

# Home intravenous therapy

## — reducing the risk of infection

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Home IV therapy is becoming more common in the UK. It reduces a patient's exposure to hospital-acquired infections and has a number of other benefits. This article describes the management of these patients and the role of the homecare team



Patients generally find it more comfortable to be treated in their home

**P**rolonged hospital stay is a risk factor for hospital-acquired infections (HAIs). The prevalence of HAIs is estimated to be 9 per cent in patients in hospital in the UK. The longer the hospital stay, the greater the risk of a patient developing an HAI.<sup>1</sup> In certain situations, notably in infectious diseases, patients may be medically fit for discharge but have to remain in hospital to complete a course of drugs that can only be given intravenously.

### Home IV therapy

Home IV therapy is the administration of intravenous drugs that would normally only be given in hospital, in a patient's home or other community or outpatient setting. This might include total parenteral nutrition, cancer chemotherapy or antimicrobials. In infectious diseases, home IV therapy is also known as outpatient antibacterial therapy (OPAT). Home IV therapy has long been used in US to facilitate early discharge or avoid hospital admission. However, it is a relatively new concept in the UK, other than in a few centres<sup>2,3</sup> or specific therapeutic areas (eg cystic fibrosis).<sup>4</sup>

Home IV therapy offers a number of benefits including reduced exposure to HAIs. Patients will generally find it more comfortable and convenient to be at home and some may be able to return to work or

study while receiving treatment. Avoiding a lengthy hospital stay will also help reduce the risk that a patient will revert to a "sickness role" which may delay discharge even further. These benefits are primarily related to improving quality of life, although home IV therapy is often viewed as a means of reducing hospital costs. There are advantages in freeing hospital beds, and although increased patient turnover may increase total expenditure, the cost per individual patient may be reduced.

Financial and personnel resources must be invested in setting up and managing a home IV therapy scheme, but reducing the risk of HAIs by facilitating early discharge or avoiding admission has an economic benefit.<sup>5</sup> The cost of treating an HAI has been estimated at \$2,500 in the US.

### Home therapy team

It is recommended that home IV therapy is managed by a multidisciplinary team that includes a senior doctor with an interest in home IV therapy (usually a microbiologist or infectious diseases consultant), specialist nurse, pharmacist and a primary care representative (GP or community nurse).<sup>6</sup> The team is responsible for agreeing the processes by which home IV therapy is managed locally and for running the service.

A vital part of the team's role is communication, both with the medical or surgical team referring the patient for home therapy and with the community team (GP and community nurses). Guidelines or standard operating procedures should be set

up detailing the roles and responsibilities of all staff involved and the lines of communication. Access to key medical and nursing staff 24 hours a day is essential for both the community nurses and the patient.

Guidelines and training of community nurses and the patient or care giver should cover:

- Preparation and administration of the drug
- Aseptic technique
- Use of saline and heparinised saline flushes
- Cleaning and dressing the insertion site
- Care of the line when not in use
- Procedure if the line is blocked or damaged
- Procedure if there are signs of infection or cellulitis around the insertion site or signs or symptoms of systemic infection

### Venous access

Venous access via short peripheral lines (eg Venflons) is only suitable for short-term use, to treat conditions such as cellulitis. Long-term conditions require central IV access that can remain in place for weeks or longer. Central access is also mandatory for irritant or hypertonic infusions such as total parenteral nutrition (TPN) and cytotoxics. If patients are self-administering, central access frees both hands for administration of the drug, which is not feasible with short peripheral lines. Three types of central IV lines are available, as described in Panel 1, p17.

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## Panel 1: The types of central line currently in use

Type of line	Description	Specialist skills required	Duration of use	Comment
Peripherally inserted central catheter (PICC)	Fine, flexible catheter inserted at the antecubital fossa and threaded into the cephalic or basilic vein	Technique similar to inserting peripheral vascular lines	Months	Cost-effective for shorter term therapy (weeks or months)
Skin tunnelled central line (eg, Hickman line)	Single or multi-lumen line usually inserted via the subclavian vein and tunnelled subcutaneously to exit on the chest wall. The tip lies in the superior vena cava or just inside the right atrium.	Usually inserted under local anaesthetic by specialist nurse or appropriately trained doctor. Sometimes inserted under general anaesthetic	Months or years	Cost-effective for prolonged courses or repeat courses (eg, chemotherapy). Lines with a Dacron cuff should only be removed by an appropriately trained doctor or nurse
Implanted ports (eg, Port-A-Cath, Pas Port)	A small reservoir is implanted in the chest wall (Port-A-Cath) or antecubital area (Pas Port) and the catheter threaded into the subclavian or internal jugular vein	Inserted and removed under general anaesthetic	Years	Usually only suitable for patients requiring therapy over a period of years due to the risks of general anaesthetics, the cost of the device and theatre time

Central lines are not without hazard. The line should only be inserted and removed by healthcare staff with the relevant expertise and guidelines should include procedures for this. Lines with a single lumen are preferable to multiple lumen lines, which may increase the risk of line-related complications such as blockage. The line must be handled correctly to maintain patency and avoid infectious complications.

### — Patient assessment

The home IV therapy team should take responsibility for ensuring patients are suitable for home therapy. It is easy to assume that patients would always prefer to be treated at home rather than in hospital, but some patients find the concept of home IV therapy unacceptable.

Patients not suitable for home IV therapy include those who:

- Are not medically stable or fit for discharge
- May misuse the central line
- Have a recent history of drug or alcohol abuse
- Are unable to give consent or understand the risks involved

Ideally, a home visit should be made before discharge by a member of the home IV team or the community nurse to assess whether the patient's home circumstances are appropriate for home IV therapy.<sup>7</sup>

The home must be reasonably hygienic with a reliable water and electricity supply. Drugs must be stored in a clean, dry and safe place, and consideration may have to be given to the loan of a suitable refrigerator. The patient should have access to a telephone and be able to travel to routine

and emergency outpatient appointments. If patients are self-administering, it is preferable that another responsible adult should be present to support and monitor the patient. Where there are children in the house, the impact of seeing a parent or other relative having a drug administered intravenously should be considered.

### — Drug selection

The choice of drug for home IV therapy is primarily dependent on the condition being treated, but ease of administration and risk of acute side effects are also important considerations. If the drug is being administered by community nurses, once or twice daily dosing is preferred because time pressures mean that it is rarely possible to support more frequent home visits. Drugs

that can be given by slow IV bolus ("push") are preferred as they are generally less complex and time consuming to administer than infusions. Volumetric pumps should be used when the infusion rate is critical (eg vancomycin, TPN) but these are expensive and patients or their carers will need training in responding to the various pump alarm signals.

Ambulatory infusion devices can facilitate the administration of some infusions while allowing the patient to move around. Drug stability is an important consideration when these devices are used — most devices are limited to a small volume of infusion fluid and since these devices may be carried in a bag or belt close to the body, the drug may be exposed to a temperature greater than that used in stability studies.<sup>8</sup>

## Panel 2: Information to be included in the discharge plan

The following information about the patient, the treatment and the central line should be included in the discharge plan.

Patient	Central line	Treatment
Patient and GP address and telephone numbers	Type of line	Disease and infecting organism
Relevant past medical history	If centrally placed, where the tip is	Problems or side effects experienced
Past history of allergic reactions	When the line was inserted and by whom	Details of regimen (drug, dose, duration)
Frequency and timing of clinic visits	Possible complications (signs, symptoms, prevention and management)	Administration directions
Blood monitoring and frequency	Care of the line	Side effects
Duration of treatment	Who to contact if there are any difficulties with the line	Monitoring requirements and action required if results are abnormal
Finish or review date	Who will remove the line and when	
Contact details for home IV therapy team		

## — Initiation of therapy

Whether or not the first doses of an IV drug should be administered in hospital is debatable. Traditionally, the first and second doses of the drug are administered in hospital due to concerns about severe allergic reactions or anaphylaxis. This is based on the assumption that if a patient is allergic to a drug they are most likely to experience a reaction early in the course, and that intravenous drugs tend to provoke a more severe reaction. However, allergic reactions can occur at any time.

Increasing pressure on hospital beds means that keeping a patient in hospital or admitting them for administration of their first doses may not be an option. US guidelines (from the American Society of Health-System Pharmacists) on homecare say that if the first dose is to be given at home, policies and procedures should define whether this is clinically appropriate, and what precautions should be taken (eg, emergency medicines to be available, healthcare worker to be present while drug is being administered).<sup>9</sup>

Patients, carers and community nurses should be trained in the recognition and management of anaphylaxis. Community nurses should have emergency kits containing adrenaline, chlorphenamine and hydrocortisone injections and patients who are self-administering should be supplied with adrenaline (eg, EpiPen, Anapen). Any patient who has a real or suspected anaphylactic reaction should go to the hospital emergency department for review.

## — Discharge planning

A minimum of two working days should be allowed for discharge planning. A written discharge plan is essential and may take the form of a pharmaceutical care plan<sup>10</sup> or patient held record. The discharge plan is an important tool for communication between primary and secondary teams (see Panel 2, p17). The patient's GP should be willing for the patient to have IV therapy at home. Even if the community nurses are not involved in administering the IV drug, they should be kept informed since they may be involved in other aspects of patient care.

Ensuring a discharge supply of the IV drug and any ancillary drugs (eg sodium chloride 0.9 per cent flushes, water for injections, emergency medication kits) is essential. Drugs for home IV therapy fall into the "hospital at home" category and as such all supplies should be provided by the hospital.<sup>11</sup>

## — Role of the pharmacist

The American Society of Health-System Pharmacists has published detailed guidelines on the pharmacist's role in

homecare.<sup>9</sup> Although these guidelines are oriented to the US system of healthcare, they are a useful tool for any pharmacist involved in home IV therapy.

The responsibilities of the pharmacist within the healthcare team will vary according to local practice. Pharmacists have an important role to play in ensuring that the choice of drug is appropriate. This includes advising on drug stability and compatibility, especially where prolonged infusion times are required or if there are restrictions on the volume of infusion fluid. Pharmacists can give advice on drug administration and infusion rates.

It is essential that pharmacists are involved in developing guidelines about situations in which it may be appropriate for patients to have their first dose administered in a non-healthcare setting.<sup>12</sup>

Homecare companies are sometimes used for the provision of drugs for home IV therapy and pharmacists should be involved in setting up contracts and subsequent liaison with these companies [editor — see *Hospital Pharmacist* 2007;14:380]. For some indications (eg, bone infections), follow on oral therapy may be required. The pharmacist should ensure that this is prescribed appropriately and should liaise with GPs and community pharmacists regarding prescriptions for oral therapy as appropriate. Where schemes are set up to initiate IV therapy in the community, drugs and ancillaries will be prescribed by the GP and dispensed by the community pharmacist — neither of whom may be familiar with the drugs involved. Hospital pharmacists may well be called on to give advice to community IV teams.

Training of patients and community nurses in IV drug administration and recognition and management of anaphylactic reactions may be carried out by various members of the home IV team. Even if the pharmacist is not delivering training themselves, they should liaise with those members of the team who are to ensure that drug-related information is accurate and up to date. Similarly they should ensure that any written drug information provided is accurate and up to date.

## — Audit

Ongoing audit and evaluation of outcomes is important. These data can be contributed to the international registry of outcomes.<sup>5</sup> Data collected will partly depend on the condition being treated but might include:

- Clinical outcomes — whether the clinical condition has improved or stabilised
- Microbiological — whether the blood cultures are negative or the organism is still detectable. Whether any new organisms are present

- Economic — the number of bed days saved, cost of home therapy versus expected hospital costs
- Patient satisfaction
- Complication rate (eg, adverse drug reactions, blocked lines, line-related infections) (see p14)

## — Summary

Home IV therapy is a growing area and there is increasing interest in community-initiated IV therapy. Cost savings are not easy to demonstrate and in practice, total expenditure may increase due to greater patient throughput. However, HAIs may be avoided by reducing the length of hospital stay. Pharmacists have a key role to play in ensuring safe, effective and cost-effective use of IV drugs in the home or in an outpatient setting.

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