
Improving resident learning on vasectomy: a national survey on urology resident vasectomy training

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Introduction: Resident training in vasectomy, especially in the office setting on the awake patient, may be limited. The aim of this study is to understand resident exposure to vasectomy and to identify barriers to learning.

Materials and methods: An anonymous 18-question survey was distributed to urology residents of the 135 ACGME-accredited urology residencies in the United States. Residents were asked to specify the total number of vasectomies they had performed and in what environment (operating room versus office), their comfort performing vasectomy independently, and any barriers to learning the procedure.

Results: In total, 119 residents responded to the survey, representing a 10% response rate. Vasectomy case volumes were variable, with 36.7% of residents

logging ≤ 20 vasectomies by their final year of training. Total of 23.4% indicated they did not receive training in perioperative counseling for patients considering vasectomy. Only 64.7% of all residents felt comfortable in the office setting versus 89.1% who felt comfortable in the operating room ($p < 0.001$). This difference persisted throughout training, and 16.7% of residents in their final year of residency were uncomfortable performing office vasectomy. Total of 60.5% of respondents cited one or more barriers to training, with lack of surgical volume (38.7%), lack of vasectomies in the resident clinic (29.4%), and lack of autonomy when performing the procedure (22.7%) being the most common.

Conclusions: Residents are significantly less comfortable performing vasectomy in the office setting versus in the operating room, including in their graduating year. Residents describe low volume and lack of autonomy as barriers to vasectomy training.

Key Words: vasectomy, education, surveys and questionnaires

Introduction

Vasectomy is one of the most common outpatient procedures performed by urologists, as roughly 500,000 men receive vasectomy each year in the United States. Per the American Urological Association vasectomy guidelines, the majority of vasectomies

are performed under local anesthesia with or without the use of oral anxiolytics, with the use of intravenous sedation or general anesthesia reserved for extenuating circumstances.¹ Although Nguyen, et al demonstrated that vasectomy performed by urology resident trainees on awake patients is safe, effective, and well tolerated by patients,² the resident experience with vasectomy training is poorly understood. In particular, residents may have limited autonomy during the procedure, verbal coaching by the attending urologist may be limited to reduce patient anxiety, and case volume may be limited as inpatient obligations often supersede time in the office.

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To better understand resident experiences with vasectomy training and barriers to learning the procedure, we distributed a survey among urology residents in the United States to assess vasectomy case volumes in the office and operating room (OR), perceived barriers to learning the procedure, level of comfort with vasectomy, and whether didactic vasectomy training was offered by the respondent's residency program.

Materials and methods

An 18-item questionnaire regarding vasectomy training was created on SurveyMonkey and distributed in February 2019 to the primary contact for each of the 135 accredited urology residency programs in the United States, who were asked to forward the survey to their current residents. Contact information for each residency program's administrator or program director was obtained from the American Urological Association's (AUA) list of accredited programs,³ which lists a primary contact for each residency. Survey responses were collected until June 2019 to limit responses to a single academic year. Included respondents were in their first year of urology training (Uro 1) through their final year of urology training (Uro 4). Respondents were excluded if they were in their internship year of residency or in fellowship ($n = 3$). Exemption was obtained by the Institutional Review Board at the University of Connecticut Health Center.

Statistical analysis

Descriptive statistics were used to analyze respondent data. Chi-squared (χ^2) test and Fischer exact test were used to compare rates of resident comfort when performing vasectomy in the office versus the OR, with $p < 0.05$ chosen for statistical significance.

Results

Demographics

A total of 119 U.S. urology residents completed the survey, representing a response rate of 10%. Residents were evenly distributed by year of training, and each of the AUA geographic sections was represented among respondents, Table 1. A total of 88.2% of respondents indicated they plan to offer vasectomy in their future practice ($n = 105/119$).

Case volume and environment

Residents were asked to report the number of vasectomy cases they had logged since beginning residency from among the following options: 0-10, 11-20, 21-30, 31-40,

TABLE 1. Respondent demographics including A) current year of residency training and B) AUA geographic region

A	
Year of training	n = 119 (%)
Uro 1	34 (28.6)
Uro 2	27 (22.7)
Uro 3	28 (23.5)
Uro 4	30 (25.2)
B	
AUA region	n = 119 (%)
Mid-Atlantic	10 (8.4)
New England	19 (16.0)
New York	2 (1.7)
North Central	15 (12.6)
Northeast	6 (5.0)
South Central	23 (19.3)
Southeastern	28 (23.5)
Western	16 (13.4)

or greater than 40 cases. The median vasectomy case volume among all respondents was between 11-20. By year of training, the median case volume was 0-10 among respondents in the Uro 1 year, 11-20 cases among Uro 2 respondents, 11-20 cases among Uro 3 respondents, and 21-30 cases among Uro 4 respondents. Among residents in their final year of training, 10.0% had performed 10 or fewer vasectomies ($n = 3/30$), and 36.7% had performed 20 or fewer vasectomies ($n = 11/30$), Figure 1. Total of 36.1% of the respondents indicated that the majority of the vasectomies they logged were performed in the OR ($n = 43/119$).

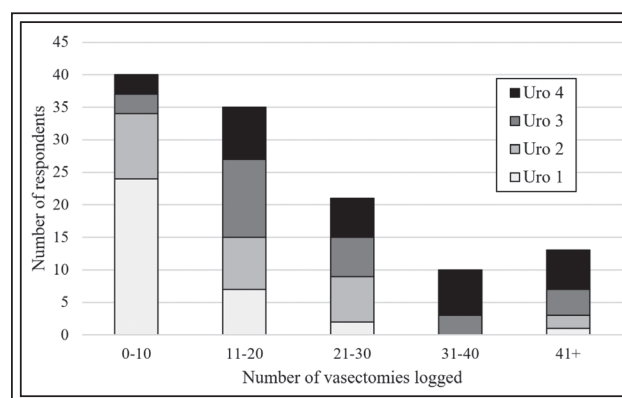


Figure 1. Histogram representing the frequency of total vasectomy case volume by year of training.

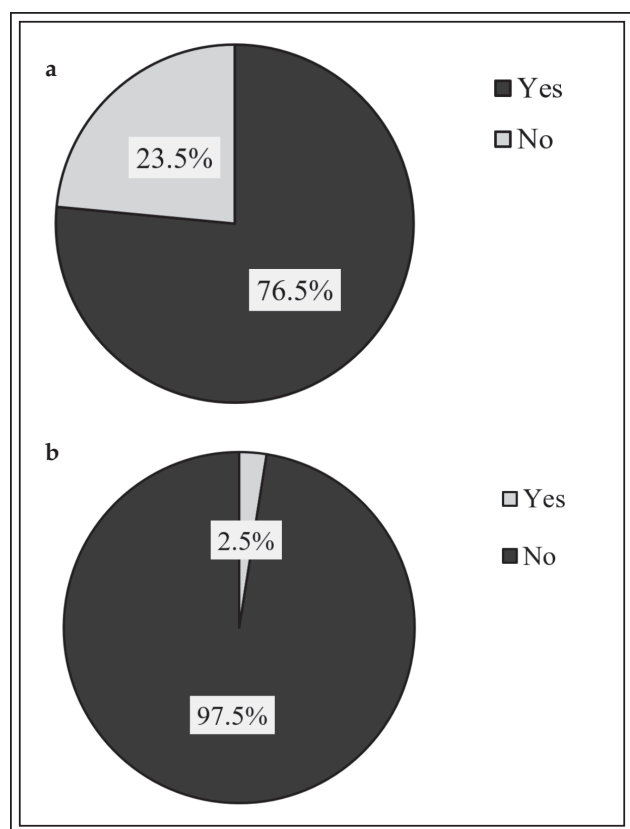


Figure 2. Percentage of respondents who said their program offered **A)** dedicated training in peri-operative counseling for vasectomy and **B)** a formal training model for vasectomy teaching.

Didactic training

Residents were asked about didactic sessions and training modules in vasectomy offered by their residency programs. 23.4% (n = 28/119) of respondents said their program did not offer dedicated didactic training in perioperative vasectomy counseling, Figure 2a, and only 2.5% (n = 3/119) said their residency program offered a formal training model for vasectomies, Figure 2b. Total of 23.4% indicated they did not feel their program offered enough opportunities to learn to perform vasectomy independently (n = 28/119).

Resident comfort

Respondents were asked about comfort performing vasectomy in the office setting and in the OR. Among all respondents, significantly more residents were comfortable in the OR (89.0%, n = 106/119) versus in the office setting (64.7%, n = 77/119, $p < .001$), Figure 3a. This difference persisted but was underpowered to assess statistical significance when analyzed by individual year of training, with 16.7% (n = 5/30)

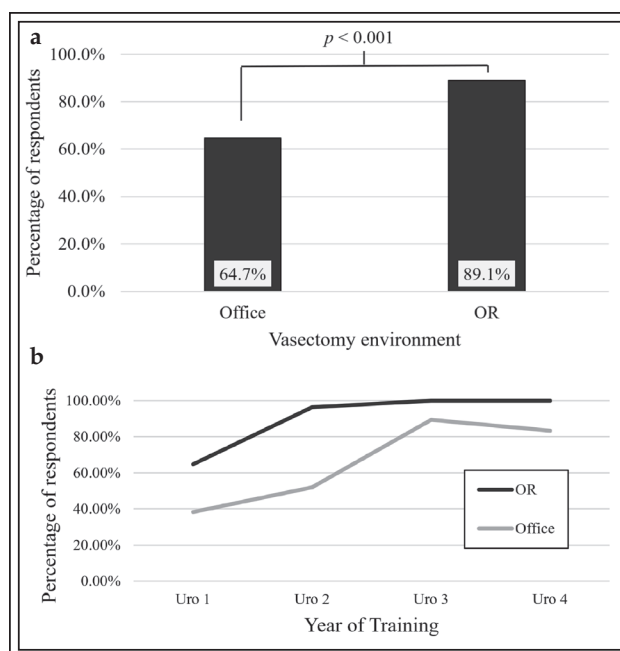


Figure 3. Percentage of respondents indicating they felt comfortable performing vasectomy independently by environment (office versus OR) among **A)** all respondents and **B)** stratified by year of training.

of respondents in their graduating year feeling uncomfortable performing vasectomy independently in the office setting, Figure 3b.

Perceived limitations

Respondents could select one or more options as limiting their vasectomy training from among the following: presence of an infertility / andrology fellow, vasectomies not being performed in the resident clinic, lack of volume, lack of resident autonomy, lack of attending physician expertise, unwillingness of attending urologist to allow residents to operate on patients

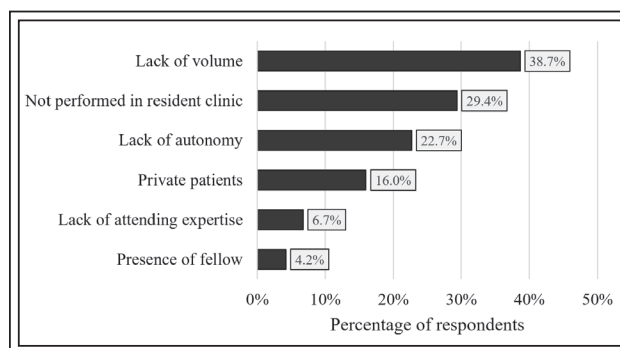


Figure 4. Percentage of respondents reporting that a given factor was a barrier to their learning vasectomy.

with private insurance. Total of 60.5% ($n = 72/119$) of residents selected one or more barrier to training. The most commonly identified limitations were lack of overall volume by 38.7% ($n = 46/119$), few or no vasectomies performed in the resident clinic by 29.4% ($n = 35/119$), and lack of resident autonomy by 22.7% of respondents ($n = 27/119$). The presence of an andrology or infertility fellow was not a commonly cited barrier to training, with only 4.2% ($n = 5/119$) selecting this as a barrier to vasectomy education, Figure 4.

Discussion

Vasectomy is one of the most common procedures that urologists perform. The difficulty of this procedure is often underappreciated, as it is typically completed in the office setting. A major source of stress in men considering vasectomy is fear of pain during the procedure.⁴ Application of local anesthetic in the awake and anxious patient can be challenging, especially without distorting pertinent anatomy. For these reasons, dedicated training during residency is necessary to safely and comfortably perform vasectomy before starting independent practice.

Residents often have limited exposure to office-based procedures due to inpatient and surgical responsibilities, and formal training in vasectomy may be limited. Although, the Accreditation Council for Graduate Medical Education (ACGME) does require 100 scrotal/inguinal surgical cases for residency graduation, there is not a specific vasectomy requirement, which would standardize exposure to this procedure. To the best of our knowledge, this is the first study to investigate urology resident experiences with vasectomy training and identify potential barriers to learning this procedure.

The results of this study demonstrated that 10% of the residents in their final year of training had completed fewer than 10 vasectomies in their entire training and 36.7 % had performed 20 or fewer vasectomies, emphasizing the need for further resident exposure to the procedure nationwide. Additionally, many residents primarily performed vasectomy in the operating room, which limits training in managing patient anxiety and pain throughout the procedure.

Respondents identified several barriers to vasectomy training, including a lack of exposure to the procedure and limited involvement in the procedure itself, with 22.7% of respondents reporting a lack of autonomy during vasectomy. These barriers might be addressed by including a clinic rotation to allow protected time for office procedures and increase resident vasectomy case load. Additionally, attending staff could cluster their vasectomy procedures to

improve training through repetition and develop trust between the resident and attending.

Surgical simulation and formal training models allow trainees to practice procedural techniques without the risk of harming patients,^{5,6} yet only 2.5% of urology residents responded that they had a formal training model for learning vasectomy, suggesting a need for urology residency programs to invest in vasectomy training models. Several models are available to simulate vasectomy, ranging from those made from easily available materials to anatomically and tactically realistic mannequins. One of the simplest models involves just three components: latex tubing as the vas, which is wrapped in a Penrose drain representing the vasal sheath, and a bicycle tire inner tube to mimic the scrotal skin.^{7,8} Using this model, residents can practice isolating the vas and opening the scrotal skin over it, clamping the vas, and sharply opening the vasal sheath. By solidifying key procedural elements of vasectomy in simulation, urology residents can better attend to the nuances of patient movement and anxiety when they start performing the procedure on the awake patient.

Cadaver education courses have been used for trainees in sexual medicine, including to teach placement of penile prostheses. In a study by Munarriz et al, 31 residents participated in a prosthetic simulation lab as part of the Sexual Medicine Society of North America Annual Meeting in 2017. The lab included a didactic lecture and hands-on cadaveric laboratory. Participants demonstrated significant improvement in procedural knowledge scores (68.8 ± 13.4 versus 74.2 ± 13.0 , $p < .05$) and self-reported increased median surgical confidence levels (4 versus 3, $p < .001$),⁹ suggesting a clear benefit to cadaver education. Vasectomy training could be incorporated during cadaveric prosthetic training courses and other cadaveric labs at resident institutions to increase exposure and improve confidence.

Furthermore, the use of 3-dimensional printed models in understanding surgical anatomy and pre-procedural planning has gained traction in many surgical specialties.¹⁰ Silicone models have been used to simulate pediatric laparoscopic pyeloplasty as well for complex renal masses to prepare surgeons for partial nephrectomy.¹¹ Similar models have also been developed for placement of penile prostheses.¹² As these technologies become more affordable and accessible, 3-dimensional modeling could be applied to vasectomy training to provide realistic simulation for residents without relying on cadaveric tissue.

Limitations to this study include the small sample size and response rate of 10%. The results of this study could be subject to selection bias, as respondents might have been motivated by dissatisfaction with their

training in vasectomy. Despite this, many respondents in all geographic regions did not feel ready to perform vasectomy independently, highlighting a need for more intensive exposure to office-based vasectomy. Additionally, we were not able to eliminate residency programs with vasectomy restrictions. That being said, there was an area in the survey where residents could fill out barriers for not performing vasectomies and there was no resident that mentioned it was due to program restrictions.

Conclusions

While a majority of surveyed residents feel comfortable performing vasectomies independently, they are significantly less comfortable doing so in the office setting on the awake patient, even in their final year of training. Residents describe low volume and lack of autonomy as barriers to developing skill in the procedure. Introduction of formalized didactic sessions and training models in vasectomy may improve resident comfort levels prior to performing vasectomies in the office. Residents should have protected time in the outpatient setting to increase comfort performing procedures on the awake patient. Additionally, vasectomies can be scheduled in clusters, such as on a single afternoon each week, to foster repetition for the resident and encourage autonomy. A specific graduation requirement for vasectomy could also encourage and standardize vasectomy training. Further studies evaluating urologists their first year in practice will better elucidate comfort level performing vasectomies independently and highlight areas for improvement in training. □

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