Urology Associates

Southeast Urology MANAGEMENT

COMPARISON OF AUA AND EAU GUIDELINES. EXPERIENCE WITH INDIVIDUAL PRACTICE GUIDELINES TO IMPROVE ED PATIENT CARE.

Presented By: Matthew McIntyre, MD

Training and Practice

- Urology residency at the Medical University of South Carolina in Charleston, South Carolina.
- Fellowship in male infertility and microsurgery with Dr. Larry Lipshultz Baylor College of Medicine in Houston, Texas
- In Practice at Urology Associates of Mobile for the last 12 years.
- Men's health service line director

Disclosures

No conflicts of interest to disclose.

Discussion Outline

- Briefly Discuss AUA Guidelines
- Compare AUA to EAU guidelines for sexual and reproductive health
  - Larger more encompassing document
- Difference in the two treatment algorithms
- Highlight new data for differences
  - LiESWL
  - Botox Therapy for ED RCT
  - PRP Therapy ED RTC
- Discuss UAM approach for an internal practice guidelines pathway
  - Data based on our pathway

Erectile Dysfunction: AUA Guidelines (2018)

Evaluation and Diagnosis:

1.Men presenting with symptoms of ED should undergo a thorough medical, sexual, and psychosocial history; a physical examination; and selective laboratory testing.

2. For the man with ED, validated questionnaires are recommended to assess the severity of ED, to measure treatment effectiveness, and to guide future management.

3. Men should be counseled that ED is a risk marker for underlying cardiovascular disease (CVD) and other health conditions that may warrant evaluation and treatment.

4. In men with ED, morning serum total testosterone levels should be measured.

5. For some men with ED, specialized testing and evaluation may be necessary to guide treatment.

Treatment:

6. For men being treated for ED, referral to a mental health professional should be considered to promote treatment adherence, reduce performance anxiety, and integrate treatments into a sexual relationship.

7. Clinicians should counsel men with ED who have comorbidities known to negatively affect erectile function that lifestyle modifications, including changes in diet and increased physical activity, improve overall health and may improve erectile function.

8. Men with ED should be informed regarding the treatment option of an FDA-approved oral phosphodiesterase type 5 inhibitor (PDE5i), including discussion of benefits and risks/burdens, unless contraindicated.

9. When men are prescribed an oral PDE5i for the treatment of ED, instructions should be provided to maximize benefit/efficacy.

10. For men who are prescribed PDE5i, the dose should be titrated to provide optimal efficacy.

11. Men who desire preservation of erectile function after treatment for prostate cancer by radical prostatectomy (RP) or radiotherapy (RT) should be informed that early use of PDE5i post-treatment may not improve spontaneous, unassisted erectile function.

Erectile Dysfunction: AUA Guidelines (2018)

Treatment (Continued):

12. Men with ED and testosterone deficiency (TD) who are considering ED treatment with a PDE5i should be informed that PDE5i may be more effective if combined with testosterone therapy.

13. Men with ED should be informed regarding the treatment option of a vacuum erection device (VED), including discussion of benefits and risks/burdens.

14. Men with ED should be informed regarding the treatment option of intraurethral (IU) alprostadil, including discussion of benefits and risks/burdens.

15. For men with ED who are considering the use of IU alprostadil, an in-office test should be performed.

16. Men with ED should be informed regarding the treatment option of intracavernosal injections (ICI), including discussion of benefits and risks/burdens.

17. For men with ED who are considering ICI therapy, an in-office injection test should be performed.

18. Men with ED should be informed regarding the treatment option of penile prosthesis implantation, including discussion of benefits and risks/burdens.

19. Men with ED who have decided on penile implantation surgery should be counseled regarding post-operative expectations.

20. Penile prosthetic surgery should not be performed in the presence of systemic, cutaneous, or urinary tract infection.

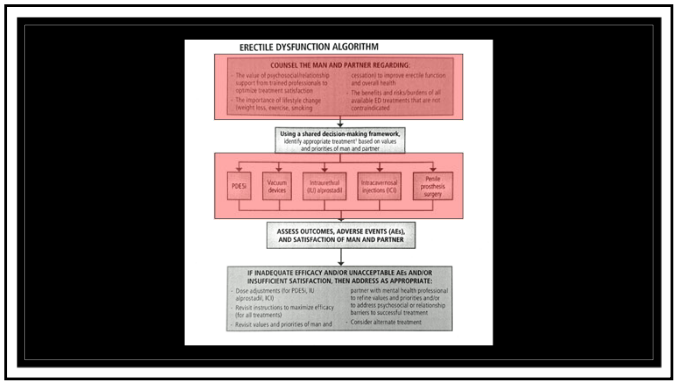
21. For young men with ED and focal pelvic/penile arterial occlusion and without documented generalized vascular disease or veno-occlusive dysfunction, penile arterial reconstruction may be considered

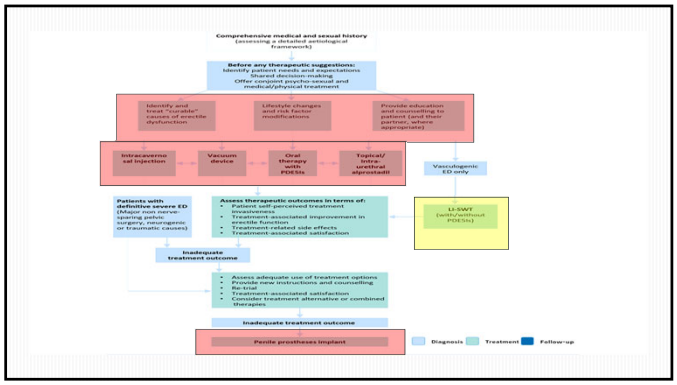
22. For men with ED, penile venous surgery is not recommended.

23. For men with ED, low-intensity extracorporeal shock wave therapy (ESWT) should be considered investigational.

24. For men with ED, intracavernosal stem cell therapy should be considered investigational.

25. For men with ED, platelet-rich plasma (PRP) therapy should be considered experimental.





Low Intensity Extracorporeal Shockwave Therapy (Li-ESWT)

- EAU Guidelines state is the only currently marketed treatment that might offer cure.

Forces Underlying Biological Effects

- Mechanical stress from force of the shockwave.
- Formation of cavitation bubbles and subsequent collapse resulting in local trauma and neo-vascularization.
- Hypothesized Mechanism

- Induction of NO
- Nerve regeneration
- Stem cell proliferation

- Ultimately the exact mechanism remain unknown.

The Basic Physics of Waves, Soundwaves, and Shockwaves for Erectile Dysfunction.

Katz JE, Clavijo RI, Rizk P, Ramasamy R.Sexual Medicine Reviews. 2020 Jan;8(1):100-105. DOI: 10.1016/j.sxmr.2019.09.004. PMID: 31735700; PMCID: PMC6934904.

Table 3

Different Types of Shockwaves

Physics Term	Mechanism
Electrohydraulic shockwave	Tips of an electrode are submerged in a fluid, when voltage is applied the fluid is vaporized which causes rapid expansion in the surrounding fluid leading to shockwave propagation.
Electromagnetic shockwave	Fluid is disturbed by applying a voltage across metallic membranes to produce a magnetic field that causes an abrupt movement in a metallic membrane and corresponding shockwave propagation
Pizoelectric shockwave	Piezoceramic elements are embedded into a spherical device submerged in a medium; when voltage is applied to the ceramic elements expand, inducing a mechanical disturbance in the medium resulting in shockwave propagation
Linear Li-ESWT	Shockwave focused over a larger surface area, designed to conform to more linear tissue such as the corpora/crura.
Radial waves	A controlled explosion of compressed air bursts a projectile into a probe, which deforms creating a wave

Applicator	Wave Type	Treatment Protocols for ED Based on RCTs
Medispec ED 1000 [17] 	Electrohydraulic Shockwave	Effective Treatment Protocol: • 1500 pulses/week for 9 weeks with energy density of 0.09 mJ/mm² [1–4] Ineffective Treatment Protocol: • N/A
Storz Duolith [18] 	Electromagnetic Shockwave	Effective Treatment Protocol: • 3000 pulses/week for 5 weeks with energy density of 0.15 mJ/mm² [19] Ineffective Treatment Protocol: • N/A
Direx Renova and MoreNova [20] 	Electromagnetic	None
Dornier Dornier Aries 2 [21] 	Electromagnetic	None
Richard-Wolf PiezoWave [22] 	Piezoelectric-Shockwave	Ineffective Treatment Protocol: • 600 pulses/week for 10 weeks with energy density of 0.09 mJ/mm²[23]
Gainswave	Radial Waves	None

Table 4: Summary of Devices Currently Available

Katz JE, Clavijo RI, Rizk P, Ramasamy R. The Basic Physics of Waves, Soundwaves, and Shockwaves for Erectile Dysfunction. Sexual Medicine Reviews. 2020 Jan;8(1):100-105. DOI: 10.1016/j.sxmr.2019.09.004. PMID: 31735700; PMCID: PMC6934904.

Clinical studies on low intensity extracorporeal shockwave therapy for erectile dysfunction: a systematic review and meta-analysis of randomized controlled trials

Ioannis Sokolakis , Georgios Hatzichristodoulou IJIR(2019) 31:177-194

- Vasculogenic ED was defined in the majority of the studies based on inclusion and exclusion criteria.

  Excluded patients with ED due to
  - Psychiatric, neurological, hormonal, or anatomical conditions
  - ED due to pharmacological treatment, and patients after pelvic surgery or irradiation
  - Two of the RCTs additionally defined vasculogenic ED using penile doppler duplex/triplex ultrasound
  - One using cardio-ankle vascular index (CAVI)
- **Outcome measurements considered.**

  - IIEF

  - EHS
- Identified 10 RCT to evaluate

Forest Plot Mean Difference in IIEF Score for RCT

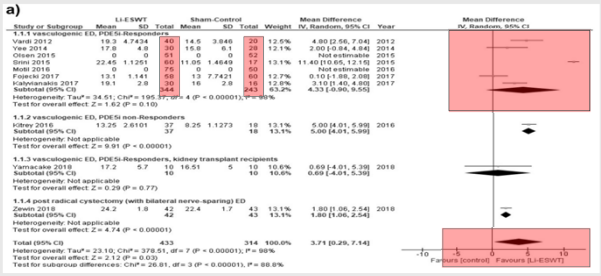


Figure 3a

Sokolakis I, Hatzichristodoulou G. Clinical studies on low intensity extracorporeal shockwave therapy for erectile dysfunction: a systematic review and meta-analysis of randomised controlled trials. *Int J Impot Res*. 2019;31(3):177-194. doi:10.1038/s41443-019-0117-z

Forest Plot of the odds ratio to reach the MCID in IIEF-EF score

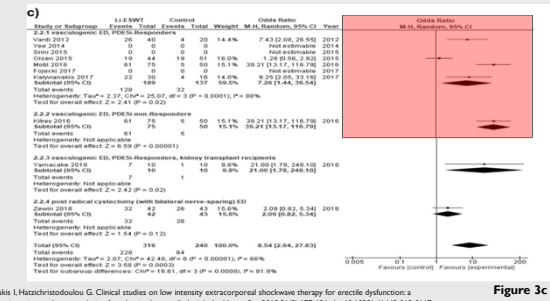


Figure 3c

Sokolakis I, Hatzichristodoulou G. Clinical studies on low intensity extracorporeal shockwave therapy for erectile dysfunction: a systematic review and meta-analysis of randomised controlled trials. *Int J Impot Res*. 2019;31(3):177-194. doi:10.1038/s41443-019-0117-z

Forest Plot Mean Difference in IIEF-EF Score based on protocol and machine use

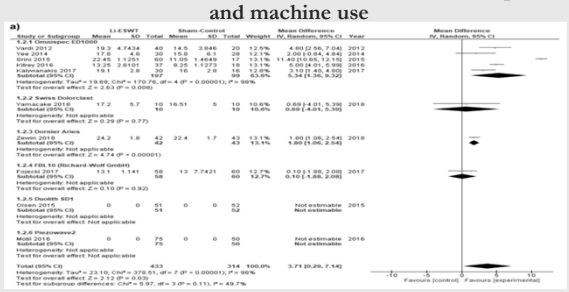


Figure 5a

Sokolakis I, Hatzichristodoulou G. Clinical studies on low intensity extracorporeal shockwave therapy for erectile dysfunction: a systematic review and meta-analysis of randomised controlled trials. *Int J Impot Res*. 2019;31(3):177-194. doi:10.1038/s41443-019-0117-z

Forest Plot Mean Difference in IIEF-EF Score ...

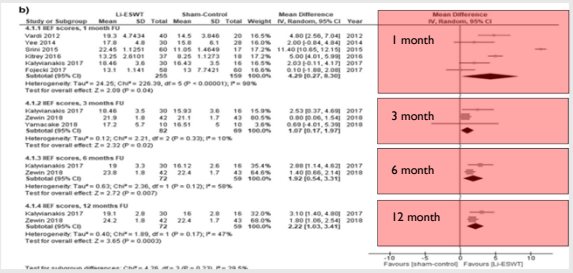


Figure 5b

Sokolakis I, Hatzichristodoulou G. Clinical studies on low intensity extracorporeal shockwave therapy for erectile dysfunction: a systematic review and meta-analysis of randomised controlled trials. *Int J Impot Res*. 2019;31(3):177-194. doi:10.1038/s41443-019-0117-z

This was the data that was available when the 2018 guidelines were written.

What data has been generated since then?

Penile low intensity shock wave treatment for PDE5I refractory erectile dysfunction: a randomized double-blind sham-controlled clinical trial

Jose Vinay1,2,3 · Daniel Moreno1 · Osvaldo Rajmil1 · Eduard Ruiz-Castañe1 · Josvany Sanchez-Curbelo1 Received: 12 June 2020 / Accepted: 16 July 2020 / Published online: 21 July 2020

- RCT double blinded sham controlled
- Vasculogenic ED PDE5i failures
- RENOVA electromagnetic machine
- Four-week protocol one session per week
  - 5000 pulses per session
- Primary outcome was change in IIEF from baseline
- Secondary outcome EHS >2, SEP 2, SEP 3, GQA 1

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Table 1 Baseline characteristics of study population at randomization

	Active	Sham	*p*-value
Number of patients	40	36	
Median age [years] (IQR)	60 (54–66)	60 (53–65)	0.826
Median ED duration [years] (IQR)	3 (2–6)	4.5 (3–6)	0.099
Median BMI [kg/m^2] (IQR)	27 (25–30)	28 (26–29.8)	0.313
Cardiovascular risk factors (%)			
Diabetes mellitus	12 (30.0%)	11 (30.6%)	1.000
Ischemic heart disease	1 (12.5%)	4 (11.1%)	0.184
Hypertension	23 (57.5%)	27 (75.0%)	0.491
Dyslipedemia	14 (35.0%)	19 (52.8%)	0.165
Median IIEF-EF score (IQR)	12 (8–17)	13 (8–17)	0.352
Median EHS (IQR)	2 (1–3)	2 (1–3)	0.478
Patients with positive SEP-2 (%)	17 (42.5%)	19 (52.8%)	0.491
Patients with positive SEP-3 (%)	6 (15.0%)	8 (22.2%)	0.556

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Table 2 Post-treatment erection function parameters

	Active	Sham	*p*-value
Median IIEF-EF score (IQR)			
Baseline	12 (8–17)	13 (8–17)	0.352
1 month	11 (8–20)	10 (6–19)	
Change	1 (−1–6)	0 (−8–4)	0.066
3 months	15 (9–23)	9 (5–21)	
Change	3.5 (0–10)	−0.5 (−11–1)	0.004*
6 months	15 (7–22)	8 (6–17)	
Change	1 (−1–7)	0 (−4–2)	0.246
Patients with EHS >2			
Baseline	13 (32.5%)	14 (38.9%)	0.561
1 month	18 (45.0%)	12 (33.3%)	0.378
3 months	18 (45.0%)	15 (41.7%)	0.807
6 months	21 (52.5%)	10 (27.8%)	0.028*

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	Active	Sham	
Patients with positive SEP-2 (%)			
Baseline	17 (42.5%)	19 (52.8%)	0.491
1 month	23 (57.5%)	21 (58.3%)	0.884
3 months	18 (45.0%)	22 (61.1%)	0.258
6 months	21 (52.5%)	20 (55.6%)	0.821
Patients with positive SEP-3 (%)			
Baseline	6 (15.0%)	8 (22.2%)	0.556
1 month	9 (22.5%)	8 (22.2%)	0.762
3 months	12 (30.0%)	11 (30.6%)	0.864
6 months	11 (27.5%)	5 (13.9%)	0.146
Patients with positive GAQ-1 (%)			
1 month	15 (37.5%)	14 (38.9%)	0.878
3 months	18 (45.0%)	11 (30.6%)	0.342
6 months	16 (40.0%)	5 (13.9%)	0.011*

IIEF-EF International Index of Erectile Function–Erectile Function domain, *EHS* Erection hardness score, *SEP-2* Question 2 of the Sexual Encounter Profile, *SEP-3* Question 3 of the Sexual Encounter Profile

*$p < 0.05$

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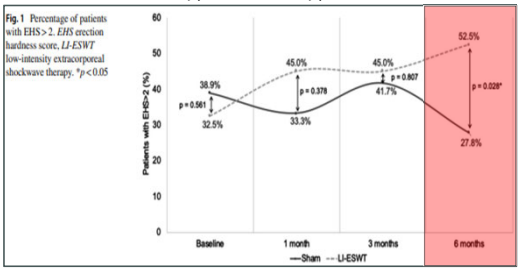

Fig. 1 Percentage of patients with EHS > 2. *EHS* erection hardness score, *LI-ESWT* low-intensity extracorporeal shockwave therapy. *$p < 0.05$

The Effect of Combination Treatment With Low-Intensity Shockwave Therapy and Tadalafil on Mild and Mild-To-Moderate Erectile Dysfunction: A Double-Blind, Randomized, Placebo-Controlled Clinical Trial

Ioannis Mykoniatis, MD, MSc, PhD,1,2 Nikolaos Pyrgidis, MD, MSc,2 Filimon Zilotis,1 Paraskeui Kapoteli, MSc,1 Agrippina Fournaraki, MSc,1 Dimitrios Kalyvianakis, MD, PhD,1,2 and Dimitrios Hatzichristou, MD, PhD1,2 J Sex Med 2022;19:106-115

- Vasculogenic ED responsive to PDE5i
- Six session LiESWT twice weekly for 3 weeks, 5000 pulses
- Electromagnetic
- Patients received 5 mg daily Tadalafil or Placebo
- Primary outcome mean change in IIEF at 3 months
  - Secondary outcomes IIEF at 1 and 6 months
  - Proportion of minimal clinically important difference as defined as improvement of 2 or more points in IIEF.

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Table 1. Baseline characteristics of the study participants

Baseline characteristics	Overall, *n* = 50	LiST + tadalafil, *n* = 25	LiST + placebo, *n* = 25	*P* value
Age (years)	56.5 (52–60.8)	56 (53–59)	58 (52–61)	.44
BMI (kg/m^2)	27.8 (25.8–30.4)	27.8 (25.5–30.5)	27.8 (26–30.1)	.76
Smoking	14 (28%)	7 (28%)	7 (28%)	>.99
Hypertension	24 (48%)	13 (52%)	11 (44%)	.78
Diabetes	4 (8%)	3 (12%)	1 (4%)	.6
Hyperlipidemia	16 (32%)	9 (36%)	7 (28%)	.76
CHD	3 (6%)	1 (4%)	2 (8%)	>.99
Testosterone (ng/dL)	471 (404–614)	466 (379–580)	481 (413–641)	.44
ED duration (months)	48 (33.2–82)	44 (38–67)	56 (26–87)	>.99
ED severity				>.99
Mild	24 (48%)	12 (48%)	12 (48%)	
Mild to moderate	26 (52%)	13 (52%)	13 (52%)	
IIEF	52.4 ± 4.5	52.5 ± 5	52.4 ± 4	.93

Statistics presented as mean ± SD or median (IQR). The 2-sample *t* test or Mann–Whitney test was performed for comparisons between continuous variables and the chi-squared (χ^2) test for comparisons between categorical variables.
BMI = body mass index; CHD = coronary heart disease; ED = erectile dysfunction; IIEF = International Index of Erectile Function; IQR = interquartile range; LiST = low-intensity shockwave therapy; SD = standard deviation.

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Table 2. Absolute between-group difference of LiST + tadalafil vs LiST + placebo in the IIEF-EF and SEP question 3 at all follow-up evaluations

Parameter		Baseline	1 month	3 months	6 months
IIEF-EF	LiST + tadalafil	21.2 ± 2.2	25.9 ± 1.7*	26.3 ± 1.4*	27.1 ± 1.6*
	LiST + placebo	21.2 ± 2.5	25 ± 2.8*	25.2 ± 2.5*	25.3 ± 2.3*
	P value for between groups	.9	.19	.067	.003
SEP question 3 (Yes %)	LiST + tadalafil	56.4 ± 14.9	78.8 ± 19.1*	85.7 ± 14.9*	88.5 ± 14.3*
	LiST + placebo	54.6 ± 16.4	75.9 ± 25.8*	76 ± 21*	76.3 ± 19.8*
	P value for between groups	.69	.66	.068	.016

Statistics presented as mean ± SD. The 2-sample *t* test was performed for between-group comparisons and the repeated measures analysis of variance (ANOVA) for within-group comparisons. The bold cells indicate statistically significant *P* values. The * indicates $P < .001$ for within-group comparisons at follow-up evaluations vs baseline.
IIEF-EF = International Index of Erectile Function-Erectile Function; LiST = low-intensity shockwave therapy; SD = standard deviation; SEP = sexual encounter profile.

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Table 4. Patients attaining MCID in the IIEF-EF at the follow-up evaluations

Patients with MCID in the IIEF-EF	LiST + tadalafil	LiST + placebo	RD (95% CI)	Between-group *P* value
One month	24/25 (96%)	21/25 (84%)	12% (−4.3, 28)	.15
Three months	25/25 (100%)	20/25 (80%)	20% (4.3, 36)	.012
Six months	25/25 (100%)	22/25 (88%)	12% (−0.1, 25)	.065

The chi-squared (χ^2) test was performed for all comparisons. The bold cells indicate statistically significant *P* values.
CI = confidence interval; IIEF-EF = International Index of Erectile Function-Erectile Function; LiST = low-intensity shockwave therapy; MCID = minimal clinically important difference; RD = risk difference.

The Efficacy of Li-ESWT Combined With VED in Diabetic ED Patients Unresponsive to PDE5is: A Single-Center, Randomized Clinical Trial

Rongzhen Tao1†, Jianhuai Chen2†, Dujian Wang1, Yunpeng Li 1, Jun Xiang3, Lei Xiong1, Junbiao Ji 1, Jie Wu1, Shuang Zhou1, Chunping Jia 1, Jianlin Lv1, Jie Yang4,5* and Qinglai Tang1* Front. Endocrinol. 2022 ;13:937958

- Diabetic related vasculogenic ED nonresponders to PDE5i
- Three arms of study were VED, LIST, VED + LIST
- Li-ESWT electromagnetic twice weekly for three weeks then intermittently treated for three weeks for a total of 12 times ; 1800-2400 shocks per session
- Outcomes measured at 4 weeks, 8 weeks, 12 weeks after treatment
  - Mean EHS
  - SEP 2
  - SEP 3
  - GAQ1
  - GAQ2
  - MCID as define at increase of 5 points for moderate ED
- Allowed to consume PDE5i after treatment ended

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TABLE 1 | Baseline characteristics of patients with diabetic erectile dysfunction in three groups.

Parameters	Group A (n = 34)	Group B (n = 33)	Group C (n = 33)	F Value	P Value
Age (mean ± SD, yr)	47.97 ± 5.69	46.70 ± 4.93	48.30 ± 3.49	1.032	0.360
ED Duration (mean ± SD, m)	45.53 ± 21.95	43.88 ± 27.16	45.27 ± 25.06	0.043	0.958
BMI (mean ± SD, points)	23.11 ± 5.99	23.33 ± 4.84	23.99 ± 3.36	0.296	0.744
Baseline PSV (mean ± SD, cm/s)	16.03 ± 2.05	15.86 ± 2.03	15.94 ± 2.36	0.050	0.497
Testosterone (mean ± SD, nmol/l)	15.29 ± 2.74	15.35 ± 2.46	14.85 ± 2.19	0.398	0.436
IIEF-EF (score)	13.38 ± 1.71	13.48 ± 1.62	13.30 ± 1.61	0.101	0.904
EHS (score)	1.82 ± 0.39	1.85 ± 0.36	1.82 ± 0.39	0.060	0.942

The data was analyzed by one-way analysis of variance (ANOVA) with a significance level alpha=0.05. ED, erectile dysfunction; BMI, body mass index; PSV, peak systolic velocity of penile artery; IIEF-EF, international index of erectile function erectile function domain; EHS, erection hardness score.

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TABLE 2 | The differences of parameters of therapeutic efficacy among three groups and within each group at various follow-up points.

Parameters	Follow-up	Group A	Group B	Group C	Chi-square value	P value
MCID (yes/%,n)	4w	14.7%, 5	36.4%, 12	36.4%, 12	5.112	0.078
	8w	14.7%, 5	39.4%, 13	51.5%, 17	10.392	0.006*
	12w	17.6%, 6	36.4%, 12	66.7%, 22	17.009	<0.001*
	Chi-square value	0.148	0.096	6.066		
	P value	0.929	0.958	0.048*		
SEP2 (yes/%,n)	4w	29.4%, 10	45.5%, 15	42.4%, 14	2.054	0.358
	8w	26.5%, 9	42.4%, 14	57.6%, 19	6.855	0.033*
	12w	29.4%, 10	39.4%, 13	66.7%, 22	10.018	0.007*
	Chi-square value	0.096	0.248	4.009		
	P value	0.953	0.883	0.135		
SEP3 (yes/%,n)	4w	8.8%, 3	18.2%, 6	27.3%, 9	12.766	0.002*
	8w	8.8%, 3	18.2%, 6	21.2%, 7	2.067	0.352
	12w	8.8%, 3	21.2%, 7	24.2%, 8	3.042	0.219
	Chi-square value	–	0.130	0.300		
	P value		0.937	0.848		
GAQ1 (yes/%,n)	4w	35.3%, 12	51.5%, 17	45.5%, 15	1.831	0.400
	8w	32.4%, 11	45.5%, 15	63.6%, 21	8.626	0.006*
	12w	35.3%, 12	45.5%, 15	66.7%, 22	8.843	0.035*
	Chi-square value	0.087	0.324	3.560		
	P value	0.957	0.850	0.167		
GAQ2 (yes/%,n)	4w	14.7%, 5	27.3%, 9	36.4%, 12	3.830	0.147
	8w	14.7%, 5	36.4%, 12	36.4%, 12	5.112	0.078
	12w	14.7%, 5	36.4%, 12	39.4%, 13	5.810	0.055
	Chi-square value	–	0.818	0.096		
	P value	–	0.664	0.953		

*The proportions were expressed as percentages and compared using the Chi-squared test. MCID(yes%): The percentage of patients meeting MCIDs. 5 score; SEP2(yes%): The percentage of patients reporting successful penetration; SEP3(yes%): The percentage of patients reporting successful intercourse; GAQ1 (Improving erectile function), GAQ2 (Improving the ability to engage in sexual activity). *P<0.05, there were statistically significant difference.*

The Efficacy of Li-ESWT Combined With VED in Diabetic ED Patients Unresponsive to PDE5is: A Single-Center, Randomized Clinical Trial

Rongzhen Tao1†, Jianhuai Chen2†, Dujian Wang1, Yunpeng Li 1, Jun Xiang3, Lei Xiong1, Junbiao Ji 1, Jie Wu1, Shuang Zhou1, Chunping Jia 1, Jianlin Lv1, Jie Yang4,5* and Qinglai Tang1*

Change in IIEF

Change in EHS

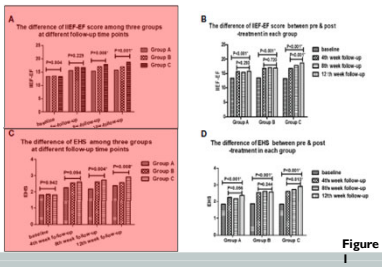

Figure 1

Long-term effects of combination treatment comprising low intensity extracorporeal shockwave therapy and tadalafil for patients with erectile dysfunction: a retrospective study

Yurdaer Kaynak , and Ilan Gruenwald IJIR 2024;36:601-606

- Retrospective study design.
- Medispec electrohydrolic Li-ESWT 1600 shocks per session.
- Six sessions of Li-ESWT over three weeks with concurrent 5 mg daily dose Tadalafil.
- Tadalafil was given daily for six months after the three-week treatments.

Study End Points

- Used IIEF to detect minimally clinically important differences (MCID)
- MCID were defined as

- 2 points mild ED IIEF (12-16)
- 5 points moderate ED (8-11)
- 7 points severe ED (5-7)

- Overall patient satisfaction with Yes/No response.
- Patients were divided into cohorts based on years of follow up A,B,C,D for1,2,3,4 years respectively.

Long-term effects of combination treatment comprising lowintensity extracorporeal shockwave therapy and tadalafil for patients with erectile dysfunction: a retrospective study

Yurdaer Kaynak 1, and Ilan Gruenwald 2

Table 1. Descriptive statistics for demographic and clinical characteristics of the patients.

Demographic and clinical characteristics	Descriptive statistics ($n = 116$)	
	Mean ± SD	Median (Min–Max)
Age (years)	47.34 ± 12.65	47 (19–71)
BMI (kg/m²)	26.72 ± 3.72	26.22 (16.48–37.65)
Follow-up length (years)	2 ± 1.16	2 (0.33–4.10)
Baseline IIEF-5 score	12.09 ± 3.66	12 (5–20)
IIEF-5 score at the end of follow-up	18.41 ± 5.68	20 (5–25)
	N (%)	
Smoker	25 (21.6)	
Diabetes mellitus	25 (21.6)	
Hypertension	31 (26.7)	

Values are presented as mean ± standard deviation, median (minimum–maximum), or number (*n*) (%).
BMI body mass index, *DM* diabetes mellitus, *HT* Hypertension, *IIEF-5* International Index of Erectile Function-5.

Long-term effects of combination treatment comprising lowintensity extracorporeal shockwave therapy and tadalafil for patients with erectile dysfunction: a retrospective study
Yurdaer Kaynak I, and Ilan Gruenwald 2

Table 2. Comparisons of demographic and clinical characteristics among the groups.

	Group A ($n = 31$)	Group B ($n = 27$)	Group C ($n = 38$)	Group D ($n = 20$)	
	n (%)	*n* (%)	*n* (%)	*n* (%)	*P*
Smoking	7 (22.6)	6 (22.2)	7 (18.4)	5 (25)	0.943
DM	5 (16.1)	8 (29.6)	10 (26.3)	2 (10)	0.299
HT	8 (25.8)	8 (29.6)	8 (21.1)	7 (35)	0.693
Disease severity (IIEF-5 scores)					0.427
5–7 (severe)	6 (19.4)	2 (7.4)	5 (13.2)	0 (0)	
8–11 (moderate)	10 (32.3)	9 (33.3)	10 (26.3)	5 (25)	
12–16 (mild to moderate)	13 (41.9)	14 (51.9)	16 (42.1)	11 (55)	
17–21 (mild)	2 (6.5)	2 (7.4)	7 (18.4)	4 (20)	
Age (years) (Mean ± SD)	47.81 ± 13.08	48.52 ± 12.73	46 ± 12.83	47.55 ± 12.26	0.874
BMI (kg/m²) Median [25–75%]	25.9 [24.4–27.1]	26.5 [24.1–29.4]	26.1 [23.3–28.4]	25.1 [23.3–29.8]	0.694
Baseline IIEF-5 score Median [25–75%]	11.0 [8–13]	12.0 [10–15]	12.0 [11–15]	13.0 [11.5–15]	0.084

BMI body mass index, *DM* diabetes mellitus, *HT* hypertension, *IIEF-5* International Index of Erectile Function-5.
Significant set at 0.05 level; Chi-square test for categorical data, one-way ANOVA test for data, Kruskal–Wallis test for non-normal data. Values are presented as mean ± standard deviation, median (minimum–maximum), or number (*n*) (%).

Long-term effects of combination treatment comprising lowintensity extracorporeal shockwave therapy and tadalafil for patients with erectile dysfunction: a retrospective study
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Table 3. Improvements in IIEF among follow-up groups.

	Follow-up groups				
	Group A	Group B	Group C	Group D	P^a
	Median [25–75%]	Median [25–75%]	Median [25–75%]	Median [25–75%]	
Baseline IIEF-5 scores	11.0 [8–13]	12.0 [10–15]	12.0 [11–15]	13.0 [11.5–15]	0.084
Follow-up IIEF-5 scores	20 [15–22]	20 [11–23]	20 [15–22]	22 [16.5–23.0]	0.644
Changes in IIEF-5 scores	7 [3–12]	6 [0–8]	7 [1–9]	6.5 [2.5–10]	0.611
Within groups P^b	0.001	0.001	0.001	0.001	

IIEF-5 International Index of Erectile Function-5.
P^a = Kruskal–Wallis test, P^b = Wilcoxon test.

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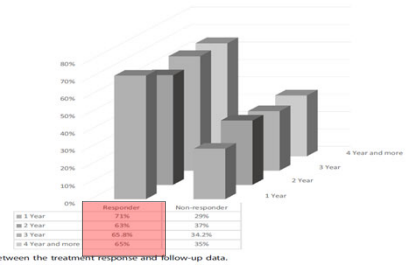
Table 4. Relationship between treatment response and patient characteristics.

Patient characteristics	Responder ($n = 77$)	Non-responder ($n = 39$)	*P*
Age, years (Mean ± SD)	45.88 ± 12.27	50.25 ± 13.04	0.082
	Median [25–75%]	Median [25–75%]	
BMI, kg/m²	26.42 [24.02–29.41]	26.15 [24.45–28.41]	0.730
Baseline IIEF-5 scores	12 [11–15]	11 [8–15]	0.053
Smoking			0.086
Yes	13 (16.9)	12 (30.8)	
No	64 (83.1)	27 (69.2)	
DM			0.215
Yes	14 (18.2)	11 (28.2)	
No	63 (81.8)	28 (71.8)	
HT			0.528
Yes	22 (28.6)	9 (23.1)	
No	55 (71.4)	30 (76.9)	
Severity of ED (IIEF-5 Score)			0.094
Sever (5–7)	6 (7.8)	7 (17.9)	
Moderate (8–11)	20 (26)	14 (35.9)	
Mild to moderate (12–16)	38 (49.4)	16 (41)	
Mild (17–21)	13 (16.9)	2 (5.1)	

BMI body mass index, *DM* diabetes mellitus, *HT* hypertension, *IIEF-5* International Index of Erectile Function 5.
Significant set at 0.05 level; Chi-square test for categorical data, Student's t-test for normal data, Mann–Whitney U-test for non-normal data. Values are presented as mean ± standard deviation, median (minimum–maximum), or number (*n*) (%).

Long-term effects of combination treatment comprising lowintensity extracorporeal shockwave therapy and tadalafil for patients with erectile dysfunction: a retrospective study

Yurdaer Kaynak 1, and Ilan Gruenwald 2



	Responder	Non-responder
1 Year	71%	29%
2 Year	63%	37%
3 Year	65.8%	34.2%
4 Year and more	65%	35%

Fig. 2 Relationships between the treatment response and follow-up data.

Take Aways From Data on LiESWT

1. Best in mild to moderate ED cohort
2. Data shows improvement in IIEF in patients with vasculogenic ED
3. Response to therapy may be augmented with concurrent treatment of VED and PDE5i.
4. Current Clinical data should only be applied to FDA approved shockwave devices.
5. Responses remain variable with "cure" rates hard to predict.

PRP for treatment of ED

- Both the AUA and EAU guidelines consider treatment with PRP for ED to be investigational
- PRP is an autologous derivative obtained from centrifugation of blood with a supraphysiologic concentration of platelets
- Effects of PRP are from high concentrations of cytokines and growth factors in platelets which result in
  - Cell proliferation
  - Modulate inflammation
  - Stimulate angiogenesis
- Many providers advertise for such treatments as cures for multiple disease states

Is Platelet Rich Plasma Safe and Effective in Treatment of Erectile Dysfunction? Randomized Controlled Study

Hussein Shaher, Abdallah Fathi, Salah Elbashir, Shabieb A. Abdelbaki, Tarek Soliman Urology 175 May 2023 114-119

- **Prospective randomized double blinded placebo controlled trial PRP vs Saline**
- **Patients excluded with**
  - Pelvic Surgery
  - Radiation
  - Penile Surgery
  - Low T
- **Patients were evaluated with**
  - IIEF
  - SEP Q2
  - SEP Q3
- **Penile Duplex Doppler**
  - Initial Visit
  - 1 month follow up
  - 6 month follow up
- **Primary end point MCID in IIEF**
  - 2 points mild and mild to moderate (12-21)
  - 5 points ≥ moderate (8-11)

Is Platelet Rich Plasma Safe and Effective in Treatment of Erectile Dysfunction? Randomized Controlled Study

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	Over All	PRP	Saline	Mann Whitney	P Value
Age	55 (45-64.75)	56 (46-65)	54 (45-64)	.656	.512
BMI	25 (23-27)	25 (23-28.7)	24.9 (22.75 -27)	1.077	.281
Smoking	55 (55%)	27 (54%)	28 (56%)	Chi-square 1.46	.22
D.M.	32 (32%)	15 (30%)	17 (34%)	Chi-square .004	.94
Hypertension	32 (32%)	18 (36%)	14 (28%)	Chi-square 1.65	.19
Hyperlipidemia	40 (40%)	22 (44%)	18 (36%)	Chi-square 3.34	.06
CHD	15 (15%)	8 (16%)	7 (14%)	Chi-square .036	.84
Duration of erectile dysfunction (month)	43.5 (34.2-53)	44.5 (33-53.25)	41.5 (33-53.5)	.142	.887
Severity of ED					
- Mild	28 (28%)	15 (30%)	13 (26%)	1.5	.18
- Mild to moderate	53 (53%)	25 (50%)	28 (56%)		
- Moderate	19 (19%)	10 (20%)	9 (18%)		

Table 1. Baseline characteristics of the studied patients.

Is Platelet Rich Plasma Safe and Effective in Treatment of Erectile Dysfunction? Randomized Controlled Study

Hussein Shaher, Abdallah Fathi, Salah Elbashir, Shabieb A. Abdelbaki, Tarek Soliman

All Patients (n=100)		Patients PRP (N=50) Median (IQR)	Patients Saline (N=50) Median (IQR)	Mann Whitney Test	Between Groups P Value
Cavernosal artery diameter (mm)	Baseline	0.4 (0.4-0.5)	0.5 (0.4-0.5)	.258	.797
	1st month followup	0.8 (0.7-0.9)	0.5 (0.4-0.6)	7.86	<.001
	6th month followup	0.7 (0.6-0.9)	0.5 (0.4-0.5)	5.10	<.001
Peak systolic velocity (cm/sec)	Baseline	*19 (16-23)	19.5 (16-24)	0.33	.739
	1st month followup	34.5 (32-36.2)	20 (16-25)	8.58	<.001
	6th month followup	33 (30-35.2)	20 (16-23.2)	8.526	<.001
End diastolic velocity (cm/sec)	Baseline	* 6 (5-7)	6 (5-7)	.505	.615
	1st month followup	1 (0-2.25)	6 (5-6.25)	8.71	<.001
	6th month followup	1 (1-3.0)	6 (5-7)	8.55	<.001
IIEF-EF	Baseline	*18 (17-22)	19 (17-22)	.00	.364
	1st month followup	22 (20-25)	19 (17-22)	3.70	<.001
	3rd month followup	22 (20-25)	19 (17-22)	3.67	<.001
	6th month followup	22 (19.7-24.2)	19 (17-22)	3.56	<.001
Minimal clinically important difference (MCID)	1st month	38 (76%)	9 (18%)		<0.001
	3rd month	36 (72%)	8 (16%)		<0.001
	6th month	35 (70%)	8 (16%)		<0.001
Sexual encounter profile Q2	Baseline (yes %)	12 (24%)	15 (30%)	Chi square test=3.53	.06
	1st month followup (yes %)	41 (82%)	14 (28%)	Chi square test=4.26	.03
	3rd month followup (yes %)	38 (76%)	13 (26%)	Chi square test=5.54	.01
	6th month followup (yes %)	37(74%)	11(22%)	Chi square test=4.55	.02
Sexual encounter profile Q3	Baseline (yes %)	0 (0%)	0 (0%)	Cochran's Q test 78.34	<.001 (H1)
	1st month (yes %)	39 (78%)	0 (0%)		
	3rd month (yes %)	35 (70%)	0 (0%)		
	6th month (yes %)	33 (66%)	0 (0%)		
IIEF intercourse satisfaction (26.7.8)	Baseline	4.1 ± 1.03	4.1 ± 1.03	t-test 0.000	=0.05
	1st month	8.6 ± 1.8	4.3 ± 1.4	13.6	<0.001
	3rd month	8.7 ± 1.8	4.1 ± 1.0	15.7	<0.001
	6th month	8.2 ± 2.0	4.1 ± 1.0	13.0	<0.001
IIEF overall satisfaction (213.14)	Baseline	2.9 ± 0.8	2.9 ± 0.8	t-test 0.000	=0.05
	1st month	6.86 ± 0.78	2.9 ± 0.8	24.4	<0.001
	3rd month	6.98 ± 0.71	2.9 ± 0.8	26.1	<0.001
	6th month	6.84 ± 0.61	2.9 ± 0.8	26.7	<0.001
Visual analogue scale (VAS)		1.52 ± 1.2	1.54 ± 1.3	0.9	=0.05

Table 2. Comparative data of the 2 groups of patients at baseline and follow up visits

Platelet-rich plasma intracavernosal injections for the treatment of primary organic erectile dysfunction: a systematic review and meta-analysis of contemporary controlled studies

Andrea Panunzio, Connie Labate, Federico Zacheo, Rossella Orlando, Floriana Luigina Rizzo, Antonio Benito Porcaro, Filippo Migliorini, Vincenzo Pagliarulo, and Alessandro Tafuri IJIR(2024)36:562-571

- A systemic review and meta-analysis
- I'll concentrate on the data based on the RCT published in literature

Platelet-rich plasma intracavernosal injections for the treatment of primary organic erectile dysfunction: a systematic review and meta-analysis of contemporary controlled studies

Andrea Panunzio, Connie Labate, Federico Zacheo, Rossella Orlando, Floriana Luigina Rizzo, Antonio Benito Porcaro, Filippo Migliorini, Vincenzo Pagliarulo, and Alessandro Tafuri IJIR(2024)36:562-571

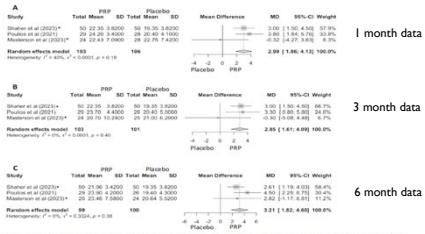


Fig. 2 Forest plots illustrating the pooled mean difference and the 95% confidence interval (CI) for the International Index for Erectile Function (IIEF erectile function domain) score between patients receiving platelet-rich plasma and placebo at 1 (**A**), 3 (**B**), and 6 (**C**) months of follow-up. Abbreviations: PRP platelet-rich plasma, SD standard deviation, MD mean difference, CI confidence interval, * denotes means derived from medians.

Conclusions from PRP Data

- Appears to have some benefit on patients with ED based on RCT
- Need further study to identify best candidates and treatment regimens

Use of Botox for ED Mechanisms of action

- **Botox inhibits**
  - sympathetic adrenergic or cholinergic vasoconstriction
  - sensory nerves
  - endothelial exocytosis of endothelin 1
  - All are involved in the pathophysiology of erectile dysfunction.
- Mounting evidence suggests that the effects BTX are mediated by non–nitric-oxide-mediated mechanism.
- **These effects might lead to**
  - decrease in the tone of resistance penile vessels
  - increase in resting blood flow
  - reduction in persistent cavernosal smooth muscle tone.
- BTX-A injection induces sinusoidal dilatation of cavernous tissue which seems to be mediated by smooth muscle relaxation.

Intra-cavernous injection of BOTOX® (50 and 100 Units) for treatment of vasculogenic erectile dysfunction: Randomized controlled trial

Waleed El-Shaer, Hussein Ghanem, Tamer Diab, Ahmed Abo-Taleb, Wael kandeel
Andrology 2021;9:1166-1175

- Randomized to three arms
  - 1 cc injections at : 100 units, 50 units, and saline
- Primary end point change in SHIM ≥ 4 assessments at
  - 2 weeks, 3 months, 6 months
  - --- Secondary end points
    - SEP 2, EHS, Penile length / girth, and GAS
- Vasculogenic ED
- Insufficient erection for intercourse (No SEP2)
  - Unresponsive to any pharmacologic treatment
  - Oral PDE5i and ICI including high dose Trimix
- Penile Doppler to confirm vasculogenic ED
- After injection band was placed at the base at the penis and then removed after 20 minutes.

Intra-cavernous injection of BOTOX® (50 and 100 Units) for treatment of vasculogenic erectile dysfunction: Randomized controlled trial

Waleed El-Shaer, Hussein Ghanem, Tamer Diab, Ahmed Abo-Taleb, Wael kandeel

	BTX 100 U (N = 62)	BT 50 U (N = 59)	Placebo group (N = 55)	p Value
Age (year; median-IQR)	55.5 (49–64)	57 (50–62)	54 (49–61)	0.685
Period of ED (month; median-IQR)	6.0 (6.0–9.0)	6.0 (6.0–9.0)	9.0 (6.0–12.0)	0.087
Cause: (N, [%])				
AI	20 (32.3)	16 (27.1)	18 (32.7)	0.960
VOD	26 (41.9)	27 (45.8)	22 (40.0)	
Mixed	16 (25.8)	16 (27.1)	15 (27.3)	
Co-morbidity (N; [%])				
DM	14 (22.6)	16 (27.1)	12 (21.8)	0.866
HTN	23 (37.1)	21 (35.6)	14 (25.5)	
DM+HTN	11 (17.7)	8 (13.6)	11 (20.0)	
IHD	1 (1.6)	1 (1.7)	1 (1.8)	
None	13 (21.0)	13 (22.0)	17 (30.9)	
Serum testosterone (ng/dl; median-IQR)	588 (450–691)	571 (444–691)	587.5 (450–717)	0.887
SEP2, Median (IQR)	0 (0.0)	0 (0.0)	0 (0.0)	
SEP3, Median (IQR)	0 (0.0)	0 (0.0)	0 (0.0)	
GAS1, Median (IQR)	0 (0.0)	0 (0.0)	0 (0.0)	
GAS2, Median (IQR)	0 (0.0)	0 (0.0)	0 (0.0)	
Penile girth, Cm, median IQR	8.5 (7.5–9.5)	8.5 (8.0–9.0)	8.5 (8.0–9.0)	0.446

Note: Data expressed as frequency (N = number, % = percentage); median (interquartile range (IQR)).

TABLE 1
Baseline characteristics of study patients

Intra-cavernous injection of BOTOX® (50 and 100 Units) for treatment of vasculogenic erectile dysfunction: Randomized controlled trial

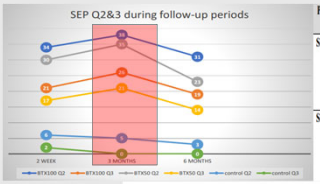
Waleed El-Shaer | Hussein Ghanem | Tamer Diab | Ahmed Abo-Taleb | Wael kandeel

Parameter	Time interval	BTX-100 IU (N = 62)	BTX-50 IU (N = 59)	Placebo group (N = 55)	P, Value
SHIM score, median (IQR)	Baseline	8.0 (7.0–9.0)	8.0 (8.0–9.0)	8.0 (7.0–9.0)	-
	2 weeks	12.0 (11.0–13.0)	11.0 (11.0–12.0)	8.0 (7.0–9.0)	<0.001[c]
	3 months	14.0 (12.0–16.0)	13.0 (12.0–15.0)	8.0 (5.0–11.0)	<0.001[c]
	6 months	14.0 (12.0–15.0)	8.0 (8.0–10.0)	8.0 (6.0–9.0)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	0.264	
EHS, median (IQR)	Baseline	1.0 (1.0–2.0)	2.0 (1.0–2.0)	1.0 (1.0–2.0)	
	2 weeks	3.0 (2.0–3.0)	2.0 (2.0–3.0)	1.0 (1.0–2.0)	<0.001[c]
	3 months	3.0 (3.0–3.0)	3.0 (3.0–3.0)	1.0 (1.0–2.0)	<0.001[c]
	6 months	2.0 (2.0–3.0)	2.0 (1.0–2.0)	1.0 (1.0–2.0)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	1	
Stretched penile length, Cm, median (IQR)	Baseline	12.0 (10.5–13.0)	12.0 (10.5–13.0)	11.5 (10.5–12.5)	
	2 weeks	12.3 (11.0–13.0)	12.0 (11.0–13.0)	12.0 (11.0–12.3)	0.168
	3 months	12.5 (11.5–13.5)	13.0 (11.5–13.5)	11.8 (10.5–12.3)	<0.001[c]
	6 months	13.0 (12.0–14.0)	12.3 (11.5–13.5)	11.5 (10.5–12.3)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	0.576	
Penile girth, Cm, median (IQR)	Baseline	8.5 (7.5–9.5)	8.5 (8.0–9.0)	8.5 (8.0–9.0)	
	2 weeks	8.5 (7.5–9.5)	8.5 (8.0–9.0)	8.5 (8.0–9.0)	1
	3 months	8.5 (7.5–9.5)	8.5 (8.0–9.0)	8.5 (8.0–9.0)	0.51
	6 months	8.5 (7.5–9.5)	8.5 (8.0–9.0)	8.5 (8.0–9.0)	1
	p, Value	0.256	0.448	1	
Change of CAD, mm, median (IQR)	Baseline	0.30 (0.30–0.30)	.20 (.15–0.35)	0.22 (0.10–0.35)	
	2 weeks	0.30 (0.23–0.40)	0.30 (0.20–0.40)	0.20 (0.15–0.35)	0.013
	3 months	0.35 (0.30–0.45)	0.35 (0.25–0.42)	0.20 (0.15–0.35)	<0.001[c]
	6 months	0.35 (0.30–0.43)	0.30 (0.22–0.35)	0.25 (0.15–0.35)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	0.144	
PSV, cm/sec, median (IQR)	Baseline	26.0 (18.0–32.0)	22.5 (19.5–37.5)	21.8 (20.0–37.5)	0.147
	2 weeks	33.8 (32.0–40.0)	32.0 (27.5–40.0)	31.5 (19.0–37.5)	0.006
	3 months	34.0 (33.0–40.0)	33.0 (30.0–40.0)	30.0 (19.0–37.5)	<0.001[c]
	6 months	37.5 (30.0–39.0)	29.0 (25.0–38.0)	32.0 (20.0–37.5)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	1	
EDV, cm/sec, median (IQR)	Baseline	6.0 (3.0–7.0)	6.5 (4.0–7.5)	6.0 (5.5–7.0)	
	2 weeks	5.0 (3.0–6.5)	6.0 (3.5–6.5)	7.0 (6.0–7.5)	<0.001[c]
	3 months	4.5 (3.0–5.0)	5.0 (3.5–5.5)	7.0 (6.0–7.5)	<0.001[c]
	6 months	3.3 (2.0–4.0)	6.0 (4.0–7.0)	7.0 (6.0–7.5)	<0.001[c]
	p, Value	<0.001[a,b]	<0.001[a,b]	0.414	

TABLE 2 Comparisons of the subjective & objective parameters between groups

Intra-cavernous injection of BOTOX® (50 and 100 Units) for treatment of vasculogenic erectile dysfunction: Randomized controlled trial

Waleed El-Shaer | Hussein Ghanem | Tamer Diab | Ahmed Abo-Taleb | Wael kandeel



Parameter	Time Interval	BTX-100 IU (N=62)	BTX-50 IU (N=59)	placebo group (N=55)	P value
SEP2, Yes (N, %)	Baseline	0(0.0%)	0(0.0%)	0(0.0%)	-
	2 weeks	36(58.1%)[a]	27(45.8%)[a]	0(0.0%)[a,b]	<0.001*
	3 months	54(87.1%)[ab]	48(81.4%)[ab]	0(0.0%)[a,b]	<0.001*
	6 months	30(48.4%)[ac]	11(18.6%)[a,bc]	0(0.0%)[a,b]	<0.001*
SEP3, Yes (N, %)	Baseline	0(0.0%)	0(0.0%)	0(0.0%)	-
	2 weeks	36(58.1%)[a]	27(45.8%)[a]	0(0.0%)[a,b]	<0.001*
	3 months	54(87.1%)[ab]	48(81.4%)[ab]	0(0.0%)[a,b]	<0.001*
	6 months	30(48.4%)[ac]	11(18.6%)[a,bc]	0(0.0%)[a,b]	<0.001*

FIGURE 2 SEP Questions 2 and 3 of study groups during follow-up visits. Data expressed as Number & percent *: significance <0.05 (chi square test), A: significance vs BTX-100 IU, B: significance vs BTX50 IU a: significance vs baseline, b: significance vs 2weeks, c: significance vs 3 months SEP = Sexual Encounter Profile

Safety and efficacy of botulinum neurotoxin in the treatment of erectile dysfunction refractory to phosphodiesterase inhibitors: Results of a randomized controlled trial

Islam Fathy Soliman Abdelrahman, Amr Abdel Raheem, Yaser Elkhiat, Abdelrahman A. Aburahma, Tarek Abdel-Raheem, Hussein Ghanem
Andrology 2022;10:254-261

- **Double blinded placebo controlled RCT**
- **70 patients enrolled**
  - 35 treatment 100 units Botox
  - 35 control
- **PDE5i Failures**
- **After treatment resumed intercourse without use of PDE5 .**
- **Study was designed to show a difference in SHIM score 3 ± 5 between the two groups**

Safety and efficacy of botulinum neurotoxin in the treatment of erectile dysfunction refractory to phosphodiesterase inhibitors: Results of a randomized controlled trial

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TABLE 1 Baseline characteristics of treatment and control groups

	Treatment	Control	*p* value
Age (mean ± SD)	54.3 ± 7.8	56 ± 9.1	0.167
SHIM (mean ± SD)	5.4 ± 1.7	5.7 ± 1.1	0.274
EHS (mean ± SD)	2.3 ± 0.6	2.1 ± 0.5	0.081
PSV (mean ± SD)	34.4 ± 11.7	31.3 ± 15.6	0.154
EDV (mean ± SD)	3.5 ± 3.7	4.5 ± 3.4	0.135
SEP-2 positive responders	3 (8.6%)	2 (7%)	0.643
SEP-3 positive responders	0	0	–

Abbreviations: EDV, end diastolic velocity; EHS, erection hardness score; PSV, peak systolic velocity; SEP-2&3, sexual encounter profile 2&3 questionnaires; SHIM, sexual health inventory for men.

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TABLE 2 SHIM, EHS, SEP-2&3, and GAQ-Q1&Q2 and penile duplex parameters: 2 weeks post treatment

	Treatment	Control	*p* value
SHIM (mean ± SD)	6.7 ± 2.2	6 ± 2.8	0.059
EHS (mean ± SD)	2.9 ± 0.8	2.2 ± 0.6	<0.001
PSV (mean ± SD)	45.8 ± 13.2	31.9 ± 16.1	<0.001
EDV (mean ± SD)	1.7 ± 3.5	4.5 ± 3.9	<0.001
SEP-2 positive responders	7(20%)	3 (8.6%)	0.172
SEP-3 positive responders	1 (2.9%)	1 (2.9%)	1
GAQ-Q1 positive responders	17 (48.6%)	3 (8.6%)	<0.001
GAQ-Q2 positive responders	3 (8.6%)	2 (5.7%)	0.643

Abbreviations: EDV, end diastolic velocity; EHS, erection hardness score; GAQ-Q1&Q2, global assessment questionnaire 1&2; PSV, peak systolic velocity; SEP-2&3, sexual encounter profile 2&3 questionnaires; SHIM, sexual health inventory for men.

2 week data

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TABLE 3 SHIM, SEP-2&3, and GAQ-Q1&Q2: 6 weeks post treatment

	Treatment	Control	*p* value
SHIM (mean ± SD)	10 ±5.9	5.8±1.8	<0.001
SEP-2 positive responders	18 (53%)	1 (3%)	<0.001
SEP-3 positive responders	3 (8.8%)	0	0.072
GAQ-Q1 positive responders	22(64.7%)	0	<0.001
GAQ-Q2 positive responders	14 (41.2%)	0	<0.001

Abbreviations: GAQ-Q1&Q2, global assessment questionnaire 1&2; SEP-2&3, sexual encounter profile 2&3 questionnaires; SHIM, sexual health inventory for men.

6 week data

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TABLE 4 SHIM, SEP-2&3, and GAQ-Q1&Q2: 12 weeks post treatment

	Treatment	Control	*p* value
SHIM (mean ± SD)	8.3 ±4	5.6±1.4	<0.001
SEP-2 positive responders	11 (32.4%)	1 (3%)	0.001
SEP-3 positive responders	2 (5.9%)	0	0.145
GAQ-Q1 positive responders	17 (48.6%)	0	<0.001
GAQ-Q2 positive responders	7 (20.6%)	0	<0.001

Abbreviations: GAQ-Q1&Q2, global assessment questionnaire 1&2; SEP-2&3, sexual encounter profile 2&3 questionnaires; SHIM, sexual health inventory for men.

12 week data

Safety and efficacy of botulinum neurotoxin in the treatment of erectile dysfunction refractory to phosphodiesterase inhibitors: Results of a randomized controlled trial

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TABLE 5 Comparison between sexual health index for men (SHIM) before, 2, 6, and 12 weeks after injection of BOTOX within the treatment group

	Mean	SD	*p* value
SHIM (B)	5.4	1.67	
SHIM (2W)	6.66	2.17	0.001
SHIM (B)	5.4	1.67	
SHIM (6W)	9.97	5.92	<0.001
SHIM (B)	5.4	1.67	
SHIM (12W)	8.26	4.07	<0.001

Abbreviations: B, before; 2W, at 2 weeks; 6W, at 6 weeks; 12W, at 12 weeks; SHIM, sexual health inventory for men.

Treatment arm comparison

Safety and efficacy of botulinum neurotoxin in the treatment of erectile dysfunction refractory to phosphodiesterase inhibitors: Results of a randomized controlled trial

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TABLE 6 Comparison between sexual health index for men (SHIM) score before 2, 6, and 12 weeks after injection of saline within the control group

	Mean	SD	*p* value
SHIM (B)	5.69	1.08	
SHIM (2W)	6.11	2.82	0.44
SHIM (B)	5.69	1.08	
SHIM (6W)	5.77	1.82	0.73
SHIM (B)	5.69	1.08	
SHIM (12W)	5.57	1.399	0.23

Abbreviations: B, before; 2W, at 2 weeks; 6W, at 6 weeks; 12W, at 12 weeks; SHIM, sexual health inventory for men.

Control arm

Safety and efficacy of botulinum neurotoxin in the treatment of erectile dysfunction refractory to phosphodiesterase inhibitors: Results of a randomized controlled trial

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TABLE 7 Comparison of erection hardness score and penile duplex parameters between before and 2 weeks after injection of BOTOX within the treatment group

	Mean	SD	*p* value
EHS (B)	2.34	0.59	
EHS (2W)	2.89	0.76	<0.001
PSV (B)	34.4	11.7	
PSV (2W)	45.8	13.2	<0.001
EDV (B)	3.5	3.7	
EDV (2W)	1.7	3.5	0.244

Abbreviations: B, before; EDV, end diastolic velocity; EHS, erection hardening score; PSV, peak systolic velocity; 2W, at 2 weeks.

Treatment arm

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TABLE 8 Comparison of erection hardness score and penile duplex parameters between before and 2 weeks after injection of saline within the control group

	Mean	SD	*p* value
EHS (B)	2.14	0.49	
EHS (2W)	2.23	0.598	0.083
PSV (B)	31.3	15.6	
PSV (2W)	31.9	16.1	0.658
EDV (B)	4.5	3.4	
EDV (2W)	4.5	3.9	0.394

Abbreviations: B, before; EDV, end diastolic velocity; EHS, erection hardening score; PSV, peak systolic velocity; 2W, at 2 weeks.

Control arm

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TABLE 9 Comparison between diabetic and nondiabetic subgroups within the treatment group as regards sexual health index for men (SHIM) before injection and at 2, 6, and 12 weeks after injection of botulinum neurotoxin

		Mean	SD	*p* value
(B) SHIM	Diabetic	5.05	1.77	
	Nondiabetic	5.93	1.385	0.019
(2W) SHIM	Diabetic	6.38	1.83	
	Nondiabetic	7.07	2.61	0.454
(6W) SHIM	Diabetic	9.7	6.1	
	Nondiabetic	10.36	5.85	0.722
(12W) SHIM	Diabetic	7.8	3.76	
	Nondiabetic	8.86	4.55	0.601

Abbreviations: B, before; 2W, 2 weeks after injection; 6W, 6 weeks after injection; 12W, 12 weeks after injection.

21 of 35 patients in treatment group had diagnosis of diabetes

PATHWAY FOR ED

WHAT DO WE MEAN BY PATHWAY?

1. Agreed upon protocol developed by providers based on national guidelines and local customs of care
2. Use this protocol to create criteria that are evaluated with PPS Analytics (Uro GPO) to identify patients with the disease states and characteristics we are seeking

WHAT DO WE MEAN BY PATHWAY?

3. Use data analyst to perform chart review and contact patients identified as outside the protocol to make appropriate follow up visits to prevent gaps in care.
4. Utilize men's health APP, in concert with MD, to see and evaluate patient response to therapy based on protocols.

Urology Associates, P.A.
Erectile Dysfunction Protocol

- The outcome of the protocol is for the patient to follow up with an APP or MD for men's health disease state.

- Hinges upon data acquisition from the chart and ability to act meaningfully on the data.
- Started with outside analyst services and then internalized to better manage analyst and patient interaction.

Urology Associates, P.A.

Erectile Dysfunction Protocol

	UAM Guidelines
SHIM Score	Baseline, every ED visit - scores of 15 or lower prompt action
Lab Cadence	Obtain a Testosterone at the initial visit
Visit Cadence Orals	First visit 1 month follow up with APP 3 month follow up with MD 6 month follow up if stable with APP 1 year follow up thereafter with MD
Visit Cadence Injections	First visit for training with APP 4-6 weeks follow up with APP 3 month follow up with MD 6 month follow up if stable with APP 1 year follow up thereafter with MD
Visit Cadence Surgery	1 week post op with MD 6 week initiate device with MD 3 - 6 month follow up with MD Annual visit with MD
Dispensary Qualifications for Refill	Must have been seen within 1 year (ideally 6 months) with no medication changes or have a visit made within that time period

Urology Associates, P.A.

Erectile Dysfunction Protocol

- The idea of the protocol is not an all-encompassing document
- Set of criteria that all providers agree patients should adhere to.
- Think of this as creating an Apgar Score. It does not tell you all of the issues that may be occurring, but it is easily assessed and can be acted upon.

APGAR SCORING SYSTEM

Indicator		0 Points	1 Point	2 Points
A	Activity (muscle tone)	Absent	Flexed arms and legs	Active
P	Pulse	Absent	Below 100 bpm	Over 100 bpm
G	Grimace (reflex irritability)	Floppy	Minimal response to stimulation	Prompt response to stimulation
A	Appearance (skin color)	Blue; pale	Pink body, Blue extremeties	Pink
R	Respiration	Absent	Slow and irregular	Vigorous cry

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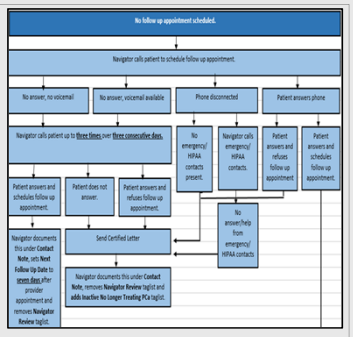
Dispensary Qualifications for Refill	Must have been seen within 1 year (ideally 6 months) with no medication changes or have a visit made within that time period

- Data Analysists encompasses RN's, LPN's, and MA's that can be trained to follow the protocols.
- Our analyst for Men's Health is responsible for protocol monitoring for ED Protocol, Low T Protocol, and Peyronie's Protocol.



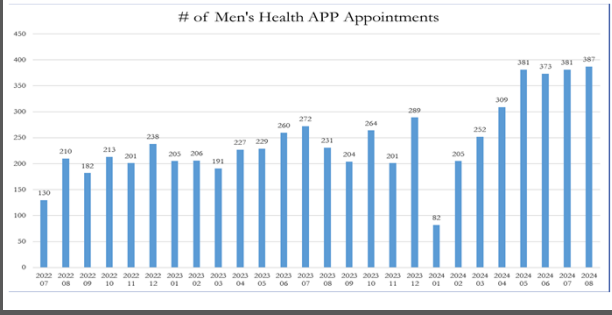
Urology Associates, P.A.

Erectile Dysfunction Protocol Use of Physician Extenders

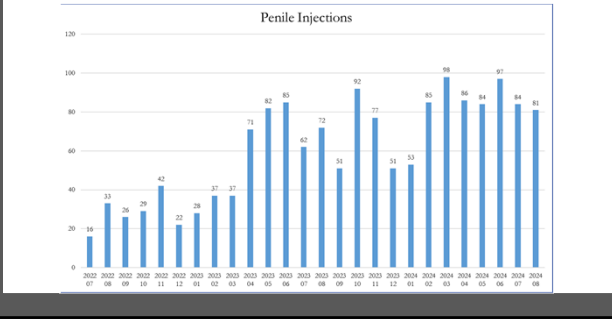
- Urology Associates has designated APP's that see and manage men's health patients.
- These APP's have additional training, including the ability to give Trimix Injections.
- They also receive more training on teaching and the indications for Penile Prosthetics.
- They treat most andrology issues including low T and Peyronie's.

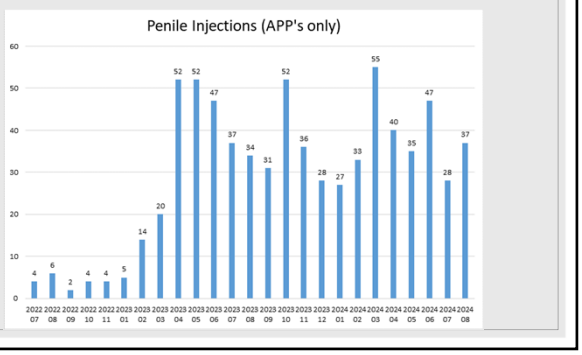
Data from Our Experience

- Currently have 18,034 patients with ED disease state
  - Only 57 do not have a scheduled follow up appointment
- Number of APP men's health appointments
  - In 2023 there were 2,779 to date 2024 2,370
- Penile Injection appointments
- Penile prosthetics
- Revenue associated with APP men's health appointments



Total Practice




Penile Injections (APP's only)
60
50
40
30
20
10
0
4
6
2
4
4
5
14
20
52
52
47
37
34
31
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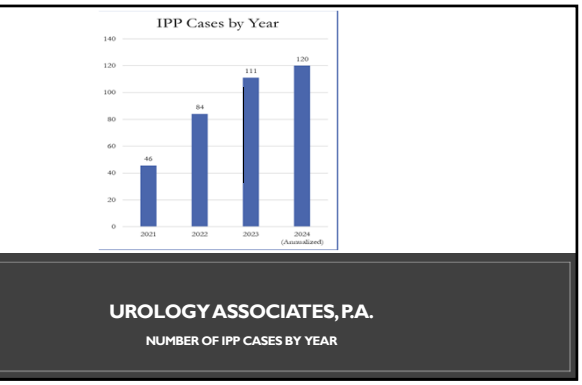
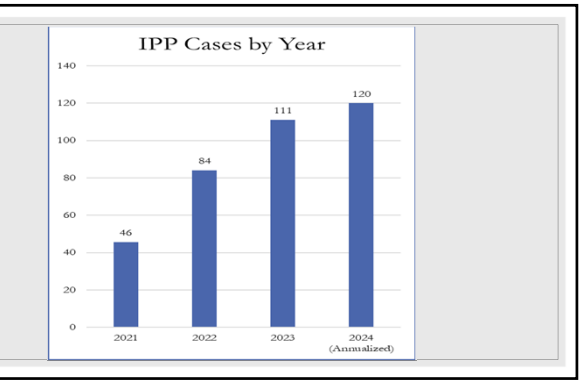

IPP Cases by Year
140
120
100
80
60
40
20
0
46
84
111
120
2021
2022
2023
2024
(Annualized)
UROLOGY ASSOCIATES, P.A.
NUMBER OF IPP CASES BY YEAR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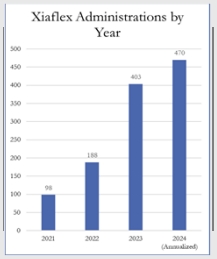
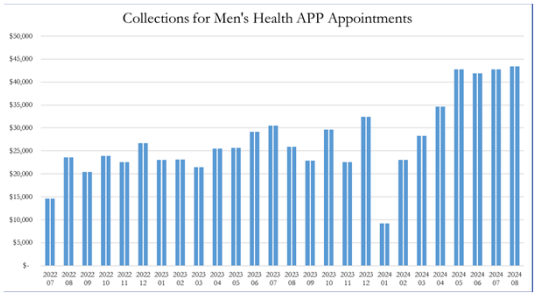
2024
(Annualized)

Urology Associates, P.A.





Conclusions from our protocol experience

- We are able to find patients falling off treatment regimens
- We have built a sustaining service line
- Increased patient visits for men's health disease states
- Seen increased utilization of services for these disease states
- Created a revenue source from improved followed up of patients already in the practice

Thank You

- **Dr. Matthew McIntyre**
- ED Director for Urology Associates, P.A.
- Email: mmcintyre@uampa.com
- Office: (251) 433-1895