

## Clinical Nutrition



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**SIMON GABE  
THERE IS NOTHING**

**NORMAL**

**ABOUT NORMAL SALINE**



How common is oedema in inpatients?



# Sodium

## Requirements

1-1.5 mmol/kg/day

## Available

Weight	Na requirement
50kg	50-75 mmol
70kg	70-105mmol
100kg	100-150mmol

0.9% NaCl	154 mmol
0.45% Dex Saline	75 mmol
0.18% Dex Saline	30 mmol
Hartmann's	131 mmol

**This is a safety issue**



# The answer ...

The problem is about the sodium content

Rename IV fluids with the sodium content in the name

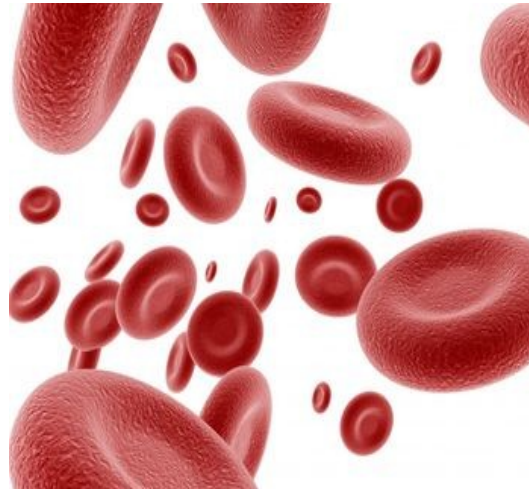
Saline 154

Dextrose saline 75

Dextrose saline 30

Hartmann's 131

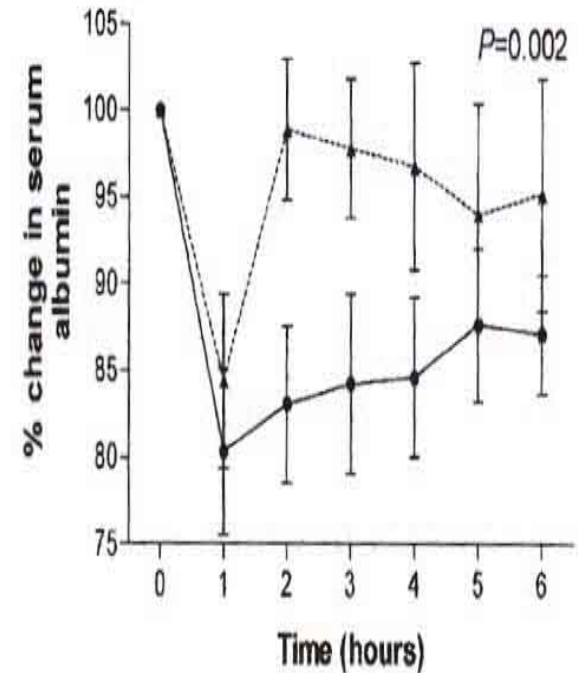
# Normal Saline



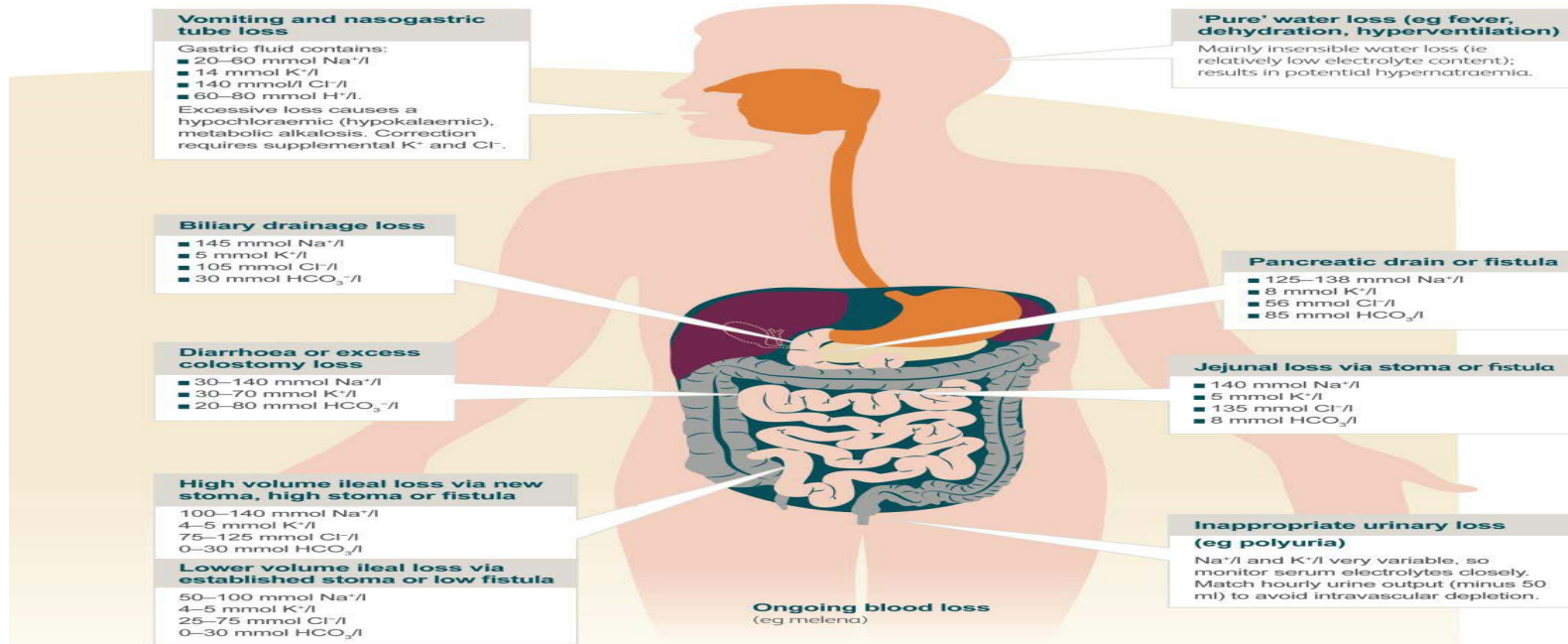


# Normal Saline

- 154mmol Na and Cl
- Oedema
- Bowel oedema
- hyperchloraemic acidosis
- Hypoalbuminaemia
- Terrible maintenance fluid
- But good replacement fluid?

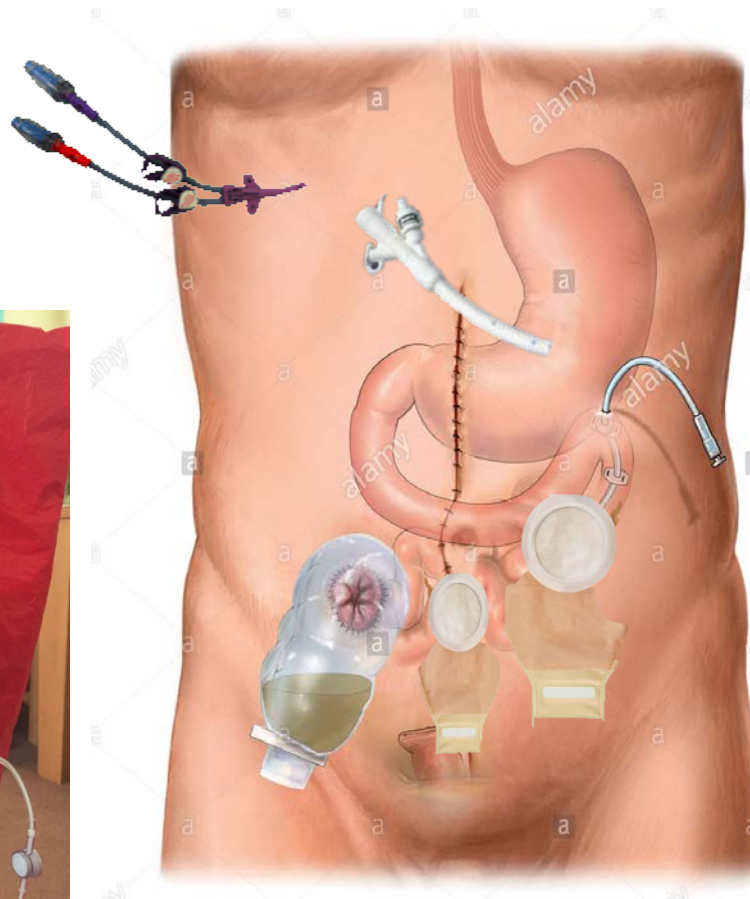
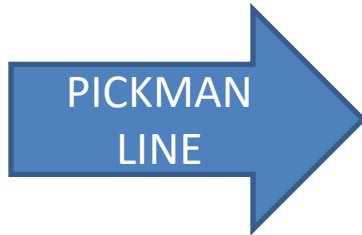


# NICE i.v. Fluid Therapy 2013



Normal saline should not go into Room 101

# Mia Small – Terminology



# Inappropriate Terminology

- Colostomy, Ileostomy or jejunostomy?
- TPN, PPN, IVN, PN,
- PIC, PICC ... Pick Line
- IVF, ECF, MRCP – different meanings
- ED admission to ICU
- Dietetic abbreviations COT, ICBINB, F'up
- Inappropriate terminology should not go into room 101



# Mike Stroud – 7 Day Myth



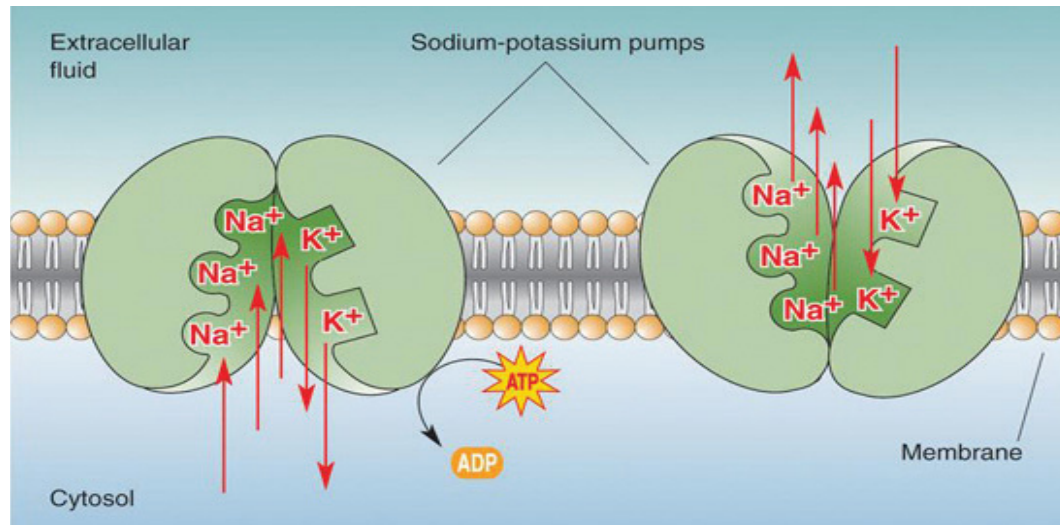
# 7 Day Myth

- What can we achieve in < 7days?
- Reverse starved state metabolism
- Replenish muscle glycogen
- Functional improvements
- Replenish intracellular electrolytes / micronutrients
- Restore cell membrane pumping



# Cell Membrane Pumps

- What percentage of REE is accounted for by cell membrane pumps?



- 37%
- 7 day myth should go into Room 101



# Anne - Food First Debate

Food vs. ONS  
has no place  
in everyday  
practice



# Oral nutritional support

Definition: The modification of food and fluid by: fortifying food with protein, carbohydrate and/or fat plus minerals and vitamins; the provision snacks **and/or** oral nutritional supplements as extra nutrition to regular meals, changing meal patterns or the provision of dietary advice to patients on how to increase overall nutrition intake by the above.

NICE CG32 (2006)

# Food vs ONS

- Artificial - derived from our pharma-based approach to research where RCTs are 'king'
- Is this what should happen in practice?
- RCTs do NOT reflect practice



# Amongst those with disease related malnutrition - Are they able to eat more?

- Poor appetite
- Loss of interest in food
- Inability to prepare food
- Restricted diet
- Reduced absorption
- Altered metabolism
- Poly-pharmacy
- Multiple medical conditions

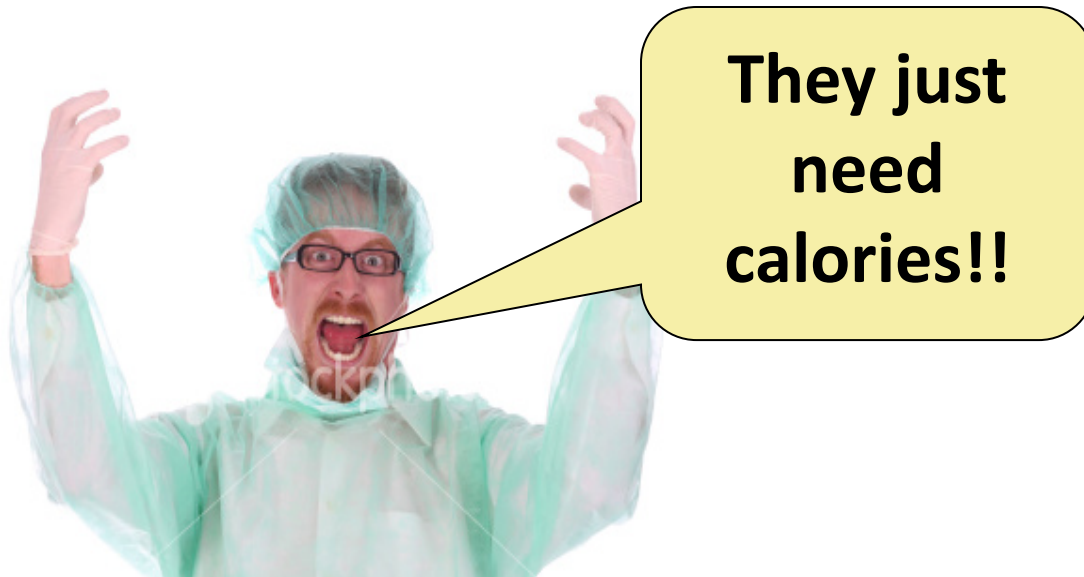


# Apply a dose of realism

- Deficit in those losing weight approx. 600 – 1000 Calories daily, 50% deficit of protein.
- What is the likely increase in oral intake diet alone?
- Is this sufficient to replete lost stores and prevent further weight loss?
- Evidence is weak for the effectiveness of dietary advice in managing illness-related malnutrition<sup>2</sup>  
However the importance of food and drink should not be overlooked and dietary advice may be required to deal with diet-related challenges

# Food First Debate

- NICE Grade A Evidence oral nutrition support
- RCTs of nutritionally balanced supplements
- Cost effective – NICE CG32
- Balanced nutrition most important



# Micronutrient Supplements?



## INGREDIENTS

Water, maltodextrin, hydrolysed corn starch, sucrose, milk protein isolate, canola oil, CASEINATES (calcium caseinate, sodium caseinate), corn oil, MINERALS (sodium citrate, potassium citrate, magnesium chloride, potassium chloride, magnesium phosphate dibasic, calcium phosphate tribasic, potassium phosphate dibasic, ferrous sulphate, zinc sulphate, manganese sulphate, cupric sulphate, sodium molybdate, potassium iodide, chromium chloride, sodium selenate), soy protein isolate, flavouring, soy lecithin, cellulose, VITAMINS (choline chloride, ascorbic acid, dl-alpha tocopheryl acetate, niacinamide, calcium pantothenate, pyridoxine hydrochloride, thiamin hydrochloride, riboflavin, vitamin A palmitate, beta carotene, folic acid, phyloquinone, biotin, vitamin D<sub>3</sub>, cyanocobalamin), sodium carboxymethyl cellulose, gellan gum.  
May contain: sodium chloride.

# ONS Name Mix Ups

- Esure drinks
- Fortisick
- Collagen
- Polycell



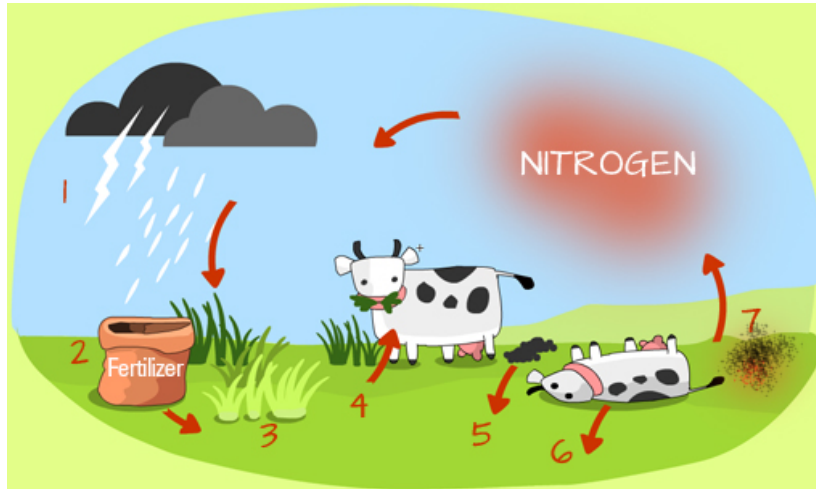
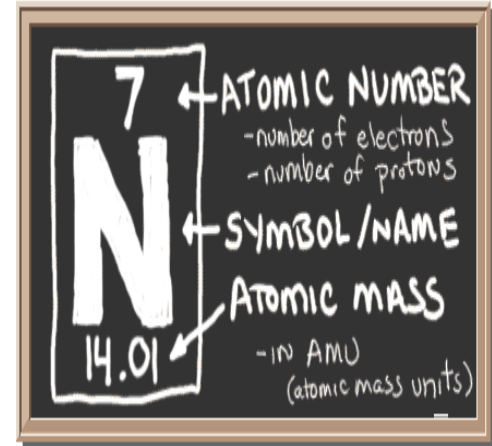
It's those  
Fartijuce  
drinks!



## Food First

- Food is important for pleasure
- May not be able to take enough
- Unlikely to use just food or just ONS
- Extreme views on food first not justified
- Balanced ONS convenient first line treatment in high risk patients
- BUT balanced nutrition is the most important factor... if we remember that food first debate should go into Room 101

# Richard Smith



Room  
101

# NITROGEN?

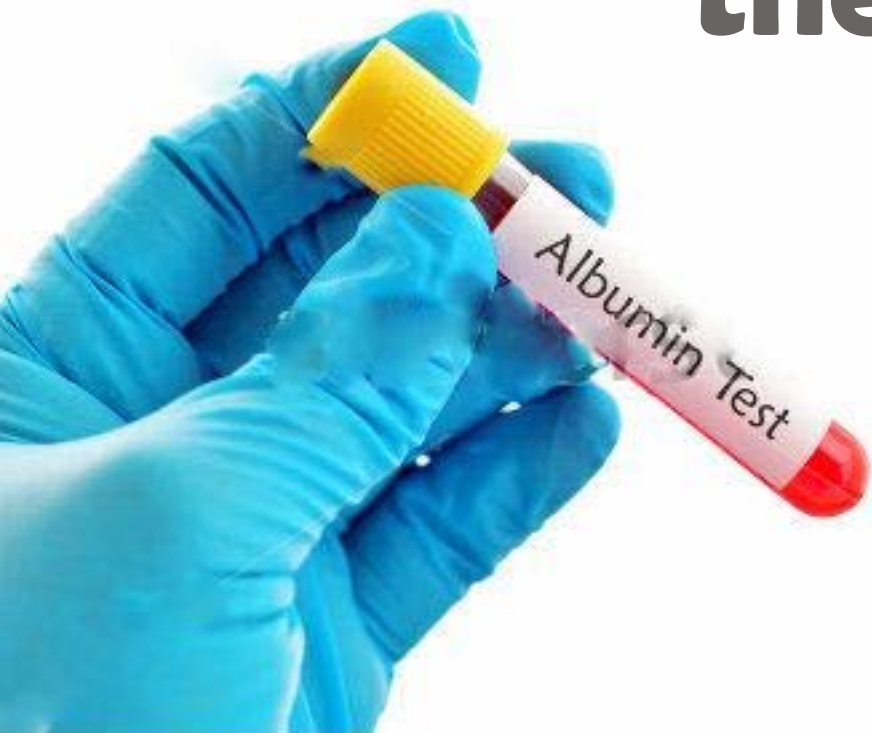


- If we can't say nitrogen what do we say?
- Amino acids?
- Nitrogen sounds more scientific than protein
- Calculations
- Nitrogen balance
- Non-nitrogen calories flawed
- 6.25 should not go into room 101



# Albumin

**A good test in  
the right hands**





In these hands?

This patient needs  
nutrition as the  
albumin is low ...





# Options

Stop albumin  
from being  
measured

Educate  
surgeons  
(possible?)

Hide the  
result from  
the surgeons

# Albumin as a nutritional marker

- Negative acute phase protein
- Drops after surgery
- Albumin level dependent on
  - Rate of synthesis
  - Rate of degradation
  - Rate of capillary leakage
- Pure starvation...



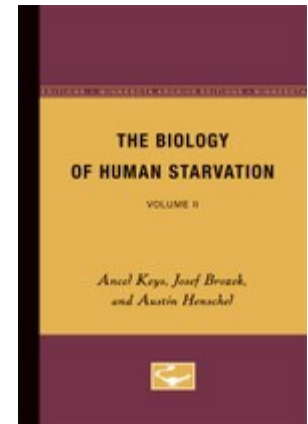
# Starvation



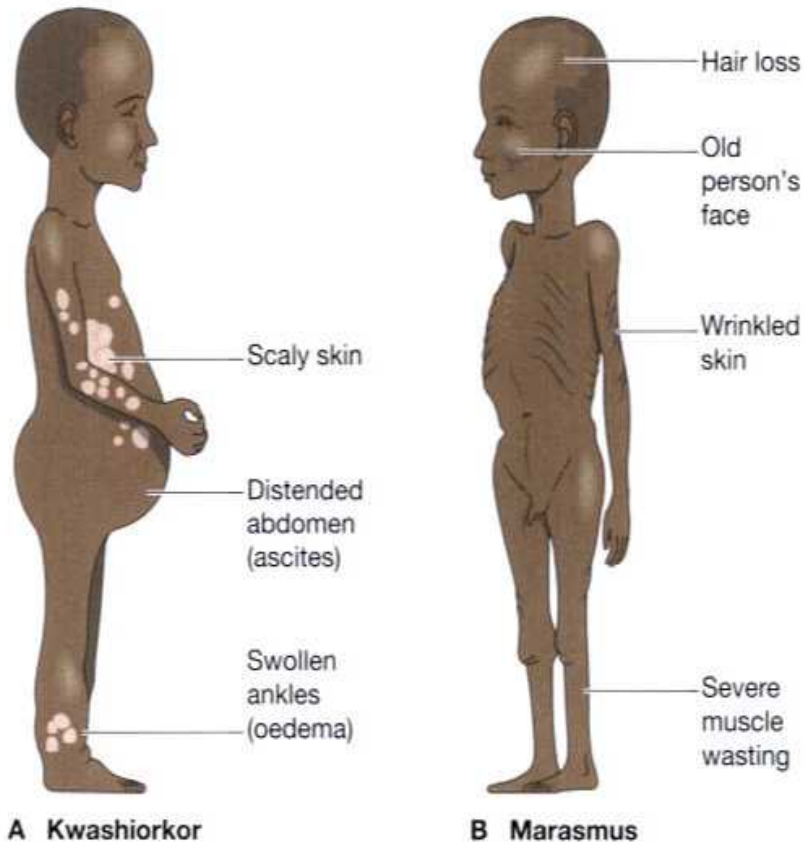
FIGURE 2 *Life* magazine photograph of conscientious objectors during starvation experiment. July 30, 1945. Volume 19, Number 5, p. 43. Credit: Wallace Kirkland/Time Life Pictures/Getty Images.



FIGURE 8.6. Minnesota volunteers after weight loss. Photo by Wallace Kirkland. Copyright 1950 by Life-Time-Warner.



# Kwashiorkor Myth

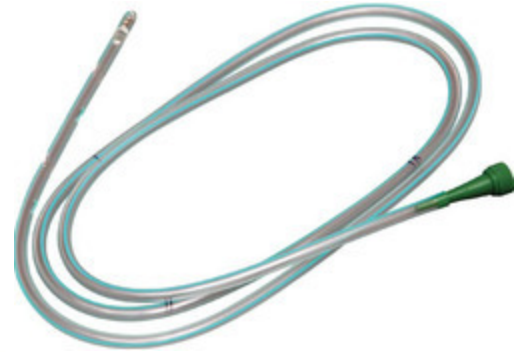




# Kwashiorkor Myth

- Kwashiorkor – protein malnutrition
- Marasmus – energy malnutrition
- Weaning onto maize diet Williams Lancet 1935
- Diet the same in both conditions Gopalan
- Low protein diet effective treatment (Jackson)
- Plasma oncotic pressure not low (Keys, Jackson)
- Oedema resolves before albumin rises (Jackson)
- Protein starvation in animals does not cause oedema
- Decompensate in kwashiorkor – sepsis? Free radicals?
- Don't use HAS to treat oedema?
- Albumin should definitely go into Room 101

# Mia Small – Ryles Tubes





## Ryles Tubes

- PVC
- Breaks down after 7 days
- Manufacturers recommend  $< 7$  days
- Strictures
- 12Fr polyurethane tube has same internal lumen as 16Fr Ryles tube
- Ryles tubes should go into Room 101



# Mike - High Protein High Energy Feeding in the Stressed Patient



**This patient  
needs more  
calories and  
protein!**





# Hyperalimentionation



22 November 1975

SA MEDIESE TYDSKRIF

2093

## Total Parenteral Nutrition

A REVIEW

J. A. HUNT, N. M. GOODWIN

TABLE I. DAILY ADULT CALORIC REQUIREMENTS

Degree of stress	kcal/24 h
Bedrest only (fit person)	1 700
Sedentary or white-collar worker	2 500
Operations, e.g. cholecystectomy, herniorrhaphy	3 000 for days/weeks
Severe infection, e.g. peritonitis, pneumonia	4 000+ for weeks
Burns over 50% of body surface	7 000+ for weeks/months

# Hyperalimentation



## Suger High Regimen

Amigen 800	3 litres	2 400
Intralipid 10%	1 litre	1 100
Balfec	1 litre	700
		<hr/>
		4 200 kcal in 5 litres

Note the fluid volume and the fact that the patient receives the equivalent of one litre of 12,2% alcohol, i.e. a litre of wine or one-third of a litre of brandy per day.

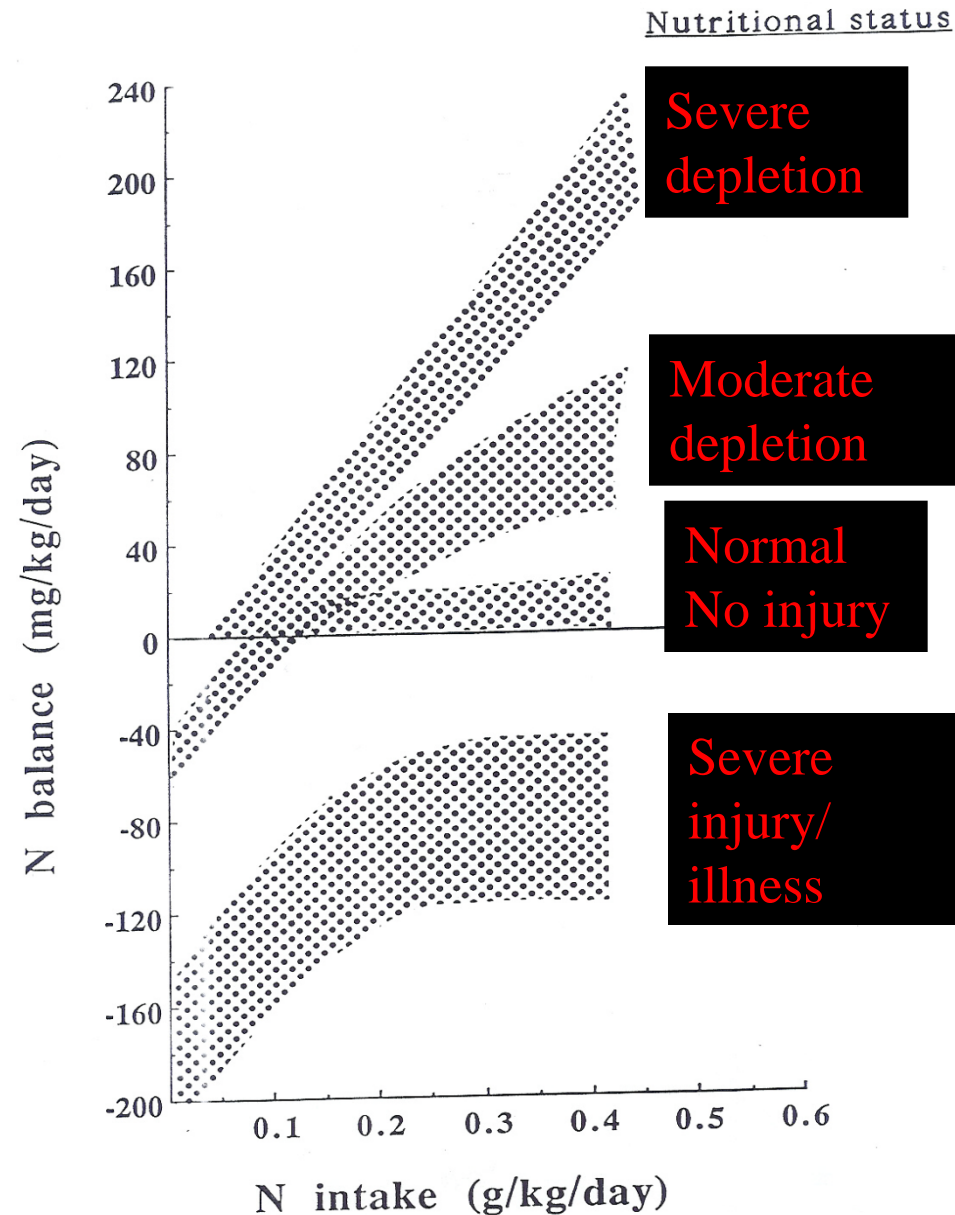


# Over feeding

- Hyperglycaemia
- Hyperlipidaemia
- TPN – proinflammatory lipids
- Steatosis
- Increased renal solute load (catabolism + feed)
- Uraemia
- Increased oxygen consumption
- Increased CO<sub>2</sub> production
- Inhibit autophagy
- Weight gain only as adipose tissue not lean mass

# Nitrogen Requirements

The influence of nitrogen intake on nitrogen balance



# Is there any evidence?

- What's the evidence for the start low and build up approach?
- No direct evidence but the hypothesis is supported by 3 recent large ICU trials
- EPANIC
- CALORIES
- Heidegger et al
- Negative stress factors needed!
- High protein / energy feeding in the metabolically stressed should go into Room 101

# Anne - The Light Diet





# Light / Sloppy Diet





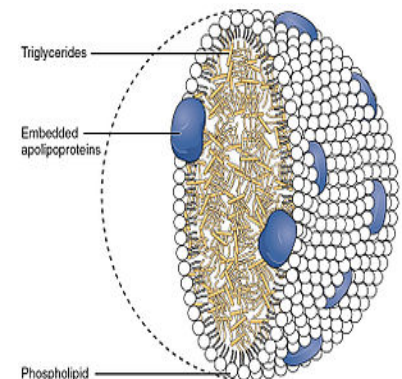
# The Light Diet

- Poorly defined
- Low fat & bland
- In hospital soup and ice cream
- Soup nutrition myth
- Delays gastric emptying and ↑satiety (Clegg Eur J Nut 2013)
- 100 – 150mmol/l sodium
- ERAS ad libitum food intake
- Decreased ileus and anastomotic breakdown
- Light diet should go into Room 101



# Phosphate in PN Lipids

- 1678 English naturalist William Courten injected olive oil into dogs – they died
- Chylomicrons
- Egg phospholipid as emulsifier
- Gives 7.5mmol phosphate
- Less than low phosphate diet - 10mmol/day
- High phosphate hypoparathyroidism or prolonged immobility
- 7.5mmol probably not significant
- But should go into Room 101



# Simon - Certain Type of Surgeon

- <https://www.youtube.com/watch?v=oVWjAeAa52o>



ROOM  
101



Mia Small



Aseptic Non Touch Technique

# Richard – Lager Drinkers

