



Original article

Nationwide survey to evaluate the characteristics of medical utilization in patients with varicocele in Taiwan



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ABSTRACT

Objective: The authors aim to analyze age, geographic, and seasonal variations in the medical services utilization of patients with varicocele in Taiwan using a population-based study.

Methods: Between 2001 and 2008, a retrospective nationwide population-based study was conducted using comprehensive data on the characteristics of medical services utilization by patients with varicocele in Taiwan obtained from the Taiwan National Health Insurance Research Database. Parameters for comparison included newly diagnosed varicocele cases, the number of varicocelectomies, and incidence rates every year, and newly diagnosed varicocele cases, the number of outpatient consults due to varicocele, and the numbers of varicocelectomies by age group, season, and area of Taiwan.

Results: An average of 303 newly diagnosed varicocele cases and an average of 63.3 varicocelectomy procedures per year per million were reported during the study period. More varicocelectomies were performed in patients aged 10–39 years. The numbers of newly diagnosed varicocele cases and outpatient visits were highest during summer, followed by during spring, autumn, and winter, and in the north of Taiwan, followed by in the center, south, and east.

Conclusion: The numbers of newly diagnosed varicocele cases and outpatient visits due to varicocele are highest in summer among all seasons and lowest in eastern Taiwan compared to other parts of the country. Medical education programs on varicocele are needed, especially for those living in eastern Taiwan.

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1. Introduction

Varicocele is abnormal tortuosity and dilatation of the veins of the pampiniform plexus within the spermatic cord. It is one of the causes of male infertility, with a prevalence of about 15–20% in the general population and 30–40% in infertile men.¹ Around 69–81% of men with secondary infertility have varicocele.^{2,3} Levinger et al⁴ reported that the prevalence of varicocele increases over time, whereas the incidence increases by 10% for every 10 years of life. In a nationwide survey in South Korea, the prevalence in middle school boys has been reported to be 16.5%.⁵ Varicocele may cause

scrotal pain or a pulling and dragging sensation that worsens after straining and exercise.⁶ The incidence of pain in men with varicocele is about 2–10%.^{6,7} Patients with varicocele will seek medical attention for male infertility, scrotal pain, testicular atrophy, and hypogonadism. Varicocelectomy is the suggested treatment for male subfertility and can be an effective management option for painful varicocele when conservative treatment fails.⁷

Information on the utilization of medical services in patients with varicocele in terms of age, season, and area is relatively scarce. This nationwide study was aimed at evaluating the utilization of medical services in patients with varicocele by calculating the numbers of newly diagnosed varicocele cases and varicocelectomies performed every year, and the numbers of newly diagnosed varicocele cases, outpatient visits for varicocele, and varicocelectomies by age, season, and area of Taiwan, using the Taiwan National Health Insurance Research Database (NHIRD) covering the period 2001–2008.

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2. Methods

Since its establishment in 1995, the National Health Insurance (NHI) program in Taiwan has covered approximately 96% of the population, 97% of hospitals, and 90% of clinics in Taiwan.^{8,9} To ensure the accuracy of the claims data, the Bureau of National Health Insurance performs quarterly expert reviews on a random sample of every 50–100 claims in each hospital and clinic and imposes severe penalties on the health providers that violate regulations.

All data from the NHIRD used in this study was deidentified. Comprehensive data about the characteristics of medical services utilization was evaluated using the following parameters: newly diagnosed varicocele cases and the number of varicocelectomies performed every year, and newly diagnosed varicocele cases, the number of outpatient visits for varicocele, and the number of varicocelectomies by age, season, and area of Taiwan. The age of each patient was determined based on the date of birth, whereas the geographic area was documented according to either the residential area or the location of employment.¹⁰ Meteorological data were obtained from the Central Weather Bureau in Taiwan.¹¹ Diagnosis of varicocele and male infertility was according to the International Statistical Classification of Disease and Related Health Problems, ninth edition (ICD-9-CM codes; 456.4 for varicocele and 606 for male infertility), and varicocelectomy according to the NHI surgical classification codes (79202B, 79203C, and 79204C). This study was exempted from a survey by the Institution Review Board of Taipei City Hospital.

The χ^2 test was used for the analysis of experimental data. SPSS version 17.0 (SPSS Inc., Chicago, IL, USA) was used for all statistical analyses. Statistical significance was set at $p < 0.05$.

3. Results

Data on newly diagnosed varicocele cases and the number of patients who underwent varicocelectomy during 2001–2008 were stratified by year (Table 1) and by age (Table 2). Data on newly diagnosed varicocele cases, the number of outpatient visits, and postvaricocelectomy patients were stratified by season, whereas those on newly diagnosed varicocele cases and numbers of outpatient visits and varicocelectomies were stratified by area of Taiwan (Tables 3 and 4, respectively). Temperature was highest in summer (June, July, and August), followed by in spring (March, April, and May), autumn (September, October, and November), and winter (December, January, and February).

From 2001 to 2008, an average of 303 newly diagnosed varicocele cases per year per million, with an average of 63.3 varicocelectomies per year per million, were reported. The overall

Table 1
NDCs and number of Vxs from 2001 to 2008.

Year	NDC	Incidence rate (per 10 ³ /y)	No. of Vx	Incidence rate (per 10 ³ /y)	No. of Vx due to MI
2001	279	0.62	62	0.12	32
2002	330	0.76	81	0.16	44
2003	284	0.62	67	0.13	34
2004	303	0.68	54	0.11	29
2005	310	0.66	54	0.11	28
2006	301	0.64	60	0.12	34
2007	304	0.66	69	0.14	38
2008	313	0.68	60	0.12	34
Ave	303	0.66	63.3	0.13	34.1

Ave = average; MI = male infertility; NDC = newly diagnosed varicocele case; Vx = varicocelectomy.

Table 2
NDCs and number of Vxs by age group from 2001 to 2008.

Age group (y)	NDC	Incidence rate (per 10 ³)	No. of Vx	Incidence rate (per 10 ³)	No. of Vx due to MI
<10	31	0.32	4	0.04	0
10–19	495	10.82	143	3.12	13
20–29	664	6.24	170	1.60	135
30–39	617	6.44	128	1.34	101
40–49	332	4.98	39	0.58	22
50–59	172	4.42	10	0.26	1
60–69	62	1.88	10	0.30	1
≥70	51	3.56	3	0.20	0

MI = male infertility; NDC = newly diagnosed varicocele case; Vx = varicocelectomy.

incidence rate of new cases of varicocele was 0.66 per million (male), whereas the overall incidence of varicocelectomy was 0.14 per million (male). No significant differences were observed between years (Table 1). About 20.9% (63.3/303) of newly diagnosed varicocele cases received varicocele repair, and about 53.8% (34.1/63.3) of patients received varicocelectomy because of male infertility. The numbers of newly diagnosed varicocele cases and varicocelectomies, and the incidence rate were highest in patients aged 10–19 years, followed by in those aged 20–29 years, 30–39 years, and 40–49 years (Table 2). The incidence of varicocelectomy due to male infertility was highest in patients aged 20–39 years (Table 2). The numbers of newly diagnosed varicocele cases and outpatient visits differed significantly across seasons and was highest in summer, followed by in spring, autumn, and winter. The number of varicocelectomies was also highest in summer, followed by in spring, winter, and autumn, varying significantly by season (Table 3). Lastly, the numbers of newly diagnosed varicocele cases, outpatient visits, and varicocelectomies were highest in the north and lowest in the east of Taiwan, with significant differences between them (Table 4).

4. Discussion

The natural history of varicocele and its associated pain in men is unclear. Possible mechanisms include nerve compression by dilated spermatic veins, and increased scrotal temperature or tissue ischemia due to blood stasis in the spermatic vein.^{12,13} A previous report has shown significantly higher scrotal temperature and lower body mass index (BMI) in normospermia adult patients with left painful varicocele than in those with left painless varicocele.¹⁴ In addition, patients with higher scrotal temperatures have significantly poorer semen quality.¹⁵ Elevation of scrotal temperature may impair spermatogenesis

Table 3
NDCs and the numbers of outpatient visits and Vxs in different seasons between 2001 and 2008.^a

Parameters	Season							
	Spring		Summer		Autumn		Winter	
	n	%	n	%	n	%	n	%
NDC*	635	26.20	665	27.43	566	23.35	558	23.02
OV**	1919	26.09	2097	28.52	1713	23.29	1625	22.10
Vx***	125	24.65	154	30.37	101	19.92	127	25.05

* $p = 0.0035$.

** $p < 0.0001$.

*** $p = 0.0202$.

NDC = newly diagnosed varicocele case; OV = outpatient visit; Vx = varicocelectomy.

^a Chi-square test was used for statistical analysis. A p value < 0.05 was considered to indicate a significant difference.

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