

New Zealand Datasheet

Name of Medicine

ACTRAPID®

Neutral insulin 100 IU/ml

Presentation

ACTRAPID is a clear colourless solution containing 100% neutral human insulin. It is available in 3 ml Penfill® cartridges made of glass, with a plunger (bromobutyl) and a stopper (bromobutyl/polyisoprene) in a carton, or in 10 ml glass vials closed with a disc (bromobutyl/polyisoprene rubber) and a protective tamper-proof plastic cap in a carton. One IU (International Unit) corresponds to 0.035 mg of anhydrous human insulin.

The Penfill cartridges are designed to be used with Novo Nordisk insulin delivery systems.

Uses

Actions

Pharmacotherapeutic group: Drugs used in diabetes. Insulins and analogues for injection, intermediate-acting combined with fast-acting, insulin (human). ATC code A10A B01

The blood glucose lowering effect of insulin is due to the facilitated uptake of glucose following binding of insulin to receptors on muscle and fat cells and to the simultaneous inhibition of glucose output from the liver.

For ACTRAPID the fast absorption is due to the product being a solution

An average action profile after subcutaneous injection indicates:

Onset:	within ½ hour
Maximum effect:	between 1.5 and 3.5 hours
Duration:	approximately 7-8 hours

Pharmacokinetics

Insulin in the bloodstream has a half-life of a few minutes. Consequently, the time-action profile of an insulin preparation is determined solely by its absorption characteristics. This process is influenced by several factors (e.g. insulin dosage, injection route and site, thickness of subcutaneous fat, type of diabetes), which is why considerable intra- and inter-patient variations are seen.

Absorption

The maximum plasma concentration is reached within 1.5-2.5 hours after subcutaneous administration.

Distribution

No profound binding to plasma proteins, except circulating insulin antibodies (if present) has been observed.

Metabolism

Human insulin is reported to be degraded by insulin protease or insulin-degrading enzymes and possibly protein disulfide isomerase. A number of cleavage (hydrolysis) sites on the human insulin molecule have been proposed; none of the metabolites formed following the cleavage are active.

Elimination

The terminal half-life is determined by the rate of absorption from the subcutaneous tissue. The terminal half-life ($t_{1/2}$) is therefore a measure of the absorption rather than of the elimination *per se* of insulin from plasma (insulin in the blood stream has a $t_{1/2}$ of a few minutes). Trials have indicated a $t_{1/2}$ of about 2-5 hours.

Children and adolescents

The pharmacokinetic profile of ACTRAPID has been studied in a small number (n=18) of diabetic children (aged 6-12 years) and adolescents (aged 13-17 years). The data are limited but suggest that the pharmacokinetic profile in children and adolescents may be similar to that in adults. However, there were differences between age groups in C_{max} stressing the importance of individual dose titration.

Indications

Treatment of diabetes mellitus. Furthermore indicated for the initial stabilisation of diabetes, during treatment of diabetic ketoacidosis and the hyperosmolar non ketotic syndrome, and during stress situations such as severe infections and major surgery in diabetic patients.

Dosage and Administration

ACTRAPID is a short-acting insulin and is often used in combination with intermediate- or long acting insulins.

Dosage is individual and determined by the physician in accordance with the needs of the patient.

The individual insulin requirement is usually between 0.5 and 1.0 IU/kg/day. The daily insulin requirement may be higher in patients with insulin resistance (e.g. during puberty in the young or due to obesity) and lower in patients with residual, endogenous insulin production.

An injection should be followed by a meal or snack containing carbohydrates within 30 minutes.

In patients with diabetes mellitus optimised glycaemic control delays the onset of late diabetic complications. Close blood glucose monitoring is recommended.

Concomitant illness, especially infections and feverish conditions, usually increases the patient's insulin requirement. Concomitant diseases in the kidney, liver or affecting the adrenal, pituitary or thyroid gland can require changes in the insulin dose.

Adjustment of the dosage may also be necessary if patients change physical activity or their usual diet. Dosage adjustment may be necessary when transferring patients from one insulin preparation to another (see Warnings and Precautions).

ACTRAPID is usually administered subcutaneously in the abdominal wall. The thigh, the gluteal region or the deltoid region may also be used. Subcutaneous injection into the abdominal wall ensures a faster absorption than from other regions of the body. Injection into a lifted skin fold minimises the risk of intramuscular injection. Keep the needle under the skin for at least 6 seconds to make sure the entire dose is injected.

Injection sites should always be rotated within the same region in order to reduce the risk of lipodystrophy.

Intramuscular administrations are possible under guidance by a physician. Intravenous administrations are only suitable for vial products and should only be carried out by a physician.

Contraindications

Insulin should never be given to patients with hypoglycaemia.

Hypersensitivity to human insulin or any of the excipients.

Warnings and Precautions

Inadequate dosing or discontinuation of treatment, especially in type 1 diabetes, may lead to hyperglycaemia. Usually the first symptoms of hyperglycaemia usually set in gradually, over a period of hours or days. They include thirst, increased frequency of urination, nausea, vomiting, drowsiness, flushed dry skin, dry mouth, loss of appetite as well as acetone breath. In type 1 diabetes, untreated hyperglycaemic events eventually leads to diabetic ketoacidosis which is potentially lethal.

Hypoglycaemia may occur if the insulin dose is too high in relation to the insulin requirement (see Adverse Effects and Overdosage).

Omission of a meal or unplanned, strenuous physical exercise may lead to hypoglycaemia.

Patients whose blood glucose control is greatly improved e.g. by intensified insulin therapy, may experience a change in their usual warning symptoms of hypoglycaemia and should be advised accordingly. Usual warning symptoms may disappear in patients with longstanding diabetes.

Transferring a patient to another type or brand of insulin should be done under strict medical supervision. Changes in strength, brand (manufacturer), type, origin (human insulin, insulin analogue) and/or method of manufacture may result in the need for a change in dosage. . Patients transferred to ACTRAPID from another type of insulin may require an increased number of daily injections or a change in dosage from that used with their usual insulin products. If an adjustment is needed when switching the patient to Actrapid®, it may occur with the first dose or during the first few weeks or months.

As with any insulin therapy, injection site reactions may occur and include pain, redness, hives, inflammation, bruising, swelling and itching. Continuous rotation of the injection site within a given area may help to reduce or prevent these reactions. Reactions usually resolve in a few days to a few weeks. On rare occasions, injection site reactions may require discontinuation of ACTRAPID.

A few patients who have experienced hypoglycaemic reactions after transfer from animal source insulin have reported that early warning symptoms of hypoglycaemia were less pronounced or different from those experienced with their previous insulin.

Before travelling between different time zones, the patient should be advised to consult the doctor, since this may mean that the patient has to take insulin and meals at different times.

Due to the risk of precipitation in pump catheters, ACTRAPID should not be used in insulin pumps for continuous subcutaneous insulin infusion.

Combination of thiazolidinediones and insulin products

Cases of congestive heart failure have been reported when thiazolidinediones were used in combination with insulin, especially in patients with risk factors for development of congestive heart failure. This should be kept in mind if treatment with the combination of thiazolidinediones and insulin medicinal products is considered. If the combination is used, patients should be observed for signs and symptoms of congestive heart failure, weight gain and oedema. Thiazolidinediones should be discontinued if any deterioration in cardiac symptoms occurs.

ACTRAPID contains metacresol, which may cause allergic reactions.

Use in Pregnancy and Lactation

There are no restrictions on the treatment of diabetes with insulin during pregnancy as insulin does not pass the placental barrier.

Both hypoglycaemia and hyperglycaemia, which can occur in inadequately controlled diabetes therapy, increase the risk of malformations and death *in utero*. Intensified blood glucose control and monitoring of pregnant women with diabetes are recommended throughout pregnancy and when contemplating pregnancy. Insulin requirements usually fall in the first trimester and increase subsequently during the second and third trimesters. After delivery, insulin requirements normally return rapidly to pre-pregnancy values.

There is no restriction on treatment with ACTRAPID during breast-feeding. Insulin treatment of the nursing mother involves no risk to the baby. However, the ACTRAPID dosage, diet or both may need to be adjusted.

Effects on Ability to Drive and Use Machines

The patient's ability to concentrate and react may be impaired as a result of hypoglycaemia. This may constitute a risk in situations where these abilities are of special importance (e.g. driving a car or operating machinery).

Patients should be advised to take precautions to avoid hypoglycaemia whilst driving. This is particularly important in those who have reduced or absent awareness of the warning signs of hypoglycaemia or have frequent episodes of hypoglycaemia. The advisability of driving should be considered in these circumstances.

Adverse Effects

a. Summary of the safety profile

The most frequently reported adverse reaction during treatment is hypoglycaemia. In clinical trials and during marketed use, the frequencies of hypoglycaemia vary with patient population, dose regimens and level of glycaemic control, please see section c below.

At the beginning of the insulin treatment, refraction anomalies, oedema and injection site reactions (pain, redness, hives, inflammation, bruising, swelling and itching at the injection site) may occur. These reactions are usually of transitory nature. Fast improvement in blood glucose control may be associated with acute painful neuropathy, which is usually reversible. Intensification of insulin therapy with abrupt improvement in glycaemic control may be associated with temporary worsening of diabetic retinopathy, while long-term improved glycaemic control decreases the risk of progression of diabetic retinopathy.

b. Tabulated list of adverse reactions

Adverse reactions listed below are based on clinical trial data and classified according to MedDRA frequency and System Organ Class. Frequency categories are defined according to the following convention: Very common ($\geq 1/10$); common ($\geq 1/100$ to $< 1/10$); uncommon ($\geq 1/1,000$ to $< 1/100$); rare ($\geq 1/10,000$ to $< 1/1,000$); very rare ($< 1/10,000$); not known (cannot be estimated from the available data).

Immune system disorders	Uncommon – Urticaria, rash
	Very rare – Anaphylactic reactions*
Metabolism and nutrition disorders	Very common – Hypoglycaemia*
Nervous system disorders	Uncommon – Peripheral neuropathy (painful neuropathy)

Eye disorders	Uncommon – Refraction disorders
	Very rare – Diabetic retinopathy
Skin and subcutaneous tissue disorders	Uncommon – Lipodystrophy*
General disorders and administration site conditions	Uncommon – Injection site reactions
	Uncommon – Oedema

* see section c

c. Description of selected adverse reactions

Anaphylactic reactions

The occurrence of generalised hypersensitivity reactions (including generalised skin rash, itching, sweating, gastrointestinal upset, angioneurotic oedema, difficulties in breathing, palpitation, reduction in blood pressure and fainting/loss of consciousness) is very rare but can potentially be life threatening.

Hypoglycaemia

The most frequently reported adverse reaction is hypoglycaemia. It may occur if the insulin dose is too high in relation to the insulin requirement. Severe hypoglycaemia may lead to unconsciousness and/or convulsions and may result in temporary or permanent impairment of brain function or even death. The symptoms of hypoglycaemia usually occur suddenly. They may include cold sweats, cool pale skin, fatigue, nervousness or tremor, anxiousness, unusual tiredness or weakness, confusion, difficulty in concentration, drowsiness, excessive hunger, vision changes, headache, nausea and palpitation.

Lipodystrophy

Lipodystrophy is reported as uncommon. Lipodystrophy may occur at the injection site.

Interactions

A number of medicinal products are known to interact with the glucose metabolism.

The following substances may reduce the insulin requirements:

- Oral anti-diabetic products, monoamine oxidase inhibitors (MAOI), non-selective beta-blocking agents, angiotensin converting enzyme (ACE) inhibitors, salicylates, anabolic steroids and sulphonamides..

The following substances may increase the insulin requirements:

- Oral contraceptives, thiazides, glucocorticoids, thyroid hormones, beta-sympathomimetics, growth hormone and danazol.

Beta-blocking agents may mask the symptoms of hypoglycaemia and delay recovery from hypoglycaemia. Octreotide/lanreotide may either increase or decrease the insulin requirement. Alcohol may intensify and prolong the hypoglycaemic effect of insulin.

Overdosage

A specific overdose of insulin cannot be defined, however, hypoglycaemia may develop over sequential stages if too high doses relative to the patient's requirement are administered:

- Mild hypoglycaemic episodes can be treated by oral administration of glucose or sugary products. It is therefore recommended that the diabetic patient always carries sugar containing products.

Severe hypoglycaemic episodes, where the patient has become unconscious, can be treated with glucagon (0.5 to 1 mg) given intramuscularly or subcutaneously by a trained person or with glucose given intravenously by a healthcare professional. Glucose must also be given intravenously if the patient does not respond to glucagon within 10 to 15 minutes.

Upon regaining consciousness administration of oral carbohydrate is recommended for the patient in order to prevent a relapse.

Pharmaceutical Precautions

Insulin preparations should be stored between 2°C and 8°C (in a refrigerator), not in or near a freezing compartment. Insulin preparations which have been frozen must not be used.

Insulin preparations should be protected from excessive heat or sunlight. Insulin solutions should not be used if they do not appear water-clear and colourless. ACTRAPID should not be used in insulin pumps for continuous subcutaneous insulin infusion.

After first use ACTRAPID vials may be kept at room temperature (below 25°C) for 6 weeks.

ACTRAPID Penfill, can be used or carried as a spare (below 25°C) for 6 weeks.

Medicine Classification

Prescription Medicine

Package Quantities

ACTRAPID is available as a Penfill of 3 ml in cartons of five, or in glass vials of 10 ml.

Further Information

Incompatibilities

In general terms, insulin should only be added to compounds with which it has known compatibility. Drugs added to the insulin solution may cause degradation of the insulin, e.g. if the drugs contain thiols or sulphites. Upon mixing ACTRAPID with infusion fluids an unpredictable amount of insulin will be adsorbed to the infusion material. Monitoring of the patient's blood glucose during infusion is therefore recommended.

Instructions for use/handling

The carton contains a package leaflet with instructions for use and handling. ACTRAPID Penfill is accompanied by a package leaflet with detailed instructions for use to be followed. ACTRAPID vials are for use with insulin syringes with the corresponding unit scale. ACTRAPID Penfill is for single person use only. The container must not be refilled.

ACTRAPID Penfill is designed to be used with Novo Nordisk insulin delivery systems and NovoFine® or NovoTwist® needles.

Cartridges and pens should only be used in combination with products that are compatible with them and allow the cartridge/pen to function safely and effectively.

Needles and ACTRAPID Penfill must not be shared.

In case of emergency in current ACTRAPID Penfill users (hospitalisation or insulin pen malfunction), ACTRAPID can be withdrawn with an U100 insulin syringe from the cartridge

Excipients

Glycerol
Metacresol

Zinc chloride
Sodium hydroxide (for pH adjustment)
Hydrochloric acid (for pH adjustment)
Water for injections

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