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Evaluation of surgical training at the end of the Urology postgraduate course at the Hospital de Clínicas in Montevideo, Uruguay.

Evaluación de la formación quirúrgica al finalizar el posgrado de Urología del Hospital de Clínicas de Montevideo, Uruguay.

Riverós Raúl, Claro Alexis.

Chair of Urology: Dr. Levin Martínez, Hospital de Clínicas, Montevideo, Uruguay
* Correspondence: raulriveros47@gmail.com

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Abstract: Objective: to describe the number and type of surgeries performed by a resident throughout his training during his 4 curricular years in the Chair of Urology of the Hospital de Clínicas de Montevideo, Uruguay. Methods: a descriptive, longitudinal, retrospective study of the surgical activity carried out in the different rotation centers of the Chair of Urology of Montevideo-Uruguay was carried out during the four years of training of a Urology resident from April 2019 to March 2023. The analysis was limited only to procedures in which the resident acted as the main surgeon. Data were recorded prospectively within the framework of the mandatory six-month portfolio and variables such as number of procedures, their subspecialty, complexity, and year of residency in which they were performed were evaluated. Of the surgeries in which he acted as an assistant, only the total number was recorded. Results: During the period analyzed, the resident participated in a total of 945 surgeries, of which he acted as a surgeon in 744, assisted and/or supervised by a licensed urologist, and in 201 he acted as an assistant. The average was 186 surgeries per year, starting with highly complex surgeries in the second year, with the fourth year being the year where they were performed the most, reaching 44 high surgeries. It should be noted that as the residency program progresses, the number and complexity of the procedures performed by the resident increase. Conclusion: During the postgraduate course in Urology, the surgical volume increases as the training progresses. Not only the number of procedures increases, but also their complexity, with the last year being the year with the highest surgical volume.

Keywords: urology residency; study programs; postgraduate education in medicine, surgical training.

Resumen: Objetivo: describir el número y tipo de cirugías realizadas por un residente a lo largo de su formación durante sus 4 años curriculares en la Cátedra de Urología del Hospital de Clínicas de Montevideo, Uruguay. Métodos: se realizó un estudio descriptivo, longitudinal, retrospectivo de la actividad quirúrgica desarrollada en los distintos centros de rotación de la Cátedra de Urología de Montevideo-Uruguay durante los cuatro años de formación de un residente de Urología en el período abril 2019 a marzo 2023. El análisis se limitó sólo a los procedimientos en los que el residente actuó como cirujano principal.

Los datos se registraron en forma prospectiva en el marco del portafolio semestral obligatorio y se evaluaron variables como número de procedimientos, subespecialidad de los mismos, complejidad y año de la residencia en que se realizaron. De las cirugías en las que actuó como ayudante sólo se registró el número total. Resultados: Durante el período analizado el residente participó en un total de 945 cirugías, de las cuales en 744 actuó como cirujano, ayudado y/o supervisado por un urólogo titulado y en 201 actuó como ayudante. El promedio fue de 186 cirugías por año, comenzando con cirugías de alta complejidad en segundo año, siendo en cuarto el año donde más las realizó llegando a 44 cirugías altas. Se destaca que a medida que se progresa en el programa de la residencia, se aumenta el número y complejidad de los procedimientos realizados por el residente. Conclusión: Durante el posgrado de Urología el volumen quirúrgico aumenta a medida que se avanza en la formación. Se incrementa no sólo el número de procedimientos, sino que también la complejidad de los mismos, siendo el último año el de mayor volumen quirúrgico.

Palabras clave: residencia de urología; programas de estudio; educación de posgrado en medicina, formación quirúrgica..

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1. Introduction

In Uruguay, the only way to access the title of specialist in Urology is through the medical residency system, a system implemented in urology in our country after the approval of the Medical Residency Law, in which as of 2008 decrees that admission to the specialty is only through residency. Unlike other specialties, its entry is only through an opposition contest, anonymous and eliminatory by entry quota, as established by law number 18438 (1-2). It has been shown that the best training for a surgical specialist is obtained through a residency system (2-6). In this context, it is sought that the resident physician develops his care and academic training through a tutorial structure of progressive delegation of responsibilities, both in decision-making and in the development of surgical capacity (7).

The training of Urology postgraduates in our country depends on the Chair of Urology that is located at the Hospital de Clínicas Dr. Manuel Quintela located in Montevideo, Uruguay. The training includes weekly on-call at the Hospital de Clínicas throughout the postgraduate course, coordination surgeries at this hospital and also, especially from the second year, residents rotate through other centers in the city and in the interior of the country. where there are teaching care units, thus increasing the surgical volume during the years studied. Starting in 2020, the rotation was implemented for a semester in Maldonado, department of the interior of the country, where the resident is involved in the team of urologists of the department and significantly increases the number of procedures performed. In 2017, the graduate school approved the new training program for specialists in Urology, which began to be implemented in 2018. The first year of general surgery was eliminated to move to 4 years of urology, being one semester of the first year dedicated to rotations through different services (nephrology, imaging, urodermatology, urodynamics, endoscopies and prostate biopsies). With the exception of rotations for lithiasis and kidney transplantation, specific surgical

rotations are not performed in our setting as they are in other high-volume international centers. Thus, the rotations are annual and are carried out in different public hospitals such as Hospital Maciel, Hospital Pasteur, Police Hospital, Military Hospital, National Cancer Institute (INCA) and Maldonado Hospital. In each of these hospitals, various urological surgeries are performed, both oncological and benign pathologies, none of these being dedicated exclusively to a specific pathology. Our country has 3,426,260 inhabitants according to the 2021 census, of which approximately half of the population lives in the country's capital where the main tertiary health care centers are located. Distributed between public and private attention, there are several assistance centers linked to state services, as many private assistance and a series of international insurances that distribute the assistance of the population. This is the reason why there are no highly specialized centers in different areas of less frequent pathologies or those with delayed priority compared to neoplastic pathologies, such as surgery related to urinary incontinence or reconstructive surgery. This is the reason why specific rotations are not carried out according to pathology.

Regarding the performance of surgical procedures, it is intended that they be of increasing complexity according to the year of residence. The first years are focused mainly on performing more frequent current and major surgeries, while in the third and fourth year the resident is expected to increase the number of highly complex procedures. The current training program for urology specialists in our country establishes that a minimum of 50 surgeries must be documented per year of residency, with their complexity depending on the year completed. It should be noted that in all cases the surgeries are performed under the supervision and responsibility of professors of the chair at the Hospital de Clínicas or urologists qualified in some of the previously mentioned annex hospitals.

Historically, at the level of surgical specialties in Uruguay, the surgical production of specialists in training has been a concern, both in terms of the number of surgeries and their level of complexity. National authors from other specialties have shown deficiencies in this aspect of training and, in response to this situation, changes have been proposed, among others, the extension of the duration of some residences. In our country, there are works that describe the surgical production of the resident during his training in general surgery, but there is no precedent of publications that describe the surgical volume acquired by the urologist in training during the residency (8-9). . In 2014, the Argentine Society of Urology (SAU) published a study carried out by the Hospital Italiano de Buenos Aires, where an analysis of surgical training was carried out during the urology residency at the aforementioned center (10). For all the aforementioned, it was considered appropriate to carry out this survey whose main objective is to describe the number and type, divided by subspecialty, of surgeries performed by a resident throughout his training during his 4 curricular years at the Department of Urology of the Hospital de Clinics of Montevideo, Uruguay.

2. Methods

A descriptive, longitudinal, retrospective study of the surgical activity of a resident who completed residency at the Chair of Urology of Montevideo, Uruguay

during the 4-year period between April 2019 and March 2023 was carried out. The analysis was mainly limited to surgeries in which the resident acted as main surgeon, although the total number of surgeries in which he acted as assistant was also recorded. Although in our country the fulfillment during residency of a certain number of total surgeries, as well as of each subspecialty, is not strictly stipulated, the activity was analyzed with the minimum standards required by the Accreditation Council for Graduate Medical Education to validate a Urology residency according to criteria of the American Urological Association, AUA (11-12), which is shown in Table 1.

	Mínimo de Cirugías	Procedimientos
Urología General	**200**	
Reseción Transuretral (RTU)	100	RTU de Vejiga, RTU Próstata, Cervicotomía
TRUS / Biopsia Transrectal	25	Biopsia Transrectal, Ecografía Transrectal
Cirugía Inguino-escrotal	40	Orquiectomía, Hidrocelectomía, Varicocelectomía
Endourología / Litiasis	**120**	
ESWL	10	Litotricia extracorpórea por ondas de choque (ESWL)
Ureteroscopia	60	Litotricia vesical endoscópica (LUE), colocación de catéter doble J
NLP	10	Nefrolitotricia percutánea (NLP)
Cirugía Laparoscópica	**50**	
	50	Cualquier procedimiento laparoscópico (Lap)
Cirugía Reconstructiva	**60**	
Cirugías de Pene - Incontinencia Masculina	10	Implante de prótesis peneana, Fractura de pene, Slings masculinos, Esfínter Urinario Artificial
Cirugías Uretrales	5	Uretroplastías
Incontinencia Femenina	15	Slings femeninos, uretrolisis, corrección de fístulas
Derivaciones Urinarias	8	Ampliación Vesical, Bricker, Ureterostomía
Oncología	**100**	
Oncología Prostática	25	Prostatectomía Radical (PR), PR Lap, PR robótica
Oncología Vesical	8	Cistectomía + derivación urinaria
Oncología Retroperitoneal	40	Nefrectomía Radical (NR), Nefrectomía Parcial (NP), NR Lap, NP Lap, Nefroureterectomía (NU), NU Lap

Table 1. Adaptation of the minimum number of surgeries per resident to prove residence by the AUA.

Data were recorded prospectively during the residency within the framework of the mandatory semester portfolio in an Excel table. This is a didactic and evaluation tool included in the postgraduate training program. Variables such as the number of procedures, their complexity, as well as the place where they were performed were evaluated. The data was analyzed grouping the surgeries according to the year of residence. Those procedures that were not performed in the surgical suite, such as cystoscopies (rigid and flexible), prostate biopsies, and some minor surgeries performed in the office, were excluded. The results of the variables were expressed in absolute frequencies and averages. The complexity of the surgeries was analyzed according to their categorization as complex, high, major, and common. For this, the classification of the State Health Services Administration (ASSE) was considered, which is automatically generated in the electronic surgical description after selecting the procedure performed.

3. Results

In the 4-year period, the urology resident participated in a total of 945 surgeries, of which he participated in 744 as a surgeon while in the remaining 201 he participated mainly as a first assistant. Although the average was 186 surgeries performed per year, it is clearly observed that this number increases exponentially as the year of residency progresses. During the first year he participated with the

surgeon in 40 procedures, in the second in 108, in the third in 243 and in the fourth in 353 (Figure 1).

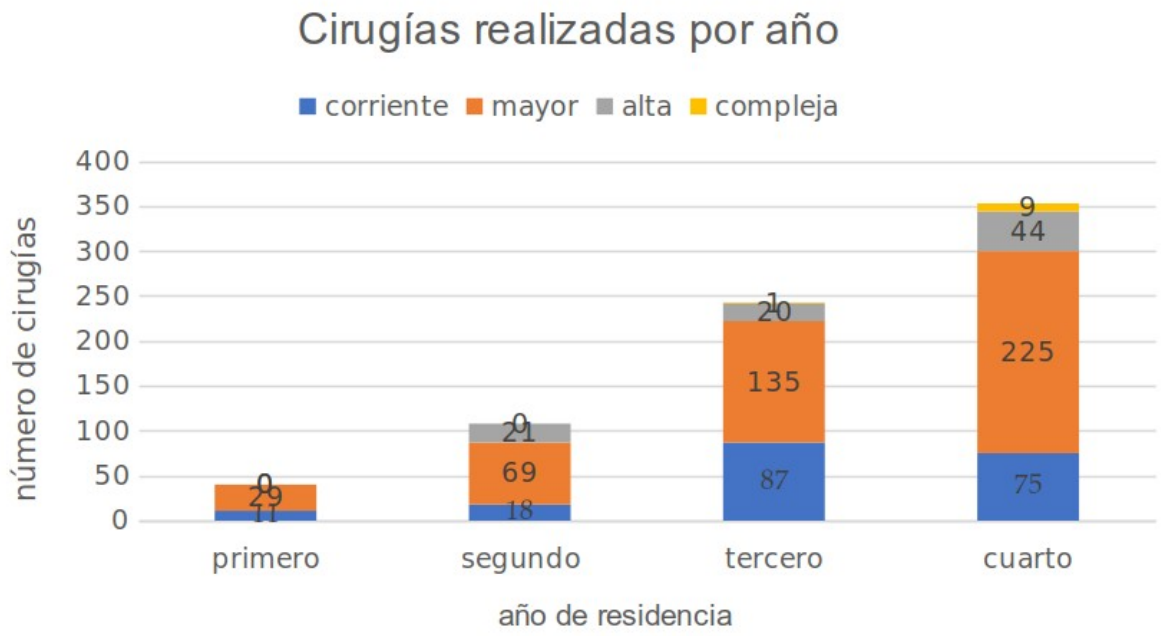

Figure 1. Surgeries performed per year and their complexity

In terms of complexity, in the first year he performed common and major procedures, with ureteral stent placement being the most frequently performed procedure. Secondly, the number of major procedures was further increased and highly complex surgeries began to be performed. It should be noted that 83.3% of the total surgeries performed this year were major and high, with ureteral stent placement being once again the most performed procedure. In the third year, the number of major and high surgeries continues to increase, adding the first complex surgery. The most frequently performed surgery this year was transurethral resection of the bladder (vTUR), completing a total of 44 vTUR this year.

In the fourth and last year, it stands out that the resident performed almost the same number of surgeries as those performed in the first 3 years. He participated as a surgeon in 353 procedures (391 surgeries performed in the first 3 years). This year, the 44 highly complex surgeries and the 9 complex surgeries performed stand out. Although the most frequently performed procedure in the last year was once again vTUR, the 32 radical nephrectomies performed stand out, of which 18 were laparoscopic (56%) and 14 open (44%). Among the laparoscopic nephrectomies, 100% were through the transperitoneal approach, while in the open nephrectomies, half were performed through the transperitoneal approach and the other half through the retroperitoneal approach.

In the entire residence, the most performed procedures are presented in Table 2, while the total procedures performed are broken down according to complexity in Table 3. The performance of 27 laparoscopic nephrectomies including hand-assisted laparoscopic nephrectomies, 14 endoureteral lithotripsy and 5 prostatic

enucleations with bipolar, procedures that until a few years ago were not performed during residency. Among the 201 surgeries in which the resident participated as an assistant, it is noteworthy that the majority were first assistants while close to 50% were helping in high and complex surgeries (retroperitoneal lymphadenectomy, laparoscopic partial nephrectomy, laparoscopic radical cystoprostatectomy, and laparoscopic radical prostatectomy).).

Table 2 . Surgeries performed in residence

Surgery	**Total**
Transurethral resection of the bladder	127
prostectomy	80
transurethral resection of the prostate	79
transvesical adenomectomy	78
double J catheter	66
percutaneous nephrostomy	35
vasectomy	3. 4
Scrotal exploration/simple orchiectomy	28
laparoscopic radical nephrectomy	27
hydrocele cure	24
Others	166

Table 3. Number of surgeries and division by complexity during the complete residency.

Surgery complexity	**Frequency**
Current	191 (25.7%)
Elderly	458 (61.5%)
high	85 (11.4%)
complex	10 (1.4%)
Total	744

4. Discussion

Although the training of a urologist must contemplate various aspects such as the theoretical management of urological pathologies, clinical management in the office, knowledge of methodology, publications, etc., this work is limited to analyzing the surgical training of the urology resident in our country. The acquisition of surgical skills constitutes a fundamental part of the residency, it is known that both the number and the complexity of the surgeries performed are key in the training of a surgical specialist. One point to take into account is that, although it is inferred that experience improves technique, there is a lack of objective tools to assess progress in each procedure. The absence of a precise objective evaluation in relation to the surgical skills acquired throughout the training is mainly due to the fact that the graduate program changes centers every year and sometimes every semester, and therefore the tutor or professor also changes. Although a solution to this could be for each resident to have a reference teacher who evaluates them from the first day until the end of the training, this is unfeasible in our environment since not all teachers work in all rotation centers. . In any case, the program has a standardized evaluation plan for the resident every six months, this includes a portfolio where the following are concentrated: the categorized surgeries performed, the patients presented to the service for

discussion, the articles analyzed during that period, the publications carried out, the congresses that he participates in or attends and the daily evaluations in the different areas (polyclinic, surgical unit, ward activity, activity in surgical coordination or discussion of clinical cases, and the resident's daily spontaneous theoretical knowledge evaluation). It culminates with a written or oral test of a specific topic to be dealt with that is developed week by week in an update of the subject that the residents carry out before the rest of the service. The theoretical knowledge test has a minimum pass rate of 80%, and both bibliographical knowledge and that demonstrated in the classes that are taught week by week are evaluated. The weighted specific weight in the evaluation of each area consists of 70% for the theoretical test and 30% for the portfolio. Which leads to a need for a minimum of 80% of the total for the approval of the semester.

In our environment, the number or type of procedures that a resident must carry out to prove a residence is not clearly standardized. On the contrary, what is standardized is the record of the surgical activity of each resident that is delivered semi-annually through the portfolio, so that there is access to carry out this type of work. As previously mentioned, this is the first quantitative and qualitative analysis carried out on the surgical activity of a Urology residency in our country.

This study allows us to affirm that during the urology postgraduate course in our country the volume of surgeries performed by a resident is high. In this specific case, the resident performed 744 surgeries and assisted in 201. Although the objective of this study is not to make a comparison of surgical volume with other specialties or with urology services in other countries, since they are not comparable, in 2019 a study was published by a surgical clinic at the Maciel Hospital in Uruguay showing that the average number of surgeries performed by a general surgery resident during his 4 years of training is 499.3 surgeries (9). In the same way, in the work of the Italian Hospital of Buenos Aires published in 2014, it was observed that during the residency plus the residency leadership, which implies a more formative year, an average of 625 surgeries are performed (10). Unlike our environment, the urology residency at the Hospital Italiano de Buenos Aires includes specific rotations, this is due to the greater volume of patients and therefore specific pathologies. This is not the case in the training of urologists in centers in the interior of Argentina or in smaller centers in Spain where the training is more similar to that of our country.

As expected, as the year of residency increases, the volume of operated patients increases, as does the complexity of the procedures. It stands out in the first two years that the most frequent surgery was the placement of a double J catheter, these were mostly performed during the call at the Hospital de Clínicas where the least experienced resident is the one who places the vast majority of internal urinary diversions. , since to optimize learning the procedures carried out by the guard (made up of an older resident and a younger one) are divided according to the stage of the learning curve and those of greater complexity are assigned to more experienced postgraduates, but at Keep in mind that the latter are the least frequent.

In the last two years of residency, more complex procedures were performed, the most frequent surgery being vTUR. The resident became familiar with more complex surgeries such as laparoscopic and open nephrectomies, open radical prostatectomies, and radical cystoprostatectomy with urinary diversion, either Bricker ureteroileostomy or cutaneous ureterostomy.

When the surgeries performed by the urology postgraduate are compared with the minimum number of procedures necessary to carry out the accreditation of a residency by the AUA (Table 1) and taking into account that in this analysis only the surgeries performed as the main surgeon are recorded, not including the surgeries in which he acted as an assistant, we can see that in some items the objectives are widely met while in others such as lithiasis surgical procedures and reconstructive surgery the volume of the international standard is not reached. (Table 4) This may be due to the high prevalence of oncological pathologies that limit the availability of a surgical unit to resolve these pathologies and the absence of a center specialized in these pathologies, which although there is the Maciel Hospital, which is a reference center in lithiasis, not all residents rotate for the same. In the case of extracorporeal shock wave lithotripsy (ESWL in the table), these are performed in an external center independent of the chair and in the Maciel Hospital, a reference center for lithiasis. Therefore, except for residents who rotate through this center, urologists in training in our country do not have access to extracorporeal lithotripsy with shock waves. Regarding endoureteral surgery and shunts, the standards are widely met, while they are not met in percutaneous lithotripsy, where in this case the resident participated as an assistant in 5 procedures while in none as a surgeon.

Regarding the performance of laparoscopic procedures, the resident acted as main surgeon on 27 occasions, but participated as an assistant in at least 50 laparoscopic surgeries. Among the more difficult oncological surgeries, radical prostatectomy was the least performed procedure, only 2 having been performed openly and none laparoscopically. This is because we are in a transition stage towards laparoscopic surgery, and therefore In most centers they try to do it this way. Likewise, there are many young urologists learning the technique, so the resident is limited to helping in most cases.

Although this study shows us the surgical volume of a urology resident during his training in our country, this work is not exempt from weaknesses and biases. In the first instance, it should be noted that this is the analysis of the surgical volume of a single resident, we know that not all residents rotate through all the annexed hospitals mentioned and that, although some centers have a greater surgical volume than others, in general terms At the end of studying, all residents perform a considerable number of surgeries. It would be of great value in the future to carry out another work that includes the analysis of several residents, which would also be a low number of residents given that an average of 3 residents are formed per year, but without a doubt it would have a greater statistical weight. On the other hand, we believe that given the period in which the surgical production of this work was analyzed, which includes the years of the COVID 19 pandemic, where in some places surgical coordination was suspended or only cancer patients were

operated on, perhaps the The number of surgeries performed by the resident in this work is underestimated, in addition to being biased towards performing a greater number of oncological surgeries. Although the period analyzed includes the pandemic years, the system of rotations through different centers did not change in relation to what is usually done under normal conditions.

As previously mentioned, as of 2018 a change was implemented in the urology resident training program. Prior to this, the first year consisted of rotating exclusively through a chair of general surgery. In that year, the graduate acquired the basic technical knowledge of surgery applied to non-specific general surgical pathology in urology, but with a greater surgical volume, which entails a faster learning curve of basic surgical techniques, but at the expense of one year. less theoretical training in urology.

Perhaps the acquisition of basic techniques in surgery has changed, with the change of the program, but a few more years are needed to really assess the weight of this and be able to compare it with the training dictated by the previous program. The great strength of the current program is that the resident makes contact from the first day of his training with urological pathology, as well as with surgeries in the specialty. The new plan also finds its strength from the evaluation point of view, being the members of the same chair those in charge of evaluating the resident throughout their training. Regarding surgical training, it should be noted that the resident is received having performed all the basic and most frequently performed surgeries in clinical practice, including a large number of endoscopic surgeries, including laparoscopic nephrectomies.

5. Conclusions

- In postgraduate training in urology, the volume and complexity of surgeries performed increases as the postgraduate course progresses, with the last year being the year with the highest surgical volume.

- Due to the subspecialization of some pathologies and their lower frequency in some cases, some procedures are usually performed by teachers and young urologists, being also a learning process for the resident, since in many of these cases he acts as a first assistant.

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