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Adrenalectomy Outcomes are Superior with the Participation of Residents and Fellows

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Abstract

Background—Adrenalectomy is a complex procedure performed in many settings, with and without residents and fellows. Patients often ask, "Will trainees be participating in my operation?" and seek reassurance that their care will not be adversely affected. The purpose of this study was to determine the association between trainee participation and adrenalectomy perioperative outcomes.

Study Design—We performed a cohort study of patients who underwent adrenalectomy from the 2005 to 2011 ACS-NSQIP database. Trainee participation was classified as none, resident, or fellow based on postgraduate year of the assisting surgeon. Associations between trainee participation and outcomes were determined via multivariate linear and logistic regression.

Results—Of 3694 adrenalectomies, 732 (19.8%) were performed by an attending surgeon with no trainee, 2315 (62.7%) involved a resident, and 647 (17.5%) involved a fellow. The participation of fellows was associated with fewer serious complications (7.9% with no trainee, 6.0% with residents, 2.8% with fellows, $p<0.001$). In a multivariate model, the odds of serious 30-day morbidity were lower when attending surgeons operated with residents (OR 0.63, 95% CI 0.45 to 0.89). Fellow participation was associated with significantly lower odds of overall (OR 0.51, 95% CI 0.32 to 0.82) and serious (OR 0.31, 95% CI 0.17 to 0.57) morbidity. There was no significant association between trainee participation and 30-day mortality.

Conclusions—In this analysis of multi-institutional data, the participation of residents and fellows was associated with decreased odds of perioperative adrenalectomy complications.

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Attending surgeons performing adrenalectomies with trainee assistance should reassure patients of the equivalent or superior care they are receiving.

INTRODUCTION

Adrenalectomy is being performed with increasing frequency due to the widespread availability of minimally invasive techniques and the detection of incidentalomas on imaging for other indications[1–3]. This complex procedure requires focused, intraoperative training to become proficient and achieve acceptable complication and conversion rates[4]. The majority of general surgery residents trained in the U.S. have little exposure to this operation, with an average of 1.7 adrenalectomies performed per general surgery resident during their training (maximum 11, mode 0) based on the most recent analysis of Residency Review Committee summary statistics in 2004[5], possibly related to limited access to high-volume surgeons or restrictions on duty hours[6]. Given the projected increase in demand for adrenalectomy and evidence of improved outcomes after the learning curve is surpassed and for high-volume surgeons, improved training of general surgery residents and endocrine surgery or minimally-invasive fellows is needed to ensure adequate numbers of competent adrenal surgeons beginning independent clinical practice and the maintenance of high-quality surgical care[1, 4, 6].

A challenge to this training paradigm is that patients often ask attending surgeons if trainees will be assisting in their operation and often request that trainees not be allowed to operate. While many patients may be comfortable with trainees participating in their general hospital care, up to one third of them state that they do not want trainees performing any part of their operation on questionnaire[7]. Therefore, attending surgeons are often left with the task of reconciling the educational needs of their trainees plus workforce demands with respect for the wishes and autonomy of their patients[8].

There are a limited number of studies that evaluate how the participation of residents and fellows in adrenalectomy affects patient outcomes adjusting for patient comorbidities and operative technique. Documentation of equivalent outcomes would provide reassurance to patients undergoing surgery at teaching institutions and peace of mind for attending surgeons responsible for training the next generation of endocrine surgeons. Therefore, the goal of this study was to investigate the association between resident and fellow participation in adrenalectomy and perioperative outcomes using multivariate logistic regression models to analyze data from a contemporary multi-institutional database. Our hypothesis was that patients operated on by attending surgeons with the assistance of residents and fellows do not have inferior 30-day outcomes compared to patients operated on by attending surgeons without a trainee.

METHODS

Database and Patient Selection

We used the 2005 to 2011 American College of Surgeons National Surgeons Quality Improvement Program (ACS-NSQIP) Participant Use Data File (PUF) for our analysis. This database contains prospective, multi-institutional information on preoperative risk factors,

intraoperative variables, and 30-day morbidity and mortality outcomes for a systematic sample of major inpatient and outpatient surgical procedures at participating institutions. Dedicated and specifically trained Surgical Clinical Reviewers examine medical records and obtain complete 30-day follow-up on all selected patients. The quality of collected data is regularly evaluated with an Inter-Rater Reliability Audit of participating institutions, with audits to date demonstrating an overall disagreement of only 1.8% for all variables[9]. Additional information on ACS-NSQIP data collection and practices has been previously described[10] and can be accessed on the ACS-NSQIP website (http://www.acsnsqip.org/).

The ACS-NSQIP PUF contains 135 variables, including the highest level of supervision provided by the attending surgeon for the case and the highest postgraduate year (PGY) of any trainee who assisted in the case. These variables were used to differentiate adrenalectomies that were performed by attending surgeons without a trainee versus those in which a resident (PGY 1 through 5) or fellow (PGY > 5) assisted. Patients with no information on trainee participation were excluded from the study. To limit our analysis to adrenalectomies performed at participating institutions from 2005 to 2011, we searched for all principal operative procedures with the Current Procedural Terminology (CPT) codes for adrenalectomy (60540, 60545, 60650) during that time period. CPT code 60650 was used to differentiate laparoscopic from open adrenalectomies. Sensitivity analyses were performed to rule out bias from grouping CPT codes for open adrenalectomies (60540 and 60545). Data on demographics, preoperative comorbidities, American Society of Anesthesiologists (ASA) class, and preoperative lab values were obtained for all patients.

Outcomes

ACS-NSQIP contains data on a large number of 30-day perioperative outcomes. To analyze the association of trainee participation on overall perioperative morbidity, we created a variable for the occurrence of any documented complication within 30 days of operation. This included pulmonary complications (pneumonia, unplanned intubation or ventilator dependence), cardiac complications (cardiac arrest or myocardial infarction), neurologic complications (stroke or coma > 24 hours), renal complications (acute renal failure or progressive renal insufficiency), bleeding complications, sepsis, surgical site infections, wound dehiscence, deep vein thrombosis requiring therapy, pulmonary embolus, urinary tract infections, and peripheral nerve injuries. We also created a variable for the occurrence of any serious complication within 30 days of operation, which excluded urinary tract infections, superficial surgical site infections, and peripheral nerve injury, the clinical significance of which are not uniform. Additional 30-day outcomes included mortality, mean length of procedure, intraoperative blood transfusion, reoperation, and mean length of stay (LOS).

Statistical Analysis

Chi-square statistics were used to compare differences in categorical variables related to baseline patient demographic and health characteristics in addition to perioperative outcomes among the three trainee groups. Odds ratios (ORs) were calculated to evaluate the degree of association between trainee group and each preoperative variable with statistically significant results on chi-square test. Analysis of variance (ANOVA) was used to compare

differences in the mean values of continuous variables related to patient characteristics and perioperative outcomes among all three trainee groups. Bonferroni multiple comparison tests were performed to identify differences between the means of each pair of trainee groups with p-value adjustment. Multivariate linear regression models were created to compare operative time and LOS in each group controlling for potential confounding variables. Univariate and multivariate logistic regression models were developed for 30-day morbidity and mortality. Covariates adjusted for in the multivariate models to control for confounding and heterogeneity of patients within trainee groups included laparoscopic versus open technique in addition to the calculated probability of morbidity or mortality provided in the ACS-NSQIP database[9]. The use of these continuous probability variables was validated by creating multiple models containing different comorbidities identified as confounders; all of these models produced similar adjusted ORs and did not change the conclusions of our analysis. Tests of linear trend in the adjusted log odds of morbidity and mortality were also performed on each multivariate model. The significance level for all comparisons was $p < 0.05$ and all tests were two-tailed. Analysis was performed using STATA statistical software (version 12.0; StataCorp LP, College Station, TX).

RESULTS

Preoperative Characteristics

A total of 4133 adrenalectomies were identified based on CPT code. After the exclusion of cases with missing data on trainee participation (n = 439), analysis was carried out on the remaining 3694 cases. Of these 3694 adrenalectomies, 732 (19.8%) were performed by an attending surgeon alone, 2315 (62.7%) involved a resident, and 647 (17.5%) involved a fellow. There was no significant difference in patient demographics and most preoperative risk factors for morbidity or mortality based on trainee participation (Table 1). Adrenalectomies involving fellows were more likely to be performed laparoscopically, with an OR of 1.4 compared to cases performed by attending surgeons without a trainee (p = 0.011, 95% CI 1.08 to 1.86). In addition, adrenalectomies involving fellows were less likely to be performed on patients with hypoalbuminemia, with an OR of 0.56 compared to cases performed by attending surgeons without a trainee (p = 0.01, 95% CI 0.35 to 0.87).

Perioperative Outcomes

Overall outcomes for adrenalectomy from the 2005 to 2011 ACS-NSQIP are presented in Table 2. The overall mean procedure length was 154 minutes and mean LOS was 4.0 days. Postoperative morbidity was documented in 7.8% of cases, with serious postoperative complications occurring in 5.8%. Overall 30-day mortality was 0.7%.

The mean procedure length was shorter for attending surgeons operating without a trainee than for those assisted by residents and fellows (141, 158 and 154 minutes respectively, $p < 0.001$). This difference remained significant on linear regression after adjusting for laparoscopic versus open technique (adjusted increase in operative time of 16 minutes for residents and fellows, $p<0.001$). The frequency of intraoperative blood transfusion, reoperation, or death within 30 days did not vary based on trainee participation (Table 2). There was a statistically significant difference in the frequency of postoperative

complications and mean LOS based on trainee participation (Table 2). However, multivariate linear regression showed no statistically significant association between LOS and trainee participation after adjusting for laparoscopic versus open technique and the probability of morbidity.

Evaluating perioperative morbidity and mortality with univariate logistic regression, there was no statistically significant association between resident participation in adrenalectomy and postoperative complications when compared to attending surgeons operating without a trainee (Table 3). However, participation of a fellow was associated with decreased odds of overall (OR 0.51, 95% CI 0.33 to 0.78) and serious (OR 0.33, 95% CI 0.19 to 0.57) postoperative complications when compared to attending surgeons operating without a trainee. On multivariate logistic regression, after controlling for laparoscopic versus open technique and the probability of postoperative morbidity, resident participation was associated with decreased odds of serious complications only (adjusted OR 0.63, 95% CI 0.45 to 0.89). Interestingly, the participation of fellows continued to be associated with significantly lower odds of overall (adjusted OR 0.51, 95% CI 0.32 to 0.82) and serious (adjusted OR 0.31, 95% CI 0.17 to 0.57) postoperative complications (Table 4). There was a statistically significant inverse linear trend in the log odds of overall and serious morbidity with the participation of a trainee in the operation and increasing PGY of the assisting trainee, both when broken down by resident and fellow as with the rest of the analysis (not shown) and when broken down into junior residents (PGY 1–3), senior residents (PGY 4–5), and fellows (Table 5). There was no association between 30-day mortality and trainee participation in the univariate or multivariate models after controlling for technique and the probability of postoperative mortality (Tables 3 and 4).

DISCUSSION

This study using a multi-institutional, national database demonstrates that the participation of trainees in adrenalectomy is not associated with adverse perioperative outcomes. In addition, we provide evidence that the participation of residents and fellows in this complex procedure is associated with decreased odds of complications after adjusting for risk of morbidity and laparoscopic versus open operative technique. The finding that surgical residents and fellows do not adversely affect, and may in fact enhance, the quality of surgical care for patients undergoing adrenalectomy is important both in its ability to improve patient confidence in their healthcare providers and to support advanced training of residents and future endocrine surgeons.

Based on the information captured in the ACS-NSQIP database, we are not able to determine why the assistance of fellows in adrenalectomy leads to superior outcomes. Comparison of baseline characteristics did show that fellows were more likely to participate in laparoscopic operations and less likely to operate on patients with hypoalbuminemia, both of which would be expected to improve outcomes. However, the association with superior outcomes persisted after adjustment for laparoscopic technique and the probability of perioperative morbidity. The fact that we see an inverse linear trend in the adjusted odds of morbidity with the addition of a trainee in the operating room and increasing PGY of trainee suggests that those who have the skills to more substantively contribute to the operation or

provide experienced postoperative care confer the most benefit to patients. Another possible interpretation of this is that the presence of a fellow in the operating room is a surrogate for an adrenalectomy performed by a high-volume surgeon at a center with an endocrine surgery fellowship. While the experience of surgeons operating with trainees likely affects our results, it is unlikely to fully explain the association with improved outcomes because the inverse trend in adjusted odds persists if we further divide trainees into junior residents, senior residents, and fellows, suggesting that the PGY of the trainee, and thus their operative skills and perioperative care, is in fact an important contributing factor beyond the distinction between an institution or surgeon who operates with residents and/or fellows. The addition of surgeon- and hospital-volume information would aid further investigation of the mechanism of this association.

This is the first study evaluating the association of trainee participation and perioperative morbidity and mortality for adrenalectomy using a multi-institutional database and multivariate regression to control for confounding patient characteristics and technique. Previous reports of chi-square analyses of adrenalectomy outcomes from the 2005 to 2008 ACS-NSQIP database did not find a significant difference in the rates of perioperative wound infections, medical complications, reoperation, or total morbidity between patients operated on by attending surgeons without a trainee versus with the assistance of any level trainee[11]. One explanation for these differing results is the lack of a distinction between residents and fellows in the previous analysis; if the addition of more senior residents and fellows confers the most benefit in adrenalectomy outcomes, as suggested above, analyses grouping trainees of all PGYs together may not detect this association. In addition, the increased sample size of our study, due to three additional years of data from 2009 to 2011, increases the power of our study and the ability to detect these associations.

Previous studies investigating the effects of trainee participation on surgical outcomes in other operations have also had mixed results. A single-center series of 2293 patients operated on by attending surgeons with and without resident assistance found no difference in morbidity but did find increased mortality, LOS and hospital cost for patients who underwent five common general surgery procedures, although their analyses did not include multivariate models to control for confounding patient characteristics[12]. Analysis of outcomes from 607,683 general and vascular surgery cases in the 2006 to 2009 ACS-NSQIP found a marginal increase in the odds of morbidity (OR 1.07, 95% CI 1.03 to 1.10) and a small decrease in the odds of 30-day mortality (OR 0.91, 95% CI 0.84 to 0.99) with the participation of residents, although the latter association was no longer present after adjustment for hospital-level variation[13]. Another analysis of over 37,000 patients who underwent common general surgery procedures from the 2005 to 2007 ACS-NSQIP also showed a very small increase in morbidity and a decrease in mortality[14]. Given that the latter two studies also analyzed ACS-NSQIP data and controlled for similar confounders, a likely explanation for differences in our results is their focus on a wider range of general surgery cases, suggesting that the results of our analysis may not be generalizable to other common or complex surgical procedures.

Operative times are consistently longer with the participation of trainees, regardless of operation or specialty. Our results are consistent with previous studies in this outcome. This

trend has been cited by some as a potential cause of increased morbidity in operations performed with trainee assistance and a target for quality improvement efforts[14–16]. However, adding operative time as a continuous or categorical variable to our regression models did not change our conclusions about the association between trainee participation and perioperative adrenalectomy outcomes. With such small differences in operative time with and without trainees (an additional 16 minutes with both residents and fellows after adjustment for laparoscopic versus open technique), it is unlikely that this factor has a significant clinical impact. The economic cost of these differences, however, may not be so insignificant on a national scale and requires further investigation using a database with information on total hospital costs for this patient population.

Our study has limitations, many of which are related to the nature of data collection and reporting for the ACS-NSQIP database. The hospitals that participate in ACS-NSQIP do so on a voluntary basis and, as a result, are not a representative sample of hospitals in the United States. This is a potential source of selection bias because large and academic institutions are over-represented. However, there is evidence that a significant proportion of complex cases are performed by ACS-NSQIP institutions and that up to two thirds of adrenalectomies are performed at teaching hospitals, which suggests that this database likely captures a large numbers of adrenalectomies performed nationally[17, 18]. A significant limitation is the failure of ICD-9 codes to adequately identify the principal diagnosis of patients undergoing adrenalectomy. Due to the frequency of non-specific coding, including among many 255.8 (Other specified disorders of adrenal glands) and 255.9 (Unspecified disorder of adrenal glands), which accounted for 5.6% and 7.9% of patients respectively, we were unable to definitively determine the indication for a large proportion of the adrenalectomies we analyzed. This forced us to exclude a diagnosis variable from our models, leaving our conclusions potentially biased due to confounding by indication (because the diagnosis of a patient that puts them at risk of worse outcomes may influence whether a trainee participates in their operation). Although controlling for other associated comorbidities may reduce the impact of this bias, the inability to adjust for diagnosis in our model must be acknowledged. In addition, ACS-NSQIP does not provide tumor-specific information such as tumor size, which affects the complexity of an adrenalectomy and would be related to both the participation of a trainee and outcomes.

Another limitation is that we are unable to control for surgeon or hospital adrenalectomy volume or for teaching status of the institutions, because hospital- and surgeon-level data is not available in the ACS-NSQIP PUF. Given evidence that surgeon volume inversely correlates with complication rates, hospital cost and LOS[18] and hospital-volume or teaching status affects postoperative management, these factors should be included in our models and their absence may affect our estimate of the association between trainee participation and perioperative outcomes. As has been mentioned in previous publications[13, 19], we cannot determine the degree of trainee participation in each case from the data provided, which limits our ability to attribute any difference in outcomes to intraoperative trainee factors, or who is assisting in operations performed without a trainee. However, as discussed above, the presence of an inverse linear trend in the adjusted odds of morbidity with increasing PGY of the trainee suggests that the surgical skills of the trainee and their postoperative care plays a role in this association and, therefore, that resident or fellow presence in the operating room

is unlikely to be a surrogate for other factors. With limited surgeon- and hospital-level data, it is difficult for us to determine how the presence of fellows leads to superior outcomes.

CONCLUSION

The participation of residents and fellows in adrenalectomy does not adversely affect and appears to improve perioperative outcomes. The participation of fellows specifically reduces the odds of overall and serious 30-day adrenalectomy complications. Given that increased exposure of trainees to this operative technique is critical to adequately train future endocrine surgeons, attending surgeons should feel comfortable reassuring patients that their care will be equivalent or superior with the addition of a resident or fellow to their operative team

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Table 1

Characteristics of patients who underwent adrenalectomy in the 2005 to 2011 ACS-NSQIP PUF stratified by trainee operative participation (n = 3694).

Characteristic	No Trainee (n = 732)	Resident (n = 2315)	Fellow (n = 647)	*P-value*[†]
Demographics				
Age—mean (SD)	54.5 (13.6)	53.5 (14)	53.2 (13.8)	0.17
Female gender—no. (%)	471 (64.3)	1380 (59.6)	385 (59.5)	0.72
Race—no. (%)				0.2
American Indian or Alaskan Native	4 (0.55)	8 (0.35)	2 (0.31)	
Asian or Pacific Islander	23 (3.1)	66 (2.9)	10 (1.6)	
Black or African American	85 (11.6)	289 (12.5)	75 (11.6)	
White	554 (75.7)	1688 (72.9)	500 (77.3)	
Other or Unknown	66 (9)	264 (11.4)	60 (9.3)	
Preoperative Health & Comorbidities				
Body mass index, kg/m2—mean (SD)	30.8 (7.6)	30.5 (8.3)	30.6 (8.45)	0.77
Weight loss (>10% in 6 months)—no. (%)	14 (1.9)	50 (2.2)	10 (1.6)	0.6
Current smoker—no. (%)	173 (23.6)	627 (27.1)	158 (24.4)	0.11
Diabetes mellitus—no. (%)	142 (19.4)	453 (19.6)	111 (17.2)	0.38
Chronic obstructive pulmonary disease—no. (%)	34 (4.6)	115 (5)	30 (4.6)	0.91
Coronary artery disease—no. (%)	41 (5.6)	190 (8.2)	52 (8)	0.06
Congestive heart failure—no. (%)	4 (0.6)	24 (1)	7 (1.1)	0.46
Hypertension requiring medication—no. (%)	507 (69.3)	1640 (70.8)	455 (70.3)	0.72
History of stroke or TIA[§]—no. (%)	46 (6.3)	124 (5.4)	32 (5)	0.51
Currently on dialysis—no. (%)	2 (0.3)	17 (0.7)	3 (0.5)	0.33
Steroid use—no. (%)	21 (2.9)	53 (2.3)	23 (3.6)	0.19
Disseminated cancer—no. (%)	41 (5.6)	117 (5.1)	40 (6.2)	0.5
Functional status prior to surgery—no. (%)				0.117
Independent	714 (97.5)	2249 (97.2)	637 (98.5)	
Partially dependent	17 (2.3)	48 (2.1)	8 (1.2)	
Totally Dependent	1 (0.14)	18 (0.8)	2 (0.3)	
ASA Class—no. (%)				0.073
No or mild systemic disease	281 (38.5)	835 (36.1)	247 (38.2)	
Severe systemic disease	398 (54.5)	1325 (57.3)	373 (57.7)	
Life threatening systemic disease or moribund	52 (7.1)	153 (6.6)	26 (4)	
Preoperative Laboratory Abnormalities—no.(%)				
Hypoalbuminemia (albumin < 3.5 g/dL)	59 (8.1)	182 (7.9)	30 (4.6)	**0.015**
Leukocytosis (white blood cells >10.8 x10^9/L)	148 (20.2)	426 (18.4)	120 (18.6)	0.54
Anemia (hematocrit < 35%)	92 (12.6)	301 (13)	83 (12.8)	0.95
Thrombocytopenia (platelets < 150 x10^9/L)	31 (4.2)	96 (4.2)	18 (2.8)	0.26

Characteristic	No Trainee (n = 732)	Resident (n = 2315)	Fellow (n = 647)	*P-value*[†]
Technique of Operation				
Laparoscopic operation—no. (%)	570 (77.9)	1733 (74.9)	539 (83.3)	**<0.001**

[†] P values for the comparison between groups calculated using chi-squared test or ANOVA.

[§] Transient ischemic attack.

Table 2

Perioperative outcomes for patients who underwent adrenalectomy in the 2005 to 2011 ACS-NSQIP PUF.

Outcome	Overall (n = 3694)	No Trainee (n = 732)	Resident (n = 2,315)	Fellow (n = 647)	*P-value*[†]
Intraoperative					
Length of procedure, minutes—mean (SD)	154 (75)	141 (72)	158 (76)	154 (77)	**<0.001**
Intraoperative blood transfusion—no. (%)	150 (4.1)	28 (3.8)	101 (4.4)	21 (3.3)	0.42
Postoperative					
Underwent reoperation—no. (%)	81 (2.2)	19 (2.6)	51 (2.2)	11 (1.7)	0.53
Mean length of stay, days—mean (SD)	4.0 (8.6)	4.1 (7.2)	4.2 (9.9)	3.2 (3.9)	**0.044**
Any postoperative complication—no. (%)	288 (7.8)	68 (9.3)	188 (8.1)	32 (5.0)	**0.007**
Serious postoperative complication[*]—no. (%)	214 (5.8)	58 (7.9)	138 (6.0)	18 (2.8)	**<0.001**
30-day mortality—no. (%)	26 (0.7)	7 (1.0)	17 (0.7)	2 (0.3)	0.34

[†] P values for the comparison between groups calculated using chi-squared test or ANOVA.

[*] Excludes superficial surgical site infection, urinary tract infection, and peripheral nerve injury.

Table 3

Univariate odds ratios for postoperative complications and 30-day mortality.

Outcome	No Trainee (n = 732)	Resident (n = 2315)	95% CI	*P-value*	Fellow (n = 647)	95% CI	*P-value*
Any complication	1	0.86	0.65 to 1.15	0.32	**0.51**	**0.33 to 0.78**	**0.002**
Serious complication	1	0.74	0.54 to 1.01	0.06	**0.33**	**0.19 to 0.57**	**<0.001**
Death	1	0.77	0.32 to 1.86	0.56	0.32	0.07 to 1.56	0.16

Table 4

Multivariate odds ratios for postoperative complications and 30-day mortality adjusting for laparoscopic versus open technique and probability of morbidity or mortality.

Outcome	No Trainee (n = 732)	Resident (n = 2315)	95% CI	*P-value*	Fellow (n = 647)	95% CI	*P-value*
Any complication	1	0.77	0.56 to 1.04	0.09	**0.51**	**0.32 to 0.82**	**0.005**
Serious complication	1	**0.63**	**0.45 to 0.89**	**0.008**	**0.31**	**0.17 to 0.57**	**<0.001**
Death	1	0.63	0.25 to 1.62	0.34	0.23	0.032 to 1.65	0.14

Table 5

Tests for linear trend in the log odds of morbidity and mortality with the participation of a trainee in the adrenalectomy and increasing PGY of assisting trainee.

	Any Complication OR (95% CI)	**Serious Complication OR (95% CI)**	**Death OR (95% CI)**
No trainee	1	1	1
PGY 1–3	1.1 (0.7 to 1.64)	0.81 (0.5 to 1.32)	0.5 (0.11 to 2.34)
PGY 4–5	0.7 (0.51 to 0.97)	0.59 (0.41 to 0.85)	0.66 (0.25 to 1.74)
PGY > 5	0.51 (0.32 to 0.82)	0.31 (0.17 to 0.57)	0.23 (0.03 to 1.65)
P-value	**0.001**	**0.0001**	0.18