



***Nutrition Management for  
Patients with COVID-19 in  
ICU Setting:  
Practical Tips and  
Challenges***

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# *Topics to cover*

Latest statistic

Starting point

Preparation for the worst

Challenges on ICU

Case study

Summary



# SARS-CoV-2



- Severe Acute Respiratory Syndrome Coronavirus 2
- Predicted 5-10% infected pts requiring ICU admission (Grasselli et al. 2020; Poston et al. 2020)
  - Older ~ 60yo (Guan et al. 2020; Livingston & Bucher 2020)
  - 25-40% have at least one comorbidity e.g. hypertension, diabetes, heart disease or COPD (Guan et al. 2020)
  - ~75% overweight or obese (ICNARC 2020)
- ICU admission approximately 10 days after onset of initial symptoms (Huang et al. 2020)



# In the UK...



- Number of cases 292,950 in UK & deaths 41,485
- Deaths in England (NHS England)
  - Up to 10<sup>th</sup> June 2020 27,706
- Ethnicity (Office for National Statistic 2020)
  - Black, Asian and minority ethnics (BAME) live in more in deprived area.
  - BAME in England & Wales shown twice likely to die of Covid-19 (data from 2/3/20 to 10/4/20).
  - Higher proportion of overweight and obesity in Black ethnic group (72%) compared to White British group (65%).

Clinical features and medical management	Nutritional implication	Nutrition management strategies
<b>Clinical Features</b>		
Metabolism alterations	Insulin resistance Protein catabolism	Blood glucose control Higher protein EN
Highly transmittable virus	Bedside practices limited Staff sickness Impact on food service and menu selection	Remote consults Team planning Upskill non-ICU dietitians
<b>Medical Management</b>		
High flow nasal oxygen therapy	Dry mouth Shortness of breath Fatigue Fasting for potential intubation	High energy/high protein diet Oral nutrition supplements Early escalation to EN
Deep sedation	Delayed gastric emptying Non-nutrition calorie contribution from propofol	1.25-1.5kcal/ml EN Prokinetics for GI intolerance Post-pyloric feeding or PN Account for propofol calories in nutrition prescription if >110% is being provided by nutrition and non-nutrition calories
Prone	Delayed gastric emptying Increased regurgitation and vomiting Feeding interruptions	Lower GRV threshold 1.25-1.5 kcal/ml EN Post-pyloric feeding or PN
Respiratory failure	Restricted fluid input	Energy-dense formula Potential compromised protein intake

**Table 1:** Clinical features and medical management, nutritional implications and suggested nutrition management strategies for patients with COVID-19 in intensive care. EN: Enteral Nutrition; ICU: Intensive Care Unit; GI: Gastrointestinal; GRV: Gastric Residual Volumes; PN: Parenteral Nutrition

Adapted from Chapple, Fetterplace & Ridley, 2020

# + The Journey

- My team...
  - ~ 20 Dietitians with 1 ICU Dietitian
  - Only 2 ICU trained Dietitians
  - 2 trained PN Dietitians and another 2 Dietitians in training
- First pt early March 2020
- ICU capacity multiplied within days (Usual capacity 12 beds)
- Start training non ICU trained Dietitians on 25<sup>th</sup> March 2020
  - Including paediatrics Dietitians
  - BDA Critical Care Specialist Group Guidance on management of nutrition and dietetics services during COVID-19 pandemic (23<sup>rd</sup> March 2020)
- Mid April 2020, we trained most Dietitians.



# Challenges faced...

Staffing level

Logistic

Resources

Meeting Dietary requirement

Emotional and psychological effects





# Distribution of Workload



- Skill mix
- Staffing level
- Rota: At least one senior ITU trained dietitian (Band 7) will lead the ITU cover.
- 2-3 junior dietitians to support
- One entry to minimise PPE usage
  - Minimum initially – no F2F contact
  - FIT Test – selected masks available depending on supply
- Those not on ITU rota, allocated to do admin if no ward allocated

# + Logistics

- Paperless for medical notes/documentation but not enough equipment e.g. computers or COWs
- Anything brought in to Covid area can't be taken out unless can be cleaned with sanitizer/alcohol gel
  - Developed a proforma
  - Scan proforma or document related on ITU & type in office
  - ITU pack – clinical guidelines, nutritional products compendium
- Length of nutrition round
  - To reduce time spent on ITU, info related prep on proforma before the nutrition round
  - 1 visit





# Resources



## ■ Feeding equipment

- Limited pump availability: encourage bolus feed on wards and for discharges
- Consumables
- Continuous vs bolus feed
- Gravity feed

## ■ Feed supply

- Types: decide which one to stock?
- Osmolite HP (1.0kcal/ml, 6.3g protein/100ml)
- Jevity Plus HP (1.3kcal/ml, 8.13g protein/100ml)
- Low Sodium Feed (10mmol Na<sup>+</sup>/L, 1kcal/ml, 4g protein/100ml)
- Nepro HP (1.8kcal/ml, 8.13g prot/100ml)



# Anthropometry



- No weight history
- Estimated weight
  - 'eyeball'
  - Calculation using the NHLBI ARDS tool:
    - 50kg + 2.3kg for every inch of height above 5' (1.52m)
  - Oedematous
  - IBW – aim BMI 25kg/m<sup>2</sup>
- Estimated height
  - Reported in feet and inches



# Nutritional requirements (ESPEN 2019)



- High Energy requirement 22-25kcal/kg
  - AKI : Filter - >30kcal/kg, UO
  - PMHx
- High protein requirement >1.2g/kg
  - Catabolic state
  - Evidence of pressure sore
- Non feed source of calories
  - Propofol (fat based)
    - 1ml = 1.1kcal
    - Provides 264kcal to 792kcal per day
  - Dextrose
    - 5% = 200kcal, 10% = 400kcal



# Meeting the Nutritional Requirements



- Risk of refeeding syndrome
  - Thiamine
  - Electrolytes disturbances
  
- Feed choices
  - Rate 65 – 85ml/hour (BDA 2020)
  - Concentration <1.5kcal/ml
  - Fibre? – delayed gastric emptying
  - Propofol 1.1kcal/ml
  
- Single nutrient
  - Prosource TF
    - 44kcal
    - 11g protein
    - 45ml per sachet

# + Tolerance to regime

- GRVs
  - Slow gastric emptying
  - <500ml/ 6hours
  - To return: <250ml
  - Prokinetics used : metochlopramide, erythromicine
- GI
  - Constipation
  - Diarrhoea or overflow
- BGs
  - Aim BG 6-11mmol/l
  - Low CHO Feed?





# Acute Kidney Injury: Filtration vs No Filtration



- Lower eGFR < 15 ml/min higher risk of Covid-19 related death especially with Diabetes (Hillson 2020)
- Hyperkalaemia
- Oliguria/Anuria
- Type of feed
  - Concentrated?
  - High protein





# Diabetes



- One in four (26%) hospital death in England following diagnosis of Coronavirus had Diabetes (NHS England, 2020)
- 31.4% death cases in Covid-19 found to have Type 2 Diabetes
- Challenging glycaemic control
  - VRII/ Sliding scale
- Challenges
  - Insufficient amount of pump
  - Nursing time – hourly monitoring and adjustment
- High risk of Diabetic Ketoacidosis (DKA) and Hyperglycaemia Hyperglycaemic Syndrome (HHS)
- Low carbohydrate feeding regime?
  - Ketosis



# Case study: 63yo female



- PMHx: T2DM, Hypertension
  - Gliclaczide 80mg BD, Omeperazole 20mg OD, Oxybutini 2.5mg OD, Empagliflozin
- PC: 5d Hx of cough, fever & progressive SOB
- Dx: severe hypoxia & Covid-19 +ve
- ITU admission 26/3/20 & Seen by RD 31/3/20
- Weight 80kg, 1.63m, BMI 30kg/m<sup>2</sup> (IBW 66kg)
- Urine output 30-50ml/hr
- BO type 6 (Sodium Ducosate & Senna)



# Case Study



- Blood glucose >10mmol/l, Actrapid 1u/hr (VRII)
- Propofol 20ml/hr = 528kcal
- Hyponatraemia
  - started Nutrison Low Sodium @30ml/hr x 24hours (720kcal/day, 29g prot, 72mmol/day Na<sup>+</sup>)
- Est Requirements:
  - Energy (25-30kcal/kg) = 1650-2000kcal
  - Protein 79-99g/day
  - Fluid 2000ml/day
- Est Na = 66mmol/l

# + Case Study

6/4/20

- Anuric
- Nil GRV – not on prokinetics
- Propofol stopped, Norad 8ml/hr
- Filter
- Feed changed to Nepro HP @42ml/hr (1000ml, 1800kcal, 81g protein, 147g carbohydrate)

Discharged 13/5/20 – Outcome *ALIVE*

- For SLT & Physio
- Wt 12/5 70.5kg, ht 1.65m BMI 26kg/m<sup>2</sup>
  - Loss 10kg in 2.5months (12.5%)





# Proning Position



- Intervention used in Acute Respiratory Distress Syndrome (ARDS)
- Benefits (Sud et al. 2014):
  - Helps improve oxygenation
  - Prevent ventilator associated lung injury
  - Decrease mortality
- Position changed every 16 hours
- Best Practice Recommendation (BDA Critical Care Specialist Group 2020):
  - Continuous feeding via pump
  - Feed  $<1.5\text{kcal/ml}$ , ?fluid restriction
  - Gastric Residual Volume (GRV) monitor 4-6 hours, aim  $<300\text{ml}$ .
  - Monitor tolerance, consider prokinetics if high GRVs
  - NG  $\rightarrow$  NJ  $\rightarrow$  PN



# Consideration



- Feeding Regime
  - Mixing feed to meet requirement
  - Propofol
  - Prosource TF – practicality
  - Fluid balance
- Nursing staff
  - Skill mix
  - Multiple tasks
- MDT working
  - Changes in regime Px (Dr & Pham)
  - Additional Px request (electrolyte correction, BGs)



# Emotional & psychological health



- Supporting each other
- 'Crisps Party' – Easter Break
- Celebrate small achievements
- BA lounge
- Well being room
  - Mental health support
  - Mindfulness

# + Summary



- Leadership – think outside the box
- Team work
- Being organised helps!



# + References

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# THANK YOU

“The dietitian is an essential frontline provider for the Covid patients, and I’ve been amazed at the passion of some dietitians. I’ve seen it both in my hospital and around the country.”

*- Prof P E Wischmeyer, 10<sup>th</sup> April 2020*