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Male Endocrinology

Medical management of erectile dysfunction in aging males: is it too late to treat?

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Erectile dysfunction (ED) is a common disorder among aging males. However, most aging males refuse to seek medical help and believe that ED is an irreversible event in the aging process. The purpose of this study was to describe the current medical management of ED in aging males and to examine whether it is too late to treat this disorder in these elderly men. From 2007 to 2008, 4507 patients diagnosed with ED were gathered from 46 centers in China; 4241 completed the study, 3837 of whom were treated with sildenafil. The 3837 patients were divided into five groups based on age (group A: 20–30 years; group B: 31–40 years; group C: 41–50 years; group D: 51–60 years; and group E: >60 years). After comparing pre- and posttreatment International Index of Erectile Function-Erectile Function domain (IIEF-EF) questionnaires, Erection Hardness Scale (EHS), and IIEF Q13 ("How satisfied have you been with your overall sex life?"), we discovered that the aging males had worse erectile function, erection hardness, and sexual satisfaction than the younger males ($P < 0.001$). After treatment, the improvement rates in the IIEF-EF, EHS, and IIEF Q13 scores were 107.0%, 83.1%, and 116.5%, respectively. The magnitude of these changes demonstrated significant differences among groups ($P < 0.001$). Accordingly, aging males are likely to benefit more from medical treatment. We propose that aging males should be informed that age is not a limiting factor for medical ED management, and it is never too late to treat.

INTRODUCTION

Erectile dysfunction (ED) is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance.[1] Epidemiological data have shown a high prevalence and incidence of ED increasing with age, especially in elderly males, defined as individuals 60 years of age or older.[2] ED is a common disorder among aging males, with a lower rate of incidence in men from 20 to 50 years. In men aged >70 years, the ED prevalence ranges from 50% to 100%.[3] Although not life-threatening, ED negatively affects quality of life, decreases work productivity, results in withdrawal from sexual intimacy, and may lead to some negative emotions such as depression, anxiety, or low self-esteem. These sequelae are harmful to the physical health of the patient and to the sexual partner.[4,5] Recently, increasing numbers of men with ED are presenting for treatment. However, most of these men are relatively young, and fewer than 10% are aging males; therefore, the proportion of presenting patients is inversely correlated to ED incidence.

Most aging males refuse to seek medical assistance or undergo ED treatment because they believe that ED is a normal and inevitable part of aging and that they will benefit little from treatment. Additionally, aging males with ED often have concurrent medical conditions such as diabetes, hypertension, and coronary disease; and more attention is paid to these comorbidities than to ED.[6,7] Giuliano *et al.*[8] also suggested that men aged >65 years may have ED that is more difficult to treat. However, this issue is controversial. Aging males often have intercourse

less frequently and engage in fewer sexual activities than younger men regardless of erectile function status. Furthermore, aging males may have lower expectations of the quality of sexual activities. However, it does not necessarily mean that aging males will benefit less from ED treatment than younger patients. Even a slight improvement in erectile function, if receiving reasonable medical treatment, may contribute to a substantial modification in psychological and emotional outcomes and even physical condition.

The necessity for ED treatment in aging males is rarely discussed, and few studies have compared outcomes of ED treatment by age. We sought to describe the medical management of ED in aging males and to examine whether it is too late to treat ED in these elderly men.

MATERIALS AND METHODS

This real-life observational study was initiated by the Youth Committee of the Chinese Andrological Association and involved an outpatient clinic-based questionnaire survey of ED patients of different ages. The appropriate local independent review boards approved the trial, and all of the participants provided their written informed consent. From 2007 to 2008, urological and andrological physicians from 46 centers in China enrolled men with ED complaints who had visited outpatient clinics. Patients were included if they could read and write Chinese and were in a stable relationship or had a sexual relationship. The exclusion criteria were patients who were being treated with the phosphodiesterase type-5 inhibitor (PDE5-I) sildenafil nitrate,

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were hypotensive, had severe organic or psychiatric comorbidities, or had a history of radical prostatectomy. All of the participants completed the following questionnaires: International Index of Erectile Function-Erectile Function domain (IIEF-EF), Erection Hardness Scale (EHS), and question 13 of the IIEF (IIEF Q13: "How satisfied have you been with your overall sex life?"). These standardized questionnaires have been validated and translated into Chinese. ED was screened using the IIEF-EF questionnaire. A total EF domain score >26 indicated no ED; 22–25 indicated mild ED; 17–21 indicated mild to moderate ED; 11–16 indicated moderate ED; and <10 indicated severe ED.[9] Consequently, the eligible patients were 20- to 80-years-old with IIEF-EF scores <25. The severity of ED was evaluated using the EHS questionnaire, which evaluated penis appearance during erection as follows: grade 1, increase in size but not hardness; grade 2, hard but not hard enough for penetration; grade 3, hard enough for penetration but not completely hard; and grade 4, completely hard and fully rigid.[10] After ED diagnosis using the IIEF-EF questionnaire, patients received sildenafil for 4 weeks. Then, patients completed all of the questionnaires again. The patients receiving treatment were divided into five groups according to age (group A: 20–30, $n = 734$; group B: 31–40, $n = 1173$; group C: 41–50, $n = 957$; group D: 51–60, $n = 639$; and group E: >60 years, $n = 334$). Adverse events were monitored throughout the treatment.

Statistical analysis involved *t*-test carried out by using of Statistical Package for Social Sciences (SPSS) version 17.0 (SPSS Inc., Chicago, IL, USA). Descriptive data are presented as the number and percentage of patients in each age group. Continuous data are presented as mean ± standard deviation (s.d.) $P < 0.05$ was considered to be statistically significant.

RESULTS

We enrolled 4507 men with ED; 3837 patients (85.1%) who received sildenafil completed the study (mean age 42.4 ± 12.2 years (range 20–84 years)). Sildenafil was taken as needed before sexual intercourse: 131 men (3.4%) took 25 mg, 976 (25.4%) took 50 mg, and 2687 (70.0%) took 100 mg as a starting dose. In total, 601 patients had self-reported hypertension, 441 had diabetes mellitus, 126 had coronary artery disease, and 506 had hypercholesterolemia. Before medical treatment, 252 cases of ED (6.6%) were mild, 903 (23.5%) were mild to moderate, 1665 (43.4%) were moderate, and 1017 (26.5%) were severe. Of the 334 patients older than 60 years (8.7%), the proportions with mild, mild to moderate, moderate, and severe ED were 2.1%, 12.6%, 36.8%, and 48.5%, respectively. The results for the IIEF-EF and IIEF Q13 by age were similar to those for the EHS (**Table 1**). Before treatment, differences in scores among the questionnaires significantly differed among the age groups ($P < 0.001$); thus, aging males indeed had poorer erectile function, erection hardness, and sexual satisfaction than younger

patients. However, after 4 weeks of medical treatment, the proportions of all men with mild, mild to moderate, moderate, and severe ED were 29.8%, 21.3%, 7.5%, and 1.5%, respectively; 39.9% of patients showed normal function. Similarly, for men aged >60 years, these percentages were 23.4%, 33.5%, 9.6%, and 3.0%, respectively; with 30.5% showing normal function.

The improvement in the scores differed among the groups. Surprisingly, for men aged >60 years, the mean IIEF-EF increased from 10.6 to 21.9, EHS increased from 1.8 to 3.4 after treatment, and IIEF Q13 increased from 1.7 to 3.7. After the 4-week treatment; the IIEF-EF, EHS, and IIEF Q13 score increases were the highest for men aged >60years (improvements of 107.0% for IIEF-EF, 83.1% for EHS, and 116.5% for IIEF Q13), in contrast to men of 20–60 years (improvements of 63.8%–85.5% for IIEF-EF, 53.6%–71.8% for EHS, and 80.3%–100.3% for IIEF Q13). Moreover, these differences were significant ($P < 0.001$); thus, sildenafil had a positive effect on improving erectile hardness and satisfaction with sexual activities for aging males, despite unfavorable data before treatment.

The treatment produced headaches, flushing, and rhinitis in the patients; but, did not require that the medication be discontinued. In addition, 271 (81.1%) men aged >60 years, whose starting dose was 100 mg, showed no adverse effects but also had a better response to treatment. Nevertheless, those men with starting doses of 50 mg, or 25 mg or less, showed a relative lack of response. In men aged 20–60 years, the proportion with a starting dose of 100 mg ranged from 67.7% to 78.1%.

DISCUSSION

Inadequate penile erection, otherwise known as ED, is a significant problem among men worldwide. ED prevalence increases sharply after the age of 60 (defined as aging males). Epidemiological studies have confirmed that age is the primary risk factor for ED. Although aging males are commonly less sexually active and have diminished libido compared with younger men, all men should be able to participate in and enjoy sexual activities regardless of their age. Many healthy, aging males continue to be sexually active. Over half of men aged >70 years still report themselves as being sexually active.[11] However, many aging males do not consult a physician to discuss ED. Our trial revealed that only 334 aging males sought medical care for the condition, with only 8.7% of 3837 ED patients sampled in outpatient clinics. A recent extensive analysis[12] showed that the prevalence of ED is 1%–10% in men aged <40 years, ranging from 2% to 9% for men aged 40–49 years, and increasing to 20%–40% for men aged 60–69 years. Unfortunately, only a minimal proportion of aging males with ED seek treatment. Despite the association of ED and depression and diminished quality of life, ED is still largely ignored.

The reasons for not seeking treatment for ED in aging males are complex and can be explained by race, marital status, occupation,

Table 1: Pre- and post-treatment improvement in erectile function for erectile dysfunction mean in different age groups

Age groups (year)	Number (%)	IIEF-EF (mean±s.d.) Pre-/post-treatment	Improvement (%)	EHS (mean±s.d.) Pre-/post-treatment	Improvement (%)	IIEF Q13 (mean±s.d.) Pre-/post-treatment	Improvement (%)
A (20–30)	734 (19.1)	13.9±5.7/24.0±4.6	72.2	2.3±0.8/3.6±0.6	56.4	1.9±0.8/3.8±0.8	96.8
B (31–40)	1173 (30.6)	14.6±5.0/23.8±4.7	63.8	2.4±0.7/3.6±0.5	53.6	2.1±0.7/3.8±0.7	80.3
C (41–50)	957 (24.9)	14.0±4.9/23.5±4.8	67.6	2.3±0.7/3.6±0.6	56.1	2.1±0.7/3.8±0.7	83.6
D (51–60)	639 (16.7)	12.3±5.0/22.8±4.9	85.5	2.1±0.7/3.6±0.6	71.8	1.9±0.7/3.8±0.8	100.3
E (>60)	334 (8.7)	10.6±5.2/21.9±5.2	107.0	1.8±0.7/3.4±0.6	83.1	1.7±0.8/3.7±0.8	116.5
P		<0.001/<0.001	<0.001	<0.001/<0.001	<0.001	<0.001/<0.001	<0.001

EHS: erection hardness scale; IIEF-EF: index of erectile function-erectile function domain; IIEF Q13: question 13 of the IIEF; s.d.: standard deviation; *P*: compared between groups A, B, C, D, and E

income, and education. Importantly, aging males often perceive that several sexual activity features decline with age and thus believe that ED is an irreversible event during the aging process and does not require treatment. Alternatively, the embarrassment of having ED symptoms leads to denial of the problem.[13] In China, most aging males are embarrassed, are discouraged from discussing sex-associated information with their doctors, and insist that sex is private and that is a natural process of aging. Moreover, aging males suggest that money should be spent on more serious diseases. The relatively high cost of medication for ED without any subsidy also leads to treatment abandonment. Additionally, the patient's fear about the side effects of an unfamiliar medication is an important factor in not seeking treatment.

In view of the physical and psychological characteristics of aging males, these men have decreased sexual frequency, decreased ejaculate motility and volume, and reduced masturbation frequency.[14] However, some minor intimate actions associated with intimacy can result in happiness and sexual satisfaction for these men and their partners. Therefore, the clinical benefits of PDE5-I in aging males should not be underestimated for couples seeking to maintain their sexual relationship. A PDE5-I such as sildenafil, the first such drug launched in Asia, is the first-line therapy for ED. This oral PDE5-I is generally well-tolerated in most aging males and has been found to be effective, independent of the etiology of the disorder.[15]

We targeted patients receiving sildenafil because most multi-institutional studies[16–18] have evaluated the efficacy, safety, and tolerability of oral sildenafil in Asian men with ED as compared with the four other types of PDE5-I (vardenafil, tadalafil, udenafil, and mirodenafil). Moreover, sildenafil is the most used PDE5-I in China; therefore studies with large sample sizes can be conducted, providing convincing results and developing a foundation in the current literature. We found that sildenafil improved subjective sexual satisfaction and objective penile erection in aging males compared with younger men. Additionally, the detailed scores for EHS in aging males after medical treatment were nearly the same as those for younger men, which could be considered the optimal goal of an ED therapy (that is, completely hard and fully rigid erection).[19] However, we should also consider that the young feel more responsible for societal burdens, which causes stress and often psychogenic impotence. This phenomenon might limit any positive responses to PDE5-I, whereas aging males suffer from less stress or none at all.

In addition to improving sexual satisfaction, treating ED with PDE5-I can partially relieve symptoms of benign prostatic hyperplasia,[20] which is highly prevalent in aging males. This outcome will undoubtedly prompt more aging males to receive ED treatment because of the advantages of simultaneously treating frustrating lower urinary tract symptoms and ED. Moreover, Chavez *et al.*[21] revealed that high ejaculation frequency, which can be improved by PDE5-I treatment, is related to a decreased risk of prostate cancer. Overall, the medical treatment of ED is crucial for aging males for improving sexual activities and a good quality of daily life.

A limitation of the trial design is that it was a real-life observation and an open-label study, without double blinding, randomization, and a placebo control. We also used data for patients receiving sildenafil because of its relatively large use in China, although some randomized clinical trials have concluded that all types of PDE5-I may have similar efficacy and safety profiles.[22] Furthermore, all of the results were based on self-reported patient information by questionnaires and a short treatment period of only 4 weeks, both of which can bias the results to some extent. Moreover, some related information and data, including the detailed ED type (organic, psychogenic, or a combination), marital status, economic

and education levels, were not recorded at baseline. As a clinic-based, open-label study, we did not follow-up patients who dropped out of the study or their reasons for doing so. Finally, our study included only Chinese men; therefore, these findings might not be applicable to populations in other countries. Ultimately, despite the study limitations, the data from this relatively large series of patients can help to build a foundation to support the requirement for medical management of ED in aging males and support future prospective clinical trials.

CONCLUSIONS

Although the prevalence of ED increases with age, it is not an irreversible process of aging. Aging males with ED are likely to benefit more from medical treatment than are younger patients. Therefore, aging males should be aware that age is not a limiting factor for ED management, and it is never too late to treat.

AUTHOR CONTRIBUTIONS

KZ conceived the study, carried out the design of this research, analysis and interpretation of data, and revised the manuscript. BX participated in the design of this research and drafted the original manuscript. DFL participated in the acquisition of data. XFW participated in the acquisition of data. JCZ participated in the acquisition of data. JJ participated in the acquisition of data. HJ conceived the study, kept the data base and reviewed all of the statistical ananlysis of the data. All authors read and approved the final manuscript.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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