from patients with HCC.

**Methods:** HCC samples were obtained from surgical resection of patients. Tumor samples were immediately minced into fine fragments and then mixed 1:1 (v/v) with Matrigel. The tissue mixture was subcutaneously injected in both flanks of NOD/SCID mice. Growth of implanted tumor xenografts was monitored twice a week. For serial transplantation, tumor-bearing animals were sacrificed and acquired tumors were injected in successive BALB/c-nu mice. To investigate the effects of anti-cancer drugs on HCC xenografts mouse models were treated with drugs and monitored by measurement of tumor size.

**Results:** The first generation of xenograft mouse was established within 3–4 months after initial transplantation of patient HCC tumor. Serial transplantations and passages were done to establish sufficient numbers of xenograft mouse for drug response tests. Serial passage of tumors has been done every 1-2 months. Improved success rate of xenograft models was achieved after learning period. Drug response experiments with sorafenib and other anti-cancer drugs are ongoing and will be presented.

**Conclusions:** Patient HCC xenograft, avatar model is established and may be useful for screening anti-cancer drugs, especially in patients with high risk of recurrence after resection.

**Keywords:** Hepatocellular carcinoma, Xenograft model, Avatar

**PO-08**

**Virological Response to Entecavir is Associated with Low Probability of Developing Hepatocellular Carcinoma in Chronic Hepatitis B Patients with Cirrhosis**

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**Background:** To assess the risk for the development of hepatocellular carcinoma (HCC) according to the underlying liver status and virological response (VR) to entecavir (ETV) in chronic hepatitis B patients with cirrhosis.

**Methods:** A total of 324 patients with cirrhosis were treated with ETV for ≥ 6 months and were followed up (mean duration 36.0 months) for the occurrence of HCC. Patients who developed HCC within 6 months were excluded. VR was defined as HBV DNA <2,000 copies/mL until June, 2008 and <20 IU/mL after July, 2008.

**Results:** Two hundred and twenty (67.9%) patients had compensated cirrhosis and remaining (32.1%) patients had decompensated cirrhosis. The 5-year prevalence of HCC was 28.5%. Univariate analysis showed that increasing age (P=0.008), male gender (P=0.002), diabetes mellitus (P=0.012), hepatic encephalopathy (P=0.017) were risk factors for the development of HCC. VR was related with low probability of developing HCC (P=0.000). Cox regression analysis showed that age over 50 (P=0.000, RR 2.906) and male gender (P=0.005, RR 2.887) were independent risks for the development of HCC. Patients with VR had protective effect for development of HCC (P=0.000, RR 0.056).

**Conclusions:** Antiviral treatment with ETV does not completely eliminate HCC risk in patients with cirrhosis. However, VR to ETV is associated with a lower probability of developing HCC in patients with cirrhosis.

**Keywords:** Hepatocellular carcinoma, Liver cirrhosis, Virological response, Entecavir

**PO-09**

**Serum Insulin-Like Growth Factor-1 Predicts Disease Progression and Survival in Patients with Hepatocellular Carcinoma who Undergo Transarterial Chemoembolization**

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**Background/Aim:** Hepatocellular carcinoma (HCC) is a hypervascular tumor, and angiogenesis plays a pivotal role in tumor biology. Insulin-like growth factor (IGF) is an angiogenic factor that is implicated in the development and progression of various cancers. In the present study, we investigated the prognostic value of serum IGF-1 levels in HCC patients treated with transarterial chemoembolization (TACE).

**Methods:** Consecutive HCC patients who had undergone TACE were included from a prospective cohort. The levels of serum IGF-1 and vascular endothelial growth factor (VEGF) were analyzed with regard to their associations with disease progression and survival.

**Results:** A total of 155 patients were included. During a median follow-up period of 35.6 months, patients with IGF-1 levels in the lower three quartiles (< 125 ng/mL) had a significantly shorter TTP (median, 6.0 months) compared with patients in the highest quartile (> 125 ng/mL; median, 16.5 months; P=0.003). The hazard ratio (HR) of progression for each 10 ng/mL decrease in IGF-1 level was 1.049 (P=0.007). The multivariate analysis revealed that low IGF-1 levels remained a significant risk factor for disease progression (for each 10 ng/mL decrease in IGF-1 level: HR, 1.062; P=0.004). Furthermore, together with tumor size, stage, serum VEGF level, and treat-
ment response, low IGF-1 levels were an independent predictor of shorter OS (for each 10 ng/mL decrease in IGF-1 level: HR, 1.073; P=0.019). When we divided the patients into four groups according to baseline IGF-1 (< median or ≥ median) and VEGF (< median or ≥ median) levels, patients with low IGF-1 and high VEGF levels had a significantly increased risk of disease progression and death compared with patients in the other 3 groups (P<0.002 and <0.001, respectively).

Conclusions: Low baseline IGF-1 levels independently correlated with shorter TTP and poorer OS in patients with HCC who underwent TACE.

Keywords: Hepatocellular carcinoma, Insulin-like growth factor-1, Prognosis, Transarterial chemoembolization

**PO-10**

Comparison of Outcomes between Combined Tace Plus Radiotherapy and Sorafenib in Patients with Advanced Hepatocellular Carcinoma

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Background: Sorafenib is regarded as the standard treatment of care in Barcelona Clinic Liver Cancer (BCLC) stage C patients in the BCLC treatment algorithm. However, the modest survival warrants for a better treatment modality. This study aimed to investigate the feasibility of combined TACE and radiotherapy (TACE+RT) in comparison with sorafenib for locally advanced HCC.

Methods: From 2007 to 2011, a total of 116 patients with locally advanced HCC without distant metastasis were retrospectively enrolled. 35 patients were treated with sorafenib and 67 patients underwent treatment with TACE+RT. Propensity score-matching generated a matched cohort composed of 54 patients. Overall survival was the primary endpoint for the analysis.

Results: At baseline, the sorafenib treated group had a tendency for a tumor size ≥10 cm (74.3% vs. 59.7%, P=0.001), presence of lymph node metastasis (34.3% vs. 11.9%, P=0.007) and presence of main portal vein tumor thrombosis (45.7% vs. 25.4%, P=0.037). The overall survival in the TACE+RT group was significantly longer compared to the sorafenib group (3.3 months vs. 14.1 months, P=0.001). In the propensity score-matched cohort, baseline characteristic did not differ between the two groups. The TACE+RT group (n=27) showed prolonged overall survival compared to the sorafenib group (n=27) (6.7 months vs. 3.1 months, P=0.001). Multivariate analysis revealed that TACE+RT was the only independent prognostic factor associated with survival in the propensity score-matched cohort (HR=0.172, 95% CI 0.078-0.379; P<0.001).

Conclusions: The overall survival of the combined treatment of TACE+RT was associated with a prolonged survival compared to the administration of sorafenib in locally advanced hepatocellular carcinoma patients.

Keywords: Sorafenib, TACE, Radiotherapy, Hepatocellular carcinoma

**PO-11**

The Effect of Transarterial Chemoemblization for The Hepatocellular Carcinoma with Hepatic Vein or Inferior Vena Cava Invasion

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Background: Hepatocellular carcinoma (HCC) with hepatic vein (HV) or inferior vena cava (IVC) invasion forecasts a grave prognosis. The aims of this study was to investigate the effect of transarterial chemoembolization (TACE) and factors associated with mortality in patients with HCC showing HV and/or IVC invasion.

Methods: The subjects were consecutively enrolled, newly diagnosed HCC patients with HV and/or IVC invasion, and were treated with TACE (n=62) at Seoul National University Bundang Hospital from May 2003 to October 2012. Follow-up was completed until March 2013. The clinical characteristics, treatment response, overall survival, and factors related to mortality were analyzed.

Results: The subjects showed mean age of 56.6 years, 82.3% of male, HBsAg positivity in 82.3%, Child-Pugh class A in 76.2%, primary tumor size ≥50% of liver area in 64.5%, accompanying portal vein invasion in 79%, IVC invasion in 41.9%, and right atrial invasion in 9.7%, and extrahepatic metastasis in 33.9%. The tumor response of TACE for the primary tumor and tumor thrombi in HV or IVC were 55.6%, and 13.0%, respectively. The median overall survival was 10.9 months (range, 0.1-23.0 months), and the cumulative survival rates at 3, 6, and 12 months were 73.8%, 58.1%, and 45.8%, respectively. The multivariable analysis showed that Child-Pugh class B (hazard ratio[HR]=2.79; 95% confidence interval[CI], 1.21-6.43; P=0.02) and HCC rupture (HR=5.99; CI, 1.45-24.75; P=0.01) were independent factors affecting mortality. The cause of death included hepatic failure (57%), tumor progression (24%), and pulmonary embolism (11%).

Conclusions: TACE seems to be effective for HCC with HV or IVC invasion, especially in the patients with preserved hepatic function but no tumor rupture.

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