Background: Incidence of hepatocellular carcinoma (HCC) has been increasing in the United States over the past decades. Chronic hepatitis B and C are the major risk factors of HCC. Early detection through risk assessment and surveillance is critical for effective management of HCC. Lectin reactive alpha-fetoprotein (AFP-L3) and des-gamma-carboxyprothrombin (DCP) are highly specific HCC biomarkers. Recently the U.S. Food and Drug Administration (FDA) has cleared these biomarkers for risk assessment of patients at risk for HCC. In this study, we measured AFP-L3 and DCP in a cohort of chronic hepatitis patients on HCC surveillance whose serial serum samples were collected prospectively and compared the serum biomarkers to magnetic resonance imaging (MRI) results in higher sensitivity of 83% in all patients and of 75% in patients who have less than 20 ng/mL of AFP while maintaining over 90% specificity (Table 2). The clinical sensitivity (true-positive rate) for detection of HCC significantly improved with combination of these biomarker assays. Furthermore, the higher clinical sensitivity appears to mitigate the uncertainties of HCC heterogeneity especially in patients with low AFP < 20 ng/mL. This is the first study of the HCC biomarkers assayed by the innovative µTASWako i30 analyzer applied in HCC surveillance in North American patient population.

Methods: Among fifty patients who developed HCC during surveillance, 30 HCC patients were eligible for the study (Table 1); serum samples were collected prospectively 1-2 years prior to , during and post-tumor ablation. For controls, three consecutive annual serum samples were obtained from 106 chronic hepatitis patients who did not develop HCC during surveillance for 5-10 years. For the biomarkers assay, µTASWako i30 auto analyzer was used. This analyzer is equipped with novel technologies on the microfluidics chip-based assay platform and can fractionate AFP-L3 glycoform and calculate the percentage of AFP-L3 if AFP is ≥ 0.6 ng/mL.

Results: We found that combined testing of AFP, AFP-L3 and DCP results in higher sensitivity of 83% in all patients and of 75% in patients who have less than 20 ng/mL of AFP while maintaining over 90% specificity (Table 2). The clinical sensitivity (true-positive rate) for detection of HCC significantly improved with combination of these biomarker assays. Furthermore, the higher clinical sensitivity appears to mitigate the uncertainties of HCC heterogeneity especially in patients with low AFP < 20 ng/mL. This is the first study of the HCC biomarkers assayed by the innovative µTASWako i30 analyzer applied in HCC surveillance in North American patient population.

Conclusion: We believe these biomarkers would be of use for surveillance in chronic hepatitis patients who have higher risk for HCC.