ORIGINAL RESEARCH

Comparaison of Tadalafil versus Papaverine in erectile dysfunction patients using Pharmaco Penile Duplex Ultrasonography

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ABSTRACT

Background: The inability to obtain and/or sustain an erection for fulfilling sexual activity is the conventional definition of erectile dysfunction. The present study was assessment of Tadalafil versus Papaverine in Pharmaco Penile Duplex Ultrasonography. **Materials & Methods:** 80 males with erectile dysfunction were compared using Pharmaco penile duplex ultrasonography with two protocols with one week gap. First one was 'Tadalafil mode' and second one was 'Papaverine mode'. Tadalafil mode: Patients were given oral Tadalafil (20mg), 2 hours before the procedure. Papaverine mode: After 1 week, patients underwent penile doppler study following intracavernosal injection with Papaverine (60 mg). In both protocols gray scale imaging followed by duplex ultrasonography was done. The erectile response is categorised visually from E0 to E5 as proposed by Broderick GA and Arger P. **Results:** Age group <20 years comprised of 2, 20-30 years had 54 and 30-40 years had 16 patients. The difference was significant (P< 0.05). In tadalafil and papaverine mode, visual grading score found to be E1 in 6 and 5, E2 in 8 and 6, E3 in 10 and 9, E4 in 11 and 10 and E5 in 45 and 50 patients respectively. The difference was significant (P< 0.05).PPDU impression under Tadalafil mode and Papaverine mode found to be normal in 0 and 15, arterial insufficiency in 32 and 35, venous insufficiency in 44 and 8 and indetermined in 4 and 22 cases. **Conclusion:** Papaverine and tadalafil both had statistically significant outcomes that were comparable. Since tadalafil avoids the intrusiveness of papaverine, it is more effective in treating psychogenic impotence. While tadalafil administration still exhibited some practical use issues, more patients responded better to papaverine in the form of higher PSVs and improved erection response.

Keywords: Erectile dysfunction,Papaverine, Tadalafil

INTRODUCTION

The inability to obtain and/or sustain an erection for fulfilling sexual activity is the conventional definition of erectile dysfunction. Although it can afflict males of all ages, its prevalence rises with age, reaching up to 52% of men in the 40–69 age range.[1]

Psychotherapists dominated the field of ED evaluation prior to the 1980s, but Virag R's 1982 invention of Papaverine made testing via intracavernosal injection of pharmaceutical substances a well- recognized practice in ED evaluation.[2]

Lue TH et al[3] pioneered the sonographic evaluation of ED. They postulated that a 75% increase in cavernosal artery diameter following an intracavernosal injection of vasodilating drugs is a positive indicator of normal arterial flow. The two main classifications for ED are "psychologic" and "organic." The most frequent cause of organic impotence is vasculogenic. Two processes can be used to explain vascular ED: either veno-occlusive dysfunction, which is the inability to trap incoming blood in the cavernosa, or obstruction in the penile inflow tract, which results in arterial insufficiency.[4]

Pharmaco Penile Duplex Ultrasonography (PPDU) can be performed by oral or intracavernosal vasoactive agents. Intracavernosal injection of papaverine causes erection by direct smooth muscle relaxation and consequent filling of the corpus cavernosum with blood.[5] However, intracavernosal injections are painful and associated with fear,

anxiety, haematoma, risk of extravasation and priapism. Tadalafil is a Phosphodiesterase type 5 (PDE5) inhibitor marketed in pill form for treating ED.[6]The present study was assessment of Tadalafil versus Papaverine in Pharmaco Penile Duplex Ultrasonography.

MATERIALS & METHODS

The study was carried out 80 males with erectile dysfunction. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Pharmaco penile duplex ultrasonography was done in all patients with two protocols with one week gap. First one was 'Tadalafil mode' and second one was 'Papaverine mode'. Tadalafil mode: Patients were given oral Tadalafil (20mg), 2 hours before the procedure. An audiovisual self- stimulation and self-genital stimulation were performed 10 minutes before the test. Papaverine mode: After 1 week, patients underwent penile doppler study following intracavernosal injection with Papaverine (60 mg). In both protocols gray scale imaging followed by duplex ultrasonography was done. Spectral waveforms were recorded once in 5 minutes for half an hour. The erectile response is categorised visually from E0 to E5 as proposed by Broderick GA and Arger P. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Number	P value
<20	2	0.01
20-30	54	
30-40	16	

Table I shows that age group <20 years comprised of 2, 20-30 years had 54 and 30-40 years had 16 patients. The difference was significant (P< 0.05).

Table II Visual grading scores for erectile response

Visual grading scores	Tadalafil mode	Papaverinemode	P value
E1	6	5	0.75
E2	8	6	
E3	10	9	
E4	11	10	
E5	45	50	

Table II, graph I shows that in tadalafil and papaverine mode, visual grading score found to be E1 in 6 and 5, E2 in 8 and 6, E3 in 10 and 9, E4 in 11 and 10 and E5 in 45 and 50 patients respectively. The difference was significant (P< 0.05).

Graph I Visual grading scores for erectile response

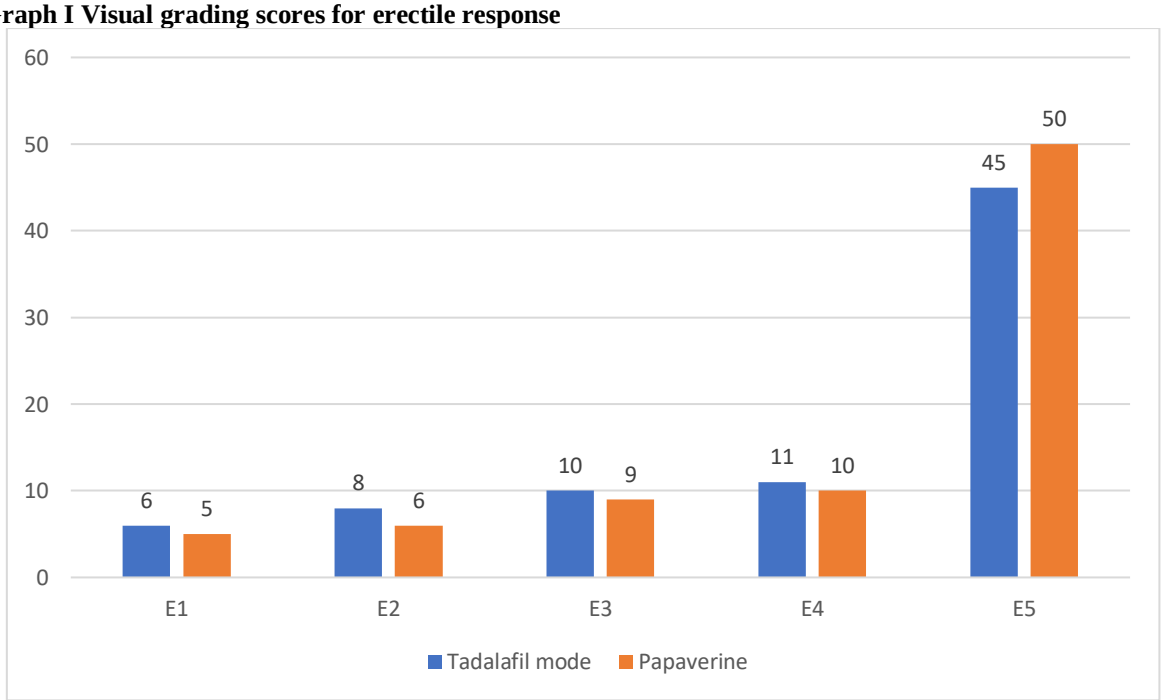

Table III Final PPDU impression

PPDU impression	Tadalafil mode	Papaverine	P value
Normal	0	15	0.75
Arterial insufficiency	32	35	
Venous insufficiency	44	8	
Indetermined	4	22	

Table III shows that PPDU impression under Tadalafil mode and Papaverine mode found to be normal in 0 and 15, arterial insufficiency in 32 and 35, venous insufficiency in 44 and 8 and indetermined in 4 and 22 cases.

DISCUSSION

Oral Tadalafil has been studied for non- invasive evaluation of ED as an alternative to intracavernosal injection of vasoactive drugs.[7] Unlike intracavernosal agents, Tadalafil alone cannot achieve satisfactory erection and it must be supplemented with audiovisual sexual stimulation and the results are inconsistent.[8,9] The quality of erection and the PSV achieved with oral pharmacological agents is lower than the same parameters achieved after intracavernosal injection.[10,11]The present study was assessment of Tadalafil versus Papaverine in Pharmaco Penile Duplex Ultrasonography.

We found that age group <20 years comprised of 2, 20-30 years had 54 and 30-40 years had 16 patients. Mutnuru PC et al[12]assessed whether oral Tadalafil is as useful as injectable Papaverine in the evaluation of men with ED. In Tadalafil mode, visual grading for erectile response was E1 in four patients, E2 in eight patients, E3 in seven patients, E4 in two patients and E5 in 15 patients. In Papaverine mode, visual grading for erectile response was E1 in three patients, E2 in seven patients, E3 in five patients, E4 in two patients and E5 in 19 patients. In Tadalafil mode, a total of 17 patients showed evidence of arterial insufficiency and two patients showed evidence of venous insufficiency. In Papaverine mode, a total of 12 patients showed evidence of arterial insufficiency, two patients showed evidence of venous insufficiency and one patient showed indeterminate results.

We found that in tadalafil and papaverine mode, visual grading score found to be E1 in 6 and 5, E2 in 8 and 6, E3 in 10 and 9, E4 in 11 and 10 and E5 in 45 and 50 patients respectively. Suresh et al[13]determined the integrity of the vascular mechanism and to differentiate between arterial and venous insufficiency. A total of 33 consecutive patients presenting with symptoms of ED and undergoing penile color Doppler evaluation with the injection of 2 ml of paperavine were included. The baseline diameter of the vessels at pre-injection was <1 mm in 46% of the patients, the majority of the patients 52% showed a baseline diameter of 1-1.5 mm. Post-injection of paperavine the peak increase in the diameter of the vessels in 43% of the patients showed an increase of <1.5 mm. However, 52% of the patients showed an increase between 1.5 and 2.5 mm. The average peak diameter was 1.71 mm and the P < 0.001, which was significant. 46% patients with low peak systolic velocity (PSV) values (<25 cm/s) in the cavernosal artery were considered to have arterial insufficiency, 9% (3) of the patients had an end-diastolic velocity of >5 cm/s had normal arterial function, that is, normal PSV. Adequate arterial inflow, a short duration erection, with the persistent antegrade flow of >5 cm/s throughout all phases suggestive of venous leak. 42% of the patients studied where found to be functional where no cause could be ascertained.

We found that PPDU impression under Tadalafil mode and Papaverine mode found to be normal in 0 and 15, arterial insufficiency in 32 and 35, venous insufficiency in 44 and 8 and indetermined in 4 and 22 cases. Kilic M et al[14]evaluated the actual incidence of papaverine-induced priapism in patients with erectile dysfunction (ED) who underwent penile colour Doppler sonography and to determine the safety of this diagnostic tool, a retrospective study was conducted using the database of our institution. A total of 672 men with ED underwent penile color Doppler ultrasonography with the intracorporeal injection of 60 mg papaverine hydrochloride. The patient characteristics of priapism cases were retrospectively evaluated. Priapism in 18 of the 672 patients (2.68%) was successfully treated with blood aspiration, irrigation and injection of an alpha-agonist medication, when needed. Patients with priapism were younger compared with those without priapism; mean age 45 +/- 12.51 (20-68) versus 50.93 +/- 12.04 (17-78) (P < 0.001). Penile Doppler ultrasound is a safe procedure in evaluating erectile dysfunction. The incidence of priapism, which is the most important complication of this procedure, is low and can be managed successfully with conservative approaches.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that Papaverine and tadalafil both had statistically significant outcomes that were comparable. Since tadalafil avoids the intrusiveness of papaverine, it is more effective in treating psychogenic impotence. While tadalafil administration still exhibited some practical use issues, more patients responded better to papaverine in the form of higher PSVs and improved erection response.

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