

A COHORT STUDY OF CAESAREAN SECTION AND INTERSTITIAL CYSTITIS/BLADDER PAIN SYNDROME

Hypothesis / aims of study

Interstitial cystitis/bladder pain syndrome (IC/BPS) is a clinical syndrome of the bladder that is characterized by pelvic pain and urinary urgency and frequency in the absence of identifiable causes. Clinicians have noted that large proportions of patients with IC/BPS had a history of pelvic surgery. Delivery itself is a trauma to pelvic area that was one of the hypothetic causes of IC/BPS. We tried to investigate the causal effect of cesarean section on IC/BPS after controlling confounding factors in a large nationwide cohort study.

Study design, materials and methods

From the Longitudinal Health Insurance Database 2010 (LHID2010) which including 1 million insured patients, women received caesarean section or vaginal delivery between 2002 and 2013 were included. Women younger than 18 years or those with both methods of delivering were excluded. IC/BPS diagnosed before delivery or occurred within 1 year after delivery were also excluded. All included women were followed until the end of 2013 to detect the event of IC/BPS. The risk of IC/BPS during the study period in the caesarean section cohort was compared with the vaginal delivery cohort after controlling the confounding factors.

Results

The caesarean section rate in our database was 35.7%. Mean age of women was 30.60±4.86 years, and 28.88±4.67 years, in caesarean section cohort (n=20391) and the vaginal delivery cohort (n=36748), respectively. The comorbidities of pelvic inflammation disease, leiomyomata, adhesion fibromyalgia, depression, anxiety and systemic lupus erythematosus in the cesarean section cohort were significantly higher than in the vaginal delivery cohort (p<0.05). However, comorbidities of pelvic organ prolapse and stress incontinence in the vaginal delivery cohort were significantly higher than in the cesarean section cohort (p<0.05). After controlling age and the comorbidities, the risk of IC/BPS revealed no different between these two cohorts (*HR* 1.464, 95%*CI* 0.956-2.241). The interval between delivery and diagnosis of IC/BPS was also not significantly different between two cohorts (5.281 ± 3.022 vs. 5.124 ± 2.600 years, p=0.789). The incidence densities of IC/BPS were similar among two cohorts and the general population.

Interpretation of results

The Caesarean rate in our data was higher than the developed countries. The mean age of caesarean delivery was higher than vaginal delivery statistically. Caesarean section most likely related to pathological or functional disorders (such as inflammation, neoplasm or systemic diseases). In contrast, vaginal delivery most likely related to mechanical pelvic disorders (such as prolapse or incontinence). However, after controlling the comorbidities, the risk of IC/BPS revealed no different between these two cohorts. The developed interval time of IC/BPS after delivery was not different between caesarean and vaginal delivery cohorts. There is no causal effect of IC/BPS by delivery due to the similar incidence densities with the general population in our database. Limitation: The effect of delivery frequency could not be accurately analyzed in LHID 2010.

Concluding message

The risk of IC/BPS was not affected by different birth delivery methods (caesarean section or vaginal delivery). Similar incidence densities with the general population revealed no causal effect by delivery. The developed interval time of IC/BPS after delivery also showed no different between caesarean and vaginal delivery cohorts. Other pelvic surgery should be further evaluated in the future.

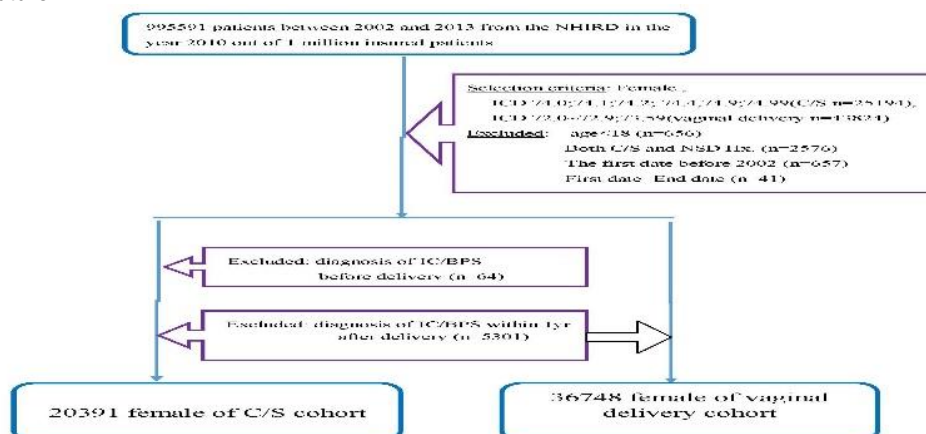


Figure 1. Sample selection process

Table 1. Distribution of confounding factors among the C/S cohort and vaginal delivery

Variable	C/S cohort (n=20391)	NSD cohort (n=36748)	P
Age (y/o) mean ± SD (range)	30.60 ± 4.86 (18.08-51.92)	28.88 ± 4.67 (18.00-65.12)	0.000 [†]
Pelvic organ prolapse inpatient	0.00 ± 0.03 (0.00-2.00)	0.00 ± 0.03 (0.00-1.00)	0.997
Pelvic organ prolapse outpatient	0.01 ± 0.16 (0.00-10.00)	0.01 ± 0.16 (0.00-10.00)	0.000 [†]
Acute cystitis inpatient	0.03 ± 0.22 (0.00-7.00)	0.03 ± 0.22 (0.00-7.00)	0.543
Fibromyalgia outpatient	1.65 ± 4.22 (0.00-135.00)	1.65 ± 4.22 (0.00-135.00)	0.000 [†]
Depression inpatient	0.02 ± 0.38 (0.00-35.00)	0.02 ± 0.38 (0.00-35.00)	0.013 [†]
Anxiety outpatient	1.45 ± 7.53 (0.00-259.00)	1.45 ± 7.53 (0.00-259.00)	0.000 [†]
Stress incontinence outpatient	0.01 ± 0.22 (0.00-13.00)	0.01 ± 0.22 (0.00-13.00)	0.001 [†]
Adhesion outpatient	0.05 ± 0.60 (0.00-39.00)	0.05 ± 0.60 (0.00-39.00)	0.000 [†]
Pelvic inflammatory disease , outpatient	1.96 ± 4.56 (0.00-132.00)	1.96 ± 4.56 (0.00-132.00)	0.000 [†]
Leiomyomata outpatient	0.72 ± 3.46 (0.00-252.00)	0.72 ± 3.46 (0.00-252.00)	0.000 [†]
Chronic urinary tract infection , outpatient	0.01 ± 0.28 (0.00-30.00)	0.01 ± 0.28 (0.00-30.00)	0.911
Systemic lupus erythematosus outpatient	0.31 ± 6.65 (0.00-274.00)	0.31 ± 6.65 (0.00-274.00)	0.003 [†]

C/S Cesarean section; SD standard deviation; Outpatient total number of times seeking outpatient medical advice for a confounding variable, Inpatient total number of admissions for a confounding

Table 2. Hazard ratio of IC/BPS in the C/S cohort compared with the vaginal delivery cohort

(n=57139)	
C/S cohort vs. vaginal delivery cohort	
HR* (95%CI)	
C/S (yecs/no)	1.464 (0.956-2.241)

IC/BPS interstitial cystitis/bladder pain syndrome; C/S Cesarean section; HR Hazard ratio, CI confidence interval

*Adjusted HR: adjusted for age, pelvic inflammation disease, leiomyomata, fibromyalgia, depression, anxiety, adhesion and systemic lupus erythematosus, pelvic organ prolapse and stress incontinence.

Table 3. The interval between delivery and IC/BPS among C/S cohort and vaginal delivery cohort (n=93)

	No	Time (year) mean ± SD (range)	P
Cesarean section with IC/BPS	43	5.281 ± 3.022 (0.142-10.809)	0.789
vaginal delivery with IC/BPS	50	5.124 ± 2.600 (1.095-11.039)	

IC/BPS interstitial cystitis/bladder pain syndrome; C/S Cesarean section; SD standard deviation

Table 4. Incidence density of IC/BPS among different cohorts and the general population

	Event	PY	IR
C/S cohort	43	142128.00	0.303
Vaginal delivery cohort	50	255881.00	0.195
General population	1533	5255336.25	0.292

IC/BPS interstitial cystitis/bladder pain syndrome; C/S Cesarean section; PY person-years;

IR incidence ratio, per 1,000 person-years.

Disclosures

Funding: nil **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Institutional Review Board of Tsaotun Psychiatric Center, Ministry of Health and Welfare, Republic of China **Helsinki:** Yes **Informed Consent:** No