Abstract

This article describes the process of setting up a community service to meet the needs of patients with chronic kidney disease who have iron-deficiency anaemia. The service provides a course of intravenous (IV) iron therapy, which is usually given initially weekly for five weeks. Collaboration between specialist anaemia services in secondary care and the community IV therapy team in Liverpool aimed to develop a safe, patient-centred service. This service and the development of new medications has made the delivery of IV iron therapy in the community possible.

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Review

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CHRONIC KIDNEY DISEASE (CKD) describes abnormal kidney function. A recent study found the overall prevalence of CKD in the UK to be 14% in men and 13% in women (Roderick et al 2011). Anaemia affects the majority of patients with CKD, including those who have not yet had dialysis as well as those who are already undergoing haemodialysis and peritoneal dialysis (Hudson and Comstock 2001). Anaemia occurs as a result of physiological changes caused by altered renal function (Hudson and Comstock 2001). Anaemia is managed by testing iron status and administering iron therapy for as long as it is required to increase the patient’s haemoglobin levels (Lew et al 2010). Early treatment can delay the start of haemodialysis, as anaemia in those with CKD is associated with poor quality of life and increases mortality, hospitalisation, and risk of developing congestive cardiac failure and left ventricular atrophy (Robbins 2003). Intravenous (IV) iron therapy is preferred as many patients are unable to tolerate the required full replacement dose of oral iron because of the associated adverse gastrointestinal effects (Wall and Pauly 2008).

IV iron therapy is also more effective than oral medication (Charytan et al 2005).

The community IV therapy team in Liverpool, was established in 2000 to enable the early discharge of patients on long-term IV antibiotics from secondary care, and prevent admissions and hospital attendances for patients with haematological disorders who require regular blood transfusions. When the team was expanded in 2003, new ways of working were established and the number of therapies provided increased. One of the therapies developed was IV iron therapy, because many patients were on a waiting list to start iron therapy for the treatment of iron-deficiency anaemia associated with CKD.

Previously, IV iron therapy was provided in secondary care by renal services staff. Because of the increasing numbers of patients diagnosed with anaemia related to CKD, services had to be developed to enable patients to be treated as close to home as possible. In addition, patients were often frail, older adults with multiple comorbidities, which made it difficult for them to attend multiple clinic appointments to receive treatment. Donal O’Donoghue, National Clinical Director for Kidney Care, stated that ‘it makes no sense for people with advanced kidney disease to have to travel long distances to receive treatments such as IV iron as an outpatient or day case in a hospital setting’ (O’Donoghue 2009). The White Paper Our Health, Our Care, Our Say: A New Direction for Community Services (Department of Health (DH) 2006) further supported the need to locate more services in local communities and closer to home.
Developing the service

Members of the community IV therapy team and the secondary care anaemia team in Liverpool decided to develop a community service to benefit patients. They discussed and evaluated:
- Evidence for a need for change.
- Numbers of patients attending secondary care and receiving repeated courses of IV iron.
- Cost effectiveness, including the cost of transport, clinic time, drugs, staffing and consumables, and providing the treatment at home or the local hospital.

After this initial meeting, a group comprising senior doctors, nurses and purchasers, together with representatives of primary and secondary care policy boards, was formed. Its aim was to ensure the most effective service was developed and to deal with any problems or issues, involving budget or safety for example, that might be encountered. Information was gathered and the concerns of the hospital renal directorate were considered.

In line with the recommendations for a quality service outlined in the document Transforming Community Services (DH 2009), the focus was on the key aspects of quality of service, patient safety, patient experience and effectiveness of care.

The potential benefits of providing an IV iron therapy service at home would include:
- Reducing waiting lists so that patients receive care more promptly, thereby enhancing care and possibly delaying the need for haemodialysis.
- Improving access for patients who have difficulty attending hospital clinics because of frailty and poor health, or who require an ambulance or hospital transport, or who rely on friends or relatives to take time off work or from their families to take them to their appointments.
- Addressing the financial considerations for patients, particularly those who are retired, and for whom travel and parking costs are an additional burden.
- Reducing the risk of infection often associated with attending secondary care-based clinics by treating people at home or in a community-based clinic.

The group set goals of developing a policy, referral process, process for prescribing medication (a prescription chart) and guidelines, together with a pathway for patients to receive continuing care when discharged into the community. Objectives were established to enable provision of a seamless service and a pathway for patients being transferred from primary to secondary care. These objectives were developed at subsequent meetings.

The policy and guidelines were agreed and approved by the primary and secondary care policy boards and medicines management committees. Funding, one of the main issues of concern, was investigated further by the nephrology directorate and the community IV therapy team – all medication was provided by the referring acute hospital and overall medication responsibility was retained by the referring consultant, and funding was agreed.

Documentation

A policy needs to be measurable and, as with other services provided by the community IV therapy team in Liverpool, this policy was evaluated in terms of performance indicators, patient satisfaction surveys, complaints and clinical incidents. The effectiveness of change was evaluated using peer review and clinical audit. The quality of the service was benchmarked against previous audits that demonstrated a gold standard service. The evidence was provided by patients, community staff, doctors and members of the anaemia team.

Risk management

One of the concerns about giving IV iron therapy in the community setting was the risk of patients having an adverse reaction to the medication. Patients have experienced reactions such as rigors and anaphylaxis to iron dextran, so it is not a suitable drug to administer in the community setting. However, the development of new medications such as IV iron sucrose, which have been shown to be safe and efficient, has made the delivery of IV iron therapy in the community safer (Mircescu et al 2006). IV iron sucrose is now the medication of choice and is generally considered safe because it is not associated with the development of anaphylaxis (Fishbane and Kowalski 2000). Patients who have experienced iron dextran sensitivity have been treated successfully with iron sucrose (Charytan et al 2005).

The risk of a patient having a reaction to IV iron medication was also managed by educating staff so that they would know the actions to take should an adverse reaction occur. In addition, all staff in the community IV therapy team undertake mandatory annual cardiopulmonary resuscitation and anaphylaxis training. When IV iron therapy is administered in the patient’s home, the attending staff carry an anaphylaxis kit. All staff were given initial training in the administration of IV iron therapy in the anaemia clinic and this was followed up by annual updates. Lectures provided by independent facilitators have also proved invaluable in maintaining high standards of care for this group of patients.
A collaborative medication use process, which encompasses prescribing, preparing, dispensing, administering, monitoring and specified outcomes, serves to optimise therapy, improve patient safety, control costs of treatment, stimulate process involvement and provide educational opportunities (Lew et al 2010).

Treatment programme
The pathway documentation, which includes the prescription and guidelines, now commences in secondary care when the patient has his or her first dose of IV iron therapy. The patient takes the documentation and medication home to ensure continuity of care. All treatment is prescribed by staff working in secondary care and medication is dispensed for each patient individually. Following administration of the first dose, the remaining course of treatment is administered by the community IV therapy team in Liverpool, either at home or in a clinic depending on whether or not the patient is housebound. The Liverpool Community Health (2009) guidelines on IV iron state that patients will be able to receive their treatment at home if they are ‘unable to leave their home without substantial support’.

The usual treatment regimen is one dose of 200mg iron sucrose per week for five weeks, but this can vary depending on the patient’s requirements. Blood tests are taken before the penultimate dose to check full blood count, and ferritin and iron levels, and these results are directed to the referring anaemia team. The anaemia team will inform the patient and the community IV therapy team of the results and if more IV iron is required, this is organised and prescribed by staff in secondary care.

The conditions that are treated with IV iron therapy are outlined in Box 1 and the target iron levels are given in Box 2. Cautions and exclusion criteria to treatment are shown in Box 3.

Outcomes
Since the inception of the service in May 2005, the community IV therapy team in Liverpool has received an average 63 referrals a year for people requiring IV iron therapy. Waiting times are less than two weeks and the success of the service has resulted in the ability to offer the service to other primary care trusts that commission renal services from the referring renal directorate in the acute hospital.

Patients are sent a patient satisfaction survey, which has shown 100% positive feedback to receiving this service. The opening of a new primary care centre has given the community IV therapy team greater capacity to treat patients in the community in a more cost-effective and timely manner, reducing hotel costs for acute care and saving bed days. This has enabled the anaemia team in secondary care to focus on more complex patients and keep waiting lists as low as possible.

Apart from several projects set up in rural areas, this innovative service is the only one of its kind in the UK involving such large numbers of patients. The IV iron therapy service has increased patient choice in relation to where care is delivered. There are often financial considerations involved in delivering this type of therapy and many patients are retired older people who rely on friends and relatives to take them to hospital appointments. They may also have other appointments they need to attend for comorbidities. This service removes some of these financial and psychological pressures on patients.

<table>
<thead>
<tr>
<th>BOX 1</th>
<th>Conditions treated with intravenous iron therapy</th>
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<tbody>
<tr>
<td>Functional iron deficiency caused by chronic kidney disease and end-stage renal failure. Indications for intravenous iron:</td>
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<tr>
<td>- Haemoglobin &lt;11g/dL.</td>
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<tr>
<td>- Transferrin saturation &lt;20%.</td>
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<tr>
<td>- Ferritin &lt;200mcg/L.</td>
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<td>(National Kidney Foundation 2006)</td>
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<tr>
<th>BOX 2</th>
<th>Target iron levels for intravenous iron therapy</th>
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<tbody>
<tr>
<td>Ferritin:</td>
<td></td>
</tr>
<tr>
<td>- Chronic kidney disease patients treated with erythropoiesis-stimulating agent – 100-500ng/mL</td>
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<tr>
<td>- Patients maintained on haemodialysis – 200-500ng/mL</td>
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<tr>
<td>Transferrin saturation: 20-40%</td>
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<tr>
<td>(Adapted from National Kidney Foundation 2006)</td>
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<th>BOX 3</th>
<th>Cautious and exclusion criteria for intravenous iron therapy in the community</th>
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<tr>
<td>Cautions:</td>
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<tr>
<td>- Previous reactions to intravenous iron therapy.</td>
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<td>- Blood pressure less than 100mmHg systolic.</td>
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<td>- Pregnancy.</td>
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<tr>
<td>Exclusion criteria:</td>
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<td>Patients with the following conditions will need to be assessed medically to ensure it is safe to continue with treatment in the community setting:</td>
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<tr>
<td>- Asthma, eczema or other atopic allergy.</td>
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<td>- History of liver impairment.</td>
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Box 4 outlines a case study of a patient treated by the community IV therapy team with IV iron. It discusses some problems that were encountered and how these were overcome. It also describes physical and psychological benefits for the patient.

**Conclusion**

IV iron therapy has been administered in the community for patients with CKD who have iron-deficiency anaemia in Liverpool since 2005. Waiting times for treatment have been reduced significantly. Patients who had been waiting for up to eight weeks for treatment are now treated within two weeks. It is hoped that treating these patients earlier may delay or prevent physical problems such as breathlessness and lethargy.

There were several barriers to overcome in setting up this community service. These were addressed through teamwork and collaboration among the healthcare professionals involved, and support from commissioners to deliver improved local health outcomes. This service, which is clinically driven and patient-centred, aims to meet the changing needs of the local population.

**BOX 4**

**Case study**

Jane is a 74-year-old woman with a diagnosis of chronic kidney disease who also has multiple comorbidities, poor mobility and is the main carer for her disabled grandson at home. Following a recent blood test, she was assessed as requiring a course of intravenous (IV) iron therapy. She attended the first appointment in secondary care for the initial dose of IV iron as per the protocol set out in the iron policy. There is a risk of non-concordance with the treatment regimen when there are factors affecting a patient’s ability to travel to secondary care. For this reason, Jane was referred to the community IV therapy team for the remainder of treatment.

Jane had been feeling particularly tired and lethargic, dropping off to sleep in the afternoons, and she noticed that she was more short of breath when climbing stairs or walking short distances. A full assessment was carried out on the initial home visit, when the procedure was explained fully to Jane and written consent was obtained. She was cannulated according to trust policy and 200mg of iron sucrose administered as a bolus injection over ten minutes in 10mL 0.9% sodium chloride. Her blood pressure and pulse were recorded before and after receiving the dose, as iron sucrose can cause a decrease in blood pressure after administration.

Jane received a further three treatments at home, and a blood sample was taken before the penultimate dose. When receiving the final dose, she commented how much better she was beginning to feel. However, her results showed she needed a further five doses of IV iron as her ferritin level had not reached an optimum level – this was also administered at home. At the end of this treatment, her blood results were much improved. Jane still experiences some tiredness, but felt more able to care for her grandson and climbing stairs was also easier. She felt the service was invaluable and had been delivered in a pleasant, professional manner. She stated that she may not have been able to complete the course of treatment if she had to attend a secondary care clinic.

**References**


