

Is your patient fed up?



.....complications of nutritional support



WENDY MOORE

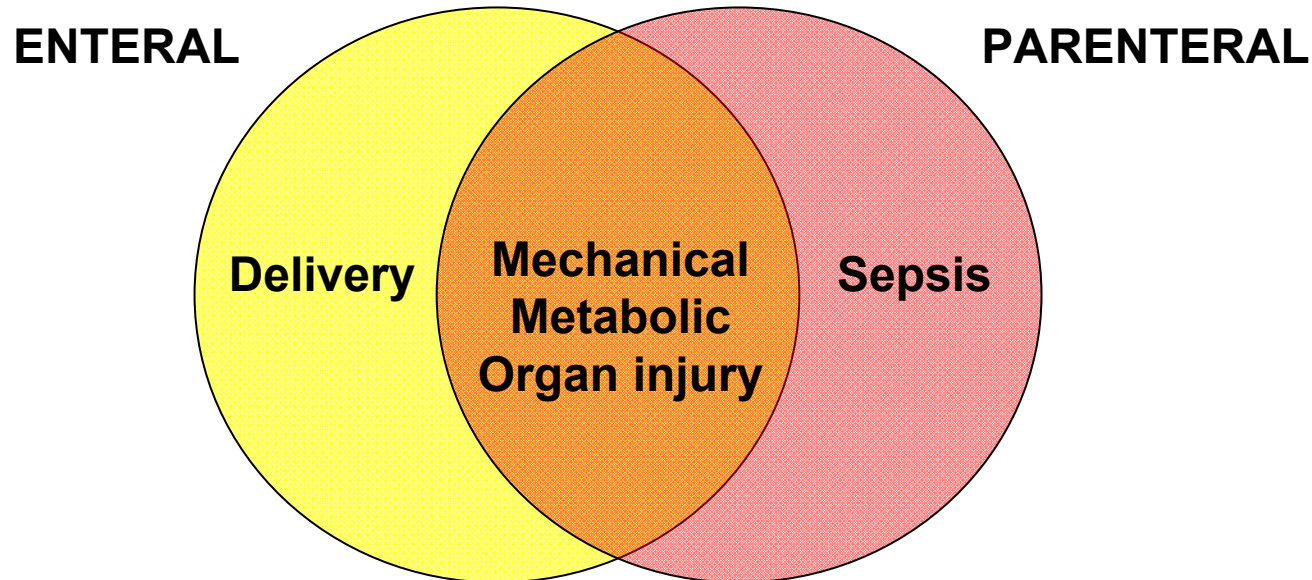
“ Inflammation is not in itself considered to be a disease but a salutary operationwhen it cannot accomplish that salutary purpose it does mischief ”

John Hunter 1794

*The
Knife Man*

The Extraordinary Life and Times of
John Hunter, Father of Modern Surgery

Complications of Nutritional Support

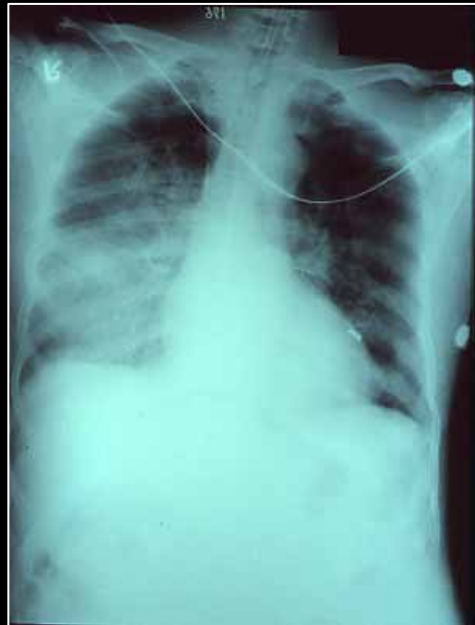


Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient. SCCM and ASPEN J Parenteral and Enteral Nutrition 2009;33:277-316

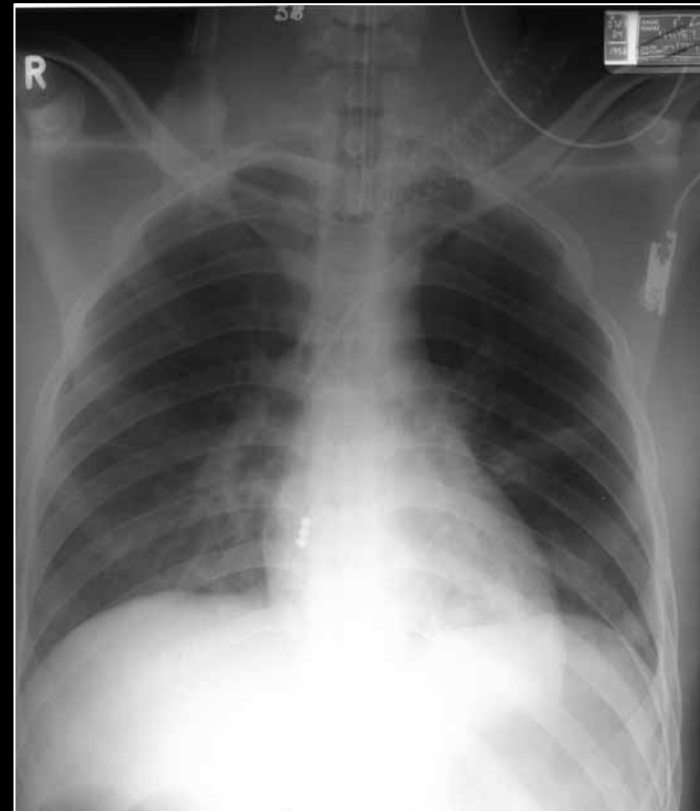
Complications of parenteral nutrition. Gastroenterol Clin N Am 2007;36:23-46

Preventing complications of central venous catheters. N Engl J Med 2003;348:1123-33

Bronchial lavage.....who needs a scope?



Nasogastric intubation...close but no cigar



Confirming Nasogastric Tube Position

Non-radiological

- ➔ coughing or gagging on insertion
- ➔ depth at nostril
- ➔ volume and colour of aspirate
- ➔ acidity of aspirate
 - Litmus paper
 - pH estimate
- ➔ colorimetric CO₂ assay
- ➔ “whoosh” test

Radiological



Central venous catheter complications.....



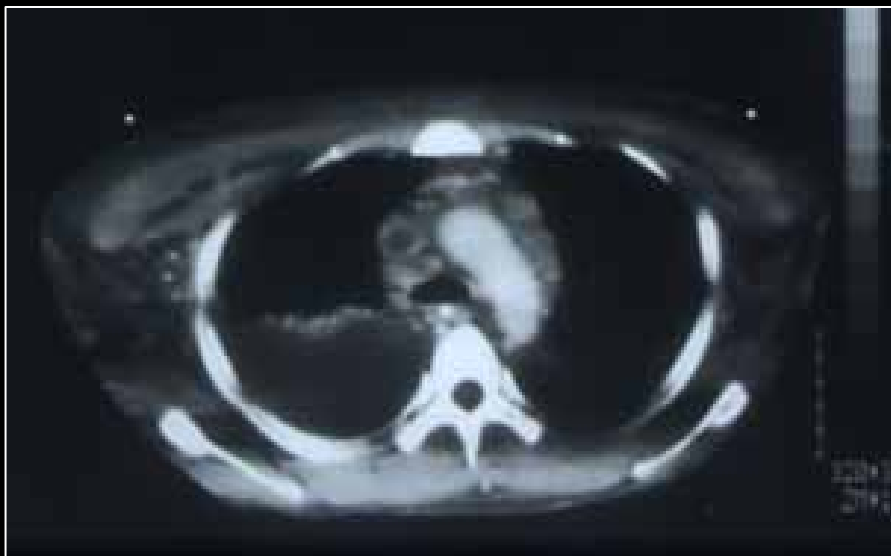
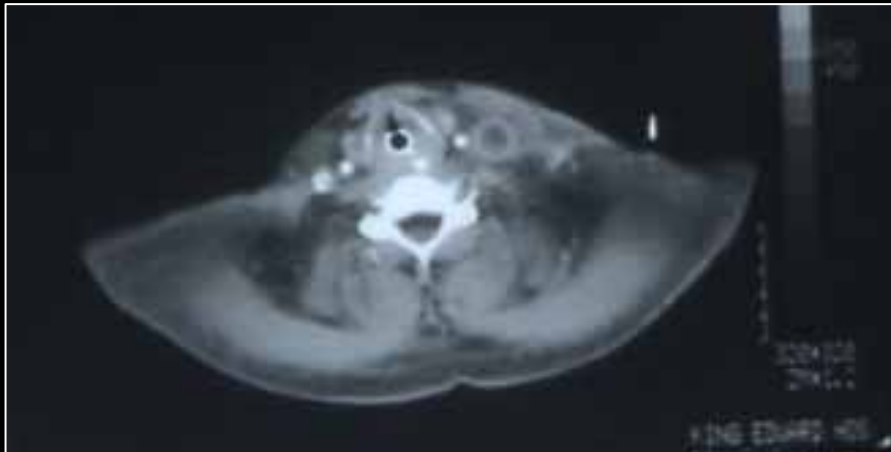
Central venous catheters ...the mark of Zorro



CVC Pneumothorax....effect of CPPV



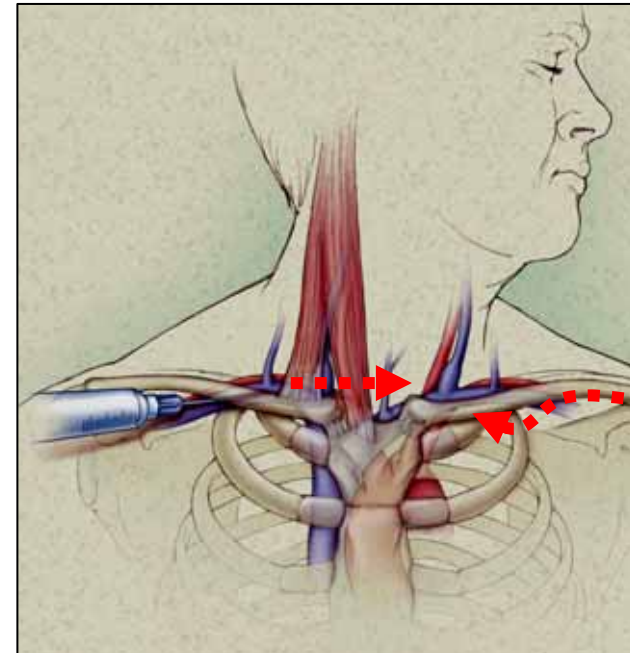
CVC Related Thrombosis



Complications of CVC Insertion

| | Subclavian | Int Jugular | Femoral |
|------------|------------|-------------|---------|
| Mechanical | +++ | + | ++ |
| Septic | + | ++ | +++ |
| Thrombotic | ++ | + | +++ |

McGee D, Gould MK. Preventing complications of central Venous catheters. N Engl J Med 2003;348:1123-1133

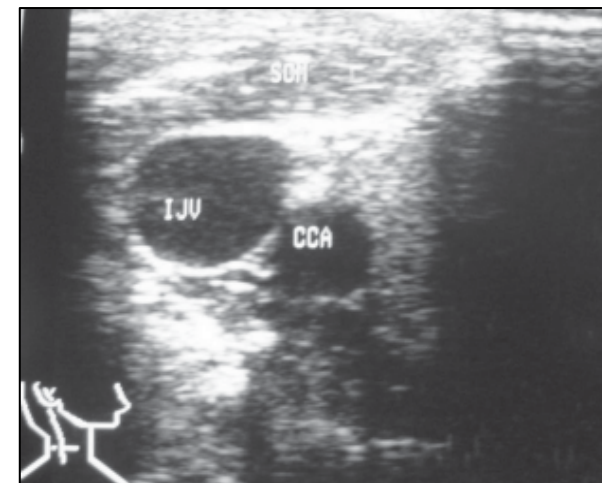
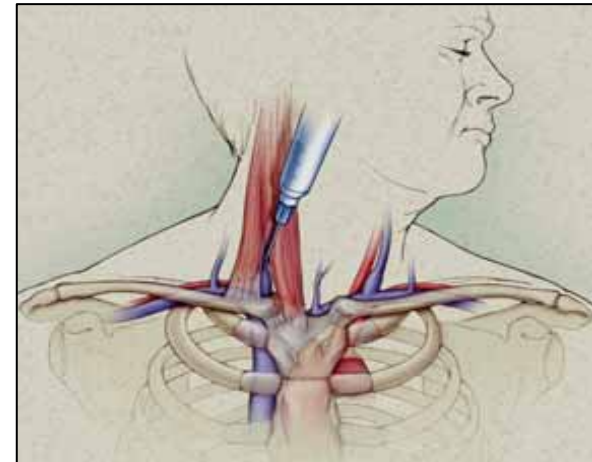


Anatomical Landmarks versus Ultrasound

| | US | AL |
|-------------------|--------------|---------------|
| Mallory 1990 | 0/12 | 6/17 |
| Trolanos 1991 | 0/77 | 3/83 |
| Soyer 1993 | 0/24 | 5/23 |
| Teichgraeber 1997 | 2/50 | 26/50 |
| Slama 1997 | 0/37 | 10/42 |
| Nadig 1998 | 0/36 | 13/37 |
| Sulek 2000 | 3/60 | 5/60 |
| TOTAL | 5/296 | 68/312 |

Hind DH. BMJ 2003;327:361

*Short and long axis US needed
Blaivas M Crit Care Med 2009;37:2345-9*



Metabolic complications of Enteral feeding

Underfeeding

Delay in instituting feeds:

- abdominal surgery
- absent bowel sounds or flatus
- presence of gut anastomosis

Underestimating total needs

Failure to adjust rate or volume

Interruption of feeds:

- diarrhoea
- diagnostic / therapeutic procedures
- residual volume estimates
- vomiting / regurgitation

Overfeeding

- increased gastric residuals
- bloating : cramping : diarrhoea
- ↑ BMR : ↑ Cardiac demand
- weight gain but fat deposition
- ↑ glycaemia ↑ lipids

Re-feeding syndrome

Malnourished patients

- gradual loss of muscle mass
- loss of functional organ tissue
- ↓ stores of biologic catalysts
- ↓ vitamins : PO_4 : Mg : Zn

- excess insulin release
- ↓ K : PO_4 : Mg by intracellular shift
- weakness : convulsions : death

Complications of Enteral Feeding

Diarrhoea

Definition:

- Stool weight > 250 – 300 grams
- Watery consistency
- More than 3 stools per day

Aetiology:

➤ Osmotic

Loss of “colonic salvage” of malabsorbed food due to antibiotics
↓ flora that convert carbohydrates and amino acids → gas and SCFA
feeds may be isotonic but patient is not

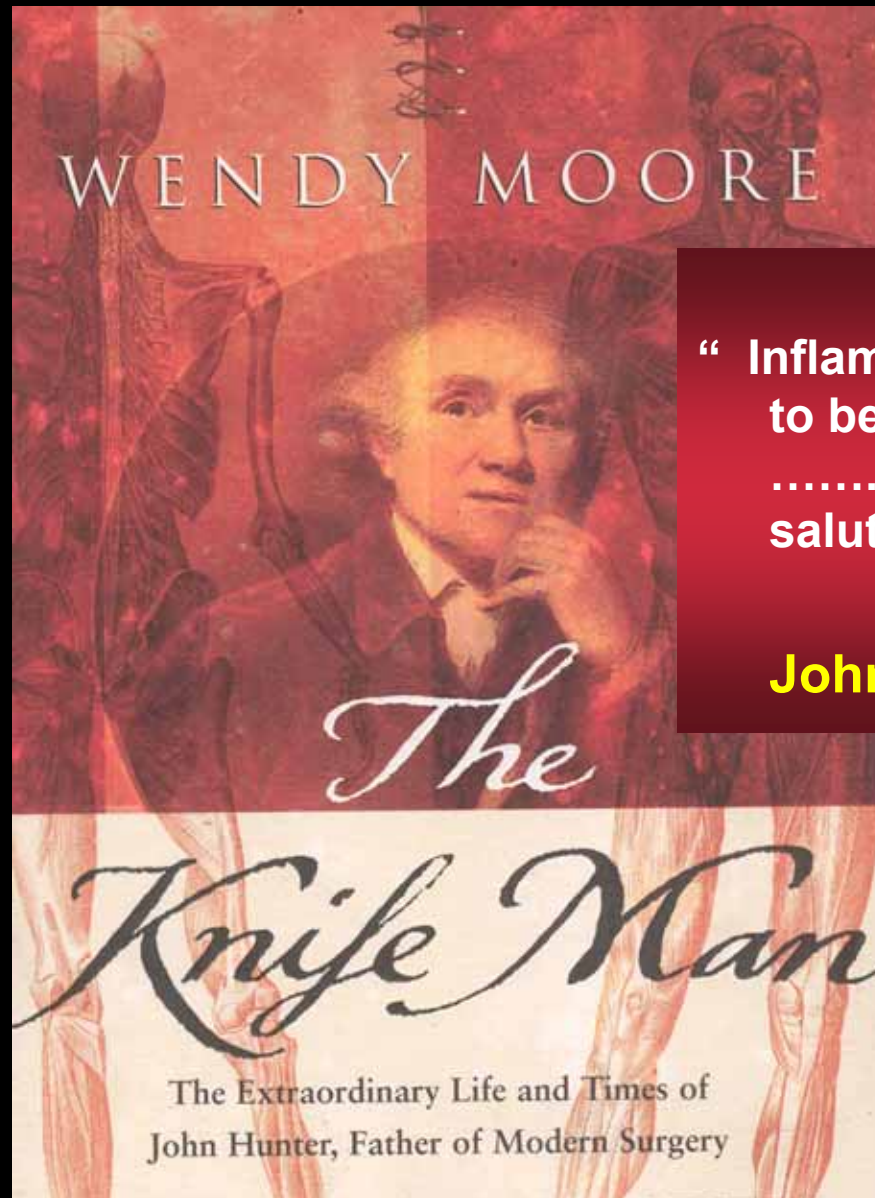
➤ Secretory

gut irritation and ↑ secretion by erythromycin and clindamycin

➤ Infective

Clostridium difficile
number : type : duration of antimicrobial use

Management?



“ Inflammation is not in itself considered to be a disease but a salutary operationwhen it cannot accomplish that salutary purpose it does mischief ”

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Immunomodulatory feeds?

Glutamine

Arginine

ω -6 fatty acids \rightarrow ω -3 fatty acids

Metabolic Complications of Nutritional Support

Hyperglycaemia

- Uncontrolled hyperglycaemia → increased mortality
- Commonest cause is excessive dextrose infusion
- Excess → hyperlipidaemia and hepatic steatosis

Hypoglycaemia

- Sudden interruption of nutritional support
- Occurs 15 – 60 minutes due to ↑ endogenous insulin levels

Hyperlipidaemia

- Excess administration or impaired clearance (obesity : diabetes : sepsis : liver disease)
- Lipid infusion should not exceed 0.12g/kg/hour
- Caution when using propofol infusion (1.1kcal/ml)

Hypercapnia

- Overfeeding of total calories especially carbohydrate

Organ Damage During Nutritional Support

Intestinal atrophy

- Occurs in absence of enteral feeding
- ↓ luminal nutrients (glutamine) : impaired hormonal response
- ↑ mucosal permeability → bacterial translocation → GALT upregulation

Hepato-biliary disease

- Abnormal LFT's in 20 – 90% of patients on PN
- Hepatic steatosis with overfeeding or essential FA deficiency
- Acalculous cholecystitis

Bone disease

- Commoner with prolonged PN (40 – 100% of patients)
- May result in bone pain or osteoporotic fracture
- Serum calcium, phosphate, vitamin D, PTH may all be normal
- Hypercalciuria common association

Acknowledgements

I am indebted to all the registrars with whom I have worked over the years without whose help such a graphic presentation would not have been possible.