Educational value of the transplant experience in urology residency

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Introduction: *To evaluate the educational value of transplant rotation in urology residency. In the United States, exposure to kidney transplantation during urology residency has declined significantly over the past few decades. At our institution, transplantation has been a core component of urology residency since its inception in 1959.*

Materials and methods: *A 15-question anonymous survey was developed. The first 8 questions queried demographics and the last 7 were a set of questions with a Likert Scale response. The survey was electronic- mailed to past and current urology residents who had completed the transplant rotation, dating back to 1972.*

Results: *A total of 61 out of 98 (62%) individuals responded. The majority (59%) were general urologists, and one (2%) had completed a transplant fellowship. In their practices, 17% performed kidney transplants and 28% performed donor nephrectomies. Overall, 100% responded that the skills learned on the transplant rotation were beneficial for urology training, 100% had learned valuable vascular surgical techniques, and 93% felt that urology residents should have clinical transplant experience during their training. There was no statistical difference between the younger and older graduates in Likert scale responses.*

Conclusion: *The majority of graduates did not perform transplants in their practice, yet, all of responders agreed that the skills learned on the transplant rotation were beneficial and 93% expressed that urology residents should have clinical transplant experience during residency. Kidney transplantation should be an integral part of urology residency training.*

Key Words: transplant, training, urology residency

Introduction

Historically, urologists were at the forefront for kidney transplantation. The first successful kidney transplant in 1954 was performed by Dr. Joseph Murray, Dr. David Hume, and Dr. J. Hartwell Harrison, a urologist.[1] Initially, kidney transplants were primarily performed by urologists.[2,3] Over the years, there has been a trend towards decreased involvement of urologists in kidney transplantation.[2-4] As a consequence, exposure to kidney transplantation during urology residency has declined significantly. The shift is likely due to the increased centralization of transplantation programs which often require fellowship-trained multi-organ

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transplant surgeons.[4] Currently, there are few kidney-only transplant fellowships. This has led to a decreased participation of urologists within transplant programs, and decreased exposure of urology residents to transplantation. Kidney transplant training during urology residency is not a requirement in the United States. If not a formal requirement, and if practicing urologists are rarely performing kidney transplants, does exposure to transplantation add any value to the training of urology residents?

At our institution, transplantation has been a core component of the urology residency since its inception. We sought to determine the value of this training by surveying current and past residents that have completed the transplant rotation. A secondary analysis was performed to see if there was a difference between recent and older graduates. We hypothesize that the younger graduates may find the transplantation rotation less valuable because there is a significant decrease in urologists' participation in transplantation.

Materials and methods

This study was approved by local institutional review board (IRB# 00021342). The electronic mail contact information of current and past urology residents of the institution was obtained. A 15-question anonymous survey was developed using the web platform Qualtrics.com and electronically mailed to the 98 eligible participants dating back to residency graduation year 1972. The survey was open from 2/21/2020 to 2/28/2020.

The survey had two sections. The first 8 questions queried demographic information: years since graduation, the duration of the transplant rotation, their current or planned subspecialty, their practice type (whether academic or private), the number of kidney transplants performed, if they're currently performing kidney transplants, if they're currently performing donor nephrectomies. The last 7 questions required Likert Scale responses. The data was analyzed with descriptive statistics.

For the secondary analysis, the responders were categorized into younger and older graduates (younger being graduates of the last 10 years). The Likert scale responses were then simplified from a 5-point to a 3-point response. The simplified Likert scale responses were then compared between the recent and older graduates using Chi-squared or Fisher's exact test as appropriate (p values of 0.05 or less were deemed statistically significant). All results were analyzed using Excel and Stata IC 16.1.

Results

A total of 61 individuals responded, with a response rate of 62%. Table 1 describes their demographic information. The majority of the responders (48%) graduated from residency greater than 20 years ago, 11% are currently residents. The transplant rotation was > 3 months for 66% of the responders. Fifty-nine percent of responders were general urologists, and only

TABLE 1. **All demographic information of the 61 responders**

	Total responders (n = 61)
Stage of career (n = 61)	
Current resident	7 (11%)
Fellow	3 (5%)
Attending	41 (67%)
Retired	10 (16%)
Years since graduation (n = 61)	
Current residents	7 (11%)
Graduated within the last 10 yrs	15 (25%)
Graduated between 10-20 yrs ago	10 (16%)
Graduated > 20 yrs ago	29 (48%)
Length of transplant rotation (n = 61)	
2 mo transplant rotation	11 (18%)
3 mo transplant rotation	10 (16%)
> 3 mo transplant rotation	40 (66%)
Planned or current specialty (n = 61)	
General	36 (59%)
Infertility	6 (10%)
Oncology	7 (11%)
Reconstruction	4 (7%)
FPMRS	1 (2%)
Transplant	1 (2%)
Pediatric	2 (3%)
Undecided	4 (7%)
Practice type (n = 57)	
Academics	15 (26%)
Private	29 (51%)
Combination	13 (23%)
Number of kidney transplants performed (median, IQR) n = 57	30 IQR25-45
Performing kidney transplant now (Freq,%), n = 59	10 (17%)
Performing donor nephrectomy now (Freq, %), n = 60	17 (28%)

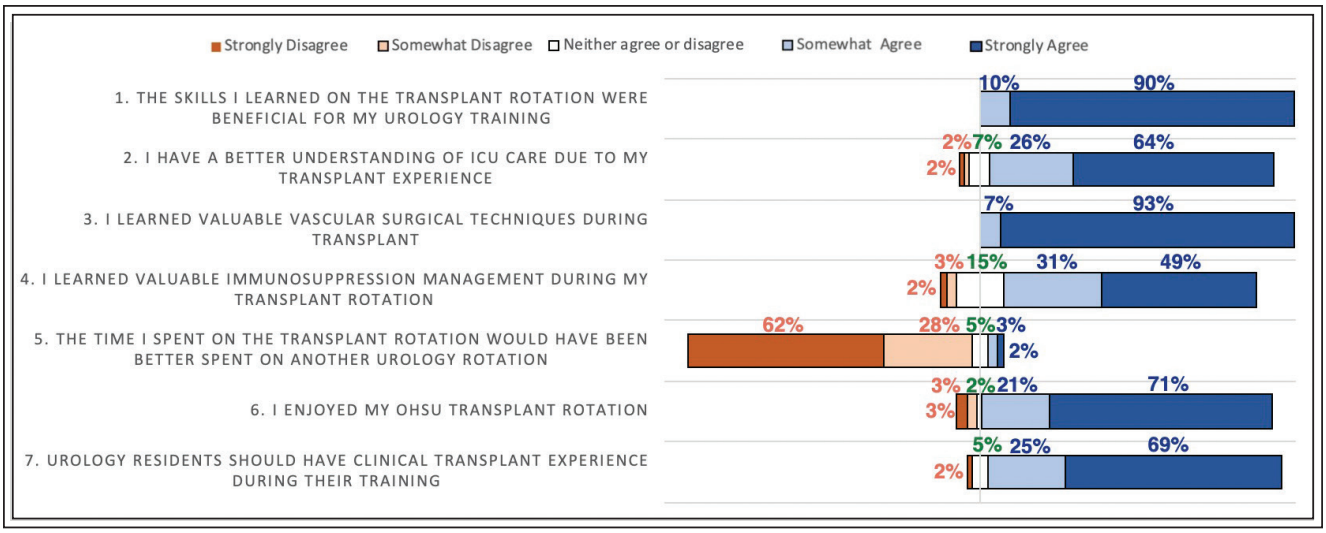

Figure 1. Likert responses of all responders (n = 61).

one responder formally specialized in transplantation. Fifty-one percent of responders work in a private setting. The median number of kidney transplants performed during a transplant rotation was 30 (IQR 20-45). Seventeen percent performed, or planned to perform, kidney transplant after residency. Twenty-eight percent performed, or planned to perform, donor nephrectomies after residency.

The Likert scale subjective responses regarding the transplant experience at our institution is shown in Figure 1. One-hundred percent responded that the skills learned on the transplant rotation were beneficial, 87% had a better understanding of ICU care, 100% had learned valuable vascular surgical techniques, 74% learned valuable immunosuppression management, 87% felt that their time would not have been better spent on another urology rotation, 89% enjoyed their transplant rotation, and 93% felt that urology residents should have clinical transplant experience during their residency.

When comparing the recent versus older graduates, Table 2, both groups had 100% response that the skills learned on the transplant rotation were beneficial for their urology training; 87% did not think their time would have been better spent on another urology rotation compared to 95% of the recent graduates; 87% of the older graduates enjoyed their transplant rotation compared to 100% of the recent graduates; and 90% of the older graduates indicated that urology residents should have clinical transplant experience during their training compared to 100% of recent graduates; however none of the above differences between the two groups was statistically significant.

Discussion

Our institution is one of the oldest kidney transplant program in the nation. In 1959, Dr. Joseph Murray, along with Dr. J. Englebert Dunphy and Dr. Clarence Hodges led the donor and recipient surgical teams for a successful kidney transplant from one 12-year-old monozygotic twin to another.[5] It was the first kidney transplant on the West Coast and 18th in the world.[5] At the time, Dr. Hodges was the urology division chief at our institution. He emphasized the value of kidney transplantation training in urology. Dr. Russell Lawson was director of the kidney transplant program from 1968 to 1976. Dr. John Barry succeeded him in 1976, and stepped down from that position in 2009. Since the inception of the transplant program, it has been a required residency rotation. Almost 50 years later, this legacy lives on.

This single institution survey study analyzes the subjective value of transplantation surgery exposure during residency training. We found that although most graduates did not participate in kidney transplants in their practice, the overwhelming majority of responders had a strong positive view on their transplant experience during residency. All responders expressed that the skills learned on the transplant rotation were beneficial for urology training, and only 5% indicated that their time would have been better spent on another urology rotation. Ninety-three percent expressed that urology residents should have clinical transplant experience during their training.

Urologists have had diminishing roles in kidney transplantation since the 1980s.[2] In 1995, a survey of

TABLE 2. **Comparing younger to older responders. Residents who are current or graduated within 10 years are considered younger. All p values are calculated using Exact Fisher's test. P value < 0.05 are significant**

	Younger responders (n = 22)	Older responders (n = 39)	p value
The skills I learned on the transplant rotation were beneficial for my urology training			
Agree	22 (100%)	39 (100%)	N/A
Neither agree or disagree			
Disagree			
I have a better understanding of ICU care due to my transplant experience			
Agree	19 (86%)	36 (92%)	0.82
Neither agree or disagree	2 (9%)	2 (5%)	
Disagree	1 (5%)	1 (3%)	
I learned valuable vascular surgical techniques during transplant			
Agree	22 (100%)	39 (100%)	N/A
Neither agree or disagree			
Disagree			
I learned valuable immunosuppression management during my transplant rotation			
Agree	15 (68%)	34 (87%)	0.17
Neither agree or disagree	5 (23%)	4 (10%)	
Disagree	2 (9%)	1 (3%)	
The time I spent on the transplant rotation would have been better spent on another urology rotation			
Agree	1 (5%)	2 (5%)	0.8
Neither agree or disagree	0	3 (8%)	
Disagree	21 (95%)	34 (87%)	
I enjoyed my residency transplant rotation			
Agree	22 (100%)	34 (87%)	0.29
Neither agree or disagree		1 (3%)	
Disagree		4 (10%)	
Urology residents should have clinical transplant experience during their training			
Agree	22 (100%)	35 (90%)	0.38
Neither agree or disagree		3 (8%)	
Disagree		1 (3%)	

urology training programs in the United States revealed that 60% of donor nephrectomies were performed by urologists; but only 25% of kidney transplants were performed by urologists.[6] By 2008, only 32% of donor nephrectomies in the United States were performed by urologists.[7] The decline of urologists' involvement in kidney transplant is not just limited to the United States. In the 1990s, Canadian programs still had a strong presence with all urology programs performing donor nephrectomies and 92% of the kidney transplants.[6] However, by 2016, less than half kidney transplant surgeons in Canada came from urology backgrounds.[6]

The decline of urology participation in transplant programs has trickled down to the training of

urology residents. In 1997, 100% of Canadian urology residents had exposure to kidney transplants but this dropped to 77% by 2014.[6,8] A recent survey of urology residency programs in the United States found that only 13% of urology residents were exposed to kidney transplantation.[9] Lack of exposure has been associated with lack of pursuit by urologists for careers in transplantation.[10] Additionally, there has been a de-emphasis in the vascular surgical training of urology residents.[3] Transplant surgery provides a unique opportunity for urology residents to develop vascular surgical skills.

Eight-seven percent of older graduating urology residents enjoyed their transplant rotation compared to 100% of the more recent graduates; 90% of older graduating residents recommended that urology residents have clinical transplant training compared to 100% of recent graduates. Both these findings were not statistically significant, but the results were contrary to what was hypothesized. In the era of minimally invasive surgery with endoscopy and robotics gaining a greater share of surgical procedures,[11] the more recent graduates may find that the transplant experience, which is still mostly an open experience, adds significant educational value.

A career in transplant surgery may not fit most surgical residents and only a few may find such a path in line with their passion. Although rare for urology residents to pursue a career in kidney transplantation, these procedures often require the assistance of urologists. In 1997, 73% of urologic complications from kidney transplants in the United States required participation from urology.[6] The overall incidence of urologic complications with kidney transplant has been reported to be 3.4%-11.2%.[12] Apart from perioperative urologic complications, a review from Sackett et al found many areas where urologists may be required to provide expertise in kidney transplantation: kidney stones, renal masses, recipient bladder dysfunction, urethral stricture, benign prostatic enlargement, native nephrectomy, genitourinary malignancy, and erectile dysfunction.[3]

There are many limitations of this study. Our institution that has always had a strong emphasis on transplantation, and our responders may be biased towards positive responses for the value of transplantation in residency training. Although we had a fairly strong response of 62%, surveys inherently contain non-response bias. The survey may also have recall bias about how long their transplant rotation was and how many kidney transplants they performed. This is a single institution study with a relatively small sample size; and it may not represent the transplant experience in other United States urology residency programs. A larger study involving all the transplant programs in the country would be more powerful.

Conclusion

This single institution retrospective study demonstrates that former and current urology residents have a strong positive view of kidney transplant training during residency. Despite only a few graduates performing kidney transplants after residency; all responders felt the transplant rotation was beneficial, and 93% would recommend a transplant during residency. □

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