

MRI-guided transurethral ultrasound ablation (TULSA) of localized prostate cancer: single institution experience of treatment efficacy

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Introduction

Magnetic resonance imaging (MRI)-guided transurethral ultrasound ablation (TULSA) has emerged as a new option for treatment of localized prostate cancer (PCa). Here we report on our institutional experience with the TULSA procedure regarding oncologic outcomes, including initial disease status, follow-up PSA, imaging, and pathology from our cohort.

Methods

This is a single-center study of prospectively collected data of men with localized PCa who underwent TULSA as primary treatment of their disease. All men were evaluated with prostate MRI and prostate biopsy prior to treatment. Men with prior PCa therapy were excluded.

Treatment plans were individualized based on disease characteristics and patient preference, spanning lesion specific to whole gland.

Oncologic outcomes were followed at routine intervals with PSA evaluation every 3 months and repeat prostate MRI and biopsy at 1 year, followed by annual prostate MRI and PSAs every 6 months after year 1.

Primary treatment efficacy was defined as the number of men after 1-year imaging/biopsy follow-up who underwent salvage treatment.

Results

From 10/2020 through 12/2023, 152 patients underwent TULSA for PCa treatment. Patient characteristics can be found in Table 1.

Results

Of the 129 patients who have met 1-year follow up, 78% (101/129) of patients have undergone **1-year follow-up MRI**.

Prostate volume decreased by 57.8% (IQR 34.3-81.5%) and median PSA density decreased by 53.3% (IQR 20.7-76.4%).

On 1-year MRI, 24/101 (23.7%) patients had a focal lesion on imaging (1 PIRADS-5, 12 PIRADS-4, 8 PIRADS≤3, 3 indeterminate PIRADS). Fifteen of these lesions were in the field of prior ablation and 9 of these lesions were out of the field of prior ablation.

Of the 101 patients with 1-year MRI results, 41 (40.6%) patients refused 1-year biopsy. 60/101 (59.4%) patients underwent repeat systematic plus targeted biopsy at 1 year. 18/60 (30%) patients had PCa recurrence, 17/18 of which were the same or lower Gleason Group (GG) compared to initial biopsy (Table 2).

7/101 (6.9%) men with 1-year follow-up have undergone salvage treatment (3 repeat TULSA, 2 RALP, 2 XRT). Median time to salvage treatment was 512 days.

Baseline Patient Characteristics (n=152)	
Age (in years)	
Median (IQR)	67.0 (63.0-72.0)
PSA (ng/mL)	
Median (IQR)	6.35 (4.5-9.2)
Prostate Volume (mL)	
Median (IQR)	43.0 (35.0-55.0)
PSA Density (ng/mL ²)	
Median (IQR)	0.15 (0.10-0.23)
Gleason Grade Group on Initial Biopsy (n, %)	
Grade group 1	19 (12.5%)
Grade group 2	97 (63.8%)
Grade group 3	32 (21.1%)
Grade group 4	4 (2.6%)
Grade group 5	0 (0%)
Ungraded	0 (0%)

Table 1: Baseline patient and disease characteristics of patients undergoing TULSA

Conclusion

Our experience with TULSA demonstrates significant decreases in post procedure PSA, PSA density and prostate volume.

Approximately 41% (41/101) of patients refused 1-year follow up biopsy after a negative MRI and favorable PSA trend.

We found a recurrence rate of 30% (18/60) on 1-year biopsy, with 44.4% (8/18) of patients having ≥ GG2 disease and 94.4% (17/18) of patients having stable or lower GG compared to initial biopsy.

Of all men reaching at least 1-year post-TULSA follow up, 6.9% have undergone salvage treatment.

1-Year Outcomes after TULSA for Localized Prostate Cancer (n=129)	
PSA (ng/mL)	
Median (IQR)	1.1 (0.5-2.1)
Prostate Volume (mL)	
Median (IQR)	17.0 (8.0-27.3)
PSA Density (ng/mL ²)	
Median (IQR)	0.07 (0.03-0.12)
Gleason Grade Group on 1-Year Biopsy (n, %)	
Grade group 1	6 (33.3%)
Grade group 2	7 (38.9%)
Grade group 3	1 (5.6%)
Grade group 4	0 (0%)
Grade group 5	0 (0%)
Ungraded/too small to grade	4 (22.2%)
GG on 1-Year Biopsy Compared to Primary Malignancy	
Same	7 (38.9%)
Lower	10 (55.6%)
Higher	1 (5.5%)
Salvage Treatment after TULSA (n=7)	
Repeat TULSA	3

Table 2: Oncologic outcomes 1 year after TULSA for treatment of localized prostate cancer