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Administrative data on diagnosis and mineralocorticoid receptor antagonist prescription identified patients with primary aldosteronism in Taiwan

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Abstract

Objectives: To develop algorithms of locating patients with primary aldosteronism (PA) using insurance reimbursement data and to validate the algorithms using medical charts.

Study Design and Setting: We extracted National Health Insurance (NHI) reimbursement data and medical charts in seven enrolled hospitals and analyzed diagnosis-related information for 1999–2010. The NHI codes PA as 255.1x, using the International Classification of Diseases, Ninth Revision, Clinical Modification. Confirmation of PA was based on suppression tests.

Results: We reviewed medical charts for 1,094 cases with at least one PA diagnosis. PA was confirmed for 563 cases. Compared with patients with essential hypertension, PA patients had higher systolic blood pressure, higher aldosterone, lower renin activity, and lower potassium level (all *P*-values <0.05). An algorithm based on PA diagnosis reported in at least one hospital stay or three outpatient visits had modest performance (sensitivity = 0.94 and specificity = 0.20). The best additional condition for the algorithm was use of mineralocorticoid receptor antagonist (MRA; sensitivity = 0.89 and specificity = 0.88).

Conclusion: Using information on PA diagnosis and MRA prescription reported in insurance claims data can precisely locate PA patients in high-risk groups. This algorithm can construct a reliable PA sample for conducting research in various fields, including epidemiology and clinical practice.

Keywords: Primary aldosteronism; Administrative data; Validation; Medical chart review; Adjudication; Mineralocorticoid receptor antagonist

1. Introduction

Primary aldosteronism (PA), characterized by an autonomous production of aldosterone, affects 5–13% of patients with resistant hypertension [1–3]. Patients with the classical symptoms known as ‘‘Conn-Trias’’ (hypertension, hypokalemia, metabolic alkalosis) and a screening test with positive results should be followed up by a confirmatory test. Using computed tomography (CT) or magnetic resonance imaging (MRI), and subsequent adrenal venous sampling (AVS), physicians differentiate patient subtypes and make decisions on adrenalectomy [4,5]. Along with better

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What is new?

- Inpatients found to have high risk for primary aldosteronism (PA) by primary screening tests; using information on PA diagnosis and mineralocorticoid receptor antagonist prescription reported in insurance claims data can locate PA patients with high precision level.
- Based on a 1-year look-back period and the criterion that there was at least one inpatient record or three outpatient records with diagnosis for a prevalent morbid condition among PA patients, the comorbid condition can be identified with high accuracy.
- This novel method can be used to extract information from health administrative data and construct a reliable sample of PA patients for conducting research in various fields, including epidemiology, clinical medicine, health services research, and health economics.

recognition of the role of PA in increasing cardiovascular risk and the potential of targeted therapy for PA, the idea of screening at the population level has gained more approval [5]. Partly because PA is a rare disease for which in-depth research requires longitudinal data collected from a tremendously large body of population, the literature has so far provided little information on the PA incidence and prevalence rates, the clinical characteristics, and the clinical course among PA patients [6].

Constructing a large representative database with comprehensive information on the disease incidence and prevalence rates, the clinical characteristics and course, and associations of treatments with prognosis among PA patients can greatly advance knowledge on societal impacts and burdens from the disease and increase chances to unearth better diagnostics, disease management, and treatments. It is promising and relatively economical to take advantage of administrative data that contain detailed, reliable, and longitudinal information on clinical features and health care use. We need solid methods to precisely locate PA patients using administrative data for the population to establish a reliable and representative sample. To the best of our knowledge, the literature has not yet reported any such method. Our study aims to discover a sound algorithm to locate PA patients using insurance claims data.

2. Study participants and design

2.1. Patient enrollment

Our study extracted National Health Insurance (NHI) reimbursement data and medical charts in seven enrolled hospitals and analyzed diagnosis-related information for 1999−2010 in the two data systems. The enrolled hospitals include two academic medical centers, three metropolitan hospitals, and two local hospitals. The seven enrolled hospitals are member organizations in five health care unions which have operation patterns of vertical integration. In total, there are 27 member hospitals in the five unions. The 27 hospitals are located in all geographical locations across Taiwan.

The Taiwan government launched the NHI program in 1995. The NHI covers outpatient visits, hospital admissions, prescriptions, and intervention procedures and maintains disease profiles for greater than 99% of Taiwanese. The NHI had improved access to health care and reduced economic disparity in health care use by the late 1990s [7]. Nearly all hospitals in Taiwan are in the NHI system, including all the associated 27 hospitals. As shown by financial reports from the National Health Insurance Administration (NHIA) [8], NHI reimbursements to the 27 hospitals account for greater than 15% of the total NHI health care expenditures. Thus, clinical data collected in our seven study hospitals are expected to be highly representative for behaviors of clinical practice and health care seeking in the NHI, and the algorithm we developed is expected to be applicable for most hospitals in Taiwan.

Each hospital in the NHI system maintains an electronic database for NHI claims. The electronic database of NHI claims contains comprehensive information on disease diagnosis and health care use, particularly for cases requiring expensive services. The NHI database has been offering research data in various studies on epidemiology, health services research, and clinical medicine [9−11].

The NHIA has been the single buyer in the NHI since 1995 [12]. To detect fraud in the NHI, the NHIA has been routinely auditing data submitted by health care institutions [13]. To avoid the NHIA's rejection of reimbursement claims, physicians in Taiwan usually follow clinical guidelines. Because confirmation tests for PA are costly and intrusive, Taiwanese physicians follow the Endocrine Society's clinical practice guidelines [14], and focuses on performing such confirmation tests for patients found to have high PA risk by the screening tool most recommended by the guidelines, the aldosterone-to-renin ratio (ARR). Physicians in Taiwan calculate ARR values using plasma aldosterone concentration (PAC) and plasma rennin activity (PRA) measured in conventional units and tend to use a cutoff value close to the most cited value: 30. The NHI codes PA as 255.1x, using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). To ensure reimbursements for PA confirmation tests, a physician would record the ICD-9-CM code before performing such tests.

2.2. Disease confirmation

We identified 1,094 patients with at least one NHI claim record (either inpatient or outpatient) with a PA diagnosis