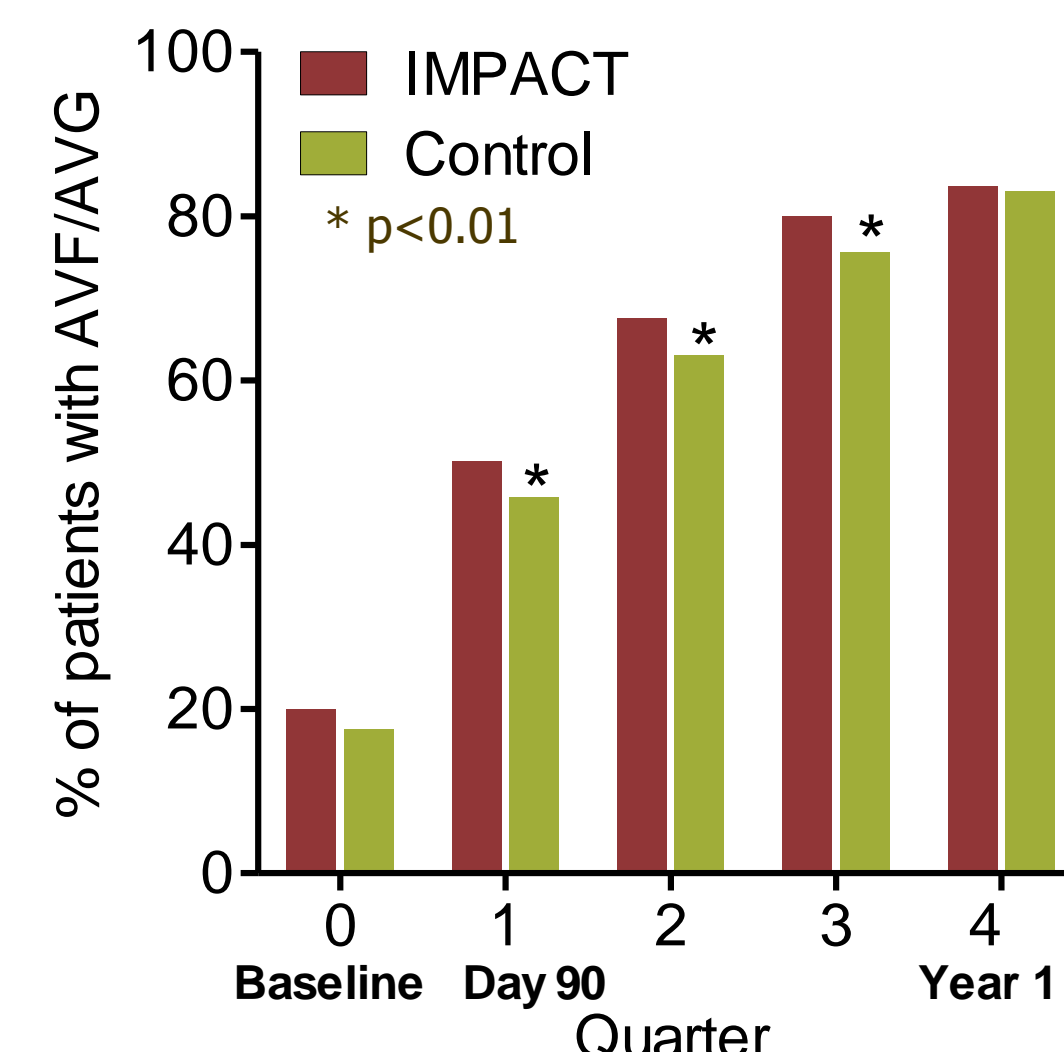


Figure 2. Percentage of Patients with Preferred Access (AVF or AVG)

Table 2. 90-Day and 1-Year Outcomes

	IMPACT	Control	
90-Day Outcomes	RR (CI) or % (N)	n	p-value
Mortality (per 100 pt yrs)	25.5 (19.6, 31.4)	35.4 (30.3, 40.5)	<0.05
Fistula/Graft (% Use)	50.1%	45.8%	0.01
Albumin ≥3.5 g/dL	63.8% (773)	62.6% (1517)	NS
Kt/V ≥1.2	82.3% (997)	80.1% (1939)	NS
Hb10-12 g/dL	36.1% (438)	38.7% (936)	NS
1-year Outcomes			
Mortality (per 100 pt yrs)	18.5 (15.9, 21.2)	25.1 (22.8, 27.4)	<0.05
Fistula/Graft (% Use)	83.7%	83.0%	0.65
Albumin ≥3.5 g/dL	81.5% (739)	80.9% (1198)	NS
Kt/V <1.2	88.8% (805)	88.9% (1316)	NS
Hb 10-12 g/dL	58.5% (531)	56.7% (841)	NS

SUMMARY of RESULTS

- Despite a lack of significant differences between IMPACT and propensity-matched controls at baseline, (Table 1), patients in the IMPACT program showed significantly lower mortality within either 90 days or 365 days (Figure 1) after initiating dialysis.
- Patients in the IMPACT program had more AVF and AVGs in use by the 1st, 2nd and 3rd quarters of their first year on dialysis (Figure 2).
- Patients in the IMPACT program compared to controls did not, however, evidence superior improvement in the surrogate outcomes albumin, hemoglobin or Kt/V (Table 2).

KEY LEARNINGS

- ✓ Results demonstrate that a broadly inclusive program that engage the patient and interdisciplinary care team can reduce incident patient mortality.
- ✓ The design of this program renders the results highly generalizable to other providers and care settings.

Our sincere appreciation to the teammates in nearly 1600 DaVita clinics who work every day not only to take care of patients but also to ensure the extensive data collection on which our work is based. We thank DaVita Clinical Research® (DCR), and specifically acknowledge Karen Spach, PhD of DCR for her editorial contribution, in preparing this poster. DCR is committed to advancing the knowledge and practice of kidney care.

Correspondence: john.robertson@davita.com
ISN World Nephrology Conference, April 8-12, 2011, Vancouver, British Columbia