Impotence in Saudi males -
etiology and risk factors

Said A. Kattan, FRCS(C)

Abstract Objectives: To study the etiology of impotence and the prevalence of the associated risk factors in Saudi males.
Setting: Erectile Dysfunction Clinic, King Khalid University Hospital, Riyadh, Saudi Arabia.
Subject: Saudi males presenting with impotence.
Methods: The medical records of 178 Saudi male patients presenting with impotence in the period between 1989 and 1994 were reviewed in a retrospective study. The statistical method used was Student t-tests taking 5% as level of confidence.
Results: The age of the patients ranged between 22 and 81 years, mean 52.6 years with the majority of patients above the age of 50 years. The etiology of impotence was related mainly to organic causes in 82% while purely psychogenic causes were detected in only 18% of cases. Arterial insufficiency and low serum testosterone were the most frequent diagnosis elicited in 57.3% and 18.9% of cases respectively. Old age, diabetes, smoking and cardiovascular disease were the most frequently encountered risk factors. There was no statistical difference in the mean age of onset of impotence between diabetic and non-diabetic, or between smokers and non-smokers.
Conclusions: Control of diabetes, anti-smoking campaign and correction of hypogonadism may reduce the prevalence of impotence among Saudi males.

Keywords: impotence, risk factors, diabetes, Saudi males.

Impotence is a wide spread problem that affects men at all ages. It is estimated that more than 10 million American men suffer from erectile dysfunction. Afflicted men and their partners usually suffer from mental stress, decrease in self-esteem and sociological problems. An erection is hemodynamically based on dilatation of the arteries, relaxation of cavernosal sinuses and reduction of venous outflow. This phenomenon is dependent on vascular smooth muscle endothelium derived relaxing factor recently recognized to be related to nitric oxide or nitric oxide containing compound. This complex physiological response is dependent upon integration of vascular, endocrine and neurological mechanisms.

Impairment of erection may result from a variety of organic and psychogenic disorders, however, in the majority of cases the etiology of impotence is usually found to be multifactorial.

Impotence had been etiologically linked with several risk factors. The prevalence of such factors usually determines the magnitude of erectile dysfunction in a certain population. Identification of these factors and subsequently its elimination or control may be useful in the reduction of the incidence of impotence or delaying its onset. A retrospective study was thus designed to assess the etiology of impotence and the prevalence of risk factors associated with it in the Saudi population.

Material and methods All Saudi male patients presenting with impotence to the Erectile Dysfunction Clinic at King Khalid University Hospital in the period from 1989-1994 were included. Non-Saudis and Saudi patients presenting with complaints other than impotence were excluded. Full history was obtained, complete examination including neurological assessment was carried out. Laboratory investigations including fasting blood sugar, serum testosterone and prolactin were carried in all patients. Penile brachial index and diagnostic intracorporeal injection of vasodilating agents (papaverine hydrochloride or prostaglandin E1) were
consistently performed. Further assessment of cavernosal arteries with 7.5 MHz doppler ultrasound shortly after intracorporeal injection or penile duplex ultrasonography were carried out in the majority of patients. Patients with repeatedly poor response to intracorporeal injections, normal penile brachial index and blood flow velocity in the cavernosal artery more than 25 cm/sec as detected by doppler ultrasound were subjected to dynamic cavernosometry and cavernosography following the technique described by Carson. Rigi scan monitoring, snap gauges application and psychological assessment by a psychiatrist were performed frequently when indicated. X-ray to the sella turcica and/or computerized tomography (CT) scan of the pituitary were performed in all patients with persistent hyperprolactenemia. The diagnosis of arterial insufficiency was made if the patients had repeatedly poor response to intracorporeal injections with vaso dilating agents, penile brachial index less than 0.7 and blood flow velocity less than 25 cm/sec in the cavernosal arteries after intracorporeal injections of vasoactive agents.

Veno occlusive disorder was diagnosed if during cavernosometry erection or intracavernous pressures above 80 mmHg cannot be maintained at infusions below 60 ml per minute and also if the cavernosal pressure of turgidity decay was more than one mmHg per second. Cavernosography in these instances was carried out for anatomical localisation of the leaking veins. The presence of normal arterial inflow was a prerequisite for the diagnosis of veno occlusive incompetence. Patients with penile brachial index more than or equal to 0.8, full response to intracorporeal vaso active agents, normal neurological examination and normal hormonal profile were diagnosed to have mainly psychogenic impotence. The statistical method used was Student t-tests taking 5% as level of significance.

Results A total of 178 Saudi male impotent patients were seen in the Erectile Dysfunction Clinic at King Khalid University Hospital between 1992 and 1994. Their ages ranged between 22 to 81 years (mean 52.6 years). The age distribution is shown in Fig.1 with the majority of patients above the age of 50 years. All the patients were married except 9 patients who were single and 5 of whom were previously divorced. One hundred and thirty patients (73%) had only one wife; 31 patients (17.4%) had 2 wives, 6 patients (3.3%) had 3 wives and 2 patients (1.1%) had 4 wives. The patient's spouse's age difference ranged from minus one to 46 years, mean 16 years. All patients complained of impotence. The degree of impotence was graded according to Table 1. Mild impotence was present in 35.7% of patients while 21.8% had a moderate degree of impotence; 42.4% of patients had a severe degree of impotence. Poor erection was associated with rapid loss of tumescence in 27.2% of patients, premature ejaculation in 12.7% of patients. Penile nodularity or curvature was elicited in 4.2% of patients. Also 4.2% complained of diminished or loss of libido. Delayed orgasm was present in 1.8% of patients and a similar number of patients complained of aspermia.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Weak erection suitable for vaginal penetration</td>
</tr>
<tr>
<td>Moderate</td>
<td>Weak erection with occasional failure of vaginal penetration</td>
</tr>
<tr>
<td>Severe</td>
<td>Weak erection with frequent failure of vaginal penetration or total loss of erection</td>
</tr>
</tbody>
</table>

The onset of impotence was described as of sudden onset in 36 patients 20.2%, while it was gradual in 79.8%. In 3 patients (1.6%) the impotence was primary starting from puberty. Twelve patients (6.7%) presented with impotence in the first month of marriage (honeymoon impotence). Significant marital problems were reported by 44 patients (24.7%), in 11 of them (6.1%) divorce was inevitable because of erectile dysfunction.

Risk factors for weak erection were identified in 79.2% of patients (Table 2). Diabetes mellitus was the most prevalent risk factor occurring in 39.8% of patients. Diabetes was insulin dependent in 22% of patients, while it was non-insulin dependent in 47% patients and diet-controlled in the remaining 2 patients. The average time lapse between the diagnosis of impotence and onset of diabetes ranged between 15 months to 23 years, mean 8.4 years. The age of diabetic patients ranged between 29-75 years (mean 53.3 years), while the mean age of non-diabetic patients was 46.3 years. No statistical difference was detected between both groups p>0.05.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>71</td>
<td>39.8</td>
</tr>
<tr>
<td>Old age &gt; 60 years</td>
<td>50</td>
<td>28.0</td>
</tr>
<tr>
<td>Smoking</td>
<td>40</td>
<td>22.4</td>
</tr>
<tr>
<td>Hypertension</td>
<td>28</td>
<td>15.7</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>16</td>
<td>8.9</td>
</tr>
<tr>
<td>Previous psychiatric history</td>
<td>7</td>
<td>3.9</td>
</tr>
<tr>
<td>Urological procedures</td>
<td>7</td>
<td>3.9</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Head trauma</td>
<td>5</td>
<td>2.8</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>Central nervous system trauma</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>Peripheral neuropathy</td>
<td>4</td>
<td>2.8</td>
</tr>
<tr>
<td>Homosexuality</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Corporal fibrosis</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>2</td>
<td>1.1</td>
</tr>
</tbody>
</table>
The most frequent risk factor associated with diabetes was smoking occurring in 18 out of 71 diabetic patients (25.3%). The age of diabetic impotent patients who smoked ranged between 41 to 64 years (mean 55.2 years). There was no statistical significant difference between the age of diabetic patients who smoked and who did not. Hypogonadism occurred in 13 patients (18.3%) of the diabetic group in comparison to a 19.6% incidence in non-diabetic population. This difference was not statistically significant p>0.05.

History of smoking was elicited in 40 patients (22.4%) where the amount smoked ranged between 10 to 80 cigarettes per day and the duration of smoking prior to onset of impotence ranged between 5 to 40 years (mean 13 years). The age of impotent patients who smoked ranged between 24 to 65 years (mean 49.3 years) which was similar to the mean age of non-smoking patients (48.8 years).

The mean age of impotent patients who smoked was less than the mean age of impotent patients with diabetes (49.3 years vs 53.3 years respectively). However, this difference was not statistically significant p>0.05.

In 7 patients (3.9%) impotence occurred following urological procedures including 6 transurethral resections of the prostate, and one visual internal urethrotomy complicated by extravasation. Three patients (1.6%) presented with corporal fibrosis subsequent to previous therapeutic measures. Two of these were receiving intracorporal papaverine and the other had a penile prosthesis explanted because of prosthesis infection.

Impotence was mainly related to organic and psychogenic causes in 146 patients (82%) and 32 patients (18%) of the cases respectively. In patients with organic impotence arterial insufficiency was the most common etiologic diagnosis encountered in 102 patients (69.9%). Risk factors in patients with arterial impotence included diabetes mellitus in 61 patients (59.8%), smoking in 28 patients (27.4%), hypertension in 21 patients (20.5%) and ischemic heart disease in 16 patients (15.6%). In 14 of these patients (13.7%) no risk factor could be identified. The age of the latest group ranged between 40 to 76 (mean 60.4 years). Veno-occlusive disorders confirmed by dynamic cavernosometry and cavernosography was diagnosed in 8 patients of the organic group (5.4%).

Impotence secondary to neurological disease was detected in 9 patients with organic etiology (6.1%). Severe peripheral neuritis was responsible in 4 patients while 3 patients were post spinal cord trauma, and the remaining two had severe head injury.

Endocrine abnormalities were detected in 41 patients (28% of the organic group). These included hyponadism in 27 patients, hypogonadism associated with hyperprolactinemia in 7 patients and isolated persistent hyperprolactinemia in 7 patients. Their ages ranged between 21 to 70 years (mean 54.7 years). Hypogonadism was associated with diabetes mellitus and smoking in 13 and 10 patients, respectively. No pituitary tumor was detected in any of the patients with hyperprolactinemia.

Significant psychological factors were elicited in 45 patients (25.2%). In 13 of these patients significant organic element was detected. In 32 patients (18%), no other risk factor or organic etiology could be identified. Seven of these patients had a previous history of psychiatric illness. The most frequent psychological disorder in patients with psychogenic impotence was performance anxiety occurring in 24 patients (68.7%), followed by depression and neurosis occurring in 20 and 6.2 percent of patients respectively.

**Discussion** Impotence is defined as the inability of the male to obtain and/or maintain erection sufficient for vaginal penetration. The major etiologic causes of impotence are described as either psychogenic or organic, however, in the majority of cases the etiology of impotence is often mixed.

Western studies indicate that approximately 50% of all cases of impotence is related to organic disease. This was not our experience as only 18% of our patients had impotence mainly related to psychological factors while in 82% of patients a clear organic etiology could be identified. The reason for such high incidence of organic causes for impotence in our population compared to the West, may be related to the high prevalence of significant risk factors for organic etiology in our patients.

Old age had been recognized as a well known
risk factor for development of organic impotence. Kinsey et al, had found that organic impotence is a common problem in men over fifty years of age. More than half of our patients (56.1%) were above the age of fifty years at time of presentation. Carrol et al, when studying impotence in the elderly population, found that erectile dysfunction in this age group is related to organic and psychogenic etiology in 80% and 20% of cases respectively; an incidence that is similar to our findings. Rowland et al, had noticed age related changes in the penile sensitivity response to penile ischemia and somatosensory evoked potentials. They suggested that decreasing erectile capacity in aging men may be related to decreasing sensory, motor and autonomic functioning. The increased frequency of chronic diseases that can adversely affect the erectile function in the elderly population also accounts for such high incidence of organic related impotence.

The incidence of diabetes mellitus in different reported groups of impotent patients varied between 7.8 to 21.6%. This incidence is low compared to our finding in which diabetes constituted 39.8% of our patient population. This high incidence may be related to active referral of diabetic patients with erectile dysfunction from the endocrine service at our institution or it may be related to higher prevalence of diabetes mellitus in our community compared to western countries. Indeed epidemiological studies revealed that in Saudi Arabia the prevalence of diabetes mellitus ranges from 6.5 to 30%, which is much higher that the West which is estimated to be 5%.

The prevalence of erectile dysfunction in men with diabetes mellitus ranges from 35 to 75%, a prevalence that is much higher than the general population. Impotence in men with diabetes had been shown to be related more to organic than psychogenic factors. It is hypothesized that cavernosal artery insufficiency, corporeal veno-occlusive dysfunction, autonomic neuropathy, or some combination thereof is the major organic pathophysiologic mechanism leading to persistent erectile impairment in diabetes mellitus. Controversy exists regarding the contribution of hormonal abnormalities in the etiology of impotence in diabetic men, so while some had reported hormonal disturbance in male diabetics, others found no difference in the hypothalamic pituitary gonadal function in potent and impotent diabetic patients. Our study tends to support the latter opinion, since in our patient population there was no statistical difference between the incidence of hormonal disturbance in diabetics and non-diabetics, 18.4% vs 19.5% respectively.

In our group of patients, smokers constituted 22.4% and 27.4% of our total and arterial impotent population respectively. There was no statistical difference in mean age of patients who smoked and who did not, 49.3 years vs 48.8 years, respectively. However, patients who smoked presented at a younger age than the diabetic mean (49.3 years vs 53.3 years). This difference was not statistically significant but may be related to the fact that the habit of smoking usually starts at a much younger age compared to the age of onset of diabetes.

The incidence of smoking amongst the Saudi population is not known. However, the fact that 38% of male physicians in the Riyadh area smoked compared to 8% incidence of smoking in a similar group of patients in the United States, may indicate that the prevalence of smoking in our community is much higher than the West. The detrimental effect of smoking on penile erection had been well recognized. Hirshkowitz et al, had shown by comparing different groups of men, that those men who smoked the most had the fewest minutes of nocturnal tumescence and detumesced fastest. The effect of smoking can be evident on the small penile vasculature resulting in a lower mean penile blood pressure compared to non-smokers or can result from inhibiting smooth muscle relaxation of the erectile tissue leading to failure in venous occlusion and diminished arterial flow during erection. Also, it had been noticed that nicotine through adrenergic action can cause peripheral arterial constriction and interfere with pharmacologically induced erection. Virag et al, had found no decrement in the penile blood pressure solely as a function of cigarette smoking. However, lower pressure was discovered when smoking occurred in conjunction with diabetes, hypertension and hyperlipidemia. In our patient population, there was no statistical difference in the age of diabetic patients who smoked and those who did not. This finding may underscore the detrimental effect of smoking on erectile function in diabetic males, as smoking may not affect the mean age of onset of impotence but may decrease the time lapse between the onset of diabetes and the development of erectile dysfunction.

History of hypertension was present in 20.5% of our patients with impotence secondary to arterial insufficiency, all of them were receiving antihypertensive medications. This is similar to the incidence of hypertension in impotent patients in Western reports that range between 16.6 to 20%. The incidence of hypertension in the Saudi population is not yet determined. However, the similarity of the incidence rate of hypertension between our patients and western impotent
population may suggest that also the incidence of hypertension among Saudis and the West may also be similar.

Hypertension is a known risk factor for impotence. Relaxation of the cavernous smooth muscle and dilatation up to two-fold of the cavernosal arteries precedes the high flow of blood to corpora cavernosa and is required to induce the initial filling phase of erection. Arterial narrowing and loss of elasticity secondary to hypertension significantly interferes with blood flow to corpora cavernosa during erection and can result in partial or complete loss of tumescence. Moreover all anti-hypertensive drugs had been reported to be associated with erectile dysfunction. Very few reports indicated that potency returned with discontinuation or a switch to other agent(s), a fact that implies that an underlying vascular abnormality usually exists. Ischemic heart and peripheral vascular disease not related to diabetes were noted in 11% of our patients. Zorgniotti had pointed out that cavernosal arteries resemble the coronary arteries mainly in that they are end arteries without collateral circulation. Epidemiological studies had identified that both impotence and ischemic heart disease have the same principal risk factors namely, aging, hypertension, diabetes, smoking and hyperlipidemia.

Impotence related to neurological traumatic injuries accounted for 3.4% of all our patients with organic etiology. Western reports indicated that neurological causes for impotence range between 10 to 15%. The reason for such a difference is not clear. Road traffic accidents in Saudi Arabia are higher than those of many Western countries of similar car ownership level and has been increasing steadily over the past 20 years. The majority of victims are males below the age of 30 years and serious neurological injuries are encountered in up to 51% of cases. It is thus surprising to encounter such low incidence of impotence related to traumatic neurological injuries in our population. Absence of active referring programs from major trauma and rehabilitation centers in the Riyadh area may account for such low incidence.

Endocrine causes of erectile dysfunction has been estimated to exist in 5% to 35% of impotent patients. This is similar to our experience in which 28% of patients in the organic group had endocrinical abnormality. The relationship between low serum testosterone and impotence remains unresolved.

Patients receiving exogenous testosterone for hypogonadism, find that it has no effect on erectile function, but that it produces a sense of well-being and increases libido.

Some reports suggest that hypogonadism may be related to peripheral vascular disease including coronary and cavernosal vessels. Testosterone had been shown to relieve angina and the relationship between low morning testosterone levels and history of myocardial infarction had been noticed. This observation may suggest that low serum testosterone may have an adverse effect on cavernosal arteries, predisposing the patient's arterial insufficiency and augmenting the effect of other risk factors such as diabetes or smoking on penile vasculature. This point may be of clinical importance since more than 70% of patients with hypogonadism in our study had an associated significant risk factor for vascular disease.

Conclusion

The etiology of impotence among male Saudis is related to organic causes in 82% of cases. Arterial insufficiency is the leading underlying abnormality in these patients followed by hypogonadism. Diabetes, smoking and old age are the most prevalent risk factors in the impotent Saudi male and likely to reflect on the high prevalence of diabetes mellitus and smoking in the Saudi population. Better health education, early detection and control of diabetes and an active anti-smoking campaign are required and may result in decreasing the risk of erectile dysfunction in our population.

References

10. Donatucci CF, Lue TF. The combined intracavernous
الغرض من الدراسة: لمعرفة أسباب العناة و مدى انتشار العوامل المصاحبة له في الرجال السعوديين.

المكان: عيادة اعتلال الهضمية، مستشفى الملك خالد الجامعي، الرياض - المملكة العربية السعودية.

المرضى: الرجال السعوديين الذين يعانون من العناة.

الطريقة: الملفات الطبية لثمانية وثماني مريض سعودي الذين استثنا من العناة في الفترة ما بين 1989-1994م قد درسوا في دراسة مرجعية، الوسيلة الإحصائية التي استُخدمت، كانت اختبار الطالب (ت) مع أخذ 5% كمستوى للثقة.

النتيجة: تراوح عمر المرضى ما بين 42 و 81 سنة (متوسط 62.6 سنة والأكثر من 50 سنة). وتبيّن وجود علاقة سببية رئيسيّة مع أمراض عضوية في 82% من الحالات، بينما أرجب السبب لأمراض نفسية فقط في 18% من المرضى، ويشكل قصور الشرايين (31.57% من الحالات) وأمراض مستوى هرمون الذكورة (التيستوسترون) بالدم (9.18% من الحالات) أعلى نسبتي تشخيص في هذه الدراسة، كما وجد أن الشيخوخة ومرض السكر، والتدخين، وأمراض القلب، والأوعية الدموية، من أكبر العوامل المصاحبة للعناية في مجموع الحالات كلها.

ولم توجد علاقة جهويرية بين العمر في حالة العناة المصاحبة لمرض السكر وغير المصاحبة له وكذلك بين المدخنين وغير المدخنين من المرضى.

الخلاص - الاستنتاجات: نستنتج من هذه الدراسة أن السيطرة على مرض السكر والعمل على منع التدخين مع معالجة انخفاض هرمونات الذكورة في حالة وجودها، قد تمكننا من تقليل نسبة حدوث العناة في المرضى السعوديين.