

mean age compared to NHW (59.6 years vs 65.3 years,  $p < 0.0001$ ). Clear cell RCC was more prevalent among Hispanics (88.9% vs 85%,  $p < 0.004$ ). Hispanics were found to have lower AJCC stage at diagnosis (I/II vs III/IV) than NHW (67.4% vs 62.2%,  $p < 0.044$ ). Overall Hispanics were found to have a greater incidence of comorbidities such as chronic kidney disease (2.6% vs 0.7%,  $p < 0.0001$ ), and diabetes (23.8% vs 15.9%,  $p < 0.001$ ), but still were more inclined to receive surgery (84.2% vs 77.9%,  $p < 0.004$ ). On multivariate analysis, the presence of metastases ( $P < 0.001$ ), nodal involvement ( $P < 0.001$ ), increased tumor size ( $P < 0.001$ ), non-surgical management ( $P < 0.001$ ), increasing age ( $P < 0.001$ ), and Hispanic race ( $P < 0.023$ ) were independent predictors of worse outcome.

**CONCLUSIONS:** Even within a healthcare system with similar access to care, Hispanics with RCC were younger, had greater comorbidities, and more frequently had clear cell RCC. Despite a lower AJCC stage and increase receipt of surgery, Hispanic ethnicity was an independent predictor of worse outcome. Further work is necessary to confirm this health disparity in other large datasets.

**Source of Funding:** None

### MP73-05

#### WHEN TO PERFORM A STAGING CHEST-CT SCAN BEFORE SURGICAL TREATMENT FOR KIDNEY CANCER

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**INTRODUCTION AND OBJECTIVES:** The decision to perform a staging chest-CT scan [CCT] remains an empirical process, due to the lack of predictive models assessing the risk of pulmonary metastasis at kidney cancer [RCC] diagnosis. The aim of the study was to predict the risk of pulmonary metastasis at CCT in order to provide objective criteria for patient selection.

**METHODS:** An assessment of 1,946 patients surgically treated for RCC and collected in a prospective institutional database was performed. The outcome of the study was the presence of pulmonary metastasis at staging CCT. Patients without a pre-operative CCT scan but with a negative post-operative CCT scan were considered negative at staging by-definition. A multivariable logistic regression model was fitted to predict positive CCT scan. Predictors consisted of preoperative haemoglobin/platelet ratio, clinical tumour stage [cT], clinical nodal stage [cN] and presence of systemic symptoms. A 2000-sample bootstrap validation was used to estimate H-index. Decision curve analysis was used to assess the performance of the model in clinical-decision making.

**RESULTS:** Overall, CCT scan resulted negative in 1827 (94%) patients and positive in 119 patients (6%). Preoperative haemoglobin/platelet ratio was associated with higher risk of positive CCT (Odds Ratio [OR] 1.04; 95% Confidence Interval [CI] 1.02-1.06;  $p < 0.0001$ ). Moreover, cT1b (OR 2.69; CI 1.16-6.22;  $p = 0.02$ ), cT2 (OR 9.13; CI 4.13-20.18;  $p < 0.0001$ ) and cT3-cT4 (OR 15.41; CI 6.73-35.25;  $p < 0.0001$ ) resulted associated with higher risk of positive CCT relative to cT1a patients. Similarly, cN1 (OR 3.21; CI 2.05-5.01;  $p < 0.0001$ ) and presence of systemic symptoms (OR 3.88; CI 2.39-6.31;  $p < 0.0001$ ) were also associated with higher risk of positive CCT. Following a 2000-sample bootstrap validation, H-index of the proposed model resulted 0.88 (CI 0.85-0.92). At decision curve analysis, the net benefit of the proposed model was superior than the treat-all and treat-none strategies.

**CONCLUSIONS:** Based on the proposed model, it is possible to estimate the risk of positive CCT at kidney cancer staging using pre-operative characteristics with optimal predictive accuracy. At decision curve analysis, the net benefit of the proposed model was superior than the treat-all and treat-none strategies. If CCT is planned only when the risk of a positive results is  $> 1\%$  a negative CCT is spared in 37% of the population and a positive CCT is missed in  $< 1\%$  of the population only.

These figures support the use of the proposed model in clinical-decision making.

**Source of Funding:** None

### MP73-06

#### DIAGNOSIS AND PROGNOSIS OF EPITHELIOID ANGIOMYOLIPOMA: A 15 YEAR FOLLOW UP AT SINGLE CENTER

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**INTRODUCTION AND OBJECTIVES:** Epithelioid angiomyolipoma (AML) is the subtype of AML, which has malignancy potential. We evaluated the clinical characteristics associated with epithelioid AML and the prognosis of epithelioid AML.

**METHODS:** Medical records of 231 patients consist of 204 patients with epithelioid AML and 27 patients with conventional AML were reviewed. Computed tomography (CT) was performed in all patients before pathological confirmation of the disease. Tumor size and Hounsfield unit (HU) were measured on pre-contrast and arterial phase of CT. Pathologic specimens were reviewed by pathologists who are specialized in urologic pathology. Variables associated with epithelioid AML were assessed using multivariate analysis.

**RESULTS:** Patients with epithelioid AML were younger (41.2 years vs. 49.1 years,  $p = 0.001$ ) than patients with conventional AML. Male patients were more common in patients with epithelioid AML (56% vs. 29%,  $p = 0.005$ ). Tumor size was larger in patients with epithelioid AML compared to conventional AML (7.5cm vs. 4.2cm,  $p < 0.001$ ). Difference in HU between pre-contrast and arterial phase was significantly lower in epithelioid AML group (46.6 vs. 65.9 HU,  $p = 0.022$ ). In multivariable logistic regression analysis, younger age ( $p = 0.024$ ) and male gender ( $p = 0.024$ ) were significantly associated with epithelioid AML. Among 27 patients with epithelioid AML, distant metastasis was observed in 8 (29.7%) patients and these patients had larger tumor compared with the other 19 patients (10.8cm vs. 6.1cm,  $p = 0.014$ ). Three patients with metastasis were expired in 10 days, 47 months and 118 months after the diagnosis of the disease.

**CONCLUSIONS:** Patients with epithelioid AML should be carefully followed-up because of malignancy potential. We should not overlook the probability of epithelioid AML, especially in young male patients with larger tumor size.

**Source of Funding:** none

### MP73-07

#### PREDICTION OF LYMPH NODE INVASION IN PATIENTS WITH RENAL CELL CARCINOMA: RESULTS FROM A LARGE INTERNATIONAL CONSORTIUM

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**INTRODUCTION AND OBJECTIVES:** Few models predicting the presence of lymph node invasion (LNI) in patients with renal cell carcinoma (RCC) are available. In this study, we tested the ability of LNI risk estimation relying on clinically attainable variables.

**METHODS:** Between 1987 and 2014, 4,948 RCC patients treated with either partial or radical nephrectomy within a multi-institutional cohort were identified. Multivariable logistic regression analyses

were used to test the accuracy of all the available clinical characteristics in predicting LNI. A nomogram predicting the probability of LNI was constructed using the logistic regression-derived coefficients. Log transformation was applied for clinical tumor size after non-linearity analysis. Calibration plot and leave-one-out cross validation (LOOCV) were used for internal validation.

**RESULTS:** Overall, 204 patients (4.1%) had LNI. In multivariable analyses, symptoms at diagnosis (OR: 1.64;  $p < 0.006$ ), clinical tumor size (OR: 1.11;  $p < 0.001$ ), non-organ confined (OR: 2.65;  $p < 0.001$ ), clinical LNI (OR: 15.6;  $p < 0.001$ ) and presence of clinical metastases (OR: 2.4;  $p < 0.001$ ) were each significantly associated with the risk of LNI. The curve depicting the relationship between predicted and observed LNI closely approximates the ideal predictions, which indicates excellent calibration. In LOOCV, the C-index of our model was 92.1%. Using a 5% nomogram cut-off, 4,346 of 4,948 patients (87.8%) would be spared lymph-node dissection (LND) and LNI would be missed in 39 patients (0.9%, 19.1% of all LNI). The sensitivity, specificity, and negative predictive value associated with the 5% cut-off were 80.9%, 90.8%, and 99.1%, respectively. To minimize the number of LNI patients missed, a 1% nomogram cut-off may be considered, allowing to spare 57% of LND and missing only 7 LNI patients (0.1%, 3% of all LNI cases).

**CONCLUSIONS:** We developed and internally validated a tool capable of highly accurately predicting LNI in RCC patients. This accurate tool could be useful for patient counseling and risk stratification at medical decision-making. Based on our model, patients with a LNI risk  $< 1\%$  may be safely spared LND. Given the number of LNI cases missed when higher cutoffs were considered, further studies aimed at identifying accurate biomarkers of hidden LNI are urgently needed, especially in low-stage disease.

**Source of Funding:** None

**MP73-08  
PROTEINURIA IN PATIENTS UNDERGOING RENAL CANCER SURGERY: IMPACT ON OVERALL SURVIVAL AND STABILITY OF RENAL FUNCTION**

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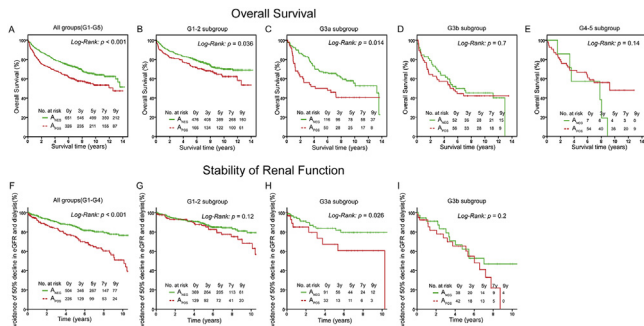
**INTRODUCTION AND OBJECTIVES:** Proteinuria is has recently been included into Kidney Disease: Improving Global Outcomes (KDIGO) risk stratification of chronic kidney disease (CKD) in the general population. However, the importance of proteinuria in patients with renal cancer has not been well studied. We sought to evaluate the prognostic impact of preoperative proteinuria on overall survival (OS) and stability of renal function (SRF) for patients managed with renal cancer surgery.

**METHODS:** From 1999-2008, 977 patients underwent renal cancer surgery with recorded preoperative estimated glomerular filtration rate (eGFR) based on CKD epidemiology collaboration (CKD-EPI) equations (G1: $>90$ ml/min/1.73m<sup>2</sup>; G2:60-89; G3a:45-59; G3b:30-44; G4:15-29; G5: $<15$ ) and proteinuria status based on dipstick (ANEG:negative/trace or APOS: $>30$ mg/dL). Median follow-up was 8.7(7.0-10.7) years. OS and SRF (avoidance of 50% or greater GFR decline and avoidance of dialysis) were analyzed using Kaplan-Meier. Multivariable Cox regression evaluated for independent predictors for both outcomes.

**RESULTS:** APOS was found in 326 patients (33%), and these patients had decreased 5-year OS compared with ANEG (65% vs. 77%,  $p < 0.001$ ). They also demonstrated reduced SRF at 5 years (72% vs. 86%,  $p < 0.001$ ). However, significant differences in OS based on proteinuria were only observed in the G1, G2, and G3a groups, and differences in SRF in G3a. On multivariable analysis for all patients or those with G1/G2/G3a, proteinuria was an independent prognosticator for OS(both  $p < 0.05$ ). On multivariable analysis for all patients or those with G3a, proteinuria was an independent prognosticator for decreased

SRF(both  $p < 0.05$ ). Limitations include retrospective design and potential ascertainment bias.

**CONCLUSIONS:** Proteinuria appears to be a significant and independent predictor of decreased OS and SRF in patients undergoing renal cancer surgery, particularly certain cohorts, and should be sensibly incorporated into routine clinical management. Further studies, ideally prospective, will be required to evaluate the importance of degree of proteinuria, and the generalizability of our findings.



**Source of Funding:** None

**MP73-09  
RENAL ANGIOMYOLIPOMAS IN CHILDREN AND ADOLESCENTS WITH TUBEROUS SCLEROSIS COMPLEX**

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**INTRODUCTION AND OBJECTIVES:** Tuberous Sclerosis (TS) is a genetic, multisystem disorder characterized by the growth of widespread hamartomas in multiple organs. Patients with TS can develop renal cysts, renal cell carcinoma, and angiomyolipomas (AMLs). Up to 80% of TS patients will have at least one AML in their lifetime. AMLs have the potential to increase in size over time, with lesions  $>4$ cm at increased risk of spontaneous, and possibly life-threatening, retroperitoneal hemorrhage. In this study we aim to describe the incidence and natural history of AMLs in a population of children and adolescents with TS, and utilize AML tumor kinetic modeling to determine optimal renal imaging intervals in an effort to improve urologic counseling, follow-up, and treatment.

**METHODS:** We performed an IRB approved, retrospective chart review of all patients managed in our pediatric and adolescent multidisciplinary TS clinic from 2004-2014. Data collected for each patient included: demographics, renal function, extra-renal manifestations, renal imaging, genetic testing, mTOR inhibitors, and surgical interventions.

**RESULTS:** A total of 145 patients were analyzed. Median age was 11yr (range 2-28). 94% underwent renal surveillance with ultrasound, 4.8% CT, and 0.7% MRI. Overall AML incidence was 50.3%. Median age at first AML was 11yr (2-26). Median size of AML at first detection was 0.7cm (0.5-6.7). AML growth rate stratified by age at first AML: age 0-6yr (0.9 mm/yr), 7-11 (1.0), 12-16 (3.7), and 17+ (33.2). AML growth rate stratified by AML size at first detection: 0.6-0.9cm (1.6 mm/yr), 1.0-1.9 (10.5), 2.0-2.9 (26.1). Figure 1 displays AML growth velocity based on patient age and AML size. Thirty-five patients (18.1%) were treated with mTOR inhibitors. Eight patients underwent a total of 13 interventions (embolization, biopsy, partial or total nephrectomy), of which two were previously treated with mTOR inhibitors. Mean patient age and AML size at time of intervention was 18.7yr and 5.2cm, respectively.

**CONCLUSIONS:** This is the largest institutional series to date of renal AMLs in pediatric and adolescent TS patients. Growth of AMLs in this specific TS population can be rapid and unpredictable. We recommend annual renal ultrasounds in all TS patients of all ages, with consideration of MRI in patients at higher risk for rapid growth ( $>11$  years of age and/or AML  $> 2$ cm in size).