A 15-year audit of home parenteral nutrition provision at the John Radcliffe Hospital, Oxford

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Summary

Background: Home parenteral nutrition (HPN) is an established option for patients suffering from intestinal failure, often pending definitive surgery, but sometimes for life or pending intestinal transplant. Care for patients with HPN is provided at centres other than designated intestinal failure units in the UK, but there are few data on outcomes.

Aim: To audit the standard of care at one such centre using objective measures to compare with results published from other centres and intestinal failure units.

Design: 15-year retrospective audit of paper and computer-based records of all HPN patients (1990–2004).

Methods: Demographic data, major line and metabolic complication rates and mortality were collected and analysed.

Results: 88 patients received HPN for a total period of 121 patient-years (median duration 217.8 days, range 18.3–3881.2, median age 40, range 3–73). Principal reasons for HPN were Crohns’ disease (35.2%), mesenteric, infarction (11.4%), surgical complications (17.0%), intestinal motility disorder (10.7%). The frequency of major complications were line sepsis (0.35 episodes/patient-year), line occlusion (0.25 episodes/patient-year), subacute bacterial endocarditis (0.02 episodes/patient-year), cholestasis (0.17 episodes/patient-year) and central venous thrombosis (0.03 episodes/patient-year). Indications and complications were all within the range of published data.

Conclusions: HPN can be delivered effectively outside designated intestinal failure units and the current data are representative of a standard of care.

Introduction

Intestinal failure (IF) is defined as the reduction in functioning gut mass below the minimum amount necessary for the adequate digestion and absorption of nutrients. Three types are generally recognized: (i) short-term inaccessible or non-functioning gut (self-limiting IF such as occurring in post-operative ileus, requiring temporary parenteral nutrition); (ii) complex metabolic or nutritional disturbance of uncertain prognosis (such as occurring with enterocutaneous fistulae complicated by sepsis, where nutritional support is only one aspect of overall management requiring a wide variety of expertise) and (iii) chronic gut failure (such as occurring after enterectomy for mesenteric infarction).

Home parenteral nutrition (HPN) is the only option for patients with chronic gut failure, sometimes pending intestinal transplantation. Such patients, once they have recovered from the catastrophic events that lead to chronic gut failure, are generally stable and can be cared for by appropriately trained and supported Nutrition Teams at a local level. HPN is also a strategic option for the second category of complex IF of...
uncertain prognosis, for which care in the UK is focussed on two IF units (St Marks, London and Hope Hospital, Manchester) designated by the National Specialist Commissioning Advisory Group. These units cannot manage the increasing number of patients with IF and depend on provision of care by other specialist centres, examples of which in the UK are located in Oxford, Southampton and Leicester. There are, however, few published data from these other centres.

The requirement for HPN is increasing in that in the UK in 1980 there were 25 patients on HPN.4 By 2002 over 500 patients were catered for,2,5 and the BANS period prevalence data for 2005 was 667.6 In 2002, 15 centres outside the IF units had more than five HPN patients.5 Most of these were in the chronic, stable category of intestinal failure. The John Radcliffe Hospital (JR Hospital) in Oxford is unusual in having provided an HPN service since 1984. Half of these patients are on HPN for a strategic period pending definitive surgery for complex intestinal failure. Oxford is also unusual in that intravenous feeding lines have been inserted by dedicated vascular access nurse specialists since 1992. The purpose of this audit was to examine demographics and complication rates for these patients and to compare these with other published data in order to monitor the effectiveness of our service and ability to provide care comparable to that received at the IF Units in the UK.

Methods

A formal TPN service has been provided at the JR Hospital since 1978 and the work of the nutrition team has been regularly audited. All but two of our patients have been trained and established on HPN at our own centre. The first patient was discharged on PN in the early 1980s.7,8 HPN has always been provided by a multidisciplinary team consisting of a consultant and registrar in Gastroenterology, dietician, pharmacist, nutrition nurse specialist and vascular access nurse specialist. The nutrition nurse specialist is responsible for training patients in line care and all aspects of nutrition use and is the patients’ first port of call when they are discharged. Patients had access to telephone support and provided blood samples on a weekly to monthly basis depending on stability of prescription. Trace elements were checked every 6 months and bone density every 1–2 years.9

Retrospective audit

Electronic and paper records of all patients receiving HPN from the JR Hospital from January 1990 were available. A retrospective analysis of the data was performed on all patients between January 1990 and December 2004 inclusive. Data was cross-checked between paper records and computer database. Information on demographics (age, sex and diagnosis), mortality and complications of HPN (line infection, line occlusion, central venous occlusion, cholestasis and endocarditis) were collected and analysed. In addition, the data was divided into three 5-year groups to assess changes in these parameters over time.

Results

Patient demographics

Over the period from January 1990 to the end of 2004 there were 88 patient episodes of HPN totalling 44,139 days (121 patient years) with a median of 217.8 days. Fifty-five percent were female and the age range was 3–73 years (median 40) (Table 1).

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to TPN. There was only one HPN-related death, which was due to line sepsis (Figure 3).

Complications

The main recorded TPN-related complications were line sepsis, line occlusion, cholestasis, central venous thrombosis and subacute bacterial endocarditis.

Line-related complications

The majority of the feeding lines was inserted by our dedicated vascular access specialist nurses. Patients were trained to care for their lines according to local protocols.

The overall line infection rate was 0.35 events per patient year. The rate showed an overall trend to decrease with time (Figure 4).

The line occlusion rate was 0.25 events per patient year and again decreased with time (Figure 5).

There were only four episodes of central venous obstruction (0.03 events per patient year), all happening within the first 10 years (Figure 6).

Finally, there were two episodes of subacute bacterial endocarditis both occurring within the first 5 years (Figure 7).
Cholestasis was defined as 1.5-fold elevation above the upper limit of normal in two out of three measures of bilirubin, gamma-glutamyl transpeptidase (γGT) and alkaline phosphatase according to other published data. The response to cholestasis was to decrease the number of days patients received lipid and to use medium chain triglycerides. The overall cholestasis rate was 0.17 events per patient year (Figure 8).

Discussion

The JR Hospital has built up substantial experience in the use of HPN over the studied 15 years, accruing 121 patient years.

Indication for HPN is similar to other published data from the UK in that Crohn’s disease makes up the largest proportion. This proportion is decreasing (prevalence of 44.4% 1990–94, 28.2% 2000–04) as vascular disease becomes more prevalent.

Mortality data varied appreciably (overall deaths, 13.6%, 3–33%) over the 15-year period, but actual numbers were small. Mortality varies with underlying diagnosis and our data were well within published ranges of 4.7–46.6%.

Our data for complications is largely in line with previous data. Our overall line sepsis rate of 0.35 events per patient year is close to that found by Russell’s Hall, Dudley of 0.315 but not as low as that of Hope Hospital (0.11). However, our results are skewed by a greater sepsis rate within the first 5 years. Over the last 10 years the sepsis rate has been 0.27 episodes per patient year and compares more favourably. During this time our experience has been greater. In addition, all lines after 1992 have been inserted by a small number of clinical nurse specialists (which we believe to be a novel situation) rather than any available doctor. It has been previously shown that catheter sepsis is inversely related to operator experience. These points may well explain why the sepsis rate has reduced.

Our line occlusion (0.25 events per patient year) and central venous occlusion rate (0.03 episodes per patient year) was low when compared to recent UK published data (from Russell’s Hall) of approximately 0.3 episodes per patient year. However, in 1988 Hope Hospital published a line occlusion rate of 0.12 events per patient year and a central venous obstruction rate of 0.03. The practice at that time was to routinely add heparin to feed bags, which is not something we currently practice and may explain their lower occlusion rate.

Finally, our rate of cholestasis (0.17) was low compared to American data quoting a rate of 0.42 per patient year using the same criteria.

The main weakness of our study is the retrospective nature of the audit. The potential error that this might have introduced was minimized by cross referencing paper records, HPN computer database and biochemistry records. The sample size and long follow-up means that any errors will not have had

![Figure 6. Central venous obstruction.](image)

![Figure 7. Subacute bacterial endocarditis.](image)

![Figure 8. Cholestasis.](image)
a substantial influence on the outcome or message, although this cannot be quantified.

These results suggest that HPN can safely and effectively be offered outside designated IF units. One of the great strengths of the service is the nature of the multidisciplinary team, which includes the nurse-led vascular access service pioneered in Oxford. NICE considers that a multidisciplinary team is essential for good care of inpatient PN and this should be extrapolated to outpatients. The need for HPN continues to rise and cannot be dealt with solely within the existing IF units. Expanded provision for supporting HPN in other units around the country would allow patients to be managed nearer to home and suffer less disruption to their lives as a consequence.

Conflict of interest: None declared.

References


