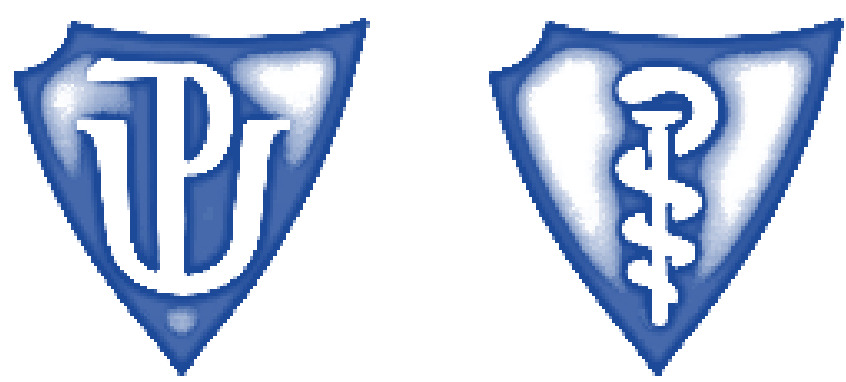# RENAL & PADUA Nephrometric Score for Outcome Prediction of Partial Nephrectomy in Renal Cancer(s)
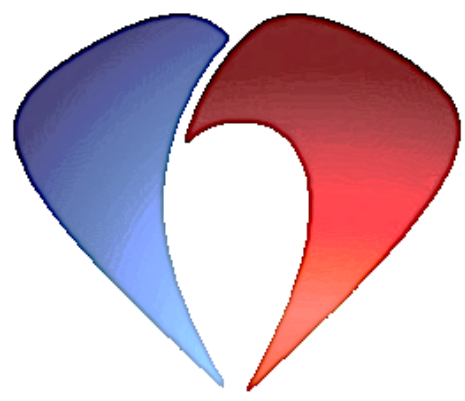
Faculty of Medicine and Dentistry

Palacký University Olomouc

Author: P.O.Akioyame, A.Konstantinou
Supervisor: MUDr. Vladimír Študent Jr., M.D., Ph.D.
Statistician: (Bc.) Mgr. Dana Purová

Urologická Klinika Fakultní Nemocnice Olomouc, Lékařská Fakulta Univerzita Palackého v Olomouci, 775 15, Czechia

FAKULTNÍ NEMOCNICE OLOMOUC

INTRODUCTION

Despite the various treatment approaches available to deal with Renal Malignancies; surgical resection by Partial nephrectomy (PN) remains the current standard of care for the conservative management of a clinically localized disease. Nephrometry Scoring Systems (NSS) were developed to help standardize the surgical decision-making process; by providing consistent, reproducible quantitative data on the pertinent characteristics of a confined renal lesion. Currently, there are many established NSS that can be used to predict the trifecta surgical outcomes (define as: negative surgical margins, no perioperative complications & ≥90% eGFR recovery) desired by surgeons undertaking these renal surgeries. A few examples of these NSS include the RENAL system (gold standard at our Faculty), PADUA Score, C-Index & DAP Score.

OBJECTIVES

- To appraise the predictive value of the RENAL & PADUA NSS.
- To determine which one best correlates with the quantitative perioperative outcomes of patients undergoing nephron-sparing surgery.

METHODOLOGY:

(1) Two medical students retrospectively evaluated several preoperative CT scans for patients with varying degrees of RCC and had undergone a PN. A value was assigned to each component of RENAL NSS (R – radius; E - exophytic/endophytic properties of the tumor; N - nearness of tumor deepest portion to the collecting system or sinus; A - anterior (a)/posterior (p) descriptors & L - location relative to the polar line) and PADUA NSS (Tumor Size, Exophytic Rate, Renal Sinus Involvement, Urinary Collecting System Involvement, Renal Rim, Longitudinal Polar Location). The recorded values for each respective scoring system were then summed up, and the subsequent final scores were grouped into the three different complexities (low, intermediate & high).

(2) From the patients used in RENAL & PADUA scoring; a fellow Urologist gathered information from their surgeries pertaining to the tumor margins, ischemia, complications, operative time, estimated blood loss & warm ischemia time. These parameters were recorded as quantitative perioperative outcomes.

(3) Finally, the continuous Nephrometry scores, as well as the coded groups, were then compared with the quantitative perioperative outcomes by a fellow Statistician.

RESULTS

Overall, 68 patients had CT scans available for evaluation. Of these 39 (57.3%), 26 (38.2%) and 3 (4.4%) were classified as low, intermediate and high Complexity RENAL score and 28 (41.1%), 29 (42.6%) and 10 (14.7%) were classified as low, intermediate and high complexity PADUA score. Only the RENAL score was predictive of some perioperative outcomes. The continuously coded RENAL score (Table 1) was predictive of ischemia on univariate analysis (OR 2,58, 95% CI 1.38-4.63, p=0.003) and it had the best predictive value on multivariate logistic regression analysis (OR 2,51, 95% CI 1.36-4.85, p=0.0001). Both RENAL and PADUA did not correlate with operative time, blood loss, complication rate and tumor margin status.

Tab. 1 Logistic regression model predicting ischemia after PN

	ISCHEMIA							ISCHEMIA					
	Univariate			Multivariate				Univariate			Multivariate		
	OR	95% CI	p val	OR	95% CI	p val		OR	95% CI	p val	OR	95% CI	p val
PADUA	1.67	0.97-2.88	0.041	1.66	0.96-2.88	0.045	**RENAL**	2.51	1.36-4.63	0.0001	2.58	1.38-4.85	0.003
AGE	1.01	0.96-1.07	0.627	1.01	0.96-1.07	0.631	AGE	1.01	0.96-1.07	0.627	1.02	0.97-1.09	0.419
GENDER	1.18	0.34-4.14	0.796	1.26	0.34-4.14	0.740	GENDER	1.18	0.34-4.14	0.796	1.36	0.31-4.85	0.682

Chart 1 shows RENAL correlated with warm ischemia time
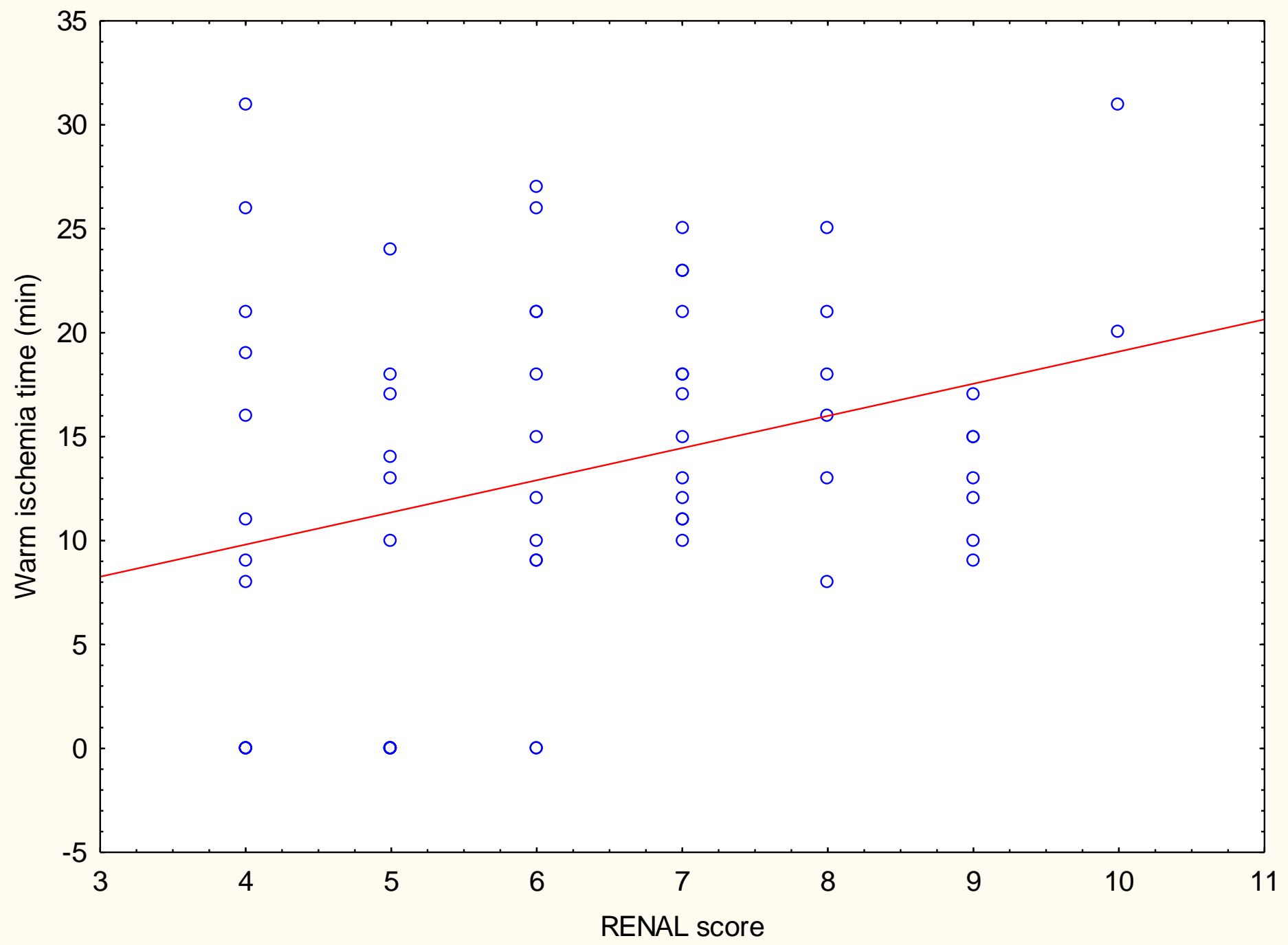
Tab. 2 - NSS correlated with perioperative outcomes, including operative time, warm ischemia time and estimated blood loss

SPEARMANN R (p-value)						
	Operative Time		Ischemia Time		Estimated Blood Loss	
	R	p	R	p	R	p
RENAL	0.21	0.08	0.28	0.02	0.16	0.19
PADUA	0.22	0.07	0.05	0.68	-0.12	0.33

CONCLUSION

A stratification base on NSS of patients before PN is recommended to predict perioperative outcomes. In our analysis, only the RENAL score showed significant correlation with ischemia time (Chart 1). All other parameters were not associated with increasing NSS score.

*Please Note that all Tables & Charts presented are taking from the Findings of Our Results