



New Zealand Data Sheet

Apo-Sertraline

Sertraline 50 mg and 100 mg tablets

Presentation

Apo-Sertraline 50 mg tablets are bluish-purple, oval, scored, film-coated tablets, engraved "APO" on one side and "SE" over "50" on the other side.

They contain sertraline hydrochloride as the active ingredient, equivalent to 50 mg sertraline.

Apo-Sertraline 100 mg tablets are yellow, oval, scored, film-coated tablets, engraved "APO" on one side and "SER" over "100" on the other side.

They contain sertraline hydrochloride as the active ingredient, equivalent to 100 mg sertraline.

Other ingredients in Apo-Sertraline are microcrystalline cellulose, methylcellulose, magnesium stearate, silicon dioxide, hypromellose, macrogol 8000, titanium dioxide, hypolose and indigo carmine (*FD & C Blue #2 aluminium lake*) (in 50 mg tablets) or iron oxide yellow (in 100 mg tablets).

Uses

Actions

Sertraline is a potent and selective inhibitor of neuronal serotonin (5-HT) uptake *in vitro*, which results in the potentiation of the effects of 5-HT in animals. It has only very weak effects on noradrenaline and dopamine neuronal reuptake. At clinical doses, sertraline blocks the uptake of serotonin into human platelets. It is devoid of stimulant, sedative or anticholinergic activity, or cardiotoxicity in animals. In controlled studies in normal volunteers, sertraline did not cause sedation and did not interfere with psychomotor performance. In accord with its selective inhibition of 5-HT uptake, sertraline does not enhance catecholaminergic activity. Sertraline has no affinity for muscarinic (cholinergic), serotonergic, dopaminergic, adrenergic, histaminergic, GABA or benzodiazepine receptors. The chronic administration of sertraline in animals was associated with down-regulation of brain noradrenaline receptors as observed with other clinically effective antidepressants and anti-obsessional drugs.

Sertraline has not demonstrated potential for abuse. In a placebo-controlled, double blind, randomised study of the comparative abuse liability of sertraline, alprazolam and d-amphetamine in humans, sertraline did not produce positive subjective effects indicative of abuse potential. In contrast, subjects rated both alprazolam and d-amphetamine significantly greater than placebo on measures of drug liking, euphoria and abuse potential. Sertraline did not produce either the stimulation and anxiety associated with d-amphetamine or the sedation and psychomotor impairment associated with alprazolam. Sertraline does not function as a positive reinforcer in rhesus monkeys trained to self-administer cocaine, nor does it substitute as a discriminative stimulus for either d-amphetamine or pentobarbital in rhesus monkeys.

Pharmacokinetics

Sertraline exhibits dose-proportional pharmacokinetics over the range of 50 to 200 mg. In man, following oral, once daily dosing over the range of 50 to 200 mg for 14 days, peak plasma concentrations (C_{max}) of sertraline occur at about 4.5 to 8.4 hours post-dosing. The

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pharmacokinetic profile in either adolescents or the elderly is not significantly different from that in adults between 18 and 65 years. The mean half-life of sertraline for young and elderly men and women ranges from 22–36 hours. Consistent with the terminal elimination half-life, there is an approximately two-fold accumulation up to steady state concentrations, which are achieved after one week of once daily dosing. Approximately 98% of the circulating drug is bound to plasma proteins. Animal studies indicate that sertraline has a large apparent volume of distribution. The pharmacokinetics of sertraline in paediatric OCD patients have been shown to be comparable with adults (although paediatric patients metabolise sertraline with slightly greater efficiency). However, lower doses may be advisable for paediatric patients given their lower body weights (especially 6–12 years), in order to avoid excessive plasma levels.

Sertraline undergoes extensive first pass hepatic metabolism. The principal metabolite in plasma, N-desmethylsertraline, is substantially less active (about 20 times) than sertraline *in vitro* and there is no evidence of activity in *in vivo* models of depression. The half-life of N-desmethylsertraline is in the range of 62–104 hours. Sertraline and N-desmethylsertraline are both extensively metabolised in man and the resultant metabolites excreted in faeces and urine in equal amounts. Only a small amount (< 0.2%) of unchanged sertraline is excreted in the urine.

Food does not significantly change the bioavailability of sertraline tablets.

Indications

Sertraline is indicated for the treatment of symptoms of depression, including depression accompanied by symptoms of anxiety, in patients with or without a history of mania. Following satisfactory response, continuation with sertraline therapy is effective in preventing relapse of the initial episode of depression or recurrence of further depressive episodes.

Sertraline is indicated for the treatment of obsessive compulsive disorder (OCD). Following initial response, sertraline has been associated with sustained efficacy, safety and tolerability in up to 2 years of treatment of OCD.

Sertraline is indicated for the treatment of paediatric patients with OCD.

Sertraline is indicated for the treatment of panic disorder, with or without agoraphobia.

Sertraline is indicated for the treatment of post-traumatic stress disorder (PTSD).

Sertraline is indicated for the treatment of social phobia (social anxiety disorder). Following satisfactory response, continuation with sertraline therapy is effective in preventing relapse of the initial episode of social phobia.

Sertraline is indicated for the treatment of premenstrual dysphoric disorder (PMDD).

Dosage and Administration

Apo-Sertraline should be administered once daily, either in the morning or evening.

Apo-Sertraline tablets can be administered with or without food.

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Initial Treatment

Depression and OCD - Sertraline treatment should be administered at a dose of 50 mg/day.

Panic Disorder, PTSD and Social Phobia - Therapy for panic disorder, PTSD and social phobia should be initiated at 25 mg/day. After one week, the dose should be increased to 50 mg/day. This dosage regimen has been shown to reduce the frequency of early treatment emergent side effects characteristic of panic disorder.

Premenstrual Dysphoric Disorder - Sertraline treatment should be initiated with a dose of 50 mg/day, either daily throughout the menstrual cycle or limited to the luteal phase of the menstrual cycle, depending on physician assessment. Patients not responding to a 50 mg/day dose may benefit from dose increases (at 50 mg increments/monthly cycle) up to 150 mg/day when dosing daily throughout the menstrual cycle, or 100 mg/day when dosing during the luteal phase of the menstrual cycle. If a 100 mg/day dose has been established with luteal phase dosing, a 50 mg/day titration step for three days should be utilized at the beginning of each luteal phase dosing period.

Dosage adjustments, which may include changes between dosage regimens (e.g. daily throughout the menstrual cycle *versus* during the luteal phase of the menstrual cycle), may be needed to maintain the patient on the lowest effective dosage and patients should be periodically reassessed to determine the need for continued treatment.

Titration

For all indications other than PMDD (*refer to section above for details on dosage titration for PMDD*) - Patients not responding to a 50 mg dose may benefit from dose increases. Dose changes should be made at intervals of at least one week, up to a maximum of 200 mg/day.

The onset of therapeutic effect may be seen within 7 days. However, longer periods are usually necessary to demonstrate therapeutic response, especially in OCD.

Maintenance - Dosage during long-term therapy should be kept at the lowest effective level, with subsequent adjustment depending on therapeutic response.

Use in Children — The safety and efficacy of sertraline has been established in paediatric OCD patients aged 6 to 17. The administration of sertraline to paediatric OCD patients (aged 13 to 17) should commence at 50 mg/day. Therapy for paediatric OCD patients (aged 6 to 12) should commence at 25 mg/day, increasing to 50 mg/day after one week. Subsequent doses may be increased in case of lack of response in 50 mg/day increments, up to 200 mg/day, as needed. In a clinical trial in patients aged 6 to 17 years with depression or OCD, sertraline appeared to have a similar pharmacokinetic profile to that found in adults. However, the generally lower body weights of children compared to those of adults should be taken into consideration in advancing the dose from 50 mg, in order to avoid excessive dosing.

More than 250 paediatric OCD patients have been exposed to sertraline in completed and ongoing studies. The safety profile of sertraline in these paediatric studies is comparable to that observed in adult OCD studies. The efficacy of sertraline in children with depression or panic disorder has not been demonstrated in controlled trials. Safety and effectiveness in children below the age of 6 have not been established.

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Titration - in Children and Adolescents - Sertraline has an elimination half-life of approximately one day; dose changes should not occur at intervals of less than one week.

Use in the Elderly - The same dose range as in younger patients may be used in the elderly. Over 700 elderly patients (> 65 years) have participated in clinical studies which demonstrated the efficacy of sertraline in this patient population. The pattern and incidence of adverse reactions in the elderly was similar to that in younger patients.

Use in Hepatic Insufficiency - The use of sertraline in patients with hepatic disease should be approached with caution. A lower or less frequent dose should be used in patients with hepatic impairment (see **Warnings and Precautions**).

Use in Renal Insufficiency - Sertraline is extensively metabolised. Excretion of unchanged drug in urine is a minor route of elimination. As expected from the low renal excretion of sertraline, sertraline dosing does not have to be adjusted based on the degree of renal impairment (see **Warnings and Precautions**).

Contraindications

Apo-Sertraline is contraindicated in patients with a known hypersensitivity to sertraline.

Concomitant use in patients taking pimozide is contraindicated (see **Interactions**).

Concomitant use in patients taking monoamine oxidase inhibitors (MAOIs) is contraindicated (see **Warnings and Precautions**).

Warnings and Precautions

Monoamine Oxidase Inhibitors - Cases of serious reactions, sometimes fatal, have been reported in patients receiving sertraline in combination with a MAOI, including the selective MAOI selegiline and the reversible MAOI moclobemide. Some cases presented with features resembling serotonin syndrome, the symptoms of which include: hyperthermia, rigidity, myoclonus, autonomic instability with possible rapid fluctuations of vital signs, mental status changes that include confusion, irritability and extreme agitation progressing to delirium and coma. Therefore, sertraline should not be used in combination with an MAOI or within 14 days of discontinuing treatment with an MAOI. Similarly, at least 14 days should elapse after discontinuing sertraline treatment before starting an MAOI (see **Contraindications**).

Serotonin Syndrome (SS) or Neuroleptic Malignant Syndrome (NMS) - The development of potentially life-threatening syndromes like SS or NMS has been reported with Selective Serotonin Reuptake Inhibitors (SSRIs), including treatment with sertraline. The risk of SS or NMS with SSRIs is increased with concomitant use of serotonergic drugs (including triptans and fentanyl) with drugs which impair metabolism of serotonin (including MAOIs), antipsychotics and other dopamine antagonists. SS symptoms may include mental status changes (e.g. agitation, hallucinations, coma), autonomic instability (e.g. tachycardia, labile blood pressure, hyperthermia), neuromuscular aberrations (e.g. hyperreflexia, incoordination) and/or gastrointestinal symptoms (e.g. nausea, vomiting, diarrhoea). Some signs of SS (including hyperthermia, muscle rigidity, autonomic instability with possible rapid fluctuation

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of vital signs and mental status changes) resemble NMS. Patients should be monitored for the emergence of signs and symptoms of SS or NMS (see **Contraindications**).

Other Serotonergic Drugs – Co-administration of sertraline with other drugs which enhance the effects of serotonergic neurotransmission, such as tryptophan or fenfluramine, fentanyl or 5-HT agonists, should be undertaken with caution and avoided whenever possible due to the potential for pharmacodynamic interaction.

St John's Wort - Concomitant use of the herbal remedy St John's Wort (*Hypericum perforatum*) in patients receiving SSRIs should be avoided since there is a possibility of serotonergic potentiation (see **Interactions**).

Switching from SSRIs, Antidepressants or Anti-obsessional Drugs - There is limited controlled experience regarding the optimal timing of switching from SSRIs, antidepressants or anti-obsessional drugs to sertraline. Care and prudent medical judgment should be exercised when switching, particularly from long-acting agents such as fluoxetine. The duration of a wash-out period for switching from one SSRI to another has not been established.

Activation of Mania/Hypomania - During pre-marketing testing, hypomania or mania occurred in approximately 0.4% of sertraline-treated patients. Activation of mania/hypomania has also been reported in a small proportion of patients with major affective disorder treated with other marketed antidepressant and anti-obsessional drugs.

Hyperkinesia has been noted in paediatric patients treated with sertraline for OCD, with an incidence of 8/53 (15.1%) for sertraline *versus* 3/54 (5.6%) for placebo in 6 to 12 year olds, and 0/39 (0%) for sertraline *versus* 1/41 (2.4%) for placebo in 13 to 17 year olds.

Weight Loss - Significant weight loss may be an undesirable result of treatment with sertraline for some patients but, on average, patients in controlled trials had minimal 0.5–1 kg weight loss *versus* smaller changes on placebo. Only rarely (< 0.1%) have sertraline-treated patients been discontinued for weight loss. In paediatric patients, weight loss was seen in 2/53 (3.8%) *versus* 0/54 (0%) of 6 to 12 year old patients and 3/39 (7.7%) *versus* 0/41 (0%) of 13 to 17 year olds treated with sertraline *versus* placebo. It is recommended that paediatric patients receiving long-term treatment should be monitored for weight and growth, consistent with good medical care.

Seizures - Seizures are a potential risk with antidepressant and anti-obsessional drugs. Seizures were reported in approximately 0.08% of patients treated with sertraline in the development program for depression. No seizures were reported in patients treated with sertraline in the development program for panic. During the development program for OCD, four out of approximately 1,800 patients exposed to sertraline experienced seizures (approximately 0.2%). Three of these patients were adolescents, two with a seizure disorder and one with a family history of seizure disorder, none of whom were receiving anticonvulsant medication. In all these cases, the relationship to sertraline therapy was uncertain. Since sertraline has not been evaluated in patients with a seizure disorder, it should be avoided in patients with unstable epilepsy and patients with controlled epilepsy should be carefully monitored. Sertraline should be discontinued in any patient who develops seizures.

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Clinical Worsening and Suicide Risk - Since the possibility of a suicide attempt is inherent in depression and may persist until significant remission occurs, patients should be closely supervised during the early course of therapy.

Because of the well-established co morbidity between OCD and depression, panic disorder and depression, PTSD and depression, social phobia (social anxiety disorder) and depression, and PMDD and depression, the same precautions observed when treating patients with depression should be observed when treating patients with OCD, panic disorder, PTSD, social phobia or PMDD.

The risk of suicide attempts must be considered especially in depressed patients.

Patients with depression may experience worsening of their depressive symptoms and/or the emergence of suicidal ideation and behaviours (suicidality) whether or not they are taking antidepressant medications and this risk may persist until significant remission occurs. As improvement may not occur during the first few weeks or more of treatment, patients should be closely monitored for clinical worsening and suicidality, especially at the beginning of a course of treatment, or at the time of dose changes, either increases or decreases. Consideration should be given to changing the therapeutic regimen, including possibly discontinuing the medication, in patients whose depression is persistently worse or whose emergent suicidality is severe, abrupt in onset, or was not part of the patient's presenting symptoms.

Patients (and caregivers of patients) should be alerted about the need to monitor for any worsening of their condition and/or the emergence of suicidal ideation/behaviour or thoughts of harming themselves and to seek medical advice immediately if these symptoms present. Patients with co-morbid depression associated with other psychiatric disorders being treated with antidepressants should be similarly observed for clinical worsening and suicidality.

Pooled analyses of 24 short-term (4–16 weeks), placebo-controlled trials of nine antidepressant medicines (SSRIs and others) in 4,400 children and adolescents with major depressive disorder (16 trials), obsessive compulsive disorder (4 trials) or other psychiatric disorders (4 trials) have revealed a greater risk of adverse events representing suicidal behaviour or thinking (suicidality) during the initial treatment period (generally the first one to two months) in those receiving antidepressants. The average risk of such events in patients treated with an antidepressant was 4% compared with 2% of patients treated with placebo. There was considerable variation in risk among the antidepressants, but there was a tendency towards an increase for almost all antidepressants studied. The risk of suicidality was most consistently observed in the major depressive disorder trials, but there were signals of risk arising from trials in other psychiatric indications (OCD and social anxiety disorder) as well. No suicides occurred in these trials. It is unknown whether the suicidality risk in children and adolescents patients extends to use beyond several months. The nine antidepressant medicines in the pooled analyses included five SSRIs (citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline) and four non-SSRIs (bupropion, mirtazapine, nefazodone, venlafaxine).

A further pooled analysis of short-term placebo-controlled trials of antidepressant medicines (SSRIs and others) showed the increased risk of suicidal thinking and behaviour (suicidality) during the initial treatment period (generally the first one to two months) extends to young adults (ages 18–24) with major depressive disorder and other psychiatric disorders. These studies did not show an increase in the risk of suicidality with antidepressants compared to

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placebo in adults beyond age 24; there was a reduction in risk with antidepressants compared to placebo in adults aged 65 and older.

Symptoms of anxiety, agitation, panic attacks, insomnia, irritability, hostility (aggressiveness), impulsivity, akathisia (psychomotor restlessness), hypomania and mania, have been reported in adults, adolescents and children being treated with antidepressants for major depressive disorder as well as for other indications, both psychiatric and non-psychiatric. Although a causal link between the emergence of such symptoms and either worsening of depression and/or emergence of suicidal impulses has not been established, there is concern that such symptoms may be precursors of emerging suicidality.

Families and caregivers of children and adolescents being treated with antidepressants for major depressive disorder or for any other condition (psychiatric or non-psychiatric) should be informed about the need to monitor these patients for the emergence of agitation, irritability, unusual changes in behaviour and other symptoms described above, as well as the emergence of suicidality, and to report such symptoms immediately to health care providers. It is particularly important that monitoring be undertaken during the initial few months of antidepressant treatment or at times of dose increase or decrease.

Prescriptions for sertraline should be written for the smallest quantity of tablets consistent with good patient management, in order to reduce the risk of overdose.

Weak Uricosuric Effect - Sertraline is associated with a mean decrease in serum uric acid of approximately 7%. The clinical significance of this weak uricosuric effect is unknown and there have been no reports of acute renal failure with sertraline.

Haemorrhage - Bleeding abnormalities of the skin and mucous membranes have been reported with the use of SSRIs (including purpura, haematoma, epistaxis, vaginal bleeding, ecchymoses and gastrointestinal bleeding). This risk may be potentiated by concurrent use of atypical anti-psychotics and phenothiazines, most tricyclic antidepressants and non-steroidal anti-inflammatory drugs (NSAIDs), aspirin or other medicines that affect coagulation. Sertraline should therefore be used with caution in patients concomitantly treated with medicines that increase the risk of bleeding or in patients with a past history of abnormal bleeding or those with predisposing conditions. Pharmacological gastroprotection should be considered for high risk patients.

Hyponatremia - Hyponatremia may occur as a result of treatment with SSRIs or SNRIs (Serotonin and Noradrenaline Reuptake Inhibitors) including sertraline. In many cases, hyponatremia appears to be the result of a syndrome of inappropriate antidiuretic hormone secretion (SIADH). Cases of serum sodium levels lower than 110 mmol/L have been reported. Elderly patients may be at greater risk of developing hyponatremia with SSRIs and SNRIs. Also, patients taking diuretics, or who are otherwise volume-depleted, may be at greater risk. Discontinuation of sertraline should be considered in patients with symptomatic hyponatremia and appropriate medical intervention should be instituted. Signs and

symptoms of hyponatremia include headache, difficulty concentrating, memory impairment, confusion, weakness and unsteadiness which may lead to falls. Signs and symptoms associated with more severe and/or acute cases have included hallucination, syncope, seizure, coma, respiratory arrest and death.

Diabetes/Loss of Glycaemic Control - Cases of new onset diabetes mellitus have been reported in patients receiving SSRIs including sertraline. Loss of glycaemic control including

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both hyperglycaemia and hypoglycaemia have also been reported in patients with and without pre-existing diabetes. Patients should therefore be monitored for signs and symptoms of glucose fluctuations. Diabetic patients especially should have their glycaemic control carefully monitored since their dosage of insulin and/or concomitant oral hypoglycaemic drug may need to be adjusted.

Symptoms Associated with Discontinuation - During marketing of sertraline and other SSRIs and SNRIs, there have been spontaneous reports of adverse events occurring upon discontinuation of these drugs, particularly when abrupt, including the following: dysphoric mood, irritability, agitation, dizziness, sensory disturbances (e.g. paresthesias such as electric shock sensations), anxiety, confusion, headache, lethargy, emotional lability, insomnia, and hypomania. While these events are generally self-limiting, some have been reported to be severe.

Patients should be monitored for these symptoms when discontinuing treatment with sertraline. A gradual reduction in the dose rather than abrupt cessation is recommended whenever possible. If intolerable symptoms occur following a decrease in the dose or upon discontinuation of treatment, then resuming the previously prescribed dose may be considered. Subsequently, the physician may continue decreasing the dose but at a more gradual rate (see **Adverse Effects**, **Use in Lactation** and **Dosage and Administration**).

Angle-Closure Glaucoma – SSRIs including sertraline may have an effect on pupil size resulting in mydriasis. This mydriatic effect has the potential to narrow the eye angle resulting in increased intraocular pressure and angle-closure glaucoma, especially in patients pre-disposed. Sertraline should therefore be used with caution in patients with angle-closure glaucoma or history of glaucoma.

Laboratory Tests – False-positive urine immunoassay screening tests for benzodiazepines have been reported in patients taking sertraline. This is due to lack of specificity of the screening tests. False positive test results may be expected for several days following discontinuation of sertraline therapy. Confirmatory tests, such as gas chromatography/mass spectrometry, will distinguish sertraline from benzodiazepines.

Use in Patients with Concomitant Illness - Caution is advisable in using sertraline in patients with diseases or conditions that could affect metabolism or haemodynamic responses. Sertraline has not been evaluated or used to any appreciable extent in patients with a recent history of myocardial infarction or unstable heart disease. Patients with these diagnoses were excluded from clinical studies during the product's premarket testing. However, the electrocardiograms of 774 patients who received sertraline in double-blind trials were evaluated and the data indicate that sertraline is not associated with the development of significant ECG abnormalities.

Use in Hepatic Insufficiency - Sertraline is extensively metabolised by the liver. A multiple dose pharmacokinetic study in subjects with mild, stable cirrhosis demonstrated a prolonged elimination half-life and approximately three-fold greater AUC and C_{max} in comparison to normal subjects. There were no significant differences in plasma protein binding observed between the two groups. The use of sertraline in patients with hepatic disease should be approached with caution. A lower or less frequent dose should be used in patients with hepatic impairment.

Use in Renal Insufficiency - Sertraline is extensively metabolised. Excretion of unchanged drug in urine is a minor route of elimination. In studies of patients with mild to moderate renal

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impairment (creatinine clearance 30–60 mL/min) or moderate to severe renal impairment (creatinine clearance 10–29 mL/min), multiple dose pharmacokinetic parameters (AUC_{0-24} or C_{max}) were not significantly different compared with controls. Half-lives were similar and there were no differences in plasma protein binding in all groups studied. This study indicates that, as expected from the low renal excretion of sertraline, sertraline dosing does not have to be adjusted based on the degree of renal impairment.

Effects on Ability to Driving and Use Machinery - Clinical pharmacology studies have shown that sertraline has no effect on psychomotor performance. However, as psychotropic drugs may impair the mental or physical ability required for the performance of potentially hazardous tasks such as driving a car or operating machinery, the patient should be cautioned accordingly.

Impairment of Fertility - A decrease in fertility was seen in one of two rat studies at a dose of 80 mg/kg (giving rise to plasma drug exposure levels similar to or slightly higher than that achieved following the maximum recommended human dose of 200 mg).

Use in Pregnancy and Lactation

Category C

Reproduction studies have been performed in rats and rabbits at doses up to approximately 20 and 10 times the maximum daily human mg/kg dose, respectively. There was no evidence of teratogenicity at any dose level. At the dose level corresponding to approximately 2.5 to 10 times the maximum daily human mg/kg dose, however, sertraline was associated with delayed ossification processes in foetuses, probably secondary to effects on the dams.

There was decreased neonatal survival following maternal administration of sertraline at doses of approximately 5 times the maximum human mg/kg dose. Similar effects on neonatal survival have been described for other antidepressant drugs. The clinical significance of these effects is unknown.

There are no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, sertraline should be used during pregnancy only if the perceived benefits outweigh the risks, taking into account the risks of untreated depression.

Neonates exposed to sertraline or other SNRIs or SSRIs, late in the third trimester, have developed complications requiring prolonged hospitalisation, respiratory support and tube feeding. Such complications can arise immediately upon delivery. Reported clinical findings have included respiratory distress, cyanosis, apnoea, seizures, temperature instability, feeding difficulty, vomiting, hypoglycaemia, hypotonia, hyperreflexia, tremor, jitteriness, irritability and constant crying. These features are consistent with either a direct toxic effect of SSRIs and SNRIs or, possibly, a drug discontinuation syndrome.

Exposure during late pregnancy to SSRIs may have an increased risk for persistent pulmonary hypertension of the newborn (PPHN). PPHN occurs in 1-2 per 1,000 live births in the general population and is associated with substantial neonatal morbidity and mortality. In a retrospective case-control study of 377 women whose infants were born with PPHN and 836 women whose infants were born healthy, the risk for developing PPHN was approximately six-fold higher for infants exposed to SSRIs after the 20th week of gestation compared to infants who had not been exposed to antidepressants during pregnancy. A study of 831,324 infants born in Sweden in 1997-2005 found a PPHN risk ratio of 2.4 (95%

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CI 1.2-4.3) associated with patient reported maternal use of SSRIs "in early pregnancy" and a PPHN risk ratio of 3.6 (95% CI 1.2-8.3) associated with a combination of patient-reported maternal use of SSRIs "in early pregnancy" and an antenatal SSRI prescription "in later pregnancy".

Some epidemiological studies have suggested an increased risk of congenital abnormalities associated with the use of SSRIs and SNRIs in pregnancy. The relevance of sertraline treatment remains unknown.

Some epidemiological data suggest that the use of SSRIs and SNRIs in pregnancy may be associated with a small but statistically significant increase in pre-term delivery.

Isolated studies in small numbers of nursing mothers and their infants indicated negligible or undetectable levels of sertraline in infant serum, although levels in breast milk were more concentrated than in maternal serum. Use in nursing mothers is not recommended unless, in the judgment of the physician, the benefit outweighs the risk.

If sertraline is used during pregnancy and/or lactation, the physician should be aware of post-marketing reports of symptoms, including those compatible with withdrawal reactions, in some neonates whose mothers had been on SSRI antidepressants, including sertraline.

Women of childbearing potential should employ an adequate method of contraception if taking sertraline.

Use in Children - A total of 225 paediatric patients have completed OCD trials with sertraline. The safety profile of sertraline in these paediatric studies is comparable to that observed in the adult OCD studies. Safety and effectiveness in paediatric patients below the age of 6 have not been established.

Sertraline should not be used in children and adolescents below the age of 18 years for the treatment of major depressive disorder. The efficacy and safety of sertraline has not been satisfactorily established for the treatment of major depressive disorder in this age group.

Use in the Elderly - Several hundred elderly patients have participated in clinical studies with sertraline. The pattern of adverse reactions in the elderly was similar to that in younger patients.

Adverse Effects

Side effects that occurred significantly more frequently with sertraline than with placebo in multiple dose studies for depression were:

Gastrointestinal Disorders:	Diarrhoea/loose stools, dry mouth, dyspepsia and nausea.
Metabolism and Nutrition Disorders:	Anorexia.
Nervous System Disorders:	Dizziness, somnolence and tremor.
Psychiatric Disorders:	Insomnia.
Reproductive System and Breast Disorders:	Sexual dysfunction (principally ejaculatory delay in males).
Skin and Subcutaneous Tissues Disorders:	Increased sweating.

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The side effect profile commonly observed in double-blind, placebo-controlled studies in patients with OCD, panic disorder, PTSD, social phobia and PMDD was similar to that observed in clinical trials in patients with depression.

No weight gain was observed in controlled clinical trials with sertraline treatment for depression or OCD; some patients may experience a reduction in body weight with sertraline.

In clinical trials in children and adolescents aged 6 to 17 years with major depressive disorder the following adverse events were reported at a frequency of at least 2% of subjects and occurred at a rate of at least twice that of placebo: diarrhoea (9.5% vs 1.6%), agitation (6.3% vs 1.1%), anorexia (5.3% vs 1.1%), vomiting (4.2% vs 1.1%) hyperkinesia (2.6% vs 0.5%), dry mouth (2.1% vs 0.5%), tremor (2.1% vs 0%) and urinary incontinence (2.1% vs 0%). The incidence of discontinuation due to adverse events was 9% (n = 17) with sertraline and 2.1% (n = 4) with placebo. The most common reasons for discontinuation due to adverse events, whether or not related to sertraline, were aggressive reaction (1.6%), agitation (1.6%), suicidal ideation (1.6%), hyperkinesia (1.1%), suicide attempt (1.1%) and aggravated depression (1.1%).

In the safety analysis, suicide attempt was reported in the same number of patients in sertraline (2/189, 1.1%) and placebo (2/184, 1.1%) with an incidence in sertraline treated subjects of 1.1% (2 attempts in 2/189 subjects) *versus* 1.6% in placebo-treated subjects (3 attempts in 2/184 subjects). Suicidal ideation was reported by 3 sertraline-treated patients (1.6%) and no placebo-treated patients. This difference is not statistically significant. Note that sertraline should not be used in children and adolescents to treat major depressive disorder (see **Warnings and Precautions**).

Post-Marketing Data

Voluntary reports of adverse events in patients receiving sertraline since market introduction have been received. They include the following:

Blood and Lymphatic System Disorders:	Leucopenia and thrombocytopenia.
Cardiac Disorders:	Palpitations and tachycardia.
Ear and Labyrinth Disorders:	Tinnitus.
Endocrine Disorders:	Hyperprolactinaemia, hypothyroidism and syndrome of inappropriate ADH secretion (SIADH).
Eye Disorders:	Mydriasis and vision abnormal.
Gastrointestinal Disorders:	Abdominal pain, constipation, pancreatitis and vomiting.
General Disorders and Administration Site Conditions:	Asthenia, chest pain, oedema peripheral, fatigue, fever and malaise.
Hepatobiliary Disorders:	Serious liver events (including hepatitis, jaundice and liver failure) and asymptomatic elevations in serum transaminases (SGOT and SGPT).

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Immune System Disorders:	Allergic reactions, allergy and anaphylactoid reaction.
Investigations:	Abnormal clinical laboratory results, altered platelet function, increased serum cholesterol, weight decrease and weight increase.
Metabolism and Nutrition Disorders:	Appetite increased and hyponatraemia, diabetes mellitus, hyperglycaemia and hypoglycaemia
Musculoskeletal and Connective Tissue Disorders:	Arthralgia and muscle cramps.
Nervous System Disorders:	Coma, convulsions, cerebrovascular spasm (including reversible cerebral vasoconstriction syndrome and Call-Fleming syndrome), headache, migraine, movement disorders (including extrapyramidal symptoms such as akathisia, dystonia, hyperkinesia, hypertonia, teeth grinding or gait abnormalities), muscle contractions involuntary, paraesthesia, hypoaesthesia and syncope. Also reported were signs and symptoms associated with serotonin syndrome (in some cases associated with concomitant use of serotonergic drugs), which included agitation, confusion, diaphoresis, diarrhoea, fever, hypertension, rigidity and tachycardia.
Psychiatric Disorders:	Agitation, aggressive reaction, anxiety, depressive symptoms, euphoria, hallucination, libido decreased-female, libido decreased-male, paroniria and psychosis.
Renal and Urinary Disorders:	Urinary incontinence, urinary retention and enuresis.
Reproductive System and Breast Disorders:	Galactorrhoea, gynecomastia, menstrual irregularities and priapism.
Respiratory, Thoracic and Mediastinal Disorders:	Bronchospasm and yawning.
Skin and Subcutaneous Tissue Disorders:	Alopecia, angioedema, face oedema, periorbital oedema, photosensitivity skin reaction, pruritus, rash (including rare reports of serious exfoliative skin disorders: e.g. Stevens-Johnson syndrome and epidermal necrolysis) and urticaria.
Vascular Disorders:	Hot flushes and hypertension, abnormal bleeding, predominantly of the skin and mucous membranes, including purpura, epistaxis, haematomas, vaginal bleeding and gastrointestinal bleeding.

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Discontinuation symptoms:

Symptoms following the discontinuation of sertraline have been reported and included agitation, anxiety, dizziness, headache, nausea and paraesthesia.

Interactions

Monoamine Oxidase Inhibitors - See **Contraindications** and **Warnings and Precautions**.

Pimozide - Increased pimozide levels have been demonstrated in a study of single low dose pimozide (2 mg) with sertraline co-administration. These increased levels were not associated with any changes in EKG. While the mechanism of this interaction is unknown, due to the narrow therapeutic index of pimozide, concomitant administration of sertraline and pimozide is contraindicated.

CNS Depressants and Alcohol - The co-administration of sertraline 200 mg daily did not potentiate the effects of alcohol, carbamazepine, haloperidol or phenytoin on cognitive and psychomotor performance in healthy subjects; however, the concomitant use of sertraline and alcohol is not recommended.

Lithium - In placebo-controlled trials in normal volunteers, the co-administration of sertraline with lithium did not significantly alter lithium pharmacokinetics, but did result in an increase in tremor relative to placebo, indicating a possible pharmacodynamic interaction. When co-administering sertraline with medications, such as lithium, which may act *via* serotonergic mechanisms, patients should be appropriately monitored.

Phenytoin - A placebo-controlled trial in normal volunteers suggests that chronic administration of sertraline 200 mg/day does not produce clinically important inhibition of phenytoin metabolism. Nonetheless, it is recommended that plasma phenytoin concentrations be monitored following initiation of sertraline therapy, with appropriate adjustments to the phenytoin dose. In addition, co-administration of phenytoin may cause a reduction of sertraline plasma levels.

Sumatriptan - There have been rare post-marketing reports describing patients with weakness, hyperreflexia, incoordination, confusion, anxiety and agitation following the use of sertraline and sumatriptan. If concomitant treatment with sertraline and sumatriptan is clinically warranted, appropriate observation of the patient is advised (see **Warnings and Precautions, Other Serotonergic Drugs**).

Other Serotonergic Drugs - See **Warnings and Precautions**.

St John's Wort - See **Warnings and Precautions**.

Protein Bound Drugs - Since sertraline is bound to plasma proteins, the potential of sertraline to interact with other plasma protein bound drugs should be borne in mind. However, in three formal interaction studies with diazepam, tolbutamide and warfarin, respectively, sertraline was not shown to have significant effects on the protein binding of the substrate (see subsections **CNS Active Drugs, Hypoglycaemic Drugs** and **Warfarin**).

Warfarin - Co-administration of sertraline 200 mg daily with warfarin resulted in a small but statistically significant increase in prothrombin time, the clinical significance of which is

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unknown. Accordingly, prothrombin time should be carefully monitored when sertraline therapy is initiated or stopped.

Medicines that Interfere with Haemostasis (NSAIDs, aspirin, warfarin, etc) - Serotonin release by platelets plays an important role in haemostasis. There is an association between use of psychotropic drugs that interfere with serotonin reuptake and the occurrence of abnormal bleeding. Concurrent use of an NSAID, aspirin or warfarin potentiates the risk. Thus, patients should be cautioned about using such medicines concurrently with sertraline.

Cimetidine - Co-administration of sertraline with cimetidine caused a substantial decrease in sertraline clearance. The clinical significance of this change is unknown.

CNS Active Drugs - Co-administration of sertraline 200 mg daily with diazepam resulted in small, statistically significant changes in some pharmacokinetic parameters. The clinical significance of these changes is unknown.

Hypoglycaemic drugs - Co-administration of sertraline 200 mg daily with tolbutamide resulted in small, statistically significant changes in some pharmacokinetic parameters. The clinical significance of these changes is unknown.

Glibenclamide - Sertraline 200 mg daily did not affect the pharmacokinetics of glibenclamide.

Biguanides - Patients receiving biguanides should monitor their blood glucose carefully when sertraline is introduced.

Atenolol - Sertraline had no effect on the beta-adrenergic blocking ability of atenolol.

Digoxin - Sertraline 200 mg daily did not change serum digoxin levels or digoxin renal clearance.

Electroconvulsive Therapy (ECT) - There are no clinical studies establishing the risks or benefits of the combined use of ECT and sertraline.

Drugs Metabolised by Cytochrome P450 (CYP) 2D6 - There is variability among antidepressants in the extent to which they inhibit the activity of isozyme cytochrome CYP 2D6. The clinical significance of this depends on the extent of the inhibition and the therapeutic index of the co-administered drug. CYP 2D6 substrates with a narrow therapeutic index include tricyclic antidepressants and class 1C antiarrhythmics, such as propafenone and flecainide. In formal interaction studies, chronic dosing with sertraline 50 mg daily showed minimal elevation (mean 23–37%) of steady state desipramine plasma levels (a marker of CYP 2D6 isoenzyme activity).

Drugs Metabolised by Other CYP Enzymes (CYP 3A3/4, CYP 2C9, CYP 2C19, CYP 1A2)

CYP 3A3/4 - *In vivo* interaction studies have demonstrated that chronic administration of sertraline 200 mg daily does not inhibit the CYP 3A3/4 mediated 6- β hydroxylation of endogenous cortisol or the metabolism of carbamazepine or terfenadine. In addition, the chronic administration of sertraline 50 mg daily does not inhibit the CYP 3A3/4 mediated metabolism of alprazolam. The data suggest that sertraline is not a clinically relevant inhibitor of CYP 3A/34.

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CYP 2C9 - The apparent lack of clinically significant effects of the chronic administration of sertraline 200 mg daily on plasma concentrations of tolbutamide, phenytoin and warfarin suggests that sertraline is not a clinically relevant inhibitor of CYP 2C9 (see subsections **Hypoglycaemic Drugs**, **Phenytoin** and **Warfarin**).

CYP 2C19 - The apparent lack of clinically significant effects of the chronic administration of sertraline 200 mg daily on plasma concentrations of diazepam suggests that sertraline is not a clinically relevant inhibitor of CYP 2C19 (see subsection **CNS Active Drugs**).

CYP 1A2 - *In vitro* studies indicate that sertraline has little or no potential to inhibit CYP 1A2.

Microsomal Enzyme Induction - Preclinical studies have shown sertraline to induce hepatic microsomal enzymes. In clinical studies, sertraline was shown to induce hepatic enzymes minimally as determined by a small (5%) but statistically significant decrease in antipyrine half-life following administration of 200 mg/day for 21 days.

Overdosage

On the evidence available, sertraline has a wide margin of safety in overdose. An overdose of sertraline alone of up to 13.5 g has been reported. Deaths have been reported involving overdoses of sertraline, primarily in combination with other drugs and/or alcohol. Therefore, any overdosage should be treated aggressively.

Symptoms of overdose include serotonin-mediated side effects such as somnolence, gastrointestinal disturbances (such as nausea and vomiting), tachycardia, tremor, agitation and dizziness. Less frequently reported was coma.

There are no specific antidotes to sertraline. Establish and maintain an airway and ensure adequate oxygenation and ventilation, if necessary. Activated charcoal, which may be used with a cathartic, may be as or more effective than lavage, and should be considered in treating overdose. Induction of emesis is not recommended. Cardiac and vital sign monitoring is recommended along with general symptomatic and supportive measures. Due to the large volume of distribution of sertraline, forced diuresis, dialysis, hemoperfusion, and exchange transfusion are unlikely to be of benefit.

Pharmaceutical Precautions

Storage conditions: Store at or below 25°C.

Shelf life: 3 years.

Medicine Classification

Prescription Medicine

Package Quantities

Blister packs of 30 tablets.

Further Information

Clinical Trial Data

Major Depressive Disorder - A study was conducted which involved depressed outpatients who had responded by the end of an initial 8-week open treatment phase on sertraline 50–200 mg/day. These patients (n = 295) were randomised to continuation for 44 weeks on double-blind sertraline 50–200 mg/day or placebo. A statistically significantly lower relapse rate was observed for patients taking sertraline compared to those on placebo. The mean dose for completers was 70 mg/day.

Obsessive-Compulsive Disorder (OCD) - In a long-term study, patients meeting DSM-III-R criteria for OCD who had responded during a 52-week single-blind trial on sertraline 50–200 mg/day (n = 224) were randomised to continuation of sertraline or to substitution of placebo for up to 28 weeks of observation for discontinuation due to relapse or insufficient clinical response. Patients receiving continued sertraline treatment experienced a significantly lower rate of discontinuation due to relapse or insufficient clinical response over the subsequent 28 weeks compared to those receiving placebo. This pattern was demonstrated in male and female subjects.

Panic Disorder - In a long-term study, patients meeting DSM-III-R criteria for Panic Disorder who had responded during a 52-week open trial on sertraline 50–200 mg/day (n = 183) were randomised to continuation of sertraline or to substitution of placebo for up to 28 weeks of observation for discontinuation due to relapse or insufficient clinical response. Patients receiving continued sertraline treatment experienced a significantly lower rate of discontinuation due to relapse or insufficient clinical response over the subsequent 28 weeks compared to those receiving placebo. This pattern was demonstrated in male and female subjects.

Post-traumatic Stress Disorder (PTSD) - In a long-term study, patients meeting DSM-III-R criteria for PTSD who had responded during a 24-week open trial on sertraline 50–200 mg/day (n = 96) were randomised to continuation of sertraline or to substitution of placebo for up to 28 weeks of observation for relapse. Patients receiving continued sertraline treatment experienced significantly lower relapse rates over the subsequent 28 weeks compared to those receiving placebo. This pattern was demonstrated in male and female subjects.

Social Phobia - In a social phobia relapse prevention study, patients who were responders at the end of a 20 week, multicentre, flexible dose study that compared sertraline (50–200 mg/day) to placebo, were re-randomised for an additional 24 weeks to either sertraline continuation treatment (within 50–200 mg/day) or placebo substitution, while placebo responders remained on placebo. Patients receiving sertraline continuation treatment experienced a statistically significantly lower relapse rate over this 24-week study than patients randomised to placebo substitution treatment.

Preclinical Safety Data - Extensive chronic safety evaluation studies in animals show that sertraline is generally well tolerated at doses that are appreciable multiples of those that are clinically effective. Sertraline has also been shown to be devoid of mutagenic effects.

Carcinogenicity, Mutagenicity - The carcinogenic potential of sertraline has not been fully elucidated. Lifetime carcinogenicity studies were carried out in CD-1 mice and Long-Evans rats (at doses up to 40 mg/kg), giving rise to plasma drug exposure levels similar to or slightly higher than that achieved following the maximum recommended human dose of 200 mg. There was a dose-related increase in the incidence of liver adenomas in male mice

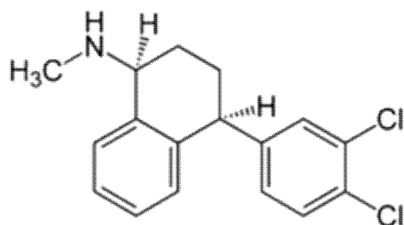
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receiving sertraline at 10–40 mg/kg. No increase was seen in female mice or in rats of either sex receiving the same treatments, nor was there an increase in hepatocellular carcinomas. Liver adenomas have a variable rate of spontaneous occurrence in the CD-1 mouse and are of unknown significance to humans. There was an increase in follicular adenomas of the thyroid in female rats receiving sertraline at 40 mg/kg; this was not accompanied by thyroid hyperplasia. While there was an increase in uterine adenocarcinomas in rats receiving sertraline at 10-40 mg/kg compared to placebo controls, this effect was not clearly drug related.

Sertraline had no genotoxic effects, with or without metabolic activation, based on the following assays: bacterial mutation assay; mouse lymphoma mutation assay; and tests for cytogenetic aberrations *in vivo* in mouse bone marrow and *in vitro* in human lymphocytes.

Chemical Structure - Sertraline hydrochloride is a naphthylamine derivative, having the following chemical name: (1S, *cis*)-4-(3,4-dichlorophenyl)- 1,2,3,4-tetrahydro-N-methyl-1-naphthalenamine hydrochloride. It has a molecular weight of 342.7. The chemical structure of sertraline is:



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