

Comparative analysis of benign prostatic hyperplasia management by urologists and nonurologists: A Korean nationwide health insurance database study

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Purpose: To compare the current management of benign prostatic hyperplasia (BPH) by urologists and nonurologists by use of Korean nationwide health insurance data.

Materials and Methods: We obtained patient data from the national health insurance system. New patients diagnosed with BPH in 2009 were divided into two groups depending on whether they were diagnosed by a urologist (U group) or by a nonurologist (NU group).

Results: A total of 390,767 individuals were newly diagnosed with BPH in 2009. Of these, 240,907 patients (61.7%) were in the U group and 149,860 patients (38.3%) were in the NU group. The rate of all initial evaluation tests, except serum creatinine, was significantly lower in the NU group. The initial prescription rate was higher in the U group, whereas the prescription period was longer in the NU group. Regarding the initial drugs prescribed, the use of alpha-blockers was common in both groups. However, the U group was prescribed combination therapy of an alpha-blocker and 5-alpha-reductase inhibitor as the second choice, whereas the NU group received monotherapy with a 5-alpha-reductase inhibitor. During the 1-year follow-up, the incidence of surgery was significantly different between the U group and the NU group.

Conclusions: There are distinct differences in the diagnosis and treatment of BPH by urologists and nonurologists in Korea. These differences may have adverse consequences for BPH patients. Urological societies should take a leadership role in the management of BPH and play an educational role for nonurologists as well as urologists.

Keywords: Epidemiology; Insurance claim review; Prostatic hyperplasia

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the most common diseases among elderly males. Today, with the trend toward a decreased incidence of surgery and a growing demand for medical therapy, medical doctors other than urologists may be responsible for the diagnosis and management of BPH treatment [1]. In European countries and in the United States, BPH patients are commonly seen by nonurologists. Usually, primary physicians and family medicine specialists diagnose and treat BPH patients and play the role of gatekeepers in the referral system. Previous work pointed out that problems associated with the management of BPH by nonurologists were symptomatic rather than diagnostic [2,3].

Many BPH patients are also managed by nonurologists in Korea. However, Korea's health care system is quite different from the systems of other countries. Most of the physicians are specialists, and these specialists are responsible for primary health care. In addition, BPH patients decide whether to visit a urologist or a nonurologist according to their preference rather than a referral system [4]. Although this situation could give rise to many problems; to date, there has been little research on this issue.

The entire population of South Korea is included in the country's national health insurance system. Using nationwide health insurance data, Kang et al. [5] presented statistics on both medical and surgical BPH treatment from 2004 to 2008. However, they did not show the actual flow of BPH management, in other words, how the patients were diagnosed and treated. In the current study, we analyzed the current status of BPH management and differences in BPH management between urologists and nonurologists.

MATERIALS AND METHODS

1. Inclusion and exclusion criteria

We obtained data from 2007 to 2011 from the Health Industry Representatives Association (HIRA). Data with the code N40, which indicates BPH according to the National Center for Health Statistics International Classification of Diseases, 9th revision (ICD-9), were included. The diagnosis of BPH at clinics or hospitals was based on this code alone.

Initial BPH patients were defined as not having been assigned a code of N40 within the last 2 years. Inflammatory diseases of the prostate and prostate cancer may affect the

evaluation and treatment of initial BPH patients. Therefore, patients with either of these conditions were excluded. Those with Parkinson disease, multiple sclerosis, cerebral palsy, stroke, and other paralytic syndromes were excluded for the same reason. Comorbidities included other diseases, such as hypertension and diabetes mellitus, diagnosed over two times after the diagnosis of BPH. This study was approved by the Institutional Review Board of at the Seoul Metropolitan Government - Seoul National University Boramae Medical Center. The approval number is H-1202-065-398.

2. Clinical parameters

The patient's ages were divided by decades, and the regions were divided into big cities, small cities, and rural areas. Comorbidities including hypertension, diabetes mellitus, and malignancy, except prostate cancer, were recorded. The type of hospital, clinical department, and insurance were divided according to each criterion. The Korean health insurance covers the whole population living in the country. Major sources of financing are contributions from the insured and government subsidies. On the other hand, medical aid is a form of public assistance to secure the minimum livelihood of low-income households and to assist with self-help by providing medical services.

Initial evaluation tests covered by medical insurance were conducted within 1 month after the diagnosis of BPH. The initial medical treatments were analyzed according to the type and the duration of the prescription at the time of the diagnosis. Drugs were classified as alpha-blockers, 5-alpha-reductase inhibitors, and anticholinergics. Alpha-blockers included alfuzosin, doxazosin, tamsulosin, and terazosin. The 5-alpha-reductase inhibitors were dutasteride and finasteride, and the anticholinergics were oxybutynin, propiverine, trospium, tolterodine, and solifenacin. The incidence of surgery was recorded during a 1-year follow-up. Four kinds of surgeries were included: transurethral resection of the prostate (TURP), open prostatectomy, hyperthermia therapy, and laser therapy. Hyperthermia therapy included transurethral needle ablation and various strategies, such as Prostron, Thermex, Microfocus, and Prosta. Laser therapy was mainly Potassium titanyl phosphate photoselective vaporization of the prostate.

3. Statistical analysis

Pearson chi-square test and a linear regression model were used to describe the relationship between the variables. Statistical significance was considered at $p < 0.05$. All statistical analyses were performed by using SPSS ver. 14.0

(SPSS Inc., Chicago, IL, USA).

RESULTS

According to the HIRA data, the number of registered BPH patients from 2007 to 2011 was 844,931 (2007), 961,983 (2008), 1,116,549 (2009), 1,238,573 (2010), and 1,297,750 (2011). The prevalence per 10,000 people was 468 (2007), 527 (2008), 606 (2009), 666 (2010), and 689 (2011) for each year. The number of patients and the prevalence tended to increase gradually.

A total of 390,767 individuals were defined as new BPH patients in 2009. Of these, 240,907 patients (61.7%) were diagnosed by urologists (U group) and 149,860 patients (38.3%) by nonurologists (NU group). Among the nonurologists, internists were most common (57.7%), followed in descending order by general surgery (8.6%), dermatology

(7.6%), orthopedics (6.9%), and family medicine (6.8%) practitioners.

The average age of the patients in the U group was lower than that in the NU group (57.4 years vs. 61.6 years, respectively), and there were more patients over the age of 70 years in the NU group. The rates of hypertension, diabetes mellitus, and malignancy were higher in the NU group. Patients from big cities and small cities were more prevalent in the U group, whereas the NU group contained more patients from rural areas. In the analysis of type of hospital, the ratio of primary hospital and public health center was significantly lower in the U group. Medical aid was more common in the NU group (Table 1).

The initial diagnostic evaluation of new BPH patients differed significantly between the two groups. The rate of all tests, except serum creatinine, was lower in the NU

Table 1. Characteristics of newly diagnosed BPH patients in 2009

Characteristic	U group	NU group	p-value
No. of patients	240,907	149,860	
Age (y), mean±SD	57.4±11.0	61.6±12.0	<0.001
Age classification			<0.001
20s	1,022 (0.4)	605 (0.4)	
30s	9,120 (3.8)	4,331 (2.9)	
40s	49,193 (20.4)	19,927 (13.3)	
50s	80,543 (33.4)	38,691 (25.8)	
60s	66,214 (27.5)	45,187 (30.2)	
70s	29,012 (12.0)	31,997 (21.4)	
Over 80s	5,803 (2.4)	9,122 (6.1)	
Comorbidities			
Hypertension	61,306 (25.4)	49,086 (32.8)	<0.0001
Diabetes mellitus	23,810 (9.9)	20,462 (13.7)	<0.0001
Dyslipidemia	6,890 (2.8)	4,115 (2.7)	0.005
Malignancy	12,044 (5.0)	12,632 (8.4)	<0.0001
Area classification			<0.0001
Big city	125,944 (52.3)	67,732 (45.2)	
Small city	97,792 (40.6)	60,775 (40.6)	
Rural area	17,171 (7.1)	21,353 (14.2)	
Hospital classification			<0.0001
Tertiary hospital	25,250 (10.5)	15,078 (10.1)	
Secondary hospital	51,266 (21.3)	26,957 (18.0)	
Primary hospital	5,691 (2.4)	18,467 (12.3)	
Clinic	158,615 (65.8)	84,690 (56.5)	
Public health center	85 (0.0)	4,668 (3.1)	
Insurance classification			<0.0001
Health insurance	231,349 (96.0)	138,725 (92.6)	
Medical aid	9,558 (4)	11,135 (7.4)	

Values are presented as number (%) unless otherwise indicated.

BPH, benign prostatic hyperplasia; SD, standard deviation; U group, patients diagnosed by a urologist; NU group, patients diagnosed by a nonurologist.

Table 2. Initial evaluation and medical treatments of newly diagnosed BPH patients in 2009

Variable	U group	NU group	p-value
No. of patients	240,907	149,860	
Initial evaluation			
Digital rectal exam	44,537 (18.5)	9,090 (6.1)	<0.0001
Urine analysis	166,036 (68.9)	71,408 (47.6)	<0.0001
Prostate-specific antigen	139,214 (57.8)	58,711 (39.2)	<0.0001
Uroflowmetry	70,250 (29.2)	10,342 (6.9)	<0.0001
Serum creatinine	61,364 (25.5)	60,713 (40.5)	<0.0001
Initial medical treatments			
No medication	81,684 (33.9)	65,738 (43.9)	<0.0001
Medication	159,223 (66.1)	84,122 (56.1)	<0.0001
Prescription days	15.4±7.3	17.9±6.7	<0.0001

Values are presented as number (%) unless otherwise indicated.

BPH, benign prostatic hyperplasia; U group, patients diagnosed by a urologist; NU group, patients diagnosed by a nonurologist.

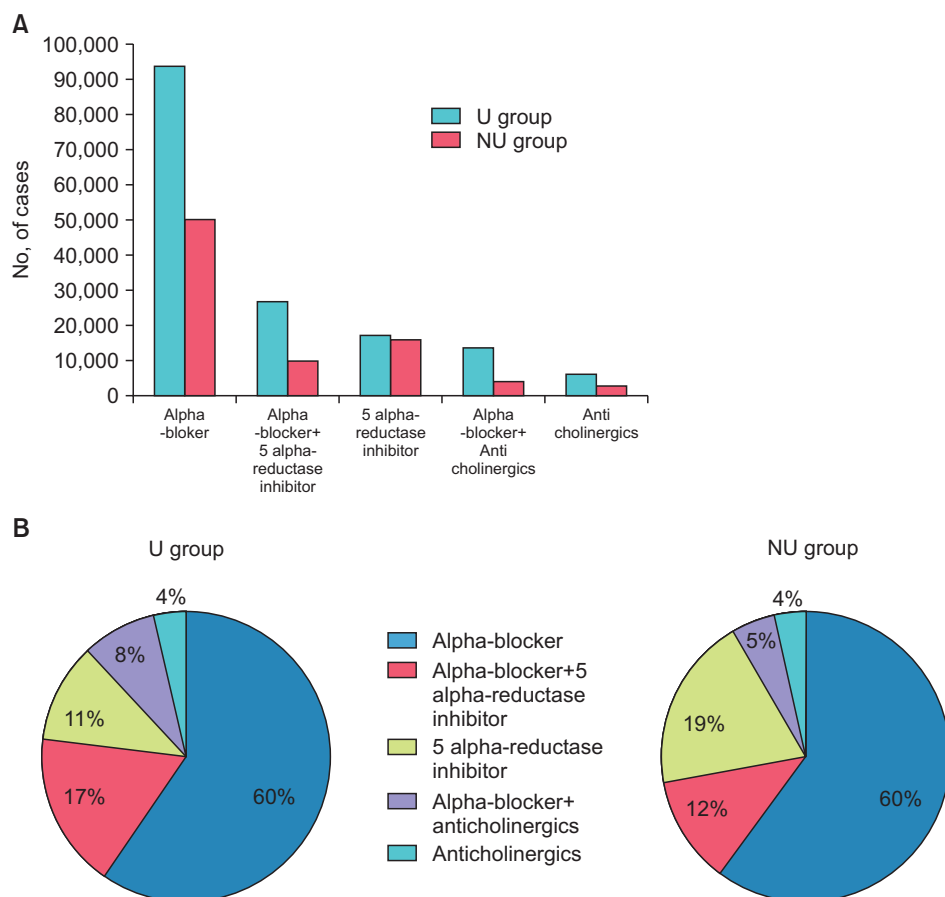


Fig. 1. Initial prescription pattern of newly diagnosed benign prostatic hyperplasia patients in 2009. (A) Total cases of prescription by U group vs. NU group. (B) Venn diagrams of prescription pattern of U group vs. NU group. U group, patients diagnosed by a urologist; NU group, patients diagnosed by a nonurologist.

group. In the case of digital rectal examination (DRE), the rate was 18.5% in the U group and only 6.1% in the NU group (Table 2).

The rate of drug prescription after the initial diagnosis was higher in the U group, whereas the periods of drug prescription were longer in the NU group (Table 2). In the analysis of kinds of drugs, the use of alpha-blockers was common in both groups. Urologists prescribed combination

therapy of an alpha-blocker with a 5-alpha-reductase inhibitor as the second choice, whereas the nonurologists preferred monotherapy with a 5-alpha-reductase inhibitor (Fig. 1).

The incidence of surgery during the 1-year follow-up was significantly different between the U group and the NU group (3,213 cases vs. 646 cases, respectively). TURP was the most common surgery, followed in descending or-

Table 3. Operation incidence of newly diagnosed BPH patients in 2009

Operation incidence	U group	NU group	p-value
No. of patients	3,213	646	<0.0001
TURP	1,272	391	<0.0001
Open prostatectomy	31	16	0.540
Laser	969	159	<0.0001
Hyperthermia	939	80	<0.0001

BPH, benign prostatic hyperplasia; U group, patients diagnosed by a urologist; NU group, patients diagnosed by a nonurologist; TURP, transurethral resection of the prostate.

der by laser, hyperthermia, and open prostatectomy. In the comparison of each type of surgery, all types of surgeries, except open prostatectomy, were significantly lower in the NU group (Table 3).

DISCUSSION

We investigated 5-year HIRA data in the present study. The HIRA monitors and analyzes reimbursement records from the Korean National Health Insurance and Korean Medical Aid. Because almost all Koreans are required to join the National Health Insurance (approximately 96.3% of the population) or the Korean Medical Aid (approximately 3.7%) scheme, the HIRA records cover all Korean citizens (approximately 50 million people).

In this study, the numbers of BPH patients in Korea increased throughout the 5-year period, but the numbers were much lower than those reported in several community-based prevalence surveys [5-7]. We defined BPH patients only as those assigned the code of N40 owing to voiding problems. Therefore, the number of patients was lower than the actual prevalence of BPH.

We referred to well-known BPH guidelines [8,9] in the course of the initial diagnostic evaluations and medical treatments. These guidelines suggest reasonable and cost-effective ways for urologists and nonurologists to manage BPH. A considerable number of BPH patients were managed by nonurologists, especially internists. The comparative analysis between the two groups revealed significant differences with respect to basic patient characteristics, initial evaluation, and medical and surgical treatments.

Greater numbers of patients who were older than 70 years and had comorbidities such as hypertension, diabetes mellitus, dyslipidemia, and malignancy visited nonurologists. This finding is related to the nature of the Korean health system, where most physicians are specialists. Internists and other medical specialists provide pri-

mary physician services locally. Because elderly patients who need treatment for voiding problems are usually receiving regular care for hypertension, diabetes mellitus, and other medical problems, they tend to prefer to see their own doctor for the management of voiding problems [4].

There are relatively few urological departments in rural areas, primary hospitals, and public health centers. Therefore, BPH patients tend to be treated by nonurologists. Urologists usually suggest numerous items not covered by insurance, including transrectal ultrasound (TRUS). Therefore, patients covered by medical aid are unlikely to visit a urologist because of cost.

The course of the initial evaluation was significantly different between the two groups. Although differences in hospital facilities and the environment might have affected the evaluation, the rates of all basic tests, except serum creatinine, were significantly lower in the NU group. The findings suggest that the nonurologists skipped a number of essential diagnostic tests. In contrast, urologists conducted many tests not covered by insurance in addition to basic tests [10,11].

An alpha-blocker was the drug of choice in both groups. The development of safe and effective BPH drugs, such as alpha-blockers, has led nonurologists to prescribe these for voiding symptoms. The statistics revealed that many nonurologists selected the 5-alpha-reductase inhibitor as the initial drug without checking the patient's baseline prostate-specific antigen (PSA) level, something that could lead to later problems in interpreting PSA levels [12].

The difference in the incidence of surgery between the U group and the NU group could be explained by differences in the patient's characteristics. Old age, more comorbidities, and the presence of several other conditions may have precluded surgery in the NU group. Most BPH operations were performed by urologists. However, it seems that the doctors who initially diagnose BPH may also influence the patient's choice of operation. In the analysis by type of surgery, TURP and laser therapy were more common in both groups.

The present study had several limitations associated with the insurance claim data used, as has been noted in similar previous studies [13-16]. Not all BPH patients have access to hospitals. Thus, insurance claim records might underestimate the BPH population if some patients are not diagnosed or treated in health care institutions. Furthermore, misclassifications of the disease or diagnosis coding errors could have occurred. Also, the data only contained items covered by insurance. In particular, the initial

examination and the diagnosis of BPH patients include history taking, a physical exam, and a questionnaire with information such as the International Prostate Symptom Score [8,9]. However, these items are not embedded in insurance coverage data and therefore were not included in the evaluation. Although most urologists prefer TRUS as a diagnostic tool, TRUS is classified as a noninsurance item in Korea. Therefore, it was not included in the evaluation. In addition, there was a risk of underestimation of BPH in the basic physical examination, which consists of a DRE. In Korea, many urologists perform the DRE as a part of the TRUS procedure, and the charge for the DRE is much cheaper than for TRUS. Thus, many urologists do not charge the DRE fee to patients [11].

The risk of selection bias in the comparative analysis between the U group and the NU group caused by the initial evaluation and medical and surgical treatments also has to be considered. In fact, the basic characteristics of each group of patients were significantly different.

Lastly, because the HIRA data contain the insurance records of all Korean citizens, it was not possible to analyze all the data. We requested the data by use of established procedures and received the results from researchers at the HIRA. We received data only for 2007–2011, and we had to define patients newly diagnosed with BPH within the range of the data. By employing fastidious inclusion and exclusion criterion, the number of patients included in this study was considerably reduced.

Despite these limitations, this study has important implications. It is the first nationwide, population-based study to demonstrate the differences in BPH management between urologists and nonurologists in Korea. Therefore, we believe that this large-scale study provides reliable and objective information for researchers and authorities formulating health care policies on the management of BPH.

CONCLUSIONS

The present study is a real-world study reflecting current BPH management in Korea. It revealed a distinct gap between urologists and nonurologists in the diagnosis and treatment of BPH. This gap may have serious implications for the management of BPH patients. The Urological Society should arrange ongoing training programs for BPH management for nonurologists as well as urologists.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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