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Testicular Pain Sensation in Diabetic Autonomic Neuropathy

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Summary

Testicular sensation was examined in 32 male diabetics with symptoms suggestive of autonomic neuropathy to evaluate its usefulness as a clinical sign in this condition. Vascular reflex responses to the Valsalva manoeuvre and sustained handgrip and blood pressure fall on standing were measured as objective tests of autonomic involvement. Absent or diminished testicular sensation correlated well both with the clinical features of autonomic neuropathy, except where impotence occurred alone, and with abnormal vascular reflexes. Most patients with impotence alone had normal testicular sensation and normal vascular reflexes. It is concluded that this sign is useful in diabetics with impotence, the presence of intact testicular sensation indicating that the impotence is unlikely to be due to autonomic neuropathy.

Introduction

Though clinical features, in retrospect attributable to autonomic nerve involvement, were described by Auché (1890) and Pryce (1893) in diabetes mellitus it was Rundles (1945) who first clearly delineated the characteristic symptom complexes of autonomic neuropathy. Pitres (1902) reported impairment of deep testicular pain sensation in four diabetics. Nevertheless, this sign has been largely ignored and we have not found any further reference to it in the literature. In the experience of one of us (L.J.P.D.), however, demonstrable impairment or absence of testicular pain sensation is often found in male diabetics with autonomic neuropathy. For this reason a group of diabetics with autonomic neuropathy were studied to assess the possible usefulness of this sign.

Patients and Methods

Thirty-two male diabetics with characteristic clinical features of autonomic neuropathy (Keen, 1959; Colby, 1965) were

studied. The most common symptom was persistent impotence; in 14 patients it was the only symptom suggestive of autonomic neuropathy, in another 17 it was accompanied by other features of the condition, and only one patient denied impotence. Other symptoms included postural hypotension (eight patients), intermittent nocturnal diarrhoea (nine patients), gastric fullness or delay in emptying (four patients), hypoglycaemic unawareness (six patients), and diminished sweating in the lower extremities (one patient). In addition 23 patients had clinical features of peripheral neuropathy, 23 had diabetic retinopathy, and 12 had persistent proteinuria. Their mean age was 48 years (range 24-63 years), and the average duration of diabetes was 17 years (range 2-33). All except four were dependent on insulin.

Deep testicular pain sensation was determined by holding the subject's scrotum in one hand and firmly squeezing each testicle in turn between the thumb and first two fingers of the other hand, increasing the pressure until pain was felt. The response was considered normal if the patient started to experience a peculiar "sickening" pain on moderate pressure (Bailey and Clain, 1954), diminished if considerable pressure elicited only unpleasant but tolerable discomfort, and absent if full pressure evoked no response whatsoever. Pain appreciation on squeezing the tendo Achillis was tested as another measure of deep pain sensation.

In all patients an independent observer measured vascular reflex responses as an objective assessment of autonomic neuropathy. The Valsalva manoeuvre and the response to sustained handgrip at 30% maximum voluntary contraction were defined as normal or abnormal as previously described (Ewing et al., 1973). A fall of systolic blood pressure of 30 mm Hg or greater immediately on changing from the lying to standing position was taken to indicate postural hypotension.

Results

Twelve patients had absent, six had diminished, and 14 had normal testicular sensation. When these results were related to the presence or absence of other clinical features and objective assessment of autonomic neuropathy striking differences were observed.

TESTICULAR SENSATION AND CLINICAL FEATURES OF AUTONOMIC NEUROPATHY

Of the 14 patients with impotence alone only two had reduced testicular sensation whereas of the 18 patients with other features 11 had absent and five had diminished testicular sensation (table I). The one man without impotence had normal testicular sensation. There were no statistical differences in age or duration of diabetes between the two groups.

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TABLE I—*Testicular Sensation and Clinical Features of Diabetic Autonomic Neuropathy in 32 Patients*

Clinical Features	No. of Patients	Mean Age in Years (Range)	Duration of Diabetes in Years (Range)	Testicular Sensation		
				Normal	Diminished	Absent
Impotence alone	14	49.3 (24-63)	17.2 (2-33)	12	1	1
Other features with or without impotence	18	45.7 (26-60)	16.8 (5-33)	2	5	11

TABLE III—*Clinical Features and Results of Objective Tests of Autonomic Neuropathy in 32 Patients*

Clinical Features	No. of Patients	Valsalva Response		Handgrip Response		Postural Hypotension*	
		Normal	Abnormal	Normal	Abnormal	Absent	Present
Impotence alone	14	11	3	14	0	13	1
Other features with or without impotence	18	3	15	8	10	4	12

*Postural blood pressure was not measured in two patients.

TESTICULAR SENSATION AND OBJECTIVE ASSESSMENT OF AUTONOMIC NEUROPATHY

Of the 14 patients with normal Valsalva and handgrip responses only one had diminished testicular sensation whereas in the 18 patients with abnormal vascular responses 12 had absent and five had diminished pain sensation (table II). Of the 17 patients without postural hypotension only four had impaired testicular pain appreciation whereas of the 13 with postural hypotension nine had absent and three had diminished testicular sensation.

Most of the 14 patients with impotence alone had normal vascular reflex responses whereas most of the other 18 patients with other features of autonomic neuropathy had abnormal responses (table III).

Pain appreciation to pressure of the tendo Achilles was normal in all but six patients. It was absent in one and diminished in another of the patients with impotence alone. In those with other features of autonomic neuropathy it was absent in one and diminished in three.

TABLE II—*Testicular Sensation and Results of Objective Tests of Autonomic Neuropathy in 32 Patients*

Testicular Sensation	Valsalva and Handgrip Responses		Postural Hypotension*	
	Normal (n = 14)	Abnormal (n = 18)	Absent (n = 17)	Present (n = 13)
Normal	13	1	13	1
Diminished	1	5	2	3
Absent	0	12	2	9

*Postural blood pressure was not measured in two patients.

Discussion

Afferent sensory fibres carrying deep testicular pain accompany the sympathetic innervation of the testis. These afferent sensory fibres enter the spinal cord at the 10th thoracic segment via the dorsal root and continue in the posterior column along with other fibres, including those carrying deep pain appreciation from the tendo Achilles, to the thalamus and sensory cortex. The accompanying sympathetic efferent fibres likewise arise at the T 10 cord level (Kuntz, 1947). The preganglionic fibres come into relation with the spermatic and hypogastric plexuses, and from there the postganglionic fibres supply the smooth muscle in the blood vessels of the testis (Gray, 1947). Parasympathetic innervation of the testis has not been definitely established (Mitchell, 1935). Loss of testicular sensation has long been recognized in tabes dorsalis (Pitres, 1902), in which

there is usually loss of deep pain appreciation from the tendo Achilles. In tabes the lesion involves the dorsal roots and posterior columns, whereas autonomic lesions in diabetes have been considered to occur in either the preganglionic white ramus (Martin, 1953 a) or the postganglionic nerve cell body (Locke, 1964). This may explain why very few of our diabetic patients with absent testicular pain sensation had comparable impairment of tendo Achilles pain.

In this study absent or diminished testicular sensation correlated well with objective evidence of autonomic neuropathy assessed by abnormal vascular reflexes. Patients with impotence alone tended to have normal testicular sensation and normal vascular reflexes, and it was only when impotence was associated with other features of autonomic neuropathy that abnormal testicular sensation and abnormal vascular reflexes (Ewing *et al.*, 1973) were found. When impotence is associated with autonomic neuropathy it is probably dependent upon disease of the second, third, and fourth sacral parasympathetic nerves, the nervi erigentes, to the arterioles of the penis (Martin, 1953 b).

Clinically the assessment of testicular sensation should therefore prove useful when a diabetic complains of impotence. In the absence of other symptoms suggestive of autonomic neuropathy and in the presence of intact testicular sensation, though an early selective lesion is a possibility, it would seem more likely that such impotence is independent of autonomic nerve involvement.

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