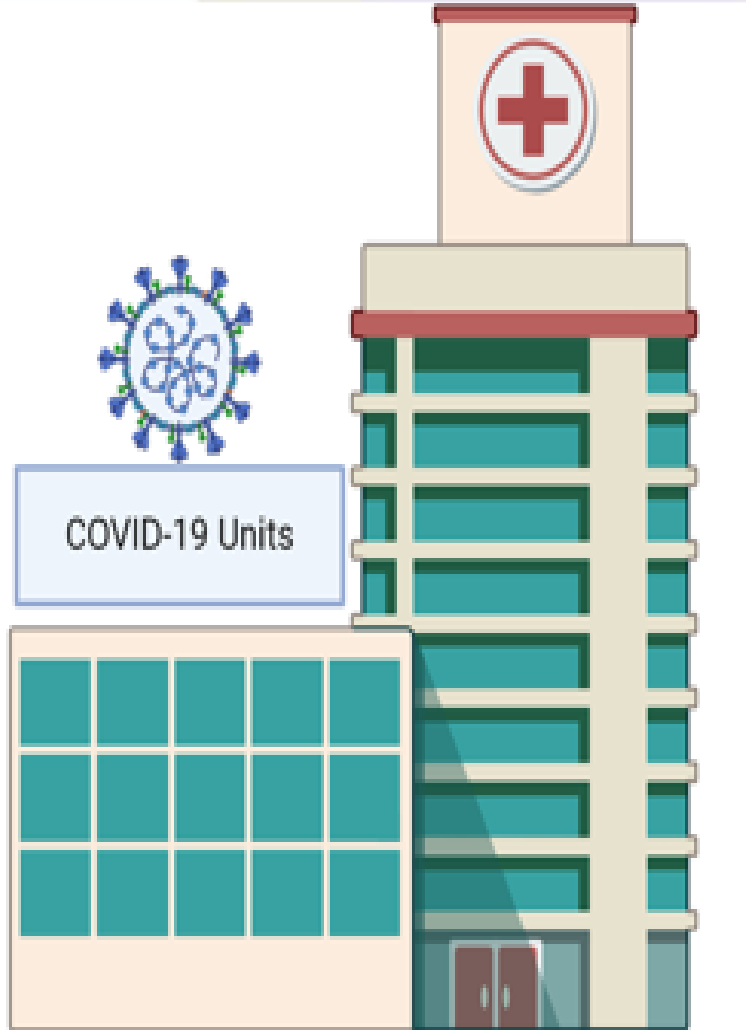




Nutritional Management Post COVID-19 Recovery

Daniyah Alkhawtani
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17th June 2020



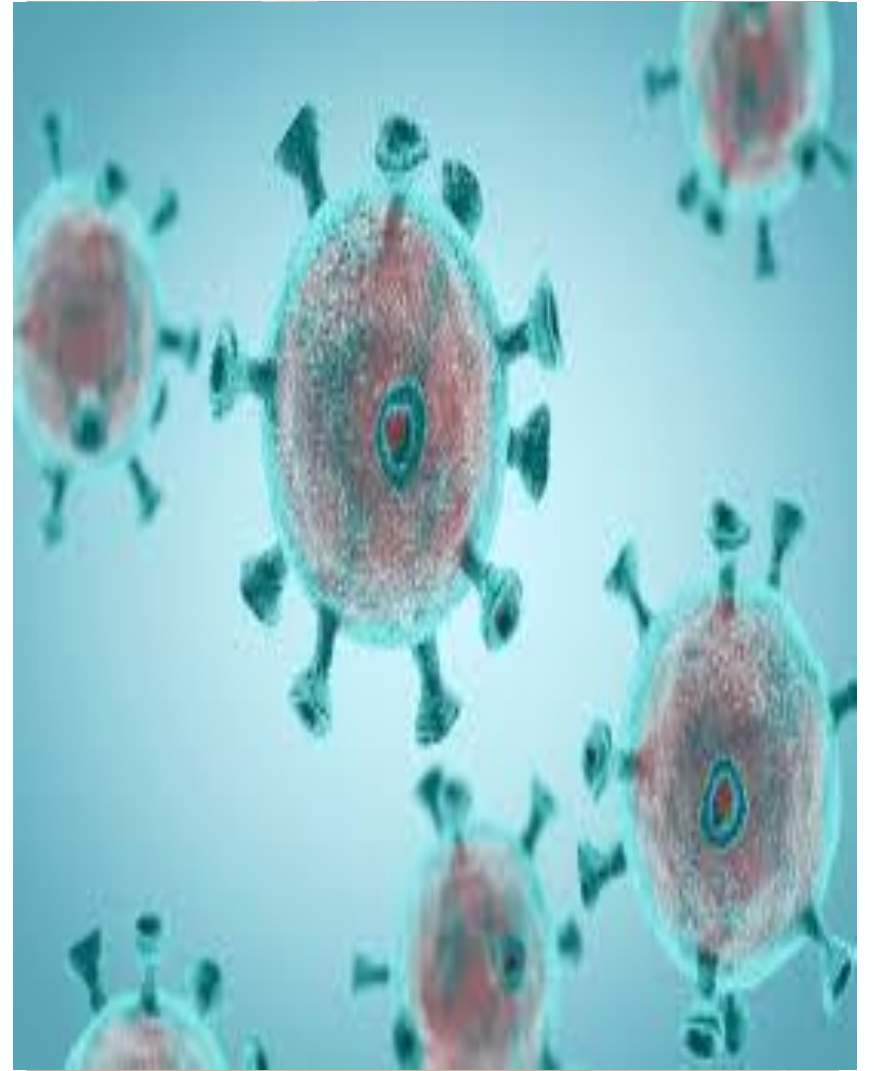
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Outlines:

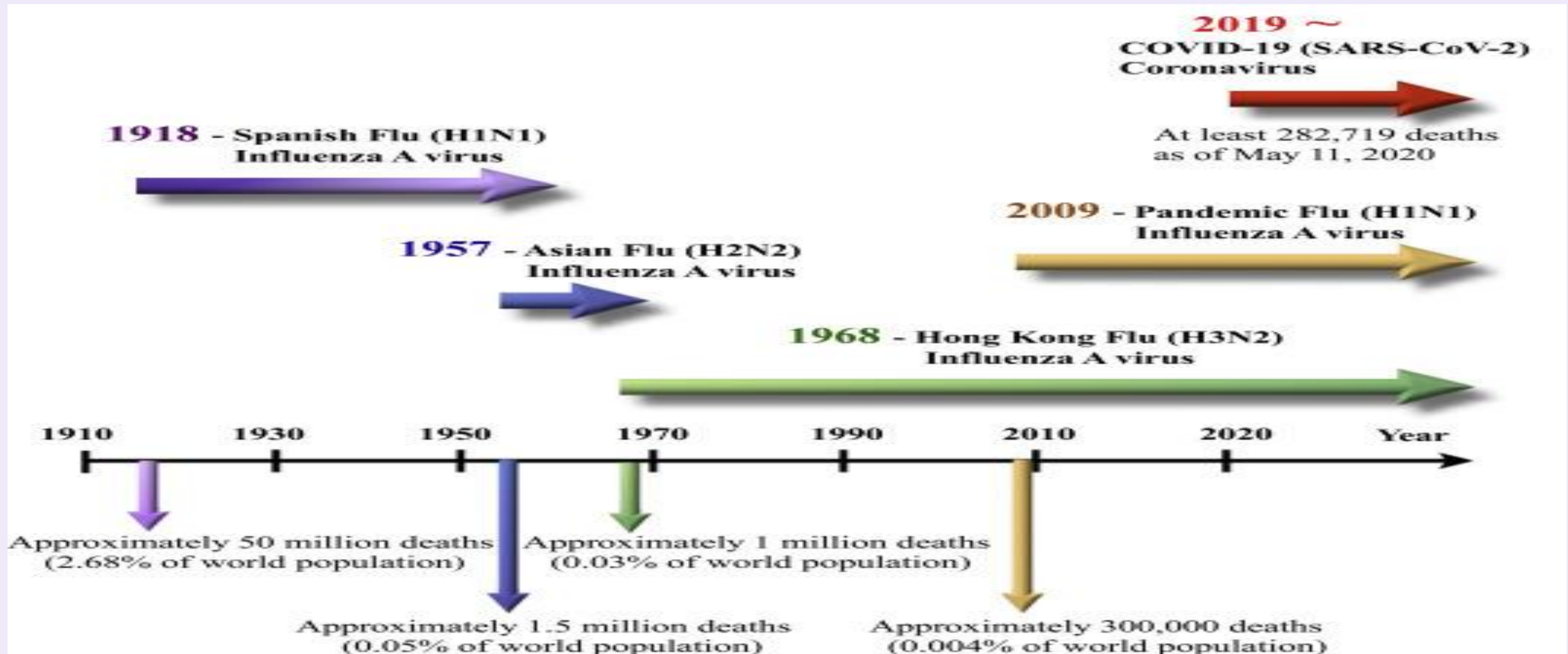
- Background.
- Malnutrition assessment.
- How to calculate calorie, protein& fluid for COVID-19 patients?
- What about immune enhancing agents?
- Nutritional Management Post COVID-19 Recovery.
- Discharge plan.



1. Background:



History:



COVID-19:

- **Coronavirus disease-2019(COVID-19)** is an infectious disease which can cause symptoms of fever, cough, generalized weakness, pain, difficulty breathing as well as changing in the taste & smell.
- **COVID-19** may **increase** the risk of malnutrition during the period of critical care, as well as in the recovery and post recovery phase.



2. Malnutrition assessment:



Acute Care¹
20–50%



Post-Acute Care¹
14–51%



Community Care^{2,4}
6–30%

Figure 1: Nutrition and the US Population^{4,5,6,7,8}



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Malnutrition in adults hospitalized patients:

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ELSEVIER

Original article

Clinical and economic outcomes associated with malnutrition in hospitalized patients

Alvaro J. Ruiz ^{a,*}, Giancarlo Buitrago ^a, Nelcy Rodríguez ^a, Gabriel Gómez ^c, Suela Sulo ^e, Carlos Gómez ^a, Jamie Partridge ^c, Juan Misas ^c, Rodolfo Dennis ^b, Magda Jeannette Alba ^c

Background & aims: Hospitalized patients show a high rate of malnutrition, which is associated with poor patient outcomes and high healthcare costs. However, relatively few studies have investigated the association between clinical and economic outcomes and malnutrition in hospitalized patients, particularly those with cardiac and pulmonary conditions.

Methods: This multicenter prospective observational cohort study included 800 patients hospitalized at four Colombian hospitals with a diagnosis of congestive heart failure, acute myocardial infarction, community-acquired pneumonia, or chronic obstructive pulmonary disease. All patients were screened for malnutrition using the Malnutrition Screening Tool (MST). A descriptive analysis of baseline variables was followed by multivariate analysis and inverse probability weighting (IPW) to compare the clinical outcomes, i.e., length of stay (LOS), mortality, and readmission, and hospital costs associated with a positive MST result.

Results: The prevalence of a positive MST result was 24.62% (n = 197) and was more common in patients with older age and greater comorbidities. Multivariate analysis controlling for age, gender, healthcare plan, university degree, hospitalization, entrance disease and Charlson co-morbidity index showed that a positive MST result was associated with increased LOS (1.43 ± 0.61 days) and both in-hospital mortality (odds ratio, 2.39) and global mortality (odds ratio, 2.52). IPW analysis confirmed the association between a positive MST result and increased hospital LOS and 30-day mortality, as well as a relative increase of 30.13% in the average cost associated with hospitalization.

Conclusions: This study of hospital inpatients demonstrated a high burden of malnutrition at the time of hospital admission, which negatively impacted LOS and mortality and increased the costs of hospitalization. These findings underscore the need for improved diagnosis and treatment of hospital malnutrition to improve patient outcomes and reduce healthcare costs.

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Original Article
Endocrinology,
Nutrition & Metabolism



Prevalence of Malnutrition in Hospitalized Patients: a Multicenter Cross-sectional Study

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OPEN ACCESS

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ABSTRACT

Background: Malnutrition is associated with many adverse clinical outcomes. The present study aimed to identify the prevalence of malnutrition in hospitalized patients in Korea, evaluate the association between malnutrition and clinical outcomes, and ascertain the risk factors of malnutrition.

Methods: A multicenter cross-sectional study was performed with 300 patients recruited from among the patients admitted in 25 hospitals on January 6, 2014. Nutritional status was assessed by using the Subjective Global Assessment (SGA). Demographic characteristics and underlying diseases were compared according to nutritional status. Logistic regression analysis was performed to identify the risk factors of malnutrition. Clinical outcomes such as rate of admission in intensive care units, length of hospital stay, and survival rate were evaluated.

Results: The prevalence of malnutrition in the hospitalized patients was 22.0%. Old age (≥ 70 years), admission for medical treatment or diagnostic work-up, and underlying pulmonary or oncological disease were associated with malnutrition. Old age and admission for medical treatment or diagnostic work-up were identified to be risk factors of malnutrition in the multivariate analysis. Patients with malnutrition had longer hospital stay (SGA A = 7.63 ± 6.03 days, B = 9.02 ± 9.96 days, and C = 12.18 ± 7.24 days, $P = 0.018$) and lower 90-day survival rate (SGA A = 97.9%, B = 90.7%, and C = 58.3%, $P < 0.001$).

Conclusion: Malnutrition was common in hospitalized patients, and resulted in longer hospitalization and associated lower survival rate. The rate of malnutrition tended to be higher when the patient was older than 70 years old or hospitalized for medical treatment or diagnostic work-up compared to elective surgery.

Keywords: Malnutrition; Nutrition Assessment; Hospitalization; Prevalence; Subjective Global Assessment

Malnutrition in adults hospitalized patients:



Prevalence of malnutrition and associated factors among hospitalized elderly patients in King Abdulaziz University Hospital, Jeddah, Saudi Arabia

Sami H. Alzahrani* and Sultan H. Alamri

Alzahrani and Alamri *BMC Geriatrics* (2017) 17:136
DOI 10.1186/s12877-017-0527-z

Abstract

Background: Malnutrition is a nutritional disorder that adversely affects the body from a functional or clinical perspective. It is very often observed in the elderly population. This study aimed to estimate the prevalence of malnutrition among hospitalized elderly patients and its associated factors and outcomes in terms of length of stay and mortality in King Abdulaziz University Hospital, Jeddah, Saudi Arabia.

Methods: In a cross-sectional study, we evaluated the nutritional status of hospitalized elderly patients using the most recent version of the short form of Mini Nutritional Assessment (MNA-SF).

Results: A total of 248 hospitalized patients were included (70.0 ± 7.7 years; 60% female). According to the MNA-SF, a total of 76.6% patients were either malnourished or at risk of malnutrition. Malnourished patients had significantly lower levels of serum albumin (28.2 ± 7.7), hemoglobin (10.5 ± 1.8), and lymphocyte (1.7 ± 0.91). They had increased tendency to stay in the hospital for longer durations (IQR, 5-11 days; median = 7 days) and had a mortality rate of 6.9%.

Conclusion: Malnutrition was highly prevalent among hospitalized elderly and was associated with increased length of stay and mortality.

Keywords: Malnutrition, Geriatric, Elderly, Hospitalized, Health services

Prevalence of malnutrition and analysis of related factors in elderly patients with COVID-19 in Wuhan, China

Tao Li ¹ · Yalan Zhang¹ · Cheng Gong¹ · Jing Wang¹ · Bao Liu¹ · Li Shi¹ · Jun Duan¹

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Abstract

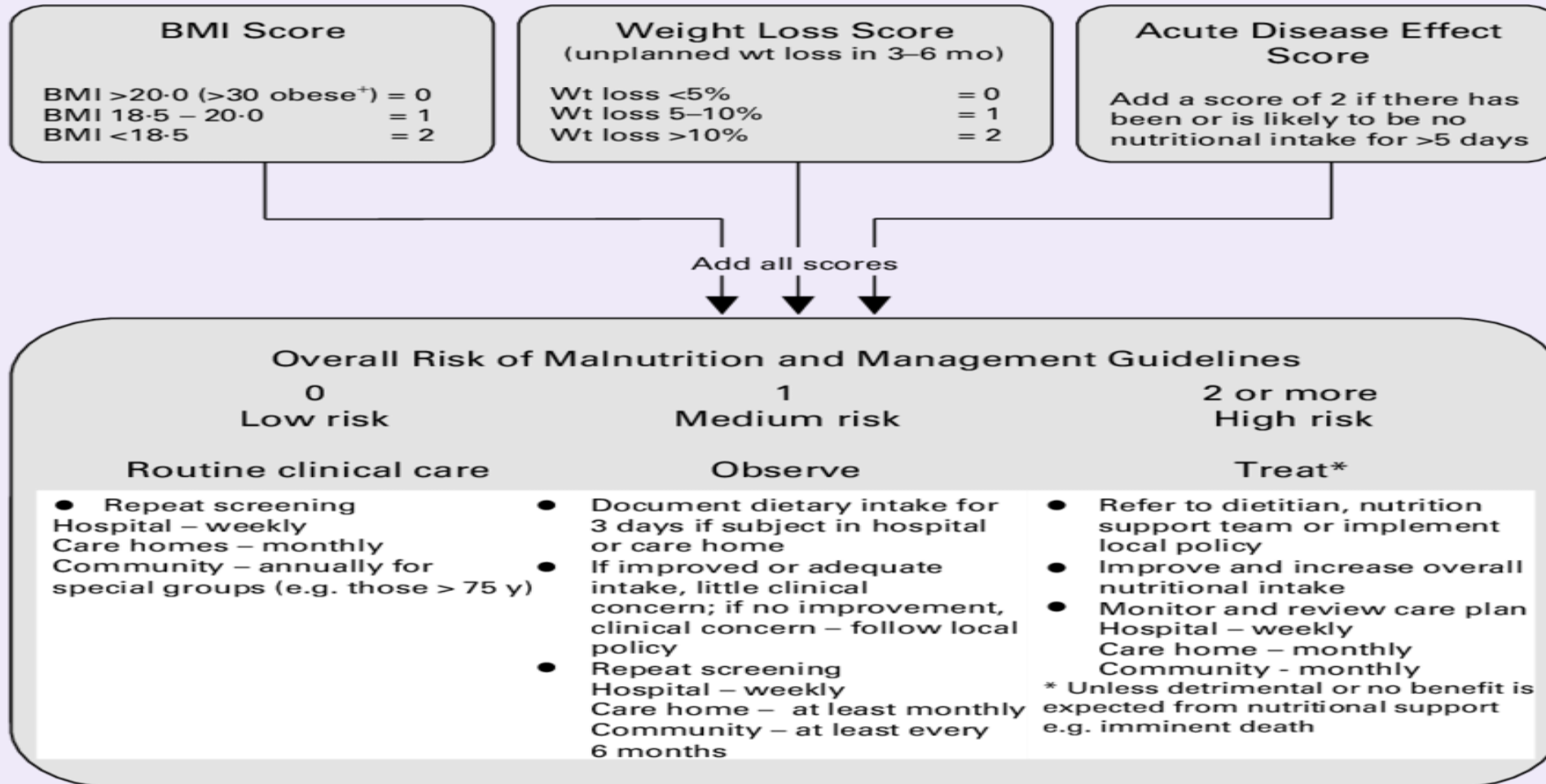
Background/objectives To evaluate the prevalence of malnutrition and its related factors in elderly patients with COVID-19 in Wuhan, China.

Subjects/methods In a cross-sectional study, we evaluated the nutritional status of elderly inpatients with COVID-19 using the Mini Nutritional Assessment (MNA). Based on MNA scores, patients were divided into non-malnutrition group (MNA $\geq$ 24), the group with risk of malnutrition (MNA 17–23.5) and malnutrition group (MNA score $<$ 17). Regression analysis was conducted to screen for risk factors for malnutrition.

Results A total of 182 patients were included in the study, of which 27.5% were in the group with malnutrition risk and 52.7% were in the malnutrition group. There were statistical differences in the incidence of comorbid diabetes mellitus, body mass index (BMI), calf circumference, albumin, hemoglobin, and lymphocyte counts among the three groups. Further regression analysis suggested that combined diabetes, low calf circumference, and low albumin were independent risk factors for malnutrition.

Conclusions The prevalence of malnutrition in elderly patients with COVID-19 was high, and nutritional support should be strengthened during treatment, especially for those with diabetes mellitus, low calf circumference, or low albumin.

Malnutrition assessment:



Record malnutrition risk category, presence of obesity and/or need for special diets and follow local policy. Re-assess those identified at risk as they move through care settings ⁺In the obese, underlying acute conditions are generally controlled before the treatment of obesity. If unable to obtain height and weight, alternative measurements and subjective criteria are provided (Elia, 2003).

© BAPEN 2003

Standard Nutrition Care
 (Completed by nursing staff or a suitably trained staff member – consideration of resources and staff safety is paramount)

- Determine and enter an appropriate **diet code** for the patients' condition
- Screen for **malnutrition using a validated screening tool**, where possible (within 24 hours)
- **Weigh patients** where possible, ensuring appropriate cleaning of equipment (within 24 hours)
- Determine if the patient **needs assistance** with feeding (identify how this will be done in isolation)
- Implement strategies where possible to enable food choices
- Optimise the management of nausea, pain and altered bowel function
- Minimise unnecessary fasting

Low Nutrition Risk
 (MST ≤ 1, MUST = 0 or <5% weight loss)

Managed by nursing staff or other suitably trained staff members, as **standard care**

Monitor intake & weight weekly
 Refer to the Dietitian if:

- Loss of weight ≥ 5% (3-4kg)
- Consuming < 50 % of meals



Moderate Nutrition Risk
 (MST = 2, MUST = 1 or 5-10% weight loss)

Referral to an **Allied Health Assistant or Dietitian** for additional simple interventions

Implement – a protocol nutrition intervention

- Add HEHP diet code
- Provide default supplements (e.g. 2 x 1.5 kcal or 2.0 kcal supplements per day)
- Commence food chart for 3/7
- Ensure menu selections are implemented

Monitor intake & weight weekly
 Escalate nutrition care, Refer to the Dietitian if:

- Loss of weight ≥ 5% (3-4kg)
- Consuming < 50 % of meals

High Nutrition Risk
 (Requirement for EN or PN or any of the above high-risk listed condition or MST ≥ 3, MUST ≥ 2)

Referral to the **Dietitian** for a full nutritional assessment and individualised care plan

Dietitian to complete Full Nutrition Assessment

- Prioritise referrals based on organisational prioritisation
- Patients who require EN and PN should be assessed within 24 hours of referral
- Provide individualised nutrition plan to optimise nutrition care

Dietitian review every 2-7 days depending on risk
 Escalate nutrition care, if ongoing weight loss occurs or patients meeting < 50 % of requirements over 5-7 days

Chapple, L. A., Fetterplace, K., & Ridley, E. (2020). Nutrition management for critically and acutely unwell hospitalised patients with COVID-19 in Australia and New Zealand. Australasian Society of Parenteral and Enteral Nutrition (AuSPEN).



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3. How to calculate calorie, protein & fluid?

- Personalized meals

- Oral Nutritional Supplements (ONS)

- High Protein/ Low Glucose artificial nutrition (enteral/parenteral)



Calorie requirement:

“

- **Energy requirements may be determined by using:**
 - Published predictive equations(Ireton-Jones Energy Equations, IJEE).
 - **Weight based equation:**
 - 25-30kcal/kg (**ASPEN 2016, AuSPEN 2020**).
 - 27kcal/kg/day for polymorbid patients aged >65 years(**ESPEN 2020**).
 - 30kcal/kg/day for older persons& severely underweight polymorbid patients(**ESPEN 2020**).



Protein requirement:

ASPEN 2016	ESPEN 2020	AuSPEN 2020
1.2-2.0 g/kg/day.	• 1.0 g/kg/day for older patients. • >1g/kg/day for polymorbid medical inpatients. • 1.3g/kg/day for obese patients	At least 1.2 g/kg /day.

Fluid requirement:

“

Fluid requirements can be computed based on age:

- **18-55years:** 30-35ml/actual body weight
- **55-75years:** 25-30ml/actual weight
- **older than 75 years:** 25ml/actual body weight.



Fluid requirement:

“

Fluid requirements may increase with:

- Fever.
- Gastrointestinal losses.
- **Water requirement may increase by 10-15ml/kg** for each C degree of body temperature elevation.



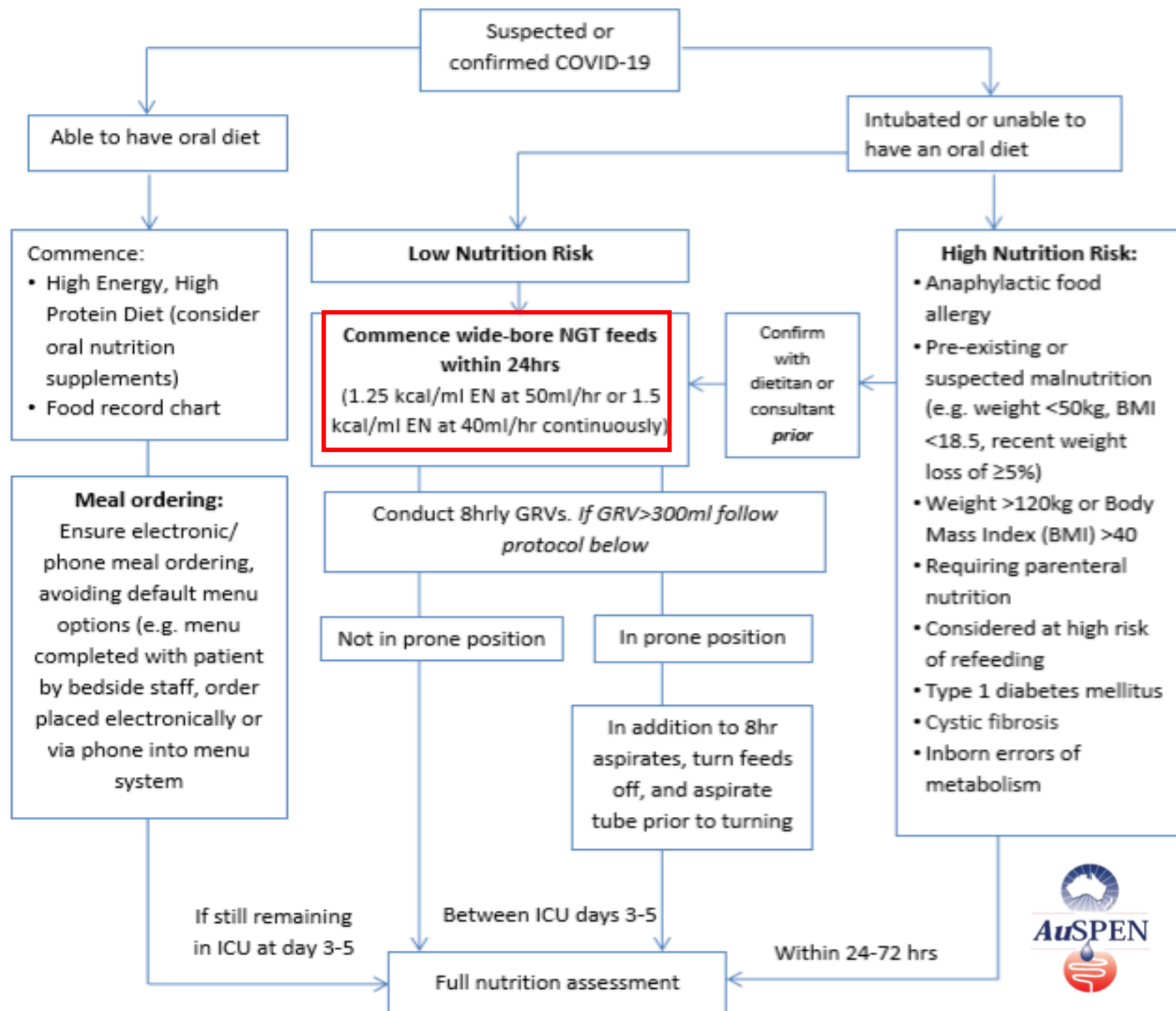


4.To feed COVID-19 patients?!



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If not now, when?

When to start EN?



Early EN (within 24-48 hrs of admission) is recommended!

“ E1. Based on expert consensus, we suggest using a standard polymeric formula when initiating EN in the ICU setting. We suggest avoiding the routine use of all specialty formulas in critically ill patients in a MICU and disease-specific formulas in the SICU. ”

Why to feed early??

- Attenuates inflammatory response to stress / critical illness.
- Prevents mucosal atrophy.
- Systemic immune support.
- Helps maintain normal gut bacteria growth.
- Reduce insulin resistance & prevent hyperglycemia.



How to initiate feeding for COVID-19 patients?

ESPEN Guideline

ESPEN guideline on clinical nutrition in the intensive care unit

Pierre Singer ^{a, *}, Annika Reintam Blaser ^{b, c}, Mette M. Berger ^d, Waleed Alhazzani ^e, Philip C. Calder ^f, Michael P. Casaer ^g, Michael Hiesmayr ^h, Konstantin Mayer ⁱ, Juan Carlos Montejo ^j, Claude Pichard ^k, Jean-Charles Preiser ^l, Arthur R.H. van Zanten ^m, Simon Oczkowski ^e, Wojciech Szczeklik ⁿ, Stephan C. Bischoff ^o

Clinical Nutrition 38 (2019) 68–79

Gastric access should be used as the standard approach to initiate EN.

Grade of recommendation: GPP – strong consensus (100% agreement)



In patients deemed to be at high risk for aspiration, post-pyloric, mainly jejunal feeding can be performed.

Grade of recommendation: GPP – strong consensus (95% agreement)



To avoid overfeeding, early full EN and PN shall not be used in critically ill patients but shall be prescribed within three to seven days.

Grade of recommendation: A – strong consensus (100% agreement)



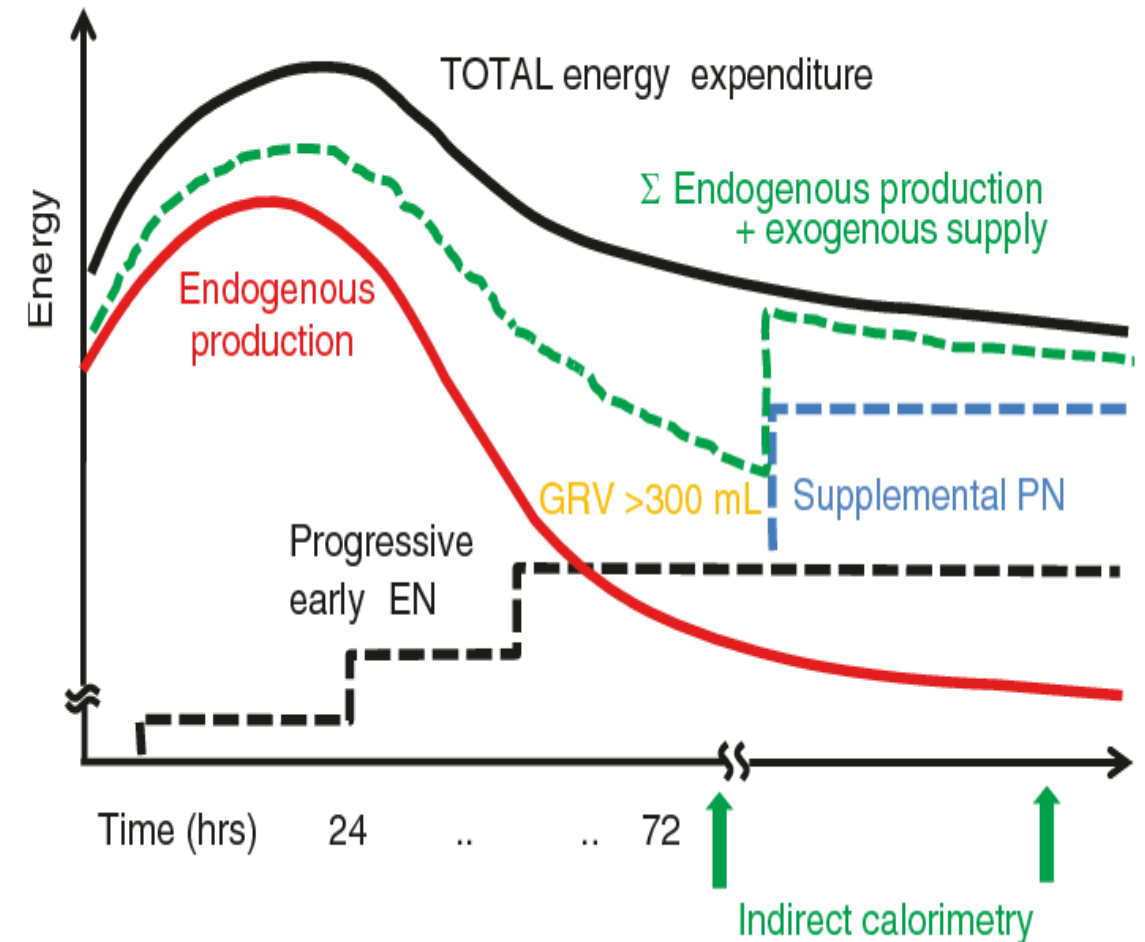
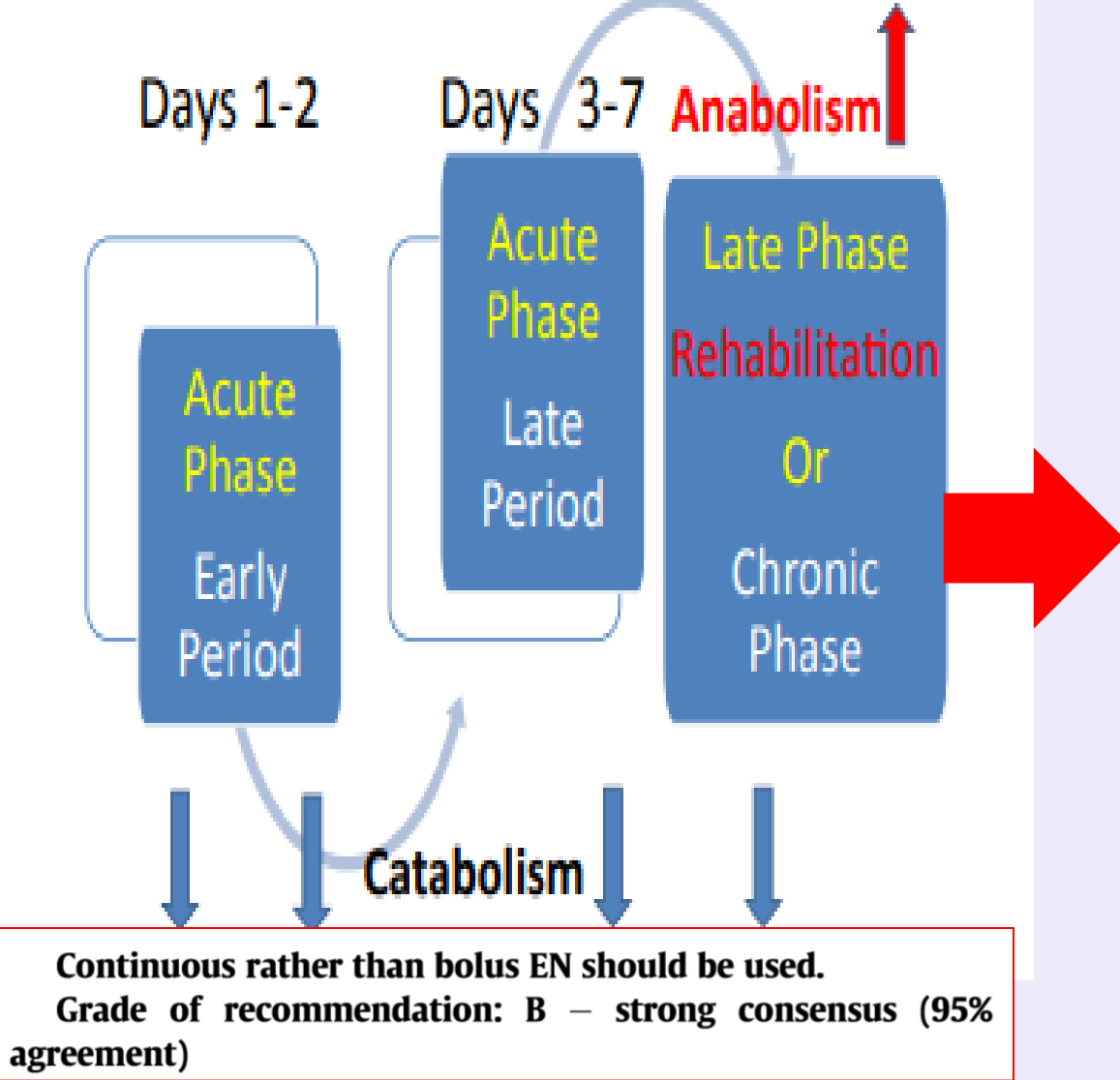
Hypocaloric nutrition (not exceeding 70% of EE) should be administered in the early phase of acute illness.

Grade of recommendation: B – strong consensus (100% agreement)



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defined by a significant muscle wasting and a stabilization of the metabolic disturbances (see Fig. 2). The **post-acute phase** follows with improvement and rehabilitation or persistent inflammatory/catabolic state and prolonged hospitalization.

Continues feeding:



- Typically, continuous feeding are initiated at **20ml/hr.**
- Advanced as tolerated by **10-25ml/hr every 4** hours until the goal rate per hour is achieved.

Approximate drip counts to achieve a desired feed rate

mls/hr	No. of drops/minute
25	7
50	13
75	20
100	27
125	33
150	40
175	47
200	53

Bolus feeding: (gravity bag)

- It can be given in one short feeding time (such as 100-400ml over 15-60 minutes); which may be repeated at intervals to achieve the required intake.
- Increment 60-120 ml q 8-12 hours as tolerated.



Water in tube feeding formula:



Amount of water is different:

- **1 kcal / 1 ml** provides ~85% water.
- **1.2-1.5 kcal/1 ml** provides ~69-82%.
- **1.5-2.0 kcal/1 ml** provides ~69-72%
- **2.0 kcal / 1 ml** provides 70%.

Water flushes:

- For continuous feeds: irrigate tube **q 4hrs** with **30-50ml water**.
- For intermittent/ bolus feeds:
irrigate tube before and after each feed with **30-50 water**.
- Use smaller volumes for fluid restricted patients.



Real life case:

	☒ Inpatient	☐ Outpatient	☒ Adult	☐ Paediatric
SUBJECTIVE	Complaints: ☒ None ☐ Mouth sores ☐ Nausea ☐ Vomiting ☐ Aspiration ☐ Epigastric pain ☐ Bloating ☐ Diarrhoea ☐ Constipation	Activity: ☐ Ambulatory ☐ Wheel chair ☒ Bound to bed Eating Difficulties: ☒ None ☐ Chewing ☐ Swallowing ☐ Need special devices ☐ Need feeding assistance	Food Intake: ☐ All (100%) ☐ Good (75%) ☐ Fair (50%) ☐ Poor (<50%) ☒ NPO ☐ Tube feeding	Diet History/Eating Habits Suboptimal nutritional intake (days): ☒ UNKN ☐ <5 ☐ 5-10 ☐ 10-15 ☐ >15 Meal Supplements: Food Consistency: Food Allergy: Dislikes: Other: <i>o/c (newly inserted)</i>
	OBJECTIVE Age <i>63</i> , Sex <i>M</i> , H/O: ☐ HTN, ☐ DM, ☐ Dyslipidaemia, ☐ IHD, ☐ CVA, ☐ CKD..... Other Medical History: <i>multiple system atrophy</i> Others: ☐ EF <35% ☐ Ventilated ☐ Dialysis/CRRT ☐ Edematous ☐ Drain/ High output fistula ☐ Septic ☐ Febrile ☐ Large wound ☐ Bed Sores, Stage: Reason for admission (<i>Inpatient only</i>): <i>loss of consciousness</i> Related Laboratory Results: <i>U 3.3, Cr 1.1, Na 132, K 3.4, Glucose 16.8</i> Related Medications: <i>B-fondax, paracetamol, atorvastatin</i> Food-Drug interaction: Physician Food Order: <i>o/c</i>			

Immune enhancing agents(Glutamine) for critically ill patients:

ESPEN Guideline

ESPEN guideline on clinical nutrition in the intensive care unit

Pierre Singer ^{a, *}, Annika Reintam Blaser ^{b, c}, Mette M. Berger ^d, Waleed Alhazzani ^e, Philip C. Calder ^f, Michael P. Casaer ^g, Michael Hiesmayr ^h, Konstantin Mayer ⁱ, Juan Carlos Montejo ^j, Claude Pichard ^k, Jean-Charles Preiser ^l, Arthur R.H. van Zanten ^m, Simon Oczkowski ^e, Wojciech Szczeklik ⁿ, Stephan C. Bischoff ^o

Recommendation 28

In ICU patients except burn and trauma patients, additional enteral GLN should not be administered.

Grade of recommendation: B – strong consensus (92.31% agreement)

Commentary to recommendations 26 - 28



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10.Singer, P., Blaser, A. R., Berger, M. M., Alhazzani, W., Calder, P. C., et al (2019). ESPEN guideline on clinical nutrition in the intensive care unit. Clinical nutrition, 38(1), 48-79.

Evaluating adequacy of nutritional support:

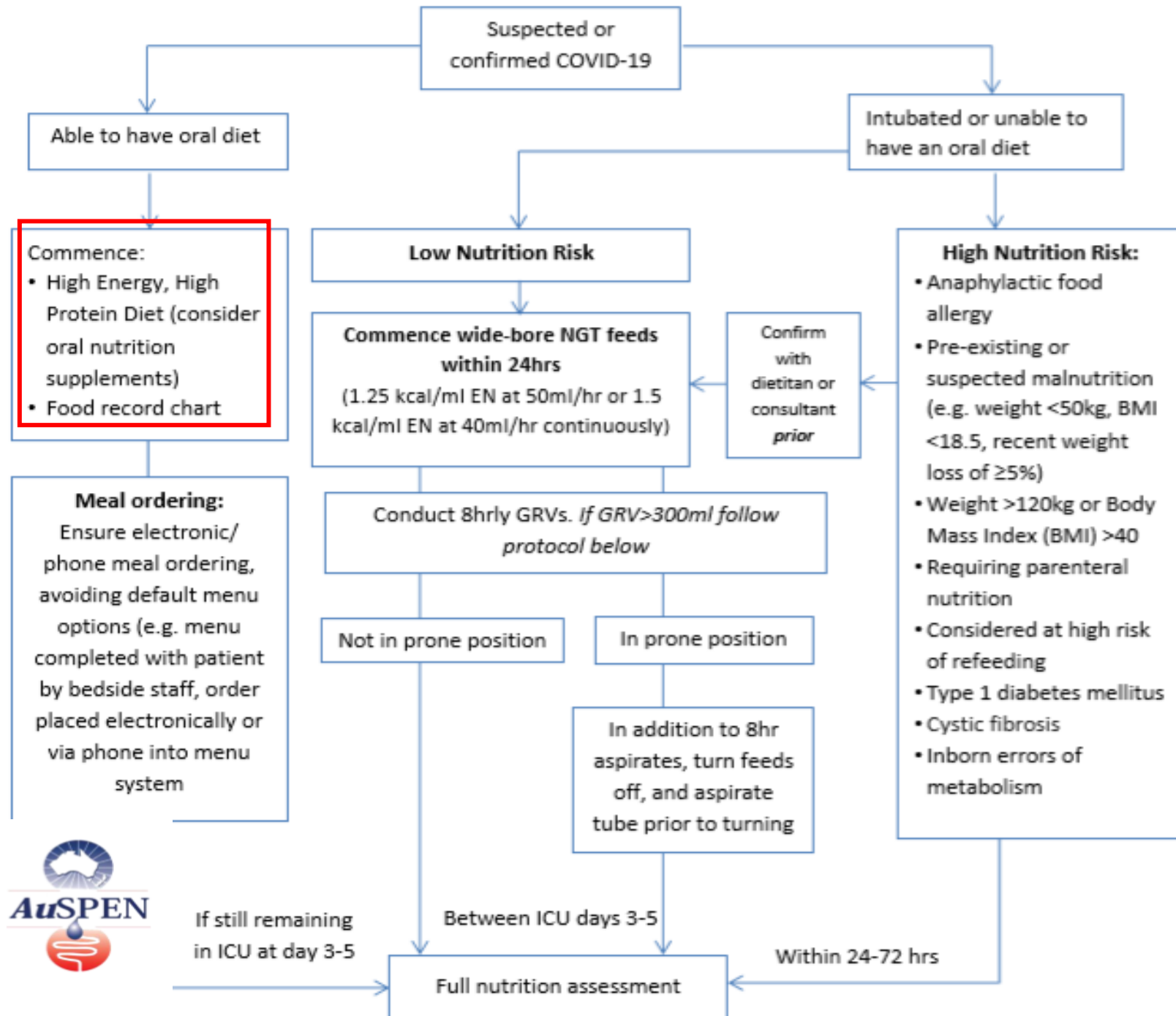
- ✓ I&O daily (what % prescribed feeding did patient receive).
- ✓ Laboratory tests.
- ✓ Nitrogen balance.
- ✓ Hand grip strength.
- ✓ Weight.



Chapple, L. A., Fetterplace, K., & Ridley, E. (2020). Nutrition management for critically and acutely unwell hospitalised patients with COVID-19 in Australia and New Zealand. Australasian Society of Parenteral and Enteral Nutrition (AuSPEN).



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Discontinuing enteral feeding:

- Swallowing team assessment
- Food preferences.
- If the patient is able to consume **60-75%** of their nutritional requirements orally, it may be appropriate to discontinue the tube feeding and use oral supplements to meet the remainder of the patients requirements.

Oral Feeding for COVID-19 patients post recovery:

- High calorie high protein diet.
- Oral high calorie high protein supplement.
- Fortify foods with protein such as **Beneprotein**.
- Adequate fluid intake for good hydration.
- In case of difficulty of swallowing thin fluid, prescribe thickened oral nutritional supplements (**Resource thickenup**).
- Choose softer, moist foods that are easier to chew & swallow.
- Prescribe fiber to manage constipation.
- Vitamins & minerals supplementation may help if deficient.



Monitoring:

By Clinical Dietician

Weight	Daily
Oral intake	Daily Every 3 days by dietician
Enteral feeding	Daily
Blood Sugar	Daily
Bowel Motion	Daily
Labs	Daily
Treatment plan	Every 3 days



5. Discharge planning:



Hospital discharge planning for COVID-19 patients post recovery:

- Patient assessment.
- Caregiver education.
- Coordination with home care providers for feeding tube supply & formula.
- A combination of mental health support & physical interventions such as physiotherapy may provide benefits.
- Encourage patient to increase physical activity.
- Initial post discharge appointment set.



Take home message:

- **Nutrition intervention** can be challenging when you have different concerns to manage, clinical guidelines can not always guide you and it is important to move your clinical judgment to manage & priorities the care .
- **Nitrogen balance** may be a practical method to assess adequacy of protein intake for **COVID-19 patients**.
- **Rigorous monitoring** is required to ensure the safety & efficacy of nutrition therapy for **COVID-19 patients post recovery**.



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- 
- A photograph of a hospital room. In the center is a white hospital bed with blue accents on the headboard and footboard, covered with a white sheet. To the left of the bed is a blue-covered chair. To the right, there is medical equipment including a stand with various tubes and a clock on the wall. The room has large windows with white curtains in the background.
- If you feed them (better)
 - They will leave (sooner)

Thank you

You can find me at:

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