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REVIEW

Neonatal parenteral nutrition: Review of the pharmacist role as a prescriber

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Abstract *Introduction:* In the context of the continuous quest to improve the care of the neonates especially the critically ill premature, the extended role of pharmacists in the process of parenteral nutrition order writing and effective participation in decision-making especially in the neonatal population is increasingly important.

This review aims to present results from literature review of available evidence on the pharmacists' role in neonatal parenteral nutrition therapy.

Material and methods: Key medical, clinical, and review databases were searched; relevant articles were retrieved and evaluated.

Results and discussion: A total of 19 papers out of 7127 searched papers met the criteria for inclusion, discussing the review topic.

The main focus of the selected papers was on parenteral nutrition practice as related to the pharmacy practice.

The overall quality of studies was mixed.

Conclusion: Overall, the review presents the up-to-date status of the most recent analysis being undertaken on the topic of pharmacist involvement in the parenteral nutrition order writing practices and more specific in the neonatal population over the period from 1979 to 2013.

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The overall impression is that the practice of pharmacist writing neonatal parenteral nutrition orders already exists, but still limited if compared with the practice pharmacist writing adult parenteral nutrition orders which is much more established in many countries.

There was no single clinical study evaluating this practice, as we were able to retrieve only two surveys, which make it difficult to evaluate the pharmacists' role in this area.

Nevertheless, despite the wide variation in literature types, characteristics and quality, there are consistent patterns across all the reviewed literature that competencies of the pharmacist in this field are well represented, which make it very important to carry out good quality clinical studies in this field.

Finally, we are currently conducting a prospective clinical study to evaluate the impact of clinical pharmacist as a neonatal PN prescriber, this impact will be judged through the study outcomes as reducing the metabolic and electrolytes complications and increasing the mean daily weight gain during PN therapy and reducing the average number of days of PN till enteral feeding is achieved.

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Contents

1. Introduction

Neonates are the most patients population that benefits from parenteral nutrition therapy, as most of the prematures and very low birth weight infants < 1500 g will need immediate after birth nutrition support therapy through parenteral access due to their inability to tolerate/contraindicated enteral or oral feeding. As such, parenteral nutrition (PN) is an essential component of care for those infants. There is good evidence that some preterm infants may fail to grow adequately (Ehrenkranz et al., 1999; Wood et al., 2003). Poor growth can be associated with poor neurodevelopmental outcomes in extremely preterm infants, with a lower weight at discharge associated with an increased risk of neurodevelopmental impairment (Ehrenkranz et al., 2006). One reason for this poor growth may be that these infants receive inadequate nutrition in the first weeks of life.

Recommendations for the optimal nutrient intake of preterm infants exist (Agostoni et al., 2010), however, there is evidence that these targets are not achieved (Embleton et al., 2001; Grover et al., 2008; Martin et al., 2009). Achieving recommended nutrient intakes in these infants is a major challenge, and feeding practices can be variable. This was demonstrated by Cooke et al. (2004) who showed that units offering the same level of care had significant variations in postnatal growth. Another unique problem, frequently encountered with the neonatal parenteral nutrition ordering practice is the provision of low calories and failure to reach the minimum required calories needed for proper weight gain, and this problem is of great significance as the single most important goal for neonatal parenteral nutrition is to maximize weight gain and provide enough calories and protein to build new tissues. And to ensure the provision of the required calories and protein for those infants; the pharmacist input is of great significance as to calculate the daily provided calories and protein – from parenteral and enteral nutrition – for the infants and to modify the parenteral nutrition orders accordingly until reaching the goals.

Understanding the barriers to implementing a change in practice is key to the development of a successful intervention (Grol, 1997; Grol and Grimshaw, 2003), and there is evidence that guidelines alone are often not enough to bring about or maintain a change in practice, and that more multifaceted implementation strategies are required (Grimshaw et al., 2004; Grol, 2001; Grol and Grimshaw, 2003; Mettes et al., 2010).

Evidence demonstrates that physicians have minimal training and experience in this area of nutrition support (Gales and Riley, 1994), and consequently this has led to the development of multidisciplinary nutrition support teams in many health care facilities (Naylor et al., 2004). According to a position paper by the European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPHGAN) Committee on Nutrition, current education of pediatricians in clinical nutrition is insufficient to ensure appropriate assessment of nutritional risk (Agostoni et al., 2005).

Improvements can be made in the nutrition support process. The nutrition support pharmacist will be a key participant in the maintenance and improvement of the nutrition

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