Stronger Together

London North West Healthcare NHS Trust

Managing abnormal LFTs

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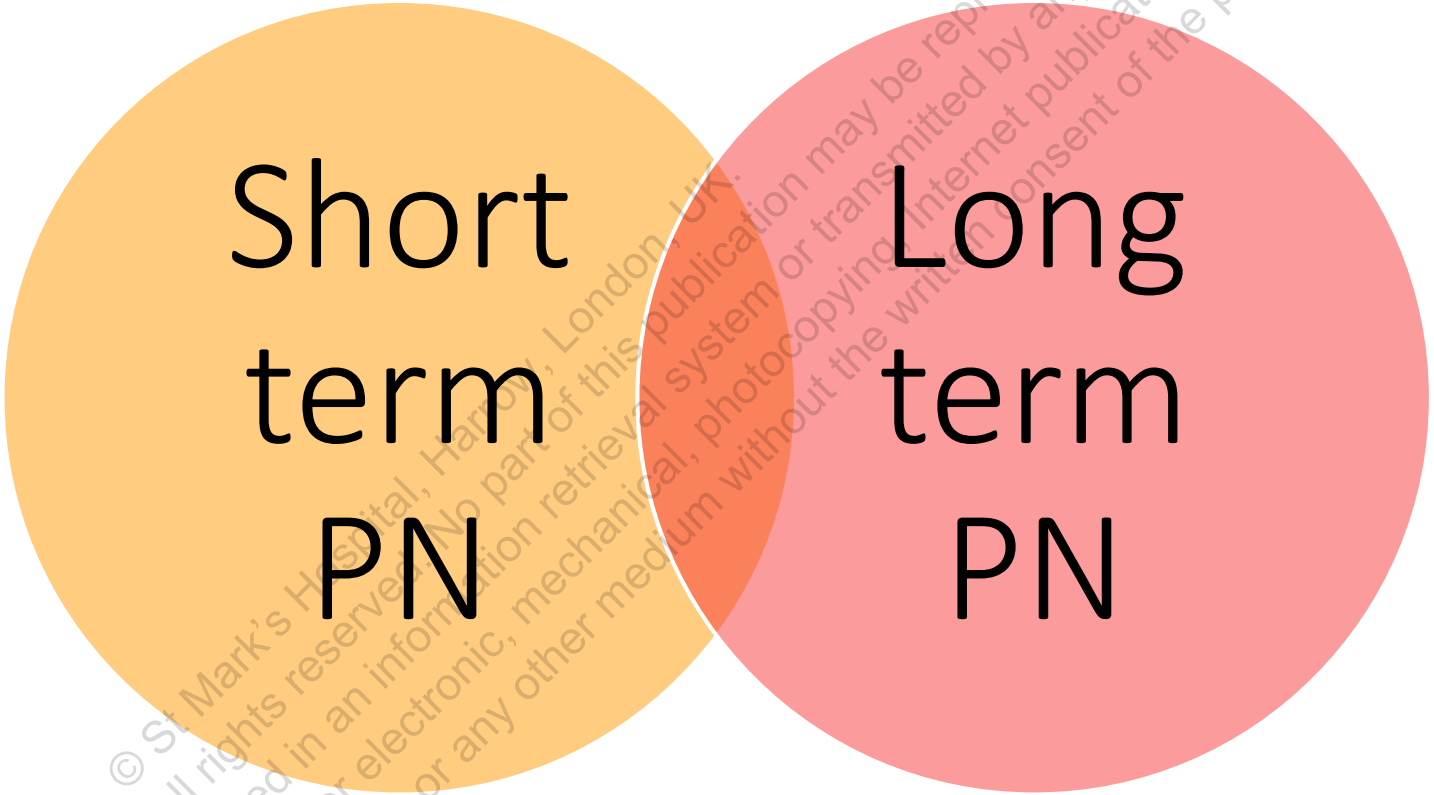
It depends …



Questions

How common are abnormal LFTs in patients on IVN?

Is it the parenteral nutrition?

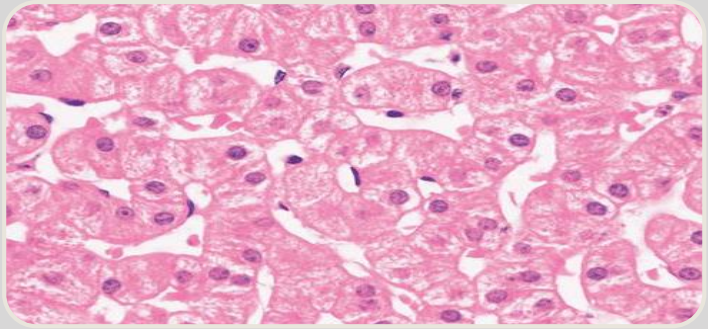
Short term PN

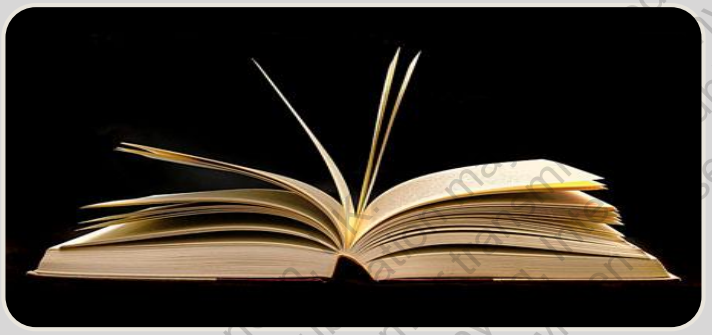
Abnormal LFTs

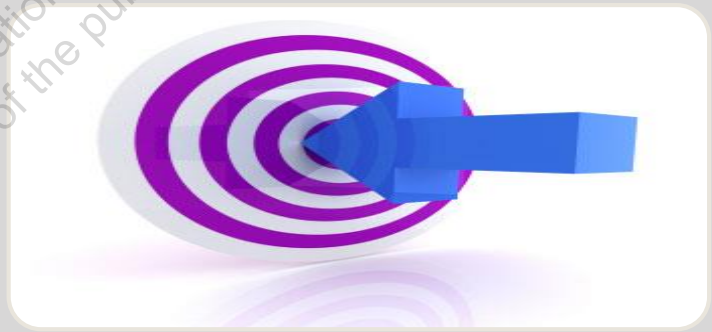
Author	Study	% Elevated		
		AST	Alk Phos	Bil
Lindor et al. 1979	2 weeks PN (high glucose & no lipid)	68%	54%	21%
Clarke et al. 1991	4 weeks PN (more balanced PN)	27%	32%	31%

Short term PN

Is it the parenteral nutrition?







Liver biopsies

- 93 patients on TPN
- 35 matched controls

Assessment

- 19 histological grades
- 27 clinical variables

Results: abnormal hepatic histology correlated with

- Pre-existing liver disease
- Abdominal sepsis
- Renal failure
- Blood transfusion

Histology DID NOT correlate with TPN administration

3;123:1084-1090

Short term PN

Abnormal LFTs & short term PN

- 58 patients receiving PN (M:F 36:22)
- 48 (83%) fistula, obstruction, ileus, failed EN

Abnormal LFTs before PN started (34% patients)

- 60% LFTs worsened on PN
- 30% LFTs resolved on PN

Abnormal LFTs while on PN (9% patients)

- 46% sepsis
- 24% underlying liver disease

Baker & Nightingale, Clin Nutr 2004;23:864

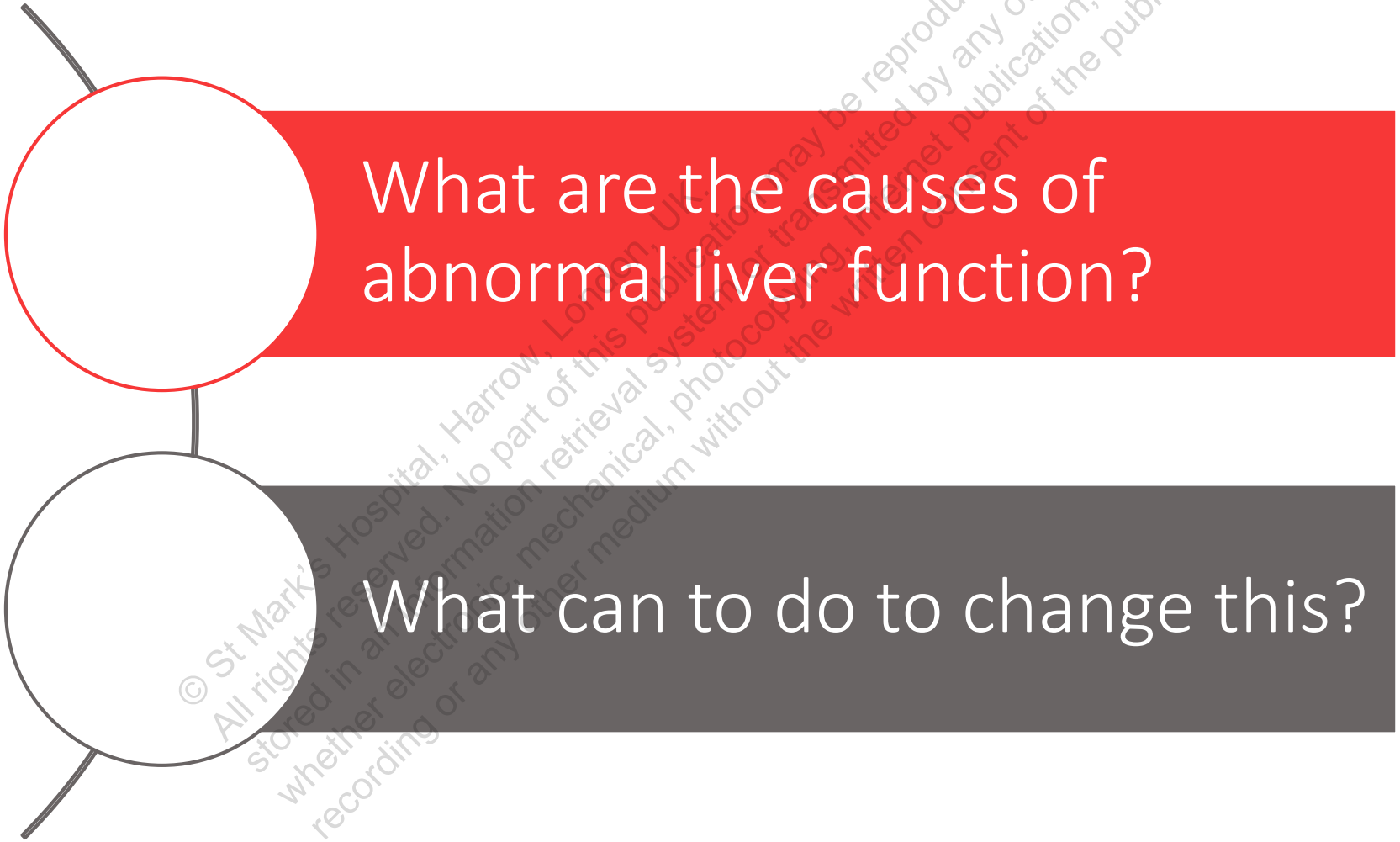
Long term PN

Abnormal LFTs & long term PN

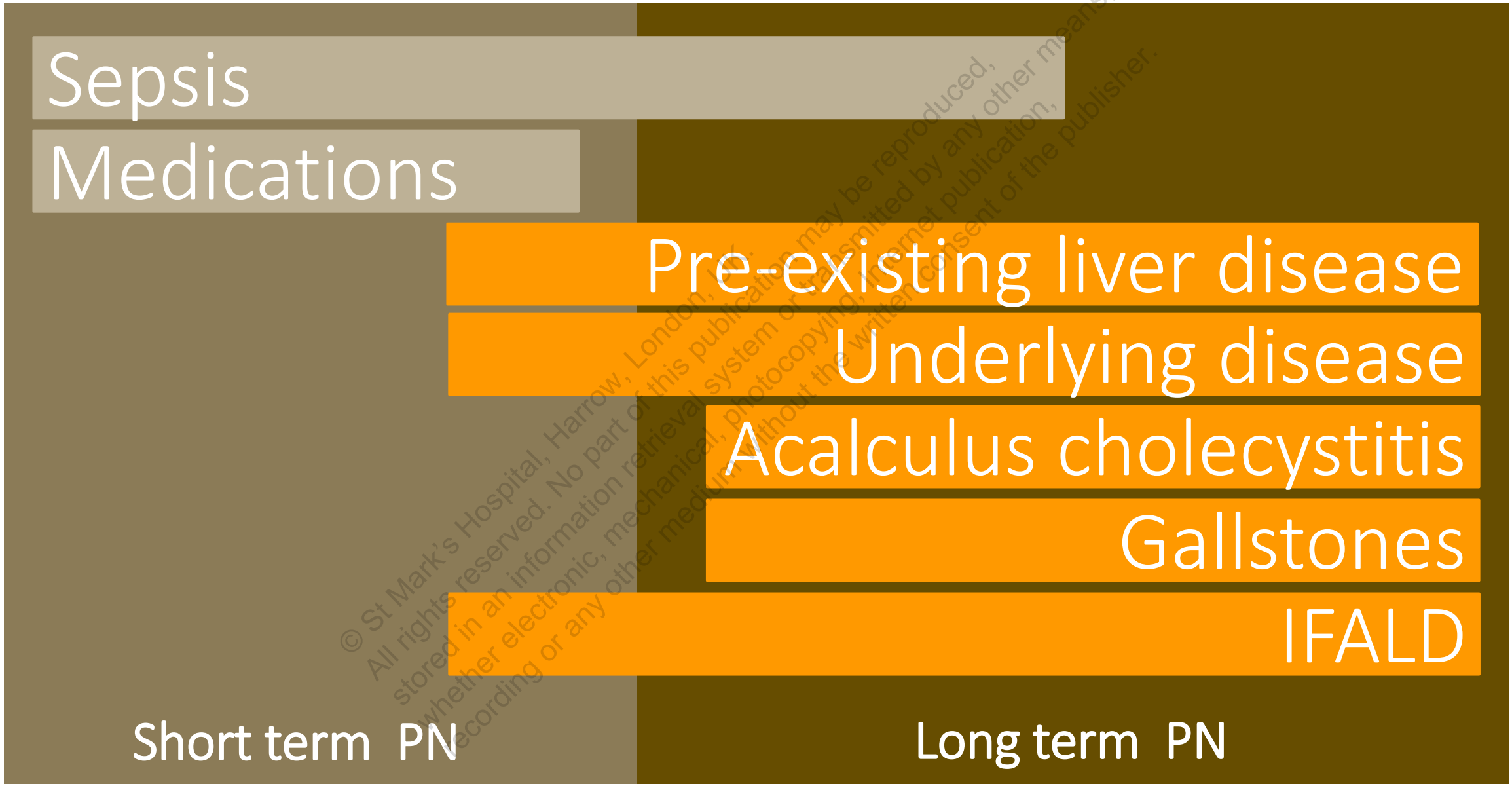
Author	No. HPN patients	Abn LFTs	Severe liver disease
Luman et al, 2002	107	48%	0%
Salvino et al, 2006	162	95%	4%
Lloyd et al, 2008	113	24% CC	
Cavicci et al, 2000	90	65% CC	26% at 2 years 50% at 5 years
Chan et al, 1999	42		14%
Ito & Shills, 1991	16		19%

CC = chronic cholestasis

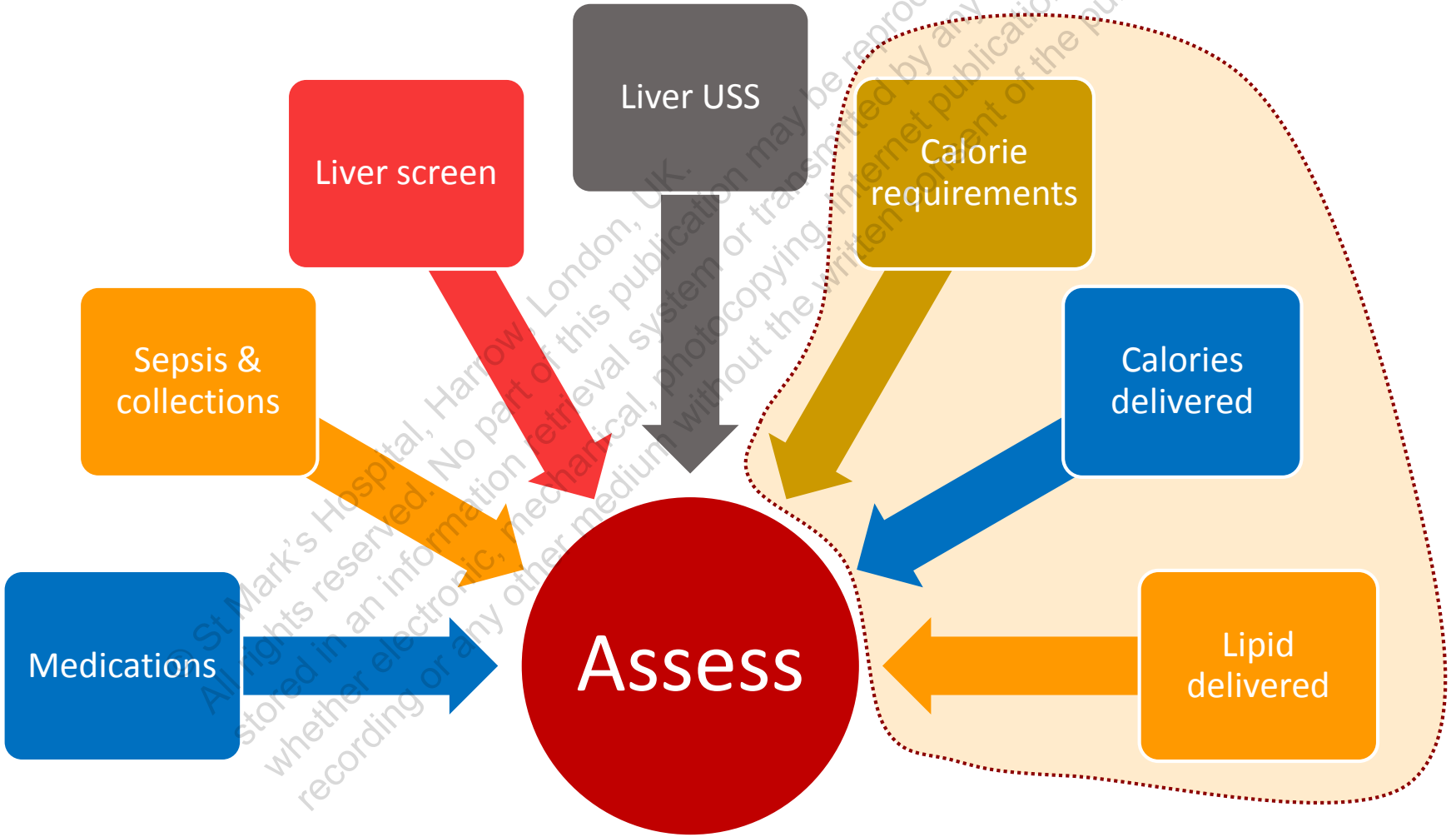
Questions



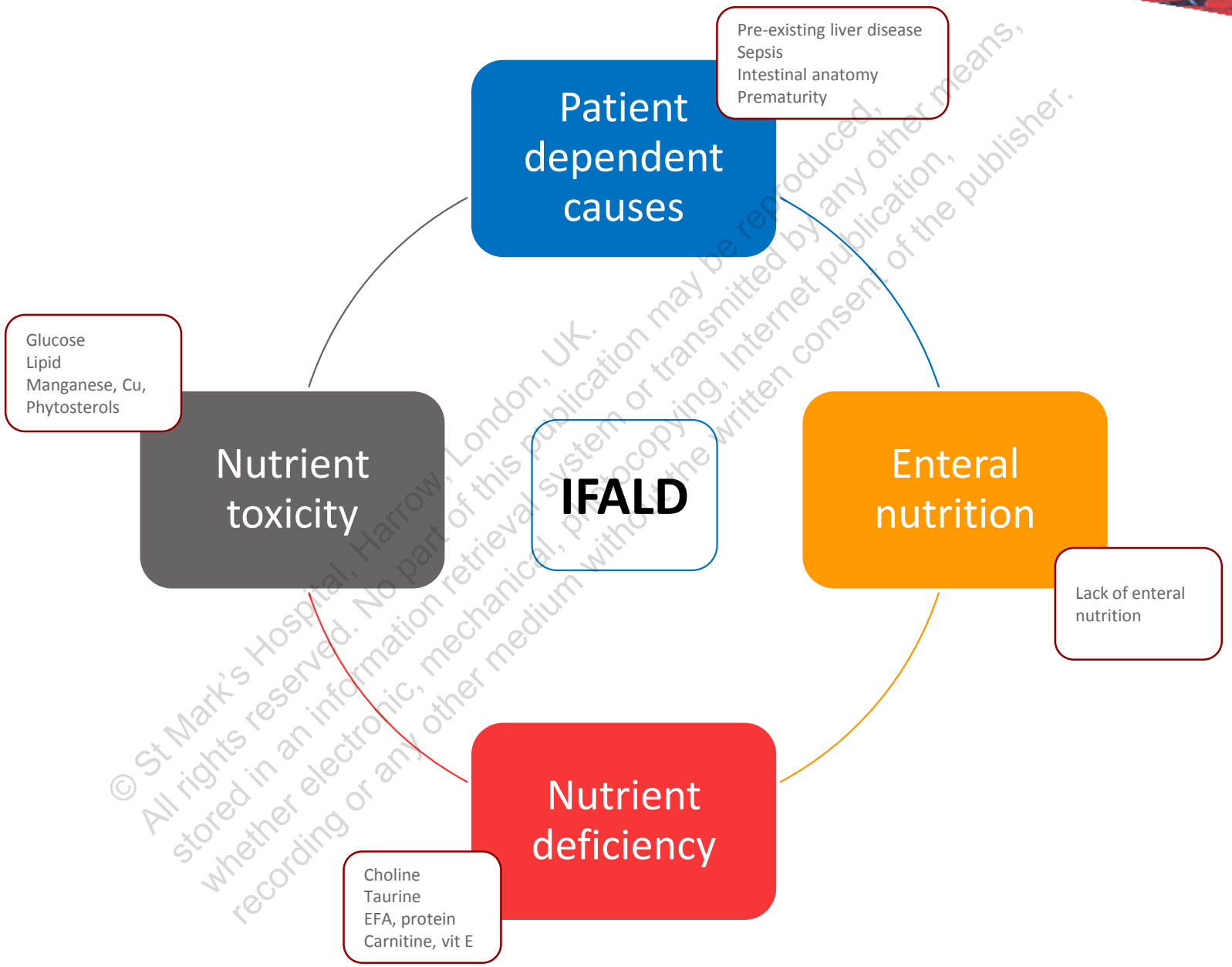
Abnormal LFTs on parenteral nutrition support



What do I do?

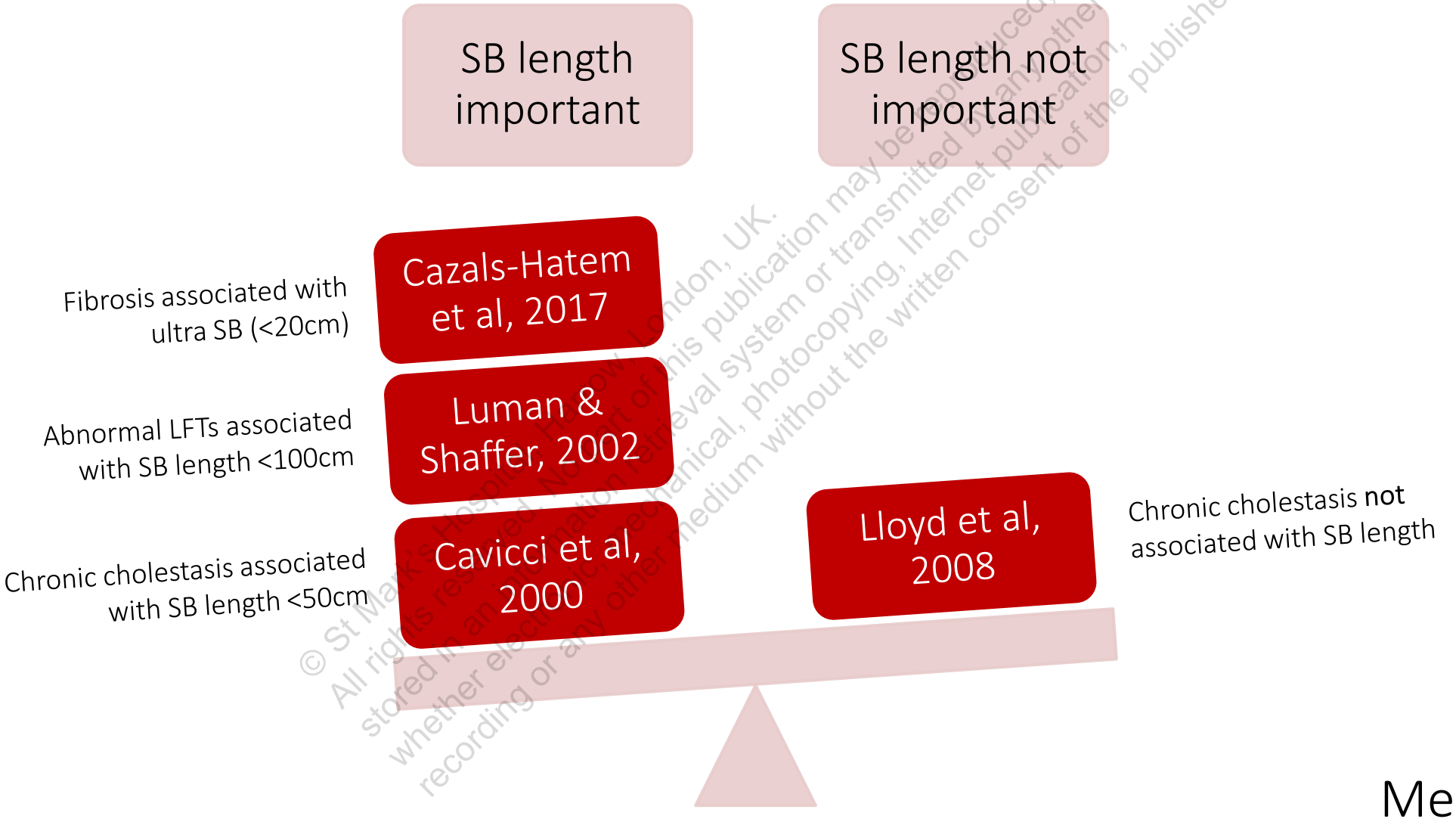


Long term PN



Long term PN

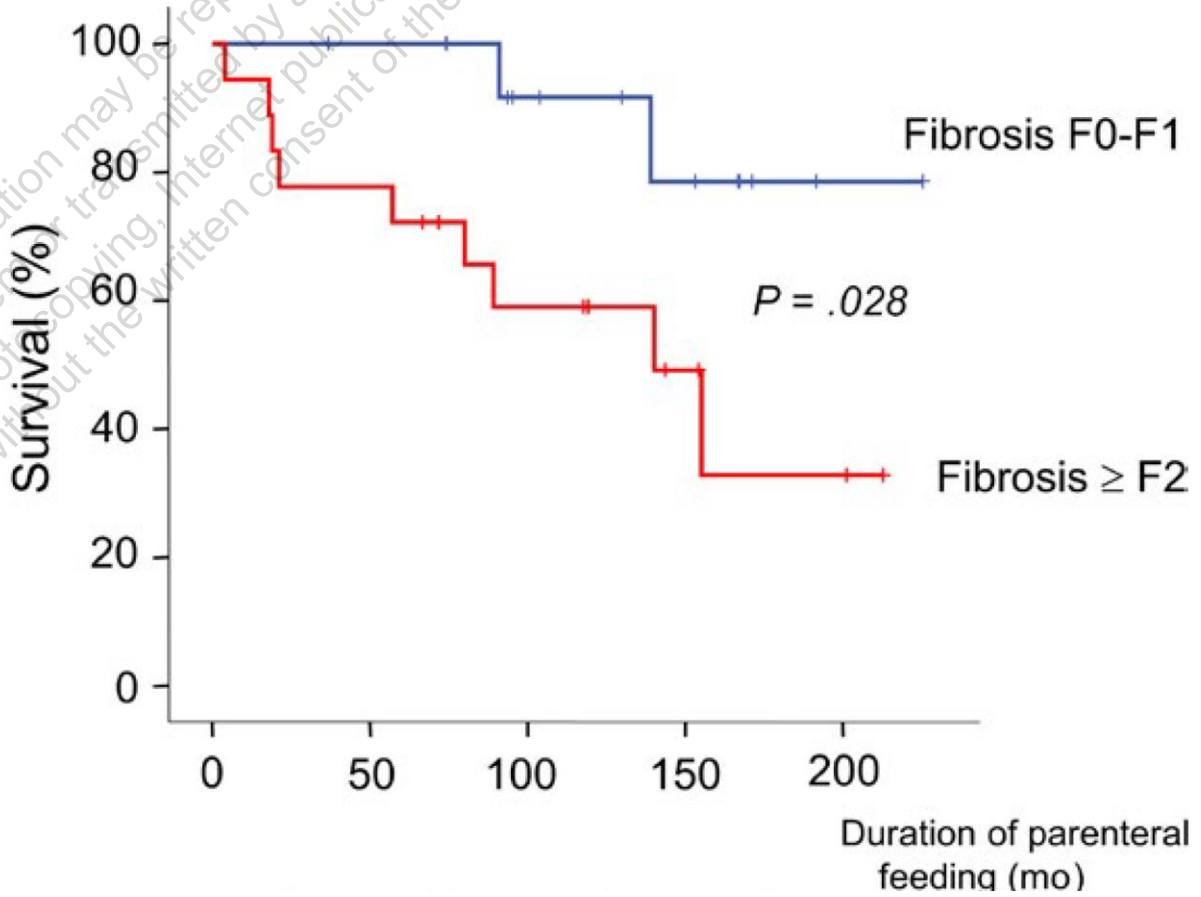
Intestinal anatomy



Mechanism?

Ultra-short bowel, alcohol & liver fibrosis

- 32 patients had a liver biopsy 55 months (9-201) after starting PN
  - 81% had a short bowel (gut < 200 cm)
  - 37% had an ultra-short bowel (gut < 20 cm)
- Liver fibrosis associated with
  - Ultra-short bowel (risk ratio 12.4)
  - Alcohol consumption (risk ratio 7.4)



Cazals-Hatem et al, Liver International 2017;1–9

What is evil …..

More parenteral lipid?

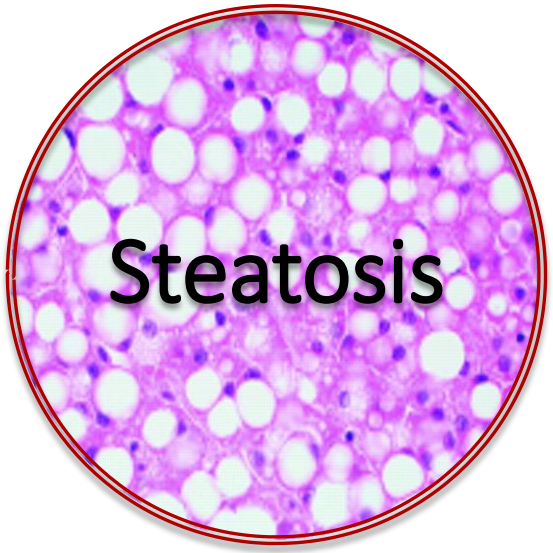
More parenteral calories?

Short term PN

Long term PN

Parenteral glucose

Glucose + Fast or excessive infusion = Steatosis



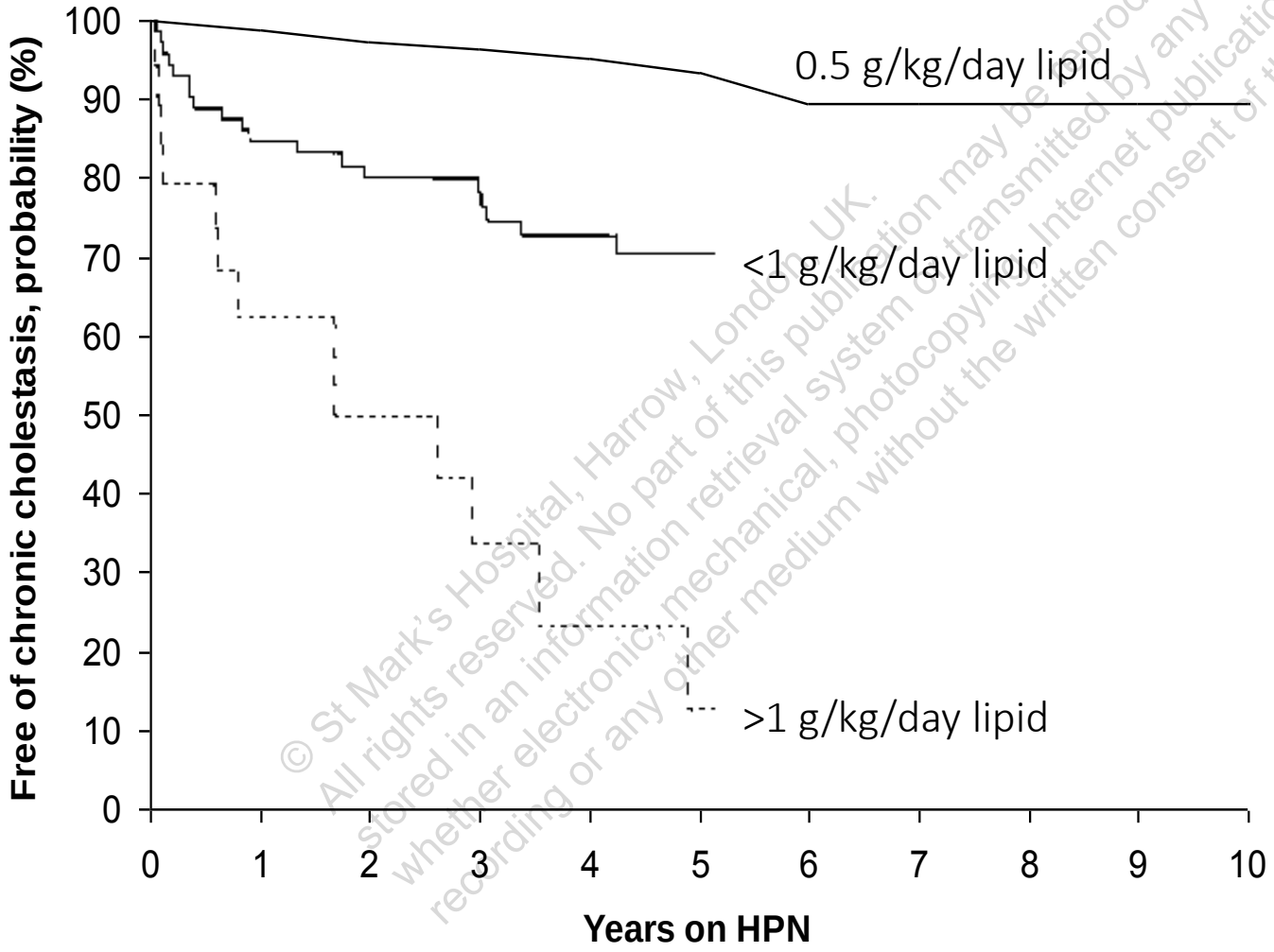
Lindor *et al*, 1979

Large amount of energy supplied as glucose (>GOR)

Associated with steatosis

Long term PN

Soybean oil



Vega *et al.*
Clin Nutr 2004
23:865-6

Cavicchi M et al. Ann Intern Med 2000;132: 525-32

Long term PN

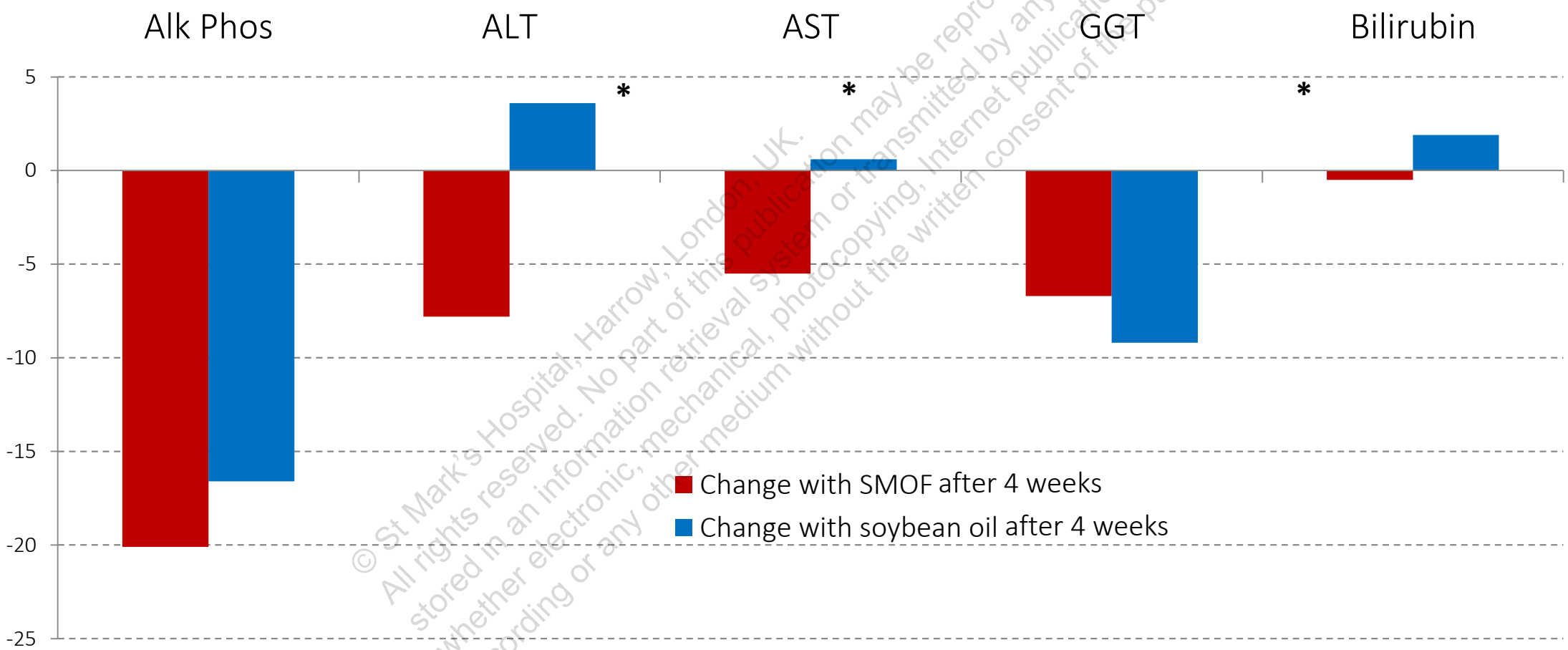
Parenteral lipid emulsions

Generation	Description	Lipid types	Brands
1st	Conventional lipid	LCT (soybean oil) LCT (soy/safflower oil)	Intralipid
2nd	Lipid emulsions with reduced PUFA	Structured lipids (MCT/LCT) Olive oil based emulsion	Structolipid Clinoleic
3rd	Lipid emulsions with reduced PUFA & specific ω6/ω3 FA ratio	Fish oil Soy/MCT/olive oil/fish oil	Omegaven SMOF

Short term PN

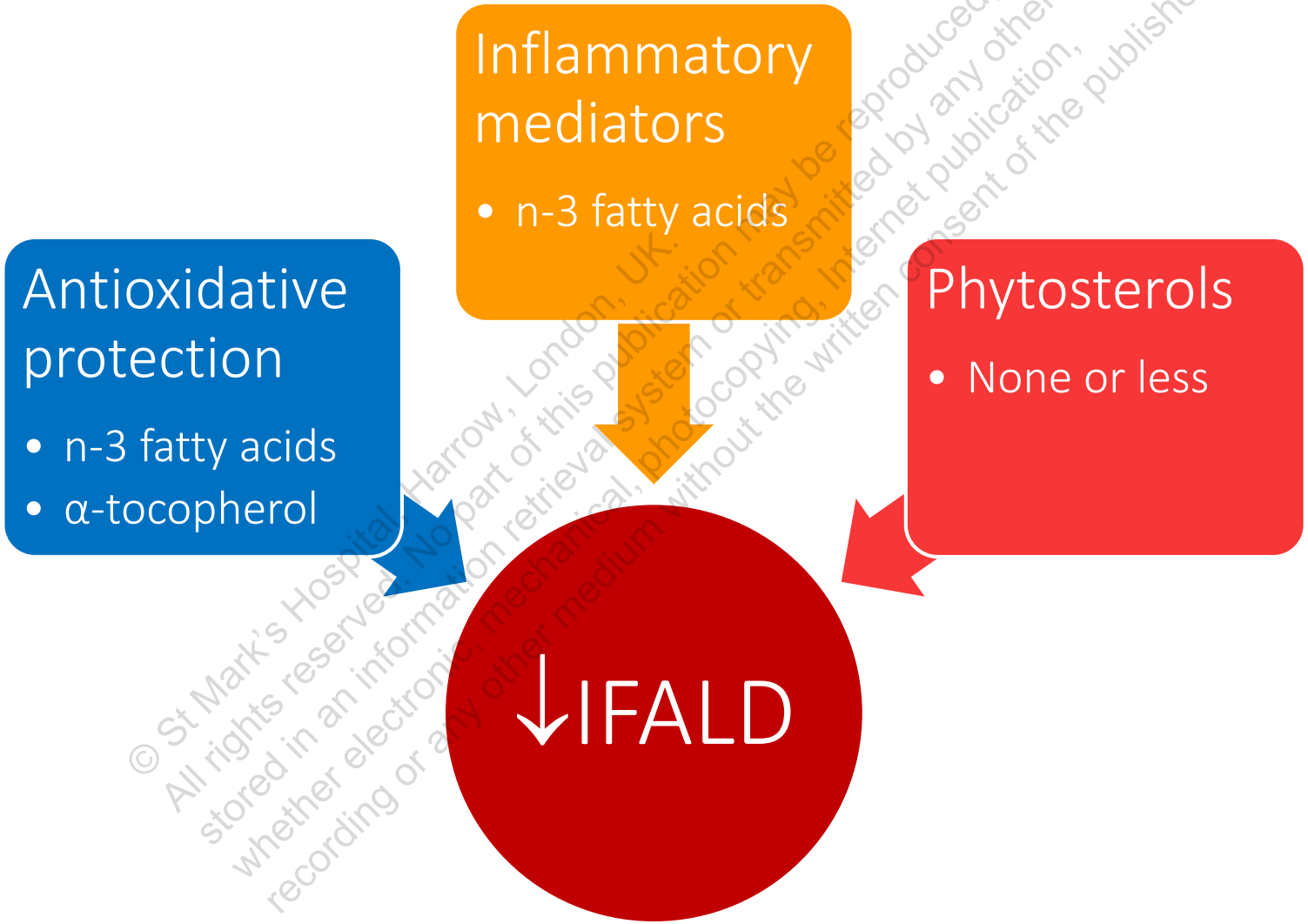
Long term PN

RCT: SMOF v soybean oil



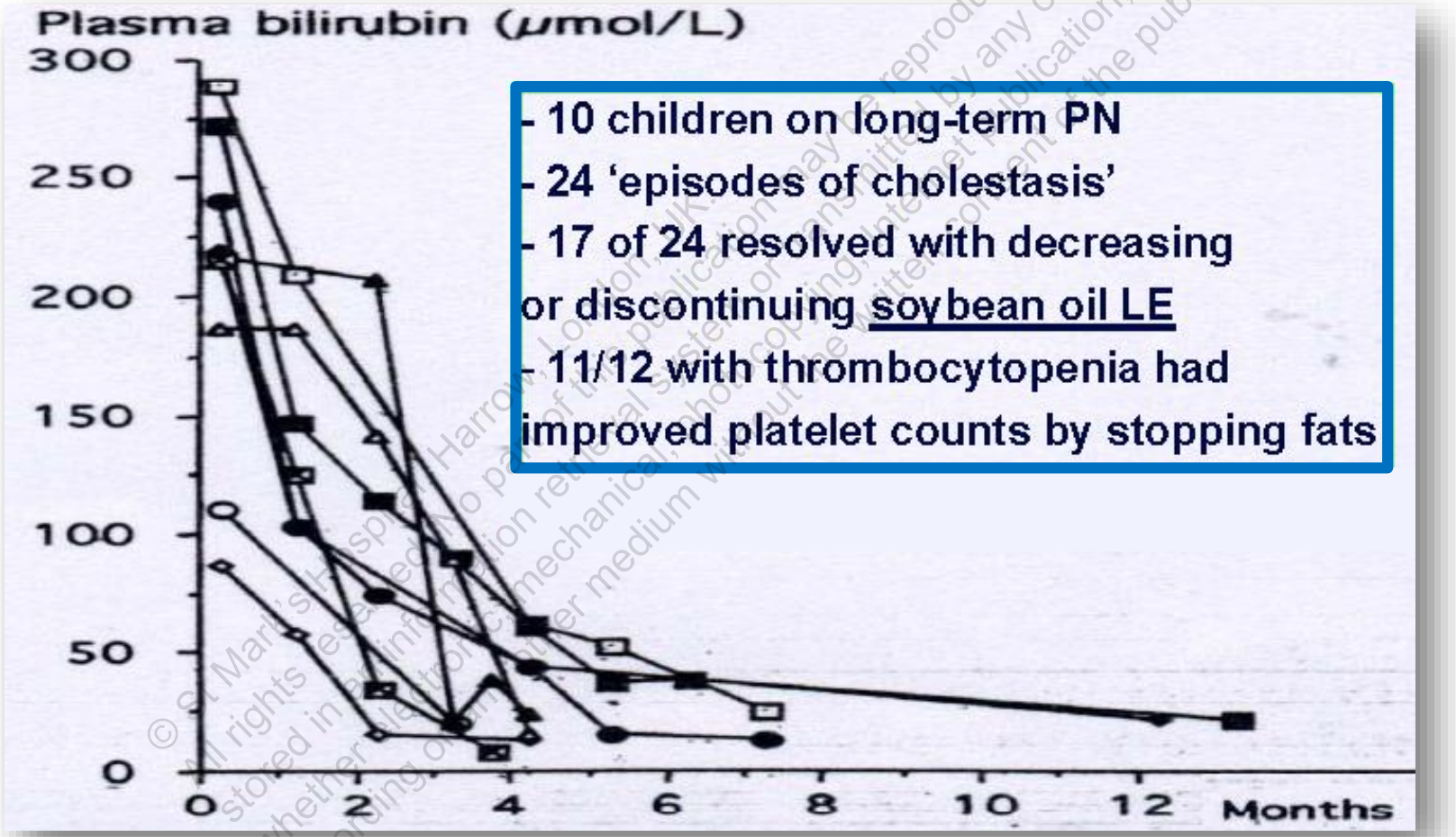
Klek et al, Clin Nutr 2013;32:224-231

Fish oil effect: >1 mechanism

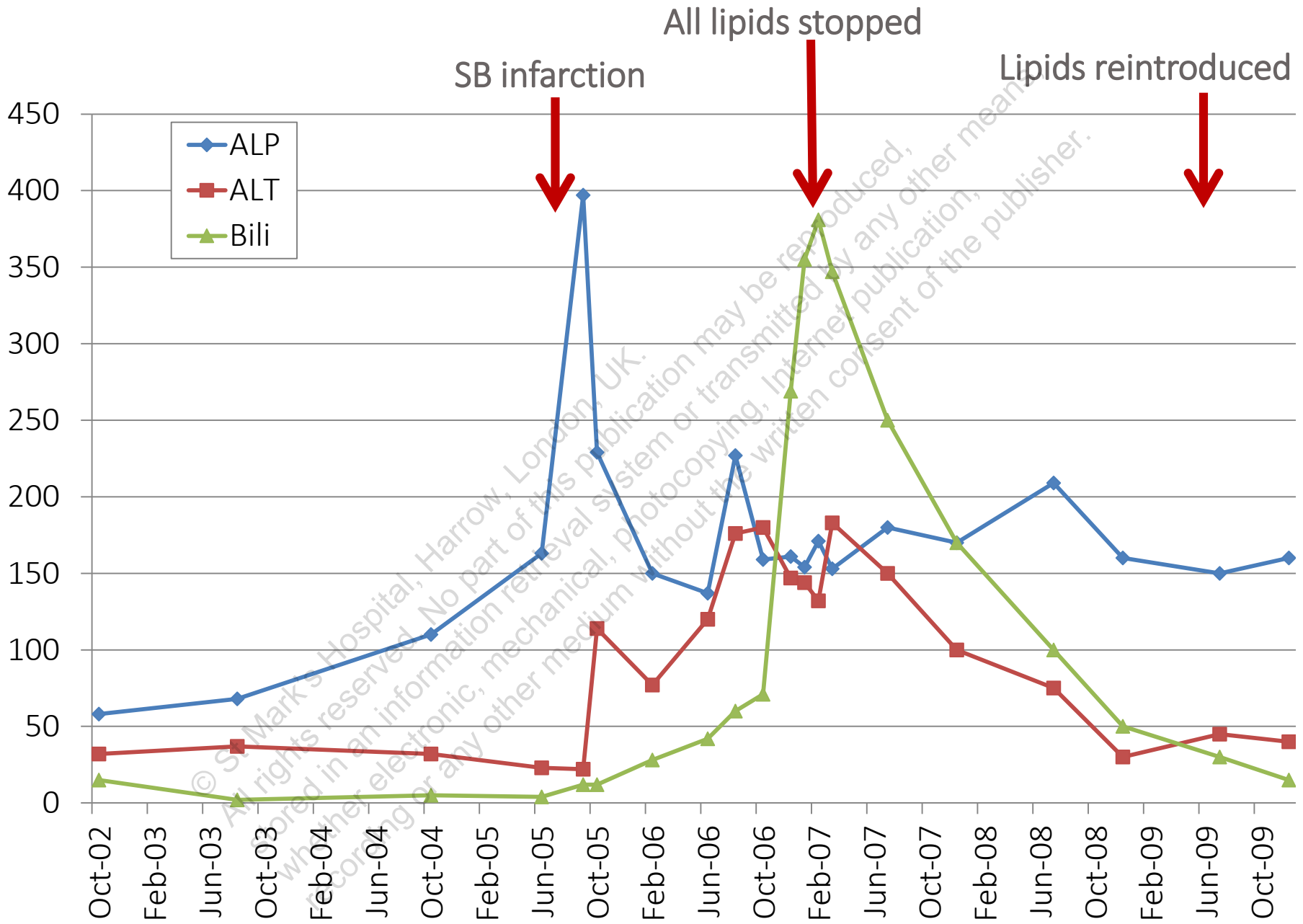


Long term PN

Reversal of cholestasis



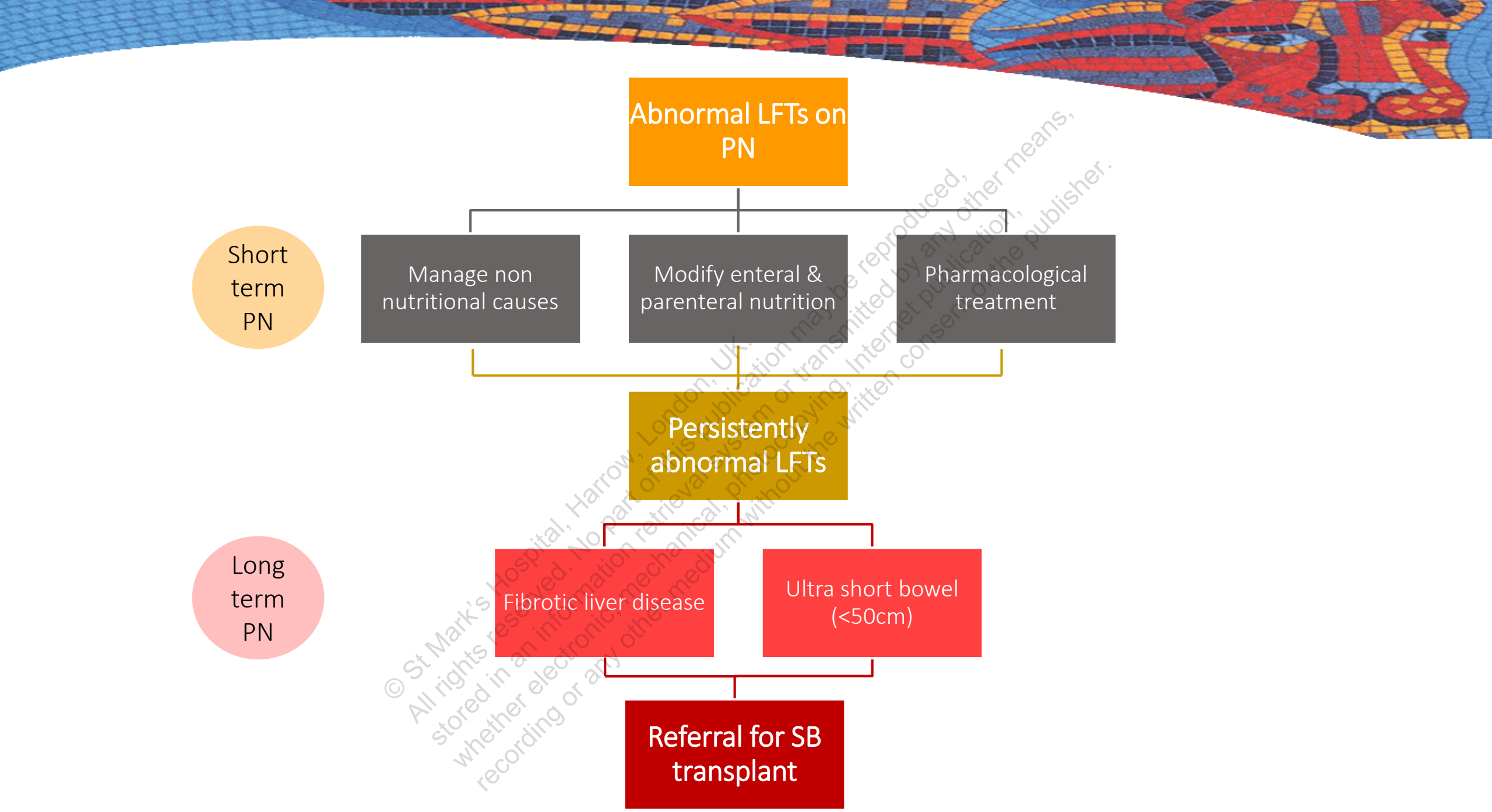
Colomb et al. JPEN 2000; 24(6): 345-50



<1g/kg/day (60kg patient)	0.11g/kg/h (60kg patient & 12h infusion)	500ml 20% lipid emulsion
<60g	80g	100g

- Best way to achieve <1g/kg/day is **NO DAILY LIPIDS**
- Could use
  - 10% lipid emulsion
  - Less 20% lipid

} but bag is less stable



Questions

Do you give cyclical parenteral nutrition?

Fibroscan or liver biopsy?

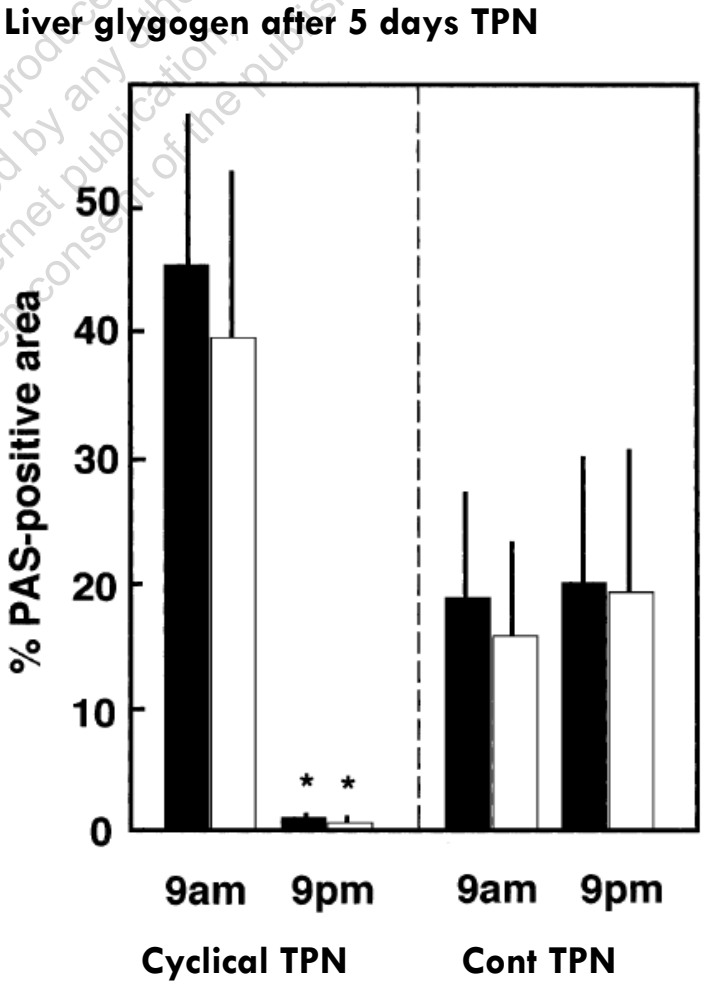
PN: continuous *vs* cyclical

Continuous PN

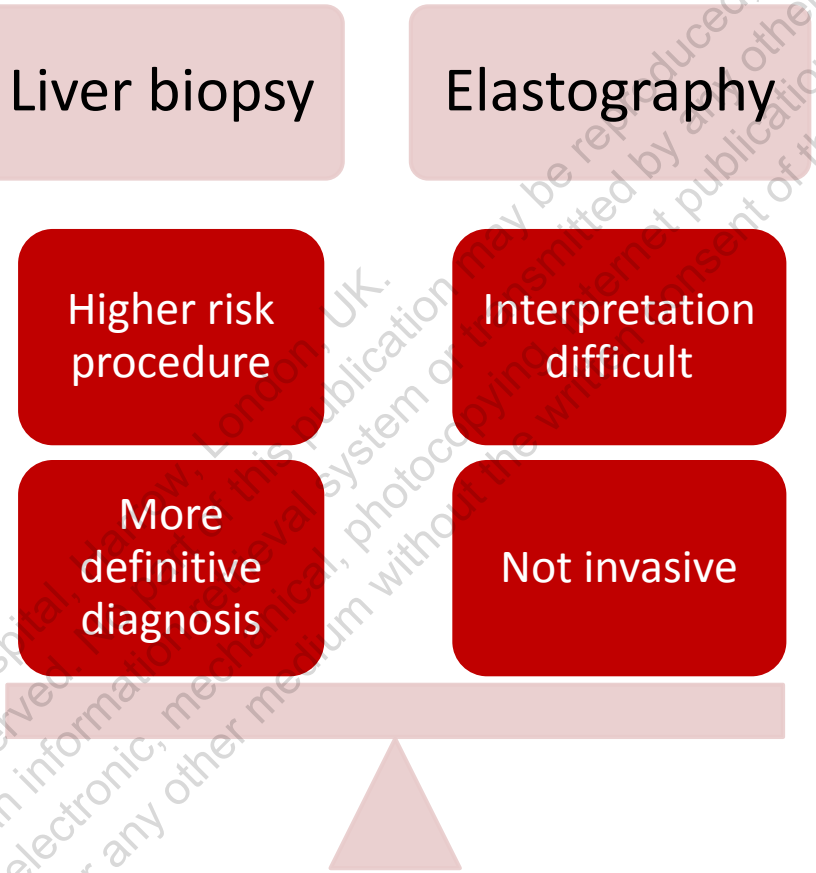
- Jeopardizes hepatic mitochondrial re-energization
- ↑Liver glycogen deposition when given PN for 5 days

Circadian PN pattern

- May reduce the risk of post-ischaemic mitochondrial liver dysfunction

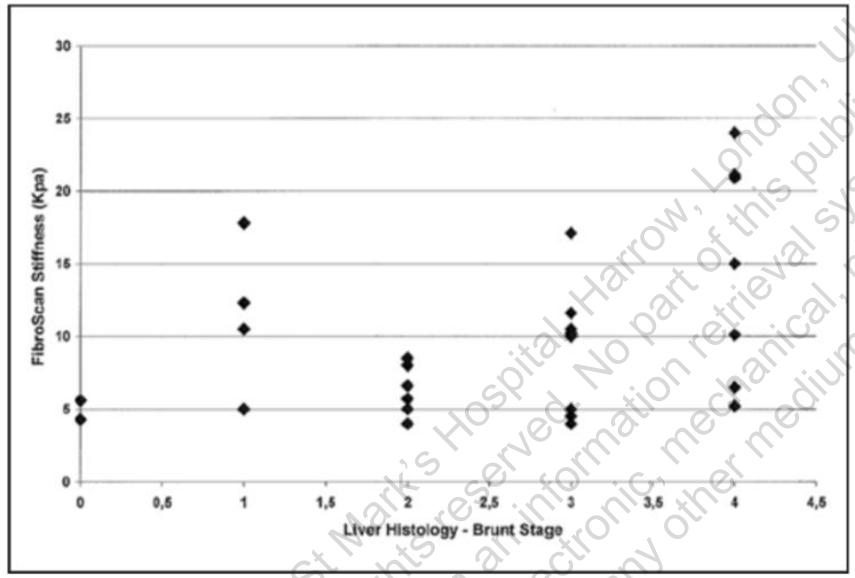


Which one?

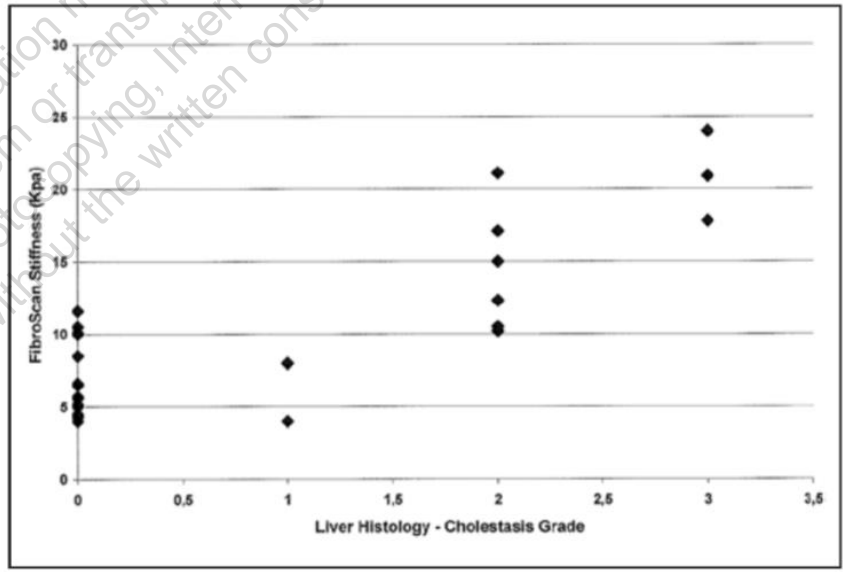


FibroScan stiffness

- Significant correlation with bilirubin & histological cholestasis
- No correlation with histologic fibrosis



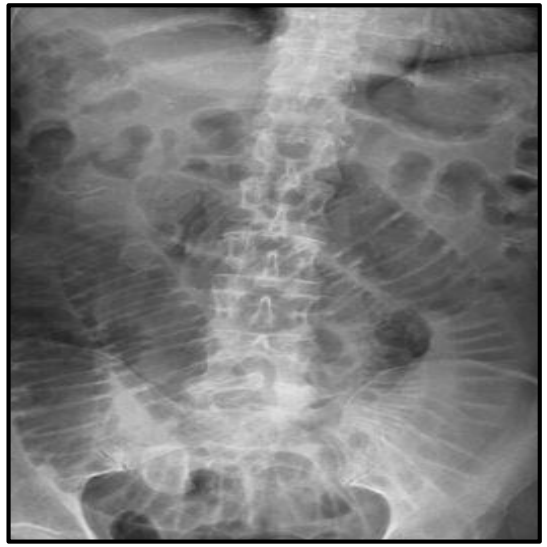
Fibroscan value and Brunt stage
(histological fibrosis score)



Fibroscan value and histological cholestasis grade

Van Gossum et al. JPEN 2014:DOI: 10.1177/0148607114538057

How can this affect your practice?



Acute IF (Type 1)

- Look for causes other than the IV nutrition
- Reasonable to give daily lipid
- Do not overfeed
- Best type of lipid?
  - Need more comparative studies
  - Anti-inflammatory & anti-oxidative properties of fish oil is attractive

Chronic IF (Type 2-3)

- Key message is to give lipid according to EFA requirements (<1g/kg/day)
- **Do not** increase glucose calories as a result
- IFALD patients
  - Decrease further/stop lipid
  - Use 2nd or 3rd generation lipid but stability issues may mean that the lipid is given separately