Rapid progress of several imaging modalities, especially ultrasound (US), has simplified the diagnosis of hepatocellular carcinomas (HCCs). The purpose of this study is to clarify whether or not US is truly necessary for the diagnosis of HCCs.

From 1981 to 1985, US was performed on 383 cases out of a total of 486 in which HCCs were studied and graded into 3 categories according to the usefulness of US. These categories are: 1) HIGHLY USEFUL, 2) MODERATELY USEFUL, and 3) NOT USEFUL. The results, using single photon emission computed tomography, were also evaluated separately.

Radionuclide liver scan, including SPECT, is definitely essential for the diagnosis of 26% (6383) of HCCs HIGHLY USEFUL. At the same time, in 9% (25338) of HCCs, radionuclide liver scan is considered to be very important and necessary for the diagnosis of the HCCs MODERATELY USEFUL GROUP, especially for the macroscopically infiltrative type of HCCs and the HCCs located in the subdiaphragmatic portion of the liver.

Factor analysis can automatically provide specific factors which correspond to various dynamic structures in a given organ. We tried to diagnose hepatocellular carcinoma using factor analysis algorithms.

After a volus injection of 10 mCi of Tc-99m pyrophosphate, images were obtained sequentially, for up to one minute using a camera and data system.

Factor analysis was made on sequences of 40 images taken with a dotation of one second after radionuclide bolus was administered into hepatic artery (according to the method of Di Paola).

Four-factor analysis was obtained, each factor respectively describes the lung, the heart, the hepatic artery and the portal vein. Hepatocellular carcinoma was contained in the hepatic artery phase.

The results of the analysis could show that the volume of arterial blood flow into hepatocellular carcinoma was decreased with transcather arteri embolization therapy.

Our studies show that factor analysis is useful method to diagnose and follow up of hepatocellular carcinoma.