



CROSS SECTIONAL STUDY OF EFFECTS AND COMPARISON OF ORAL SILDENAFIL WITH INTRACAVERNOSAL INJECTION OF PAPAVERINE IN PENILE DOPPLER ULTRASONOGRAPHY ASSESSMENT OF ERECTILE DYSFUNCTION

Radiology

Dr. Parmar Bharat Kuberbhai 3rd Year Resident, Department Of Radiology, Chettinad Hospital And Research Institute Care, Kelambakkam, Chennai, India.

Dr. Nikhill Murugadass* Senior Resident, Shree Balaji Medical College And Hospital, Chennai, India.
*Corresponding Author

Dr. Pedro P Consultant Radiologist, Nirmala Scans, Perambalur, Tamil Nadu, India.

ABSTRACT

Introduction: This study was made to investigate the use of oral sildenafil as a possible substitute for intracavernosal injection of papaverine as an erection induction agent. **Materials And Method:** This observational cross sectional study was performed on the patients who were referred to the department for routine history of erectile dysfunction that lasted at least 6 months. A detailed history was noted. Penile Doppler with regular dose Inj. all of the patients were given papaverine (30-60mg). All patients were given another penile Doppler with Tab. Sildenafil after a week (50 mg). Both hemodynamic changes and clinical evaluation were done concurrently during penile Doppler testing. **Results:** There was no difference in the percentage of patients who responded properly to these two medicines. Using clinical grading of self-rating scores, the mean score for anxiety was 40.89 and for depression was 0.480.09 in the study population. Except for end diastolic velocity, the findings of PDU of peak systolic velocity (PSD), resistive index, and acceleration time for both 5 and 15 minutes with Papaverine and oral sildenafil citrate were not significantly different. **Conclusion:** Oral sildenafil was shown to be equally efficacious as papaverine. While erections were delayed in onset, their length and quality were equal.

KEYWORDS

Erectile dysfunction, Color Doppler ultrasonography, intracavernous injection, Peak systolic velocity.

INTRODUCTION

Erectile dysfunction (ED) is a common clinical disease that affects men of all ages, although it is most common in those over 40.^{1,2} With 52 percent of males aged 40–70 years suffering from ED and up to 10% of the population suffering from severe ED, it is a significant public health issue.³ Because of the emotional component and related social guilt, the problem usually goes unrecognized.^{4,5} Given the complexity of erection physiology, it's unsurprising that the causal reasons for erectile dysfunction are numerous. Physical causes of ED can be classified as issues with arterial inflow, anatomic penile anomalies, or venous occlusion mechanism dysfunction.⁶ Doppler sonography is a highly specialized method that requires an in-depth understanding of the subject in order to help in diagnosis and guide future therapy.⁶ This procedure is suggested for individuals who do not react to oral pharmaceutical medications for erectile dysfunction (e.g., PDE-5 inhibitors). The standard procedure is to induce a pharmaco erection and analyze the Doppler wave shape of the cavernosal arteries.⁷ Lue et al.⁸ introduced penile Doppler sonography in 1985, with evaluation of cavernosal artery flow dynamics to investigate ED. While Papaverine is now the most powerful erectogenic medication on the market, it is invasive and has adverse effects. Intra cavernous injection is connected with anxiety, which might have a detrimental effect on the patient's erectile function. Sildenafil is a well-established oral treatment for erectile dysfunction. Additionally, it has been demonstrated to be effective as a secondary testing agent in conjunction with Color Doppler ultrasonography (CDU). Since then, its function has altered significantly, most notably with the development of oral PDE5 inhibitors such as Sildenafil. In this study we examined erectile dysfunction using oral sildenafil citrate and an intracavernosal injection of papaverine as an erection stimulant and to determine if oral sildenafil was equally effective as injectable papaverine in the evaluation of men with ED based on these variables.

MATERIALS AND METHOD

This observational cross-sectional research comprised of 75 clinically suspected ED patients aged 20 to 45 years referred from different departments. Patients with cardiac dysfunction and patients on nitrates were excluded from the study. All patients had a history of erectile dysfunction that lasted at least 6 months.

All patients had a thorough clinical history taken, as well as basic blood tests. The degree of erectile dysfunction was clinically graded using a standard questionnaire (Sexual health inventory for men - SHIM). The research comprised individuals with a score of less than 21.

The study module is organised as follows: Penile Doppler with regular

dose Inj. All of the patients were given papaverine (30-60 mg)

All patients were given another penile Doppler with Tab. Sildenafil after a week (50 mg). Both hemodynamic changes (by colour Doppler and spectral pattern) and clinical evaluation were done concurrently during penile Doppler testing.

Doppler criteria for erectile dysfunction:

1. Normal
 - PSV - >30cm/sec
 - EDV - nilThere is no venous leak.
2. Erectile dysfunction
 - PSV - 30 cm/sec
 - EDV - more than 5cm/sec
 - Venous occlusion

RESULT

A total of 75 consecutive patients with mean age of 37.3 ± 10.1 were randomly chosen for our follow-up research. ED was observed more number in married men. IIEF score were taken from all the patients. Maximum number of patients were mild to moderate category (Score-17-21).

Based on SAS and SDS score in our study 28% had depression and 18% of patients had anxiety. In this study when comparing to the baseline papaverine mode showed slightly increased in length and circumference which is not statistically significant. In this study PDU assessment of Peak systolic velocity of right cavernosal artery at 5 mins showed Sildenafil mode slightly higher in both right and left sides. Regarding PDU assessment of EDV of right cavernosal artery at 5 mins showed significantly lower in papaverine mode than the sildenafil mode.

Regarding PDU assessment of resistive index of right cavernosal artery showed significantly lower in papaverine mode than the sildenafil mode. Regarding PDU measurement of acceleration time with papaverine showed higher than sildenafil. In this study PDU assessment of Peak systolic velocity of right cavernosal artery at 15 mins showed papaverine mode slightly higher in both right and left sides. (Table 1)(Figure 1) Regarding PDU assessment of EDV of right and left cavernosal artery showed significantly lower in papaverine mode than the sildenafil mode. (Table 2) (Figure 2) AT was higher in papaverine group after 15 mins when comparing to the sildenafil. In this study we have observed few adverse reaction in both drug administration. Maximum number of patients had pain in papaverine

group and most of the patients had flushing in sildenafil group. (Figure 3)

DISCUSSION

US is the preferred imaging modality for first penile examination because it can examine both anatomical and dynamic blood flow; it is widely available, minimally invasive, and cost effective; and it is well tolerated by the patient.⁹ Erectile dysfunction develops as a result of psychogenic, vascular, neurologic, endocrinologic, or pharmacologic issues. Vasculogenic impotence is a frequent and potentially treatable cause of organic ED. Isolated ED has been hypothesized to be a sign of subclinical coronary artery disease. Thus, accurate identification of vasculogenic ED is critical. Appropriate knowledge of the penile hemodynamics underlying normal erection is critical for evaluating vasculogenic ED.¹⁰ Vasculogenic impotence has been assessed using both invasive and non-invasive methods. Among them, pharmacopenile Doppler ultrasonography is the gold standard for evaluating penile arterial and veno-occlusive function.

The age distribution of the patients investigated in this study ranged from 21 to 66 years. The majority of patients 34 % were in the age group between 35 and 40. ED has been shown to be an age-dependent illness, with a prevalence ranging from 0.1 percent at age 20 to 75 percent at age 80, according to the findings. In order to understand the process of erection and how it changes in illness, researchers have used both invasive and non-invasive methods. Normal Doppler tests (defined as a PSV higher than 30 cm per sec with no diastolic flow or obvious venous leak) were obtained in all patients taking both Papaverine and Sildenafil. There was no difference in the percentage of patients who responded properly to these two medicines. In this study, erectile function was determined using replies to a physician-administered questionnaire. IIEF scores of 14% (11) in the 10th grade, 24% (18) in the 11-16 grade, 35% (26) in the 17-21 grade, and 26% (20) in the group aged 22-25 grade were considered. Recently, Lehmann et al.¹¹ shown that while pharmacostimulated erection could not be used to define ED, meaningful ED may be reported honestly. As Rosen et al.¹² state, the IIEF is meant to supplement rather than replace clinical judgement and meaningful diagnostic evaluations. It may be especially effective as a first screening device in the general practice environment, particularly in light of the growing availability of oral medications for ED. Using clinical grading of self-rating scores, the mean score for anxiety was 40.89 and for depression was 0.480.09 in the study population. A novel noninvasive technique for evaluating erectile dysfunction utilizing penile Doppler ultrasound (PDU) and sildenafil citrate (Viagra) as an erection inducing drug has been developed. Except for end diastolic velocity, the findings of PDU of peak systolic velocity (PSD), resistive index, and acceleration time for both 5 and 15 minutes with Papaverine and oral sildenafil citrate were not significantly different.¹³ Despite the fact that PGE 1 was shown to be the most effective erectogenic agent, patients said that sildenafil citrate was the most convenient medication. It is also a choice for people who are afraid of needles since it is a less intrusive alternative to intracavernous injection. In our practise, tactile stimulation is regularly used in conjunction with intracavernosal injections. We chose to investigate this hypothesis in addition to objectively evaluating sildenafil's involvement in ED assessment. While stiffness may be evaluated using rigidscan, rigidometer, or snap gauge, such equipment adds to the expense of the evaluation. Sildenafil was shown to be equally effective as Papaverine in our study, but had a higher rate of side effects. Similarly, Viswaroop et al.¹⁴ found that oral sildenafil is as effective as papaverine in treating erectile dysfunction.

CONCLUSION

The findings revealed that Tab. Sildenafil significantly increases the blood flow to the penile vasculature, suggesting that it might be utilized as an erectogenic medication in conjunction with self-tactile stimulation. Oral sildenafil was shown to be equally efficacious as papaverine. Subjective and objective answers were quite congruent. While erections were delayed in onset, their length and quality were equal. Although adverse effects were observed, they were all minor, and none of the males had priapism. Men who never had a sexual interaction likewise responded well.

Table 1: Distribution of PDU of Peak systolic velocity (PSD) value measured 15 mins after erection induction with two drugs

PSV cm/s	Papaverine Mean (SD)	Sildanefil Mean (SD)	P value
Right side	38.3±14.3	31.6±13.31	0.361
Left side	32.5±13.7	28.7±12.9	0.091

Table 2: Distribution of PDU of End Diastolic Velocity value measured 15 mins after erection induction with two drugs

EDV cm/s	Papaverine Mean (SD)	Sildanefil Mean (SD)	P value
Right side	-2.5±4.6	-1.4±2.7	0.012*
Left side	-1.9±4.2	-1.6±3.1	0.121

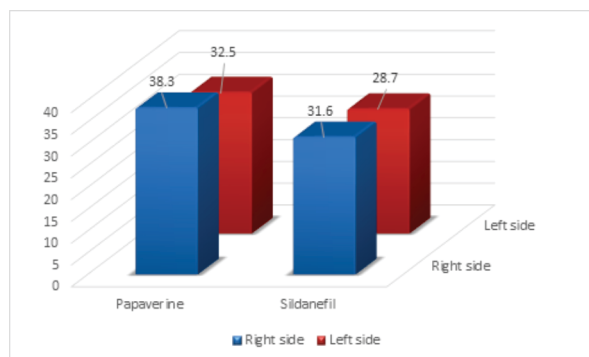


Figure 1: Distribution of PDU of Peak systolic velocity (PSD) value measured 15 mins after erection induction with two drugs

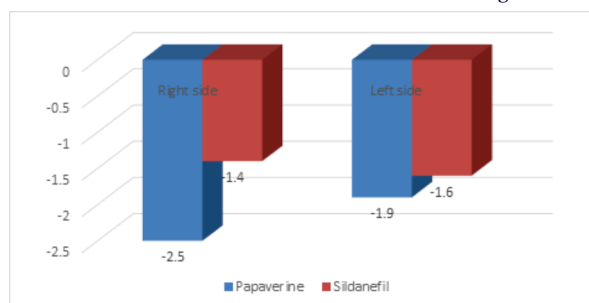


Figure 2: Distribution of PDU of End Diastolic Velocity value measured 15 mins after erection induction with two drugs

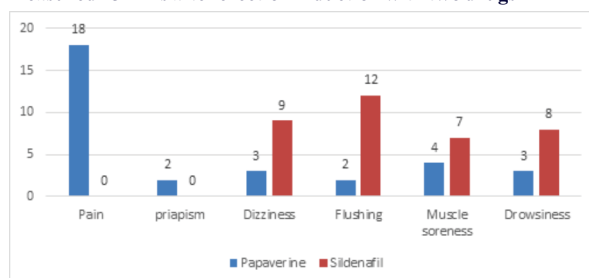


Figure 3: Distribution of complications observed in both due to Papaverine and sildenafil

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