Epidemiological study of skin diseases using National Health Insurance database (NHIRD)

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REDUCED ACCESS TO DATABASE

Publicly available databases accelerate academic production

Electronic health databases are popular as research materials in medical studies.[1] Our analysis of publications that used the general practice research database (GPRD) as their main data source found that from 1995 to 2009, GPRD had attracted 1251 authors from 22 countries. In total, 749 studies were published in 193 journals, covering 58 study fields—from pharmacology and pharmacy (26.4%), general and internal medicine, to economics. The number of GPRD studies is increasing rapidly and is expected to double by 2015.

Taiwan's national health insurance research database (NHIRD), composed of de-identified medical claims from 99% of Taiwan's 23 million people, is available to any researcher in Taiwan.[2] A small data processing fee is charged—TWD500 (£11; €12.6; $17) per compact disc or TWD200 per gigabyte of data. Like GPRD, NHIRD also has great academic influence. In a 10 year analysis, we found 383 NHIRD studies conducted by 667 authors, published in 210 journals, covering 60 study fields—from healthcare sciences (14.4%), to economics, and computer science.[3] Not only clinical but also general health disciplines benefited from NHIRD. The number of articles doubled every two years—a growth rate two times greater than that for GPRD studies.

These analyses suggest that public health databases promote scientific research, and even more so when the barriers for use are low. To promote healthcare, data holders at a national level should consider minimising financial and technical constraints on the reuse of data for research purposes.

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Competing interests: None declared.

1 Kmietowicz Z. End of free access to database will

Case series study

- Chang YT, Liu HN, Wong CK: Bullous pemphigoid –a report of 86 cases from Taiwan. Clinical and Experimental Dermatology 1996;21:20-22.
- We reviewed 86 cases of bullous pemphigoid and the results were compared with those reported in the literature. Seventy-eight per cent of the patients developed generalized blisters and 22% had localized blisters, including three cases of dyshidrosiform pemphigoid and one case of pretibial pemphigoid. Oral mucosal involvement was noticed in 12.8% of the patients. Fifteen per cent of the patients had internal malignancies but the incidence was not significantly different from the control group. Direct immunofluorescence in our series showed a high positive rate of 98.8%. Indirect immunofluorescence was positive in 48.1% of the 54 patients in whom this was carried out. Peripheral blood eosinophilia was observed in 22.1% of the patients. Prednisolone alone or in combination with immunosuppressive agents was the mainstay of treatment. Treatment side-effects was observed in 33% of the patients. Thirty per cent of the patients had a complete remission after a mean follow-up period of 26.9 months.

Case series study

- 診斷準確度高
- 有詳細的lab data, 疾病嚴重程度,personal data
- 數目有限
- 具不具代表性?(VGH vs nation-wide study)
- Incidence? Prevalence?

Health insurance database

* UK general practice database
* USA:
  * Medicare:a social insurance program administered by the United States government, providing health insurance coverage to people who are aged 65 and over, or who meet other special criteria.
  * Medicaid: health program for eligible individuals and families with low incomes and resources.

* Molecular biology study很重要
* NHIRD是很好的輔助研究工具
  * 可以做許多流行病學的研究
  * Incidence, prevalence, comorbidity, cancer risk, pharmacoeconomics….

Claim-based studies

- Strength of claim-based databases:
  - Infrequent events
  - Real-world patterns (utilization/cost/effects)
  - Low cost
  - Accessible
  - Long follow-up duration (1996-2009, 14 years)

Drawbacks of claim based study

- Diagnosis code may be unreliable.
- No lab data, histopathological reports.
- No information about family history, life style (smoking, drinking), body weight, body length.
- No detailed clinical information (disease extent, severity..)
- 死亡率無法直接得知 (on site service?)

資料庫研究著作：

- Chen YJ, Wu CY, Lin MW, Chen TJ, Liao KK, Chen YC, Hwang CY, Chu SY, Chen CC, Lee DD, *Chang YT (corresponding author), Wang WJ, Liu HN. Comorbidity profiles among patients with bullous pemphigoid: a nationwide population-based study. Br J Dermatol.
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- Chen YJ, Wu CY, Huang YL, Wang CB, Shen JL, *Chang YT. Cancer risks of dermatomyositis and polymyositis: a nationwide cohort study in Taiwan. Arthritis Research & Therapy, 2010 Apr 16;12(2):R70.
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- Huang YL, Chen YJ, Lin MW, Wu CY, Liu PC, Chen TJ, Chen YC, Jih JS, Chen CC, Lee DD, *Chang YT (corresponding author), Wang WJ, Liu HN. Malignancies associated with dermatomyositis and polymyositis in Taiwan: a nationwide population-based study. British Journal of Dermatology, 2009,161(4):854-60.
- Chang YT, Chen TJ, Liu PC, Chen YC, Chen YJ, Huang YL, Jih JS, Chen CC, Lee DD, Wang WJ, Lin MW*, Liu HN. Epidemiological study of psoriasis in the national health insurance database in Taiwan. Acta Dermato Venereol, 2009; 89:262-266.

SCI 2010, dermatology, 54 journals

2010 Dermatology		Impact Factor
1	J INVEST DERMATOL	6.27
2	PIGM CELL MELANOMA R	4.75
3	BRIT J DERMATOL	4.351
4	J AM ACAD DERMATOL	4.274
5	ARCH DERMATOL	4.231
6	EXP DERMATOL	4.159
7	J DERMATOL SCI	3.712
8	CONTACT DERMATITIS	3.672
9	WOUND REPAIR REGEN	3.443
10	J EUR ACAD DERMATOL	3.309
11	ACTA DERM-VENEREOL	2.78
12	DERMATOLOGY	2.714
13	SKIN PHARMACOL PHYS	2.711
14	CLIN DERMATOL	2.424
15	EUR J DERMATOL	2.421
16	DERMATOL SURG	2.264
17	MELANOMA RES	2.254

Design of claim-based studies

Observational studies

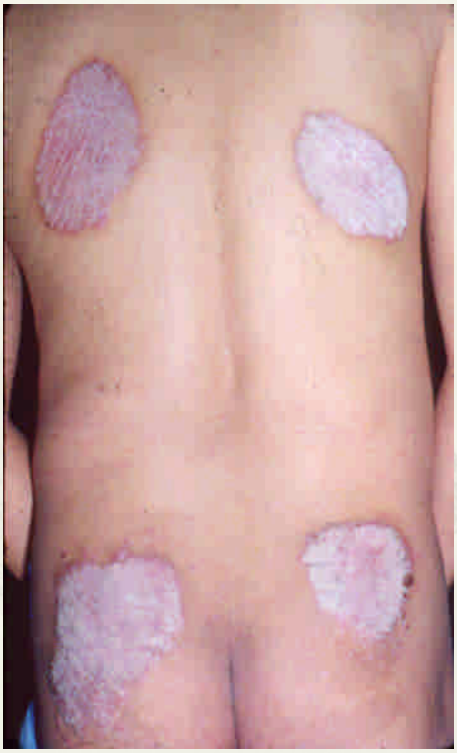
Descriptive studies	Analytic studies	- Ecological - Cross-sectional - Case-control - Cohort

資料處理

單純 複雜

低臨床相關 高臨床相關

Psoriasis乾癬(牛皮癬、銀屑病)



- Psoriasis is a common chronic inflammatory disorder of the skin.
- It affect about 2% of people in USA, with low incidence in Japan and China (0.3%)
- life-long disease.
- Age of onset: 3rd decades (other peak: 2nd, 6th decades)
- Sex: male = female

Yip SY. The prevalence of psoriasis in the Mongoloid race. *J Am Acad Dermatol* 1984; **10**: 965-8.

Studies in the UK and Spain have demonstrated that the prevalence of psoriasis declines significantly in patients older than 70 years.

Table 1. Prevalence of Psoriasis in the GPRD by Age Group and Sex

	Prevalence/10 000 (95% Confidence Interval)		
Patient Age, y	Male Patients	Female Patients	Total
0-9	48.62 (47.02-50.27)	61.76 (59.91-63.66)	55.02 (53.78-56.27)
10-19	118.58 (115.20-122.02)	154.79 (151.08-158.57)	137.37 (134.85-139.93)
20-29	149.14 (146.15-152.18)	152.55 (149.86-155.29)	151.04 (149.04-153.07)
30-39	186.60 (183.01-190.25)	169.75 (166.39-173.16)	178.01 (175.55-180.50)
40-49	219.06 (214.73-233.47)	187.94 (183.39-192.01)	203.43 (200.48-206.42)
50-59	232.30 (227.07-237.61)	213.73 (208.84-218.71)	222.78 (219.20-226.40)
60-69	226.28 (220.74-231.92)	225.66 (220.50-230.90)	225.95 (222.17-229.77)
70-79	168.40 (162.50-174.46)	156.60 (151.89-161.43)	161.39 (157.70-165.15)
80-89	89.62 (82.94-96.69)	87.90 (83.43-92.55)	88.44 (84.71-92.29)
≥90	46.42 (33.03-63.40)	47.57 (40.30-55.76)	47.33 (40.85-54.53)
Total	152.74 (151.46-154.02)	151.38 (150.18-152.58)	152.02 (151.14-152.89)

Abbreviation: GPRD, General Practice Research Database.

1.Gelfand JM, Weinstein R, Porter SB, Neimann AL, Berlin JA, Margolis DJ. Prevalence and treatment of psoriasis in the United Kingdom: a population-based study. Arch Dermatol 2005; 141: 1537-1541.
2. Ferrándiz C, Bordas X, García-Patos V, Puig S, Pujol R, Smandía A. Prevalence of psoriasis in Spain (Epiderma Project: phase I). J Eur Acad Dermatol Venereol 2001; 15: 20-23.

台灣乾癬病人的流行病學

* An epidemiological study of psoriasis using national health insurance database in Taiwan.

Chang YT, et al.

Acta Dermato Venereol, 2009; 89:262-266.

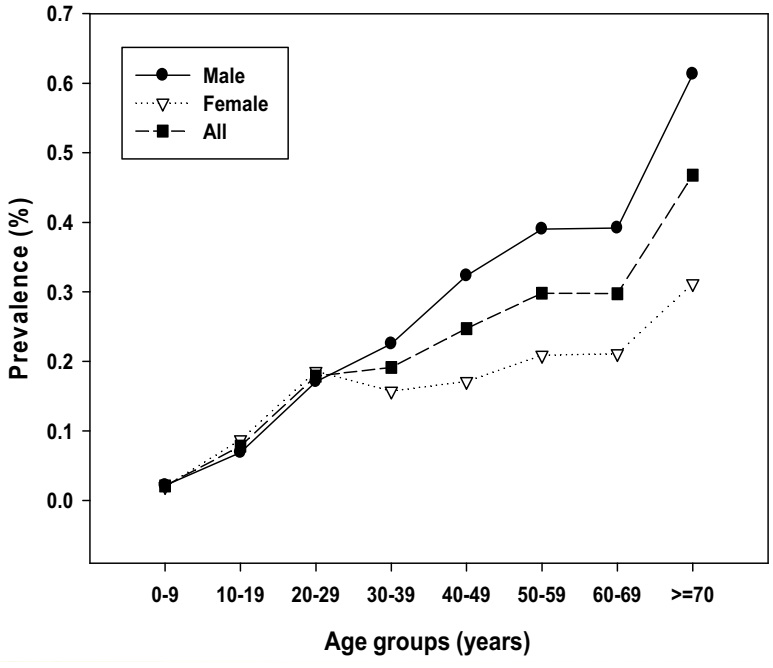
Prevalence

* A nationally representative cohort of 1,000,000 individuals from the National Health Insurance enrollees was followed up from 2000 to 2006.
* The mean one-year prevalence of psoriasis was 0.23% for men and 0.16% for women, respectively.

Age and sex difference

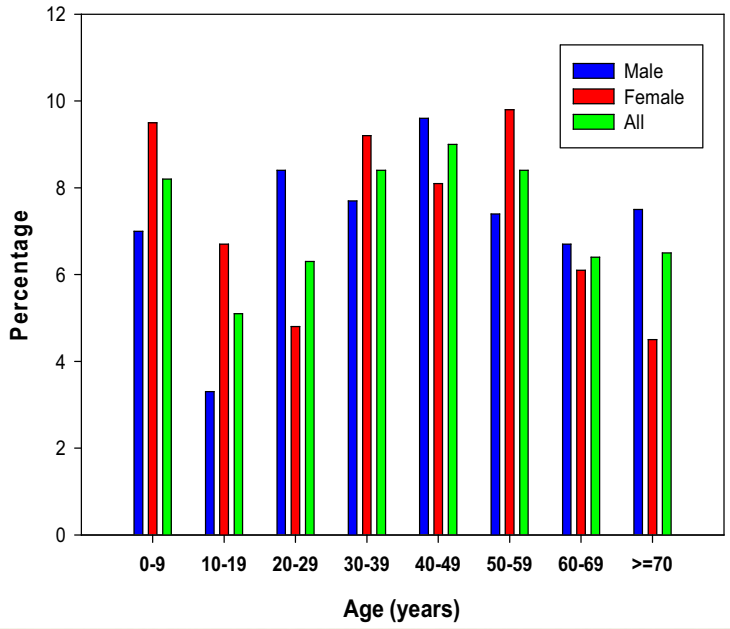
The prevalence of psoriasis increased more rapidly in male patients 30 years or older and reached its peak in patients 70 years and older, regardless of sex.

Age- and sex- specific mean one-year prevalence of psoriasis during 2000-2006 in Taiwan.



In this study cohort, there were 8388 patients (4691 males and 3697 females) with claim of primary diagnosis as psoriasis during the 7-year study period. To minimize the possibility of misdiagnosis, only 5864 patients (3243 males and 2621 females) cared by dermatologists and rheumatologists were recruited as patients with psoriasis in the present study. The mean one-year prevalence of psoriasis was 0.23% for men and 0.16% for women,

Fig 2. Frequency of psoriatic arthritis in patients with psoriasis



Overall, 436 (7.7%) of these patients were also diagnosed with psoriatic arthritis. The frequencies of psoriatic arthritis in patients with psoriasis were higher in patients younger than 10 years and aged 30 to 59 years.

Chang YT, Chen TJ, Liu PC, Chen YC, Chen YJ, Huang YL, et al. Epidemiological study of psoriasis in the national health insurance database in Taiwan. Acta Derm Venereol 2009;89:262-6.

Acta Derm Venereol 2009; 89: 612–616

INVESTIGATIVE REPORT

Epidemiological Features and Costs of Herpes Zoster in Taiwan: A National Study 2000 to 2006

Jaw-Shyang JIH[1,2], Yi-Ju CHEN[1,3], Ming-Wei LIN[4,5], Yu-Chun CHEN[6,7], Tzeng-Ji CHEN[6,7], Yu-Lin HUANG[1,2], Chih-Chiang CHEN[1,2], Ding-Dar LEE[1,2], Yun-Ting CHANG[1,2,8], Wen-Jen WANG[1,2] and Han-Nan LIU[1,2,9]

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- To analyse the epidemiological characteristics and related costs of herpes zoster in Taiwan, a nationally representative cohort of 1,000,000 individuals from the National Health Insurance register was followed up from 2000 to 2006 and their claims data analysed. Overall, 34,280 patients were diagnosed with zoster (incidence 4.89/1000 person-years) and 2944 patients (8.6%) developed post-herpetic neuralgia 3 months after the start of the zoster rash (incidence 0.42/1000 person-years). People with older age, diabetes, and immunocompromising conditions were at higher risk of developing zoster and post-herpetic neuralgia. The overall hospitalization rate for zoster was 16.1 cases per 100,000 person-years. The cost for each home care case and per hospitalized case were approximately 53.30 euro and 1224.70 euro, respectively. Further research into the cost-effectiveness of zoster vaccine is needed.

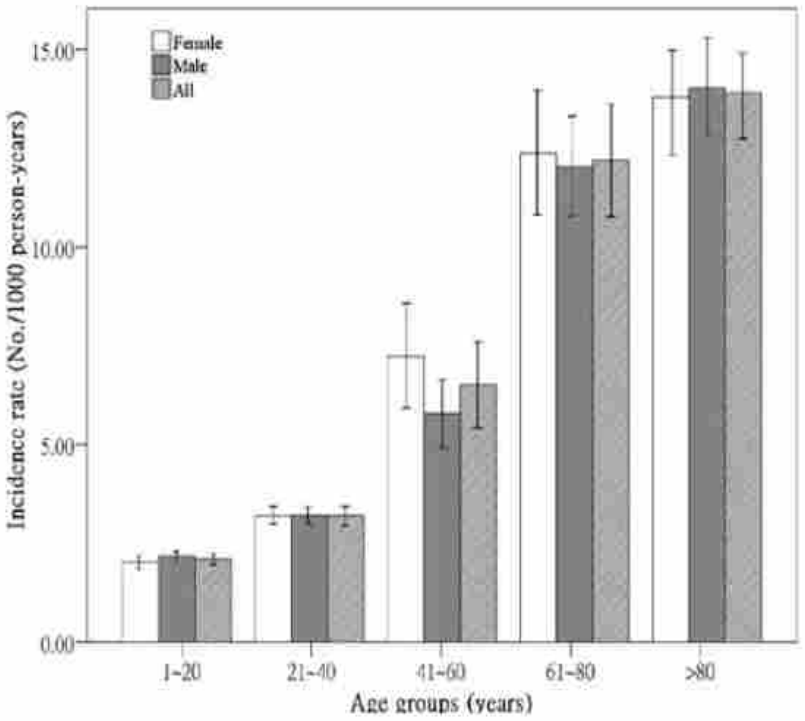

Fig. 1. Age- and sex-specific incidence rate (and 95% confidence intervals) of herpes zoster during 2000 to 2006 in Taiwan.

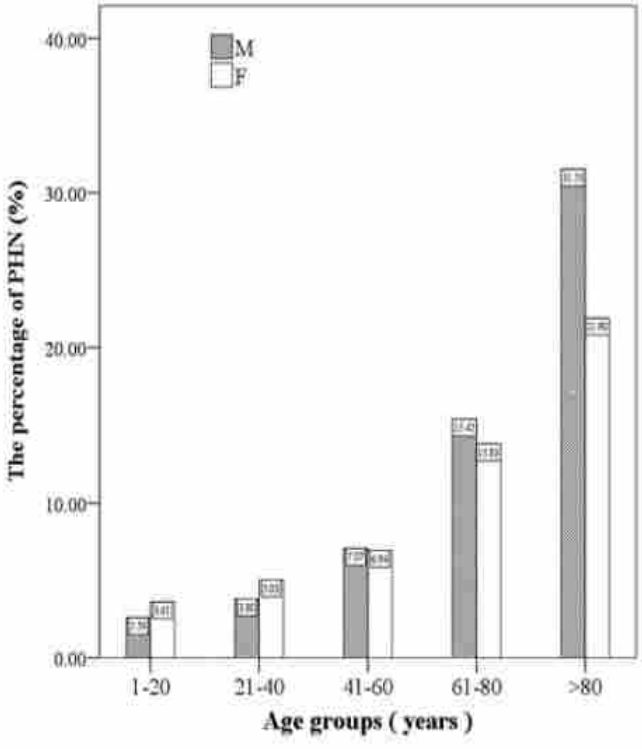

Fig. 2. Percentage of post-herpetic neuralgia (PHN) in patients with herpes zoster.

Table I. *Multivariate analysis for the co-morbid diseases in patients with herpes zoster vs. controls*

Co-morbid diseases	RR (95% CI)[a]	*p*-value
Diabetes mellitus	1.522 (1.478–1.565)	<0.001
Lymphoma/leukaemia	1.908 (1.670–2.179)	<0.001
Breast cancer	1.568 (1.399–1.758)	<0.001
Liver cancer	1.191 (1.076–1.318)	<0.001
Systemic lupus erythematosus	2.115 (1.876–2.385)	<0.001
HIV/AIDS	1.527 (1.172–1.990)	<0.001

[a]Model adjusted for age and sex.
RR: rate ratio; CI: confidence interval; HIV: human immunodeficiency virus; AIDS: acquired immunodeficiency syndrome.

Table II. *Multivariate analysis for potential risk indicators for post-herpetic neuralgia at 3 months in patients with herpes zoster*

Potential risk indicator	RR (95% CI)[a]	*p*-value
Age ≥60 years	2.344 (2.171–2.532)	<0.001
Female gender	0.953 (0.886–1.025)	0.195
Diabetes mellitus	1.351 (1.246–1.467)	<0.001
Lymphoma/leukaemia	1.735 (1.319–2.282)	<0.001
Breast cancer	0.748 (0.526–1.063)	0.105
Liver cancer	0.864 (0.651–1.148)	0.315
Systemic lupus erythematosus	2.268 (1.749–2.942)	<0.001
HIV/AIDS	0.475 (0.264–0.856)	0.013

[a]Model adjusted for age and sex.
RR: rate ratio; CI: confidence interval; HIV: human immunodeficiency virus; AIDS: acquired immunodeficiency syndrome.

Acta Derm Venereol 2010; 90: 589–594

INVESTIGATIVE REPORT

Prevalence of Atopic Dermatitis, Allergic Rhinitis and Asthma in Taiwan: A National Study 2000 to 2007

Chian-Yaw HWANG[1,2], Yi-Ju CHEN[2,3], Ming-Wei LIN[4,5], Tzeng-Ji CHEN[6,7], Szu-Ying CHU[1,2], Chih-Chiang CHEN[1,2], Ding-Dar LEE[1,2], Yun-Ting CHANG[1,2,8], Wen-Jen WANG[1,2] and Han-Nan LIU[1,2,9]

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To study the prevalence of atopic dermatitis, allergic rhinitis, and asthma in Taiwan, we analysed the claims data of a nationally representative cohort of 997,729 enrolees from the National Health Insurance register from 2000 to 2007. Overall, 66,446 patients were diagnosed with atopic dermatitis, and 49.8% of them had concomitant allergic rhinitis and/or asthma. The overall 8-year prevalences of atopic dermatitis, allergic rhinitis, and asthma were 6.7%, 26.3% and 11.9%, respectively. Children and adolescents had significantly higher prevalences of these atopic diseases. The prevalence of atopic dermatitis in females was lower than that in males before the age of 8 years, but became higher after that. Patients with atopic dermatitis were more likely to have allergic rhinitis and asthma. Those having both atopic dermatitis and allergic rhinitis possessed an even higher risk for asthma (odds ratio 9.04). The numbers of visits for atopic dermatitis were highest in late spring to mid-summer. These data suggest that atopic diseases are common in Taiwan. *Key words: allergic rhinitis; asthma; atopic dermatitis; epidemiology.*

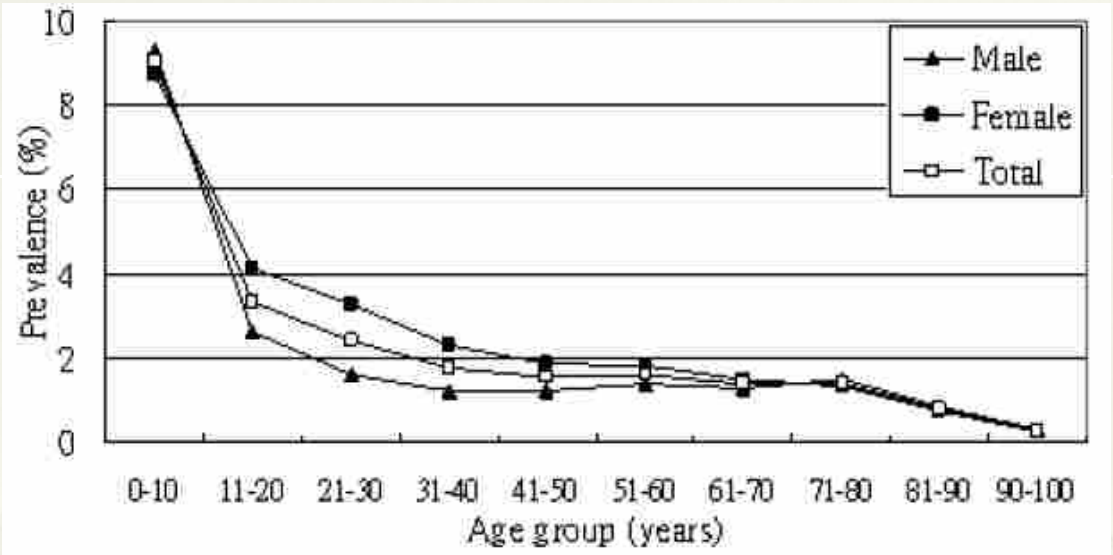

Fig. 1. Overall 8-year prevalence of atopic dermatitis in the whole study group.

Table I. *Overall 8-year prevalences of atopic dermatitis (AD), allergic rhinitis (AR), and asthma in Taiwan*

	Whole study group			Age <20 years		
	Total % (*n*)	Male % (*n*)	Female % (*n*)	Total % (*n*)	Male % (*n*)	Female % (*n*)
AD	6.7 (66,446)	5.9 (30,062)	7.5 (36,384)	9. 6 (26,576)	9.2 (13,250)	10 (13,326)
AR	26.3 (262,665)	25.1 (128,524)	27.7 (134,141)	37.8 (105,160)	39.7 (57,419)	35.8 (47,741)
Asthma	11.9 (118,849)	11.7 (59,794)	12.2 (59,055)	15.7 (43,707)	17.3 (25,039)	14 (18,668)

ORIGINAL ARTICLE

Comorbidity profiles among patients with alopecia areata: The importance of onset age, a nationwide population-based study

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Taipei, Taichung, and Taitung, Taiwan

Background: Alopecia areata (AA) is considered an autoimmune disease with undetermined pathogenesis. Age at onset predicts distinct outcomes. A nationwide study of the relationship of AA with associated diseases stratified by onset age has rarely been reported.

Objective: We sought to clarify the role of atopic and autoimmune diseases in AA, thereby better understanding its pathogenesis.

Methods: A total of 4334 patients with AA were identified from the National Health Insurance Database in Taiwan from 1996 to 2008. A national representative cohort of 784,158 persons served as control subjects.

Results: Among patients with AA, there were significant associations with vitiligo, lupus erythematosus, psoriasis, atopic dermatitis, autoimmune thyroid disease, and allergic rhinitis. Different ages at onset resulted in disparate comorbidities. Increased risk of atopic dermatitis (odds ratio [OR] 3.82, 95% confidence interval 2.67-5.45) and lupus erythematosus (OR 9.76, 95% confidence interval 3.05-31.21) were found in childhood AA younger than 10 years. Additional diseases including psoriasis (OR 2.43) and rheumatoid arthritis (OR 2.57) appeared at onset age 11 to 20 years. Most atopic and autoimmune diseases were observed at onset ages of 21 to 60 years. With onset age older than 60 years, thyroid disease (OR 2.52) was highly related to AA. Moreover, patients with AA had higher risk for more coexisting diseases than control subjects.

Limitations: We could not differentiate hypothyroidism from hyperthyroidism.

Conclusions: AA is related to various atopic and autoimmune diseases. Different associated diseases in each onset age group of AA can allow clinician to efficiently investigate specific comorbidities. (J Am Acad Dermatol 10.1016/j.jaad.2010.08.032.)

Comorbidity profiles among patients with alopecia areata: The importance of onset age, a nationwide population-based study

- ***Background:*** Alopecia areata (AA) is considered an autoimmune disease with undetermined pathogenesis. Different age of onset predicts distinct outcomes. A nationwide study of the relationship between AA and associated diseases stratified by onset age has rarely been reported.
- ***Objective:*** To clarify the role of atopic and autoimmune diseases in AA, thereby better understanding its pathogenesis.
- ***Methods:*** A total of 4,334 patients with AA were identified from National Health Insurance Database in Taiwan from 1996 to 2008. A national representative cohort of 784,158 persons was used as controls.

- ***Results:*** Patients with AA were significantly associated with vitiligo, lupus erythematosus, psoriasis, atopic dermatitis, autoimmune thyroid disease, and allergic rhinitis. Different ages of onset unveiled disparate comorbidities. Increased risk of atopic dermatitis (odds ratio [OR] 3.82, 95% confidence interval [CI] 2.67-5.45) and lupus erythematosus (OR 9.76, 95% CI 3.05-31.21) was found in childhood AA less than age 10. Additional diseases including psoriasis (OR 2.43) and rheumatoid arthritis (OR 2.57) appeared at onset age 11 to 20. Most atopic and autoimmune diseases were observed when AA occurred at age 21 to 60. With onset age more than 60, thyroid diseases (OR 2.52) was highly related to AA. Moreover, AA patients had higher risk for more kinds of coexisting diseases than controls.
- ***Limitations:*** We could not differentiate hypo- from hyperthyroidism.
- ***Conclusions:*** AA was related to various atopic and autoimmune diseases. Different associated diseases in each onset age group of AA could prompt clinician to investigate the specific comorbidities efficiently.

Table IV. Odds ratio (95% confidence interval) of patients with alopecia areata and various comorbid diseases stratified by age

	Age, y						
	0-10	11-20	21-30	31-40	41-50	51-60	>60
AD	**3.82 (2.67-5.45)**	**3.70 (2.80-4.89)**	**2.11 (1.56-2.86)**	**2.41 (1.68-3.46)**	**2.29 (1.49-3.53)**	**4.23 (2.51-7.11)**	**6.00 (3.30-10.90)**
Asthma	1.69 (0.90-3.16)	0.91 (0.59-1.41)	1.16 (0.89-1.52)	0.81 (0.59-1.12)	0.77 (0.56-1.06)	0.82 (0.56-1.19)	1.08 (0.72-1.62)
AR	0.66 (0.42-1.04)	1.05 (0.82-1.34)	**1.49 (1.26-1.75)**	**1.42 (1.17-1.72)**	**1.36 (1.10-1.69)**	**1.38 (1.01-1.88)**	1.45 (0.99-2.13)
Psoriasis	1.76 (0.44-7.15)	**2.43 (1.36-4.35)**	**2.11 (1.32-3.39)**	**3.06 (1.97-4.76)**	**2.60 (1.52-4.45)**	**2.84 (1.43-5.63)**	2.15 (0.87-5.30)
Thyroid disease	1.04 (0.33-3.28)	1.20 (0.82-1.76)	**1.57 (1.26-1.96)**	**1.56 (1.22-1.99)**	**1.70 (1.32-2.20)**	1.24 (0.81-1.90)	**2.52 (1.53-4.15)**
Vitiligo	-	-	**5.29 (1.64-17.08)**	**9.01 (3.90-20.82)**	2.55 (0.62-10.45)	**9.86 (2.96-32.89)**	-
LE	**9.76 (3.05-31.21)**	**3.50 (1.81-6.77)**	**3.04 (1.82-5.07)**	**2.83 (1.53-5.23)**	**4.84 (2.83-8.30)**	**4.43 (2.02-9.70)**	2.25 (0.53-9.55)
RA	-	**2.57 (1.03-6.43)**	0.59 (0.24-1.44)	0.66 (0.31-1.40)	0.78 (0.42-1.43)	1.33 (0.67-2.63)	2.05 (0.99-4.24)
DM	2.26 (0.56-9.18)	0.27 (0.07-1.07)	**0.48 (0.30-0.76)**	**0.41 (0.29-0.59)**	**0.54 (0.41-0.69)**	0.78 (0.59-1.03)	1.18 (0.86-1.62)

AD, Atopic dermatitis; *AR*, allergic rhinitis; *DM*, diabetes mellitus; *LE*, lupus erythematosus; *RA*, rheumatoid arthritis.
OR was calculated by model adjusted for sex and other comorbid diseases.
Bold type denotes statistically significant OR.

EPIDEMIOLOGY AND HEALTH SERVICES RESEARCH

BJD
British Journal of Dermatology

Comorbidity profiles among patients with bullous pemphigoid: a nationwide population-based study

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Conflicts of interest
None declared.

Summary

Background Bullous pemphigoid (BP) has been associated with neurological and psychiatric diseases; however, large-scale population-based study of different comorbid diseases in patients with BP is quite limited.

Objectives We sought to analyse the prevalence of neurological, psychiatric, autoimmune and inflammatory skin diseases prior to the diagnosis of BP and their associations with BP among patients with BP from a nationwide database in Taiwan.

Methods A total of 3485 patients with BP and 17 425 matching controls were identified from the National Health Insurance Database in Taiwan from 1997 to 2008. Conditional logistic regression analyses for a nested case–control study were performed to examine the prevalence of comorbidities prior to the diagnosis of BP between these two groups.

Results Overall, our results showed that stroke [odds ratio (OR) 3·30; 95% confidence interval (95% CI) 3·03–3·60], dementia (OR 4·81; 95% CI 4·26–5·42), Parkinson disease (OR 3·49; 95% CI 3·05–3·98), epilepsy (OR 3·97; 95% CI

- Background: It has been described that bullous pemphigoid (BP) is associated with neurological and psychiatric diseases. However, large-scale population-based study of different comorbid diseases in BP patients is quite limited. Objectives: We sought to analyze the prevalence of neurological, psychiatric, autoimmune, and inflammatory skin diseases before the diagnosis of BP and their associations with BP among patients with BP from a nationwide database in Taiwan.
- Methods A total of 3485 patients with BP and 17425 matching controls were identified from the National Health Insurance Database in Taiwan from 1997 to 2008. Conditional logistic regression analyses for a nested-case control study were performed to examine the prevalence of comorbidities before the diagnosis of BP between these two groups.

如何挑選control subjects

- Age- and sex-match.
- Visit the clinic at the same time
- Matched by income.
- Matched by urbanization.
- Adjust by
  - Follow up time.
  - Charlson score

* Results: Overall, our results showed that stroke (odds ratio [OR], 3.30; 95% confidence interval [95% CI], 3.03-3.60), dementia (OR, 4.81; 95% CI, 4.26-5.42), Parkinson disease (OR, 3.49; 95% CI, 3.05-3.98), epilepsy (OR, 3.97; 95% CI, 3.28-4.81), schizophrenia (OR, 2.56; 95% CI, 1.52-4.30), and psoriasis (OR, 2.02; 95% CI, 1.54-2.66) were significantly associated with BP. Among them, the association with schizophrenia and psoriasis was predominant in female and male patients with BP, respectively. All these comorbid diseases remained to be independently associated with BP by multivariate analysis. Conclusion: Patients with BP are more likely to have various neurological diseases, schizophrenia, and psoriasis before the diagnosis of BP, supporting associations found in other studies. Further research is required to elucidate the tentative causal

EPIDEMIOLOGY AND HEALTH SERVICES RESEARCH

BJD British Journal of Dermatology

Malignancies associated with dermatomyositis and polymyositis in Taiwan: a nationwide population-based study

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Key words
dermatomyositis, malignancy, nasopharyngeal carcinoma, polymyositis

Conflicts of interest

Summary

Background Previous studies showed that idiopathic inflammatory myopathies (IIM) carried an increased risk of cancers. However, no large-scale study of IIM has been conducted in the Chinese population.

Objectives We sought to delineate the association of IIM and various cancer types from a nationwide database in Taiwan.

Methods We analysed the published national data from records of National Health Insurance claims. Cases of dermatomyositis (DM) and polymyositis (PM) from 2000 to 2005 and cancers registered in the catastrophic illness profile from 1997 to 2006 were collected. A nationally representative cohort of 1 000 000 enrollees was included for comparison.

Results In total, 136 patients (12·8%) among 1059 cases of DM and 46 persons

Malignancies associated with dermatomyositis and polymyositis in Taiwan: a nationwide population-based study.

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* OBJECTIVES: We sought to delineate the association of IIM and various cancer types from a nationwide database in Taiwan.
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* RESULTS: In total, 136 patients (12.8%) among 1059 cases of DM and 46 persons (7.0%) among 661 cases of PM carried internal malignancies. Patients with DM tended to have cancers of nasopharynx, lung and breast. On the other hand, patients with PM tended to have breast, uterine cervix and lung cancers. Compared with the general population, DM gave a 10-fold increased risk for cancers, in which a 66-fold increased risk for nasopharyngeal carcinoma and a 31-fold increased risk for lung cancer were the two most significant. For patients with PM, a 6-fold increased risk for cancer was observed. Juvenile DM had a 16-fold increased risk for haematopoietic or lymphoid malignancy. Two thirds of comorbid malignancies were detected shortly after the diagnoses of IIM, within a mean of 1-2 years. Overall, younger patients with IIM carried the highest risk for malignancies, especially those in their twenties and thirties.
* CONCLUSIONS: This is the first large-scale study to report the associated malignancies and the cancer risk of IIM in Taiwan.

Table 1 Association between various comorbid cancers and dermatomyositis (DM)

	All patients with DM with cancer		Male patients with DM with cancer		Female patients with DM with cancer	
	n	OR (95% CI)[a]	n	OR (95% CI)[b]	n	OR (95% CI)[b]
Nasopharynx	40	65·76 (40·14–107·76)	26	108·99 (59·17–200·77)	14	50·84 (22·22–116·36)
Lung	25	30·69 (16·07–58·62)	9	23·72 (6·98–80·64)	16	38·75 (18·54–81·01)
Breast	20	8·81 (4·66–16·66)	0		20	6·27 (3·40–11·57)
Uterine cervix	10[c]		0		10[c]	5·21 (1·83–14·84)
Colorectum	8	4·03 (1·29–12·57)	2	2·67 (0·23–30·48)	6	4·93 (1·43–16·97)
Liver	7	4·74 (1·35–16·61)	4	5·98 (1·11–32·12)	3	5·74 (0·94–35·15)
Stomach	4	5·43 (0·95–31·15)	3	12·8 (1·81–90·68)	1	1·77 (0·04–75·15)
Lym/Leu	4	6·69 (1·78–25·21)	1	3·54 (0·17–74·43)	3	9·47 (2·29–39·10)
Kidney	4	10·20 (1·77–58·67)	0		4	16·61 (1·00–89·99)
UB	3[c]	5·91 (0·78–44·82)	1	2·68 (0·03–277·40)	2[c]	11·27 (1·29–98·59)
Oral cavity	3	2·86 (0·56–14·62)	1	2·27 (0·18–28·06)	2	10·55 (1·33–83·56)
Ovary	2		0		2	4·98 (0·77–32·36)
Thyroid	2	3·17 (0·45–22·28)	1	11·26 (0·53–238·01)	1	1·63 (0·14–18·62)
Oesophagus	1	7·4 (0·59–92·02)	1	13·5 (1·08–168·48)	0	
Pancreas	1	3·85 (0·04–399·26)	1	10·4 (0·10–1084·82)	0	
Bone & joint	1	18·88 (1·47–243·23)	0		1	26·77 (2·25–317·80)
Connective and soft tissue[d]	1	6·74 (0·32–140·5)	0		1	10·47 (0·56–195·12)
Other uterine cancer	1		0		1	3·83 (0·33–44·81)
All cancers	136[c]	10·18 (7·72–13·42)	50	13·58 (8·49–21·73)	86[c]	8·36 (6·02–11·60)

OR, odds ratio; CI, confidence interval; Lym/Leu, lymphoma or leukaemia; UB, urinary bladder. [a]Model adjusted for age and sex, based on population distribution in 2005. [b]Model adjusted for age. [c]One patient with DM had cancers of both uterine cervix and UB. [d]Cancers of connective and soft tissue include cancers of blood vessels, synovium, bursa, tendon, fat, fascia, muscle etc.

	Diagnosed before DM		Diagnosed after DM	
	n	Mean ± SD (years)	n	Mean ± SD (years)
Nasopharynx	10	11·3 ± 26·42	30	0·87 ± 1·49
Lung	4	3·64 ± 3·77	21	1·26 ± 2·3
Breast	11	2·42 ± 3·03	9	1·34 ± 1·22
Uterine cervix	6	2·78 ± 3·05	4	1·7 ± 2·81
Colorectum	3	1·52 ± 1·68	5	1·07 ± 2·05
Liver	2	2·35 ± 2·95	5	0·77 ± 1·09
Stomach	3	2·87 ± 0·17	1	4·83
Lym/Leu	0	–	4	1·24 ± 0·93
Kidney	1	0·5	3	1·13 ± 1·61
UB	1	4·85	2	3·45 ± 4·93
Oral cavity	2	1·05 ± 1·03	1	2·19
Ovary	0	–	2	0·34 ± 0·17
Thyroid	0	–	2	2·66 ± 3·13
Oesophagus	0	–	1	0·06
Pancreas	0	–	1	0·32
Bone & joint	1	1·48	0	–
Connective and soft tissue	0	–	1	0·28
Other uterine cancer	1	1·22	0	–
All cancers	45	4·48 ± 12·72	92	1·14 ± 1·78

Lym/Leu, lymphoma or leukaemia; UB, urinary bladder.

Chen et al. Arthritis Research & Therapy 2010, 12:R70
http://arthritis-research.com/content/12/2/R70

arthritis research&therapy

RESEARCH ARTICLE Open Access

Cancer risks of dermatomyositis and polymyositis: a nationwide cohort study in Taiwan

Yi-Ju Chen[1,2], Chun-Ying Wu[1,3,4,5], Yu-Lin Huang[1,6], Chang-Bi Wang[4], Jui-Lung Shen[2] and Yun-Ting Chang*[1,6]

Abstract

Introduction: The association of idiopathic inflammatory myositis (IIM) and malignancies has been reported, but rarely in Asian countries. Our aim was to investigate the risk of cancer among IIM patients without a prior history of malignancies, in Taiwan.

Methods: We conducted a nationwide cohort study of 1,012 patients with dermatomyositis (DM) and 643 patients with polymyositis (PM), but without prior history of malignancies, utilizing the National Health Insurance Database from 1997 to 2007. Standardized incidence ratios (SIRs) of cancers were analyzed.

Results: A total of 95 cancers (9.4%) in DM and 33 cancers (4.4%) in PM were identified. Overall cancer risk was significantly elevated in DM patients (SIR = 5.11, 95% confidence interval [CI] = 5.01 to 5.22) and PM patients (SIR = 2.15, 95% CI = 2.08 to 2.22). Most cancers were detected in the first year of observation. The risk of cancer decreased with observation time, yet remained elevated compared with the general population in both study groups after 5 years of follow-up. DM was associated with sustained elevated risk of cancers in every age group, whereas the risk of cancer in PM was highest in younger patients and decreased with age. DM patients were at the greatest risk of cancers of the nasopharynx, lungs and hematopoietic malignancies.

Conclusions: Patients with IIM are at increased risk for cancer and should receive age-appropriate and gender-appropriate malignancy evaluations, with additional assessment for nasopharyngeal, lung and hematologic malignancy following diagnosis, and with continued vigilance for development of cancers in follow-up.

* RESULTS: A total of 95 cancers (9.4%) in DM and 33 cancers (4.4%) in PM were identified. Overall cancer risk was significantly elevated in DM patients (SIR = 5.11, 95% confidence interval [CI] = 5.01 to 5.22) and PM patients (SIR = 2.15, 95% CI = 2.08 to 2.22). Most cancers were detected in the first year of observation. The risk of cancer decreased with observation time, yet remained elevated compared with the general population in both study groups after 5 years of follow-up. DM was associated with sustained elevated risk of cancers in every age group, whereas the risk of cancer in PM was highest in younger patients and decreased with age. DM patients were at the greatest risk of cancers of the nasopharynx, lungs and hematopoietic malignancies.
* CONCLUSIONS: Patients with IIM are at increased risk for cancer and should receive age-appropriate and gender-appropriate malignancy evaluations, with additional assessment for nasopharyngeal, lung and hematologic malignancy following diagnosis, and with continued vigilance for development of cancers in follow-up.

Table 2: Cancer incidence among dermatomyositis and polymyositis patients by age, gender and years of follow-up

	Dermatomyositis group (n = 1,012)			Polymyositis group (n = 643)		
	Observed	Expected	SIR (95% CI)	Observed	Expected	SIR (95% CI)
Total	95	18.58	5.11 (5.01 to 5.22)	33	15.36	2.15 (2.08 to 2.22)
Age						
<20 years	1	0.13	7.86 (6.26 to 9.36)	0	0.02	-
20 to 39 years	8	1.11	7.20 (6.72 to 7.72)	7	0.65	10.69 (9.99 to 11.60)
40 to 59 years	55	6.67	8.25 (8.03 to 8.47)	13	4.98	2.61 (2.47 to 2.76)
60 to 79 years	29	5.40	5.37 (5.18 to 5.57)	13	6.80	1.91 (1.81 to 2.02)
≥ 80 years	2	0.24	8.47 (7.22 to 9.57)	0	0.52	-
Gender						
Male	39	7.16	5.44 (5.28 to 5.62)	12	6.51	1.84 (1.74 to 1.95)
Female	56	10.99	5.10 (4.96 to 5.23)	21	8.89	2.36 (2.26 to 2.47)
Follow-up						
<1 years	64	3.00	21.30 (20.81 to 21.86)	18	2.67	6.75 (6.43 to 7.06)
1 to 2 years	12	2.36	5.08 (4.80 to 5.38)	3	2.30	1.31 (1.16 to 1.46)
2 to 5 years	13	5.16	2.52 (2.38 to 2.66)	5	4.93	1.01 (0.93 to 1.11)
>5 years	6	4.39	1.37 (1.26 to 1.48)	7	3.51	1.99 (1.85 to 2.15)

Expected cancer cases were calculated by age-specific and gender-specific estimates of the general population in Taiwan 2006. CI, confidence interval; SIR, standardized incidence ratio.

Table 3: Incidence for specific cancer types after diagnosis of dermatomyositis and polymyositis

Cancer type	Dermatomyositis group (n = 1,012)			Polymyositis group (n = 643)		
	Observeda	Expectedb	SIR (95% CI)	Observeda	Expectedb	SIR (95% CI)
Nasopharynx	30	0.21	139.94 (137.79 to 146.06)	2	0.16	12.71 (10.83 to 14.36)
Lung[c]	22	1.07	20.58 (19.71 to 21.44)	5	0.93	5.38 (4.92 to 5.87)
Breast	9	2.55	3.53 (3.30 to 3.77)	3	1.80	1.67 (1.48 to 1.87)
Uterus	0	-	-	1	0.14	7.13 (5.81 to 8.69)
Uterine cervix	3	0.91	3.28 (2.93 to 3.68)	1	0.70	1.44 (1.16 to 1.74)
Ovary[c]	2	0.38	5.33 (4.56 to 6.05)	0	-	-
Lymphoma/ leukemia	4	0.16	24.70 (22.61 to 27.57)	1	0.13	7.78 (6.26 to 9.36)
Oropharynx and larynx	1	0.13	7.46 (6.26 to 9.36)	0	-	-
Esophagus	1	0.33	3.06 (2.47 to 3.69)	0	-	-
Liver/gall bladder	5	1.38	3.62 (3.31 to 3.96)	4	1.20	3.34 (3.01 to 3.68)
Colorectum	5	1.21	4.12 (3.78 to 4.51)	5	1.06	4.70 (4.31 to 5.15)
Stomach	1	0.97	1.03 (0.84 to 1.25)	0	-	-
Pancreas	1	0.33	3.04 (2.47 to 3.69)	1	0.29	3.44 (2.81 to 4.19)
Kidney	3	0.51	5.93 (5.24 to 6.59)	1	0.45	2.22 (1.81 to 2.70)
Urinary bladder	2	0.49	4.05 (3.54 to 4.69)	2	0.44	4.59 (3.94 to 5.22)
Melanoma	1	0.23	4.33 (3.54 to 5.29)-	2	0.20	9.76 (8.66 to 11.49)
Bone/joint	1	0.07	14.87 (11.62 to 17.38)	2	0.05	39.64 (34.65 to 45.94)
Brain	0	-	-	2	0.11	18.21 (15.75 to 20.88)
Thyroid	2	0.45	4.49 (3.85 to 5.10)	1	0.32	3.12 (2.54 to 3.80)
Metastatic cancers[c]	2	0.56	3.57 (3.09 to 4.10)	0	-	-

[a]Observed cancer cases. [b]Expected cancer cases based on estimates of the general population in Taiwan, after age and gender adjustment. [c]Lung, including lung and mediastinum; ovary, including ovary and fallopian tube; metastatic cancers, including cancers of ill-defined or unknown origin. CI, confidence interval; SIR, standardized incidence ratio.

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global cancer control

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International Journal of Cancer

Cancer risk in patients with allergic rhinitis, asthma and atopic dermatitis: a nationwide cohort study in Taiwan

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It has long been a debate that whether atopy is a risk factor or protective factor for cancer. However, no large-scale study of different cancers in patients with atopic diseases has been conducted among Asians. Here, we conducted a nationwide study to evaluate the cancer risk in patients with allergic rhinitis (AR), asthma and atopic dermatitis (AD). Drawing on Taiwan's National Health Insurance Research Database, 225,315 patients with AR, 107,601 patients with asthma and 34,263 patients with AD without prior cancers were identified in the period from 1996 to 2008. The standard incidence ratio (SIR) of each cancer was calculated. Although the overall cancer risks in patients with atopic symptoms were not increased, the risks were slightly elevated in female patients with AR or asthma (SIR: 1.13 and 1.08, AR and asthma, respectively) and slightly decreased in males patients with AR. Those aged 20–39 years-old possessed the highest risk. A higher risk of developing brain cancer was found in patients with atopic diseases, and patient with AR or asthma also had an elevated risk of developing cancer of kidney and urinary bladder. In contrast, the risk of nonmelanoma skin cancer was lower in patients with AR and asthma. Compared to patients with only one atopic disease, those with more than one atopic disease had lower cancer risks. Our data suggests that the association between atopy and cancer is site-specific.

Abstract

* It has long been a debate that whether atopy is a risk factor or protective factor for cancer. However, no large-scale study of different cancers in patients with atopic diseases has been conducted among Asians. Here, we conducted a nationwide study to evaluate the cancer risk in patients with allergic rhinitis (AR), asthma and atopic dermatitis (AD). Drawing on Taiwan's National Health Insurance Research Database, 225,315 patients with AR, 107,601 patients with asthma and 34,263 patients with AD without prior cancers were identified in the period from 1996 to 2008. The standard incidence ratio (SIR) of each cancer was calculated.

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重大傷病catastrophic illnesses

* Strength
  * 診斷準確度高(最好再看一下中文診斷病名double check)
  * 收集全國的案例,數目多.
* Weakness
  * 無處方資料
  * 探討comorbid disease可能會有遺漏.

如何提高診斷準確度

* 找重大傷病
* 曾經因為同診斷多次看診
* 限制由專科醫師看過的病人(zoster vs psoriasis)
* 曾經做過某些examination (DM: blood sugar, HbA1c, pemphigoid: immunofluorescence test..)
* 接受某些處方 (pemphgioid under systemic steroid, immunosuppressive Tx)
* Study to validate diagnosis

Potential misclassification of patients with psoriasis in electronic databases. Icen M, et al. J Am Acad Dermatol. 2008 Dec;59(6):981-5.

* BACKGROUND: Electronic claims and medical record databases are increasingly used for observational studies of psoriasis. The purpose of this study was to assess the validity of psoriasis diagnostic codes in an electronic database.
* METHODS: This study was performed in a population-based setting in Olmsted County, Minnesota, where all diagnoses and procedures from all health care providers in a large community are indexed and recorded in an electronic database. The database was searched for patients aged 18 years or older with diagnostic codes consistent with psoriasis for the time period January 1, 1976, to January 1, 2000. The complete medical records of all patients were reviewed manually for validation of psoriasis diagnoses.

* RESULTS: We reviewed the complete medical records of 2556 patients with at least one diagnostic code consistent with psoriasis. Based on medical record review, 1458 (57.0%) patients were confirmed to have psoriasis, of which the majority (81%) received confirmation by a dermatologist. The most commonly used diagnostic codes for psoriasis were International Classification of Diseases, Ninth Revision 696.1 (psoriasis, not otherwise specified) with a positive predictive value of 68.7% (95% confidence interval: 66.5%, 70.9%). Increasing frequency of codes in a given time window was associated with positive predictive values. However, positive predictive value for only one code in a 5-year time window was still as high as 60% (95% confidence interval: 57%, 63%).
* LIMITATIONS: Differences between individual electronic medical record databases may limit the ability to form a general conclusion from these findings. The remitting, relapsing course of psoriasis and the heterogeneity in clinical presentation create challenges in case ascertainment.
* CONCLUSION: Electronic identification of patients with psoriasis by diagnostic codes alone may lead to misclassification in database studies.

BJD British Journal of Dermatology

Eczema and cancer risk: a critical appraisal and review of the literature

DOI: 10.1111/j.1365-2133.2011.10542.x

ORIGINAL ARTICLE: Hwang CY, Chen YJ, Lin MW *et al.* Cancer risk in patients with allergic rhinitis, asthma and atopic dermatitis: a nationwide cohort study in Taiwan. *Int J Cancer* 2011; Mar 31. doi: 10.1002/ijc.26105.

Aim Hwang et al. aimed to evaluate the risk of malignancy among individuals with eczema, allergic rhinitis (AR) and asthma, compared with the general Taiwanese population.

Hypothesis People with atopic conditions, including eczema, have an altered risk of malignancy.

Setting and design This was a prospective nationwide cohort study. The authors used the Taiwanese National Health Insurance Research Database (NHIRD) to compare the incidence of cancers among people with established allergic disease relative to the risk in the general population.

Study exposure Exposure was the presence of one or more atopic conditions (eczema, AR or asthma). Data were extracted on 997 729 randomly selected people registered on the NHIRD at any time point between 1996 and 2008. Eczema was identified via ICD-9-CM codes with the diagnosis being made by a dermatologist, paediatrician or allergist. Follow-up was until 2008, date of first cancer or death.

Outcomes The outcome was a new diagnosis of malignancy, identified via catastrophic illness insurance certificates, again only of borderline significance for those with eczema and AR [SIR = 0·85 (0·67–1·07)].

Conclusions Hwang et al. conclude that the relationship between allergic diseases and cancer risk is complex and site specific. The risk of malignancy was highest in all atopic conditions in the 20–39-year age group. In patients with eczema, the incidence of brain cancer was higher than expected, which the authors note is at odds with previous studies. However, numbers were too small to allow stratification by histological subtypes. The authors warn against deriving conclusions for rarer cancers and that borderline SIRs must be interpreted with caution.

Comment

What is already known about this topic?

The incidence of cancer among atopic patients has been debated for years.[1–3] The immune surveillance theory speculates that a chronically overactive immune system, as seen in individuals with long-standing allergic conditions, may enhance detection of malignant cells, and therefore decrease the risk of developing cancer.[4] Previous meta-analyses for atopy in general[5] and for eczema specifically[6] have proposed a possible protective effect on pancreatic cancer, brain tumours

Most importantly, the paper of Hwang *et al.* does not mention any effort to validate the NHIRD database records, both for allergic and malignant disease. For instance, the authors could have confirmed the accuracy of the database entries with individual physician's practice records. There also does not seem to be an inbuilt auditing process to ensure the NHIRD data quality and completeness justify its use for research purposes, an exercise that is, for instance, routine within the U.K. General Practice Research Database.[70] This appears particularly important, as the NHIRD is essentially a billing database for insurance purposes, and there may well be the incentive to record certain diagnoses to gain higher remuneration both from the physician's as well as the patient's perspective, which would also potentially impinge on diagnostic accuracy.

Response to eczema and cancer risk: a critical appraisal and review of the literature

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Wedgeworth *et al.*[1] have written a critical appraisal of our study[2] on cancer risk in atopic patients. They have performed a very comprehensive literature review on the topic of eczema and cancer risk. This work provides further information to enable both researchers and clinicians to understand how the immune system interacts with oncogenesis of different organs. In response to their appraisal, we would like to take this opportunity to present our comments.

Validation of exposure and outcome variables

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Validation of exposure and outcome variables

Validation of diagnosis is one of the most difficult problems for researchers using electronic claims and medical record databases as the research material. It is even more challenging for dermatologists, because many dermatological diseases are not specified in the current ICD-9-CM codes. We were aware that ICD-9-CM code 691·0 does not belong to eczema, so only those with ICD-9-CM codes 691 and 691·8 were included as our eczema cohort. Although no study has been performed to validate the diagnoses of atopic dermatitis in the National Health Insurance Research Database (NHIRD) before, a recent study showed that the accuracy of the NHIRD in recording ischaemic stroke diagnosis was high.[3]

3 Cheng CL, Kao YH, Lin SJ *et al.* Validation of the National Health Insurance Research Database with ischemic stroke cases in Taiwan. *Pharmacoepidemiol Drug Saf* 2011; **20**:236–42.

ORIGINAL CONTRIBUTION

Association Between Disease-Modifying Antirheumatic Drugs and Diabetes Risk in Patients With Rheumatoid Arthritis and Psoriasis

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Context Rheumatoid arthritis (RA) and psoriasis have been linked with insulin resistance and diabetes mellitus (DM). Prior investigations suggest that systemic immunosuppressive drugs may improve insulin resistance and reduce the risk of DM.

Objective To compare the risk of newly recorded DM among participants diagnosed with RA or psoriasis based on use of a variety of disease-modifying antirheumatic drugs (DMARDs).

Design, Setting, and Participants A retrospective cohort study among 121 280 patients with a diagnosis of either RA or psoriasis on at least 2 visits. The analyses were conducted in the context of 2 large health insurance programs, 1 in Canada and 1 in the United States, using administrative data. The mean follow-up was 5.8 months and began with the first prescription for a DMARD after study eligibility was met. Drug regimens were categorized into 4 mutually exclusive groups: (1) tumor necrosis factor (TNF) inhibitors with or without other DMARDs; (2) methotrexate without TNF inhibitors or hydroxychloroquine; (3) hydroxychloroquine without TNF inhibitors or methotrexate; or (4) other nonbiologic DMARDs without TNF inhibitors, methotrexate, or hydroxychloroquine (reference exposure).

Main Outcome Measure Newly recorded DM as evidenced by a new diagnosis of DM with use of a DM-specific medication.

Results The study cohort consisted of 13 905 participants with 22 493 treatment episodes starting 1 of the categories of DMARD regimens between January 1996 and June 2008. New diabetes cases and respective incidence rates per 1000 person-years were: other nonbiologic DMARDs (55 cases among 3993 treatment episodes; rate, 50.2; 95% confidence interval [CI], 47.3-53.2); TNF inhibitors (80 cases among 4623 treatment episodes; rate, 19.7; 95% CI, 19.1-20.3); methotrexate (82 cases among 8195 treatment episodes; rate, 23.8; 95% CI, 23.0-24.6); and hydroxychloroquine (50 cases among 5682 treatment episodes; rate, 22.2; 95% CI, 21.3-23.1). The multivariate adjusted hazard ratios for DM were 0.62 (95% CI, 0.42-0.91) for TNF inhibitors, 0.77 (95% CI, 0.53-1.13) for methotrexate, and 0.54 (95% CI, 0.36-0.80) for hydroxychloroquine compared with other nonbiologic DMARDS.

Conclusion Among patients with RA or psoriasis, the adjusted risk of DM was lower for individuals starting a TNF inhibitor or hydroxychloroquine compared with initiation of other nonbiologic DMARDs.

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INDIVIDUALS WITH SYSTEMIC INFLAMmatory conditions experience higher rates of cardiovascular disease.[1-3] Although part of this excess risk relates to the direct effects of inflammation on the development of atherosclerosis,[4,5] an increase in cardiovascular risk factors also plays a role.[6-8] Moreover, inflammation likely accelerates development of several cardiovascular risk factors such as diabetes mellitus (DM).[9,10] Inflammation may cause insulin resistance and DM through several mechanisms. Tumor necrosis factor α (TNF-α) and interleukin (IL) 6 appear to block the function of insulin at the receptor level; as well, C-reactive protein and plasminogen activator inhibitor–1 are negatively associated with insulin sensitivity.[11-14]

Two common systemic inflammatory conditions, rheumatoid arthritis (RA) and psoriasis, predispose patients to insulin resistance and may

* Validation study?
* 特殊申請的收費?
  * Psoriasis

Thanks for your attention.