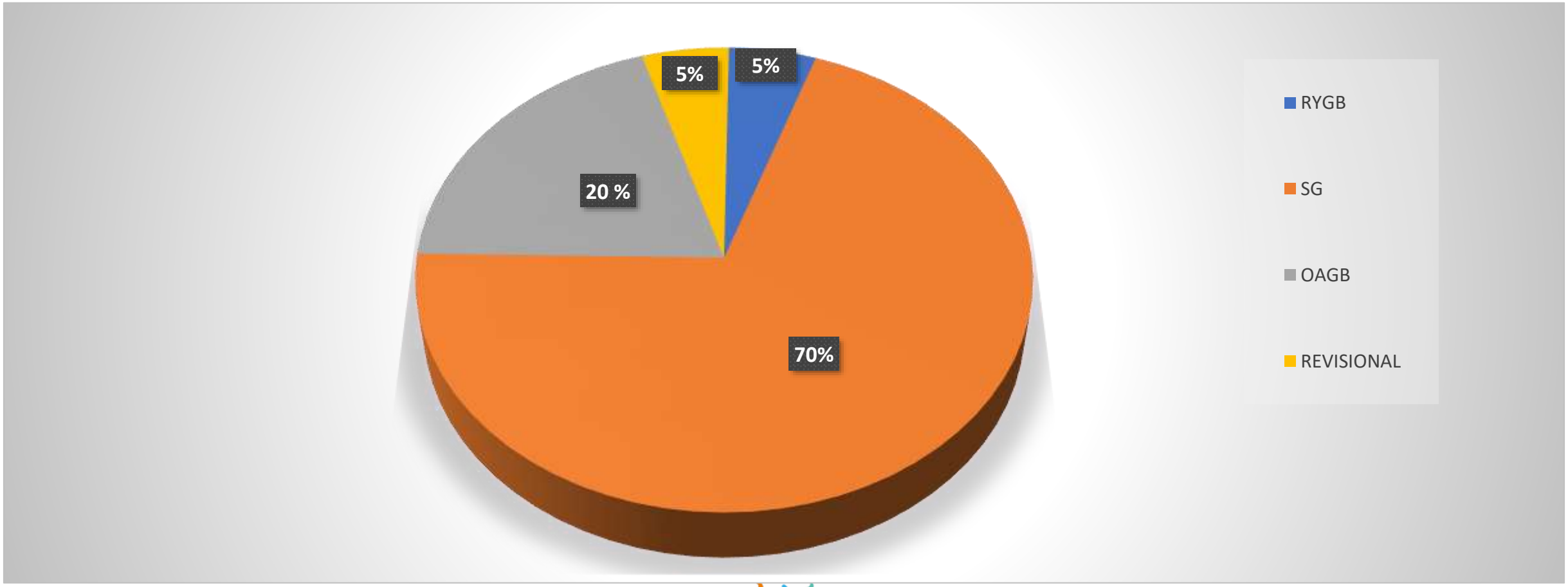
Evaluating Non-alcoholic Fatty Liver Disease (NAFLD) In Morbidly Obese Patients Using TRANSIENT ELASTOGRAPHY

Mohammed Al Sibani ***MD,FRCSC***
Senior consultant
Bariatric and Metabolic surgery Unit
Armed Forces Hospital – Oman

IFSO
NAPOLI
2023

Nothing to Disclose

CASE MIX DISCLOSURE



IFSO
NAPOLI
2023

Introduction

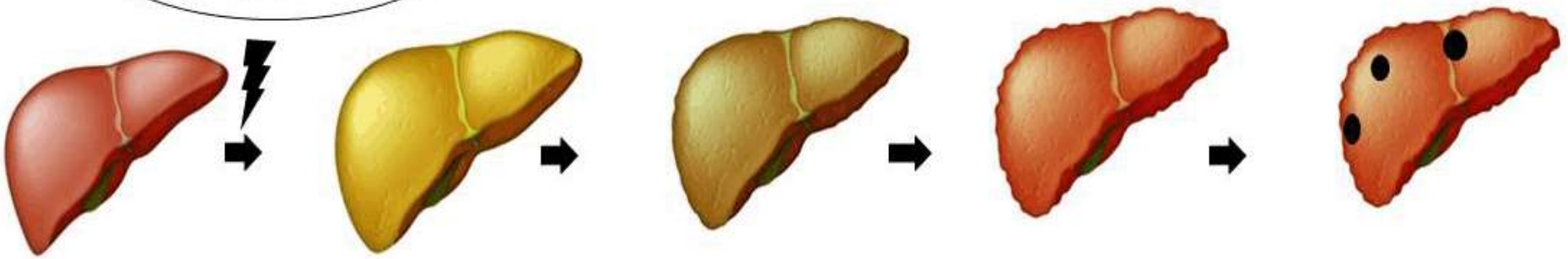
- NAFLD or MAFLD is defined as fat concentration > 10% of the liver weight in the absence of secondary causes such as alcohol use, viral hepatitis or medications
- It is estimated to be prevalent in 50% of normal population and 80 % of obese patients
- It is a spectrum of liver disease ranges from simple fatty liver to cirrhosis and hepatocellular carcinoma
- It is the most common cause of chronic liver disease and it is projected to be the leading indication for liver transplant *

* *Wong et al Gastroenterolog. 2015*

Introduction…

- There is growing interest in NAFLD as part of the metabolic syndrome associated with obesity
- It has been recognized as a hepatic manifestation of metabolic syndrome linked to insulin resistance
- Bariatric surgery improve and reverse the progression of NAFLD along the other aspect of metabolic syndrome

Obesity
Diabetes mellitus
Dyslipidaemia



Healthy liver

Simple fatty liver

Fatty liver with inflammation/scarring

Liver cirrhosis

Hepatocellular carcinoma

Liver Transplantation or death

How to assess NAFLD

- Biochemical parameters (liver enzymes , Platelet, Albumin, Glucose)
- Ultrasound (operator dependent, inaccurate , low sensitivity in Obese patients)
- MRI spectrometry (long time and cost ?)
- Liver biopsy is the gold standard for diagnosis (invasive , serious complication 0.3% - Mortality 0.01% ,, sampling error up to 30-40 %)
- Transient Elastography is noninvasive technique to assess hepatic fibrosis and steatosis

The study

- The aim of the study is to compare Transient Elastography to liver biopsy in detecting (NAFLD) in morbidly obese patients

Age
BMI
TG/Chole
HbA1c
AST/ALT

224 Morbidly Obese patients

TRANSIENT ELASTOGRAPHY
CAP score

219
Intraoperative wedge liver biopsy

histological
Score

TE 6 ,12 month

F/U
BMI ,TG, Chole.,
HbA1c,ALT/AST

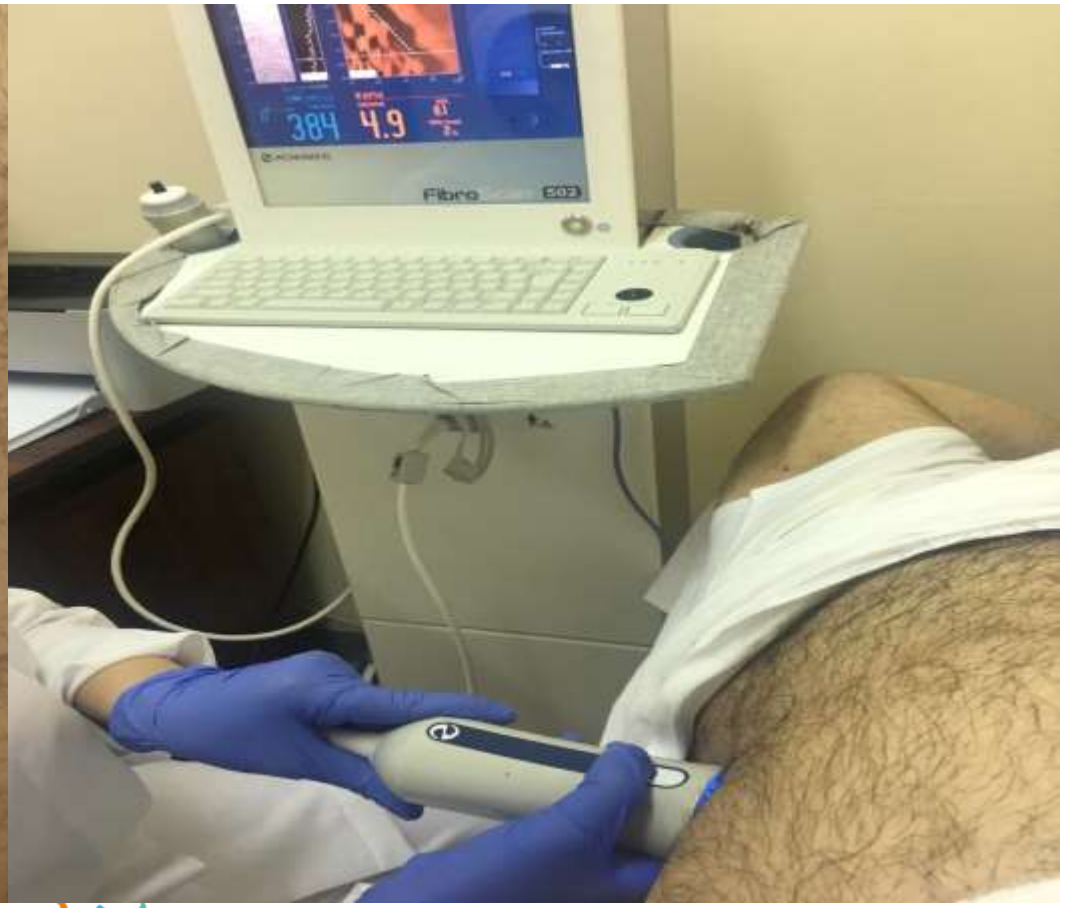
EXCLUSION CRITERIA:
Any Liver Disease
Medications affecting Liver
Previous Liver Surgery

Demographic Character and Clinical Data

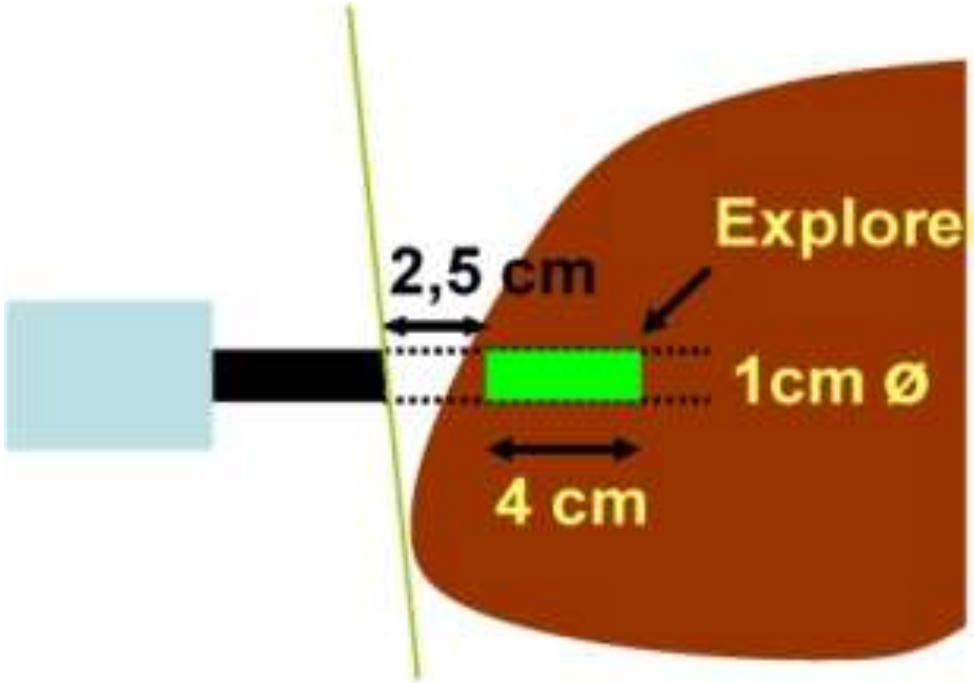
Variable Data	*Values*
Total Number of Patients	*N= 224*
Male	*N= 90 (40.2%)*
Female	*N= 134 (59.8%)*
Age (years)	*35.75 +/- 8.66*
Weight (kgs)	*123.19 +/- 20.30*
Height (cms)	*165.79 +/- 9.30*
BMI (kg/m^2)	*44.61 +/- 7.18*
CAP (dB/m)	*304.51 +/- 64.94*
Fibro (kPa)	*8.7 +/- 0.72*
Hypertension	*35 (15.8%)*
DM	*41 (18.3%)*
Obstructive Sleep Apnea	*35 (15.8%)*
Osteoarthritis	*24 (10.9%)*

Fibroscan

- portable
- Non-invasive
- Easy to use
- It uses technology of Ultrasound attenuation rate



IFSO
NAPOLI
2023



= 100

×

liver biopsy

N = 5,5 (± 1,6) kPa

Advantage that it can assess area 100 times bigger than liver biopsy sample

Steatosis Grading Based On Controlled Attenuated Parameter Value in Fibroscan

Steatosis Grade	CAP Value
S0	< 238 dB/m
S1	>238 dB/m
S2	>260 dB/m
S3	>293 dB/m

Kleiner's Histological Scoring System for Nonalcoholic Fatty Liver Disease (NAFLD)

NAS Components			
Item	Score	Extent	Definition and Comment
Steatosis	0	<5% hepatocytes involved	Refers to amount of surface area involved by steatosis as evaluated on low to medium power examination; minimal steatosis (<5%) receives a score of 0 to avoid giving excess weight to biopsies with very little fatty change
	1	5-33% hepatocytes involved	
	2	>33-66% "	
	3	>66% "	
Lobular Inflammation	0	No foci	Acidophil bodies are not included in this assessment, nor is portal inflammation
	1	<2 foci/200x field	
	2	2-4 foci/200x "	
	3	>4 foci/200x "	
Hepatocyte Ballooning	0	None	
	1	Few balloon cells	The term "few" means rare but definite ballooned hepatocytes as well as cases that are diagnostically borderline
	2	Many cells/prominent ballooning	Most cases with prominent ballooning also had Mallory's hyalin, but Mallory's hyaline is not scored separately for the NAS

NAFLD activity score	Histological Diagnosis of Steatohepatitis
5	Probable or Definite NASH (K3)
3 - 4	Uncertain (K2)
2	Not NASH (K1)

Results

- 117 patients out of 219 patients (46%) had probable or definitive NASH based on pathological score
- 110 patients out of 224 (49 %) has positive CAP score > 300 db/m in Fibroscan
- There was Significant correlation between the CAP score and NAFLD pathological score ($p<0.01$)
- Age, gender and BMI has no significant association with both CAP and NAFLD scores

Fibroscan & Liver Biopsy Grading Scores

NAFLD Score (Kleiner's)

Fibroscan Steatosis	K1	K2	K3	**Total**	
S0	14	14	7	35	
S1	6	5	11	22	
S2	24	16	17	57	
S3	8	20	82	110	**49%**
Total	52	55	117	224	
			46%		

SENSITIVITY : 72.1 %

SPECIFICITY : 76.9%

Correlation Between Variables			
		CAP Score (P value)	*NAFLD Score (P value)*
*Gender**		*0.281*	*0.252*
*Age***		*0.430*	*0.946*
*BMI***		*0.574*	*0.870*

Correlation is significant at 0.05 level (2-tailed)
* *Spearman's correlation*
** *Pearson's correlation*

Discussion :

- There is limited data on Transient Elastography (FibroScan) fo liver assessment in morbidly obese patients
- Most of studies were done with Medium size probe and many were done prior to CAP technology
- Similar results reported using tru-cut liver biopsy *(H. Garg et al. Surgery for Obesity and Related Diseases ,2018)*
- The advantage of our study :
  - Wedge biopsy
  - CAP technology and XL probe was used (good sucess rate >90%)
  - Average patients BMI 45

Conclusion:

- NAFLD is essential manifestation of metabolic syndrome and it should be addressed and followed up closely
- Transient Elastography (FibroScan) can be used to diagnose and follow up patients with NAFLD with good sensitivity, specificity and validity
- Liver biopsy can be avoided in many patients
- NAFLD should be seriously considered in the guidelines to recommend bariatric surgery


SRC
CENTER
OF
EXCELLENCE
METABOLIC & BARIATRIC
SURGERY