ACCURACY OF THE INITIAL HISTORY AND PHYSICAL EXAMINATION TO ESTABLISH THE ETIOLOGY OF ERECTILE DYSFUNCTION

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ABSTRACT—Objectives. Because of its implications for possible therapy, the ability to establish a diagnosis of erectile dysfunction (ED) solely on the basis of history and physical examination has been a matter of controversy. The determination of the etiology of ED based on history and physical examination is evaluated in this present study.

Methods. Consecutive patients presenting for evaluation of ED were evaluated by careful history, physical examination, psychologic evaluation, and RigiScan monitoring. They were then stratified into either organic or psychogenic groups based on each of these modalities. These diagnoses were then compared to a final diagnosis obtained through additional testing.

Results. History and physical examination had a 95% sensitivity but only a 50% specificity in diagnosing organic ED. The accuracy rates of history and physical examination in diagnosing ED were 80% and 60%, respectively.

Conclusions. A multifaceted comprehensive approach is required to evaluate fully and to diagnose ED.

Erectile dysfunction (ED) affects approximately 20 million American men and is the most common sexual problem found in men seeking help for sexual disorders. A variety of diagnostic procedures, including pulse volume plethysmography, nocturnal penile tumescence testing, duplex ultrasound scanning, cavernosography, and selective pudendal arteriography, are now available to characterize the etiology of the ED, which may be classified as either organic, psychogenic, or of mixed origin. Organic refers to the presence of neurologic, vascular, or endocrine lesions that impair erectile function. Psychogenic impotence may result from either performance anxiety, relationship conflicts, sexual inhibition, or fear. Of course, in the case of combined or mixed etiologies, minimal organic disease may result in performance anxiety, stress with heightened sympathetic tone, and secondary psychogenic sexual dysfunction (organic more than psychogenic). Similarly, a patient may have a disease that can cause impotence (eg, diabetes) but be capable of entirely normal erections (psychogenic more than organic).

Given the variety of therapies now available for treating organic and psychologic ED, the determination of causality becomes important if the treating physician elects to treat the etiologic problem specifically to optimize success. However, establishing the etiology can be costly, especially given the current climate of health care delivery.

History-taking and subsequent physical examination have often been stated as the required initial steps in evaluating any medical complaint; the evaluation of ED is no exception to this rule. However, the ability to establish a diagnosis of ED based solely on history and physical examination has been a matter of contention. Many centers and practitioners have added the cavernosal injection alone or with a stimulation test and duplex ultrasound of the penis as measures used to
establish a diagnosis of causality. However, although these tests may predict response to therapy, each may give false-positive results in the presence of neurogenic and mild to moderate vascular dysfunction. This present study attempts to evaluate the limitations of the initial history and physical examination alone, not augmented by additional more definitive tests, to establish the etiology of ED.

MATERIAL AND METHODS

Between October and December 1992, 53 consecutive patients referred to our sexual dysfunction center for ED were evaluated by a single experienced urologist. A careful medical and sexual history was obtained and a physical examination performed. A routine component of our physical examination consists of biothesiometry and pulse volume plethysmography (PPG). Patients were divided into either primarily organic or primarily psychogenic groups based separately on the interview and physical examinations. In those instances in which both psychogenic and organic components were thought to be present (mixed etiology), the examiner's diagnosis was determined according to that component believed to exhibit the prevailing influence. For example, a patient with diabetes who was found to have normal erections would be considered primarily psychogenic (psychogenic more than organic).

All patients underwent independent evaluations by an experienced psychologist/sex therapist. No specific grading scores of the interview were used, but the evaluation focused on detailed sexual history and description of the sexual problem, as well as details of current sexual relationships, emotional stressors, psychopathology, and expectations of treatments. A separate interview with the patient's primary sex partner was sought to augment the assessment. At the conclusion of the psychologic evaluation, the psychologist/sex therapist made an independent diagnosis of either primarily organic or primarily psychogenic ED for each patient.

Patients then underwent additional testing of nocturnal penile tumescence and rigidity (NPTR) with Rigiscan (Dacomed Corp., Minneapolis, Minn); duplex sonography, cavernosometry, and arteriography were also performed when clinically indicated as determined by the urologists, as in cases of a history of trauma or with abnormalities found on PPG. The criterion used for a normal ultrasound was a velocity of greater than 30 cm/s in each cavernous artery 5 minutes after a 0.2 mL dose of trimix. Criteria used for plethysmography, cavernosometry, and arteriography have been previously reported by us and were used in this study. NPTR testing with the Rigiscan was done at the patient's home on 2 consecutive nights. Patients who registered more than one erection longer than 5 minutes with at least 60% at the base and tip of the phallus were registered as normal. Based on these results, a final diagnosis was made classifying the ED as either primarily organic (ie, organic and organic more than psychogenic) or primarily psychogenic (ie, psychogenic and psychogenic more than organic) in etiology. This final diagnosis was then compared with the initial diagnostic designations reported in terms of sensitivity, specificity, and accuracy.

History, physical examination, the psychologic evaluation, and the Rigiscan were defined as individual diagnostic modalities, since separate diagnoses were determined from each of them. Patients who had a normal physical examination were given a psychogenic diagnosis. It was, therefore, possible to compare per individual patient each of the diagnostic modality findings. Various combinations of these concurring diagnoses are reported.

RESULTS

A total of 53 patients were eligible, of which 45 completed the evaluation; the mean age was 57 years, ranging from 40 to 72 years. History, physical examination, and psychologic evaluation, when considered as separate diagnostic modalities, determined an etiology of organic ED in 36, 27, and 23 patients, respectively. A diagnosis of psychogenic ED was made in 9 patients by history taken by the urologist, 18 patients by physical examination, and 22 patients on the basis of the psychologic evaluation (Fig. 1).

The psychologic evaluation diagnosed organic ED in 23 of 45 patients (51%) and psychogenic ED in 22 of 45 patients (49%). On final evaluation, organic ED was found in 29 of 45 patients (64.4%) and psychogenic ED in 16 of 45 patients (35.6%). However, it was the Rigiscan results that correlated most closely with the final diagnoses, as organic ED was diagnosed by this method in 67% of the patients. Only a single patient thought to have organic disease based on the Rigiscan results failed to be so diagnosed on the final assessment. That patient reported return of normal erectile function (corroborated by his partner) prior to the final meeting with the staff.

In 32 patients (71%) initial diagnoses from both the interview and physical examination concurred (Fig. 2). Five of 25 patients thought to have organic ED on preliminary evaluations were found...
Patients were diagnosed as per individual modalities (x-axis) as having either organic or psychogenic erectile dysfunction. The number of patients falling into each of these designations is shown.

to have a psychogenic etiology at final assessment. Twenty-five of the 32 patients (78%) were thought to have organic ED initially but on final analysis only 20 (63%) were found to have organic disease.

When the interview and the physical examination results agreed and the diagnosis was psychogenic ED (n = 7), the final diagnosis concurred in all but 1 case. In 25 (78%) patients, the separate diagnoses by history, physical examination, and the initial evaluation concurred; 19 of these patients were found to have organic ED and 6 had psychogenic ED (Fig. 2).

In 19 patients the separate diagnoses by history, physical examination, psychologic evaluation, and RigiScan agreed, not only with each other, but also with the final diagnosis. That is, in 19 of 45 patients (42%), there was an across-the-board agreement in diagnoses (15 organic ED and 4 psychogenic ED).

Table I displays the sensitivities and specificities of each individual modality and various combinations of concurring individual diagnoses in determining organic disease. In addition, the accuracies for each modality are shown in the Table. History and physical examination had individual accuracies of 60% and 80%, respectively; collectively, that is, when the diagnosis by history agreed with that of the physical examination, the accuracy was 78%. RigiScan and the psychologic evaluation registered accuracies of 93% and 73%, respectively. Both the sensitivities and specificities increased as the number of separate concurring diagnostic modalities increased, as illustrated in Table I. The number of patients falling into the true and false diagnostic categories as per individual and combinations of concurring diagnoses are shown in Figures 3 and 4.

COMMENT

As successful, nonspecific treatments continue to develop for ED, the ability to designate dysfunction and distinguish between organic and psychogenic etiologies has decreased in importance if the treating physician chooses not to treat the etiologic problem specifically. However, for those whose medical practice dictates specific therapy for treatable problems, the identification of specific etiologies remains of paramount importance.

Hatch et al. suggested that the responses to specific diagnostic questions were as reliable as standard NPTR evaluation in classifying patients as having either organic or psychogenic ED. As a diagnostic modality, NPTR testing is expensive and does not necessarily reflect the patient's awake erectile function. An anxious dream state may interfere with erections and depression states may alter sleep patterns, mitigating the accuracy of this test.

A false-negative rate of 12% has been reported with NPTR, as adequate nocturnal erections have been observed in patients with established diagnoses of organic ED. In addition, the possible differences in neural pathways between sleep-related tumescence and dysfunctional tumescence associated with sexual stimulation must be considered when using this technique as a diagnostic tool. To date, however, there exists no individual modality to both quantify and classify ED. Acknowledging these drawbacks, NPTR testing is still a diagnostic standard for evaluating ED.
**TABLE I. Diagnostic category with its corresponding sensitivity (Sens), specificity (Spec), and accuracy rates**

<table>
<thead>
<tr>
<th>Diagnostic Modality</th>
<th>Sens (%)</th>
<th>Spec (%)</th>
<th>Accuracy (%)</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>History [Hx]</td>
<td>96.5</td>
<td>50</td>
<td>80</td>
<td>28</td>
<td>8</td>
<td>1</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>Physical [PEx]</td>
<td>65.5</td>
<td>50</td>
<td>60</td>
<td>19</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>Psychologic evaluation [PSY]</td>
<td>68.9</td>
<td>81.7</td>
<td>73</td>
<td>20</td>
<td>3</td>
<td>9</td>
<td>13</td>
<td>45</td>
</tr>
<tr>
<td>RigiScan [Rigi]</td>
<td>96.6</td>
<td>86.7</td>
<td>93</td>
<td>29</td>
<td>2</td>
<td>1</td>
<td>13</td>
<td>45</td>
</tr>
<tr>
<td>Hx = PEx = PSY</td>
<td>93</td>
<td>80</td>
<td>90</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Hx = PEx = Rigi</td>
<td>100</td>
<td>83</td>
<td>96</td>
<td>20</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Hx = PEx = PSY = Rigi</td>
<td>100</td>
<td>85</td>
<td>96</td>
<td>20</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>26</td>
</tr>
</tbody>
</table>

*The letters represent the actual number of patients falling into each of the following categories: a, true positives: both the initial and final diagnoses determined organic disease; b, false positives: the initial diagnosis was organic dysfunction but the final evaluation proved psychogenic disease; c, false negative: the initial diagnosis was psychogenic disease but final organic; and d, true negative: corresponding to both the initial and final diagnoses determining psychogenic disease. The total number of patients in each category is shown. Accuracy = [(a+d)/(a+b+c+d)]%.

**FIGURE 3.** The individual diagnostic modalities (x-axis) ranged in accuracy rates from 60% to 93%. The actual number of patients correctly and incorrectly diagnosed per category is shown. (Final = final diagnosis.)

An organic pattern of impotence can generally be eliminated if an adequate erection is observed during sleep in NPTR testing.

The results of this study indicate a clear superiority of RigiScan compared to history and physical examination as individual modalities or as a common one in determining the final diagnosis (accuracy 93% versus 60% to 73%). When the interview diagnosis concurred with that of the physical examination, the accuracy increased to 78%. Indeed, as Table I illustrates, both sensitivities, specificities, and accuracy rates increase as the number of concurring diagnostic modalities increase.
The specificity derived from the psychologic interview was higher than that derived from history and physical examination alone or as a composite diagnosis (80% versus 50%). This may well be the result of the length of the interview, details of the sexual history, or the inclusion of the partner. This finding underscores the importance of a psychologic sexual evaluation in determining ED, as this modality can uncover self-report bias through interviews of the sex partner. Indeed, a thorough history should incorporate a full psychologic evaluation. In this study, when the diagnosis by history and the psychologic interview concurred (28 of 45), the initial diagnosis had an accuracy of 92% in determining the final designation.

As demonstrated, history and physical examination had moderate ability in establishing the etiology of ED. History alone has a sensitivity of 96% and a 50% specificity in diagnosing organic ED. History and physical examination collectively demonstrated sensitivities, specificities, and accuracy rates, respectively, of 95%, 50%, and 78% in diagnosing organic ED. This is likely the result of the absence of an absolute dichotomy between organic and psychogenic ED due to the complexity and multiplicity of factors involved in the erectile process itself with the interplay of physical, psychogenic, and emotional components. Patients with a disease process known to cause ED (eg, diabetes) may, in fact, have a psychogenic problem. The correct diagnosis of a psychogenic problem was not made in 7 of 36 men (19%) based on his diabetes may, in fact, have a psychogenic problem. The correct diagnosis of a psychogenic problem was not made in 7 of 36 men (19%) based on his diabetes may, in fact, have a psychogenic problem. The correct diagnosis of a psychogenic problem was not made in 7 of 36 men (19%) based on history and physical examination alone because of that factor. Clearly, a multifaceted comprehensive approach is required to evaluate fully and to diagnose ED.

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REFERENCES

EDITORIAL COMMENT
Erectile dysfunction is a frequent problem affecting men and women in this country. Over the past years there has been an increasing public awareness of the problem of impotence. Whereas a decade ago the common belief was that 90% of erectile dysfunction is caused by psychologic problems, now we know that at least 50% of sexual dysfunction has a physical, pathologic basis. These findings have led to a renewed interest in the diagnosis of erectile dysfunction. This diagnosis serves two purposes: (1) to determine pathologically based treatment and (2) to help the patient understand and accept the physical cause and treatments of erectile dysfunction. It would seem common sense that any test or procedure that helped differentiate the physical from the psychologic causes of erectile dysfunction would be welcome. Unfortunately no tests have proved perfect or unflawed. Davis-Joseph et al. have shown that even the carefully directed history and physical examination can often give a false diagnosis. This should not be surprising in view of the many factors that influence a patient's reporting and perception of his erection problems, not the least of which is the response of his partner. Davis-Joseph et al. have also clearly shown that in their hands, RigiScan nocturnal penile tumescence tests, even with their very conservative definition of normal, is the best test to determine the psychologic versus physical nature of the problem. Unfortunately this test has recently been maligned by insurance companies and government advisors. Nocturnal penile tumescence tests can help direct further diagnostic studies in a group of patients with a high likelihood of organic disease and direct patients with psychogenic problems for appropriate therapy. The cost of a RigiScan nocturnal penile tumescence test is small compared with poorly directed treatment based only on the imprecise science of history and physical findings.

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