NASH and bariatric surgery

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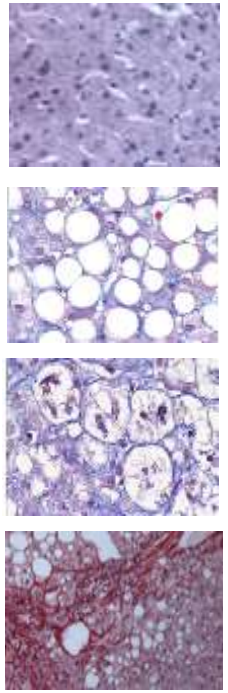
Definition : NASH vs NAFLD (MASLD)



Normal liver

NAFL (steatosis)

NASH (inflammation necrosis)

Cirrhosis (fibrosis)

- Liver histology

  NASH / NAFLD Activity score (0-8)
  Fibrosis Kleiner score (0-4)

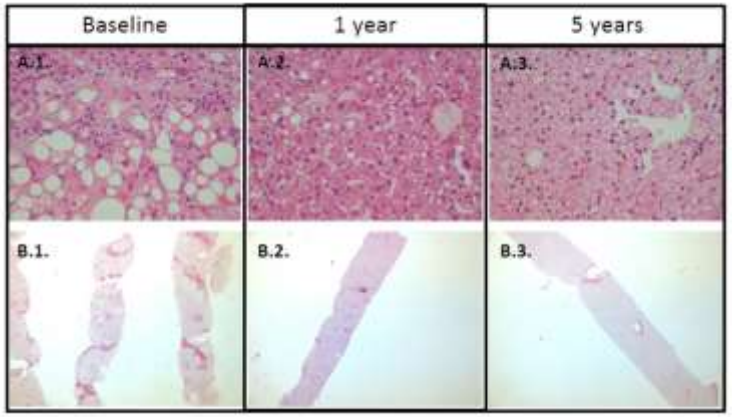
- Non invasive biomarkers (NFS, APRI , FIB-4)
- Non invasive imaging (MRI, Elastography)

Efficacy : NASH after surgery

- Meta-analysis of cohort studies

  Chavez Tapia *Cochrane Review* 2010

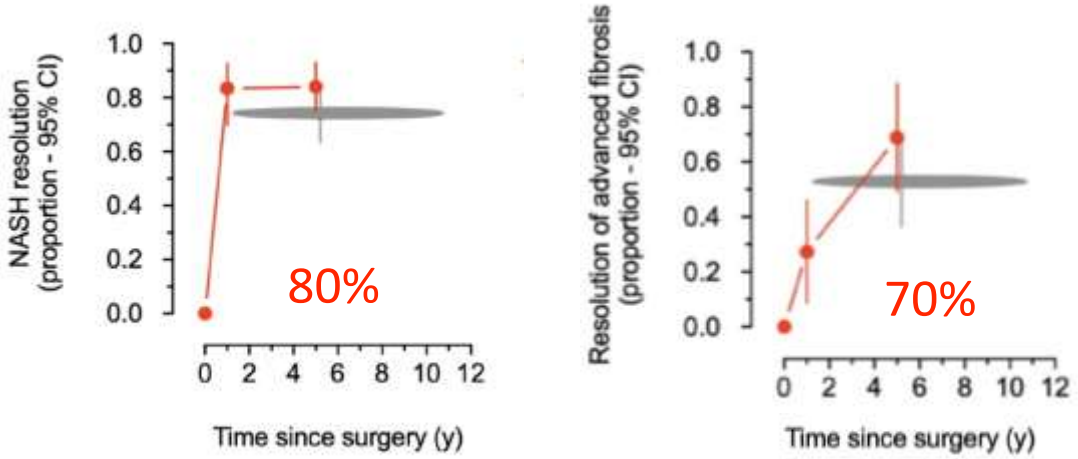
- Prospective cohort study



Lassailly et al. *Gastroenterology* 2020

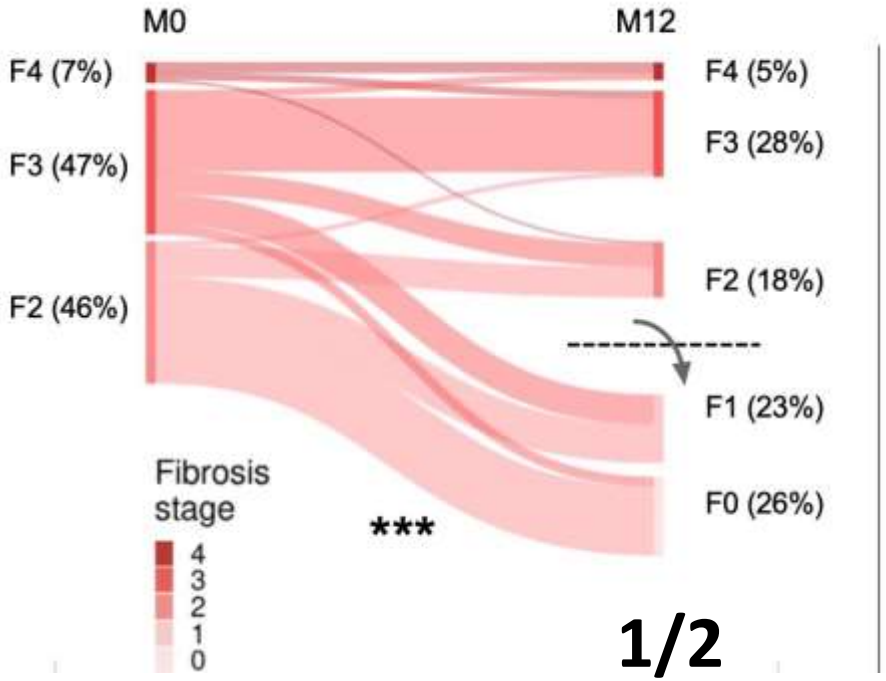
NASH Advanced Fibrosis

Prospective (retrospective) cohort study



Pattou et al. *Hepatology* 2022

Efficacy : fibrosis remission after surgery



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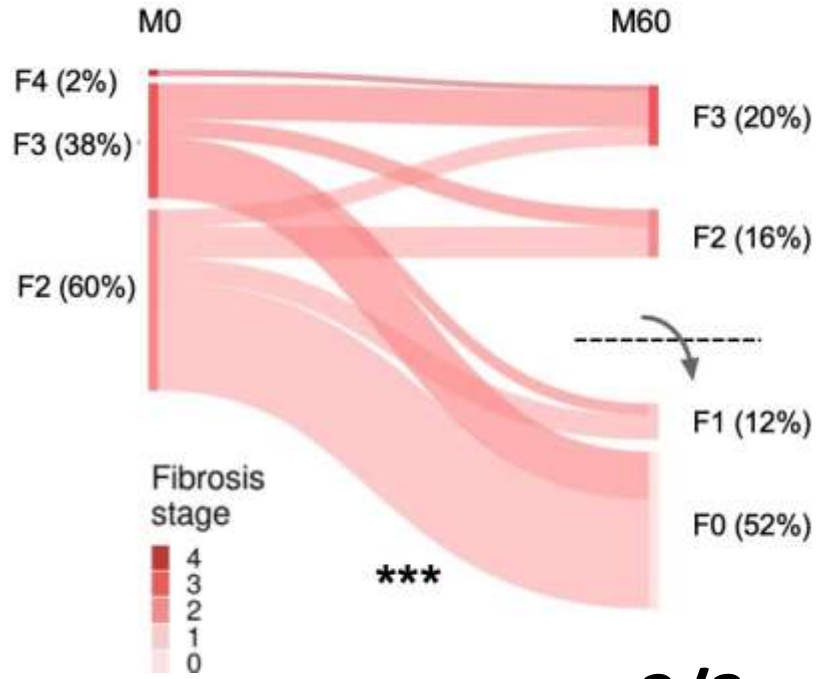

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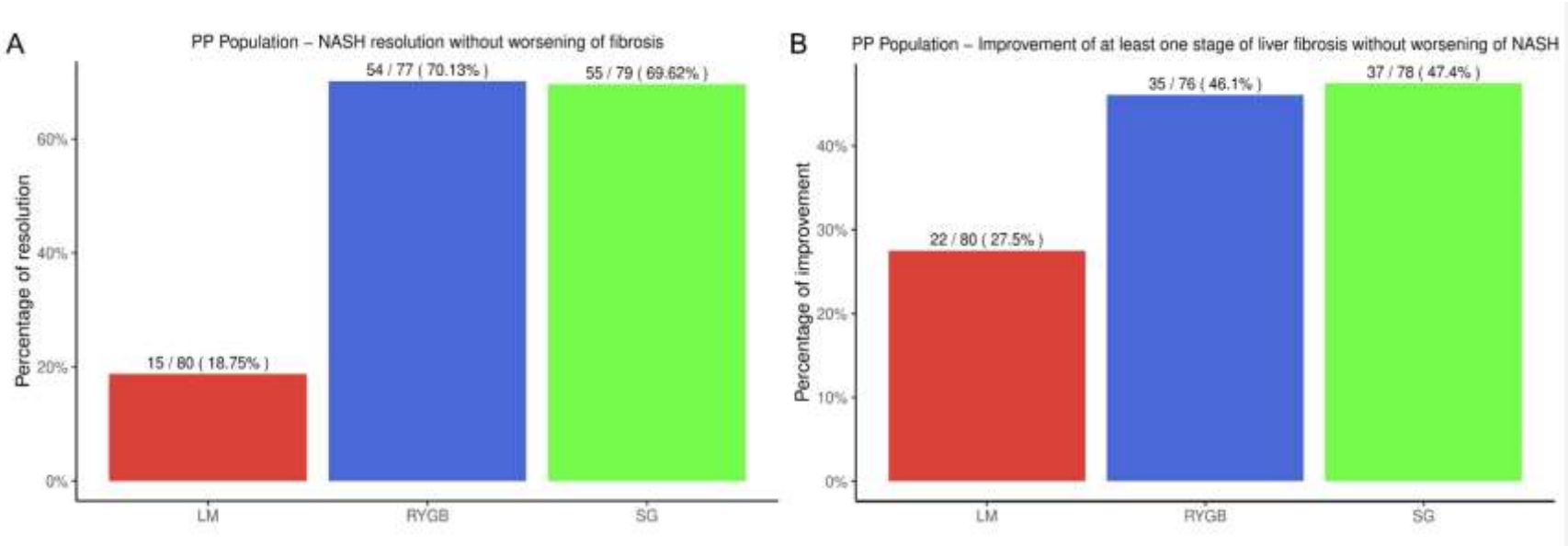
Raverdy et al. (under review)

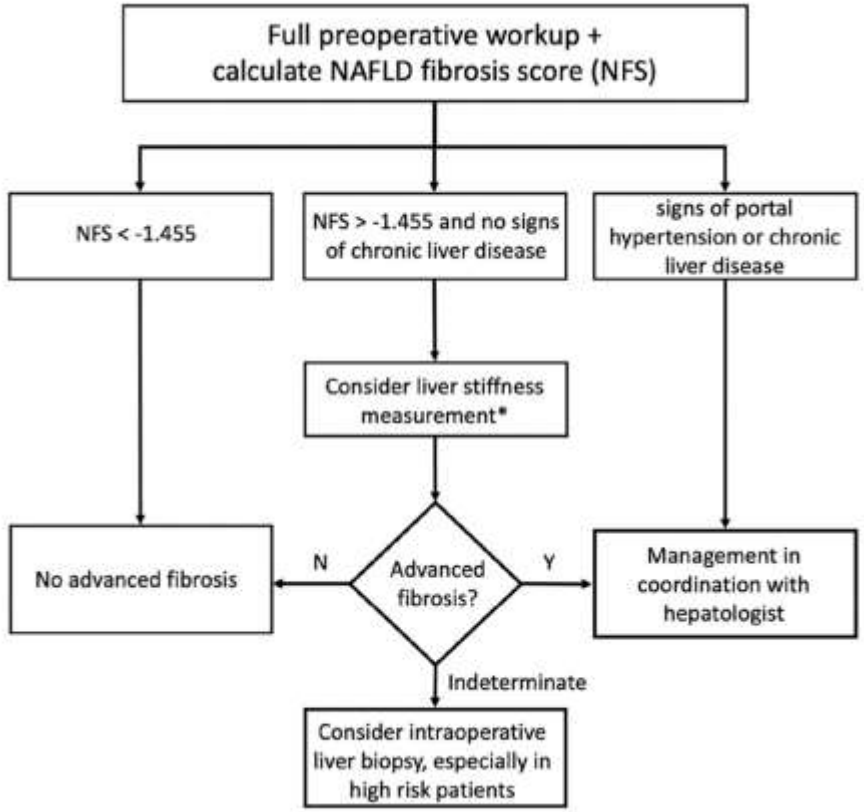
Efficacy : RCT - Surgery vs Medical treatment



Verrastro et al. *Lancet* 2023

NASH diagnosis

ASMBS position statement



Mazzini et al. *SOARD 2021*

Non invasive liver tests

NFS, NAFLD fibrosis score

FIB-4, Fibrosis-4 index

APRI, AST to platelet ratio index

HFS, hepamet fibrosis index

FNI, fibrotic NASH index

Non-invasive test	FIB-4	NFS	APRI	HFS	FNI
First author, year of publication (# ref)	Sterling, 2006 (27)	Angulo, 2007 (28)	Wai, 2003 (29)	Ampuero, 2020 (30)	Tavaglione, 2023 (31)
Reference lower cut-off	1.3	-1.445	1	0.12	0.1
Variables					
Age	X	X		X	
Gender				X	
BMI		X			
AST	X	X	X	X	X
ALT	X	X			
Albumin		X		X	
Platelets	X	X	X	X	
HbA1c					X
Type 2 diabetes		X		X	
HOMA-IR				X	
HDL cholesterol					X

Diagnosing significant fibrosis in BS

Non-invasive tests	AUC M0	AUC M12	AUC M60
FIB-4	0.71 (0.67-0.74)	0.75 (0.69-0.80)	0.69 (0.59-0.80)
NFS	0.68 (0.64-0.72)	0.68 (0.61-0.75)	0.75 (0.67-0.83)
APRI	0.75 (0.72-0.79)	0.75 (0.69-0.80)	0.73 (0.61-0.84)
HFS	0.74 (0.70-0.78)	0.72 (0.64-0.80)	0.82 (0.74-0.91)
FNI	0.79 (0.76-0.82)	0.74 (0.68-0.80)	0.84 (0.77-0.92)

Numbers in brackets are 95% CI.

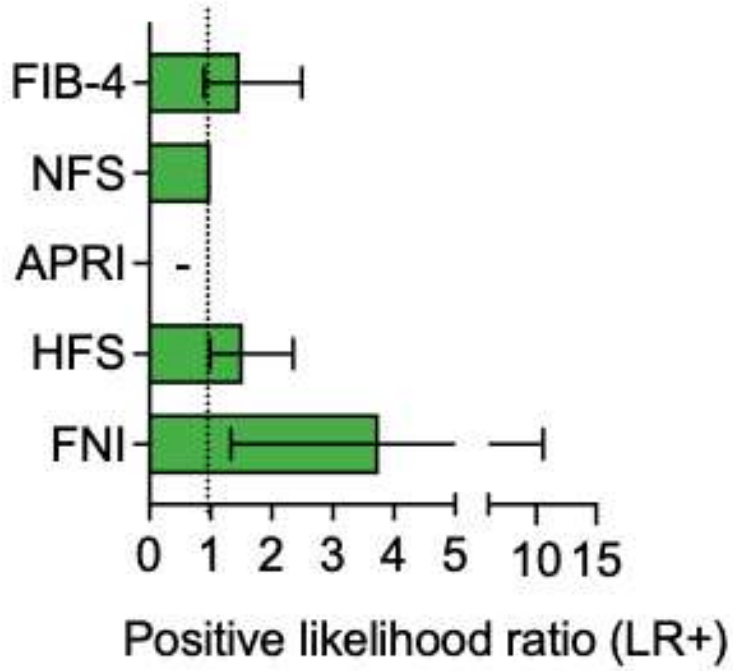
Raverdy et al. (under review)

Diagnosing remission of significant fibrosis

Non-invasive tests	AUC M12	AUC M60
FIB-4	0.69 (0.59-0.78)	0.70 (0.54-0.85)
NFS	0.59 (0.47-0.70)	0.70 (0.55-0.85)
APRI	0.67 (0.58-0.77)	0.72 (0.57-0.87)
HFS	0.68 (0.57-0.69)	0.83 (0.71-0.96)
FNI	0.67 (0.56-0.77)	0.83 (0.71-0.95)

Raverdy et al. (under review)

Diagnosing 5-year remission of significant fibrosis



Raverdy et al. (under review)

Safety : Surgery in NASH

- Meta analysis

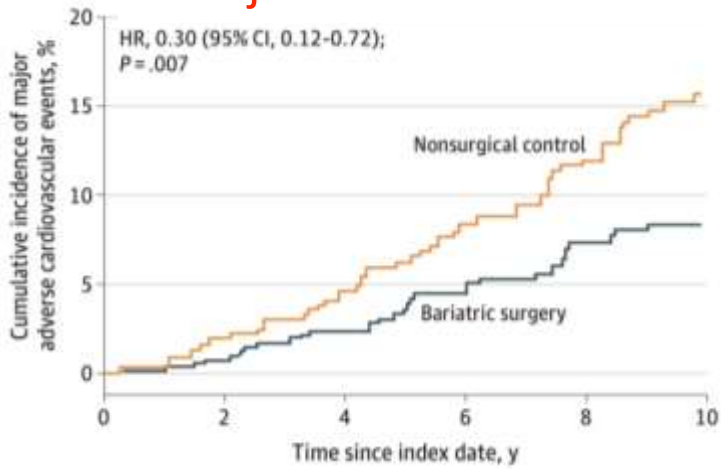
30 day mortality

Type of surgery	Overall (%)	Child-Pugh class			MELD score
		A (%)	B (%)	C (%)	
Appendectomy	9	n.a.	n.a.	n.a.	n.a.
Cardiac	16-17	0-3	42-50	100	n.a.
Cholecystectomy	1-3	0.5	3	n.a.	<8 = 0% ≥8 = 6%
Colorectal cancer surgery	12.5	6	13	27	n.a.
Esophagectomy	17	n.a.	n.a.	n.a.	n.a.
Major abdominal surgery	26-30	10	30-31	76-82	n.a.

Bhangui et al. *J Hepatol* 2012

- Retrospective controled cohort study

Major CV adverse events



Aminian et al. *JAMA* 2021

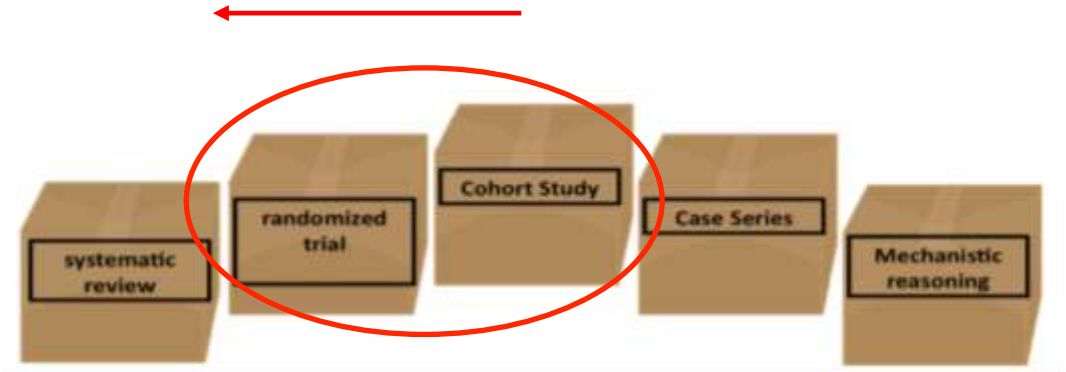
Surgery for NASH ?

-> Randomized controlled trials (ongoing)

1. BRAVES (BS Versus Non-alcoholic Steato-hepatitis) NCT03524365, Italy
2. BariaNash (BS for NASH With Advanced Liver Fibrosis) NCT03472157, France
3. VSG and Lifestyle Modification for the Treatment of NASH NCT03587831, USA
4. BeLEANeR (BS vs. Lifestyle Modification for NASH) NCT04298736, Brazil
5. NASH-APOLLO (Endosccopic Gastric Tubulization in Patients With NASH) NCT03426111, Spain

Surgery for NASH ?

"The Oxford 2011 Levels of Evidence".
http://www.cebm.net



- Does surgery help to treat NASH ? -> Level 1-2
- What are the common (rare) harms of surgery in NASH ? -> Level 2-3