Clinical Nutrition 32 (2013) 73–76

Contents lists available at SciVerse ScienceDirect

Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

Original article

Adherence to the national institute of clinical excellence guidance on parenteral nutrition screening is not enough to improve outcomes

Royce P. Vincent [a,*,d], Sohail Omar [a,d], Manal O. Elnenaei [a], Chui Hoong Goo [b], Rashim Salota [a], PeiFang Wu [c], Hannah L. Delaney [a], Carel W. le Roux [a]

[a] Department of Chemical Pathology, King's College Hospital NHS Foundation Trust, Denmark Hill, London SE5 9RS, UK
[b] Department of Nutrition & Dietetics, King's College Hospital NHS Foundation Trust, Denmark Hill, London SE5 9RS, UK
[c] Department of Pharmacy, King's College Hospital NHS Foundation Trust, Denmark Hill, London SE5 9RS, UK

ARTICLE INFO

Article history:
Received 5 July 2011
Accepted 22 May 2012

Keywords:
Parenteral nutrition
Nutrition guideline
Malnutrition
Clinical outcome

SUMMARY

Background & aim: Majority of the National Institute of Clinical Excellence (NICE) nutrition guidance recommendations were based on Grade D evidence due to absence of randomised controlled trials. The aim was to assess outcomes of parenteral nutrition (PN) administration when the guidance was adhered to.

Methods: The prospective study included patients referred for PN. Patients were divided into two groups: guidance compliant and guidance non-compliant. Primary outcome measures were duration of PN treatment, number of PN bags used per patient, length of hospital stay and mortality.

Results: There were 262 patients, aged 54(42–67) [median (IQR)] years. The guidance compliant and the non-compliant groups consisted of 143 and 119 patients respectively. In the guidance compliant group all patients were screened on admission compared to 40% in the non-compliant group ($p < 0.001$). Among those malnourished/at risk of malnutrition all were referred for early dietetic assessment in the compliant group but only 14% in the non-compliant group ($p < 0.001$). There was no difference in any of the outcome measures between the groups.

Conclusion: Compliance with the nutritional guidance in the UK was not enough to improve outcomes in patients requiring PN in our cohort. Evidence based changes to PN practice are required to optimise care.

1. Introduction

Parenteral nutrition (PN) administration is reserved for patients who are not able to meet their nutritional requirements via enteral nutrition (EN). Accurately predicting the nutritional requirement in hospitalised patients remains a challenge. Underfeeding has been associated with an increased incidence of infection and prolonged length of hospital stay.[1,2] Overfeeding has also been associated with increased risk of infection as well as metabolic disturbances such as hyperglycaemia, dyslipidaemia, hepato-biliary complications and refeeding syndrome.[3,4] PN may not influence the overall mortality rate of critically ill patients or those following surgical procedures, but it reduces the complication rate, especially in malnourished patients.[5] The route of administration, the delay in initiating nutrition, calorie content and possibly the type of nutrient formula may be important factors determining clinical benefits.[6–8] Recently the first ever national observation study on PN across UK was conducted by the National Confidentiality Enquiry into Patient Outcome and Death (NCEPOD). The study reported PN care based on current evidence to be inadequate in up to 80% of patients and that PN related metabolic complications developed in 40% of patients.[9]

A reasonable suggestion by many experienced PN clinician has been that early identification and management of malnutrition may be beneficial,[10] however, to date there have been no randomised controlled trials (RCTs) to support this notion. As compared to PN, early EN in particular, has been shown to be associated with fewer complications.[11–13] EN could be safer as well as cheaper, but relying on EN alone could result in not achieving calorific requirements for some critically ill patients who are unable to tolerate EN.[6,14–16]

The 2006 the United Kingdom, National Institute for Health and Clinical Excellence guideline 32[17] on nutrition support suggested that, all patients should be screened on initial admission to hospital and where appropriate be referred immediately to an enteral or

* Corresponding author. Tel.: +44 02032994100.
E-mail address: royce.vincent@nhs.net (R.P. Vincent).
[d] RPV and SO contributed equally to this manuscript.

0261-5614/$ – see front matter © 2012 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism. All rights reserved.
doi:10.1016/j.clnu.2012.05.015

parenteral feeding team.[17] A large proportion of the recommendations on NICE guideline had to be based on consensus and expert opinion (Grade D) due to the lack of RCT level evidence. The EPaNIC multi-centre RCT is currently underway to compare the outcome of the American/Canadian and the European clinical practice guidelines for nutritional support in the critically ill,[18] and is expected to be completed by mid 2011. The EPaNIC trial will address whether supplementary PN to failing EN early in the course of critical illness has clinical outcome benefits. However, there are no similar studies to date on patients admitted to non-critical wards.

Our study aimed to compare current hospital practice in adult patients, against the NICE guideline on nutrition support.[17] The focus was on, initial nutrition screening and early dietitian referral of adult patients with either malnutrition or at risk of malnutrition (as defined by NICE guidelines) who required PN. Thus, this study particularly addresses the referral pathway recommended on the guidelines and not the nutritional management of patients once they were referred for nutritional support. The study also assessed the effect of compliance with the NICE guideline on the primary outcome measures of PN administration such as; a) number of days on PN, b) total number of PN bags used per patient, c) length of hospital stay and d) 30-day mortality.

The NICE guidelines defined malnutrition and risk of malnutrition using objective and subjective measures. These include patients who have eaten very little for more than five days and/or unlikely to eat more than small amounts for the next five days, or have a poor absorptive capacity, and/or have high nutrient losses and/or have increased nutritional needs from causes such as catabolism.[17] The nutritional status of patients was determined based on definitions stated in the NICE guidelines.

2. Methods

This prospective study consisted of 262 consecutive patients referred to the multi-disciplinary PN team. All the relevant Information was obtained from medical notes, electronic patient records, dietetic record cards, pharmacy PN records, nursing care plans, malnutrition universal screening tool (MUST) scores and completed PN prescription charts. The nutritional status of patients was determined based on the NICE guideline.[17] Patient confidentiality was maintained as data was made anonymous for analysis. The study was approved by the local Clinical Effectiveness Committee (CASS AP1099-01).

The patients were divided into two groups for comparison; NICE compliant and NICE non-compliant groups. The compliant group consisted of patients who fulfilled all of the following criteria (a) screened on admission, (b) referred to a dietitian if malnourished or (c) referred to a dietitian if at risk of malnutrition before commencing on PN. The non-compliant group consisted of patients not fulfilling one or more of the above three criteria. Patients were categorised as malnourished, at risk of malnutrition or at risk of developing refeeding syndrome based on the NICE guideline.[17] All the patients referred to the dietitians were assessed for nutritional requirement based on the Schofield Equation and those who were identified as at risk of refeeding syndrome or metabolically impaired were treated as per the NICE guideline recommendations.[17] The two groups were compared for the number of patients either malnourished or at risk of malnourishment, number of appropriate dietetic referrals and number of patients who had a trial of EN feeding (tried and failed where appropriate) prior to PN administration.

2.1. Statistics

Normality of distribution for each variable was assessed using the Shapiro Wilk normality test. Comparison of data between the two groups was done using the independent samples *t*-test, Mann–Whitney *U* test or Chi Square test as appropriate. A *p*-value < 0.05 was considered significant. Results are expressed as median (IQR). All statistical analysis was done on Analyse-it® (Microsoft, version 2.21; Leeds, UK) software.

3. Results

The study included 262 adult patients aged 54 (42–67) years of which 155 were male. Admissions were either to critical care such as intensive and high dependency units ($n = 148$) or non-critical wards ($n = 114$). One hundred and ninety one (73%) patients were screened for malnutrition on admission to hospital using the MUST screening tool. In total 176 (67%) were identified as either malnourished or at risk of becoming malnourished based on the NICE guideline criteria. Of the 176 malnourished patients identified only 96 (55%) were referred for dietetic assessment. Number of patients identified as being at risk of developing refeeding syndrome was 114 (44%). No patient died because of malnutrition, but the all cause mortality rate within 30-days of all those initiated on PN was 32%. Mortality among those who on admission were malnourished or at risk of malnutrition was 30%, and among those who were at risk of developing refeeding syndrome was 32%. Central venous catheter related sepsis due to PN administration was 3.4%, but was not associated with any mortality within 30 days of the infection.

The guidance compliant group consisted of 143 patients (55%) and the non compliant group of 119 (45%). Comparison between the groups in terms of ward admission, initial screening, those malnourished or at risk of malnutrition, referral to dietitians were appropriate, those at risk of refeeding syndrome, number of days nil by mouth (NBM; not receiving any form of nutritional support) prior to PN administration, number of days on PN, number of PN bags per patient, length of hospital stay and mortality are shown in Table 1.

There was no significant difference in mortality between patients found to be malnourished, at risk of malnutrition, at risk of refeeding syndrome or those who did not fall into any of the mentioned categories (all, $p > 0.05$). The outcome of initial

Table 1
Demographics, nutritional screening, outcome measures and mortality between NICE compliant and non-compliant groups. Data expressed as either median (IQR) or numerical value (%). A *p* value <0.05 was considered significant.

	NICE compliant group ($n = 143$)	NICE non-compliant group ($n = 119$)	*p* value
Age (years)	55 (41–63)	58 (43–72)	0.007
Number male:female	95:48	60:59	0.008
Number critical: non-critical ward admissions	76:67	72:47	0.234
Nutritional screening done on admission	143 (100%)	48 (40%)	<0.001
Malnourished or at risk of malnutrition on admission	83 (58%)	93 (78%)	0.123
Appropriate dietetic referral	83 (100%)	13 (14%)	<0.001
Risk of refeeding syndrome	59 (42%)	55 (46%)	0.731
Number of days nil by mouth prior to PN administration	0 (0–4)	2 (0–5)	0.005
Trial of EN feeding prior to PN feeding (tried and failed:not relevant)	38:57	37:60	0.792
Number of PN bags per patient	8 (5–12)	9 (5–13)	0.814
Number of PN days	9 (6–16)	8 (5–14)	0.375
Length of hospital stay (days)	30 (21–52)	36 (20–57)	0.523
30-day mortality (all cause)	47 (33%)	35 (29%)	0.664

Abbreviations: NICE, National Institute for Health and Clinical Excellence; PN, parenteral nutrition; EN, enteral nutrition.