ORIGINAL ARTICLE

Residency in urology and training in kidney transplantation. Results of a national survey

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KEYWORDS
Kidney transplantation; Residency; Surgical training

Abstract
Objectives: To determine the current state of kidney transplantation (KT) training in a country that is leader in organ donation and transplantation.
Material and methods: We conducted an online survey by e-mail to 138 urology residents. The survey contained 5 sections: affiliation, training in KT, interest in KT, residents of transplant centers and residents of nontransplant centers.
Results: Sixty-five residents responded, 47.1% of the urologists in training surveyed, representing 28 cities and 15 provinces.
Fifty-five percent (n = 36) of the respondents deemed the KT training offered during their residency as insufficient, and 85% (n = 55) demanded more resources. More than half were not confident in their abilities to perform transplantation surgery over the course of their residency (n = 35). Nineteen percent of the residents considered KT an important discipline in their residency, with a mean score of 56.2 (1–100).
Among the residents of the transplant centers (69.2%, n = 45), 73% (n = 33) considered KT when choosing a center for their residency. Of the surveyed residents from nontransplant centers (30.7%, n = 20), 45% (n = 9) do not perform an external rotation in KT.
Conclusions: The surveyed residents demand more training in KT. The most common situation is to end a residency without having performed a complete KT.
KT is considered an asset when selecting a resident medical intern position and commonly they are part of the transplantation team. The majority of residents are trained in centers with less than 75 transplants/year. External rotations in KT are not the rule in centers where transplantation is not performed.
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Residencia de urología y formación en trasplante renal: resultados de una encuesta a nivel nacional

Resumen
Objetivos: Conocer la situación actual sobre el adiestramiento en trasplante renal (TxR) en un país líder en donación y trasplante. 

Material y métodos: Realizamos una encuesta on-line vía correo electrónico a 138 residentes de urología con 5 apartados: filiación, formación en TxR, interés por el TxR, residentes de centros trasplantadores y de centros no trasplantadores. 

Resultados: Respondieron 65 residentes, un 47,1% de los urólogos en formación encuestados, desde 28 ciudades en 15 provincias. 

Para un 55% (n = 36) la formación que se ofrece sobre el TxR les parece insuficiente y el 85% (n = 55) demanda más medios. Más de la mitad no confía en realizar una cirugía de trasplante a lo largo de su residencia (n = 35). El 19% lo considera una disciplina importante, otorgándole una puntuación media de 56,2 (1-100). 

Entre los residentes de centros trasplantadores—69,2% (n = 45)—: el 73% (n = 33) consideraron el TxR a la hora de elegir centro para hacer la residencia. Los residentes encuestados de centros no trasplantadores—30,7% (n = 20)—: un 45% (n = 9) no realizan rotación externa en TxR. 

Conclusiones: Los residentes encuestados demandan más formación en TxR. La situación más habitual es terminar la residencia sin haber realizado un TxR de forma completa. 

Se contempla el TxR como un activo a la hora de elegir plaza MIR. El residente forma habitualmente parte del equipo de trasplante. La mayoría se forma en centros con menos de 75 trasplantes/año. La rotación externa en TxR no es la norma en los centros donde no se realiza trasplante. 

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Introduction

The medical internal resident (MIR) in urology must be trained in the study, diagnosis, and treatment of medical and surgical conditions of the urinary tract and retroperitoneum in both sexes, as well as the male genital tract. The official program that orders the 5 years of training divides the specialty into 7 areas of knowledge (andrology, urolithiasis, endourology, oncology, female and urodynamic functional urology, uropediatry, and renal transplant). This legislative framework provides the theoretical content, but as it is designed, it does not require a final exam and it does not evaluate the compliance of the teaching program or the level achieved. We do not know the reality of how new urologists are being trained in our country in any of the 7 major thematic blocks in which the specialty has been divided.

In Spain the surgeon of the renal transplant (RxT) is the urologist. Knowing the reality on the training offered to urology MIRs would detect points susceptible to improvement, redesign resources, and provide the means to ensure the training of future generations of surgeons of RxT. We intend to put in situation the current RxT training during residency and draw attention to the importance of it in our country.

Material and methods

According to the available vacancies in the last 5 years in the MIR call, a theoretical number of 476 residents studied their specialty training (2009--2013) in Spain. To know the current situation of training in RxT, an online survey was carried out between 15th and 26th January 2014 (Tables 1 and 2 and Figs. 1-4) with questions concerning filiation, training, interest in RxT, as well as specific issues depending on whether they were residents of a transplant center or not. The questionnaire was developed by the author of this article (RC) by means of Google Docs (CA, U.S.A.) so that it was answered online in a simple, quick, personal, and anonymous way. It was emailed to 138 urology residents, a figure that is about 30% of the theoretical MIR urology census.

Table 1 About current training in RxT: number of RxT surgeries estimated to be performed by the resident during training.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you complete your residence, how many RxT do you think you will have performed as first surgeon?</td>
<td>53.8% do not trust in performing transplant surgery as first surgeon (n = 35)</td>
</tr>
<tr>
<td>- One RxT: 6.1% (n = 4)</td>
<td>15.3% consider performing one RxT or more (n = 10):</td>
</tr>
<tr>
<td>- From 2 to 5 RxT: 7.7% (n = 5)</td>
<td>- &gt;5 RxT: 1.5% (n = 1)</td>
</tr>
<tr>
<td>- DK/DA: 3% (n = 2)</td>
<td></td>
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</tbody>
</table>
Table 2 Questions about training in RxT and their integration within their daily activity according to whether the resident was from a center with RxT or not.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents from transplant centers n = 45 (69.2%)</td>
<td>Was the RxT a decisive criterion when choosing the residence center? 73% contemplated the transplant as an important criterion when choosing the center to perform the residence (n = 33) 27% did not realize that aspect at the appropriate moment (n = 12)</td>
</tr>
<tr>
<td>Type of RxT performed in your hospital</td>
<td>Brain death donor: 100% (n = 45) Living donor: 73% (n = 33)</td>
</tr>
<tr>
<td>Residents from non-transplant centers n = 20 (30.7%)</td>
<td>Cadaveric donor in controlled asystole: 49% (n = 22) Cadaveric donor uncontrolled asystole: 22% (n = 10)</td>
</tr>
<tr>
<td>Number of RxTs performed in your hospital a year (tx/a)</td>
<td>&lt;25 tx/a: 2.2% (n = 1) Between 25 and 50 tx/a: 44.4% (n = 20) Between 51 and 75 tx/a: 31.1% (n = 14) Between 76 and 100 tx/a: 11.1% (n = 5) &gt;100 tx/a: 11.1% (n = 5)</td>
</tr>
<tr>
<td>Are residents an active part of the transplant team?</td>
<td>77.8% are an active part of the transplant team (n = 35) 20% do not participate in the transplant (n = 9) 2.2% DK/DA (n = 1)</td>
</tr>
<tr>
<td>How does the transplant integrate in your activity?</td>
<td>Alert exclusively for transplant-related activity: 60% (n = 27) Transplant is included as activity associated to urology duty: 40% (n = 18)</td>
</tr>
<tr>
<td>Is the activity you perform with the transplant financially compensated?</td>
<td>No remuneration is given for the activity related to the transplant: 53.3% (n = 24) The act related to the transplant is paid: 35.5% (n = 16) Both alert and act related to the transplant are paid: 11.1% (n = 5)</td>
</tr>
<tr>
<td>Do you perform external rotation in RxT?</td>
<td>External rotation in RxT is performed: 45% (n = 9) External rotation in RxT is not performed: 45% (n = 9)</td>
</tr>
<tr>
<td>In what year of residence is that rotation performed?</td>
<td>R5: 10% (n = 2) R4: 20% (n = 4) R3: 10% (n = 2) R2: 5% (n = 1) R1: 0</td>
</tr>
<tr>
<td>Length of the rotation in transplant?</td>
<td>DK/DA: 10% (n = 2)</td>
</tr>
<tr>
<td>Do you consider rotation adequate and sufficient?</td>
<td>DK/DA: 55% (n = 11)</td>
</tr>
</tbody>
</table>

Results

65 medical residents responded to the survey, 47.1% of surveyed urologists in training in Spain, from 28 cities in 15 provinces (Fig. 1). In relation to the current year of residency, 70% of residents who responded were R4–R5 and 30% R1–R3 (Fig. 1). According to whether the hospital performed RxT or not, 45 residents from transplant centers (69.2%) and 20 from non-transplant ones (30.7%) responded.

With regard to training (Fig. 2), more than half of respondents (55%) considered the training offered during residency in RxT insufficient, clearly asking for more training means (85%). By year of residence between the R4 and R5 (n = 45) group, 31.1% estimated the current training in RxT as correct, 62.2% valued it as insufficient, and 6.6% did not know or did not answer (DK/DA) to this question. While in the R1–R3 group (n = 20), 40% considered training as correct, 40% valued it as insufficient, and 20% did not express the matter. In relation to the assessment of training means, the R4–R5 group expressed, with 84.4%, the need for more means, 13.3% considered current means sufficient, and 2.2% DK/DA. For R1–R3, 85% demanded more means,
Figure 1 Questions about the filiation of residents who responded to the survey (n=65). At the top of the figure the participants are collected by year of residence and according to whether they are trained in a transplant or non-transplant center, and at the bottom, there is a map of Spain highlighting the provinces representing a resident in the survey.

Figure 2 Survey questions regarding the opinion of residents on the current training in RxT.

Figure 3 Question stratifying the interest in each of the 7 areas of knowledge that are part of the MIR urology program among respondents.

5% considered adequate means, and 10% DK/DA. When estimating the number of RxT that will be performed at the end of the resident, 53.8% said they will not perform any RxT as first surgeon, 27.7% could get to perform some part of the surgery, but not completely, and only 15.3% thought they will perform one or more RxT.

They were asked to place in order of priority, from 1 to 7, the different areas of knowledge that are part of urology (laparoscopy and robotics, uro-oncology, andrology, functional and female urology, endourology and lithiasis, pediatrics, renal transplant) (Fig. 3). They were classified into 3 groups, showing the percentage of selection, as "more important" (choice in first and second place), "important" (choice between the third and fifth position), and "less important" (chosen in sixth and seventh position). The RxT was located in a secondary position, away from the 3 major topics in care by residents (oncology, laparoscopy, and endourology-lithiasis), and near others such as functional urology and andrology. In the R4–R5 group, the RxT was placed as "more important" by 22.2% of respondents, while in the group R1–R3, it was selected in this position.

Figure 4 Question about potential interest in devoting in the future to health care activity associated to RxT among respondent residents.
by 10%. By means of a direct question, they were asked to place on a scale from 0 to 100 the importance they give to RxT in their residence; it was scored with an overall average of 56.2. Asking about a hypothetical scenario about their future career development, only 4.6% contemplated working on RxT as the main part of their healthcare activity, although 43.1% would be willing to devote themselves to it as a part of their clinical activity.

Of the 65 participating residents, 45 belonged to transplant centers (69.2%) (Table 2). 73% (n = 33) acknowledged having seen it as an important factor when choosing the center for their residence. In all these centers, cadaveric transplant is performed after brain death (n = 45). In 73.3% (n = 33) of residents trained in hospitals which also perform live donor, the percentage drops to 49% (n = 22) when it comes to cadaveric donor in controlled asystole, and 22.2% (n = 10) when we speak about cadaveric donor in uncontrolled asystole. Most (77.8%) are an active part of the transplant team, 20% do not participate in this activity, and 2.2% DK/DA. Being asked about organizational issues, 60% admit that there is a unique alert for transplant-related activity, whereas up to 40% is included as an activity associated to urological duty. More than half of respondents in this group (53.3%) do not receive any pay for this activity. For 35.5% the act associated with transplant is paid, while only 11.1% receive emoluments, both for alert and for act.

Of the 65 participating residents, 20 belonged to non-transplant centers (30.7%) (Table 2). External rotation in the RxT will be performed only by 45% of this group (n = 9). When there is rotation distribution, it is: R5: 2 (10%), R4: 4 (20%), R3: 2 (10%), R2: 1 (5%), R1: 0. As for the duration thereof, it is usually 2 (35%) or 3 (10%) months. It is considered appropriate to achieve the objectives proposed by 40% (n = 8), while 15% consider it insufficient (n = 3), 5% would rather not do it for considering it a waste of time (n = 1), and up to 40% DK/DA (n = 8).

Discussion

In Spain for the past 20 years, the number of RxT has increased significantly; while in 1993 1488 implants were performed, in 2013 the figure rose to 2552; 1064 transplants/year have increased in this period,2 a high activity carried out by multidisciplinary teams with experienced urologists involved in the RxT. The training of future surgeons of RxT is vital to maintain this activity and ensure the natural generational change. At this same time transplant units have increased, from 33 to 39 RxT in adults and from 6 to 7 in children.3 This increased number of transplants and the hospital units has approached the place to perform the implant to patients in ESRD and also to urologists in training of these hospitals.

The training of the urology resident is variable depending on the country in which they are trained.4,5 We found a fundamental difference; in other countries around, the RxT is not usually the urologist's responsibility so their training is not usually specifically regularized.6 In Spain, the RxT is included in the program of the specialty,1 and it is therefore imperative to ensure training on the same to all residents, regardless of whether they chose for their residence centers where transplants are performed or not.7

Laparoscopy revolutionized urological surgery toward a minimally invasive approach. The development of this change has occurred since its emergence in the early 90s. Today nobody disputes that every urology resident must be trained in laparoscopy. The RxT in the decade between the 50s and 60s also revolutionized urological surgery. While there are many courses for the training of new urologists in laparoscopy and minimally invasive surgery, very few offer for training in RxT. RxT surgery is more difficult to learn than any other open surgery; it offers fewer opportunities to be practiced, requires more experience, and the mistakes made may compromise the graft and the recipient.7 Alternative mechanisms must be developed to teach surgical skills in RxT.

The surgical learning is described as a process that begins by reading and studying, going through discussion forums, viewing of multimedia, continues by cadaver dissection exercises, ex vivo experimental models, and simulations in the experimentation animal, and it ends by activity in the operating room.8 Surgery in the experimental animal is useful for teaching and surgical practice.9 Its use approaches the student to situations they will face in the real operating room, making it possible to face and practice complex techniques that they would not have the opportunity to perform in humans.9 Of the different models for research and experimental training in RxT perhaps the most affordable, widespread, and similar to human, both anatomically and functionally, is the porcine.10,11

The incorporation of novel surgeons to the transplant units does not compromise the results, provided that this is done gradually and supervised by an experienced surgeon.5,12 Warm ischemia and surgical time are reduced from the 40 transplants performed,13 without clinically significant changes in the rate of complications or graft function.14 Young surgeons should not be excluded from transplant units if they were properly integrated.

To achieve certification as a surgeon of RxT, the European Board of Transplant Surgery requires at least 20 implants performed (www.uemmsurg.org), while for the American Society of Transplant Surgeons (ASTS) www.astvs.org, at least 30 are required. With the numbers shown by the survey, it is evident that the reality of MIR training is far from the minimum records required to obtain internationally recognized certifications (Table 2). The objectives of residence are not as ambitious; they are aimed at making contact and general knowledge of RxT, especially during the last 2 years, when the management of objectives of complexity III level is programmed, level in which the transplant is included.15 The future in RxT training in Spain will change with the MIR system toward a fellow Anglo-Saxon-like model, or perhaps through a “Trunk MIR”, with one to 2 years of general surgical training, 3 years of general urology, and a final year of specialization.

The secondary interest that the RxT arises among our residents is striking, without this being a disregard to other areas of knowledge within urology. This position in which the RxT stays is difficult to justify in a country like ours, in which a high transplant activity of which the urologist is the protagonist surgeon is performed, which does not require exclusive dedication to this specialty which enjoys high social recognition. A Canadian study published in 2006 asked its residents to stratify perceived usefulness
for future professional practice in different areas of knowledge and urology procedures; these placed transplant in last position. This fact could be motivated because in this country urologists are not responsible or main actors in RxT surgery, or perhaps because of the poor quality of life and work overload experienced by surgeons exclusively dedicated to the transplant.

In the environment of the ASTS for a center to have teaching accreditation in RxT the number of implants should exceed 60/year. If we transpose this figure to the data of our survey, 46% (n = 21) of residents belonging to transplant centers are trained in centers with fewer than 50 transplants per year. Residents who have to move out of their center to rotate in RxT may encounter some difficulties; educational services with high assistential load, little programmable work due to the characteristics of transplant surgery, and competition with local residents. To this fact we may add the fact that they arrive at a different health center and that it usually has few mechanisms for feedback to improve the stage and details of the rotation. This published situation in relation to rotation in transplant in an environment under the influence of the ASTS is perfectly extrapolated to our environment. These potential difficulties cannot justify that 45% (n = 9) of residents surveyed from non-transplant centers do not perform rotation in RxT. Rotation is something more than just having the opportunity to see how an implant is performed. The RxT has been considered an area of exemplary knowledge as medical and surgical compendium in urology. From the medical point of view, the metabolism and associated comorbidity of the recipient, knowledge of immunology, organ preservation, and immunosuppressive drugs are managed, while from the surgical point of view it is an extraperitoneal abdominal surgery, it requires vascular anastomoses and reconstructive techniques, preparation of graft in bench surgery and microsurgery, not forgetting complementary and endourological techniques that should be known and managed for their follow-up or the surgical emergencies that may occur. The RxT provides much more than the specific surgical technique to general training of the urologist as surgeon. Although a resident has little interest, and even if they end up working in a non-transplant center, it is likely that at some point they have to perform an extraction, either renal only or multigorgan. Therefore, there is so much to learn and experience during rotation, useful for the urologist beyond the act of transplant itself. Training in RxT should be ensured and standardized to all urology residents, whether or not they are in a transplant center, as well as courses enhanced, both practical and theoretical on training in RxT, as with any other technical procedure subject to a manual learning.

Among the limitations of the study, we can emphasize that the questionnaire sent is not validated externally or responds to any initiative of any scientific society and it has been designed specifically for this study by the author of the article (RC). Furthermore, the response rate is low, 47.1% of respondent residents, a percentage that can express little interest in the topic under discussion. Being a non-institutional initiative, low participation could also be motivated by the lack of advertising, the limited time to completion, or inability to contact the entire population of active residents.

Conclusions

Residents surveyed demand more training in RxT. The most common situation is that a resident finishes his education without having conducted a RxT completely. The RxT awakens a secondary interest among the priorities of residents.

The resident contemplates RxT as an asset when choosing their MIR vacancy, and they usually form part of the transplant team. Most residents are trained in centers with less than 75 transplants/year. External rotation in RxT is not the norm in centers where no transplant is performed.

Conflict of interest

The authors declare that they have no conflict of interest.

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