NEW SEVERITY CLASSIFICATION SCALE FOR PHEOCHROMOCYTOMAS

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BACKGROUND

Pheochromocytoma (PC) may present in a wide variety of clinical scenarios including asymptomatic patients found to have an adrenal incidentaloma to the critically ill patient in hypertensive crisis. No clinical classification scheme exists for PC. We evaluated a PC severity scale (PCSS) in a multinational, multi-institutional study as a predictive tool for post-operative outcomes after adrenalectomy for PC.

MATERIALS & METHODS

We evaluated all patients who underwent adrenalectomy for PC from 2000-2017. We classified patients as follows: Class I- incidentaloma; Class II: asymptomatic + controlled hypertension; Class III: symptomatic + controlled hypertension; Class IV: un-controlled hypertension or hemodynamic and crisis. We obtained all available pre- intra-operative data, normalized biochemical studies, pathologic results, and discharge information. Non-parametric multi-variable regression and analysis of variance (ANOVA) were used for statistical considerations.

Table: Correlation between clinical factors and risk escalation in a Pheochromocytoma Clinical Severity Scale (PCSS)

Variable	95% C.I.	univariate	Multivariate
Number pre-op HTN meds	0.23-0.51	<0.01	<0.01
Positive Urine Epinephrine	0.14-0.50	<0.01	<0.01
Positive Plasma Epinephrine	0.08-0.53	<0.01	<0.01
Hypertension History	0.18-0.49	<0.01	<0.01
Cardiovascular History	0.02-0.34	.03	.03
Familial History	-0.54 - -0.21	<0.01	<0.01
Any Complication	0.02-0.35	<0.02	<0.05
Total # Take Home Meds	0.14-0.43	<0.01	<0.01
Hospital Stay	0.03-0.34	0.02	0.06
Tumor Size	0.04-0.35	0.01	0.07
Estimated Blood Loss	0.01-0.37	0.04	0.08

RESULTS

A total of 157 patients were included in our study, 48 (+/- 18) yrs, 54% female, BMI 26 (+/- 3), 57% right sided (6% bilateral), and 34% of whom had a familial disorder. By PCSS the study population consisted of: Class 1 (25%), Class 2 (35%), Class 3 (22%), and Class 4 (18%). Urinary and plasma normetanephrines were the most commonly abnormal test in 91.7 and 98.1% of patients. Endoscopic excision was performed laparoscopically in 56% and robotically in 26%. A total of 5% sustained a Clavien 3a complication. In a multivariable model, PCSS positively correlated with significant history of cardiovascular disease, urinary and plasma epinephrine levels, post-operative complications, and the number of discharge medications; PCSS negatively correlated with family history.

CONCLUSIONS

We present results of a PC severity scale as a predictive tool for post operative outcomes. In a multivariable analysis (Table), the 1-4 PCSS scale correlated with pre-operative cardiac and vascular disease and post-operative complications requiring longer hospital stays and prolonged medical therapy. The severity scale may thus serve to easily stratify patients presented with PC into those who are at particular risk of post-operative complications.

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