DOI: *10.4081/aiua.2023.11481*

LETTER TO EDITOR

Benign prostatic obstruction (BPO) as a possible risk factor for Peyronie's disease (PD). The influence of BPO and PD on mental health

Gianni Paulis [1], Andrea Paulis [2]

[1] Peyronie's Care Center, Department of Uro-Andrology, Castelfidardo Clinical Analysis Center, Rome, Italy;
[2] Neurosystem Center for applied Psychology and Neuroscience, Janet Clinical Centre, Rome, Italy.

KEY WORDS: *Benign prostatic obstruction; Peyronie's disease; Mental health.*

Submitted 27 June 2023; Accepted 14 July 2023

To the Editor,

Our study aimed to investigate a possible relationship between *benign prostatic obstruction* (BPO) and *Peyronie's disease* (PD) and to characterize the psychological profile of patients affected by Peyronie's disease, with or without concomitant BPO. In this study, we have investigated whether there is a relationship between the two diseases. The typical symptoms of PD are as follows: penile deformation, local pain, *erectile dysfunction* (ED), and anxious-depressive state. *Benign prostatic hyperplasia* (BPH) causes symptoms only in the case of urinary obstruction (benign prostatic obstruction/BPO). BPO is an emotionally stressful condition, but any type of treatment, such as surgery, by significantly decreasing LUTS, can significantly improve the general well-being of the affected patient (1).
We performed a retrospective analysis of the clinical database of a single uro-andrology clinic. From the database, we considered two separate cohorts of patients observed between January 2013 and February 2023. The first cohort included 539 patients diagnosed with Peyronie's disease. As a comparator population, we considered a cohort of 2208 outpatients referred to our clinic for any disease, but not Peyronie's disease.
In the two cohorts, we identified patients with a diagnosis of long-standing BPO.
All data were obtained from patient records. This retrospective observational study was conducted in compliance with the principles contained in the Declaration of Helsinki (*Fortaleza, 2013*); all study subjects were contacted and provided informed consent for study inclusion. Sensitive data were anonymized to warrant patients' privacy according to *Legislative Decree 10 August 2018, n. 101*, published in the *Official Gazette of the Italian Republic, General Series, issue 205, 09/04/2018*.
All 539 PD patients underwent photographic documentation of the penile deformation and dynamic penile eco-color Doppler with plaque and volume measurements and answered the following questionnaires: the *Generalized Anxiety Disorder-7*, the *Patient Health Questionnaire-9*, the Visual Analog Scale for penile pain measurements, the *International Index of Erectile Function* (IIEF), and the *International Prostate Symptom Score* (IPSS). In the cohort of 539 PD patients and in a cohort of 2208 outpatients (comparator population), BPO was diagnosed in patients with urinary symptoms according to the following examinations: clinical history, thorough physical examination, including a digital rectal exam, prostate ultrasound, and microbiological assessment (pre- and post-massage urine and sperm cultures) to exclude concomitant chronic bacterial prostatitis, and the compilation of the *International Prostate Symptom Score* (IPSS).
The primary endpoint of the study was the association between a diagnosis of BPO and the occurrence of PD in a single outpatient center patient population. The secondary endpoints were as follows: the impact of PD on the psychological status of patients with or without BPO; the impact of BPO in PD patients on the severity of penile curvature, on the multiplanarity of penile curvature, on plaque volume, on plaque multifocality, on plaque calcification, on the presence and severity of ED, and on presence and severity of penile pain. To investigate an association between PD and a history of BPO, we calculated the *odds ratio* (OR) test. We completed a post hoc analysis of the statistical power obtained by calculating the crude odds ratio.
Our findings show that cases (PD patients) and controls (comparator population) did not differ in age and most associated pathologies. However, for some associated diseases such as diabetes mellitus, erectile dysfunction, hypertension, BPO, and *chronic prostatitis* (CP), there was a statistically significant difference between the two groups. Clinical features and basic demographics of the patients in the two groups, as well as the results for the primary and secondary endpoints of the study, are shown in Table 1.
Although many studies indicate some risk factors that influence the appearance of Peyronie's disease (penile trauma, diabetes mellitus, Dupuytren's disease, erectile dysfunction, congenital penile curvature, hypertension, obesity, smoking,

Table 1.
Clinical features and basic demographics of patients in the two groups, and results for the primary and secondary endpoints of the study.

Clinical features and basic demographics of patients in the two groups (PD patients and non-PD patients)			
Variable	**PD patients (539 cases)**	**Non-PD control population (2208 cases)**	**Statistical analysis P-value (t-test)**
Mean age	49.6 (± 12.16 SD)	50.5 (± 12.04 SD)	0.120
Variable	**PD patients n. cases (%)**	**Non-PD control population n. cases (%)**	**Statistical analysis P-value (χ^2-test)**
Varicocele	13 (2.4)	62 (2.8)	0.720
Hydrocele	6 (1.1)	23 (1.04)	0.884
Hypercholesterolemia	48 (8.9)	151 (6.8)	0.117
Thyroid disease	27 (5.00)	111 (5.02)	0.986
History of myocardial infarction	13 (2.4)	50 (2.2)	0.964
History of malignant urological neoplasm	43 (7.97)	176 (7.97)	0.995
History of non-urological malignancy	11 (2.04)	48 (2.17)	0.979
History of urinary stones	52 (9.6)	207 (9.37)	0.910
Urogenital infections	19 (3.5)	120 (5.4)	0.088
Diabetes mellitus	32 (5.9)	77 (3.48)	0.0128
Hypertension	101 (18.7)	299 (13.5)	0.0027
Erectile dysfunction (ED)	216 (40.07)	529 (23.95)	< 0.0001
Chronic prostatitis (CP)	200 (37.1)	384 (17.39)	< 0.0001
Benign prostatic obstruction (BPO)	119 (22.07)	298 (13.49)	< 0.0001
PRIMARY ENDPOINTS	**Cohort of patients with Peyronie's disease (PD)**	**Non-PD control population**	**Statistical analysis odds ratio (OR) - P-value**
Benign prostatic obstruction (BPO)	119	298	-
No Benign prostatic obstruction (BPO)	420	1910	-
TOTAL	622	2208	-
Prevalence of BPO (%)	22.07	13.49	OR = 1.81 - P < 0.0001
SECONDARY ENDPOINTS		**IMPACT Yes or no**	**Statistical analysis P-value**
The impact of benign prostatic obstruction on the	presence and severity of anxiety	No	< 0.05 *
	presence and severity of depression	No	< 0.05 *
	presence and severity of penile curvature	No	> 0.05
	penile curvature multiplanarity	No	> 0.05
	plaque volume	No	> 0.05
	plaque multifocality	No	> 0.05
	plaque calcification	No	> 0.05
	presence and severity of erectile dysfunction	No	< 0.05 **
	presence and severity of penile pain	No	< 0.05 ***

* *Although the P-value was found to be significant, this must be interpreted in favor of cases without BPO.*
Note that median anxiety and depression scores were found to be higher in PD patients without BPO. Consequently, no positive impact of BPO on presence of anxiety or depression in patients with PD was found.
** *Although the P-value was found to be significant, this must be interpreted in favor of cases without BPO, in fact, the severity of total BPO symptom scores assessed with the IPSS test correlated significantly and inversely with IIEF scores. These results indicate that, in PD patients, no positive impact of BPO on presence and severity of erectile dysfunction was found.*
*** *Although the P-value was found to be significant, the trend line of the logistic regression test indicated that the VAS score is higher in PD patients without BPO than the VAS score in BPO patients. These results indicate that, in PD patients, no positive impact of BPO on pain severity was found.*

hypertension, rheumatoid arthritis, psoriatic arthritis, psoriasis, dyslipidemia, and alcohol consumption), studies on BPO as a risk factor for PD are unfortunately lacking.

Our results show that the overall prevalence of benign prostatic obstruction in patients with Peyronie's disease is significantly higher (22.07%) than the prevalence in a non-PD control population (13.49%). The resulting significant crude odds ratio for BPO was 1.81 ($p < 0.0001$). Our data suggest that BPO and PD are frequently associated.

We have also ascertained that in PD patients, there is no impact of BPO on the psychological status of patients, on the severity of penile curvature, on the multiplanarity of penile curvature, on plaque volume, on plaque multifocality, on plaque calcification, on the presence and severity of ED, or on the presence and severity of penile pain. Nevertheless, the severity of BPO symptom scores (IPSS) correlated significantly with the severity of erectile dysfunction ($p < 0.0001$).

Furthermore, in Peyronie's disease patients, we ascertained the presence of significant depressive symptoms in 57.1% of cases in contrast to the lower percentages documented in Nelson's studies (48%) (2, 3). Additionally, the prevalence of significant anxiety symptoms that we found in Peyronie's disease patients (89.2%) appears to be higher when compared to the findings of other studies that generically refer to "*distress*" and "*emotional*" difficulties (80-81%) (4, 5).

Our findings indicate that BPO and PD are often associated. Although our study has the limitations of being a retrospective analysis based on patient medical records, the the size of the odds ratio (OR = 1.81) and its statistical significance ($p < 0.0001$) support our conclusions sufficiently. Nevertheless, we believe that more studies are needed to confirm BPO as a risk factor for PD. Our study confirms that BPO affects the severity of ED in patients with Peyronie's disease, and this suggests that BPO should be treated early and efficiently to hinder the onset and progression of ED in these patients.

Our results also revealed an important prevalence of anxiety and depression in PD patients; furthermore, we are especially concerned about the high percentages of "*severe*" anxiety (39.3%) present in the course of PD.
Consequently, we believe that simultaneous psychological therapy is highly desirable in these patients, both to improve their quality of life and to avoid a drop-out of medical treatments.

References

1. Anderson D, Kumar D, Divya D, et al. Mental Health in Non-Oncologic Urology Patients. Health Psychol Res. 2022; 10:38352.

2. Nelson CJ, Diblasio C, Kendirci M, et al. The chronology of depression and distress in men with Peyronie's disease. J Sex Med. 2008; 5:1985-1990.

3. Nelson CJ, Mulhall JP. Psychological impact of Peyronie's disease: a review. J Sex Med. 2013; 10:653-660.

4. Terrier JE, Nelson CJ. Psychological aspects of Peyronie's disease. Transl Androl Urol. 2016; 5:290-295.

5. Smith JF, Walsh TJ, Conti SL, et al. Risk factors for emotional and relationship problems in Peyronie's disease. J Sex Med. 2008; 5:2179-2184.

Correspondence
Gianni Paulis, MD (Corresponding Author)
paulisg@libero.it
Peyronie's Care Center, Department of Uro-Andrology, Castelfidardo Clinical Analysis Center, Rome, Italy

Andrea Paulis
andrea.fx.94@gmail.com
Neurosystem Center for applied Psychology and Neuroscience, Janet Clinical Centre, Rome, Italy

Conflict of interest: The authors declare no potential conflict of interest.