Telehealth management program for patients with chronic renal disease and for AF screening

The Telehealth Center of National Taiwan University Hospital, established in 2009, provides a synchronized and integrated remote management program for patients with multiple chronic diseases. We have shown in our prior studies that this synchronous telehealth management program improves blood pressure and sugar control, reduces the burden of caregivers and is associated with decreased rehospitalization and all-cause mortality compared with usual care. Our center is dedicated to exploring new applications of advanced technology in the remote care of patients.

We evaluated the effect of renal function status on hospitalization among patients participating in our telehealth management program in a recent paper [1]. Among the 715 patients enrolled in this study, chronic kidney disease was a risk factor for hospitalization. Moreover, we found for the first time that the contract compliance rate (to a telehealth management program) in these patients had a triphasic relationship with cardiovascular and all-cause hospitalization. Patients with low or very high contract...
compliance rates had a higher risk of hospitalization. We also observed a significant interaction of the effects of renal function status and contract compliance rate on the risk of hospitalization: patients with end-stage renal disease who were on dialysis had an increased risk of hospitalization at a lower contract compliance rate (Figure 1). Our study provides support that contract compliance to telehealth management should be taken into consideration when evaluating adverse outcomes.

Atrial fibrillation (AF) is a common form of arrhythmia that is associated with an increased risk of stroke and mortality. AF-related stroke is preventable with anticoagulation therapy. Therefore, detecting AF before the first complication occurs is a first priority. However, AF is frequently asymptomatic and escapes early detection. We evaluated the feasibility of AF screening using a telehealth surveillance system with an embedded cloud-computing algorithm in another recent study [2]. We prospectively screened for AF among residents in a nonmetropolitan area (Jinshan district, New Taipei City, Figure 2) using a single-lead, handheld electrocardiogram (ECG) recorder. All ECG measurements were reviewed on the telehealth surveillance system and interpreted by the cloud-computing algorithm and a cardiologist. Among the 922 residents enrolled in this study, a total of 22 (2.4%, 22/922) residents with AF were identified by the physician’s ECG interpretation, and only 0.2% (2/967) of ECGs contained significant artifacts. The novel cloud-computing algorithm for AF detection had a sensitivity of 95.5% (95% confidence interval CI, 77.2–99.9%) and a specificity of 97.7% (95% CI, 96.5–98.5%). The overall satisfaction score for the process of AF screening was 92.1%. Our study demonstrates that AF screening in nonmetropolitan areas using a telehealth surveillance system with an embedded cloud-computing algorithm is feasible.

References


Chi-Sheng Hung
Assistant Professor, Department of Internal Medicine; Tele-Health Center, National Taiwan University Hospital
009578@ntu.edu.tw

Yi-Lwun Ho
Professor, Department of Internal Medicine, National Taiwan University Hospital and National Taiwan University College of Medicine Vice Director of Department of Internal Medicine; Director of Tele-Health Center, National Taiwan University Hospital ylho@ntu.edu.tw

Figure 1. Relationship between the risk of hospitalization and contract compliance rate among patients with end-stage renal disease

Figure 2. NTUH Telehealth Center AF screening program in Jinshan district