
Expanding the Knowledge Base in Diet, Nutrition and Critical Care: Electronic and Published Resources

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Abstract

The critical care ward manages the needs of the highest dependency patients, the majority of whom are malnourished. Malnutrition could have been preexistent and compounded by critical illness or may have arisen due to acute disease effects. The appropriate identification and management of malnutrition in the critical care unit will have a major influence on the clinical outcome. The importance of appropriate nutritional support has become increasingly recognized in the last few decades. In fact, in some regions, the inclusion of appropriate nutritional support is essential for the accreditation of healthcare establishments.

The first line of nutritional support is the identification of malnutrition, followed by in-depth assessment if required. These processes will indicate the risk of malnutrition, the need for nutritional support, the constituents of feed, and the mode of delivery, whether via oral, enteral, or parenteral feeding. At the very least, nutritional support in the critical care unit aims to maintain hydration and protein-energy balance and prevent or minimize the catabolic effects of critical illness. Some decisions are based on pragmatism, whereas others are based on evidence, experience, available resources, or locally agreed policies from regional authoritative bodies. This chapter discusses the essential and central role of nutritional support in the critical care

unit. A list of important resources that advise nutritional support in critical care is also highlighted in this chapter.

Introduction

Critical care units initially developed to fill gaps in healthcare provision for extremely vulnerable patients. In this critically ill cohort are some of the highest dependency patients to be found in hospitals. To support their care, critical care units are intensively staffed with multidisciplinary teams of physicians, surgeons, specialist nurses, physiotherapists, pharmacists, dieticians, enteral and parenteral nutrition support teams, and many other healthcare professionals. Given the severity of the patients' illness and breadth of cases encountered in critical care, a multidisciplinary team must rapidly and effectively provide the best evidence-based therapies for a plethora of conditions.

Figure 1 is a schematic diagram of the interactions between critical care and the other departments in hospitals that demonstrate the central role of critical care units. Although critical care units can receive referrals from anywhere in any hospital, most admissions to critical care units come from emergency departments, hospital wards, and surgical theaters (see Fig. 2). However, critical care units are not directly involved with patient primary care or with direct discharge from the hospital.

Intensivists have brought the most important lifesaving therapies performed by other specialists to their patients in critical care units. An early example of this was the innovative use of tracheostomies to treat patients with respiratory failure during the 1952 polio epidemic in Copenhagen, Denmark. During this epidemic, there were not enough "iron lung" ventilators for all polio patients that developed respiratory failure. The use of the tracheostomy artificial airway was a lifesaving measure. It allowed vast numbers of medical students to manually apply positive pressure ventilation. Prior to this use, tracheostomies had only been used to assist breathing to facilitate surgery in operating theaters (Menon and Nightingale 2006). Today, tracheostomy-assisted breathing is routine in critical care wards throughout the world.

Unlike other specialist departments, the practice in critical care units is typically not disease or organ specific. Despite this, a wide range of expertise is required to care for the various conditions and patients that are encountered. The critically ill patient will often require multiple organ support, artificial ventilation, and/or artificial feeding (Menon and Nightingale 2006).

Since the 1980s the recognition of the importance of nutritional support in critical care has increased. In response to this, authoritative organizations have endorsed and overseen the development of training, monitoring, and treatment plans to deliver optimal nutrition support as part

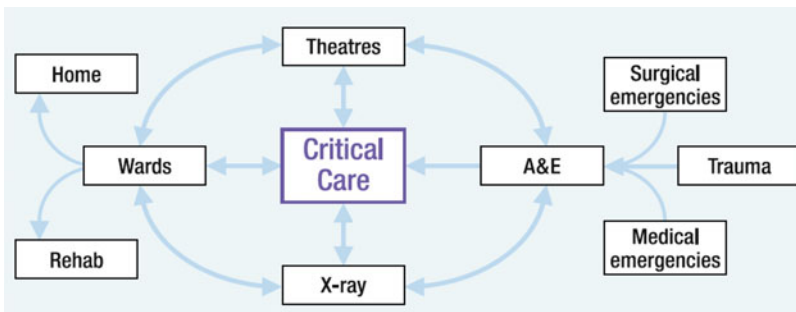


Fig. 1 The central role of critical care in clinical interface: Admissions to critical care will continuously come from separate and diverse areas of the hospital, most commonly accident and emergency (A&E), surgical theaters, X-rays, and other wards. Critical care discharges will be to

wards, theaters, and X-ray. In light of this, critical care wards and staff tend not to interact with primary care or direct discharge out of the hospital (Reproduced with permissions from Menon and Nightingale 2006)

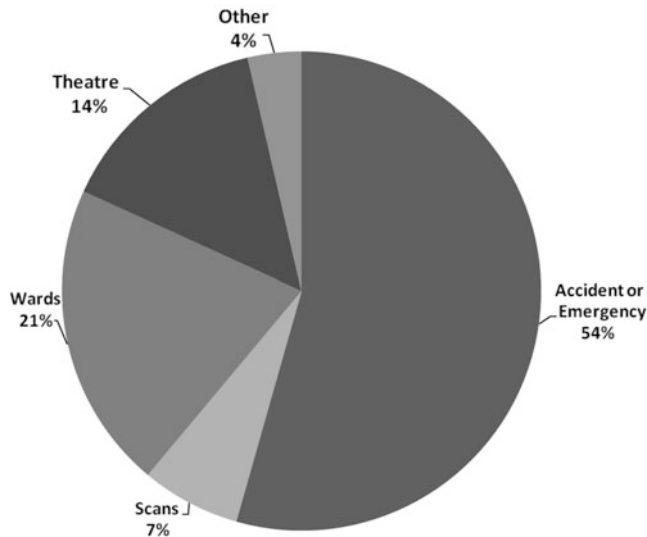


Fig. 2 Proportion of admissions to critical care units: Direct admissions represent direct referral from primary care units to critical care units, and indirect admissions include referral to other units prior to admission to critical care (Based on data from Simpson et al. 2005). Proportion of patients referred from “scans” includes those having

undergone computed tomography, X-ray scans, and endoscopy. “Other” includes those patients referred from other hospital critical care or intensive care units, same or other hospital high-dependence units, or other intermediate care units

of a holistic healthcare approach. In fact in some countries, such as the United States of America, a healthcare establishment will not be accredited unless appropriate nutritional support is included as part of routine clinical practice.

Up to 60 % of critical care patients can be malnourished despite feeding (Calvo et al. 2012). Malnutrition may have developed as a result of the acute effect of a disease or may have been present prior to admission; this is then compounded by critical illness. Appropriate management of malnutrition can significantly influence the course of many diseases and improve clinical outcomes (Agarwal et al. 2012; Lisboa da Silva et al. 2012). Nutritional screening must include an assessment of nutritional status to identify malnutrition and decide the appropriate route and constituents of feed. Screening is often followed by more in-depth assessment if needed. When indicated, delivery of nutrition support is either through oral intake or through artificial nutrition via enteral or parenteral routes. These decisions are often based on pragmatism and on locally agreed policies. Locally agreed policies are typically developed from the guidelines of

regional authoritative bodies, for example, the American Society for Parenteral and Enteral Nutrition (ASPEN), the British Association for Parenteral and Enteral Nutrition (BAPEN), the European Society for Clinical Nutrition and Metabolism (ESPEN), or the Society of Critical Care Medicine (SCCM).

The most minimal aim of nutritional support is to maintain hydration and protein-energy balance and prevent or minimize catabolic effects of disease. Enrichment of specific nutrients may be indicated in specific disease states as important advances in research have highlighted the beneficial effects of supplementing feeds with specific micronutrients and vitamins such as selenium or vitamin D or with fish oil emulsions or antioxidants (Hardy et al. 2012; Reddell and Cotton 2012; Nair and Venkatesh 2012; Manzanares et al. 2013).

Given the importance of nutritional support, it is necessary that evidence-based findings are highlighted and collected in resources such as this publication. This book presents a comprehensive collection of the evidence-base for current clinical practice guidelines on nutritional support

Table 1 Regulatory bodies and professional societies related to diet and nutrition in critical care. This table lists the important regulatory bodies and professional societies related to diet and nutrition in critical care

Regulatory or professional body	Websites
American Academy of Pediatrics (AAP)	www.aap.org
American College of Clinical Pharmacy (ACCP)	www.accp.org
American Diabetes Association	www.diabetes.org
American Dietetic Association (ADA)	www.eatright.org
American Society for Nutrition (ASN)	www.nutrition.org
American Society for Parenteral and Enteral Nutrition (ASPEN)	www.nutritioncare.org
American Society of Health System Pharmacists (ASHP)	www.ashp.org
Association of Dieticians – German Federal Association (VDD)	www.vdd.de
Austrian Nutrition Society (OEGE)	www.oege.at
Spanish Food Composition Database (BEDCA)	www.bedca.net/bdpub
British Association for Parenteral and Enteral Nutrition (BAPEN)	www.bapen.org.uk
British Dietetic Association (BDA)	www.bda.org
British Nutrition Foundation (BNF)	www.nutrition.org.uk
Canadian Critical Care Society	www.canadiancriticalcare.org
European Federation of the Associations of Dieticians (EFAD)	www.efad.org
European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN)	www.espghan.med.up.pt
European Society of Intensive Care Medicine (ESICM)	www.esicm.org
European Society of Parenteral and Enteral Nutrition (ESPEN)	www.espen.org
German Interdisciplinary Society of Intensive Care and Emergency Medicine (DIVI)	www.divi.de
German Nutrition Society (DGE)	www.dge.de
German Sepsis Society	www.sepsis-gesellschaft.de
German Society of Surgery (DGHC)	www.dgch.de
Intensive Care Society (ICS)	www.ics.ac.uk
International Confederation of Dietetic Association (ICDA)	www.internationaldietetics.org
International Union of Nutritional Sciences (IUNS)	www.iuns.org
Irish Nutrition and Dietetic Institute (INDI)	www.indi.ie
Japan Dietetic Association	www.dietitian.or.jp
Joint Commission on the Accreditation of Healthcare Organizations	www.jointcommission.org
Korean Dietetic Association	www.dietitian.or.jp
National Institute for Health and Care Excellence (NICE)	www.nice.org.uk
Norwegian Dietetic Association	www.matomsorg.no
Nutrition Society	www.nutrition society.org
Nutrition Society of Taiwan	www.nutrition.org.tw
Polish Foundation for Children Fed Differently	www.dziecizywioneinaczej.pl
Polish Society of Anaesthesiology and Intensive Care	www.anestezjologia.org.pl
Polish Society for Parenteral, Enteral Nutrition and Metabolism (POLSPEN)	www.polspen.pl
Royal College of Nursing	www.rcn.org.uk
Royal Society of Medicine	www.rsm.ac.uk
Critical Illness Professionals (SEMICYUC)	www.semicyuc.org
Spanish Society of Parenteral and Enteral Nutrition (SENPE)	www.senpe.com
Singapore Nutrition and Dietetic Association (SNDA)	www.snda.org.sg
Society of Critical Care Medicine (SCCM)	www.sccm.org
Spanish Association of Dietetics and Food Science (SEDCA)	www.nutricion.org
Swedish Association of Dieticians	www.kostochnaring.se
Swiss Association of Registered Dieticians	www.svde-asdd.ch
US Department of Agriculture (USDA)	www.nutrition.gov

(continued)

Table 1 (continued)

Regulatory or professional body	Websites
US Department of Health and Human Services	www.health.gov
US Food and Drug Administration (FDA)	www.fda.gov
US Pharmacopeial Convention (USP)	www.usp.org
World Health Organization	www.who.int

Table 2 Journals important for diet and nutrition in critical care. This table lists examples of important journals that publish peer-reviewed original research and review articles relating to diet and nutrition in critical care

Journals	Websites
American Journal of Clinical Nutrition	www.ajcn.nutrition.org
Anaesthesiology Intensive Therapy (Anestezjologia Intensywna Terapia)	www.czasopisma.viamedica.pl/ait/index
Annals of Nutrition and Metabolism	www.karger.com/anm
Archives of Gastroenterology	www.scielo.br/ag.htm
Brazilian Journal of Nutrition	www.puc-campinas.edu.br/ccv
British Journal of Nutrition	www.journals.cambridge.org/bjn
Chest	www.chestnet.org
Clinical Nutrition	www.journals.elsevier.com/clinical-nutrition
Critical Care	www.ccforum.com/
Critical Care Medicine	www.journals.lww.com/ccmjournals
Current Opinion in Clinical Nutrition and Metabolic Care	www.journals.lww.com/co-clinicalnutrition
European Journal of Clinical Nutrition	www.nature.com/ejcn
Food & Nutrition Research	www.foodandnutritionresearch.net
Infant, Child, & Adolescent Nutrition	www.can.sagepub.com
Intensive Care Medicine	www.lcmjournal.edicm.org
Journal of Internal Medicine	www.jim.se
Journal of Nutrition, Health and Aging	www.editorialmanager.com/jnha/
Journal of Parenteral and Enteral Nutrition	www.pen.sagepub.com
Journal of the Academy of Nutrition and Dietetics	www.adajournal.org
Medicina Intensiva	http://medintensiva.org/en/
Neurocritical Care	http://link.springer.com/journal/12028
Nutricion Hospitalaria	www.nutricionhospitalaria.com
Journal of Nutrition	www.jn.nutrition.org
Nutrition	www.journals.elsevier.com/nutrition
Nutrition in Clinical Practice	www.ncp.sagepub.com
Nutrition Journal	www.nutritionj.com
Nutrition Research	www.nrjournal.com
Polish Society for Parenteral, Enteral Nutrition and Metabolism (POLSPEN)	http://www.polspen.pl/postepy-zywienia-klinicznego
Public Health Nutrition	www.journals.cambridge.org/PHN

and future research into the identification and management of malnutrition in critical care wards. This collection of chapters presents work that is clinically relevant and applicable and has been supported by multiple peer-reviewed investigations. Below is a brief list of important

resources that advise nutritional management practices in critical care units.

Tables 1–3 list the most up-to-date information on the regulatory bodies and professional societies (Table 1), journals (Table 2), and books (Table 3) that are relevant to an evidence-based

Table 3 Books important for diet and nutrition in critical care. This table lists examples of important published textbooks with information regarding diet and nutrition in critical care

Books
Duggan CP, Watkins JB, Walker WA, Nutrition in Paediatrics, McGraw Hill Medical, 2008, USA
Duggan CP, Gura KM, Jaksic T, Clinical Management of Intestinal Failure, CRC Press, 2012, USA
Hendricks KMP, Duggan C, Manual of Paediatric Nutrition, BC Decker, 2005, USA
Bray GA, Bourchard C, James WPT, Handbook of obesity: Clinical applications, Marcel Dekker, 2004, USA
Starks TP, Trends in Nutrition Research, Nova Science Publishers Inc, 2006, USA
Caplan L, van Gijn J, Stroke Syndromes Cambridge University Press, 2012, UK
Mohr JP, Wolf PA, Grotta MD, Moskowitz A, Mayberg MR, Von Kummer R, Stroke: Pathophysiology, Diagnosis and Management, Saunders, 2011, USA
Stratton RJ, Green CJ, Elia M, Disease-related Malnutrition: An Evidence-Based Approach to Treatment, CABI Publishing, 2003, UK
Gil Hernandez A, Nutrition Treatise (Tratadi de Nutricion), SENPE, 1999, Spain
Ross AC, Caballero B, Cousins RJ, Tucker KL, Ziegler TR, Modern Nutrition in Health and Disease, Lippincott Williams and Wilkins, 2012, USA
Coulston A, Boushey C, Nutrition in the Prevention and Treatment of Disease, 2nd ed. Academic Press, 2008, USA
Thomas B, Bishop J, Manual of Dietetic Practice, 4th ed. Blackwell Science, 2007, UK.
Zaloga P, Nutrition in Critical Care, Mosby, 1994, USA
Elia M, Ljungqvist O, Stratton R, Lanham-New SA, Clinical Nutrition, 2nd ed. Wiley-Blackwell, 2012, UK
Lang CE, Nutritional Support in Critical Care, Aspen Publishers, 1987, USA
Lanham-New SA, Macdonald IA, Roche HM, Nutrition and Metabolism, 2nd ed. Wiley-Blackwell, 2010, UK
Bender DA, A Dictionary of Food and Nutrition, 3rd ed. Oxford University Press, 2009, UK
American Society for Parenteral and Enteral Nutrition, The Science and Practice of Nutrition Support: A Case-Based Core Curriculum, Kendall Hunt Pub Co. 2007, USA
American Society for Parenteral and Enteral Nutrition, Nutritional Considerations in the Intensive Care Unit, Kendall Hunt Pub Co. 2002, USA
Mahan LK, Escott-Stump S, Raymond JL, Krause's Food and the Nutrition Care Process, Elsevier Saunders, 2012, USA

incorporation of diet and nutritional support to critical care units.

Summary Points

- Critical care units are dedicated to patients in the most fragile health states due to acute illness or deterioration of chronic illness.
- Healthcare provisions to the critically ill patient require a multidisciplinary team of physicians, specialist nurses, pathologists, dietitians, and other healthcare professionals.
- Critical care units and the multidisciplinary teams that staff them are central to hospitals and are indispensable to the other departments and services.
- The care delivered in critical care units is dependent on the care received at the source

of admission and will influence patient destination after discharge.

- Focus on diet and nutrition in critical care units has grown significantly. Many lines of evidence demonstrate the importance of appropriate nutritional support to positive clinical outcomes.
- This chapter lists the most up-to-date resources, regulatory bodies, professional societies, journals, and books that are relevant to an evidence-based approach to applying dietary and nutritional support to patients in critical care units.

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