

# Transurethral Endoscopic Ultrasound to Assess Tumor Stage in Bladder Cancer

Abstract #: 18-321

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## Background

- Endoscopic ultrasound is utilized in tumor staging of many luminal cancers
- Its utility in bladder cancer is poorly understood
- Transurethral ultrasound (TUEUS) has several potential advantages
  - No exposure to ionized radiation
  - Superior delineation of depth of invasion compared to CT and MRI
  - Can be done intraoperatively
  - Impact on clinical decision making/surgical planning
  - Lower cost
  - Possible provider reimbursement

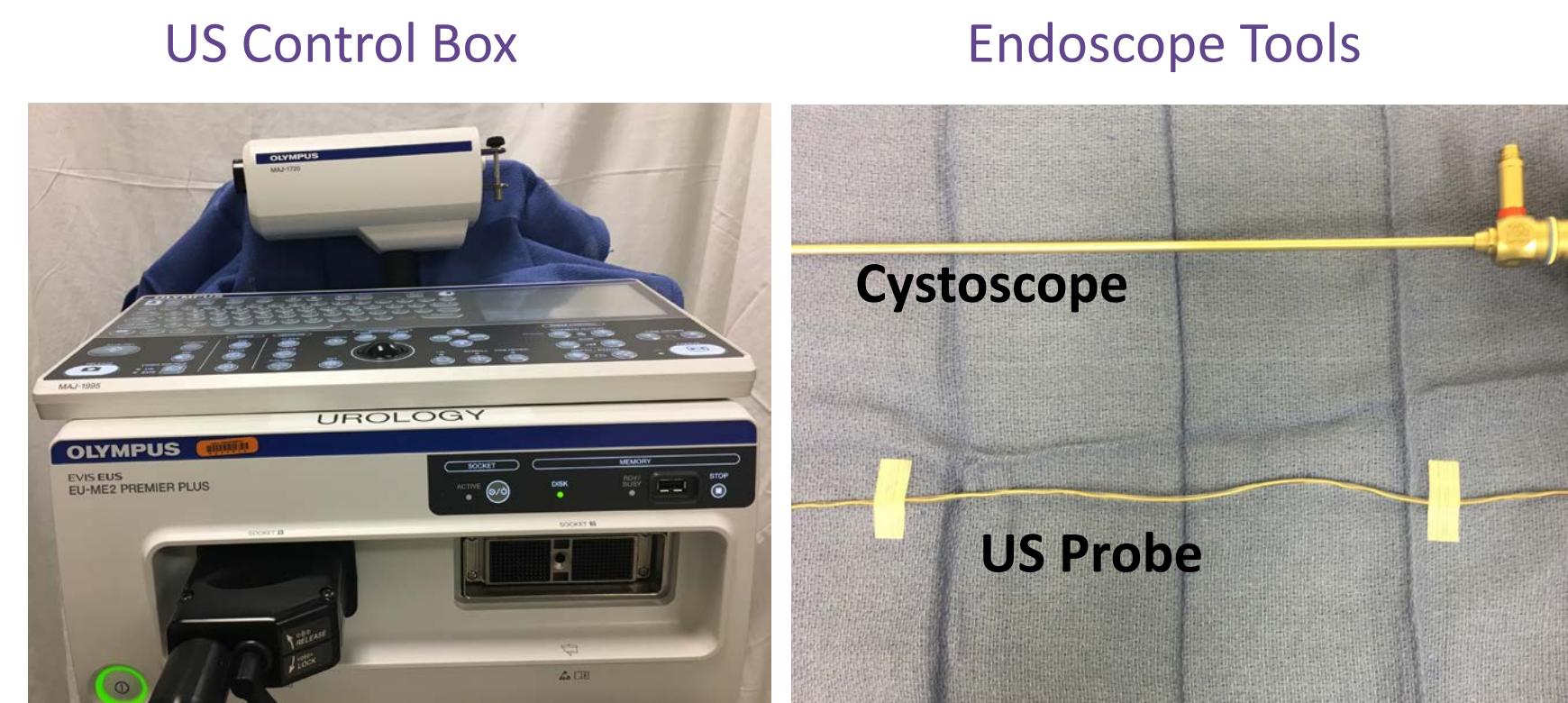
## Objective

- To evaluate the diagnostic accuracy of TUEUS in differentiating muscle invasive (MIBC) and non-muscle invasive bladder cancer (NMIBC) when compared to tumor pathology

## Methods

- IRB approval obtained
- 14 patients with bladder cancer were enrolled
  - Evaluated with TUEUS prior to transurethral resection of bladder (TURBT)
  - A single surgeon examined 31 distinct bladder lesions by TUEUS
  - Final pathology was reviewed
  - Intraoperative assessment of depth of invasion as NMIBC or MIBC were correlated with final pathology
  - Sensitivity, specificity, negative and positive predictive values were calculated

## Endoscope and Intraoperative TUEUS



Normal Bladder                      Non Muscle Invasive Bladder Cancer                      Muscle Invasive Bladder Cancer

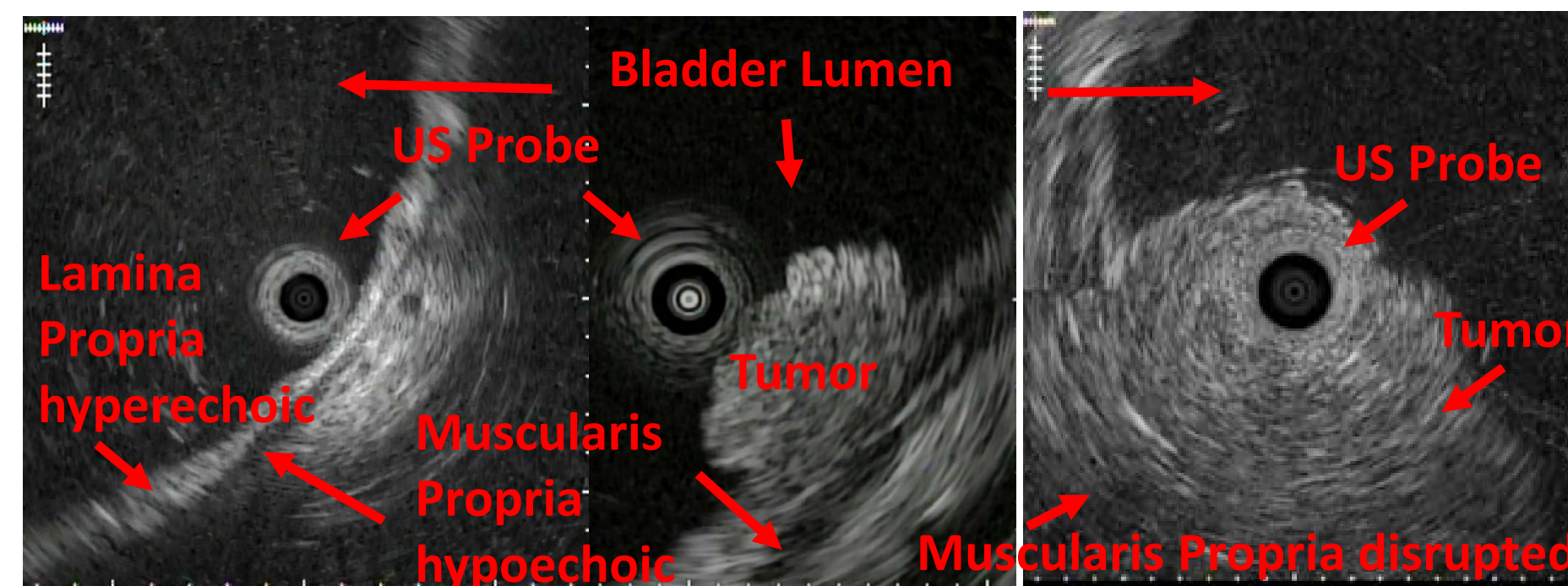


Table 1: Patient Characteristics

Characteristic	N=14
Mean age	65.9 SD ± 12.0
Sex	
Male	8 (57%)
Female	6 (43%)
Total Tumors	31 (range 1-4)
Mean tumor burden	2.2 SD ± 1.0
SD = Standard deviation	

## Results

- 31 distinct bladder tumors evaluated among 14 unique patients
  - Two tumors were deemed to be muscle invasive bladder cancer on pathology
  - Remaining 29 were non muscle invasive bladder cancer
- Size/location of tumor did not significantly impact outcomes
- No adverse events

Table 2: Diagnostic Utility of TUEUS

End Point	Percent [95% CI]
Sensitivity	100% [100%, 100.0%]
Specificity	97% [90%, 100%]
Positive Predictive Value	50%
Negative Predictive Value	100%

## Discussion

- TUEUS had high sensitivity and specificity as well as excellent negative predictive value
- Low positive predictive value could be due to small number of MIBC tumors

## Conclusions

- In this pilot study, we demonstrate that TUEUS is a safe procedure that has a high concordance with pathologic stage
- TUEUS is a promising tool that warrants further investigation for the local staging of bladder cancers

## Disclosures

- This is an investigator initiated trial
- Endoscope was provided by Olympus
- Principal investigator is a consultant for Olympus