

## Appendix III

Summary of evidence regarding the test characteristics for diagnostic tests for the identification of HS UTUC.			
Author, Year Sample size Study Design  RoB	Key Inclusion Criteria	Diagnostic test Reference standard	Results: Diagnostic accuracy for identifying HS disease and/or association of test result with HS disease (defined as ≥pT2, unless otherwise indicated) (95% CI, unless otherwise indicated)
Almas, <sup>49</sup> 2021 N=176 (CT); N=60 (cytology) Retrospective [chart review]  High	UTUC with RNU	Test: CT (n=176)  Test: Urinary cytology (n=60; 43 with sample during ureteroscopy)  Reference: Final surgical pathology results	CT for predicting NOCD (≥ pT3 and/or N+)[n=176] Local invasion on CT: Sensitivity: 49% Specificity: 85% Pathological lymph nodes on CT: Sensitivity: 22% Specificity: 98%  Urine cytology Presence of NOCD according to presence of malignant cells on cytology: OR 1.84 (95% CI: 0.55 to 6.14), p=0.3
Ng, <sup>47</sup> 2011 N=106 Retrospective [chart review]  Moderate	UTUC with RNU	Test: CT (ipsilateral hydronephrosis)  Reference: Final surgical pathology results	Sensitivity: 57% (39% to 74%) Specificity: 73% (61% to 83%) PPV: 51% (39% to 63%) NPV: 78% (70% to 84%)  In multivariate adjusted analysis, hydronephrosis on CT was associated with HS: HR 4.0 (1.4 to 11.5), p=0.01 Findings on CT
Mammen, <sup>46</sup> 2018 N=48 (with 49 UTUCs) Retrospective [chart review]  Moderate	UTUC with RNU	Test: CT  Reference: Final surgical pathology results	Appearance: filling defect or mass vs. wall thickening or stricture Sensitivity: 87% (66% to 97%) Specificity: 15% (4% to 35%) PPV: 48% (42% to 53%) NPV: 57% (25% to 84%)  Margin: spiculated vs. smooth Sensitivity: 70% (47% to 87%) Specificity: 73% (52% to 88%) PPV: 70% (53% to 82%) NPV: 73% (58% to 84%)  Collecting system: Dilated vs. non-dilated Sensitivity: 52% (31% to 73%) Specificity: 65% (44% to 83%) PPV: 57% (41% to 72%) NPV: 61% (48% to 72%)  Texture: heterogeneous vs. homogeneous Sensitivity: 91% (72% to 99%) Specificity: 58% (37% to 77%) PPV: 66% (54% to 75%) NPV: 88% (66% to 97%)  Calcification vs. no calcification Sensitivity: 13% (3% to 34%) Specificity: 88% (70% to 98%) PPV: 50% (18% to 82%) NPV: 54% (48% to 59%)
Scolieri, <sup>48</sup> 2000 N=37 Retrospective [chart review]  Moderate	UTUC with RNU or distal ureterectomy	Test: CT  Reference: Final surgical pathology results	For HS (≥pT3)  Sensitivity: 28% (8% to 76%) Specificity: 100% (88% to 100%) PPV: 100% (NA) NPV: 85% (77% to 91%)  CT failed to detect 34% (10/29) of tumors staged <pT3, which was treated as <T3 on CT for the above measures of diagnostic accuracy
Yu, <sup>50</sup> 2021 N= 125 Retrospective [chart review]  Low	UTUC with RNU with MDCTU	MDCTU	For HS (≥pT3) Sensitivity: 75% (59% to 87%) Specificity: 84% (74% to 91%) PPV: 68% (56% to 78%) NPV: 88% (80% to 92%)

Farnum, <sup>162</sup> 2018 N=27 Retrospective [chart review]  Moderate	UTUC with NU	Test: Endoluminal US  Reference: Final surgical pathology results	Sensitivity: 17% (0.4% to 64%) Specificity: 76% (53% to 92%) PPV: 17% (3% to 58%) NPV: 76% (68% to 83%)
Messer, <sup>163</sup> 2011 N=326 Retrospective [chart review]  Moderate	UTUC with RNU or distal ureterectomy	Test: Urine cytology – voided/cath bladder and selective upper tract  Reference: Final surgical pathology results	Bladder and selective upper tract urine cytology combined (n=326): Sensitivity: 77% (70% to 84%) Specificity: 18% (13% to 24%) PPV: 45% (43% to 48%) NPV: 47% (37% to 58%)  Selective upper tract urine cytology (n=168): Sensitivity: 76% (71% to 84%) PPV: 89% (41% to 51%)
Sakano, <sup>164</sup> 2015 N=437 Retrospective [chart review]  High	UTUC with RNU	Test: Urine cytology – voided bladder and selective upper tract  Reference: Final surgical pathology results	For HS (≥pT3) Multivariate adjusted analyses  Voided urine cytology: OR 1.86 (1.07 to 3.25), p=0.029  Selective upper tract urine cytology: univariate analysis p>0.05 (p=0.11); therefore, multivariate analysis not conducted.
Sverrisson, <sup>165</sup> 2014 N=68 Retrospective [chart review]  Moderate	UTUC with RNU	Test: Urine cytology – selective upper tract  Reference: Final surgical pathology results	Sensitivity: 73% (52% to 88%) Specificity: 32% (18% to 49%) PPV: 42% (35% to 50%) NPV: 63% (44% to 79%)
Su, <sup>44</sup> 2017 N=210 Retrospective [chart review]  Moderate	UTUC with surgical intervention	Test: FISH  Reference: Final surgical pathology results	Sensitivity: 72% (62% to 80%) Specificity: 47% (37% to 57%) PPV: 58% (49% to 67%) NPV: 62% (53% to 70%)
Wang, <sup>45</sup> 2012 N=34 Diagnostic accuracy  Moderate	UTUC with RNU or ureterectomy	Test: FISH  Reference: Final surgical pathology results	Sensitivity: 83% (59% to 96%) Specificity: 38% (15% to 65%) PPV: 60% (49% to 70%) NPV: 67% (37% to 87%)  FISH results were not significantly associated with HS (chi-squared test p=0.12)
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