

# Vibration-Controlled Transient Elastography (VCTE) is Useful in Identifying Clinically Significant Portal Hypertension in Patients with NASH Cirrhosis

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## INTRODUCTION

Portal pressure, as assessed by the hepatic venous pressure gradient (HVPG) is a validated predictor of the development of complications of cirrhosis. Prior studies in patients with compensated viral / alcoholic cirrhosis showed that

- HVPG  $\geq 10$  mmHg predicts varices and decompensation
- HVPG  $\geq 12$  mmHg predicts variceal hemorrhage

However, measuring HVPG is invasive, expensive and requires special expertise. A non-invasive tool that predicts HVPG is therefore, very valuable in the management of cirrhosis.

Vibration-controlled transient elastography is a non-invasive tool that measures the liver stiffness reliably. Although, majority of the studies examined the relationship between LSM and fibrosis, some studies have suggested that LSM could be a predictive tool of clinically significant portal hypertension in patients with compensated viral / alcoholic cirrhosis .

## AIM

To examine the relationship between liver stiffness measurement (LSM) by vibration-controlled transient elastography (VCTE) and HVPG in patients with compensated cirrhosis secondary to non-alcoholic steatohepatitis (NASH).

## METHODS

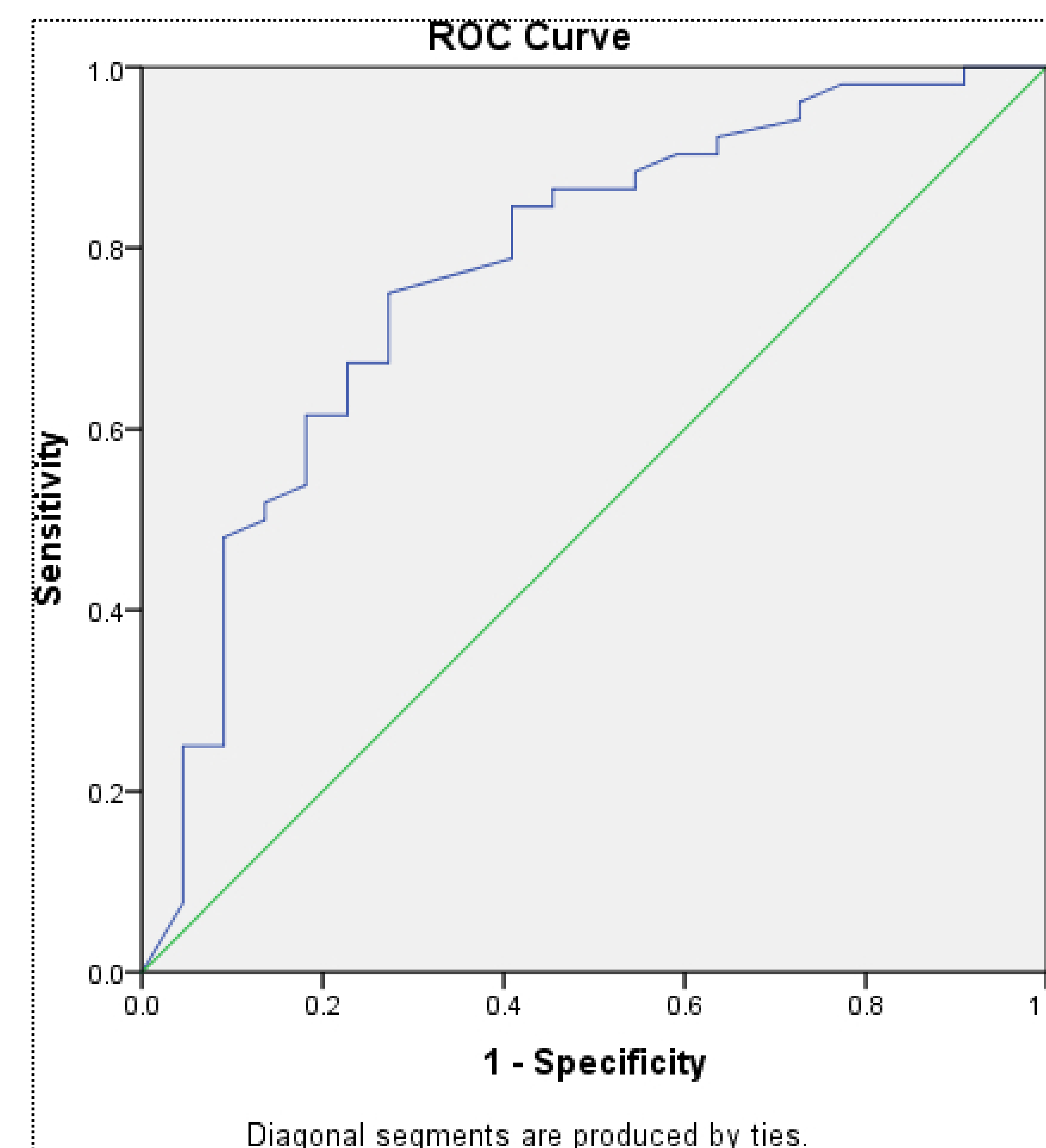
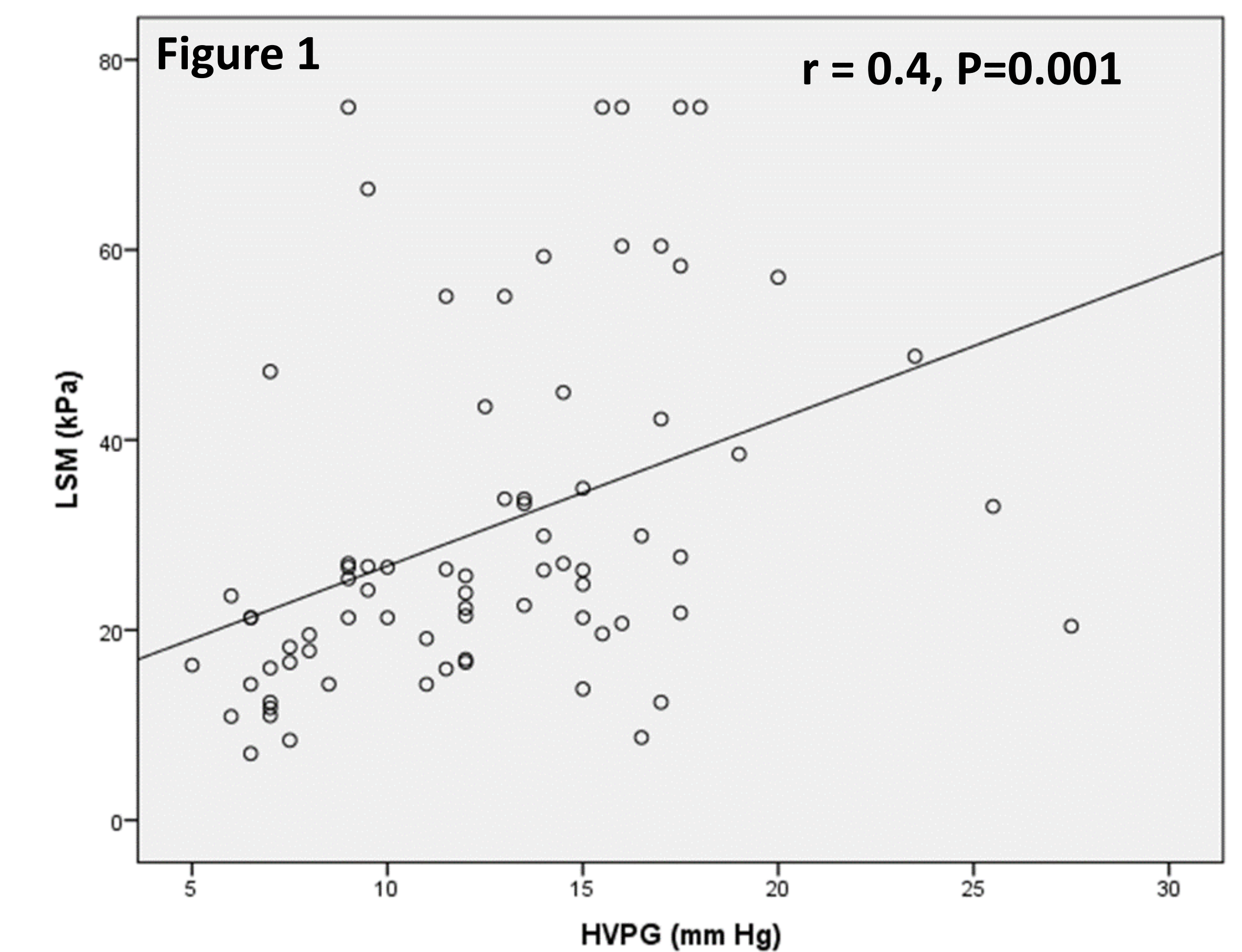
In an ongoing phase 2 multicenter trial of an antifibrotic agent (GR-MD-02), patients with compensated NASH cirrhosis and portal hypertension (HVPG  $\geq 6$ mmHg) (NCT02462967) who underwent both LSM and HVPG (measured within 4 weeks from each other at baseline) were included in this analysis. LSM was obtained using Fibroscan<sup>®</sup> 502 Touch while HVPG values were obtained from centrally-read HVPG tracings.

Identifying patients with HVPG  $\geq 10$  mmHg or  $\geq 12$  mmHg was the primary objective.

Descriptive statistics, including means, standard deviations (SD) and percentages, were used to characterize the study patients. The diagnostic performance of Fibroscan was determined by constructing receiver operating curves. Sensitivity, specificity and positive and negative predictive values (PPV and NPV) were calculated for the cutoffs. Statistical analyses were done using SPSS 24 (IBM Corporation, Armonk, NY).

## RESULTS

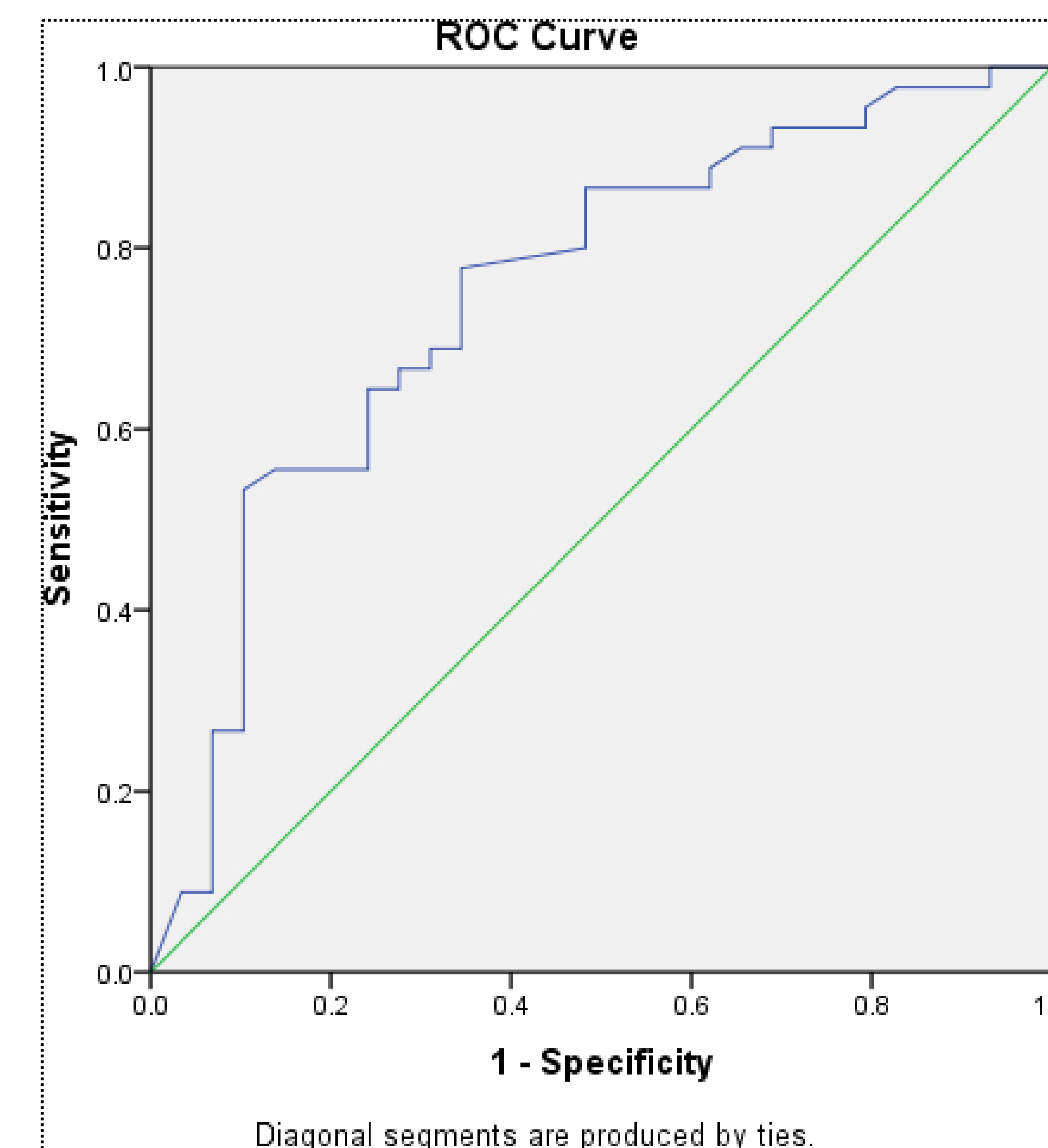
- Seventy four patients with mean age, BMI and MELD score of  $59 \pm 9$  years,  $34 \pm 6$  kg/m<sup>2</sup> and  $7.2 \pm 1.3$  respectively were eligible for this analysis.
- The median (IQR, 25th-75th percentile) LSM was 25.1 (18.1-39.4) kPa and median HVPG was 12.0 (9.0-15.6) mmHg.
- There was significant correlation between LSM and HVPG ( $r = 0.4$ ,  $P = 0.001$ ) (Figure 1).
- The median LSM in 52 patients with HVPG  $\geq 10$  mmHg was 26.8 (21.3-47.8) kPa and the median LSM in 45 patients with HVPG  $\geq 12$  mmHg was 29.9 (21.7-51.9) kPa.
- The AUROCs of LSM for identifying HVPG  $\geq 10$  mm Hg was 0.78 (95% CI: 0.66-0.90,  $P = <0.001$ ) and for identifying  $\geq 12$  mm Hg was 0.75 (95% CI: 0.63-0.87,  $P = <0.001$ ).
- The LSM cut-offs for identifying HVPG  $\geq 10$  and  $\geq 12$  mm Hg with 90% sensitivity were 16.3 and 16.7 kPa respectively.
- The LSM cut-offs for ruling in HVPG  $\geq 10$  and  $\geq 12$  mm Hg with 90% specificity were 27.4 and 46.1 kPa respectively.



### HVPG $\geq 10$ mm Hg

AUROC: 0.78  
 95% CI: 0.66-0.90  
 P value  $<0.001$   
 Optimal LSM cut-off: 21.4 kPa  
 Sensitivity: 75%  
 Specificity: 72%  
 PPV: 0.86  
 NPV: 0.55  
 Accuracy: 0.74

LSM cut-off with 90% sensitivity: 16.3 kPa  
 LSM cut-off with 90% specificity: 27.4 kPa



### HVPG $\geq 12$ mm Hg

AUROC: 0.75  
 95% CI: 0.63-0.87  
 P value  $<0.001$   
 Optimal LSM cut-off: 23.7 kPa  
 Sensitivity: 69%  
 Specificity: 69%  
 PPV: 0.76  
 NPV: 0.58  
 Accuracy: 0.68

LSM cut-off with 90% sensitivity: 16.7 kPa  
 LSM cut-off with 90% specificity: 46.1 kPa

## SUMMARY

- There is significant correlation between LSM and HVPG.
- The ability for LSM to predict the HVPG cut-offs of  $\geq 10$  mm Hg and  $\geq 12$  mm Hg was fair ( AUROC : 0.7 to 0.8)

## CONCLUSIONS

In patients with compensated NASH cirrhosis, LSM by VCTE can non-invasively identify NASH cirrhotics with HVPG  $\geq 10$  mmHg or  $\geq 12$  mmHg.

## REFERENCES

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