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CLINICAL CASES
IRON DEFICIENCY AND ANAEMIA

CHRONIC KIDNEY DISEASE CASE STUDIES

CASE STUDY 4
A holistic approach to treatment of iron deficiency in an elderly patient with chronic kidney disease and multiple comorbidities

Contributing author: Ms Susan McKenna,
Renal Clinical Nurse Specialist,
Cavan Monaghan Hospital, Ireland

CASE STUDY 5
Diagnosis and treatment of anaemia in advanced chronic kidney disease

Contributing author: Dr Richard Hull,
Consultant Nephrologist, St George's University Hospitals NHS Foundation Trust,
London, UK

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This booklet is intended for healthcare professionals only.

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CASE STUDY 4

A HOLISTIC APPROACH TO TREATMENT OF IRON DEFICIENCY IN AN ELDERLY PATIENT WITH CHRONIC KIDNEY DISEASE AND MULTIPLE COMORBIDITIES

Contributing author: Ms Susan McKenna, Renal Clinical Nurse Specialist, Cavan Monaghan Hospital, Ireland

PATIENT INFO

Age 92

Sex M

CASE HISTORY

This patient presented with confusion and unsteadiness, and was admitted with AKI, hypercalcaemia, anaemia and dehydration.

Medical history included hypertension, myocardial infarction, heart failure, atrial fibrillation, multiple myeloma and renal failure. The patient had received erythropoietin treatment for a low Hb (7.7 g/dL) three years previously. Blood tests had subsequently been repeated regularly at renal clinics; liver function, bone profile, iron, ferritin, TSAT, Hb and renal function had remained stable (average eGFR ~25 mL/min/1.73m^2).

IDENTIFICATION AND DIAGNOSIS OF IRON DEFICIENCY

The patient was admitted to the medical assessment unit, and blood tests confirmed he was anaemic.

Bloods:

- Urea: 32.1 mmol/L
- Serum potassium: 5.2 mmol/L
- eGFR: 8 mL/min/1.73m^2
- Serum calcium: 3.1 mmol/L
- Serum phosphate: 1.63 mmol/L
- Hb: 8.7 g/dL
- Iron: 6.3 µmol/L
- Ferritin: 308 µg/L
- TSAT: 15%

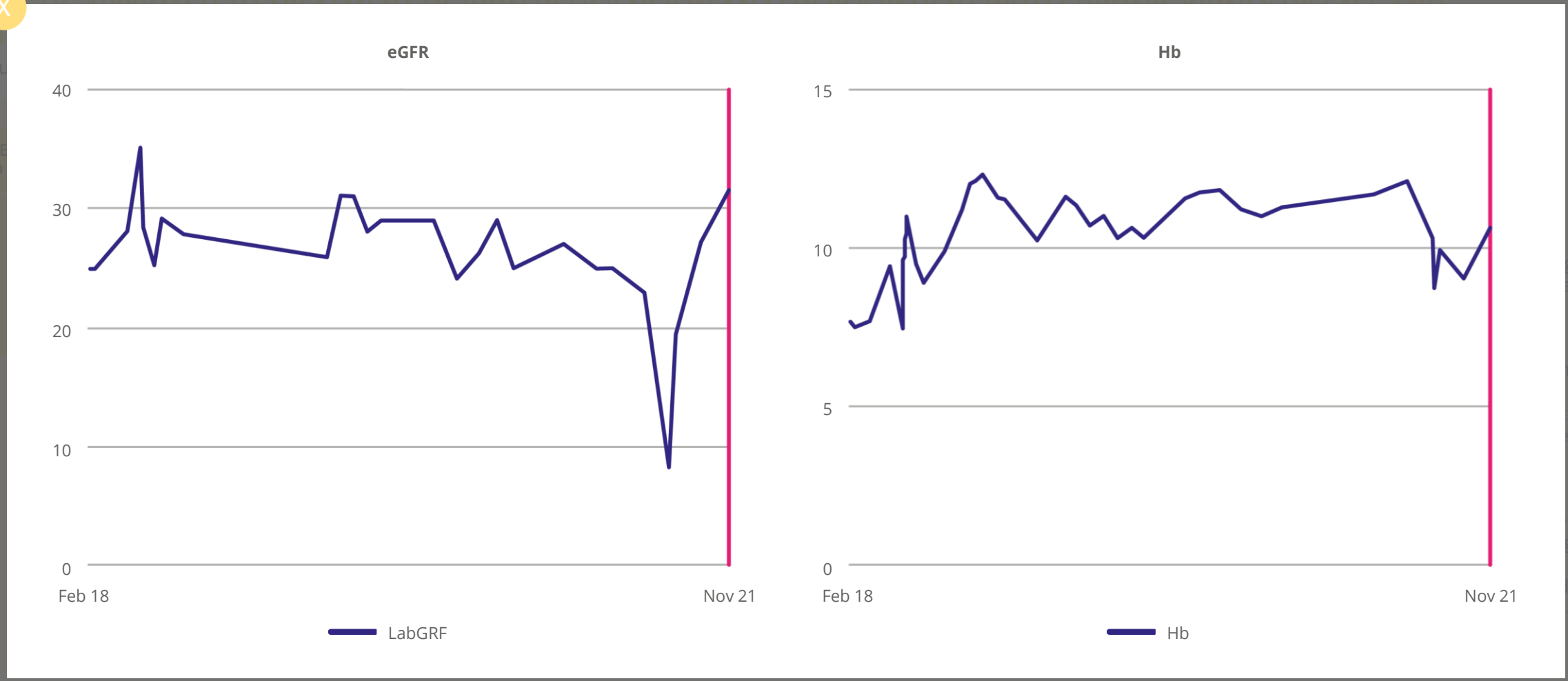
Click here to view a chart of eGFR and Hb over time.

CONSIDERATIONS

The primary objective of treatment for this patient was to improve symptoms, with dehydration leading to AKI as the probably culprit. There was no evidence of underlying infection. The patient's confused state was a barrier to discussion, so management was discussed with his daughter.

The patient's medications were reviewed and furosemide and calcium/vitamin D supplement were stopped. A urinary catheter was placed to monitor urine output and the patient was rehydrated with IV fluids.

Owing to the patient's history of multiple myeloma we needed to rule out recurrence as a possible cause of anaemia. Haematology review and serum protein electrophoresis suggested that multiple myeloma remained in remission (an oligoclonal band and normal light chain ratio). A faecal immunochemical test was negative.


eGFR
40
30
20
10
0
Feb 18
Nov 21
LabGRF
Hb
15
10
5
0
Feb 18
Nov 21
Hb

CASE STUDY 4

PATIENT EXPERIENCES

The patient responded well to medication changes and rehydration to correct AKI and hypercalcaemia (which had been judged to be due to the calcium/vitamin D supplement), and was discharged 1 week later. However, the patient remained very frail.

INTERVENTIONS

It was decided that the patient should receive IV iron along with further erythropoietin as recommended by the haematology team.

OUTCOME

The patient and their blood tests improved with treatment:

- Hb: 10.7 g/dL
- Iron: 17.1 µmol/L
- Ferritin: 478 µg/L
- TSAT: 27%
- eGFR: 31 mL/min/1.73m^2
- Serum calcium: 2.2 mmol/L

The patient is much improved and able to continue to live at home with the support of his wife and community services.

LEARNING POINTS / KEY CLINICAL POINTS

1. This very elderly patient had a background of chronic kidney disease and multiple myeloma, which had been diagnosed after his first admission to the renal clinic.
2. Investigation and correction of iron deficiency is warranted even in a very elderly patient with multi-morbidity in order to improve well-being.
3. Correction of anaemia AND iron deficiency can be a very effective symptomatic therapy.

AKI, acute kidney injury; eGFR, estimated glomerular filtration rate; Hb, haemoglobin; IV, intravenous; TSAT, transferrin saturation

CASE STUDY 5

DIAGNOSIS AND TREATMENT OF ANAEMIA IN ADVANCED CHRONIC KIDNEY DISEASE

Contributing author: Dr Richard Hull, Consultant Nephrologist, St George's University Hospitals NHS Foundation Trust, London, UK

PATIENT INFO

Age 54

Sex F

CASE HISTORY

This patient had a history of hypertension, primary membranous nephropathy (PLA2R positive) and DVT, and had been experiencing a progressive decline in kidney function.

The patient had remained on anticoagulants since a DVT 10 years previously and was also receiving ramipril.

She had reported some non-specific symptoms of lethargy and had been referred to a specialist clinic to assess treatment options for advanced CKD.

IDENTIFICATION AND DIAGNOSIS OF IRON DEFICIENCY

The combination of the patient's symptoms and presence of advanced CKD prompted blood tests for iron deficiency. The patient's Hb had been low for at least 12 months, however owing to the COVID-19 pandemic, clinic appointments and further investigation had been delayed.

Bloods:

- Hb: 8 g/dL
- Iron: 15 µmol/L
- Total iron binding capacity: 45 µmol/L
- Ferritin: 30 µmol/L
- Transferrin saturation: 15%
- eGFR: 13 mL/min/1.73m^2

A full medical history was taken during a remote consultation with the patient. The patient did not report any bleeding, but she did complain of intermittent constipation and loss of appetite. Endoscopy and colonoscopy were normal.

CONSIDERATIONS

The severity of anaemia and evident symptoms led to a recommendation for IV iron infusion.

The potential benefit of improving Hb with erythropoietin therapy was discussed with the patient. The merits of oral and IV iron therapy were discussed. The patient agreed that IV iron would work more quickly and effectively.

CASE STUDY 5

PATIENT EXPERIENCES

The patient responded well to treatment; Hb increased by 2 g/dL in the following 6 weeks.

During the first IV iron infusion (ferric carboxymaltose) the patient felt unwell at completion, with some abdominal discomfort which was reported as an adverse event. Her observations were stable and the discomfort settled after a few minutes.

INTERVENTIONS

Owing to incomplete resolution of symptoms, a declining eGFR, and persistent anaemia (9.2 g/dL), a decision was made to introduce erythropoietin therapy (darbepoetin alfa).

Symptoms and overall well-being improved further.

OUTCOME

The patient responded well to the combination of erythropoietin and IV iron, and Hb improved.

Bloods:

- Hb: 10.4 g/dL
- Ferritin (2 months post-infusion): 322 µmol/L

Repeated IV iron infusions are required to prevent recurrence of iron deficiency. Her CKD continues to progress and she will soon require renal replacement therapy.

LEARNING POINTS / KEY CLINICAL POINTS

1. It is important to assess all patients with CKD and anaemia for iron deficiency.
2. Taking a full history and doing appropriate investigations is essential – it shouldn't be assumed that the cause is always just CKD.
3. There is a need for regular assessments to optimise anaemia management. The effect of the COVID-19 pandemic has caused delays to treatment.

COVID-19, coronavirus disease 2019; CKD, chronic kidney disease; DVT, deep vein thrombosis; eGFR, estimated glomerular filtration rate; Hb, haemoglobin; IV, intravenous.

Ferinject® (ferric carboxymaltose)

Prescribing Information - Ireland
For full prescribing information refer to the Summary of Product Characteristics (SmPC)
Active Ingredient: Ferric carboxymaltose (50mg/mL)
Presentation: Dispersion for injection/infusion. Available as a 2mL vial (as 100mg of iron), 10mL vial (as 500mg of iron) and 20mL vial (as 1000mg of iron).
Indication: Treatment of iron deficiency when oral iron preparations are ineffective or cannot be used or if there is a clinical need to deliver iron rapidly. The diagnosis must be based on laboratory tests.
Dosage and Administration: The posology of Ferinject follows a stepwise approach:
Step 1: Determination of the iron need:
The individual iron need for repletion using Ferinject is determined based on the patient's body weight and haemoglobin (Hb) level, using the simplified table in the SmPC. Two doses may be required to replenish the total iron need.
Step 2: Calculation and administration of the maximum individual iron dose(s):
Based on the total iron need determined, the appropriate dose(s) of Ferinject should be administered:
In adults and adolescents aged 14 years and older, the maximum single dose is 15 mg iron/kg body weight (for administration by intravenous injection) or 20 mg iron/kg body weight (for administration by intravenous infusion) and the maximum recommended cumulative dose of Ferinject is 1,000 mg of iron (20 mL Ferinject) per week.
In children and adolescents aged 1 to 13 years, the maximum single dose is 15 mg iron/kg body weight, and the maximum recommended cumulative dose of Ferinject is 750 mg of iron (15 mL Ferinject) per week.
In all cases, if the total iron need is higher, then the administration of an additional dose should be a minimum of 7 days apart from the first dose.
Administration rates for intravenous injection using undiluted dispersion:
For iron doses of 100mg to 200mg, there is no prescribed administration time. For doses >200mg to 500mg, Ferinject should be administered at a rate of 100mg iron/min. For doses >500mg to 1,000mg, the minimum administration time is 15 min.
Administration of intravenous drip infusion:
For iron doses of 100mg to 200mg, there is no prescribed administration time. For doses >200mg to 500mg, Ferinject should be administered in a minimum of 6 mins. For doses >500mg to 1,000mg, the minimum administration time is 15 mins.
Ferinject must only be diluted in 0.9% m/V NaCl but should not be diluted to concentrations less than 2 mg iron/mL.
Step 3: Post-iron repletion assessments
Contraindications: Hypersensitivity to Ferinject or any of its excipients. Known serious hypersensitivity to other parenteral iron products. Anaemia not attributed to iron deficiency. Iron overload or disturbances in utilisation of iron.
Special warnings and precautions: Parenterally administered iron preparations can cause potentially fatal anaphylactic reactions. The risk is enhanced for patients with known allergies, a history of severe asthma, eczema or other atopic allergy, and in patients with immune or inflammatory conditions. There have been reports of hypersensitivity reactions which progressed to Kounis syndrome (acute allergic coronary arteriospasm that can result in myocardial infarction). Ferinject should only be administered in the presence of staff trained to manage anaphylactic reactions where full resuscitation facilities are available (including 1:1000 adrenaline solution). Each patient should be observed for 30 minutes following administration. If hypersensitivity reactions or signs of intolerance occur during administration, the treatment must be stopped immediately. Symptomatic hypophosphataemia leading to osteomalacia and fractures requiring clinical intervention has been reported. Patients should be asked to seek medical advice if they experience symptoms. Serum phosphate should be monitored in patients who receive multiple administrations at higher doses or long-term treatment, and those with existing risk factors. In case of persisting hypophosphataemia, treatment with ferric carboxymaltose should be re-evaluated. In patients with liver dysfunction, parenteral iron should only be administered after careful risk/benefit assessment. Careful monitoring of iron status is recommended to avoid iron overload. There is no safety data on the use of single doses of more than 200mg iron in haemodialysis-dependent chronic kidney disease patients. Parenteral iron must be used with caution in case of acute or chronic infection, asthma, eczema or atopic allergies. It is recommended that treatment with Ferinject is stopped in patients with ongoing bacteraemia. In patients with chronic infection a benefit/risk evaluation has to be performed. Caution should be exercised to avoid paravenous leakage when administering Ferinject. The efficacy and safety of Ferinject has not been investigated in children below 1 year of age. Ferinject is therefore not recommended for use in children in this age group.
Special Populations: In adults and adolescents aged 14 years and older, a single maximum daily dose of 200 mg iron should not be exceeded in haemodialysis-dependent chronic kidney disease patients.
In children aged 1 to 13 years with chronic kidney disease requiring haemodialysis, the efficacy and safety of Ferinject has not been investigated. Ferinject is therefore not recommended for use in children aged 1 to 13 years with chronic kidney disease requiring haemodialysis.
A careful risk/benefit evaluation is required before use during pregnancy. Ferinject should not be used during pregnancy unless clearly necessary and should be confined to the second and third trimester. Foetal bradycardia may occur during administration of parenteral irons, as a consequence of hypersensitivity. The unborn baby should be carefully monitored during administration to pregnant women.
Undesirable effects: Common (≥1/100 to <1/10): Hypophosphataemia, headache, dizziness, flushing, hypertension, nausea, injection/infusion site reactions. Rare (≥1/10,000 to <1/1,000): Anaphylactic reactions. Frequency not known: Kounis syndrome, hypophosphataemic osteomalacia. Please consult the SmPC in relation to other undesirable effects
Legal category: POM
MA Number: PA0949/004/001
Date of Authorisation: 19.07.2007
MA Holder: Vifor France, 100-101 Terrasse Boieldieu, Tour Franklin La Défense 8, 92042 Paris La Défense Cedex, France

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Document number: IE-FCM-2300011
Date of preparation: 06/2023

Additional information is available on request

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Adverse events should also be reported to Vifor Pharma UK Ltd. Tel: +44 1276 853633.
Email: MedicalInfo_UK@viforpharma.com

Venofer® (iron sucrose)

Prescribing Information - Ireland
For full prescribing information refer to the Summary of Product Characteristics (SmPC)
Active ingredient: Iron sucrose (20 mg/mL)
Presentation: Solution for injection/infusion. Available as a 5 mL vial (as 100 mg of iron).
Indication: Treatment of iron deficiency 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, and in chronic kidney disease when oral iron preparations are less effective. The diagnosis of iron deficiency must be based on appropriate laboratory tests.
Dosage and Administration: The total cumulative dose of Venofer, equivalent to the total iron deficit (mg), must be individually determined for each patient, based on haemoglobin level and body weight and calculated with the Ganzoni formula. The total single dose must not exceed 200 mg of iron given not more than three times per week.
Administration for intravenous drip infusion:
Venofer must be diluted only in sterile 0.9% m/V sodium chloride solution up to a maximum dilution of 1 mg/mL. For iron doses of 50 mg, minimum infusion time is 8 minutes. For doses of 100 mg, minimum infusion time is 15 minutes. For doses of 200 mg, the minimum administration time is 30 min.
Intravenous injection: Venofer may be administered by slow intravenous injection at a rate of 1 mL undiluted solution per minute and not exceeding 10 mL Venofer (200 mg iron) per injection.
Administration into dialysis machine: Venofer may be administered during a haemodialysis session directly into the venous line of the dialysis machine under the same conditions as for intravenous injection.
Contraindications: Hypersensitivity to Venofer or any of its excipients. Known serious hypersensitivity to other parenteral iron products. Anaemia not attributed to iron deficiency. Iron overload or disturbances in utilisation of iron.
Special warnings and precautions: Parenterally administered iron preparations can cause potentially fatal anaphylactic/anaphylactoid reactions. The risk is enhanced for patients with known allergies, a history of severe asthma, eczema or other atopic allergy, and in patients with immune or inflammatory conditions. There have been reports of hypersensitivity reactions which progressed to Kounis syndrome (acute allergic coronary arteriospasm that can result in myocardial infarction).
Venofer should only be administered in the presence of staff trained to manage anaphylactic reactions where full resuscitation facilities are available (including 1:1000 adrenaline solution). Each patient should be observed for 30 minutes following administration. If hypersensitivity reactions or signs of intolerance occur during administration, the treatment must be stopped immediately. In patients with liver dysfunction, parenteral iron should only be administered after careful risk/benefit assessment. Careful monitoring of iron status is recommended to avoid iron overload. Parenteral iron must be used with caution in case of acute or chronic infection, asthma, eczema or atopic allergies. It is recommended that treatment with Venofer is stopped in patients with ongoing bacteraemia. In patients with chronic infection a benefit/risk evaluation has to be performed. Caution should be exercised to avoid paravenous leakage when administering Venofer.
Special populations: The use of Venofer has not been studied in children. A careful risk/benefit evaluation is required before use during pregnancy. Venofer should not be used during pregnancy unless clearly necessary and should be confined to the second and third trimester. Foetal bradycardia may occur during administration of parenteral irons, as a consequence of hypersensitivity. The unborn baby should be carefully monitored during administration to pregnant women.
Undesirable effects Common (≥1/100 to <1/10): Dysgeusia, hypotension, hypertension, nausea and injection/infusion site reactions. Frequency not known: Anaphylactoid/anaphylactic reactions and Kounis syndrome. Please consult the SmPC in relation to other undesirable effects.
Legal category: POM
MA Number: PA 949/001/002
Date of Authorisation: 11.09.2009
MA Holder: Vifor France, 100-101 Terrasse Boieldieu, Tour Franklin La Défense 8, 92042 Paris La Défense Cedex, France

Venofer® is a registered trademark

Document number: IE-VEN-2200001
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Additional information is available on request

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Email: medicalinfo_UK@viforpharma.com