Delivering intravenous diuretics in the community

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Heart failure is a common chronic condition and people living with it can have periods of relative stability as well as episodes where their symptoms worsen and they require hospital admission and treatment (Chun et al, 2012), such as intravenous (IV) diuretics. Traditionally, patients who failed to respond to an increase in oral diuretics have been admitted to hospital for IV diuretics. The British Heart Foundation (BHF) funded a two-year project in 10 NHS organisations across the UK to determine if delivering IV diuretics in the patient’s home or in a community setting was safe, clinically and cost-effective, and well received by patients and carers (BHF, 2014). The programme was led by heart failure specialist nurses working within existing community heart failure teams and was built on existing evidence that, when compared to other heart failure patients, heart failure patients under the care of a heart failure specialist nurses were up to five times less likely to be hospitalised (BHF, 2008). As IV diuretic services become embedded into existing services, community nurses have an important role to play in working in partnership with heart failure specialist nurses to support patients having IV diuretics at home. This article discusses the benefits and challenges of delivering IV diuretics in the home.

KEYWORDS:
Heart failure ■ Intravenous diuretics ■ Life-limiting conditions

It is estimated that around half a million people in the UK are living with heart failure with many more undiagnosed cases (Health and Social Care Information Centre [HSCIC], 2015).

This number is expected to rise due to the combined effect of medical advances in the treatment of heart disease and the ageing population.

Heart failure is also a significant burden to healthcare systems, accounting for up to 2% of the UK NHS budget (70% of these costs are due to hospitalisation) and resulting in over one million patient bed days per year (National Institute for Health and Care Excellence [NICE], 2010).

The mean length of hospital stay for a heart failure admission is 12 days (British Society for Heart Failure, 2014).

There are three main types of heart failure:

- Left ventricular systolic dysfunction (LVSD): a weakened left ventricle
- Heart failure with preserved ejection fraction (HFPEF): usually a result of the left ventricle becoming stiff, making it difficult for the chamber to fill with blood
- Heart failure caused by diseased or damaged valves.

Source: www.nhs.uk

Heart failure develops when the heart becomes too weak to pump enough blood around the body at the right pressure. This usually occurs because the muscles of the heart have become too weak or stiff. Heart failure is not the same as a heart attack — rather it means the heart needs support to continue functioning, usually in the form of medicines. Symptoms include shortness of breath, tiredness and swelling of the ankles and can develop quickly (acute heart failure), or over a longer period of time (chronic heart failure).

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HEART FAILURE

Symptoms vary depending on the severity of the condition, but people with heart failure often report feeling breathless and tired. In the early stages, fluid retention can be
Of the ten UK-wide NHS organisations that took part in the project, the heart failure specialist nurses led the development, management and coordination of the IV diuretic service. This provided an opportunity to redesign existing heart failure services and enhance partnerships with other services.

A steering group, led by the BHF and an expert external panel, developed a guidance document to help the various sites set up the service. Similar steering groups were also formed at the pilot sites to tailor the new way of working to local needs.

Training on cannula insertion was a key learning development for the nurses; while patients were provided with a care record that included all the necessary documentation about their treatment and advice on who to contact and when.

Although the majority of the interventions were performed by the heart failure specialist nurses during the pilot, various models of delivery were used depending on the local infrastructure, including delivery by district nurses, community teams, rapid-response teams and hospital-at-home teams, etc. This showed the potential for district nurses, rapid response teams or community teams to deliver the intervention, with supervision from heart failure specialist nurses.

The decision to deliver IV diuretic therapy was taken by the healthcare professionals involved in the patient’s management if:

- The patient was receiving oral heart failure therapy
- Increased prescribed doses of oral loop diuretics and/or added metolazone or thiazides (diuretic medications) had been tried following discussion with their local cardiologist.

Where these measures were insufficient to improve fluid retention, patients were offered the option of community-based IV diuretics, which were administered once or twice daily as a bolus dose, usually via a peripheral line. Doses were usually ‘stepped’, and ranged from 40–250mg (for furosemide). Higher doses were given via an infusion pump over periods of up to one hour. The dose depended on individual patient’s needs — usually related to a starting dose comparable to the oral dose of diuretic they were currently taking — and was increased depending on the patient’s response to the initial IV diuretic dose.

The clinical responsibility remained with the heart failure specialist nurses. The cardiologists were only consulted to discuss any variances and complexities not covered by the guidance document and local protocols, and patients did not have to be seen by a nominated cardiologist before starting IV diuretic treatment at home.

All treatment changes and decisions were communicated to the GPs by the heart failure specialist nurses and while little input was required from the GPs, they were supportive.

According to anecdotal reports from the external evaluation team during patient and heart failure specialist nurse interviews, both nurses and patients valued the extra time the home service gave them to discuss the treatment and the patients’ condition. Further information on the project and key learning points are available as BHF resources (BHF, 2015a,b).

**Challenges**

A major challenge was developing the service against a backdrop of NHS reform. Training and maintaining staff cannulation competence were also issues that arose in the set-up phase where patient numbers were initially small.

Solutions included nurses spending time on wards or with paramedic teams to gain experience in inserting cannulas, while one site opted to use butterfly needles (specially designed devices for venipuncture, i.e for accessing a superficial vein for either IV injection or phlebotomy).

Having back-up support from other members of the heart failure nursing team who were also able to
deliver IV diuretics in the absence of the heart failure specialist nurse leading the project was important, as was developing on-call systems and working with local out-of-hours services.

Developing local protocols and getting these approved can be time-consuming and attaching protocols to existing nursing or medical guidelines speeds this up. For example, one site added the new IV diuretics protocol to its existing IV antibiotics service guidelines.

As with all IV therapies — including those delivered in hospital — some patients experienced complications such as phlebitis (inflammation of the walls of a vein), but generally any inflammation was only experienced for one day.

**Evaluation**

An independent external evaluation of the project demonstrated that the administration of IV diuretics in a community setting was safe, clinically and cost-effective, and valued by patients and carers (the findings are shown in more detail in Figure 1).

With the right infrastructure and resources, existing heart failure specialist nursing teams can provide a service that is a viable alternative to hospital admission, enabling patients to have IV diuretics delivered effectively and safely in the comfort of their own home (BHF, 2014). The patient profile of the pilot study is outlined in Table 2.

**Safety**

Overall, the pilot data indicated good levels of safety. The most common challenges faced were:

- Cannula insertion: this generally only required the heart failure specialist nurses to re-site the cannula and resume treatment
- Renal dysfunction: the renal function of all patients was monitored on a daily basis during their IV diuretic treatments
- Healthcare associated infections (HAI): there were no incidences of healthcare associated infections attributable to the IV diuretic treatment.

**Clinical-effectiveness**

Of the patients who underwent this intervention, 79% avoided hospital admission. The majority of the treatments achieved effective target weight loss and/or oedema reduction and/or reduction of patient symptoms.

**Cost-effectiveness**

Once a service is established, there is potential to generate significant savings in bed days and delivery costs compared with admitting patients to hospital (Figure 1). The start-up costs were relatively modest but essential. The time required to develop and establish the service appeared prohibitive under ‘business-as-usual’ conditions, and therefore required a dedicated start-up resource.

**Patient/carer experience**

Feedback was consistently positive, with all patients stating that they would opt for home-based treatment again in the future.

Inevitably, a small number of carers found the responsibility of having the patient at home during a complex treatment challenging, but only a small number preferred...
Box 1: Patient and carer perspectives

‘I know I’m living on borrowed time, so every day is a bonus. I don’t want to spend time in hospital, I want to be at home with my wife.’ (Patient aged 79)

‘The trauma experienced during his symptoms was considerably reduced being in his own environment…. he was happy to be surrounded by known carers.’ (Carer aged 84)

Patients indicated that they had gained a wide range of personal benefits from staying at home including:
- Being more confident in knowing how to manage their condition, when to call for help and who to speak to in an emergency
- Being able to stay with loved ones
- Convenience and minimal disruption to day-to-day life
- Time to do what they wanted
- Being comfortable and relaxed, not stressed.

Carers who indicated that they felt this treatment was better than staying in hospital, reported that the person they cared for:
- Had access to home comforts
- Had time and the independence to do what they wanted
- Avoided the trauma associated with hospital stays and admission
- Could carry on with family life.

CONCLUSION

Independent evaluation demonstrated that the administration of IV diuretics in a community setting was safe, clinically and cost-effective, and valued by patients and carers. With the right infrastructure and resources, existing heart failure teams can provide a service that enables patients to have IV diuretics delivered safely and effectively in the comfort of their own homes. This is particularly important to patients in the advanced stages of heart failure, as it enables them to choose whether they want to remain at home at the end of their lives.

Delivering IV diuretics in the community should be part of a flexible and responsive package of heart failure care, rather than a standalone service. Integration with other teams is essential to ensure sustainability.

REFERENCES


KEY POINTS

- Heart failure is a common chronic condition.

- Patients can have periods of relative stability as well as episodes where their symptoms worsen and they require hospital admission and treatment such as intravenous (IV) diuretics.

- Traditionally, patients who failed to respond to an increase in oral diuretics were admitted to hospital for IV diuretics.

- The British Heart Foundation (BHF) funded a two-year project in 10 NHS centres to determine if delivering IV diuretics in the patient’s home or in a community setting was safe, clinically and cost-effective and well received by patients and carers.

- The programme was led by heart failure specialist nurses working within existing community heart failure teams.

- As IV diuretic services become embedded into existing services, community nurses have an important role to play in working in partnership with heart failure specialist nurses to support patients having IV diuretics at home.

- This article discusses the benefits and challenges of delivering IV diuretics in patients’ home.