JOVAN T 20

TADALAFIL TABLETS USP 20 mg

1. NAME OF THE MEDICINAL PRODUCT
JOVAN T 20mg tablets.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION
Each JOVAN T 20mg tablet contains Tadalafil USP 20 mg.

3. PHARMACEUTICAL FORM
Film-Coated tablet.
Yellow colored, almond shaped, film coated tablets, debossed with "20" on one side and plain on other side.

4. CLINICAL PARTICULARS
4.1 Therapeutic indications
Treatment of erectile dysfunction in adult males.
In order for tadalafil to be effective, sexual stimulation is required.
Tadalafil is not indicated for use by women.
4.2 Posology and method of administration
Posology
Use in Adult Men
In general, the recommended dose is 10mg taken prior to anticipated sexual activity and with or without food. In those patients in whom tadalafil 10mg does not produce an adequate effect, 20mg might be tried. It may be taken at least 30 minutes prior to sexual activity.
The maximum dose frequency is once per day.
Tadalafil 10mg and 20mg is intended for use prior to anticipated sexual activity and it is not recommended for continuous daily use.
In patients who anticipate a frequent use of tadalafil (i.e., at least twice weekly) a once daily regimen with the lowest doses of tadalafil might be considered suitable, based on patient choice and the physician's judgement.
In these patients, the recommended dose is 2.5mg taken once a day at approximately the same time of day. The dose may be increased to 5mg once a day based on individual efficacy and tolerability.
The appropriateness of continued use of the daily regimen should be reassessed periodically.
Use in Elderly Men
Dose adjustments are not required in elderly patients.
Use in Men with Impaired Renal Function
Tadalafil for Use as Needed
- Mild (creatinine clearance 51 to 80 ml/min): No dose adjustment is required.
- Moderate (creatinine clearance 31 to 50 ml/min): A starting dose of 5mg not more than once per day is recommended and the maximum dose is 10mg not more than once in every 48 hours.
- Severe (creatinine clearance < 30 ml/min or on hemodialysis): The maximum dose is 5mg not more than once in every 72 hours (see section 4.4 and 5.2).

Tadalafil for Once Daily Use
- Mild (creatinine clearance 51 to 80 ml/min): No dose adjustment is required.
- Moderate (creatinine clearance 31 to 50 ml/min): No dose adjustment is required.
- Severe (creatinine clearance < 30 ml/min or on hemodialysis): Cialis for once daily use is not recommended (see section 4.4 and 5.2).

Use in Men with Impaired Hepatic Function
Tadalafil for Use as Needed
The recommended dose is 10mg taken prior to anticipated sexual activity. There is limited clinical data on the safety of Cialis in patients with severe hepatic impairment (Child-Pugh Class C); if prescribed, a careful individual benefit/risk evaluation should be undertaken by the prescribing physician. There are no available data about the administration of doses higher than 10mg of tadalafil to patients with hepatic impairment.
Tadalafil for Once Daily Use
Once-a-day dosing has not been extensively evaluated in patients with hepatic impairment; therefore, if prescribed, a careful individual benefit/risk evaluation should be undertaken by the prescribing physician (see section 4.4 and 5.2).
Use in Men with Diabetes
Dose adjustments are not required in diabetic patients.
Paediatric population
Tadalafil should not be used in individuals below 18 years of age.
Patients taking CYP3A4 Inhibitors
Tadalafil for Use as Needed
For patients taking concomitant potent inhibitors of CYP3A4, such as ketoconazole or ritonavir, the maximum recommended dose of Tadalafil is 10mg, not to exceed once every 72 hours (see section 4.4 and 4.5)
Tadalafil for Once Daily Use
For patients taking concomitant potent inhibitors of CYP3A4, such as ketoconazole or ritonavir, the maximum recommended dose of Tadalafil is 2.5mg (see section 4.4 and 4.5)
4.3 Contraindications
Hypersensitivity to the active substance or to any of the excipients.
In clinical studies, tadalafil was shown to augment the hypotensive effects of nitrates. This is thought to result from the combined effects of nitrates and tadalafil on the nitric oxide/cGMP pathway. Therefore, administration of tadalafil to patients who are using any form of organic nitrate is contraindicated.
Agents for the treatment of erectile dysfunction, including tadalafil, must not be used in men with cardiac disease for whom sexual activity is inadvisable. Physicians should consider the potential cardiac risk of sexual activity in patients with pre-existing cardiovascular disease.
The following groups of patients with cardiovascular disease were not included in clinical trials and the use of tadalafil is therefore contraindicated:
- patients with myocardial infarction within the last 90 days,
- patients with unstable angina or angina occurring during sexual intercourse,
- patients with New York Heart Association Class 2 or greater heart failure in the last 6 months,
- patients with uncontrolled arrhythmias, hypotension (< 90/50 mmHg) or uncontrolled hypertension,
- patients with a stroke within the last 6 months

Tadalafil is contraindicated in patients who have loss of vision in one eye because of non-arteritic anterior ischaemic optic neuropathy (NAION), regardless of whether this episode was in connection or not with previous PDE5 inhibitor exposure.
The co-administration of PDE5 inhibitors, including tadalafil, with guanylate cyclase stimulators, such as riociguat, is contraindicated as it may potentially lead to symptomatic hypotension (see section 4.5).

4.4 Special warnings and precautions for use
A medical history and physical examination should be undertaken to diagnose erectile dysfunction and determine potential underlying causes, before pharmacological treatment is considered.
Prior to initiating any treatment for erectile dysfunction, physicians should consider the cardiovascular status of their patients, since there is a degree of cardiac risk associated with sexual activity. Tadalafil has vasodilator properties, resulting in mild and transient decreases in blood pressure and as such potentiates the hypotensive effect of nitrates.
Tadalafil (2.5mg and 5mg) - In patients receiving concomitant antihypertensive medicines, tadalafil may induce a blood pressure decrease.
Serious cardiovascular events, including myocardial infarction, sudden cardiac death, unstable angina pectoris, ventricular arrhythmia, stroke, transient ischaemic attacks, chest pain, palpitations, and tachycardia, have been reported either post-marketing and/or in clinical trials. Most of the patients in whom these events have been reported had pre-existing cardiovascular risk factors
Visual defects and cases of NAION have been reported in connection with the intake of Tadalafil and other PDE5 inhibitors. The patient should be advised that in case of sudden visual defect, he should stop taking tadalafil and consult a physician immediately.
Cases of sudden hearing loss have been reported after the use of tadalafil. Although other risk factors were present in some cases (such as age, diabetes, hypertension and previous hearing loss history) patients should be advised to stop taking tadalafil and seek prompt medical attention in the event of sudden decrease or loss of hearing.
Due to increased tadalafil exposure (AUC), limited clinical experience and the lack of ability to influence clearance by dialysis, once-a-day dosing of tadalafil is not recommended in patients with severe renal impairment.
There is limited clinical data on the safety of single-dose administration of tadalafil in patients with severe hepatic insufficiency (Child-Pugh class C). Once-a-day administration has not been evaluated in patients with hepatic insufficiency. If tadalafil is prescribed, a careful individual benefit/risk evaluation should be undertaken by the prescribing physician.
Patients who experience erections lasting 4 hours or more should be instructed to seek immediate medical assistance. If priapism is not treated immediately, penile tissue damage and permanent loss of potency may result.
Agents for the treatment of erectile dysfunction, including tadalafil, should be used with caution in patients with anatomical deformation of the penis (such as angulation, cavernosal fibrosis, or Peyronie's disease) or in patients who have conditions which may predispose them to priapism (such as sickle cell anaemia, multiple myeloma, or leukaemia).
The evaluation of erectile dysfunction should include a determination of potential underlying causes and the identification of appropriate treatment following an appropriate medical assessment. It is not known if tadalafil is effective in patients who have undergone pelvic surgery or radical non-nerve-sparing prostatectomy.
In patients who are taking concomitant anti-hypertensive medicinal products, tadalafil may induce a blood pressure decrease. When initiating daily treatment with tadalafil, appropriate clinical considerations should be given to a possible dose adjustment of the anti-hypertensive therapy.
Caution should be exercised when prescribing tadalafil to patients using potent CYP3A4 inhibitors (ritonavir, saquinavir, ketoconazole, itraconazole, and erythromycin), as increased tadalafil exposure (AUC) has been observed if the medicines are combined.
The safety and efficacy of combinations of tadalafil and other PDE5 inhibitors or other treatments for erectile dysfunction have not been studied. The patients should be informed not to take tadalafil with such combinations.
Jovan T contains lactose monohydrate. Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicinal product.
4.5 Interaction with other medicinal products and other forms of interaction
Interaction studies were conducted with 10mg and/or 20mg tadalafil, as indicated below.
With regard to those interaction studies where only the 10mg tadalafil dose was used, clinically relevant interactions at higher doses cannot be completely ruled out.
Effects of Other Substances on Tadalafil
Tadalafil is principally metabolised by CYP3A4. A selective inhibitor of CYP3A4, ketoconazole (200mg daily), increased tadalafil (10mg) exposure (AUC) 2-fold and Cmax by 15%, relative to the AUC and Cmax values for tadalafil alone. Ketoconazole (400mg daily) increased tadalafil (20mg) exposure (AUC) 4-fold and Cmax by 22%. Ritonavir, a protease inhibitor (200mg twice daily), which is an inhibitor of CYP3A4, CYP2C9, CYP2C19, and CYP2D6, increased tadalafil (20mg) exposure (AUC) 2-fold with no change in Cmax. Although specific interactions have not been studied, other protease inhibitors, such as saquinavir, and other CYP3A4 inhibitors, such as erythromycin, clarithromycin, itraconazole, and grapefruit juice, should be co-administered with caution, as they would be expected to increase plasma concentrations of tadalafil. Consequently, the incidence of the undesirable effects listed in section 4.8 might be increased.
The role of transporters (for example, p-glycoprotein) in the disposition of tadalafil is not known. There is thus the potential of drug interactions mediated by inhibition of transporters.
A CYP3A4 inducer, rifampicin, reduced tadalafil AUC by 88%, relative to the AUC values for tadalafil alone (10mg). This reduced exposure can be anticipated to decrease the efficacy of tadalafil; the magnitude of decreased efficacy is unknown. Other inducers of CYP3A4, such as phenobarbital, phenytoin, and carbamazepine, may also decrease plasma concentrations of tadalafil.
Effects of Tadalafil on Other Medicinal Products
Nitrates
In clinical studies, tadalafil (5, 10 and 20mg) was shown to augment the hypotensive effects of nitrates. Therefore, administration of Tadalafil to patients who are using any form of organic nitrate is contraindicated (see section 4.3). Based on the results of a clinical study in which 150 subjects receiving daily doses of tadalafil 20mg for 7 days and 0.4mg sublingual nitroglycerin at various times, this interaction lasted for more than 24 hours and was no longer detectable when 48 hours had elapsed after the last tadalafil dose. Thus, in a patient prescribed any dose of Tadalafil (2.5- 20mg), where nitrate administration is deemed medically necessary in a life-threatening situation, at least 48 hours should have elapsed after the last dose of Tadalafil before nitrate administration is considered. In such circumstances, nitrates should only be administered under close medical supervision with appropriate haemodynamic monitoring.
Anti-hypertensives
In two clinical pharmacology studies, no significant decreases in blood pressure were observed when tadalafil was co-administered to healthy subjects taking the selective alpha [1A]-adrenergic blocker, tamsulosin. In subjects receiving concomitant tadalafil (20 mg) and doxazosin (4-8mg daily), an alpha (1) - adrenergic receptor blocker, there was an augmentation of the blood- pressure- lowering effect of doxazosin. This effect was still present at 12 hours post- dose and had generally disappeared at 24 hours. The number of subjects with potentially clinically significant standing- blood-pressure decreases was greater for the combination. In these clinical pharmacology studies, there were symptoms associated with the decrease in blood pressure Including syncope. Therefore, the combination of tadalafil and alpha blockers is not recommended. It is not known how this extrapolates to other alpha (1 A) -adrenergic receptor blocking agents.
In clinical pharmacology studies, the potential for tadalafil to augment the hypotensive effects of anti-hypertensive medicinal products was examined. Major classes of anti-hypertensive medicinal products were studied, including calcium channel blockers (amlodipine), angiotensin converting enzyme (ACE)-inhibitors (enalapril), beta-adrenergic receptor blockers (metoprolol), thiazide diuretics (bendrofluazide) and angiotensin II receptor blockers (various types and doses, alone or in combination with thiazides, calcium channel blockers, beta blockers and/or alpha blockers). Tadalafil (10mg except for studies with angiotensin II receptor blockers and amlodipine in which a 20mg dose was applied) had no clinically significant interaction with any of these classes. In another clinical pharmacology study, tadalafil 20mg was studied in combination with up to 4 classes of anti-hypertensives. In subjects taking multiple anti-hypertensives, the ambulatory blood pressure changes appeared to relate to the degree of blood pressure control. In this regard, study subjects whose blood pressure was well controlled, the reduction was minimal and similar to that seen in healthy subjects. In study subjects whose blood pressure was not controlled, the reduction was greater although this reduction was not associated with hypotensive symptoms in the majority of subjects. In patients receiving concomitant anti-hypertensive medicinal products, tadalafil 20mg may induce a blood pressure decrease, which (with the exception of alpha blockers - see above) is, in general, minor and not likely to be clinically relevant. Analysis of phase 3 clinical trial data showed no difference in adverse events in patients taking tadalafil with or without anti-hypertensive medicinal products. However, appropriate clinical advice should be given to patients regarding a possible decrease in blood pressure when they are treated with anti-hypertensive medicinal products.
Riociguat
Preclinical studies showed an additive systemic blood pressure lowering effect when PDE5 inhibitors were combined with riociguat. In clinical studies, riociguat has been shown to augment the hypotensive effects of PDE5 inhibitors. There was no evidence of favourable clinical effect of the combination in the population studied. Concomitant use of riociguat with PDE5 inhibitors, including tadalafil, is contraindicated (see section 4.3).
5-alpha reductase inhibitors (5-ARIs)
In a clinical trial that compared tadalafil 5mg co-administered with finasteride 5mg to placebo plus finasteride 5mg in the relief of BPH symptoms, no new adverse reactions were identified. However, as a formal drug-drug interaction study evaluating the effects of tadalafil and 5-ARIs has not been performed, caution should be exercised when tadalafil is co-administered with 5- ARIs.
CYP1A2 substrates (e.g. theophylline)
When tadalafil 10mg was administered with theophylline (a non-selective phosphodiesterase inhibitor) in a clinical pharmacology study, there was no pharmacokinetic interaction. The only pharmacodynamic effect was a small (3.5bpm) increase in heart rate. Although this effect is minor and was of no clinical significance in this study, it should be considered when co-administering these medicinal products.
Ethinylestradiol and terbutaline
Tadalafil has been demonstrated to produce an increase in the oral bioavailability of ethinylestradiol; a similar increase may be expected with oral administration of terbutaline, although the clinical consequence of this is uncertain.
Alcohol
Alcohol concentrations (mean maximum blood concentration 0.08%) were not affected by co-administration with tadalafil 10mg or 20mg. In addition, no changes in tadalafil concentrations were seen 3 hours after co-administration with alcohol. Alcohol was administered in a manner to maximise the rate of alcohol absorption (overnight fast with no food until 2 hours after alcohol). Tadalafil 20mg did not augment the mean blood pressure decrease produced by alcohol (0.7 g/kg or approximately 180ml of 40% alcohol [vodka] in an 80-kg male) but in some subjects, postural dizziness and orthostatic hypotension were observed. When tadalafil was administered with lower doses of alcohol (0.6 g/kg), hypotension was not observed and dizziness occurred with similar frequency to alcohol alone. The effect of alcohol on cognitive function was not augmented by tadalafil 10mg.
Cytochrome P450 metabolised medicinal products
Tadalafil is not expected to cause clinically significant inhibition or induction of the clearance of medicinal products metabolised by CYP450 isoforms. Studies have confirmed that tadalafil does not inhibit or induce CYP450 isoforms, including CYP3A4, CYP1A2, CYP2D6, CYP2E1, CYP2C9 and CYP2C19.
CYP2C9 substrates (e.g. R-warfarin)
Tadalafil 10mg and 20mg had no clinically significant effect on exposure (AUC) to S-warfarin or R-warfarin (CYP2C9 substrate), nor did tadalafil affect changes in prothrombin time induced by warfarin.
Digoxin
Co-administration of tadalafil 40mg once per day for 10 days did not have a significant effect on the steady-state pharmacokinetics of digoxin 0.25 mg/day in healthy subjects.
Tadalafil (10mg and 20mg) did not potentiate the increase in bleeding time caused by acetylsalicylic acid.
Specific interaction studies with antidiabetic agents were not conducted.

4.6 Pregnancy and lactation
Tadalafil is not indicated for use by women.
There are limited data from the use of tadalafil in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/foetal development, parturition or postnatal development. As a precautionary measure, it is preferable to avoid the use of tadalafil during pregnancy.
Available pharmacodynamic/toxicological data in animals have shown excretion of tadalafil in milk. A risk to the suckling child cannot be excluded. Tadalafil should not be used during breast feeding.

4.7 Effects on ability to drive and use machines

No studies of the effect on the ability to drive and use machines have been performed. Although the frequency of reports of dizziness in placebo and tadalafil arms in clinical trials was similar, patients should be aware of how they react to tadalafil before driving or operating machinery.

4.8 Undesirable effects

a. Summary of the safety profile

The commonly reported adverse reactions were headache, dyspepsia, flushing, dizziness, myalgia, back pain and nasal congestion. The adverse reactions reported were transient, and generally mild or moderate. Adverse reaction data are limited in patients over 75 years of age.

A slightly higher incidence of ECG abnormalities, primarily sinus bradycardia, has been reported in patients treated with tadalafil once a day as compared with placebo. Most of these ECG abnormalities were not associated with adverse reactions.

The table below lists the adverse reactions observed from spontaneous reporting and in placebo- controlled clinical trials (comprising a total of 8,022 patients on Tadalafil and 4,422 patients on placebo) for on-demand and once-a-day treatment of ED and the once-a-day treatment of BPH.

Frequency convention: Very common (≥ 1/10), Common (≥ 1/100 to < 1/10), Uncommon (≥ 1/1,000 to < 1/100), Rare (≥ 1/10,000 to < 1/1,000), Very rare (< 1/10,000) and Not known (cannot be estimated from the available data)

Very common	Common	Uncommon	Rare
Immune system disorders			
		Hypersensitivity reactions	Angioedema[3]
Nervous system disorders			
Headache	Dizziness		Stroke[1](including haemorrhagic events), Syncope, Transient Ishcaemic attacks[1], Migraine[3], Seizures, Transient amnesia
Eye disorders			
		Blurred vision, Sensations described as eye pain	Visual field defect, Swelling of eyelids, Conjunctival hyperaemia, Non-arteritic anterior ischemic optic neuropathy (NAION)[3], Retinal vascular occlusion[3]
Ear and labyrinth disorders			
		Tinnitus	Sudden hearing loss[2]
Cardiac disorders[1]			
		Tachycardia, Palpitations	Myocardial infarction, Unstable angina pectoris[3], Ventricular arrhythmia[3]
Vascular disorders			
	Flushing	Hypotension[4], Hypertension	
Respiratory, thoracic and mediastinal disorders			
	Nasal congestion	Dyspnoea, Epistaxis	
Gastrointestinal disorders			
	Dyspepsia	Abdominal pain, Vomiting, Nausea, Gastro-oesophageal reflux	
Skin and subcutaneous tissue disorders			
		Rash	Urticaria, Stevens-Johnson syndrome[3], Exfoliative dermatitis[3], Hyperhydrosis (sweating)
Musculoskeletal, connective tissue and bone disorders			
	Back pain, Myalgia, Pain in extremity		
Renal and urinary disorders			
		Haematuria	
Reproductive system and breast disorders			
		Prolonged erections	Priapism Penile haemorrhage, Haematospermia
General disorders and administration site conditions			
		Chest pain[1] Peripheral oedema, Fatigue	Facial oedema[3], Sudden cardiac death[1, 3]

[1] Most of the patients in whom these events have been reported had pre-existing cardiovascular risk factors (see section 4.4).

[2] Sudden decrease or loss of hearing has been reported in a small number of post-marketing and clinical trial cases with the use of all POE5 inhibitors, including tadalafil.

[3] Post-marketing surveillance reported adverse reactions not observed in placebo-controlled clinical trials

[4] More commonly reported when tadalafil is given to patients who are already taking anti-hypertensive medicinal products

4.9 Overdose

Single doses of up to 500mg have been given to healthy subjects, and multiple daily doses up to 100mg have been given to patients. Adverse events were similar to those seen at lower doses.

In cases of overdose, standard supportive measures should be adopted, as required.

Haemodialysis contributes negligibly to tadalafil elimination.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Drugs used in erectile dysfunction. ATC code: G04BE08.

Mechanism of action

Tadalafil is a selective, reversible inhibitor of cyclic guanosine monophosphate (cGMP)-specific phosphodiesterase type 5 (PDE5). When sexual stimulation causes the local release of nitric oxide, inhibition of PDE5 by tadalafil produces increased levels of cGMP in the corpus cavernosum. This results in smooth muscle relaxation and inflow of blood into the penile tissues, thereby producing an erection. Tadalafil has no effect in the absence of sexual stimulation.

Pharmacodynamic effects

Studies in vitro have shown that tadalafil is a selective inhibitor of PDE5. PDE5 is an enzyme found in corpus cavernosum smooth muscle, vascular and visceral smooth muscle, skeletal muscle, platelets, kidney, lung, and cerebellum. The effect of tadalafil is more potent on PDE5 than on other phosphodiesterases

Clinical Efficacy and Safety

Tadalafil administered to healthy subjects produced no significant difference compared to placebo in supine systolic and diastolic blood pressure (mean maximal decrease of 1.6/0.8 mmHg, respectively), in standing systolic and diastolic blood pressure (mean maximal decrease of 0.2/4.6 mmHg, respectively) and no significant change in heart rate.

In a study to assess the effects of tadalafil on vision, no impairment of colour discrimination (blue/green) was detected using the Farnsworth-Munsell 100-hue test. This finding is consistent with the low affinity of tadalafil for PDE6 compared to PDE5. Across all clinical studies, reports of changes in colour vision were rare (< 0.1%).

Three studies were conducted in men to assess the potential effect on spermatogenesis of Tadalafil 10mg (one 6-month study) and 20mg (one 6-month and one 9-month study) administered daily. In two of these studies decreases were observed in sperm count and concentration related to tadalafil treatment of unlikely clinical relevance. These effects were not associated with changes in other parameters such as motility, morphology and FSH.

Erectile Dysfunction

For Tadalafil on-demand, three clinical studies were conducted in 1,054 patients in an at-home setting to define the period of responsiveness. Tadalafil demonstrated statistically significant improvement in erectile function and the ability to have successful sexual intercourse up to 36 hours following dosing, as well as patients' ability to attain and maintain erections for successful intercourse compared to placebo as early as 16 minutes following dosing.

In a 12-week study performed in 186 patients (142 tadalafil, 44 placebo) with ED secondary to spinal cord injury, Tadalafil significantly improved the erectile function leading to a mean per- subject proportion of successful attempts in patients treated with tadalafil 10mg or 20mg (flexible- dose, on-demand) of 48% as compared to 17% with placebo.

For once-a-day evaluation of tadalafil at doses of 2.5mg, 5mg and 10mg, three clinical studies were initially conducted involving 853 patients of various ages (range 21-82 years) and ethnicities, with ED of various severities (mild, moderate, severe) and etiologies. In the two primary efficacy studies of general populations, the mean per-subject proportion of successful intercourse attempts were 57 and 67% on Tadalafil 5mg, 50% on Tadalafil 2.5mg as compared to 31 and 37% with placebo. In the study in patients with ED secondary to diabetes, the mean per-subject proportion of successful attempts were 41 and 46% on Tadalafil 5mg and 2.5mg, respectively, as compared to 28% with placebo. Most patients in these three studies were responders to previous on-demand treatment with PDE5 inhibitors. In a subsequent study, 217 patients who were treatment-naïve to PDE5 inhibitors were randomised to Tadalafil 5mg once a day vs placebo. The mean per-subject proportion of successful sexual intercourse attempts was 68% for Tadalafil patients compared to 52% for patients on placebo.

Tadalafil at doses of 2mg to 100mg has been evaluated in 16 clinical studies involving 3,250 patients, including patients with ED of various severities (mild, moderate, severe), etiologies, ages (range 21-86 years) and ethnicities. Most patients reported ED of at least 1 year in duration. In the primary efficacy studies of general populations, 81% of patients reported that Tadalafil improved their erections as compared to 35% with placebo. Also, patients with ED in all severity categories reported improved erections whilst taking Tadalafil (86%, 83% and 72% for mild, moderate and severe respectively, as compared to 45%, 42% and 19% with placebo). In the primary efficacy studies, 75% of intercourse attempts were successful in Tadalafil treated patients as compared to 32% with placebo.

5.2 Pharmacokinetic properties

Absorption

Tadalafil is readily absorbed after oral administration and the mean maximum observed plasma concentration (C_{max}) is achieved at a median time of 2 hours after dosing. Absolute bioavailability of tadalafil following oral dosing has not been determined.

The rate and extent of absorption of tadalafil are not influenced by food, thus tadalafil may be taken with or without food. The time of dosing (morning versus evening) had no clinically relevant effects on the rate and extent of absorption.

Distribution

The mean volume of distribution is approximately 63 litres, indicating that tadalafil is distributed into tissues. At therapeutic concentrations, 94% of tadalafil in plasma is bound to proteins. Protein binding is not affected by impaired renal function.

Less than 0.0005% of the administered dose appeared in the semen of healthy subjects.

Biotransformation

Tadalafil is predominantly metabolised by the cytochrome P450 (CYP) 3A4 isoform. The major circulating metabolite is the methylcatechol glucuronide. This metabolite is at least 13,000-fold less potent than tadalafil for PDE5. Consequently, it is not expected to be clinically active at observed metabolite concentrations.

Elimination

The mean oral clearance for tadalafil is 2.5 l/h and the mean half-life is 17.5 hours in healthy subjects.

Tadalafil is excreted predominantly as inactive metabolites, mainly in the faeces (approximately 61% of the dose) and to a lesser extent in the urine (approximately 36% of the dose).

Linearity/Non-Linearity

Tadalafil pharmacokinetics in healthy subjects are linear with respect to time and dose. Over a dose range of 2.5mg to 20mg, exposure (AUC) increases proportionally with dose. Steady-state plasma concentrations are attained within 5 days of once daily dosing.

Pharmacokinetics determined with a population approach in patients with erectile dysfunction are similar to pharmacokinetics in subjects without erectile dysfunction.

5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on conventional studies of safety pharmacology, repeated dose toxicity, genotoxicity, carcinogenic potential and toxicity to reproduction.

There was no evidence of teratogenicity, embryotoxicity or fetotoxicity in rats or mice that received up to 1,000 mg/kg/day tadalafil. In a rat pre-natal and post-natal development study, the no observed effect dose was 30 mg/kg/day. In the pregnant rat, the AUC for calculated free drug at this dose was approximately 18 times the human AUC at a 20mg dose. There was no impairment of fertility in male and female rats.

In dogs given tadalafil daily for 6 to 12 months at doses of 25 mg/kg/day (resulting in at least a 3- fold greater exposure [range 3.7–18.6] than seen in humans given a single 20mg dose) and above, there was regression of the seminiferous tubular epithelium that resulted in a decrease in spermatogenesis in some dogs (see also section 5.1).

Special Populations

Elderly

Healthy elderly subjects (65 years or over) had a lower oral clearance of tadalafil, resulting in 25% higher exposure (AUC) relative to healthy subjects aged 19 to 45 years. This effect of age is not clinically significant and does not warrant a dose adjustment.

Renal Insufficiency

In clinical pharmacology studies using single dose tadalafil (5mg-20mg), tadalafil exposure (AUC) approximately doubled in subjects with mild (creatinine clearance 51 to 80ml/min) or moderate (creatinine clearance 31 to 50ml/min) renal impairment and in subjects with end-stage renal disease on dialysis. In haemodialysis patients, Cmax was 41% higher than that observed in healthy subjects. Haemodialysis contributes negligibly to tadalafil elimination.

Hepatic Insufficiency

Tadalafil exposure (AUC) in subjects with mild and moderate hepatic impairment (Child-Pugh class A and B) is comparable to exposure in healthy subjects when a dose of 10mg is administered. If tadalafil is prescribed once-a-day, a careful individual benefit/risk evaluation should be undertaken by the prescribing physician.

Patients with Diabetes

Tadalafil exposure (AUC) in patients with diabetes was approximately 19% lower than the AUC value for healthy subjects. This difference in exposure does not warrant a dose adjustment.

6.1 List of excipients

Lactose monohydrate
Microcrystalline Cellulose (E460)
Hydroxy Propyl Cellulose (E463)
Sodium Lauryl Sulphate (E487)
Crosscarmellose Sodium (E468)
Magnesium Stearate (E572)
Opadry II 32K520009 yellow*

***Components for Opadry II 32K520009 yellow:**

Lactose Monohydrate
HPMC 2910/Hypromellose
Titanium Dioxide
Iron Oxide Yellow
Triacetin
Talc

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

Observe "Expiry date" (month/year) imprinted on outer pack.

6.4 Special precautions for storage

Store below 30°C. Store in the original package. Keep all medicines out of reach and sight of children.

6.5 Nature and contents of container

Aluminium-PVC/PVDC blister packs of 1, 2, 3, 4, 8, 10, 12, 16, 20, 24 or 28 tablets. Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

No special requirements.

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Manufactured by:
CADILA PHARMACEUTICALS LIMITED
1389, Trasad Road, Dholka-382225,
Dist: Ahmedabad, Gujarat state, India.