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COMPARISON OF SATISFACTION RATES AND ERECTILE FUNCTION IN PATIENTS TREATED WITH SILDENAFIL, INTRACAVERNOUS PROSTAGLANDIN E1 AND PENILE IMPLANT SURGERY FOR ERECTILE DYSFUNCTION IN UROLOGY PRACTICE

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ABSTRACT

Purpose: We compared erectile function status and satisfaction rates in patients who received treatment for erectile dysfunction (ED) with sildenafil, intracavernous prostaglandin E1 (ICI) and penile implant surgery (IPP).

Materials and Methods: A total of 138 consecutive patients who received treatment for ED between April 2000 and April 2001 were considered candidates for study. Mean followup was 19.54 months. Of the patients 27 were not available for followup and 26 were not on any form of treatment. Of the patients receiving treatment for ED 85 were administered the Erectile Dysfunction Inventory for Treatment Satisfaction (EDITS) questionnaire and the Erectile Function Domain (EFD) of the International Index of Erectile Function questionnaire. Three treatment groups were identified, including 31 patients on sildenafil citrate, 22 on ICI and 32 who underwent IPP. Mean total EDITS, EDITS Index and EFD scores in the 3 groups were considered for statistical evaluation.

Results: There was no statistical difference in the total EDITS (25.59 versus 27.06, $p = 0.48$), EDITS Index (58.16 versus 61.15, $p = 0.49$) or EFD (22.91 versus 20.26, $p = 0.12$) score between the groups on ICI and sildenafil citrate, respectively. Total EDITS, EDITS Index and EFD scores were significantly higher in patients who underwent IPP than those on sildenafil citrate (36.09 versus 27.06, $p < 0.001$, 82.03 versus 61.51, $p < 0.001$ and 27.88 versus 20.26, $p < 0.001$, respectively). Total EDITS, EDITS Index and EFD scores were significantly higher in patients who underwent IPP than those on ICI (36.09 versus 25.59, 82.03 versus 58.16 and 27.88 versus 22.91, respectively, all $p < 0.001$).

Conclusions: At a mean followup of 19.54 months patients who underwent penile implant surgery had significantly better erectile function and treatment satisfaction than those receiving sildenafil citrate and intracavernous prostaglandin E1.

KEY WORDS: penis, impotence, penile implantation, injections, patient satisfaction

Erectile dysfunction (ED) is a common problem affecting 20 to 30 million males in the United States alone.[1] Results of the Male Massachusetts Aging Study have shown that in the United States approximately 921,000 new cases of ED are expected annually.[2] The introduction of new oral therapy (sildenafil citrate) marked a significant change in the management of ED. Recent data suggest that ED is no longer a condition that is exclusively treated by urologists. In fact, while 250,000 American physicians have prescribed sildenafil, 18% of the prescriptions were written by urologists, whereas nonurologists wrote about 82%.[3]

In the absence of any contraindication first line therapy for ED is oral therapy in the form of sildenafil. This drug provides easy, safe, on demand treatment for erectile dysfunction. Various clinical trials and studies have shown it to be a safe and effective agent for ED.[4–7] When sildenafil fails, patients may select second line therapy in the form of MUSE (VIVUS, Inc., Menlo Park, California) intraurethral alprostadil, a vacuum erection device (VED) or intracavernous injections (ICI). Of these modalities ICI represents an effective alternative because it acts locally without any major systemic side effects. The efficacy rate (production of rigid erection) has been reported to be 72% to 87%.[8–10] However, ICI are limited by a high long-term dropout rate of 37% to 76% secondary to decreased effectiveness, local side effects (pain or scar tissue formation) or simply aversion to self-injection.[11,12] When conservative measures fail, some patients select penile implant surgery (IPP). Modern technology has made penile implant surgery a safe option for ED and multiple series have shown a high satisfaction rate for implants.[13–15]

Few studies have compared the efficacy of the various forms of ED treatment. It is important since it serves as a guide for the urologist, while explaining the various treatment options. We studied 138 consecutive patients who received different treatments for ED to compare their erectile function and treatment satisfaction while on various treatments. Most patients who received ICI, VED, intraurethral alprostadil or a penile implant had already tried sildenafil, which failed. We used the Erectile Dysfunction Inventory for Treatment Satisfaction (EDITS) questionnaire to determine treatment satisfaction and the Erectile Function Domain (EFD) of the International Index of Erectile Function (IIEF) questionnaire to evaluate erectile status while on treatment.

PATIENTS AND METHODS

Our study population consisted of 138 consecutive patients 21 to 85 years old (mean age 55.76) who underwent treat-

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ment for ED between April 2000 to April 2001. Patients provided a complete history and underwent physical evaluation and investigations in the form of an endocrine profile (follicle-stimulating hormone, luteinizing hormone, prolactin, and total and free testosterone), penile Doppler and RigiScan (UroHealth Systems, Inc., Laguna Niguel, California) at presentation. In the absence of contraindications patients were initially offered 50 mg. sildenafil citrate as primary treatment for ED. Based on the response and side effects the dose was escalated to 100 mg. Patients were also instructed to ingest the medication on an empty stomach and in the presence of sexual stimulation, and cautioned about side effects. Patients in whom sildenafil treatment failed after multiple attempts and those who had a contraindication to sildenafil were offered other therapeutic options, such as VED, ICI, intraurethral alprostadil and IPP. Patients interested in ICI were administered a test dose that was subsequently adjusted based on patient response. Patients were then given instructions and educated about proper injection technique in the clinic prior to using the therapy at home. Patients who elected VED were instructed on the technique of using the device and those who elected intraurethral alprostadil were prescribed intraurethral alprostadil for home trial with dose instructions and information on side effects. Patients who underwent IPP were thoroughly educated about the risks and rewards of surgery. Six weeks postoperatively patients were taught the technique of using the implant.

Patients were followed by telephone interviews or office visits using the EDITS questionnaire and the EFD of the IIEF. The EDITS questionnaire consists of 11 questions with 5 responses to every question graded from 0 to 4 with a maximum score of 44.[16] It is a validated questionnaire for judging patient satisfaction to treatment. The EDITS Index was calculated by multiplying the mean EDITS score by 25, resulting in a treatment satisfaction range of 0—extremely dissatisfied to 100—extremely satisfied The EFD of the IIEF questionnaire consists of 6 questions with each question graded from 1 to 5 and a maximum score of 30.[17] It is an effective validated tool for assessing erectile function.

Patients who could not be contacted despite of multiple efforts or those who refused to participate in the survey were not included in the study. Three treatment groups were identified, namely, 1—patients receiving sildenafil citrate, 2—those using intracavernous prostaglandin E1 (PGE1) and 3—those treated with penile implant surgery. Responses to the questionnaires as well as relevant demographic and medical information were entered into a database using commercially available statistical software. The results were evaluated. The mean score ± SD of the EFD, EDITS and EDITS Index in the 3 groups was calculated and Student's t test was used for statistical analysis.

RESULTS

Of the 138 patients who received treatment for ED 2 patients died, 2 claimed to have recovered completely and did not require further treatment, 1 had a cerebrovascular accident and 27 could not be contacted (fig. 1). A total of 106 patients (76.81%) were available for followup and their data were considered for further analysis (fig. 2). Risk factors for ED were hypertension in 55.3% of patients, radical prostatectomy in 34%, smoking in 29.4%, venous leakage in 20.8%, hypogonadism in 17.6%, hyperlipidemia in 15.3%, diabetes mellitus in 10.6%, obstructive airway disease in 10.6%, coronary artery disease in 9.4%, psychogenic erectile dysfunction in 7.55%, end stage renal disease in 4.7%, pelvic trauma in 2.4%, spinal trauma in 1.2% and so forth. Patients on sildenafil had a lower mean age of 50 years compared with those on ICI (57 years) and IPP (60 years). Patients in the 3 groups were well matched for risk factors except radical retropubic prostatectomy (RRP) and psychogenic ED. Fewer patients who underwent RRP were on sildenafil (9.7%) compared with those on ICI (50%) or IPP (46.9%) and a greater number of patients with psychogenic ED were on sildenafil (16%) compared with those on ICI (4.5%) or IPP (0%). At presentation 96 of the 106 patients (90.57%) had already attempted sildenafil and were not satisfied with the result. Only 10 of the 106 patients (9.43%) had not attempted any form of treatment at presentation.

A total of 102 patients (96.23%) were re-prescribed sildenafil with detailed instructions, as described. At evaluation 31 patients (29.24%) reported success with sildenafil at evaluation, of whom 29 (93.55%) were using 100 mg and 2 (6.45%) were using 50 mg. Of the 106 patients 71 (69.61%) discontinued sildenafil at evaluation, including 68 (95.77%) because it was ineffective, 2 (2.81%) due to side effects and 1due to cardiac failure.

Of the 106 patients 64 (60.38%) were prescribed ICI, of whom 22 (34.38%) were finally using ICI at evaluation. The

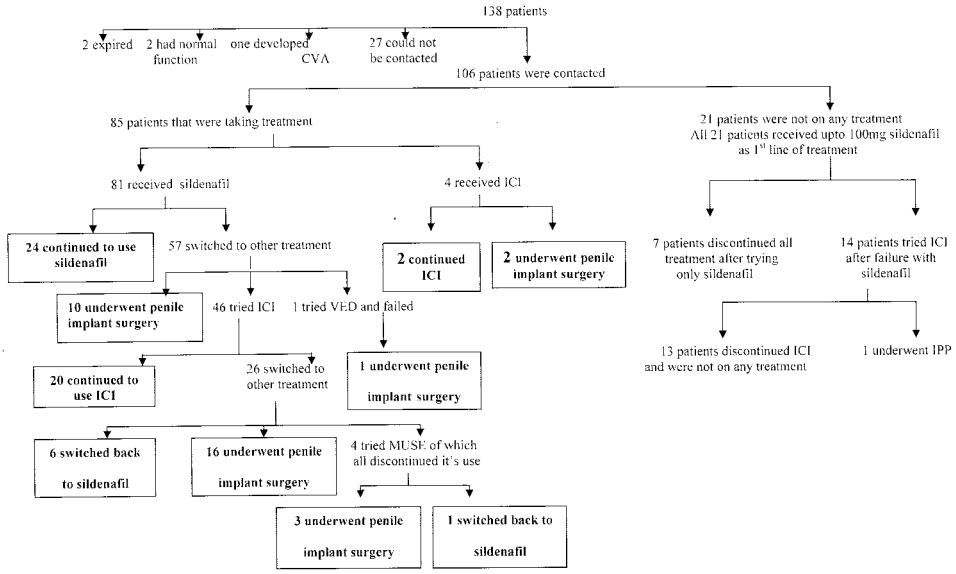

FIG. 1. Flow chart of 138 patients who presented to urology clinic for ED treatment shows how they tried various modalities and changed among them before electing final treatment modality (bold).

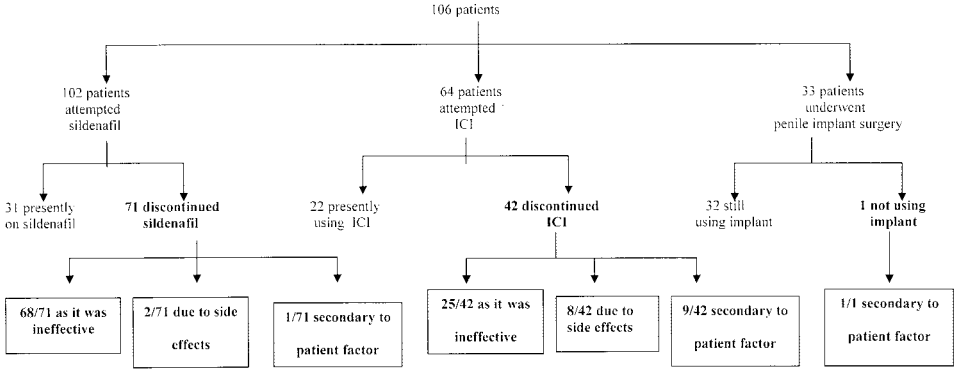

FIG. 2. Reasons for discontinuing sildenafil, ICI and IPP

mean dose of PGE1 was 13.89 mcg. Of the 64 patients who used ICI 42 (65.62%) discontinued it at evaluation, including 25 (59.52%) because it was ineffective, 8 (19.05%) with side effects (scar tissue in 1 and complaints of pain in 7) and 9 (21.43%) due to patient factors (aversion to self-injection in 8 and concern about long-term effects in 1).

Of the 106 patients 33 (31.13%) had undergone IPP at evaluation. All patients had a 3-piece inflatable penile prosthesis. Only 1 patient (3.03%) had stopped using the implant at evaluation due to fear of a cardiac event during sexual activity. He reported that the implant was functioning normally at evaluation.

Of the 106 patients 74 (70.59%) used multiple forms of therapy and changed from 1 therapy to another before continuing with the final form of therapy (fig. 2). Of the patients who underwent penile implant surgery 10 had attempted sildenafil, 2 used ICI, 16 used ICI and sildenafil, 3 used ICI, sildenafil and intraurethral alprostadil, and 1 tried sildenafil and VED prior to surgery. Average followup was similar in the 3 groups, namely 20.16 months in patients on sildenafil, 19.59 months in those on ICI and 18.91 months in those who underwent penile implant surgery.

At evaluation 85 patients were on some form of treatment for ED, of whom 31 (36.47%) were using sildenafil citrate, 22 (25.88%) were using ICI and 32 (37.65%) were using the penile implant. Of the 106 patients 21 (19.81%) were on no treatment for ED and incapable of successful sexual intercourse.

Evaluation of the patients on sildenafil and ICI showed no statistical difference in total EDITS, EDITS Index and EFD scores (see table). EFD, total EDITS and EDITS Index scores were significantly higher in patients who underwent penile implant surgery than in those on sildenafil citrate (see table). EFD, total EDITS and EDITS Index scores were significantly higher in patients who underwent penile implant surgery than in those on ICI (see table).

Furthermore, evaluation of the response to question 1 of the EDITS questionnaire, which assesses overall satisfaction with treatment, revealed that a significantly higher number of patients who underwent IPP had a response of 3 or 4 (moderately or completely satisfied) than those on sildenafil or ICI (fig. 3). A significantly greater number of patients who underwent penile implant surgery responded to question 2 of the EDITS questionnaire, which addresses whether treatment met their expectations, with a response of 3 or 4 (considerably and completely) than those on sildenafil or ICI (fig. 4).

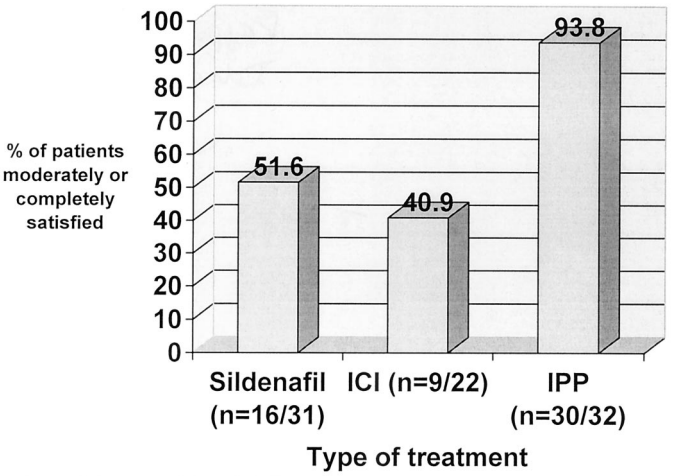

FIG. 3. In response to EDITS questionnaire question 1 on overall satisfaction with treatment 30 of 32 patients (93.75%) who underwent IPP were moderately or completely satisfied (response 3 or 4) compared with 16 of 31 (51.61%) on sildenafil and 9 of 22 (40.91%) on ICI.

Patients who undergo RRP historically respond poorly to sildenafil. To eliminate bias in the results we excluded patients who had undergone RRP and calculated EFD, total EDITS and EDITS Index scores in the remaining patients who received the 3 treatment modalities. Even in this group patients who underwent IPP had significantly higher EFD, total EDITS and EDITS Index scores than those on sildenafil (28 versus 19.79, 36.29 versus 26.89 and 82.49 versus 61.12) and ICI (28.00 versus 21.82, , 36.29 versus 25.27and 82.49 versus 57.44, respectively, all $p < 0.001$).

DISCUSSION

The introduction of sildenafil into clinical practice revolutionized the management of erectile dysfunction. Recent data show that almost 82% of prescriptions are written by nonurologists and urologists write first prescriptions for only 18%

EDITS Index, EDITS and EFD scores in patients treated with sildenafil, intracavernous injections and penile implant surgery

	Sildenafil	Intracavernous Injection*	Penile Implant Surgery†
No. pts	31	22	32
Mean EDITS ± SD	27.06 ± 7.033	25.59 ± 8.034	36.09 ± 6.34
Mean EFD score ± SD	20.26 ± 5.47	22.91 ± 6.202	27.88 ± 2.52
Mean EDITS Index ± SD	61.51 ± 15.98	58.16 ± 18.25	82.03 ± 14.41

* No significant differences between patients on sildenafil and intracavernous injections ($p > 0.05$).
† Significantly higher scores for patients who underwent penile implant surgery compared with those on ICI or sildenafil ($p < 0.001$).

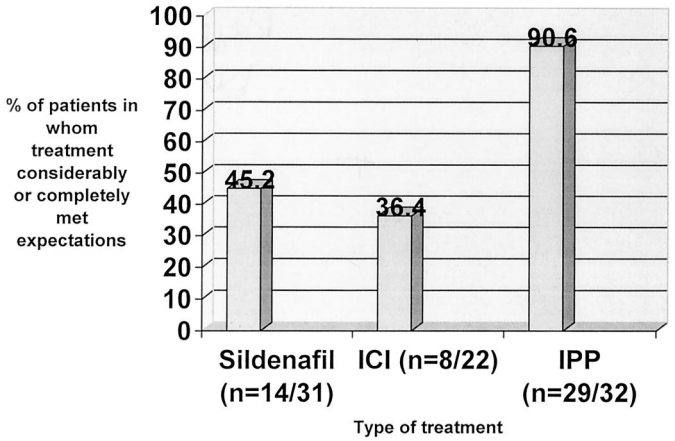

FIG. 4. In response to EDITS questionnaire question 4 on whether treatment met expectations 29 of 32 patients (90.63%) who underwent IPP said that treatment met expectations considerably or completely compared with 14 of 31 (45.16%) on sildenafil and 8 of 22 (36.36%) on ICI.

of the patients with ED.[3] Almost 91% of the patients in our study had already attempted sildenafil at various doses prior to presentation to our clinic. Therefore, our patients represent nonresponders to sildenafil in the primary care setting. Even then around 30% of these patients continued to use sildenafil at a followup of approximately 20 months. This finding highlights the importance of detailed instructions on sildenafil use, including the need to use it in the presence of sexual stimulation, on multiple occasions and on an empty stomach. Hatzichristou stressed the importance of detailed instructions prior to prescribing sildenafil and showed that around 55% of patients categorized with treatment failure actually responded to the drug on re-prescription with instructions.[7]

To our knowledge our study is the first to compare treatment satisfaction and erectile function in patients treated with sildenafil, ICI and IPP for ED using validated questionnaires. The results of the study show that at a mean followup of almost 2 years patients who underwent IPP had significantly higher total EDITS and EDITS Index scores than those maintained on sildenafil or ICI. Furthermore, a significantly greater number of patients who underwent IPP were moderately or completely satisfied compared with those on sildenafil and ICI. Most importantly a significantly greater number of patients treated with IPP believed that the treatment considerably or completely met their expectations compared with those on sildenafil or ICI. This finding implies that at a followup of approximately 20 months patients who undergo IPP have higher levels of satisfaction than those receiving sildenafil or ICI. At the same time patients who undergo IPP have significantly better erectile function than those on sildenafil and/or intracavernous injections based on higher erectile function domain scores. It may be a reason that patients who undergo IPP have better treatment satisfaction than those on other forms of therapy. Prior studies have shown similarly high satisfaction rates in patients who undergo IPP, varying from 83% to 88% at 2 years of followup.[18,19]

Interestingly in our study patients who received ICI had better EFD scores (not statistically significant), while patients on sildenafil had better EDITS Index scores (not statistically significant). In a prior series Giuliano et al reported higher a mean EDITS score in patients on sildenafil than in those on ICI, although success was higher in patients on ICI (90% versus 79%).[20] Furthermore, almost 40% of the 42 patients who discontinued ICI did so due to reasons other than treatment efficacy. This observation shows that in patients on ICI factors other than the adequacy of erectile function have a role in determining treatment satisfaction and continuation of the medication. Prior studies have shown that 15% of the patients offered ICI do not accept it, 40% discontinue it within 3 months of starting therapy and only 20% to 30% continue to use it after 3 years.[21] Other studies indicate that 74.8% of the patients on ICI change to sildenafil and 47.7% continue to use it after 6 months, suggesting that patients prefer less invasive oral treatment to ICI.[22]

The commonest cause of discontinuation of sildenafil and ICI was drug ineffectiveness. Patients who discontinued sildenafil rarely did so due to adverse effects (1.9% in our study), while 41% on ICI discontinued the drug due to reasons other than drug ineffectiveness, including drug related side effect/patient related factors, such as aversion or fear of injection. In contrast to sildenafil and ICI, patients cannot discontinue the implant unless it is removed. However, a patient who is dissatisfied with the implant may stop using it. In our population only 1 of 33 patients discontinued using the implant due to fear of a cardiac event while attempting sexual activity. Of the patients who expressed dissatisfaction with the implant 2 were unhappy with penile length. However, each patient remained sexually active and 1 mentioned that he would not mind undergoing repeat surgery as long as the penis would be enlarged.

A surprising finding in our study is that only 30% of the patients were still using sildenafil after 20 months. These values are much lower than the high rates in other studies.[22,23] A reason could be that 34% of our patients underwent radical prostatectomy in the past. Prior studies have shown low rates of success with sildenafil in these patients.[4,23] However, as noted, the treatment benefit of IPP (higher EFD, total EDITS and EDITS Index scores) was significantly higher in all groups of patients and not restricted to those treated with RRP. A final reason for the lower rate of sildenafil continuation could be that almost 91% of the patients presented to us with sildenafil treatment failure. These patients may have had severe ED since the success of sildenafil decreases with the severity of erectile dysfunction.[23] Nevertheless, the majority of patients presenting to the urology clinic have tried sildenafil in the primary care setting and they present for urology consultation after an inadequate response to sildenafil. In addition, 20 patients had tried sildenafil and/or ICI, and did not want to undergo IPP when the 2 treatments failed. Thus, patients are unwilling to undergo the more invasive option of penile implant surgery despite proven success in other patients.

CONCLUSIONS

Of patients who present to a urologist for the treatment of ED a significant majority have already tried sildenafil and report failure. With the proper dose and instruction almost 30% of patients continued to use sildenafil after 20 months. At a mean followup of 19.54 months patients who underwent penile implant surgery had significantly better erectile function and treatment satisfaction than those on sildenafil citrate or intracavernous PGE1, as determined by the total EDITS, EDITS Index and erectile function domain scores.

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