Pilot Survey of Home Parenteral Nutrition (HPN) set up and connection procedures in Australasia

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BACKGROUND

The AuSPEN (2008) and ESPEN (2009) HPN guidelines recommend that the HPN patient be trained in management of HPN and sign off a written record of demonstrated competence. AuSPEN refers to the United States Centre for Disease Control (CDC) guidelines that are designed to reduce the infectious complications associated with intravascular catheter use, in which recommendations regarding the frequency of replacing catheters, dressings, administration sets, and fluids also are provided. For skin preparation 2% aqueous chlorhexidine is the antiseptic of choice for the CDC and in subsequent European systematic reviews published in 2011 and 2012. However, a recent report from UK (Small M 2013) suggests there is a lack of standardisation with no specific guidance provided for other practical aspects of the parenteral nutrition (PN) set up procedure.

METHODS

In order to ascertain whether the same variability in set up procedures is prevalent in Australasia, as elsewhere, we conducted a survey of the Parenteral Nutrition Down Under (PNDU) support group for HPN consumers/parents/carers. All members of the PNDU private online and Facebook forums were invited to participate in the survey, which involved completing an online questionnaire consisting of 12 multiple choice questions asking about HPN set up and connection procedures. The survey took place between June and July 2014.

RESULTS

Respondents

There were 21 respondents, who answered all of the 12 questions, including 13 (61.9%) adult HPN consumers and 8 (38.1%) parents or carers of children dependent on HPN. Two (9.5%) respondents resided in New Zealand and the remaining 19 (90.5%) lived in Australia (Table 1). Approximately half of the respondents, 11 (52.4%) lived in the Australian state of New South Wales.

Table 1. Place of residence of respondents

Place of residence	Number (n=21) (%)
New Zealand	2 (9.5)
New South Wales	11 (52.4)
Queensland	4 (19.0)
Tasmania	1 (4.8)
Victoria	2 (9.5)
Western Australia	1 (4.8)

Duration of PN infusion

PN infusions were at least 10 hours in duration (Figure 1). The most commonly employed infusion time was 12 hours (7, 33.3%) but there were various times between 12 hours and 18 hours and three (14.3%) HPN users infused for 24 hours.

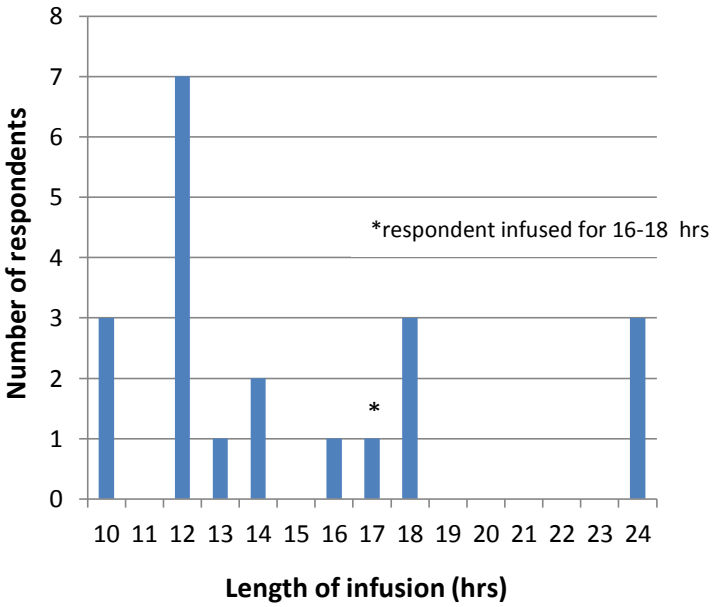

Figure 1. Duration of PN infusion

Giving set priming volume and in-line filter

The type of pump or giving set used was not asked in the survey. However, 9 (42.9%) respondents incorporated an in-line filter in their giving sets and 12 (57.1%) did not.
One respondent received the PN bags with lines attached and already primed, and another respondent used gravity to begin filling the line with fluid then primed the remaining line. No priming volumes were recorded in these two cases. Priming volumes used by the remaining 19 respondents ranged from 8 to 30 ml (Figure 2).

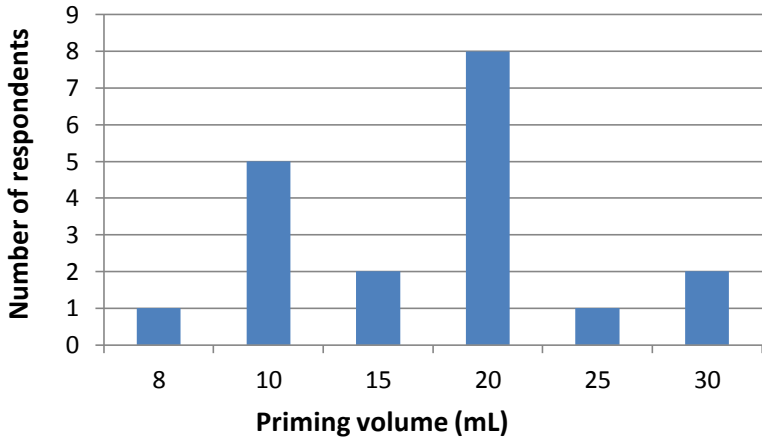

Figure 2. Priming volume of giving set

Use of gloves

The use of gloves when connecting to the PN and when changing the dressing surrounding the catheter exit site ranged from using no gloves for either procedure to using sterile gloves for both (Table 2).

Ten (47.6%) respondents reported using sterile gloves when connecting to PN. A further 3 (14.3%) used non sterile gloves and 1 (4.8%) used both at different stages of the procedure. Seven (33.3%) did not use gloves.

The respondents were not asked whether they or hospital/community nurses changed the dressings surrounding the catheter exit site. However, 13 (61.9%) reported that sterile gloves were used and 1 (4.8%) used sterile gloves at different stages of the procedure. Seven (33.3%) did not wear gloves.

When considering use of gloves and both procedures, 3 (14.3%) respondents did not wear gloves for either procedure, and 10 (47.6%) wore gloves (either sterile or non sterile) for both procedures.

Table 2. Use of gloves when connecting PN versus when changing dressing

Use of gloves when changing dressing	Use of gloves when connecting PN				
	Sterile	Non Sterile	Both sterile/non sterile	No gloves	Total
Sterile	7	2	0	4	13
Non sterile	0	0	0	0	0
Both sterile/non sterile	0	0	1	0	1
No gloves	3	1*	0	3	7
Total	10	3	1	7	21

*respondent commented that hospital changes the dressing

Dressing used for catheter site

A range of dressings were used for the catheter site. The two most frequent were Opsite® IV3000® and Tegaderm® (Table 3).

Table 3. Dressings used for catheter site

Dressing	Number (%)
Opsite IV3000®	10* (47.6)
Tegaderm®	6 (28.6)
Meplex®	1 (4.8)
Duoderm®	1 (4.8)
Opsite drain®	1 (4.8)
Bioclusive®	1 (4.8)
Primapore®	1 (4.8)

*1 respondent used IV3000® or Hypafix® depending on the state of the skin

Disinfectant used

Nine (42.9%) respondents used chlorhexidine on either or both connector and skin site. A further 10 (47.6%) used a chlorhexidine and alcohol combined disinfectant. Two (9.5%) used povidone/iodine with one of these respondents commenting that isopropanol alone was used to disinfect the connector while iodine was used on the skin during dressing change.

Disinfecting time

Disinfecting time ranged from not waiting for the disinfectant to dry, to waiting for a couple of minutes (Table 4). Twelve (57.1%) respondents waited at least 30 seconds. It is not known whether this applied to all steps when disinfectants were used.

Table 4. Disinfecting time

Time for disinfectant to dry	Number (%)
No wait	2 (9.5%)
Less than 10 seconds	1 (4.8%)
15 seconds	5 (23.8%)
20 seconds	1 (4.8%)
30 seconds	9* (42.9%)
Up to 1 minute	1 (4.8%)
2 or couple of minutes	2 (9.5%)

* one respondent waited 30 seconds for disinfectant to dry on connector and until skin looked dry when changing the catheter site dressing

Locking solution and drawing back before connecting

Heparinised saline and normal saline were the most frequently used catheter locks with 12 (57.1%) respondents using one of these solutions (Table 5). In addition, a further 1 (4.8%) respondent indicated that heparinised saline and ethanol (70%) were used (presumably at different times due to the potential incompatibility of ethanol and heparin). A further 3 (14.3%) respondents used an alcohol based lock and 4 (19.0%) used Taurolock®.

Table 5. Locking solution used after disconnecting

Locking solution	Number (%)
Heparinised saline	7 (33.3%)
Heparinised saline/ethanol 70%*	1 (4.8%)
Normal saline	5 (23.8%)
Taurolock®	4 (19.0%)
Alcohol not specified	1 (4.8%)
Ethanol concentration not specified	1 (4.8%)
Ethanol 30%	1 (4.8%)
Other (not specified) (locked?)	1 (4.8%)

*Assume doesn't use together but at different times

Eleven (52.4%) respondents reported drawing back before connecting to PN. Seven (33.3%) only flushed and 3 (14.3%) connected without drawing back or flushing.

All 4 respondents who used Taurolock® as the locking solution drew back before connecting. Of the remaining 7 respondents who drew back, 1 used ethanol (concentration not provided) as a lock, 1 used heparinised saline/ethanol, 4 used heparinised saline, and 1 used saline. Of those 3 who did not flush or draw back, 2 locked with saline and the other did not specify.

DISCUSSION

The survey data confirm a wide variability in duration of PN infusion times, ranging up to 24 hours with the majority infusing for 10-12 hours. Priming volumes for PN administration sets ranged from 8-30ml with the majority choosing 20ml. Whether these volumes are appropriate is unknown, but a future survey could include a question regarding the type of pump and administration set used. One third of respondents did not use gloves for connecting their PN and a third did not use gloves for changing dressings. While two thirds used gloves for connecting PN, less than half (47.6%) of all respondents used sterile gloves. It would be interesting to know whether use or non-use of gloves reflects the nursing practice at the hospitals which manage the HPN patients.

The most recent ASPEN standards for home and alternate site nutrition support therapy (NCP 2014) insist that “PN---shall be administered through a filter”. However in our survey, the use of in-line filters was fairly evenly split: 43% used filters versus 57% who did not.

Heparinised saline/saline were the most frequently used catheter locks (57%). An alcohol-based lock was used by 14% and Taurolock® was used by 19%. The reason for the use of a particular catheter lock was not ascertained but could have been related to level of risk or previous history of line infections of the individual patient. Approximately half drew back before connecting, whilst the remainder simply flushed or connected directly.

Opsite® and Tegaderm® were the most popular catheter site dressings, and over 90% used a chlorhexidine-based disinfectant for either or both the PN connection and the skin site, in line with AuSPEN/CDC recommendations. However approximately 10% used povidone-iodine. The reason for this is unknown but may be due to skin sensitivity to chlorhexidine. The majority (57%) waited at least 30 secs for the disinfectant to dry but surprisingly some did not wait at all (10%) and others waited 'a couple of minutes'. Perhaps guidelines on appropriate drying times to maximise the effectiveness of particular disinfectants are needed to be disseminated and incorporated into the training for HPN patients.

CONCLUSIONS

Although this was a small study, our on-line pilot survey reached approximately 10% of known HPN consumers/parents/carers (AuSPEN Register 2012) across the majority of Australian states and New Zealand, and we believe the results are reasonably representative of the wide variability of HPN set up procedures used in Australasia. It is not possible to ascertain what effect these differences might have on infection rates. However, these data suggest that further study is warranted to determine the best evidence-based procedures so these could be implemented into more standardised HPN training programmes and incorporated into the new AuSPEN/ESPEN HPN Guidelines.

ACKNOWLEDGEMENTS

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