암재활
발표일시 및 장소 : **10 월 27 일(토) 14:40-14:50 Room E(5F)**

OP4-2-5

The efficacy and feasibility of prescribed exercise by mobile health in hepatocellular carcinoma

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Introduction
Exercise has proven to positively influence cancer patients biologically and functionally in various cancers, especially in breast and prostate cancer. Recent studies support that even patients undergoing acute cancer treatments can benefit from individualized prescribed exercise program. In previous studies of hepatocellular carcinoma (HCC), continuous regular exercise reduced the risk of primary development of HCC and lowered mortality after cancer diagnosis. However, fear of developing hepatic decompensation has led cancer patients and even physicians to ignore the benefit of exercise. The aim of this study was to evaluate the efficacy and feasibility of individualized prescribed exercise on quality of life, physical performance, biological profile, and body composition change of HCC patients on compensated stage, via smartphone application and wearable device.

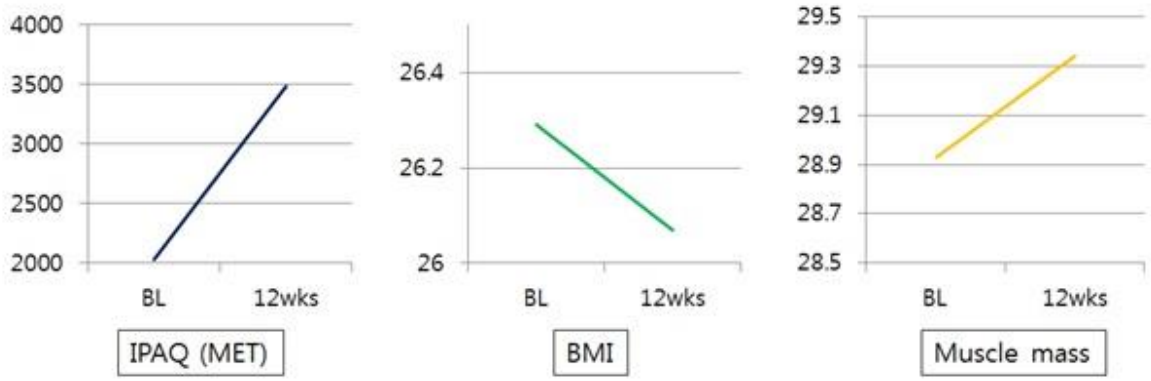
Material and method
The HCC patients on compensated stage who visited the HCC clinic in a tertiary hospital were enrolled. The inclusion criteria were HCC patients aged > 18 years, < 70 years on compensated stage who were able to walk independently for 30 minutes. The participants were provided with a mobile health application and wearable device. We provided individually prescribed exercise program (aerobic, strengthening, stretching exercise) which was adjusted according to the test Results at initial and 6 weeks follow up. The participants' physical performance status (6 minutes' walk test, 30-second chair stand test, grip strength test) was tested initially, at 6 weeks and 12weeks. At initial and terminal assessment, questionnaires of quality of life (EORTC QLQ C30), physical activity level (IPAQ-SF) and measurement of body composition alongside with complete blood count and blood chemistry profile were done.

Results
Among 37 patients, 30 patients completed 12 weeks of exercise and measurements. Although compliance of aerobic and strengthening exercise gradually decreased, the average terminal compliance was 62.90% and 41.94%, respectively. After 12 weeks of individually prescribed exercise intervention, participants showed significant

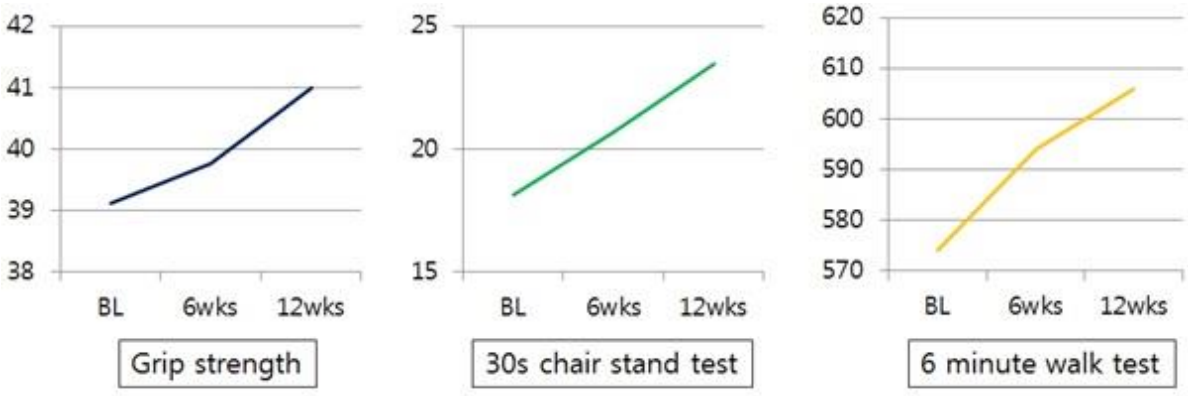
improvement in body composition (increased muscle mass, physical activity, p=0.026, 0.011, respectively) and even in functional terms (6 minutes' walk test, 30-second chair stand test, grip strength test, p<0.001, <0.001, 0.008, respectively). Among items of quality of life, only pain improved significantly (p=0.043). None of the participants reported hepatic decompensated complications and any key biological markers (albumin, bilirubin, liver enzymes) did not deteriorated.

Conclusion

By 12 weeks of prescribed rehabilitation exercise intervention via mobile health application assisted by wearable device, participants showed significantly improved in body composition and in functional terms. All participants terminated 12 weeks of exercise safely without any complication of hepatic decompensation or biological deterioration.



Change of body composition after 12 weeks of individually prescribed exercise with mobile health application



Change of physical performance status after 12 weeks of individually prescribed exercise with mobile health application

	baseline	12 weeks	p value
WBC(x10³/μL)	5.84±2.37	5.92±2.50	.758
Hb(g/dL)	14.41±1.85	14.50±1.38	.658
PLT(x10³/μL)	151.96±44.49	148.25±43.41	.278
Alb(g/dℓ)	4.43±0.39	4.42±0.34	.881
Cholesterol(mg/dℓ)	144.06±25.04	148.87±24.85	.243
Bilirubin, Total(mg/dℓ)	0.81±0.53	0.74±0.40	.217
AST(U/ℓ)	32.64±14.61	32.61±14.08	.986
ALT(U/ℓ)	28.83±17.75	27.61±21.42	.643
ALP(U/ℓ)	78.80±23.09	74.29±19.04	.093
GGT(U/ℓ)	41.80±39.12	38.80±34.37	.366
Creatinine(mg/dℓ)	0.88±0.18	0.85±0.20	.074
Glucose, Fasting(mg/dℓ)	103.90±18.79	111.03±37.73	.194
Osteocalcin	15.92±5.63	16.45±6.73	.255
PT(INR)	1.07±0.11	1.05±0.11	.136

* $p < 0.05$

Change of biological profiles after 12 weeks of individually prescribed exercise with mobile health application