

Incidentally diagnosed Peyronie's disease in men presenting with erectile dysfunction

A Kadioglu^{1*}, T Oktar¹, E Kandirali¹, M Kendirci¹, O Sanli¹ and C Ozsoy¹

¹Section of Andrology, Department of Urology, Medical Faculty of Istanbul, University of Istanbul, Istanbul, Turkey

The aim of this study was to analyze characteristics of patients with Peyronie's disease (PD) diagnosed during a standart evaluation for erectile dysfunction (ED) and compare them with patients presenting with the classical complaints of PD. During a 10-y period, a total of 448 patients were evaluated at our two outpatient clinics, directed by the same author (AK). They were divided into two groups: group I consisted of patients, who presented with only ED and were unaware of their penile deformity, and group II consisted of patients with the classical features of the disease. The clinical characteristics, penile deformities, erectile status and the presence of comorbidities were determined in the two groups. Of 448 Peyronie's patients, 16% ($n = 71$) were detected during diagnostic work-up for ED. In this group of patients, ED was the presenting symptom for a mean period of 31.3 ± 9.7 months. The mean age of men was 57.54 ± 8.75 and 52.21 ± 10.27 y in groups I and II, respectively ($P = 0.0001$). The mean degree of deformity was $31.5 \pm 12.66^\circ$ in group I and $41.16 \pm 19.14^\circ$ in group II ($P = 0.0001$). In group I ($n = 71$), 69% ($n = 49$) of the patients had a poor erectile response to the combined injection and stimulation (CIS) test. Also, in this group, the mean degrees of deformity in CIS-positive and -negative patients were 27.05 ± 12.50 and $33.80 \pm 12.03^\circ$, respectively ($P = 0.033$). Diabetes mellitus (40%) was the leading comorbidity in group I, while at least one comorbidity was observed in 73% of the cases ($P = 0.001$). A remarkable percent of Peyronie's patients (16%) were detected during a standard evaluation for ED. This study analyzed, for the first time, the frequency and the characteristics of incidentally diagnosed Peyronie's patients who presented with only ED. Our data indicate that one should always consider the possibility of PD in older patients with diabetes, presenting with only ED.

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Introduction

Peyronie's disease (PD) is a localized connective tissue disorder of the penis that primarily affects the tunica albuginea.^{1,2} Epidemiological studies have demonstrated prevalence rates up to 7.1%.³ It is most commonly detected in men aged 40–70 y and the average age of onset is in the mid-50s.^{4,5} Clinical manifestations include penile deformity, palpable nodule on the shaft of penis, pain on erection and erectile dysfunction (ED). Although several theories

have been proposed as to the etiology of PD, it still remains obscure. Today, the most widely accepted theory is that PD is a wound-healing disorder, initiated by repetitive microtrauma to penis, with subsequent scar formation.^{6,7}

PD can affect the potency of the patients. Sexual dysfunction, being a part of the presenting symptom, is reported to vary between 18 and 80% in different series.^{8–10} The etiology of ED remains controversial, and several factors may be responsible for this condition. Excessive penile bending may prevent sexual intercourse and painful erections may also lead to disabled sexual function. In addition, performance anxiety of the patients due to penile deformity may contribute to ED.^{8,11}

The impaired erection was also associated with cavernosal disease and impaired arterial inflow. As a disorder of the tunica albuginea, pathologic changes encountered in PD dramatically affect erectile status by impairing the veno-occlusive function.^{9,12–15} The presence of comorbidities

*Correspondence: A Kadioglu, MD, Professor of Urology, Chief of Section of Andrology, Department of Urology, Medical Faculty of Istanbul, University of Istanbul, 34390-Capa, Istanbul, Turkey.
 E-mail: kadiogluates@ttnet.net.tr
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(which may affect the penile vascular system directly) in these patients may also determine the erectile status of patients with PD.

In our study, a subgroup of Peyronie's patients were diagnosed during a standart evaluation for ED, and a detailed questionnaire revealed that these patients were unaware of their penile deformity. To our knowledge, the frequency of incidentally diagnosed PD in patients presenting with only ED was not reported before. They constitute a challenging entity and herein we retrospectively reviewed the characteristics of Peyronie's patients previously unaware of their deformity, presenting with ED and compared them with those patients having the classical features of PD.

Materials and methods

During a 10-y period, 448 patients with PD were evaluated at two outpatient clinics, which were directed by the same author (AK). All patients underwent a detailed sexual and medical history, physical examination focusing on genital system and a serial serum analysis. The presence of comorbidities such as diabetes mellitus, hypertension, hypercholesterolemia, hypertriglyceridemia, ischemic heart disease and age were recorded.

The patients were divided into two groups. In group I, Peyronie's patients who were unaware of their penile deformity and presented with only ED were examined, while those patients with the classical features of the disease were classified as group II.

All patients were evaluated by the combined injection (60 mg papaverine) and stimulation (CIS) test, performed in privacy to induce maximal erection and to overcome sympathetic overactivity due to anxiety, to assess the degree of tumescence, location and degree of curvature. Criteria for positive erectile response to CIS test were determined as occurrence of erection (buckling pressure greater than 500 g) within 10 min and continuation of this state for at least 10 min. A vacuum erection device was used to achieve full erection in patients with a negative or a partial response to combined injection and stimulation in order to assess the exact degree of deformity. The degree of the deformities was measured by a protractor during the CIS test. The deformities were also documented by photographs or drawings.

A palpable plaque was detected in 21 patients during physical examination. Two patients had hourglass deformity, three had swan-neck deformity and six patients had pure indentation with no additional curvature. They were not included in the calculation of the mean degree of deformities.

Penile color Doppler ultrasound (ATL Ultramark 9/7.5 MHz probe) was performed in 39 patients with injection of a vasoactive agent, as previously described.¹⁴ Peak systolic blood flow velocity (PSV) values of ≥ 35 cm/s were considered normal for penile arterial system.^{13,14} End diastolic values (EDV) of > 5 cm/s and resistive index (RI) of < 0.9 were considered diagnostic for cavernosal disease.

Statistical analyses were performed by Mann-Whitney U test and Pearson's χ^2 test. A *P*-value of < 0.05 was considered as statistically significant.

Results

Between 1992 and 2002, a total of 448 Peyronie's patients, with a mean age of 53.05 ± 10.22 y, were evaluated. Of these, 16% ($n=71$) were detected during a diagnostic work-up for ED, consisting of standart questionnaire for sexual function and CIS test. In other words, of 7594 patients with ED who were seen at our outpatient clinic during this 10-y period, 1% ($n=71$) were found to have PD. A detailed evaluation of these cases underlined that they were previously unaware of their penile deformity.

The mean age of men in group I was found to be 57.54 ± 8.75 (range = 32–79) y while in group II it was 52.21 ± 10.27 y ($P=0.0001$). In group I, the presenting symptom was ED for a mean period of 31.3 ± 9.7 months.

The mean degree of deformity was $31.5 \pm 12.66^\circ$ in group I (range = 10–50°), compared to $41.16 \pm 19.14^\circ$ in group II ($P=0.0001$) (Table 1). In group I, the CIS test resulted in poor erectile response in 69% ($n=49$) of the patients, while adequate erectile response (buckling pressure greater than 500 g) was detected in 31% ($n=22$) of the cases. Comparison of the CIS test responses between the two groups of Peyronie's patients is given in Table 1. The mean degrees of deformity in CIS-positive and -negative patients in group I were 27.05 ± 12.50 and $33.80 \pm 12.03^\circ$, respectively ($P=0.033$). Also in this group of patients, 39 had a deformity of $\leq 30^\circ$. Four patients had a deformity of 10° , 12 patients between

Table 1 Comparison of the mean age, the mean degree of deformities and CIS test response between groups I and II

	Mean age	Mean degree of deformity	CIS(+) no.	CIS(-) no.
Group I (n: 71)	57.54 ± 8.75	31.5 ± 12.66	22	49
Group II (n: 377)	52.21 ± 10.27	41.16 ± 19.14	241	136
	<i>P</i> : 0.0001	<i>P</i> : 0.0001	<i>P</i> : 0.0001	<i>P</i> : 0.0001

Table 2 Comorbidities detected in groups I and II

	Group I (n: 71)	Group II (n: 377)	P-value
Diabetes mellitus	29 (40.8%)	84 (22.28%)	0.001
Hypercholesterolemia	26 (36.6%)	129 (34.2%)	0.79
Hypertension	14 (19.712%)	58 (15.3%)	0.46
Hypertriglyceridemia	19 (26.7%)	79 (20.95%)	0.35
Ischemic heart disease	8 (11.2%)	32 (8.4%)	0.59

11 and 20° and 23 had a deformity between 21 and 30°.

At least one comorbidity was observed in 73% of the cases in group I: diabetes mellitus and hypercholesterolemia being the leading ones. The comorbidities are shown in Table 2 in comparison with group II. Diabetes mellitus was detected in 40% of patients in group I and was found to be the only statistically significantly different comorbidity in the two groups.

Color Doppler USG was performed in 39 patients in group I, as previously described. Overall, mixed (arterial and venous) penile vascular disease was observed in 28 patients while pure arterial insufficiency and cavernosal disease were detected in two and five patients, respectively. Four patients had normal penile vascular system by CDU. In group II ($n = 371$), penile Doppler ultrasound was performed to 148 patients and penile vascular disease was diagnosed in 70.3%. Mixed vascular disease was detected in 36.4%, cavernosal disease in 23.6% and arterial disease in 10.1% of the patients. Penile vascular disease was significantly more prevalent in group I (90.8%), compared to group II (70.3%) ($P < 0.05$).

Discussion

There is a general belief that the advances in the management of ED have increased the number of men seeking medical therapy for ED. As a result, large numbers of patients are being evaluated for ED in outpatient clinics. Increased clinical incidence of Peyronie's patients was noted by several authors and this situation may partially be explained with a detailed evaluation of these large number of ED patients.^{4,16} In our series, we observed that 16% ($n = 71$) of our Peyronie's patients presented with only ED and were not aware of their deformity at the time of diagnosis. In other words, between 1992 and 2002, a total of 7594 patients with ED were evaluated at our outpatient clinics and about 1% ($n = 71$) of them had PD. The analysis of these patients may be helpful to define some characteristics of ED patients who may require a further, more detailed evaluation for the existence of PD.

The severity of deformity was found to be significantly less in these patients compared to

other patients with PD, which may be an important contributing factor to their unawareness of their disease. The mean degree of deformity was $31.5 \pm 12.66^\circ$ in these patients while it was $41.16 \pm 19.14^\circ$ in the other PD patients ($P = 0.0001$).

The degree of tumescence assessed by the CIS test resulted in poor erectile response in 69% of the patients, indicating a deteriorated penile vascular system. In fact, this inadequate erectile capacity may be one of the most significant factors responsible for this situation, as patients could not achieve adequate erections to be aware of their deformity. The degree of deformity in patients with a positive response to CIS test was $27.05 \pm 12.50^\circ$, compared to $33.80 \pm 12.03^\circ$ in the CIS-negative group ($P < 0.05$). Also, two patients had hourglass deformity, three had swan-neck deformity and six patients had pure indentation. It is possible that these patients in the CIS (+) group ignored the minor deformities and probably they did not accept a condition such as indentation as a pathology.

Penile vascular abnormalities, claimed to be responsible for ED in 61–70% of Peyronie's patients,^{9,12–15} were detected in 89% of our patients by color Doppler ultrasound in group I. Cavernosal disease was reported in 30–86% and the role of arterial disease was also shown in 44–52% of Peyronie's patients with ED.^{9,12–15} In this study, mixed vascular disease was detected in the majority of the cases, confirming the data that penile vascular disease, especially arterial disease, accounts for much of the diminished rigidity in men with PD. A vacuum device can be used to determine the exact degree of deformity in these patients.

Comorbidities such as diabetes, serum lipid abnormalities and hypertension have clearly defined negative effects on erectile function. ED was observed in 35–75% of men with diabetes mellitus, with deterioration of sexual function being the first symptom in 12%.¹⁷ Hypertension and serum lipid abnormalities (hypercholesterolemia, hyperlipidemia) primarily affect vascular endothelium, while vascular and neural pathways may be impaired by diabetes. Diabetes is a reported potential risk factor for PD.^{4,18,19} It was detected in 40% of the Peyronie's patients presenting with ED only, which was significantly higher than the other Peyronie's patients ($P = 0.001$). At least one comorbidity, diabetes mellitus being the most common, was identified in 73% of the patients. Although the impact of these risk factors on the pathogenesis of PD is still controversial, it is obvious that vascular disease significantly affects erectile capacity in PD.

The patients presenting with ED only were older (age 57.54 ± 8.75 y) compared to the other Peyronie's patients (age 52.21 ± 10.27 y) ($P = 0.0001$). A progressive decline in sexual function was shown in healthy aging men in several studies. Aging may be a contributing factor for ED in these patients, as they are older than the other group. Also, the majority of

these patients could not achieve a full erection (negative CIS test in 69%) and have a long duration of ED (31.3 months). We know that development of PD as a result of repetitive microtrauma to erect the penis, with subsequent aberrant wound healing and scar formation, is a widely accepted pathophysiologic mechanism in PD.^{6,7} It is also proposed that patients with partial erections may be more prone to PD, because of the increased mechanical stress associated with buckling that occurs while attempting sexual intercourse with partial erections. However, Jarow and Lowe⁶ reported that partial erections do not appear to be a predisposing factor for PD although an association between penile trauma of all types and PD was demonstrated in their study. Recently, Levine and Latchamsetty²⁰ reviewed the efficacy of sildenafil in patients with ED associated with PD. They detected a success rate of 71% in coitus in men with PD after sildenafil and also reported no worsening of deformity or increase in penile pain. Although we do not know the exact relationship between the onset of deformity and ED by history in our patients, as they all presented with ED, the repetitive microtrauma to penis may be a contributing factor in the development of PD in these patients.

Conclusion

The frequency and characteristics of incidentally diagnosed Peyronie's patients presenting with only ED (16%) were not reported before. We found that these patients have more severe ED, have a milder degree of deformity and are older compared to other Peyronie's patients having the classical features of the disease. According to our data, the possibility of PD should be considered in older patients with diabetes mellitus, presenting with only ED.

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