

Drug Regulatory Affairs

SANDOSTATIN[®]

(octreotide acetate)

Ampoules 0.05 mg/1 mL, 0.1 mg/1 mL, 0.5 mg/1 mL solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion)

Multidose vials 1 mg/5mL (0.2 mg/mL), solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion)

Basic Prescribing Information

NOTICE

The Basic Prescribing Information (BPI) is the Novartis Core Data Sheet. It displays the company's current position on important characteristics of the product, including the Core Safety Information according to ICH E2C.

National Prescribing Information is based on the BPI. However, because regulatory requirements and medical practices vary between countries, National Prescribing Information (incl. US Package Insert or European SPCs) may differ in several respects, including but not limited to the characterisation of risks and benefits.

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1 Name of the medicinal product

0.05 mg/1 mL ampoules

SANDOSTATIN® 0.05 mg/1 mL ampoules, solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion).

0.1 mg/1 mL ampoules

SANDOSTATIN® 0.1 mg/1 mL ampoules, solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion).

0.5 mg/1 mL ampoules

SANDOSTATIN® 0.5 mg/1 mL ampoules, solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion).

1 mg/5 mL (0.2 mg/mL) multidose vials

SANDOSTATIN® multidose vials 1 mg/5 mL (0.2 mg/mL), solution for injection (s.c.) or concentrate for solution for infusion (i.v. infusion).

2 Qualitative and quantitative composition

The active substance is octreotide acetate.

1 mL ampoules containing 0.05, 0.1 or 0.5 mg octreotide (as free peptide).

5 mL multidose vials containing 1 mg octreotide (as free peptide).

Sandostatin® solution for injection contains less than 1 mmol (23 mg) of sodium per dose, i.e. essentially 'sodium-free'.

For a full list of excipients, see section 6.1 List of excipients.

3 Pharmaceutical forms

Solution for injection (s.c) or concentrate for solution for infusion (i.v. infusion).

The solution is clear and colourless.

4 Clinical particulars

4.1 Therapeutic indications

Symptomatic control and reduction of growth hormone (GH) and IGF-1 plasma levels in patients with acromegaly who are inadequately controlled by surgery or radiotherapy. Sandostatin treatment is also indicated for acromegalic patients unfit or unwilling to undergo surgery, or in the interim period until radiotherapy becomes fully effective.

Relief of symptoms associated with functional gastro-entero-pancreatic (GEP) endocrine tumours:

- Carcinoid tumours with features of the carcinoid syndrome.
- VIPomas.
- Glucagonomas.
- Gastrinomas/Zollinger-Ellison syndrome, usually in conjunction with proton pump inhibitors, or H₂-antagonist therapy.
- Insulinomas, for pre-operative control of hypoglycaemia and for maintenance therapy.
- GRFomas.

Sandostatin is not an anti-tumour therapy and is not curative in these patients.

Control of refractory diarrhoea associated with AIDS.

Prevention of complications following pancreatic surgery.

Emergency management to stop bleeding and to protect from re-bleeding owing to gastro-oesophageal varices in patients with cirrhosis. Sandostatin is to be used in association with specific treatment such as endoscopic sclerotherapy.

4.2 Posology and method of administration

Acromegaly

Initially 0.05 to 0.1 mg by s.c. injection every 8 or 12 hours. Dosage adjustment should be based on monthly assessment of GH and IGF-1 levels (target: GH < 2.5 ng/mL; IGF-1 within normal range) and clinical symptoms, and on tolerability. In most patients, the optimal daily dose will be 0.3 mg. A maximum dose of 1.5 mg per day should not be exceeded. For patients on a stable dose of Sandostatin, assessment of GH should be made every 6 months.

If no relevant reduction in GH levels and no improvement in clinical symptoms have been achieved within 3 months of starting treatment with Sandostatin, therapy should be discontinued.

Gastro-entero-pancreatic endocrine tumours

Initially 0.05 mg once or twice daily by s.c. injection. Depending on clinical response, effect on levels of tumour-produced hormones (in cases of carcinoid tumours, on the urinary excretion of 5-hydroxyindole acetic acid), and on tolerability, dosage can be gradually increased to 0.1 to 0.2 mg 3 times daily. Under exceptional circumstances, higher doses may be required. Maintenance doses have to be adjusted individually.

In carcinoid tumours, if there is no beneficial response within 1 week of treatment with Sandostatin at the maximum tolerated dose, therapy should not be continued.

AIDS-related refractory diarrhoea

The data suggest that 0.1 mg 3 times per day by s.c. injection is the optimal starting dose. If diarrhoea is not controlled after 1 week of treatment, the dose should be titrated on an

individual basis up to 0.25 mg 3 times per day. Dose adjustment should be based on assessment of stool output and on tolerability.

If within 1 week of treatment with Sandostatin at a dose of 0.25 mg 3 times per day no improvement is achieved, therapy should be discontinued.

Complications following pancreatic surgery

0.1 mg 3 times daily by s.c. injection for 7 consecutive days, starting on the day of operation at least 1 hour before laparotomy.

Bleeding gastro-oesophageal varices

25 micrograms/hour for 5 days by continuous i.v. infusion. Sandostatin can be used in dilution with physiological saline.

In cirrhotic patients with bleeding gastro-oesophageal varices, Sandostatin has been well tolerated at continuous i.v. doses of up to 50 micrograms/hour for 5 days.

Use in the elderly

There is no evidence of reduced tolerability or altered dosage requirements in elderly patients treated with Sandostatin.

Use in children

Experience with Sandostatin in children is limited.

Use in patients with impaired liver function

In patients with liver cirrhosis, the half-life of the drug may be increased, necessitating adjustment of the maintenance dosage.

Use in patients with impaired renal function

Impaired renal function did not affect the total exposure (AUC) to octreotide administered as s.c. injection, therefore no dose adjustment of Sandostatin is necessary.

4.3 Contraindications

Known hypersensitivity to octreotide or to any of the excipients, (see section 6.1 List of excipients).

4.4 Special warnings and precautions for use

General

As GH-secreting pituitary tumours may sometimes expand, causing serious complications (e.g. visual field defects), it is essential that all patients be carefully monitored. If evidence of tumour expansion appears, alternative procedures may be advisable.

The therapeutic benefits of a reduction in growth hormone (GH) levels and normalization of insulin-like growth factor 1 (IGF-1) concentration in female acromegalic patients could potentially restore fertility. Female patients of childbearing potential should be advised to use adequate contraception if necessary during treatment with octreotide (see section 4.6 Pregnancy and lactation).

Thyroid function should be monitored in patients receiving prolonged treatment with octreotide.

Cardiovascular related events

Uncommon cases of bradycardia have been reported. Dose adjustments of drugs such as beta-blockers, calcium channel blockers, or agents to control fluid and electrolyte balance, may be necessary.

Gallbladder and related events

The incidence of gallstone formation with Sandostatin treatment is estimated to be between 15 to 30%. The incidence in the general population is 5 to 20%. Ultrasonic examination of the gallbladder before, and at about 6- to 12-month intervals during Sandostatin therapy is therefore recommended. The presence of gallstones in Sandostatin-treated patients is largely asymptomatic; symptomatic stones should be treated either by dissolution therapy with bile acids or by surgery. Further details are available from Novartis.

GEP endocrine tumours

During the treatment of GEP endocrine tumours, there may be rare instances of sudden escape from symptomatic control by Sandostatin, with rapid recurrence of severe symptoms.

Glucose metabolism

Because of its inhibitory action on growth hormone, glucagon, and insulin, Sandostatin may affect glucose regulation. Post-prandial glucose tolerance may be impaired and, in some instances, the state of persistent hyperglycaemia may be induced as a result of chronic administration.

In patients with insulinomas, octreotide, because of its greater relative potency in inhibiting the secretion of GH and glucagon than that of insulin, and because of the shorter duration of its inhibitory action on insulin, may increase the depth and prolong the duration of hypoglycaemia. These patients should be closely monitored during initiation of Sandostatin therapy and at each change of dosage. Marked fluctuations in blood glucose concentration may possibly be reduced by smaller, more frequently administered doses.

Insulin requirements of patients with type I diabetes mellitus therapy may be reduced by administration of Sandostatin. In non-diabetics and type II diabetics with partially intact insulin reserves, Sandostatin administration can result in prandial increases in glycaemia. It is therefore recommended to monitor glucose tolerance and antidiabetic treatment.

Oesophageal varices

Since, following bleeding episodes from oesophageal varices, there is an increased risk for the development of insulin-dependent diabetes or for changes in insulin requirement in patients with pre-existing diabetes, an appropriate monitoring of blood glucose levels is mandatory.

Local site reactions

In a 52-week toxicity study in rats, predominantly in males, sarcomas were noted at the s.c. injection site only at the highest dose (about 40 times the maximum human dose). No hyperplastic or neoplastic lesions occurred at the s.c. injection site in a 52-week dog toxicity study. There have been no reports of tumour formation at the injection sites in patients treated with Sandostatin for up to 15 years. All the information available at present indicates that the findings in rats are species specific and have no significance for the use of the drug in humans.

Nutrition

Octreotide may alter absorption of dietary fats in some patients.

Depressed vitamin B₁₂ levels and abnormal Schilling's tests have been observed in some patients receiving octreotide therapy. Monitoring of vitamin B₁₂ levels is recommended during therapy with Sandostatin in patients who have a history of vitamin B₁₂ deprivation.

4.5 Interaction with other medicinal products and other forms of interaction

Sandostatin has been found to reduce the intestinal absorption of ciclosporin and to delay that of cimetidine.

Concomitant administration of octreotide and bromocriptine increases the bioavailability of bromocriptine.

Limited published data indicate that somatostatin analogs might decrease the metabolic clearance of compounds known to be metabolized by cytochrome P450 enzymes, which may be due to the suppression of growth hormone. Since it cannot be excluded that octreotide may have this effect, other drugs mainly metabolized by CYP3A4 and which have a low therapeutic index should therefore be used with caution (e.g. quinidine, terfenadine).

4.6 Pregnancy and lactation

Pregnancy

There are no adequate and well-controlled studies in pregnant women. In the post-marketing experience, data on a limited number of exposed pregnancies have been reported in patients with acromegaly, however, in half of the cases the pregnancy outcomes are unknown. Most women were exposed to octreotide during the first trimester of pregnancy at doses ranging from 100-300 micrograms/day of Sandostatin s.c. or 20-30 mg/month of Sandostatin LAR. In

approximately two-thirds of the cases with known outcome, the women elected to continue octreotide therapy during their pregnancies. In most of the cases with known outcome, normal newborns were reported but also several spontaneous abortions during the first trimester, and a few induced abortions.

There were no cases of congenital anomalies or malformations due to octreotide usage in the cases that reported pregnancy outcomes.

Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/foetal development, parturition or postnatal development apart from some transient retardation of physiological growth (see section 5.3 Preclinical safety data).

Sandostatin should only be prescribed to pregnant woman under compelling circumstances (see section 4.4 Special warnings and precautions for use).

Lactation

It is unknown whether octreotide is excreted in human breast milk. Animal studies have shown excretion of octreotide in breast milk. Patients should not breast-feed during Sandostatin treatment.

4.7 Effects on ability to drive and use machines

No data exist on the effects of Sandostatin on the ability to drive and use machines.

4.8 Undesirable effects

The most frequent adverse reactions reported during octreotide therapy include gastrointestinal disorders, nervous system disorders, hepatobiliary disorders, and metabolism and nutritional disorders.

The most commonly reported adverse reactions in clinical trials with octreotide administration were diarrhoea, abdominal pain, nausea, flatulence, headache, cholelithiasis, hyperglycaemia and constipation. Other commonly reported adverse reactions were dizziness, localized pain, biliary sludge, thyroid dysfunction (e.g., decreased thyroid stimulating hormone [TSH], decreased Total T4, and decreased Free T4), loose stools, impaired glucose tolerance, vomiting, asthenia, and hypoglycaemia.

In rare instances, gastrointestinal side effects may resemble acute intestinal obstruction, with progressive abdominal distension, severe epigastric pain, abdominal tenderness and guarding.

Pain or a sensation of stinging, tingling or burning at the site of s.c. injection, with redness and swelling, rarely lasting more than 15 minutes. Local discomfort may be reduced by allowing the solution to reach room temperature before injection, or by injecting a smaller volume using a more concentrated solution.

Although measured faecal fat excretion may increase, there is no evidence to date that long-term treatment with octreotide has led to nutritional deficiency due to malabsorption.

Occurrence of gastrointestinal side effects may be reduced by avoiding meals around the time of Sandostatin s.c. administration, that is, by injecting between meals or on retiring to bed.

In very rare instances, acute pancreatitis has been reported within the first hours or days of Sandostatin s.c. treatment and resolved on withdrawal of the drug. In addition, cholelithiasis-induced pancreatitis has been reported for patients on long-term Sandostatin s.c. treatment.

In both acromegalic and carcinoid syndrome patients, ECG changes were observed such as QT prolongation, axis shifts, early repolarisation, low voltage, R/S transition, early R wave progression, and non-specific ST-T wave changes. The relationship of these events to octreotide acetate is not established because many of these patients have underlying cardiac diseases (see section 4.4 Special warnings and precautions for use).

The following adverse drug reactions, listed in Table 1, have been accumulated from clinical studies with octreotide:

Adverse drug reactions (Table 1) are ranked under heading of frequency, the most frequent first, using the following convention: *very common* ($\geq 1/10$); *common* ($\geq 1/100$, $< 1/10$); *uncommon* ($\geq 1/1,000$, $< 1/100$); *rare* ($\geq 1/10,000$, $< 1/1,000$) *very rare* ($< 1/10,000$), including isolated reports. Within each frequency grouping, adverse reactions are ranked in order of decreasing seriousness.

Table 1 Adverse drug reactions reported in clinical studies

Gastrointestinal disorders	
Very common:	Diarrhoea, abdominal pain, nausea, constipation, flatulence.
Common:	Dyspepsia, vomiting, abdominal bloating, steatorrhoea, loose stools, discolouration of faeces.
Nervous system disorders	
Very common:	Headache.
Common:	Dizziness.
Endocrine disorders	
Common:	Hypothyroidism, thyroid dysfunction (e.g., decreased TSH, decreased Total T4, and decreased Free T4).
Hepatobiliary disorders	
Very common:	Cholelithiasis.
Common:	Cholecystitis, biliary sludge, hyperbilirubinaemia.
Metabolism and nutrition disorders	
Very common:	Hyperglycaemia.
Common:	Hypoglycaemia, impaired glucose tolerance, anorexia.
Uncommon:	Dehydration.
General disorders and administration site	
Very common:	Injection site localized pain.
Investigations	
Common:	Elevated transaminase levels.
Skin and subcutaneous tissue disorders	
Common:	Pruritus, rash, alopecia.
Respiratory disorders	
Common:	Dyspnoea.

Cardiac disorders	
Common:	Bradycardia
Uncommon:	Tachycardia.

Post-marketing

Spontaneously reported adverse reactions, presented in Table 2, are reported voluntarily and it is not always possible to reliably establish frequency or a causal relationship to drug exposure.

Table-2 Adverse drug reactions derived from spontaneous reports

Immune disorders Anaphylaxis, allergy/hypersensitivity reactions.
Skin and subcutaneous tissue disorders Urticaria.
Hepatobiliary disorders Acute pancreatitis, acute hepatitis without cholestasis, cholestatic hepatitis. Cholestasis, jaundice, cholestatic jaundice.
Cardiac disorders Arrhythmias.
Investigations Increased alkaline phosphatase levels, increased gamma glutamyl transferase levels.

4.9 Overdose

A limited number of accidental overdoses of Sandostatin in adults and children have been reported. In adults, the doses ranged from 2,400-6,000 micrograms/day administered by continuous infusion (100-250 micrograms/hour) or subcutaneously (1,500 micrograms t.i.d.). The adverse events reported were arrhythmia, hypotension, cardiac arrest, brain hypoxia, pancreatitis, hepatitis steatosis, diarrhoea, weakness, lethargy, weight loss, hepatomegaly, and lactic acidosis.

In children, the doses ranged from 50-3,000 microgram/day administered by continuous infusion (2.1-500 micrograms/hour) or subcutaneously (50-100 micrograms). The only adverse event reported was mild hyperglycaemia.

No unexpected adverse events have been reported in cancer patients receiving Sandostatin at doses of 3,000-30,000 micrograms/day in divided doses subcutaneously.

Treatment

The management of overdosage is symptomatic.

5 Pharmacological properties

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Antigrowth hormone (ATC code H01CB02)

Octreotide is a synthetic octapeptide derivative of naturally occurring somatostatin with similar pharmacological effects, but with a considerably prolonged duration of action. It inhibits pathologically increased secretion of growth hormone (GH) and of peptides and serotonin produced within the GEP endocrine system.

In animals, octreotide is a more potent inhibitor of GH, glucagon and insulin release than somatostatin is, with greater selectivity for GH and glucagon suppression.

In healthy subjects Sandostatin has been shown to inhibit:

- release of GH stimulated by arginine, exercise- and insulin-induced hypoglycaemia,
- postprandial release of insulin, glucagon, gastrin, other peptides of the GEP endocrine system, and arginine-stimulated release of insulin and glucagon,
- thyrotropin-releasing hormone (TRH)-stimulated release of thyroid-stimulating hormone (TSH).

Unlike somatostatin, octreotide inhibits GH secretion preferentially over insulin and its administration is not followed by rebound hypersecretion of hormones (i.e. GH in patients with acromegaly).

In acromegalic patients Sandostatin lowers plasma levels of GH and IGF-1. A GH reduction by 50% or more occurs in up to 90% patients, and a reduction of serum GH to < 5 ng/mL can be achieved in about half of the cases. In most patients Sandostatin markedly reduces the clinical symptoms of the disease, such as headache, skin and soft tissue swelling, hyperhidrosis, arthralgia, paraesthesia. In patients with a large pituitary adenoma, Sandostatin treatment may result in some shrinkage of the tumour mass.

In patients with functional tumours of the GEP endocrine system, Sandostatin, because of its diverse endocrine effects, modifies a number of clinical features. Clinical improvement and symptomatic benefit occur in patients who still have symptoms related to their tumours despite previous therapies, which may include surgery, hepatic artery embolization, and various chemotherapies, e.g. streptozotocin and 5-fluorouracil.

Sandostatin's effects in the different tumour types are as follows

Carcinoid tumours

Administration of Sandostatin may result in improvement of symptoms, particularly of flush and diarrhoea. In many cases, this is accompanied by a fall in plasma serotonin and reduced urinary excretion of 5-hydroxyindole acetic acid.

VIPomas

The biochemical characteristic of these tumours is overproduction of vasoactive intestinal peptide (VIP). In most cases, administration of Sandostatin results in alleviation of the severe secretory diarrhoea typical of the condition, with consequent improvement in quality of life. This is accompanied by an improvement in associated electrolyte abnormalities, e.g. hypokalaemia, enabling enteral and parenteral fluid and electrolyte supplementation to be withdrawn. In some patients, computer tomography scanning suggests a slowing or arrest of progression of the tumour, or even tumour shrinkage, particularly of hepatic metastases. Clinical improvement is usually accompanied by a reduction in plasma VIP levels, which may fall into the normal reference range.

Glucagonomas

Administration of Sandostatin results in most cases in substantial improvement of the necrolytic migratory rash which is characteristic of the condition. The effect of Sandostatin on the state of mild diabetes mellitus which frequently occurs is not marked and, in general, does not result in a reduction of requirements for insulin or oral hypoglycaemic agents. Sandostatin produces improvement of diarrhoea, and hence weight gain, in those patients affected. Although administration of Sandostatin often leads to an immediate reduction in plasma glucagon levels, this decrease is generally not maintained over a prolonged period of administration, despite continued symptomatic improvement.

Gastrinomas/Zollinger-Ellison syndrome

Although therapy with proton pump inhibitors or H₂-receptor blocking agents controls the recurrent peptic ulceration which results from chronic gastrin-stimulated hypersecretion of gastric acid, such control may be incomplete. Diarrhoea may also be a prominent symptom not alleviated by this therapy. Sandostatin alone or in conjunction with proton pump inhibitors or H₂-receptor antagonists may reduce gastric acid hypersecretion and improve symptoms, including diarrhoea. Other symptoms possibly due to peptide production by the tumour, e.g. flush, may also be relieved. Plasma gastrin levels fall in some patients.

Insulinomas

Administration of Sandostatin produces a fall in circulating immunoreactive insulin, which may, however, be of short duration (about 2 hours). In patients with operable tumours Sandostatin may help to restore and maintain normoglycaemia pre-operatively. In patients with inoperable benign or malignant tumours, glycaemic control may be improved without concomitant sustained reduction in circulating insulin levels.

GRFomas

These rare tumours are characterized by production of GH releasing factor (GRF) alone or in conjunction with other active peptides. Sandostatin produces improvement in the features and symptoms of the resultant acromegaly. This is probably due to inhibition of GRF and GH secretion, and a reduction in pituitary enlargement may follow.

In patients with acquired immune deficiency syndrome (AIDS)-related refractory diarrhoea, Sandostatin produces partial or complete control of stool output in about one-third of patients with diarrhoea unresponsive to conventional anti-infective and/or antidiarrhoeal agents.

For patients undergoing pancreatic surgery, the peri- and post-operative administration of Sandostatin reduces the incidence of typical postoperative complications (e.g. pancreatic fistula, abscess and subsequent sepsis, postoperative acute pancreatitis).

In patients presenting with bleeding gastro-oesophageal varices due to underlying cirrhosis, Sandostatin administration in combination with specific treatment (e.g. sclerotherapy) is associated with better control of bleeding and early re-bleeding, reduced transfusion requirements, and improved 5-day survival. While the precise mode of action of Sandostatin is not fully elucidated, it is postulated that Sandostatin reduces splanchnic blood flow through inhibition of vaso-active hormones (e.g. VIP, glucagon).

5.2 Pharmacokinetic properties

Absorption

After s.c. injection, Sandostatin is rapidly and completely absorbed. Peak plasma concentrations are reached within 30 minutes.

Distribution

The volume of distribution is 0.27 L/kg, and the total body clearance 160 mL/min. Plasma protein binding amounts to 65%. The amount of Sandostatin bound to blood cells is negligible.

Elimination

The elimination half-life after s.c. administration is 100 minutes. After i.v. injection, the elimination is biphasic, with half-lives of 10 and 90 minutes. Most of the peptide is eliminated via the faeces, while approximately 32% is excreted unchanged into the urine.

Special patient population

Impaired renal function did not affect the total exposure (AUC) to octreotide administered as s.c. injection.

The elimination capacity may be reduced in patients with liver cirrhosis, but not in patients with fatty liver disease.

5.3 Preclinical safety data

Acute toxicity

Acute toxicity studies of octreotide in mice revealed LD₅₀ values of 72 mg/kg by the i.v. route and of 470 mg/kg by the s.c. route. The acute i.v. LD₅₀ value of octreotide in rats was determined at 18 mg/kg. Octreotide acetate was well tolerated by dogs receiving up to 1 mg/kg body weight by i.v. bolus injection.

Repeat-dose toxicity

A 26-week i.v. toxicity study in dogs carried out at dose levels of up to 0.5 mg/kg twice per day revealed progressive changes in acidophil prolactin-containing cells in the pituitary. Further investigations showed this to be within physiological range, apparently without relationship to the exogenously administered somatostatin. There were no significant alterations in plasma hormone levels. Female Rhesus monkeys receiving the same dose level of 0.5 mg/kg b.i.d. for 3 weeks failed to reveal pituitary changes, and there were no alterations of basal levels of plasma growth hormone, prolactin, or glucose.

Whereas the acidic vehicle produced inflammation and fibroplasia upon repeated s.c. injection in rats, there was no evidence that octreotide acetate causes delayed-type hypersensitivity reactions when injected intradermally in guinea pigs in 0.1% solution in 0.9% sterile saline.

Mutagenicity

Octreotide and/or its metabolites were devoid of mutagenic potential when investigated in vitro in validated bacterial and mammalian cell test systems. Increased frequencies of chromosomal changes were observed in V79 Chinese hamster cells in vitro, albeit at high and cytotoxic concentrations only. Chromosomal aberrations were however not increased in human lymphocytes incubated with octreotide acetate in vitro. In vivo, no clastogenic activity was observed in the bone marrow of mice treated with octreotide i.v. (micronucleus test) and no evidence of genotoxicity was obtained in male mice using a DNA repair assay on sperm heads. The microspheres were devoid of mutagenic potential when tested in a validated in vitro bacterial assay.

Carcinogenicity/chronic toxicity

In rats receiving octreotide acetate at daily doses up to 1.25 mg/kg body weight, fibrosarcomas were observed, predominantly in a number of male animals, at the s.c. injection site after 52, 104 and 113/116 weeks. Local tumours occurred also in the control rats, however development of these tumours was attributed to disordered fibroplasia produced by sustained irritant effects at the injection sites, enhanced by the acidic lactic acid/mannitol vehicle. This non-specific tissue reaction appeared to be particular to rats. Neoplastic lesions were observed neither in mice receiving daily s.c. injections of octreotide at doses up to 2 mg/kg for 98 weeks, nor in dogs which were treated with daily s.c. doses of the drug for 52 weeks.

The 116-week carcinogenicity study in rats with s.c. octreotide also revealed uterine endometrial adenocarcinomas, their incidence reaching statistical significance at the highest s.c. dose level of 1.25 mg/kg per day. The finding was associated with an increased incidence of endometritis, a decreased number of ovarian corpora lutea, a reduction in mammary adenomas and the presence of uterine glandular and luminal dilation, suggesting a state of hormonal imbalance. The available information clearly indicates that the findings of endocrine-mediated tumours in rats are species-specific and are not relevant for the use of the drug in humans.

Reproduction

Fertility as well as pre-, peri- and post-natal studies in female rats revealed no adverse effects on reproductive performance and development of the offspring, when s.c. doses of up to 1 mg/kg body weight per day were administered. Some retardation of the physiological growth noted in pups was transient and attributable to GH inhibition brought about by excessive pharmacodynamic activity.

6 Pharmaceutical particulars

6.1 List of excipients

Ampoules

Lactic acid, mannitol, sodium hydrogen carbonate, water for injections.

Multidose vials

Lactic acid, phenol, mannitol, sodium hydrogen carbonate, water for injections.

Information might differ in some countries.

6.2 Incompatibilities

Octreotide acetate is not stable in Total Parenteral Nutrition (TPN) solutions.

6.3 Shelf life

Ampoules

3 years.

Information might differ in some countries.

Multidose vials

4 years.

Information might differ in some countries.

6.4 Special precautions for storage

Ampoules

Keep container in the outer carton in order to protect from light.

For prolonged storage, Sandostatin ampoules must be stored at 2 to 8°C.

Do not freeze.

For day-to-day use, they may be stored not above 30°C for up to 2 weeks.

Information might be differ in some countries.

Sandostatin must be kept out of the reach and sight of children.

Multidose vials

Keep container in the outer carton in order to protect from light.

For prolonged storage, Sandostatin multidose vials must be stored at 2 to 8°C.

Do not freeze.

For day-to-day use, they may be stored not above 25°C for up to 2 weeks.

Information might be differ in some countries.

Sandostatin must be kept out of the reach and sight of children.

6.5 Nature and contents of the container

Country specific.

6.6 Instructions for use/handling

Subcutaneous administration

Patients who are to self-administer the drug by s.c. injection must receive precise directions from the physician or the nurse.

To reduce local discomfort, it is recommended that the solution should be at room temperature before injection. Multiple injections at short intervals at the same site should be avoided.

Ampoules should be opened just prior to administration, and any unused portion discarded.

To prevent contamination, it is recommended that the cap of multidose vials should be punctured not more than 10 times.

Intravenous infusion

Parenteral drug products should be inspected visually for discoloration and particulate matter prior to administration.

Sandostatin (octreotide acetate) is physically and chemically stable for 24 hours in sterile physiological saline solutions or sterile solutions of dextrose (glucose) 5% in water. However, because Sandostatin can affect glucose homeostasis, it is recommended that physiological saline solutions be used rather than dextrose. The diluted solutions are physically and chemically stable for at least 24 hours below 25°C. From a microbiological point of view, the diluted solution should preferably be used immediately. If the solution is not used immediately, storage prior to use is the responsibility of the user and should be at 2 to 8°C. Before administration the solution has to be brought to room temperature again.

The cumulated time between reconstitution, dilution with infusion media, storage in a refrigerator, and end of administration must not be longer than 24 hours.

In cases where Sandostatin is to be administered by i.v. infusion, the contents of one 0.5 mg ampoule should normally be dissolved in 60 mL physiological saline, and the resulting solution should be infused by means of an infusion pump. This should be repeated as often as necessary until the prescribed duration of treatment is reached. Sandostatin has also been infused in lower concentrations.

Special precautions for disposal

Any unused product or waste material should be disposed of in accordance with local requirements.