

# Sensitivity of Ultrasound and Alpha Fetoprotein for Detection of Hepatocellular Carcinoma in Patients with Cirrhosis



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## Abstract

Hepatocellular carcinoma (HCC) is a malignant form of liver cancer that often arises on the background of liver cirrhosis. Given the strong association between early diagnosis and prognosis, HCC screening among at-risk patients is recommended. To evaluate the current screening method of ultrasonography (US) and alpha-fetoprotein (AFP), we performed a retrospective chart review of patient newly diagnosed with HCC. Sensitivity of ultrasound alone was 74.3% compared to 89.0% with ultrasound and AFP. Based on our findings, the addition of AFP screening to ultrasonography significantly improves early HCC detection in clinical practice.

## Background

- Hepatocellular carcinoma (HCC) is the fastest growing cause of cancer-related mortality in the United States.
- Prognosis is strongly associated with tumor stage at time of diagnosis; early detection allows for more curative treatment and improved overall survival.
- HCC surveillance using ultrasonography is recommended every 6 months for at-risk patients (i.e. those with cirrhosis).
- Few studies have evaluated the effectiveness of ultrasonography and potential benefit of adding serum biomarkers such as alpha-fetoprotein (AFP).

## Aims

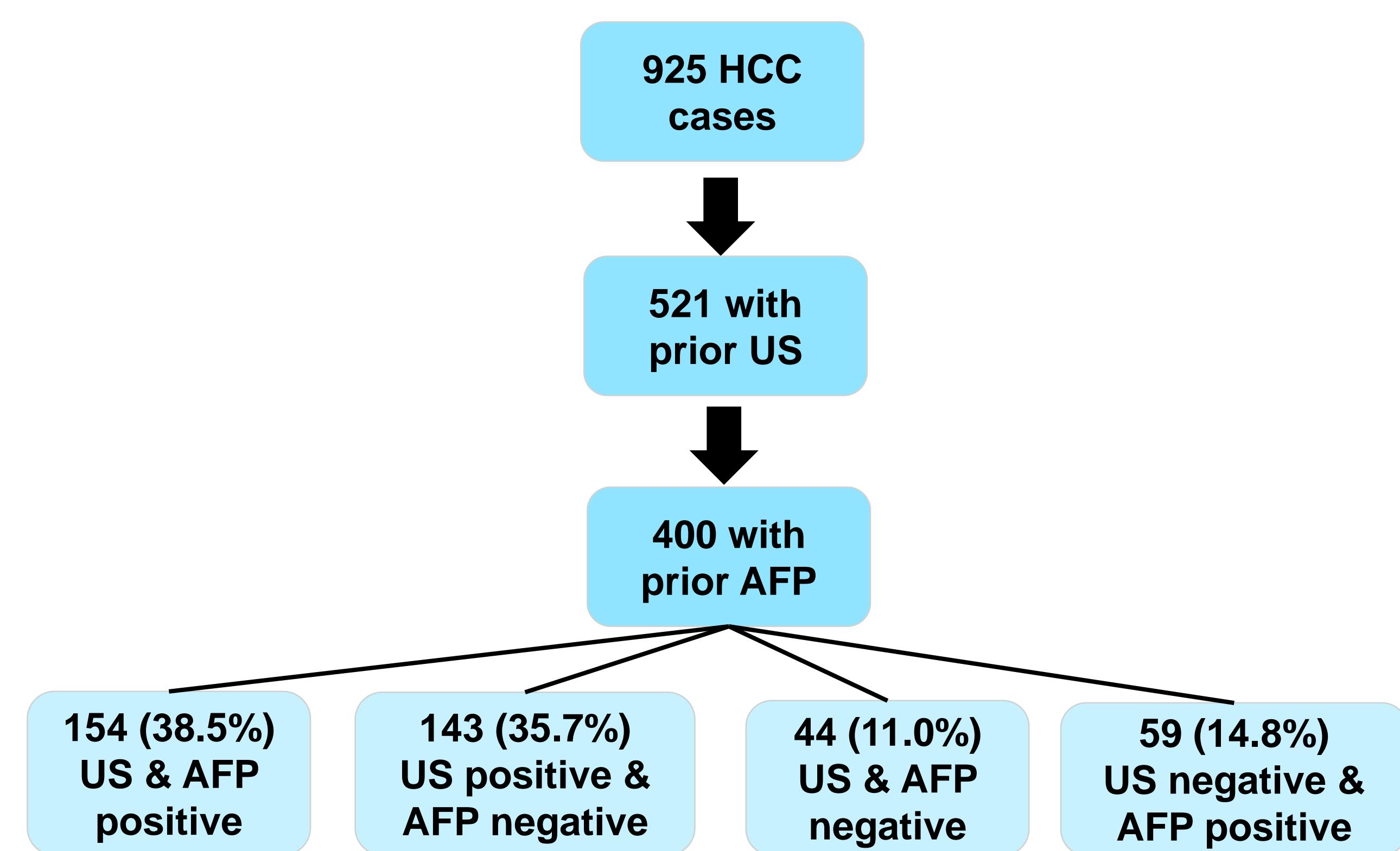
Quantify the sensitivity of ultrasound with or without AFP for detection of HCC in patients with cirrhosis

## Methods

- Retrospective chart review of patients newly diagnosed with HCC at Parkland Health and Hospital System or UT Southwestern Medical Center between January 2009 and December 2015
- Inclusion criteria:
  - HCC diagnosis confirmed per American Association for the Study of Liver Disease (AASLD) criteria
  - Presence of at least one ultrasound and AFP value within 12 months prior to date of HCC diagnosis
- Ultrasound positivity was defined by the presence of a suspicious mass > 1 cm.
- AFP positivity was defined as a value  $\geq 20$  ng/mL, the most common cut-off used in clinical practice.
- Sensitivities of ultrasound, AFP and combined ultrasound plus AFP were compared using chi-square test, with statistical significance of  $p<0.05$ .

## Results

Figure 1. Patient Consort Diagram

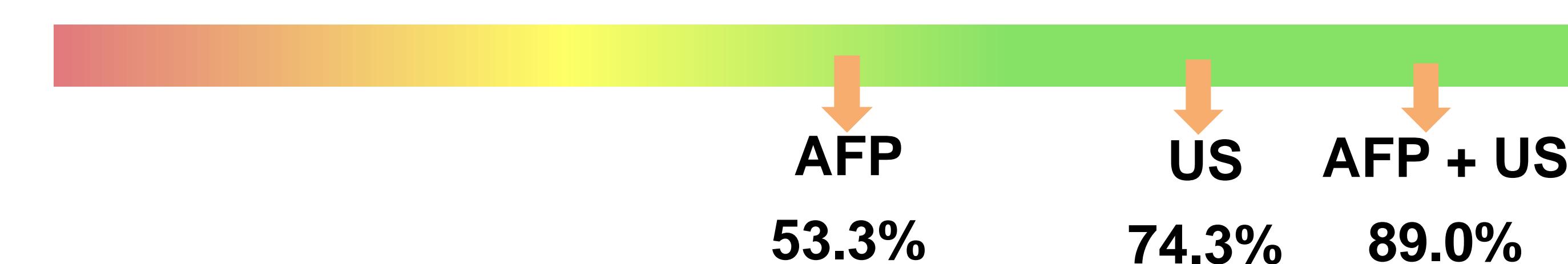


## Results

Table 2. Screening Test Results

Screening modality	Sensitivity
Ultrasound	297/400 (74.3%)
Alpha fetoprotein	213/400 (53.3%)
Ultrasound or AFP	356 (89.0%)

Figure 3. Sensitivity of Screening Modalities



- Sensitivity of ultrasound for HCC detection was significantly higher than AFP alone ( $p<0.001$ ).
- Sensitivity of ultrasound and AFP was significantly higher than either test when used alone ( $p<0.001$ )

## Conclusions

- Ultrasound alone has suboptimal sensitivity for HCC detection in clinical practice, highlighting the need for better screening tools.
- Adding AFP to screening ultrasound can improve HCC detection in patients with cirrhosis

## Future Directions

- Update cohort for patients diagnosed in 2016 to increase sample size
- Evaluate sensitivity of ultrasound +/- AFP for early HCC detection
- Identify predictors of ultrasound and AFP sensitivity