Summary of product characteristics

1.NAME OF THE FINISHED PHARMACEUTICAL PRODUCT

FERRIN (Iron Sucrose Injection USP 20mg/ml)

2.QUALITATIVE AND QUANTITATIVE COMPOSITION

Each ml contains:
Ferric Hydroxide in complex with Sucrose
Eq. To Element Iron.....20 mg
For the full list of excipients, see section 6.1.

3.PHARMACEUTICAL FORM

Injection
A Clear reddish brown colour liquid filled in 5 ml ampoules

4.CLINICAL PARTICULARS

4.1 Therapeutic indications

Iron sucrose Injection is indicated for the treatment of iron deficiency in the following indications:

- Where there is a clinical need for a rapid iron supply,
- In patients who cannot tolerate oral iron therapy or who are non-compliant,
- In active inflammatory bowel disease where oral iron preparations are ineffective,
- In chronic kidney disease when oral iron preparations are less effective.

The diagnosis of iron deficiency must be based on appropriate laboratory tests (e.g. Hb, serum ferritin, TSAT, serum iron, etc.).
(Hb haemoglobin, TSAT transferrin saturation)

4.2 Posology and method of administration

Monitor carefully patients for signs and symptoms of hypersensitivity reactions during and following each administration of Iron sucrose Injection. Iron sucrose Injection should only be administered when staff trained to evaluate and manage anaphylactic reactions is immediately available, in an environment where full resuscitation facilities can be assured. The patient should be observed for adverse effects for at least 30 minutes following each Iron sucrose Injection administration.

Posology

The cumulative dose of Iron sucrose Injection must be calculated for each patient individually and must not be exceeded.

Calculation of dosage

The total cumulative dose of Iron sucrose Injection, equivalent to the total iron deficit (mg), is determined by the haemoglobin level (Hb) and body weight (BW). The dose of Iron sucrose Injection must be individually calculated for each patient according to the total iron deficit calculated with the following Ganzoni formula, for example:

Total iron deficit [mg] = BW [kg] x (target Hb - actual Hb) [g/dl] x 2.4* + storage iron [mg]

- Below 35 kg BW:
- 35 kg BW and above:
- Target Hb = 13 g/dl and storage iron = 15 mg/kg BW Target Hb = 15 g/dl and storage iron = 500 mg

* Factor 2.4 = 0.0034 (iron content of Hb = 0.34%) x 0.07 (blood volume = 7% of BW) x 1000 (conversion of [g] to [mg]) x 10

$$\text{Total Venofer to be administered (in ml)} = \frac{\text{Total iron deficit [mg]}}{\text{20 mg iron/ml}}$$

Total amount of Iron sucrose Injection (ml) to be administered according to body weight, actual Hb level and target Hb level*:

BW	**Total amount of Iron sucrose Injection (20 mg iron per ml) to be administered**			
	Hb 6.0 g/dl	**Hb 7.5 g/dl**	**Hb 9.0 g/dl**	**Hb 10.5 g/dl**
30 kg	47.5 ml	42.5 ml	37.5 ml	32.5 ml
35 kg	62.5 ml	57.5 ml	50 ml	45 ml
40 kg	67.5 ml	60 ml	55 ml	47.5 ml
45 kg	75 ml	65 ml	57.5 ml	50 ml
50 kg	80 ml	70 ml	60 ml	52.5 ml
55 kg	85 ml	75 ml	65 ml	55 ml
60 kg	90 ml	80 ml	67.5 ml	57.5 ml
65 kg	95 ml	82.5 ml	72.5 ml	60 ml
70 kg	100 ml	87.5 ml	75 ml	62.5 ml
75 kg	105 ml	92.5 ml	80 ml	65 ml
80 kg	112.5 ml	97.5 ml	82.5 ml	67.5 ml
85 kg	117.5 ml	102.5 ml	85 ml	70 ml
90 kg	122.5 ml	107.5 ml	90 ml	72.5 ml

* Below 35 kg BW: Target Hb = 13 g/dl
35 kg BW and above: Target Hb = 15 g/dl To convert Hb (mM) to Hb (g/dl), multiply the former by 1.6.

If the total necessary dose exceeds the maximum allowed single dose, then the administration must be divided.

Posology

Adults

5 - 10 ml of Iron sucrose Injection (100 - 200 mg iron) 1 to 3 times a week. For administration time and dilution ratio see “Method of administration”.

Paediatric population
The use of Iron sucrose Injection has not been adequately studied in children and, therefore, Iron sucrose Injection is not recommended for use in children.
Method of administration

Iron sucrose Injection must only be administered by the intravenous route.
Intravenous injection
Iron sucrose Injection may be administered by slow intravenous injection at a rate of 1 ml undiluted solution per minute and not exceeding 10 ml Iron sucrose Injection (200 mg iron) per injection.
Injection into venous line of dialysis machine
Iron sucrose Injection may be administered during a haemodialysis session directly into the venous line of the dialysis machine under the same conditions as for intravenous injection.

4.3 Contraindications

The use of Iron sucrose Injection is contraindicated in the following conditions:
- Hypersensitivity to the active substance, to Iron sucrose Injection or any of its excipients
- Known serious hypersensitivity to other parenteral iron products
- Anaemia not caused by iron deficiency
- Evidence of iron overload or hereditary disturbances in utilisation of iron

4.4 Special warnings and precautions for use

Parenterally administered iron preparations can cause hypersensitivity reactions including serious and potentially fatal anaphylactic/anaphylactoid reactions. Hypersensitivity reactions have also been reported after previously uneventful doses of parenteral iron complexes including iron sucrose. However, in several studies performed in patients who had a history of a hypersensitivity reaction to iron dextran or ferric gluconate, Iron sucrose Injection was shown to be well tolerated.
The risk of hypersensitivity reactions is enhanced for patients with known allergies including drug allergies, including patients with a history of severe asthma, eczema or other atopic allergy.
There is also an increased risk of hypersensitivity reactions to parenteral iron complexes in patients with immune or inflammatory conditions (e.g. systemic lupus erythematosus, rheumatoid arthritis).
Iron sucrose Injection should only be administered when staff trained to evaluate and manage anaphylactic reactions is immediately available, in an environment where full resuscitation facilities can be assured. Each patient should be observed for adverse effects for at least 30 minutes following each Iron sucrose Injection injection. If hypersensitivity reactions or signs of intolerance occur during administration, the treatment must be stopped immediately. Facilities for cardio respiratory resuscitation and equipment for handling acute anaphylactic/anaphylactoid reactions should be available, including an injectable 1:1000 adrenaline solution. Additional treatment with antihistamines and/or corticosteroids should be given as appropriate.

In patients with liver dysfunction, parenteral iron should only be administered after careful risk/benefit assessment. Parenteral iron administration should be avoided in patients with hepatic dysfunction where iron overload is a precipitating factor, in particular Porphyria Cutanea Tarda (PCT). Careful monitoring of iron status is recommended to avoid iron overload.
Parenteral iron should be used with caution in the case of acute or chronic infection. It is recommended that the administration of Iron sucrose Injection is stopped in patients with bacteraemia. In patients with chronic infection, a risk/benefit evaluation should be performed.
Paravenous leakage must be avoided because leakage of Iron sucrose Injection at the injection site can lead to pain, inflammation and brown discoloration of the skin.

4.5 Interaction with other medicinal products and other forms of interaction

As with all parenteral iron preparations, Iron sucrose Injection should not be administered concomitantly with oral iron preparations since the absorption of oral iron is reduced. Therefore, oral iron therapy should be started at least 5 days after the last injection of Iron sucrose Injection.

4.6 Fertility, pregnancy and lactation

Pregnancy
There is no data from the use of iron sucrose in pregnant women in the first trimester. Data (303 pregnancy outcomes) from the use of Iron sucrose Injection in pregnant women in the second and third trimester showed no safety concerns for the mother or newborn.
A careful risk/benefit evaluation is required before use during pregnancy and Iron sucrose Injection should not be used during pregnancy unless clearly necessary.
Iron deficiency anaemia occurring in the first trimester of pregnancy can in many cases be treated with oral iron. Treatment with Iron sucrose Injection should be confined to second and third trimester if the benefit is judged to outweigh the potential risk for both the mother and the foetus.
Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity .
Breast-feeding
There is limited information on the excretion of iron in human milk following administration of intravenous iron sucrose. In one clinical study, 10 healthy breast-feeding mothers with iron deficiency received 100 mg iron in the form of iron sucrose. Four days after treatment, the iron content of the breast milk had not increased and there was no difference from the control group (n=5).
It cannot be excluded that newborns/infants may be exposed to iron derived from Iron sucrose Injection via the mother's milk, therefore the risk/benefit should be assessed.
Preclinical data do not indicate direct or indirect harmful effects to the nursing child. In lactating rats treated with 59Fe-labelled iron sucrose, low secretion of iron into the milk and transfer of iron into the offspring was

observed. Non metabolised iron sucrose is unlikely to pass into the mother's milk.

Fertility
No effects of iron sucrose treatment were observed on fertility and mating performance in rats.

4.7 Effects on ability to drive and use machines

In the case of symptoms of dizziness, confusion or light headedness following the administration of Iron sucrose Injection, patients should not drive or use machinery until the symptoms have ceased.

4.8 Undesirable effects

The most commonly reported adverse drug reaction in clinical trials with Iron sucrose Injection was dysgeusia, which occurred with a rate of 4.5 events per 100 subjects. The most important serious adverse drug reactions associated with Iron sucrose Injection are hypersensitivity reactions, which occurred with a rate of 0.25 events per 100 subjects in clinical trials. Anaphylactoid/anaphylactic reactions were reported only in the post-marketing setting (estimated as rare);.
The adverse drug reactions reported after the administration of Iron sucrose Injection in 4,064 subjects in clinical trials as well as those reported from the post-marketing setting are presented in the table below.

System Organ Class	**Common (≥1/100, <1/10)**	**Uncommon (≥1/1,000, <1/100)**	**Rare (≥1/10,000, <1/1,000)**	**Frequency not known[1])**
Immune system disorders		Hypersensitivity		Anaphylactoid/anaphylactic reactions, angioedema
Nervous system disorders	Dysgeusia	Headache, dizziness, paraesthesia, hypoaesthesia	Syncope, somnolence	Depressed level of consciousness, confusional state, loss of consciousness, anxiety, tremor
Cardiac disorders			Palpitations	Bradycardia, tachycardia
Vascular disorders	Hypotension, hypertension	Flushing, phlebitis		Circulatory collapse, thrombophlebitis
Respiratory, thoracic and mediastinal disorders		Dyspnoea		Bronchospasm
Renal and urinary disorders			Chromaturia	
Gastrointestinal	Nausea	Vomiting,		

disorders		abdominal pain, diarrhoea, constipation		
Skin and subcutaneous tissue disorders		Pruritus, rash		Urticaria, erythema
Musculoskeletal and connective tissue disorders		Muscle spasm, myalgia, arthralgia, pain in extremity, back pain		
General disorders and administration site conditions	Injection/infusion site reaction[2)]	Chills, asthenia, fatigue, oedema peripheral, pain	Chest pain, hyperdrosis, pyrexia	Cold sweat, malaise, pallor, influenza like illness[3)]
Investigations		Alanine aminotransferase increased, aspartate aminotransferase increased, gamma-glutamyltransferase increased, serum ferritin increased	Blood lactate dehydrogenase increased	

[1)] Spontaneous reports from the post-marketing setting; estimated as rare
[2)]The most frequently reported are: injection/infusion site pain, -extravasation, -irritation, - reaction, -discolouration, -haematoma, -pruritus.
[3)] Onset may vary from a few hours to several days.

Reporting of suspected adverse reactions:
Reporting suspected adverse reactions after authorisation of the medicinal product is important as it allows continued monitoring of the benefit–risk balance of the medicinal product. Healthcare professionals are requested to report any suspected adverse reactions to the marketing authorisation holder or, where applicable, via the national reporting system

4.9 Overdose

Overdose can cause iron overload which may manifest itself as haemosiderosis. Overdose should be treated, as deemed necessary by the treating physician, with an iron chelating agent or according to standard medical practice.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Anti-anaemic preparation, iron, parenteral preparation, ATC code: B03AC

Mechanism of action

Iron sucrose, the active ingredient of Iron sucrose Injection, is composed of a polynuclear iron(III)-hydroxide core surrounded by a large number of non-covalently bound sucrose molecules. The complex has a weight average molecular weight (Mw) of approximately 43 kDa. The polynuclear iron core has a structure similar to that of the core of the physiological iron storage protein ferritin. The complex is designed to provide, in a controlled manner, utilisable iron for the iron transport and storage proteins in the body (i.e., transferrin and ferritin, respectively).

Following intravenous administration, the polynuclear iron core from the complex is taken up predominantly by the reticuloendothelial system in the liver, spleen, and bone marrow. In a second step, the iron is used for the synthesis of Hb, myoglobin and other iron-containing enzymes, or stored primarily in the liver in the form of ferritin.

Clinical efficacy and safety Chronic kidney disease

Study LU98001 was a single arm study to investigate the efficacy and safety of 100 mg iron as Iron sucrose Injection for up to 10 sessions over 3-4 weeks in haemodialysis patients with iron deficiency anaemia (Hb >8 and <11.0 g/dl, TSAT <20%, and serum ferritin ≤300 µg/l) who were receiving rHuEPO therapy. A Hb ≥11 g/dl was attained in 60/77 patients. The mean increase in serum ferritin and TSAT was significant from baseline to the end of treatment (Day 24) as well as to the 2 and 5 weeks follow-up visit.

Study 1VEN03027 was a randomised study comparing Iron sucrose Injection (1000 mg in divided doses over 14 days) and oral ferrous sulphate (325 mg 3 times daily for 56 days) in non-dialysis dependent chronic kidney disease patients (Hb ≤11.0 g/dl, serum ferritin ≤300 µg/l, and TSAT ≤25%) with or without rHuEPO. A clinical response (defined as Hb increase ≥1.0 g/dl and serum ferritin increase ≥160 µg/l) was more frequently observed in patients treated with Iron sucrose Injection (31/79; 39.2%) compared to oral iron (1/82; 1.2%); p<0.0001.

Inflammatory Bowel Disease

A randomised, controlled study compared Iron sucrose Injection (single IV dose of 200 mg iron once per week or every second week until the cumulative dose was reached) with oral iron (200 mg twice daily for 20 weeks) in patients with inflammatory bowel disease and anaemia (Hb <11.5 g/dl). At the end of treatment, 66% of patients in the Iron sucrose

Injection group had an increase in Hb ≥2.0 g/dl compared to 47% in the oral iron group (p=0.07).

Postpartum

A randomised, controlled trial in women with postpartum iron deficiency anaemia (Hb <9 g/dl and serum ferritin <15 µg/l at 24–48 hours post-delivery) compared 2 × 200 mg iron given as Iron sucrose Injection on Days 2 and 4 (n=22) and 200 mg of oral iron given as ferrous sulphate twice daily for 6 weeks (n=21). The mean increase in Hb from baseline to Day 5 was 2.5 g/dl in the Iron sucrose Injection group and 0.7 g/dl in the oral iron group (p<0.01).

Pregnancy

In a randomised, controlled study, women in their third trimester of pregnancy with iron deficiency anaemia (Hb 8 to 10.5 g/dl and serum ferritin <13 µg/l) were randomised to Iron sucrose Injection (individually calculated total dose of iron administered over 5 days) or oral iron polymaltose complex (100 mg 3× daily until delivery). The increase in Hb from baseline was significantly greater in the Iron sucrose Injection group compared to the oral iron group at Day 28 and at delivery (p<0.01).

5.2 Pharmacokinetic properties

Distribution

The ferrokinetics of iron sucrose labelled with ^{52}Fe and ^{59}Fe were assessed in 6 patients with anaemia and chronic renal failure. In the first 6–8 hours, ^{52}Fe was taken up by the liver, spleen and bone marrow. The radioactive uptake by the macrophage-rich spleen is considered to be representative of the reticuloendothelial iron uptake.

Following intravenous injection of a single 100 mg iron dose of iron sucrose in healthy volunteers, maximum total serum iron concentrations were attained 10 minutes after injection and had an average concentration of 538 µmol/l. The volume of distribution of the central compartment corresponded well to the volume of plasma (approximately 3 litres).

Biotransformation

Upon injection, sucrose largely dissociates and the polynuclear iron core is mainly taken up by the reticuloendothelial system of the liver, spleen, and bone marrow. At 4 weeks after administration, red cell iron utilization ranged from 59 to 97%.

Elimination

The iron sucrose complex has a weight average molecular weight (Mw) of approximately 43 kDa, which is sufficiently large to prevent renal elimination. Renal elimination of iron, occurring in the first 4 hours after injection of a Iron sucrose Injection dose of 100 mg iron, corresponded to less than 5% of the dose. After 24 hours, the total serum iron concentration was reduced to the pre-dose level. Renal elimination of sucrose was about 75% of the administered dose.

5.3 Preclinical safety data

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

6.PHARMACEUTICAL PARTICULARS

6.1 List of Excipients

- Sodium Hydroxide, BP
- Water for Injection, USP

6.2 Incompatibilities

There is the potential for precipitation and/or interaction if mixed with other solutions or medicinal products

6.3 Shelf life

24 months

6.4 Special precautions for storage

Store in a cool & dry place, below 30°c.

6.5 Nature and contents of container

5 x 5 ml Ampoule

6.6 Special precautions for disposal and other handling

KEEP OUT OF THE REACH AND SIGHT OF CHILDREN.

7. MARKETING AUTHORIZATION HOLDER AND MANUFACTURING SITE ADDRESSES

MARKETING AUTHORISATION HOLDER
INSPIRE PHARMACEUTICALS
Pinetree Plaza, F8, Narobi,
Kenya PO Box No. 1730-
00606

MANUFACTURING SITEADDRESSES
SHUKRA PHARMACEUTICALS LTD
Plot No. 795, Rakanpur Sola-Santej
Road, Ta. Kalol, Dist. Gandhinagar
Gujarat, India

8. MARKETING AUTHORIZATION NUMBER

H2025/CTD12340/25550

9. DATE OF FIRST <REGISTRATION> / RENEWAL OF THE <REGISTRATION>

2025 November 03

10. DATE OF REVISION OF THE TEXT

2025 November 03