Supplementary Table 2. Characteristics of included studies.

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| *First author, journal and year of publication* | | *Study Design* | | *Number of patients and selection criteria* | | *FU*  *(months)* | | *Anesthesia* | | *𝛥IPSS (Mean p value* | | *𝛥Qmax*  *(ml/sec,*  *Mean, p value)* | | *𝛥IPSS QoL*  *(Mean, p value)* | | *Perioperative Complication/Adverse events (%) according CD classification* | | *Retreatment (%)* | | *EAU Recommendation* | |
| *TIND ( first generation)* | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Porpiglia et al, BJU 2015 [11] | | Prospective,  single arm, single center  **(MT-01 study)** | | 32pts;  >50 years, IPSS≥ 10, Qmax ≤ 12 ml/sec, prostate< 60 ml with no median lobe | | 12 | | Local +light sedation | | -10  p<0.001 | | +4.3  p<0.001 | | -2 | | 1 pt prostatic abscess (CD-II), 1 pt urinary retention(CD-II), 1 pt UTI (CD-II) and 1 pt transient incontinence (CD-II).  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 0 | | Under investigation | |
| Porpiglia et al, BJU 2018 [13] | | Prospective, single arm, single center  **(MT-01 study)** | | 32pts;  >50 years, IPSS≥ 10, Qmax ≤ 12 ml/sec, prostate< 60 ml with no median lobe | | 36 | | Local +light sedation | | -7  p<0.001 | | +2.5  p<0.001 | | -1 | | 1 pt prostatic abscess (CD-II), 1 pt urinary retention(CD-II), 1 pt UTI (CD-II) and 1 pt transient incontinence (CD-II).  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 8% medical retreatment | | Under investigation | |
| *iTIND ( second generation)* | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Porpiglia et al, BJU 2018 [12] | | Prospective,  single arm, European multicentre  **(MT-02 study)** | | 81 pts;  prostate < 75ml IPSS ≥ 10, Qmax ≤ 12 mL/s with no median lobe | | 12 | | Local +light sedation | | -13.4  p<0.001 | | +7.6  p<0.001 | | -3  p<0.001 | | Haematuria CD-I(12.3%),  micturition urgency CD-II(11.1%), pain CD-I(9.9%) dysuria CD-I (7.4%), UTIs CD-II (6.2%) urinary retention CD-II (9.9%)  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 5% medical retreatment | | Under investigation | |
| Kadner et al,  WJU 2020 [14] | | Prospective,  single arm, European multicentre  **(MT-02 study)** | | 81 pts;  prostate < 75ml IPSS ≥ 10, Qmax ≤ 12 mL/s with no median lobe  51 pts remaining in f ollow-up until 24 months | | 24 | | Local +light sedation | | -12 | | +8.4 | | -2.2 | | No complications were reported between the 1 and 2 year  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 5 pts underwent surgery between the 1 and 2 year | | Under investigation | |
| *AQUABLATION* | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Gilling et al, BJU 2016 [15] | | Prospective,  single arm,  single center | | 15 pts;  IPSS>12, Qmax ≤ 12 ml/sec, Schaffer scale of ≥2, prostate 25-80 ml | | 6 | | General anesthesia | | -14.4  p<0.001 | | +10  p<0.001 | | -2.5  p<0.001 | | 5 pts (33%) Urinary retention (CD-II)  3pts (20%) haematuria (CD-II), 3pts (20%) dysuria (CD-I), 3pts (20%) pelvic pain (CD-I)  *No retrograde ejaculation*  *No erectile dysfunction* | | 6% surgical retreatment | | Under investigation | |
| Gilling et al, J Urol 2017 [17] | | Prospective,  single arm,  three center | | 21 pts;  IPSS>12, Qmax ≤ 12 ml/sec, Schaffer scale of ≥2, prostate 25-80 ml | | 12 | | General anesthesia | | -16  p<0.001 | | +9.7  p<0.001 | | -3.3  p<0.001 | | 3 pts (14%) Urinary retention (CD-II), 1pt (5%) UTI (CD-II)  1pt (5%) haematuria (CD-II), 1pt (5%) dysuria (CD-I), 1pt (5%) pelvic pain (CD-I)  *No ejaculatory dysfunction*  *No erectile dysfunction* | | nn | | Under investigation | |
| Misrai et al,  Eur Urol 2019 [18] | | Prospective single arm,  Francais three centers study | | 30pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml | | 12 | | General or spinal anesthesia | | -15.6  p<0.001 | | +12  p<0.001 | | -4  p<0.001 | | 23 adverse events in 20 pts  classified:  CD-I 15 events ( 65.2%)  CD-II ( UTI, urinary frequency) 4 events ( 17.4%)  CD-III (bleeding requiring intervention, meatal stenosis requiring intervention) 4 events ( 17.4%)  *27% anejaculation*  *No erectile dysfunction* | | No surgical or medical retreatment in each groups | | Under investigation | |
| Gilling et al.  J Urol 2018 [16] | | International multicenter randomized controlled study  **WATER study** | | 181 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation 116 pts  TURP  65pts | | 6 | | General or spinal anesthesia | | -16.9 Aquablation  -15.4  TURP  p=0.14 | | +10.9  Aquablation  +8.9  TURP  p=0.10 | | -3.5  Aquablation  -3.3  TURP  p=NS | | CD-I  Aquablation 39pts  (33.6%)  TURP 27 pts (42.5%)  p=0.335  CD-II  Aquablation 19pts  (16.4%)  TURP 11pts (16.9%)  p=NS  CD-III  Aquablation 7pts  (6%)  TURP 5 pts (7%)  p=NS  CD-IV  Aquablation 1 pt  *10% ejaculatory dysfunction (anejaculation) with Aquablation*  *36% with TURP*  *p<0.001*  *No difference about erectile function scores on IIEF-15* | | No surgical or medical retreatment in each groups | | Under investigation | |
| Gilling et al  Urology 2019 [19] | | International multicenter randomized controlled study  **WATER study** | | 181 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation 116 pts  TURP  65pts | | 12 | | General or spinal anesthesia | | -15.1 Aquablation  -15.1  TURP  p=0.98 | | +10.3  Aquablation  +10.6  TURP  p=0.86 | | -3.2 Aquablation  -3.5  TURP  p=0.31 | | The primary safety endpoint( defined as persistent CD-I adverse events or CD ≥II adverse events)was 26% for Aquablation vs. 42% for TURP, p=.0149).  Between  month 3 and month 12, 8 adverse events  related to the index procedure, but the proportion of subjects with these events was  similar across treatment groups  *10% ejaculatory dysfunction (anejaculation) with Aquablation*  *36% with TURP*  *p<0.001*  *No difference about erectile function scores on IIEF-15 between two groups* | | 1-year surgical retreatment  rates were 2.6% for Aquablation and 1.5% for TURP  p = 1 | | Under investigation | |
| Kasivisvanathan et al, J Urol 2018 [21] | | International multicenter randomized controlled study  **WATER study**  ***US sub cohort*** | | 90pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation  60 pts  TURP  30 pts | | 12 | | General or spinal anesthesia | | -14.5  Aquablation  -13.8  TURP  p=0.71 | | +11ml/sec  Aquablation  +10  TURP  p=0.83 | | -3.1  Aquablation  -3.4  TURP  p=0.57 | | The primary safety endpoint ( defined as persistent CD-I adverse events or CD ≥II adverse events) was 20% Aquablation versus 47% TURP, p=0.0132  *9% ejaculatory dysfunction (anejaculation) with Aquablation*  *45% with TURP*  *p<0.001*  *No difference about erectile function among two groups* | | 1-year surgical retreatment  rates were 1.7% for Aquablation and 3.3% for TURP  p = 0.42 | | Under investigation | |
| Gilling et al,  Adv Ther 2019 [20] | | International multicenter randomized controlled study  **WATER study** | | 181 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation 116 pts  TURP  65pts | | 24 | | General or spinal anesthesia | | -14.7  Aquablation  -14.9  TURP  p=0.83 | | +11.2 ml/sec  Aquablation  +8.6 ml/sec  TURP  p=0.18 | | -3.2  Aquablation  -3.3  TURP  p=0.70 | | Adverse events to 1 year have been above  reported.  Between year 1 and 2, the rate of most individual  events was low and similar  across groups.  *10% ejaculatory dysfunction (anejaculation) with Aquablation*  *36% with TURP*  *p<0.001*  *Ejaculatory function as*  *assessed by MSHQ-EjD was better in Aquablation*  *compared with TURP through 2 years*  *No erectile dysfunction* | | 2-year surgical retreatment  rates were 4.3% for Aquablation and 1.5% for TURP  p = 0.42 | | Under investigation | |
| Gilling et al,  Can J Urol 2020 [23] | | International multicenter randomized controlled study  **WATER study** | | 181 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation 116 pts  TURP  65pts | | 36 | | General or spinal anesthesia | | -14.4  Aquablation  -13.9  TURP  p=0.68 | | +11.6  Aquablation  +8.2  TURP  p=0.84 | | -3.2  Aquablation  -3.2  TURP  p=0.78 | | Adverse events to 1 year have been above  reported.  Between year 2 and 3 the rate of most individual  events procedure related was low and similar  across groups ( 1 pt -0.9% and 4 pts-6.2% of Aquablation and TURP had urethral stricture and = pts had meatal or submeatal stenosis  p=0.55  *11% ejaculatory dysfunction (anejaculation) with Aquablation*  *29% with TURP*  *p=0.0039*  *No erectile dysfunction* | | 3years surgical retreatment were 4.3% 5/116 in the Aquablation group vs 1.5% 1/65 in the TURP group  P=0.42 | | Under investigation | |
| Plante et al  BJU 2019 [22] | | Prespecified and *post hoc* exploratory subgroup analyses from **WATER study**  Subgroups:  *a.* prostate size <50 gr vs ≥50 gr  *b.* baseline IPSS <20 vs ≥ 20  *c.* age <65 vs ≥65 years | | 181 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Randomized 2:1  Aquablation 116 pts  TURP  65pts | | 6 | | General or spinal anesthesia | | IPSS by prostate volume:  *a.<*50 gr no difference  ≥50 gr IPSS change was 4 points greater after Aquablation vs TURP  P=0.02  *b.* no statistically significant treatment response differences were seen related to IPSS score between Aquablation vs TURP  c. no statistically significant treatment response differences were seen related to age between Aquablation vs TURP | | No statistically significant treatment response differences were seen related to prostate volume, IPSS score and age between Aquablation vs TURP | |  | | The primary safety endpoint difference defined as the presence of persistent CD-I or CD≥ IIadverse events (20% Aquablation vs 46%TURP, p=0.008) was greater for men with large prostate compared with the overall result (26%vs42%, p=0.015).  *Post-operative anejaculation was also less common after Aquablation compared with TURP in men with large prostates (2% vs 41, p<0.001) vs the overall results (10% vs 36%, p<0.001).* | | nn | | Under investigation | |
| Desai et al,  BJU 2018 [24] | | Prospective single arm,  single center | | 47 pts;  IPSS > 12, Qmax ≤ 15 ml/sec, prostate 20-120 ml | | 3 | | General or spinal anesthesia | | -19.4  p<0.001 | | +9.4  p<0.001 | | -4.2  p<0.001 | | 3 pts ( 6.3%) acute retention (CD-I),  1pt (4.7%) haematuria  (CD-II), 1pt (4.7%) infection (CD-II), 3 pts (6.3%) urinary retention underwent to TURP (CD-III), 2 pts with urethral stricture (CD-III)  *No retrograde ejaculation*  *No erectile dysfunction* | | 6% surgical retreatment | | Under investigation | |
| Desai et al  BJU 2019 [25] | | Prospective,  multicentre,  single arm study  **WATER II**  **study** | | 101 pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 1 | | General or spinal anesthesia | | nn | | nn | | nn | | CD≥2  event rate at 1 month was 29.7%.  Among these complications,  Bleeding were recorded in 10 patients  (9.9%) during the index procedure hospitalization prior to  discharge, and included six (5.9%) peri-operative transfusions.  Other 6 pts required transfusion and/or cystoscopic fulguration for  delayed bleeding.  *No data reported on retrograde ejaculation*  *and erectile dysfunction* | | nn | | Under investigation | |
| Yafi et al  Int J Impt Res 2018 [26] | | Prospective,  multicentre,  single arm study  **WATER II**  **study**  **U.S. cohort** | | 82 pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 3 | | General or spinal anesthesia | | -16.6  p<0.001 | | +10.3  p<0.001 | | -2.7  p<0.001 | | CD≥2  event rate at 3 months was 34.1%  The CD grade 1 persistent events consisted of  ejaculatory dysfunction (11%), incontinence (6%),  *No data reported on retrograde ejaculation*  *and erectile dysfunction* | | nn | | Under investigation | |
| Zorn et al  Can Urol Ass J 2019 [27] | | Prospective,  multicentre,  single arm study  **WATER II**  **study**  **Canadian cohort** | | 19pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 3 | | General or spinal anesthesia | | -16.2  p<0.001 | | +16.5  p<0.001 | | -2.8  p<0.001 | | CD≥2  event rate at 3 months was  31.6% (six events).  There were no reports of blood transfusions.  *Ejaculatory dysfunction*  *(32%).*  *No erectile dysfunction* | | nn | | Under investigation | |
| Desai et al,  BJU 2019 [28] | | Prospective,  multicentre,  single arm study  **WATER II**  **study** | | 101 pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 6 | | General or spinal anesthesia | | -16.5  p<0.001 | | +10.1  p<0.001 | | -2.8  p<0.001 | | The primary safety endpoint, defined as Clavien–Dindo grade  2 or higher or any grade 1 event resulting in persistent  disability  (permanent incontinence), at 3 months occurred in 45.5%  Bleeding-related events were observed in 14 patients, of which  eight (7.9%) occurred prior to discharge and six (5.9%)  occurred within 1 month of discharge. Overall,blood transfusions were  required in eight patients (7.9%), return to the operating  theatre for fulguration in three patients (3.0%), and both  transfusion and fulguration in two patients (2.0%).  *No data reported on %retrograde ejaculation*  *and erectile dysfunction* | | No surgical retreatment  2% retreatment with alfa blockers  1% retreatment with 5alfa reductase inhibitors | | Under investigation | |
| Bhojani et al  Urology 2019 [29] | | Prospective,  multicentre,  single arm study  **WATER II**  **study** | | 101 pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 12 | | General or spinal anesthesia | | -17  p<0.001 | | +12.5  p<0.001 | | -3.3  p<0.001 | | The primary safety endpoint, defined as CD Grade 2 or higher  or any Grade 1 event resulting in persistent disability (permanent incontinence),  at 3months occurred in 45.5% of men ( similar to 6 months)  *19% retrograde ejaculation*  *No erectile dysfunction* | | No surgical retreatment  2% retreatment with alfa blockers  1% retreatment with 5alfa reductase inhibitors | | Under investigation | |
| Bhojani et al  WJU 2019 [30] | | Prospective multicentre international study  **WATER II** | | 101 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec,  prostate 80-150 ml  Two groups underwent to Aquablation  <100ml 42 pts  >100ml 59 pts | | 3 | | General or spinal anesthesia | | Changes in IPSS at 3 months between two groups were not statistically different  (p=0.2198) | | Changes in  Qmax at 3 months between two groups were not statistically different | | Change in IPSS QoL at 3 months between two groups were not statistically different  (p=0.2879) | | The primary safety endpoint difference defined as the presence of adverse events CD≥ II were similar in both groups  *No difference about ejaculatory dysfunction*  *between two groups*  *17% anejaculation in <100ml group*  *14 % anejaculation in >100ml group* | | nn | | Under investigation | |
| Nguyen et al  BJU 2020 [31] | | Comparison **WATER** (only Aquablation arm) and **WATERII** | | 116 pts;  IPSS ≥ 12, Qmax ≤ 15 ml/sec, prostate 30-80 ml  Vs  101 pts;  45-80years  IPSS ≥12, Qmax < 15 ml/sec, prostate 80-150 ml | | 12 | | General or spinal anesthesia | | Changes in IPSS at 12 months between two groups were not statistically different  (p=0.605) | | Changes in  Qmax at 12 months between two groups were not statistically different | | Change in IPSS QoL at 12 months between two groups were not statistically different | | CD≥2  event rate at 12 months was 19.8% for W-I and 34.7% for W-II ( p=0.468)  *Ejaculatory disfunction*  *Anejaculation) rate was 19% in W-II and )9%in W-II*  *No erectile dysfunction* | | Surgical retreatment at 12 months 2.6% fro W-I  0% for W-II | | Under investigation | |
| Chugthai et al  Adv Ther 2018 [32] | | Pooled Analysis of **WATER and WATERII** ( pts underwent Aquablation) | | 170 pts  Prostate size between 60-150 ml | | 3 | | General or spinal anesthesia | | -16.7  p<0.001 | | +11.2  p<0.001 | | -3.1  p<0.001 | | CD grade ≥II adverse events rate of 29%. | | nn | | Under investigation | |
| Bach et al  WJU 2019 [33] | | Prospective single arm,  single center  in a “real life scenario” | | 118 Un-selected patients  The only exclusion criteria was anticoagulant/antiplatelet therapy | | 3 | | General or spinal anesthesia | | -13.84  p<0.001 | | +10.87  p<0.001 | | -3.04  p<0.001 | | 13 adverse events in 10 pts ( 8.5%)  9 adverse events were categorized as CD-II( hematuria not needing intervention, UTI, re-catheterization, transfusion)  4 were categorized as CD-IIIB ( hematuria needing intervention)  *No retrograde ejaculation*  *No erectile dysfunction* | | No surgical or medical retreatment | | Under investigation | |
| *URETHRAL LIFT* |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Woo HH et al,  BJU 2011 [40] | Prospective,  single arm, single center | | 19pts;  ≥ 55 years, IPSS≥ 13, Qmax ≤ 12 ml/sec, prostate 20- 100 ml with no median lobe  PVR <250 ml | | 12 | | General | | -8.6  p 0.002 | | +2.5  p 0.13 | | -2.2  p 0.002 | | 12pts (63%) haematuria  11 pts (58%) dysuria  9 pts (47%) irritative symptoms  3 pts (16%) transient incontinence,  3 pts (16%) bladder spasm,  3 pts (16%) urinary retention  1 pt (5%) UTI,  1 pt (5%) prostatitis  1 pt (5%) incomplete voiding,  1 pt (5%) weak stream,  1 pt (5%) penile discomfort/pain,  1 pt (5%) soprapubic discomfort/pain,  1 pt (5%) unspecified pain  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 16% surgical retreatment | |  | |
| Chin PT. et al,  Urology 2012 [39] | Prospective, single arm, multicenter | | 64pts;  ≥55 years, IPSS> 13, Qmax ≤ 12 ml/sec, prostate 21- 149 ml with no median lobe  PVR < 250 ml | | 24 | | Local or General | | -9.2  p<0.001 | | +2.8  p 0.006 | | -2.2  p <0.001 | | Irritative symptoms, dysuria, mild haematuria (CD-I)  5 pts (8%) transient urge incontinence  1 pt (1,56 %) epididymo-orchitis (CD-II)  1 t (1,56%) rigor (CD-II)  1 pt (1,56%) prostatitis (CD-II)  7 pts (10,93%) UTI (CD-II)  1 pt (1,56%) angina (CD-II)  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 20% surgical retreatment | |  | |
| McNicholas et al,  Eur Urol 2013 [41] | Retrospectivemulticenter  single arm | | 102pts;  68 ±10 years, IPSS 23.2±6.1, Qmax 8.7±4.0 ml/sec, prostate volume 48±21 ml | | 12 | | Local or General or spinal | | -12.3  p<0.001 | | +4.0  p <0.001 | | -2.6  p <0.001 | | 25 pts (25%) dysuria,  16 pts (16%) haematuria,  10 pts (10%) urgency,  3 pts (3%) retention,  3 pts (3%) UTI,  3 pts (3%) orchitis  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 6.5% surgical retreatment | |  | |
| Roehrborn et al,  J Urol 2013 [38] | Prospective, randomized, controlled, blinded, multicentre  L.I.F.T. Study | | 206pts;  ≥50 years,  AUASI ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe,  PVR > 250 ml  Randomized 2:1  PUL 140 pts  Sham control 66 pts | | 12 | | Local or General or periprostatic block | | -10.8 (AUASI)  p <0.0001 | | +4  p <0.0001 | | -2.4  p < 0.0001 | | 7 pts (5%) clot retention,  48 pts (34.3%) dysuria,  36 pts (25.7%) haematuria,  25 pts (17.9%) perlvic pain/discomfort,  10 pts (7.1%) urgency,  5 pts (3.6%) bladder spasm,  5 pts (3.6%) urge incontinence,  4 pts (2.9%) UTI, 1 pt (0.7%) retention  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 5% surgical retreatment | |  | |
| Roehrborn et al,  Can J Urol 2015 [37] | Prospective, randomized, controlled, blinded, multicentre  L.I.F.T. Study | | 206pts;  ≥50 years,  AUASI ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe,  PVR > 250 ml  Randomized 2:1  PUL 137 pts  Sham control 64 pts | | 36 | | Local or General or periprostatic block | | -8.83  p <0.0001 | | +3.47  p <0.0001 | | -2.25  p < 0.0001 | | Rigors <0.01%  UTI 0.03%  Dysuria 1%  Urinary urge incontinence 1%  Other 4%  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 10.7% surgical retreatment | |  | |
| Roehrborn et al,  Can J Urol 2017  [36] | Prospective, randomized, controlled, blinded, multicentre  L.I.F.T. Study | | 206pts;  ≥50 years,  AUASI ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe,  PVR > 250 ml  Randomized 2:1  PUL 96 pts | | 60 | | Local or General or periprostatic block | | -7.56  p <0.0001 | | +3.48  p <0.0001 | | -2.32  p < 0.0001 | | Haematuria 0.07%  Urinary urge incontinence 1%  Other 3%  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 13.6% surgical retreatment | |  | |
| Cantwell et al,  BJU Int 2014 [35] | Multicentre prospective  randomized crossover study | | 66 pts;  ≥50 years,  IPSS ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe,  PVR > 250 ml  PUL 53 pts | | 12 | | Local or General or periprostatic block | | -8.7  p <0.0001 | | +4.6 | | -2.0  p < 0.0001 | | 19 pts (35.8%) dysuria,  14 pts (26.4%) haematuria,  11 pts (20.8%) pelvic pain/discomfort,  4 pts (7.5%) urgency,  4 pts (7.5%) retention,  1 pts (1.9%) bladder spasm,  1 pts (1.9%) urgency incontinence,  1 pts (1.9%) UTI  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 2% surgical retreatment | |  | |
| McVary et al,  J Sex Med 2014 [48] | Prospective,  Randomized, controlled, blinded, single center | | 206 pts;  ≥50 years,  IPSS > 12,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe  Randomized 2:1  PUL 140 pts  Sham control 66 pts | | 12 | | Local | | -10.8  p <0.001 | | +4.0  p<0.001 | | -2.2  p < 0.001 | | Transient dysuria, heameturia, pelvic pain  *No ejaculatory dysfunction*  *No erectile dysfunction* | |  | |  | |
| Shore et al,  Can J Urol 2014 [47] | Prospective, multicentre,  Single arm,  Non-blinded | | 51 pts  ≥50 years,  IPSS ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe | | 1 | | Local | | -10.47  p<0.0001 | | +3.30  p<0.0001 | | -2.12  p 0.0001 | | 40 pts (78%) haematuria,  37 pts (73%) dysuria,  12 pts (24%) incontinence,  10 pts (20%) pelvic pain/discomfort,  4 pts (8%) urgency,  3 pts (6%) retention,  2 pts (4%) penile pain,  2 pts (4%) urinary frequency  1 pt (2%) urinary flow decreased  *No ejaculatory dysfunction*  *No erectile dysfunction* | |  | |  | |
| Sonksen et al,  Eur Urol 2015 [8] | Prospective, randomized, multinational,  Nonblinded  BPH6 study | | 80 pts  ≥50 years  IPSS>12  Qmax ≤ 15 ml/s  PVR < 350 ml  Prostate < 60 cm3 with no median lobe  Randomized 1:1  PUL 45 pts  TURP 35 pts | | 12 | | General, spinal or local | | -11.4 PUL  -15.4 TURP  p 0.02 | | +4.0 PUL  +13.7 TURP  p<0.0001 | | -2.8 PUL  -3.1 TURP  p 0.4 | | CD-I  PUL 30 pts (68%)  TURP 26 pts (74%)  CD-II  PUL 3 pts (7%)  TURP 4 pts (11%)  CD-IIIb  PUL 4 pts (9%)  TURP 5 pts (14%)  *MSHQ-EjD scores and the BPH6 ejaculatory function element were significantly greater for the PUL group*  *No erectile dysfunction in both groups* | | 6.8% PUL group  5.7% TURP group | |  | |
| Rukstalis et al,  BJU Int 2016 [46] | Multicenter  Crossover study  L.I.F.T study | | 53 pts  ≥50 years,  IPSS ≥ 13,  Qmax ≤ 12 ml/sec,  Prostate 30-80 ml with no median lobe | | 24 | |  | | -9.6  p<0.001 | | +4.18  p<0.001 | | -2.0  p<0.001 | | No AEs | | 8% surgical retreatment | |  | |
| Bozkurt et al,  Urol Int 2016 [45] | Prospective,  Single arm,  Single center | | 17 pts  67±10.8 years  IPSS >12  Qmax < 15 ml/s  Prostate < 100 ml with no median lobe | | 12 | | Local or General | | -9.6  p<0.001 | | +4.2  p<0.001 | | -0.88  p<0.001 | | No AEs  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 5% surgical retreatment | |  | |
| Gratzke et al,  BJU Int 2017 [7] | Prospective, randomized, multinational,  Nonblinded  BPH6 study | | 80 pts  ≥50 years  IPSS>12  Qmax ≤ 15 ml/s  PVR < 350 ml  Prostate < 60 cm3 with no median lobe  Randomized 1:1  PUL 45 pts  TURP 35 pts | | 24 | | General, spinal or local | | -9.2 PUL  -15.3 TURP  p 0.004 | | +5.0 PUL  +15.8 TURP  p 0.002 | | -2.5 PUL  -3.3 TURP  p 0.066 | | *No ejaculatory dysfunction in PUL group,*  *34% anejaculation in TURP group.*  *No erectile dysfunction in both groups* | | 13.6% PUL group  5.7% TURP group | |  | |
| Schoenthaler et al, World J Urol 2018 [43] | Prospective, single arm | | 28 pts  ≥45 years  IPSS > 12  Qmax < 12 ml/s  Prostate < 60 cc with median lobe  PUL + mTUR of median lobe or TUBNI or TUIP | | 10.9  (3-36) | | General or spinal | | -12.95  p<0.01 | | +9.4  p<0.01 | | -2.0  p<0.01 | | Transient hematuria, dysuria, urgency  1 pt (3.6%) recatherization (CD-I)  1 pt (3.6%) clot retention and surgical revision (CD-IIIb)  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 0 | |  | |
| Rukstalis et al,  Prostate Cancer Prostatic Dis. 2019 [42] | Prospective, non-randomized, multicentre  MedLift Study | | 53 pts  ≥50 years  IPSS ≥ 13  Qmax ≤ 12 ml/s  Prostate 30-80 cc with median lobe | | 12 | | General, intravenous sedation, topical/local | | -13.5  p<0.0001 | | +6.4  p<0.0001 | | -3.0  p<0.0001 | | Hematuria, dysuria  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 2(%) surgical retreatment | |  | |
| Sievert et al,  World J Urol 2019 [44] | Prospective, multicentre  Single arm | | 138 pts  No median lobe | | 24 | | Local or General | | -10.65  p<0.0001 | | +2.97  p 0.005 | | -2.16  p<0.0001 | | 12 pts (14%) transient dysuria and haematuria  3 pts (3.5%) pelvic pain  *No ejaculatory dysfunction*  *No erectile dysfunction* | | 12.8% surgical retreatment | |  | |
| Eure et al,  J Endourol 2019 [34] | Real world Retrospective  multicentre | | 1413 pts  35-96 years  IPSS ≥ 13  Qmax ≤ 12 ml/s  Prostate 13-158 cc | | 24 | | General, local or twilight | | -8.3  p<0.0001 | | +2.1  p 0.08 | | -1.7  p<0.0001 | | 219 pts (15.5%)Hematuria  83 pts (5.87%) Dysuria  31 pts (2.19%) Incontinence  23 pts (1.62%) Pelvic pain  42 (2.97%) Urinary urgency  16 (1.13%) Urinary frequency  453 pts (32%) Other | | 5.09% surgical retreatment | |  | |
| *REZUM* |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Dixon, Urology 2015 [52] | Non randomized pilot study  multicenter | | 65pts;  ≥45 years, IPSS ≥ 13, Qmax ≤ 15 mL/s; PVR < 300 mL;  Prostate 20-120 mL | | 12 | | Intravenous sedation or oral medication | | -12.5  p<0.001 | | 4.6  p<0.001 | | -2.7  p<0.001 | | 22 pts (33.8%) urinary retention (CD-I)  14 pts (215%) dysuria (CD-1)  13 pts (20%) urinary urgency (CD-I)  13 pts (20%) UTI-suspected (CD-II)  9 pts (13.8%) haematuria (CD-I)  9 pts (13.8%) poor stream (CD-I)  7 pts (10.8%) painful urination (CD-I)  5 pts (7.7%) nocturia (CD-I)  4 pts (6.2%) urinary frequency (CD-I)  3 pts (4.6%) urethral secretion – without haematuria or stones (CD-I)  3 pts (4.6%) fever (CD-I)  1 pt (1.5%) urinary incontinence –urge (CD-I)  2 pts (3.1%) terminal dribbling (CD-I)  2 pts (3.1%) scrotal pain/discomfort (CD-I)  1 pt (1.5%) urinary incontinence-not specified (CD-I)  1 pt (1.5%) UTI-prophylaxis (CD-II)  1 pt (1.5%) prostatic urethral injury (CD-I)  1 pt (1.5%) bladder spasm (CD-I)  1 pt (1.5%) epididymitis (CD-II)  1 pt (1.5%) prostatic cyst de novo (CD-I)  1 pt (1.5%) hesitancy (CD-I)  1 pt (1.5%) gross haematuria with clots and retention (CD-I)  1 pt (1.5%) perineum pain/discomfort (CD-I)  1 pt (1.5%) pelvic pain/discomfort (CD-I) | | 1.5% surgical retreatment | |  | |
| Dixon, Urology 2016 [53] | Non randomized pilot study  multicenter | | 65pts;  ≥45 years, IPSS ≥ 13, Qmax ≤ 15 mL/s; PVR < 300 mL;  Prostate 20-120 mL | | 24 | | Intravenous sedation or oral medication | | -12.1  p<0.001 | | 3.7  p 0.001 | | -2.6  p<0.001 | | No AEs in the 12-to 24- month follow-up | |  | |  | |
| McVary, J Urol. 2016 [54] | Multicentre, randomized, double blinded, controlled study | | 197pts;  ≥50 years, IPSS ≥ 13, Qmax between 5-15 mL/s; PVR < 250 mL;  Prostate 30-80 g  Randomized 2:1  Rezūm 136 pts  Control 61 pts | | 12 | | Oral sedation, prostate block or conscious IV sedation | | -11.7  p<0.0001 | | 5.1  p<0.0001 | | -2.3  p<0.0001 | | 7 pts (5.1%) serious AEs  2 pts (1.5%) related serious AEs  23 pts (16.9%) dysuria  16 pts (11.8%) gross haematuria  10 pts (7.4%) hematospermia  8 pts (5.9%) urinary frequency  8 pts (5.9%) urinary urgency  4 pts (2.9%) decrease in ejaculatory volume  5 pts (3.7%) urinary retention  5 pts (3.7%) UTI-suspected  4 pts (2.9%) anejaculation  4 pts (2.9%) epididymitis  4 pts (2.9%) UTI-culture proven  4 pts (2.9%) pelvic pain/discomfort | |  | |  | |
| Roehrborn, J Urol. 2016 [55] | Multicentre, randomized, double blinded, controlled and prospective crossover studies | | 197pts;  ≥50 years, IPSS ≥ 13, Qmax between 5-15 mL/s; PVR < 250 mL;  Prostate 30-80 g  Randomized 2:1  Rezūm 136 pts  Control 61 pts  Crossover 53 pts | | 24  crossover  12 | | Oral sedation, prostate block or conscious IV sedation | | -11.2  p<0.0001  Crossover  -10.8  p<0.0001 | | 4.2  p<0.0001  5.9  p<0.0001 | | -2.2  p<0.0001  -2.0  p<0.0001 | | 6 (11.3%) serious AEs  1 pt (1.9%) bladder neck contracture  1 pt (1.9%) bladder stone formation  1 pt (1.9%) sepsis  10 pt (18.9%) dysuria  6 pts (11.3%) gross haematuria  3 pts (5.7%) urinary retention  4 pts (7.5%) UTI-suspected  4 pts (7.5%) decrease in ejaculatory volume  3 pts (5.7%) urinary frequency  2 pts (3.8%) hematospermia  2 pts (3.8%) terminal dribbling | | 3.7% surgical or minimally invasive retreatment | |  | |
| McVary, Urology 2018 [56] | Multicentre, randomized, double blinded, controlled study | | 197pts;  ≥50 years, IPSS ≥ 13, Qmax between 5-15 mL/s; PVR < 250 mL;  Prostate 30-80 g  Randomized 2:1  Rezūm 136 pts  Control 61 pts | | 36 | | Oral sedation, prostate block or conscious IV sedation | | -11.0  p<0.0001 | | 3.5  p<0.0001 | | -2.2  p<0.0001 | | No AEs | | 4.4% surgical or minimally invasive retreatment | |  | |
| McVary, Urology 2019 [57] | Multicentre, randomized, double blinded, controlled study | | 197pts;  ≥50 years, IPSS ≥ 13, Qmax between 5-15 mL/s; PVR < 250 mL;  Prostate 30-80 g  Randomized 2:1  Rezūm 136 pts  Control 61 pts | | 48 | | Oral sedation, prostate block or conscious IV sedation | | -10.1  p<0.0001 | | 4.2  p<0.0001 | | -2.0  p<0.0001 | | No AEs | | 4.4% surgical retreatment | |  | |
| Darson, Res Rep Urol, 2017 [59] | Retrospective  multicentre | | 131pts;  47-96 years,  IPSS 9-35,  Qmax 1.5-23.1 ml/s,  PVR 0-2.000ml,  Prostate 13-183 cc, | | 12 | | IV sedation or prostate block | | -9.4  p<0.0001 | | 1.5  p 0.4257 | | -1.9  p<0.00001 | | 14 pts (10.7%) acute urinary retention  Urinary frequency, urgency, frequency and urgency, haematuria and nocturia ≤ 3,8% | |  | |  | |
| Mollengarden, Prostate Cancer Prostatic Dis 2018 [58] | Retrospective  Single centre | | 129 pts;  46-86 years,  IPSS 1-35,  Prostate 20-85.9 cc,  Qmax 3.8-29.8 ml/s | | 6 | | Prostate block, oral sedation | | -11.6  p<0.001 | | 5.9  p<0.001 | |  | | 22 pts (17.1%) UTI (CD-II)  10 pts (7.8%) cystoscopic LUTS evaluation (CD-III)  18 pts (14%) Urinary retention (16pts CD-I and 2 pts CD-III)  5 pts (3.9%) urethral stricture (CD-III)  5 pts (3.9%) postvoid dribbling (CD-I)  5 pts (3.9%) urinary incontinence  4 pts (3.1%) erectile dysfunction (2 pts CD-I and pts CD-II)  4 pts (3.1%) retrograde ejaculation (CD-I)  2 pts (1.6%) prostate tissue sloughing (CD-I)  2 pts (1.6%) epididymo-orchitis (CD-II)  1 pt (0.8%) bladder stone (CD-III)  1 pt (0.8%) bladder neck contracture (CD-III) | | 2.3% surgical retreatment | |  | |