Ironing out problems with iron infusions in general practice

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Articles in this series highlight common medicolegal issues in general practice. Written by the claims and advocacy team at medical defence organisation Avant, the series is based on actual cases, with some details changed for privacy. With the availability of ferric carboxymaltose infusions, GPs can administer intravenous iron to patients with iron deficiency anaemia in their practices. This case study describes a potential side effect, skin discolouration, and recommends steps for risk management.

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Iron deficiency and iron deficiency anaemia are common presentations in general practice. A central role for the GP is to carefully consider and investigate the cause of iron deficiency, and to discuss the various options for treatment. These therapeutic options have changed over the years. With current guidelines advising against the use of intramuscular iron, intravenous iron delivered in general practice seems to be a reasonable option for patients who do not tolerate oral iron supplements.[1]

However, intravenous iron therapy has potential problems, as illustrated by the following case example, which includes events from actual cases but does not represent a single person or event. Intravenous iron therapy needs to be considered and provided in a manner that takes into account adequate safety checks and informed patient consent.

Case history

Rose, a 56-year-old woman, presented to Dr Jones with concerns about increasing tiredness. Dr Jones organised pathology tests, which revealed severe iron deficiency anaemia. Previous investigations had ruled out sinister causes.

Rose had previously been treated for anaemia with oral iron therapy but stopped taking this because of constipation. Dr Jones suggested she receive an infusion of ferric carboxymaltose (FCM) in the surgery, and Rose agreed.

The practice nurse administered the intravenous infusion, which was delivered over 15 minutes with no apparent problems.

Three weeks later Rose returned to the practice with concerns about a brown discolouration around the injection site. She said she also experienced tenderness and pain for several days after the infusion, and swelling at the infusion site for about a week, but did not report these at the time.

When Dr Jones initially suggested to Rose that she have an iron infusion, he did not discuss the potential risk of injection site reactions because Dr Jones believed discolouration was an uncommon complication. When Rose returned with the discolouration, Dr Jones explained to her that discolouration is a known complication and may be permanent.

Rose was upset that she was not warned of this risk or advised about treatment options to address the discolouration. She lodged a civil claim for compensation.

Discussion

Rapid intravenous iron infusion in general practice

FCM is a recently PBS-listed alternative intravenous preparation for treating iron deficiency anaemia in patients who have not tolerated oral preparations or have found them ineffective.

Intravenous iron infusions have been an important therapeutic modality for patients with iron deficiency anaemia. Previously available intravenous formulations, such as iron polymaltose and iron sucrose, require long administration times (e.g. five hours for administration of 1000 to 2500 mg iron polymaltose). Patients have therefore received these treatments in hospital clinics, with a significant burden on hospital beds and costs to the community (not to mention the inconvenience for patients and their families).

The key advantage of FCM is the ability to safely administer larger single doses in a shorter time. A consequence is that patients no longer require day admission in hospitals for infusions, but can have the equivalent dose of iron administered intravenously as an outpatient, in as little as 15 minutes.

With pressure on public hospitals to cut costs or shift services, many GPs are now asked to provide this management for their patients in their surgeries. The treatment can offer patients significant convenience at the same time as improving continuity of care. However, as with any novel treatment, it is important to ensure that the correct protocols and safety precautions are implemented before offering the treatment.

Before introducing treatment

Although intravenous FCM has a good safety profile, there are potential hazards and some uncertainties.[2] Consequently, GPs who are considering offering this therapy should undertake a risk assessment and develop appropriate practice protocols. The protocols should be fully documented, and staff should be provided with appropriate training before participating in providing this treatment.

Patient selection

The approved indication for FCM is 'for treatment of iron deficiency when oral iron preparations are ineffective or cannot be used' (e.g. they are not tolerated or are otherwise inappropriate).[3] The diagnosis of iron deficiency anaemia must be based on laboratory tests.[3]

Doctors should only consider the use of FCM when oral iron preparations are inappropriate. Advice from insurers is that doctors should not prescribe or offer this treatment in cases where previous forms of intravenous therapy would not have been indicated. There are safety questions around the use of the infusion in the first trimester of pregnancy, and no studies involving children.[3] A careful risk–benefit evaluation is therefore required, and GPs are advised to seek confirmation from treating specialists before undertaking intravenous iron infusions in these patient groups.

Potential adverse events

The most significant potential adverse event after intravenous FCM infusion is anaphylaxis, which is a risk common to all forms of intravenous iron therapy. Accordingly, resuscitation equipment must always be available on-site before FCM is administered. Hypertension and transient hypophosphataemia are also recognised side effects (with an incidence around 1% each) and may warrant careful attention in patients with particular underlying risk factors.[3] Other potential side effects include nausea (3%), headache (2%) and dizziness (1%).[2]

However, a more specific adverse event that needs to be carefully explained to patients is the risk of pigmentation following extravasation of iron during the infusion process. Medical defence organisations are seeing an increasing number of notifications of this skin discolouration, which is most likely due to paravenous or extravascular administration or leakage, and can occur even in cases of best-practice cannula insertion and infusion.

The iron leakage is not harmful, but the resulting discolouration, colloquially referred to as an 'iron tattoo', can be aesthetically unacceptable to many patients. Patients should be warned to expect that any pigmentation could be permanent.

There are few publications about the frequency and optimal management of this complication. A limited study suggested some success with a series of Nd:YAG (neodymium-doped yttrium aluminium garnet) laser treatments, but the evidence for this is still unclear and the treatment is time consuming and costly.[4]

Consent and consent forms

Individuals have the right to make decisions about their own health care. Consent is a process that allows all healthcare providers to manifest their respect for patient autonomy. It is an intrinsic part of patient-centric and ethical care.[5] When adverse outcomes happen in health care, a common medicolegal question is whether there was adequate patient consent. If consent is deemed to be deficient or inadequate then it may lead to disciplinary actions, a claim in negligence or even a claim of trespass to the person.

The legal framework and expectations for consent in the Australian healthcare system have been developed over many decades. Legislation and especially a landmark High Court decision have placed on doctors an ethical and legal duty to ensure that the essential elements of consent are met for any proposed course of treatment, not just surgery.[6] Specifically, these

RISK MANAGEMENT TIPS FOR GPS WHO INTRODUCE IRON INFUSIONS IN THEIR PRACTICES

- Discuss the risk of long-lasting or permanent skin discolouration with patients as part of the consent process
- Clearly document your discussion and the patient's decision
- Develop and use a consent form as a safety checklist
- Ensure practice nurses performing infusions are appropriately trained, understand the risks, know the symptoms to monitor and have indemnity cover
- Encourage patients to report any discomfort or pain during the infusion, and if this occurs then stop the infusion immediately
- Consider referring patients for specialist assessment if skin discolouration occurs

elements are that:

- the patient provided consent voluntarily
- the doctor provided the patient with sufficient information to gain an adequate understanding and make an informed decision about the proposed treatment and its material risks.

What constitutes material risk varies from case to case. A risk is material if the health carer knows, or should know, that a person in this patient's situation, or this particular patient, would be likely to attach significance to it.[6]

The law recognises that consent in medical care need not be written. However, to properly document patient consent, and to help facilitate a comprehensive consent process, it is advisable that a procedure-specific written consent form be developed for FCM infusions. In a case such as this, especially given the likely permanent nature of skin staining, the consent form can become effectively part of a 'safety checklist', ensuring that all pertinent information is adequately provided to all patients. This should be done prior to the first infusion, with the consent confirmed in the medical records before each subsequent infusion. A useful additional step would also be to provide the patient with the consumer medicine information sheet.[7]

Dose calculation and protocols

The amount of iron required to replace the deficiency and to guide the appropriate dosing regimen needs to be calculated before commencing and administering FCM. The Ganzoni rather than the Simplified Method is recommended.[3] The Ganzoni calculation is based on current and target haemoglobin levels as well as body weight as follows:

Cumulative iron dose (mg) =
body weight (kg) x (target Hb – actual Hb in g/L) x 0.24 + iron stores (mg)

where target Hb is 130 g/L for body weight less than 35 kg and 150 g/L for body weight 35 kg or more; iron stores are 15mg/kg body weight for body weight less than 35 kg and 500 mg for body weight 35 kg or more. Round down to the nearest 100 mg if body weight is 66 kg or less and round up to the nearest 100 mg if body weight is more than 66 kg.

No more than 1000 mg iron may be administered in a single infusion, and no more than 1000 mg iron may be administered per week.[1-3]

Doctors and practices introducing iron infusion services for their patients should develop protocols to minimise side effects and in particular the risk of extravasation and permanent pigmentation around the injection site. These protocols should include the following:

- appropriate training of all staff who will be involved in the infusion process
- avoiding use of butterfly cannulae and instead inserting a larger bore cannula at a site away from the dorsum of the hand
- checking whether the cannula is patent by flushing with normal saline before and after the infusion
- appropriately monitoring the cannula during the infusion
- immediately stopping in the event that pain or swelling develops around the cannula site.

The patient should be encouraged to report any discomfort or pain during the procedure, as this can indicate extravasation. If this occurs then the infusion should be stopped immediately.

If skin discolouration occurs then the patient may need to be referred for further assessment and management by an appropriate specialist such as a dermatologist or plastic surgeon.

Outcome

Given that Rose did not give informed consent and that Dr Jones did not document any discussion about the risk or nature of the staining, the case was settled. However, the case prompted Dr Jones to review his practice systems and to develop intravenous infusion protocols and a specific consent form for use in his practice.

Risk management

Tips on risk management for GPs who introduce intravenous iron infusions in their practices are summarised in the Box. MT

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