Title: Diagnosis of Interstitial Cystitis / Bladder Pain Syndrome in Women with Chronic Pelvic Pain: A Prospective Observational Study.

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Financial Disclaimer/Conflict of Interest: None

Contribution:

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Abstract

Introduction and hypothesis: This study assesses the prevalence of interstitial cystitis (IC)/bladder pain syndrome (BPS) in women with chronic pelvic pain (CPP).

Methods: A prospective study of 150 women undergoing laparoscopy as investigation for CPP in an Endometriosis and Pelvic Pain unit. Preoperative questionnaires (included demographic details, pelvic pain symptoms, the Pelvic Pain and Urgency/Frequency (PUF) and O'Leary-Sant (OLS) Symptom and Problem Index scores) were completed and concurrent standardised cystoscopy with hydrodistension performed at the laparoscopy.

The primary outcome measures the proportion of IC in this group, defined by presence of glomerulations with CPP and urinary symptoms (urinary frequency, nocturia or urgency). The secondary outcome measures the proportion of BPS (defined by the European Society of the Study of Interstitial Cystitis, ESSIC).

Results: IC was diagnosed in 48/150 (32%) subjects and 80/150 (53%) had BPS. There were no significant differences in symptomatology or questionnaire results between the groups with and without IC. Women with BPS had higher PUF (17.2 vs 12.9, p<0.001), OLS Symptom (8.2 vs 6.0, p=0.001) and Problem (7.5 vs 4.2, p<0.001) scores and more severe pain symptoms.
Visually proven endometriosis was seen in 90/150 (60%) and 27/150 (18%) had both endometriosis and IC. Of the 80 women with BPS, 45/80 (60%) had endometriosis.

Conclusions: The prevalence of IC/BPS varies depending on the definition used. This study showed IC in 32% of women with CPP, based on symptoms and presence of glomerulations. BPS as defined by ESSIC was diagnosed in 53%. History and questionnaires did not correlate with positive cystoscopic findings.

Keywords: Bladder pain syndrome; Chronic pelvic pain; Endometriosis; Interstitial cystitis.
1. Introduction

Interstitial cystitis (IC) is a chronic, possibly inflammatory condition of the bladder, of unknown cause [1]. It was first described by Hunner in 1918 with Hunner’s ulcer [2]. Subsequently the definition of IC has seen many changes - in 1978, IC definition was broadened to include glomerulations [3]; 1987 saw the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) publish criteria for IC for research purposes [4]; in 2002 the International Continence Society (ICS) defined the term ‘painful bladder syndrome’ which did not include abnormal cystoscopic findings [5]; in 2003 NIDDK/Interstitial Cystitis Association (ICA) formed another criteria based on history and examination [6]. In 2007-08, the most recent definition was proposed by the European Society of the Study of Interstitial Cystitis (ESSIC) and they suggested the term ‘bladder pain syndrome’ (BPS) [7]. The common denominators for all these definitions are pain and urinary symptoms, with or without cystoscopic findings of Hunner’s lesion or glomerulations.

With an evolving definition, the prevalence of IC has also altered with time. In 1975, the population prevalence of IC was estimated at 18 per 100,000 women in Finland [8]; in the United States, it was 30 per 100,000 in 1987 [9] and 865 per 100,000 women in 1994 [10].

It stands to reason that IC/BPS is one of the differential diagnoses in women with chronic pelvic pain (CPP). A prospective study in 2005 by Chung et al[11] of 178 women with CPP who underwent both laparoscopy and cystoscopy showed 159 (89%) had IC, 134 (75%) had endometriosis and 115 (65%) had both conditions.
Another prospective study of 162 women with CPP in 2007 by Paulson et al[12] showed 133 (82%) had IC, 123 (76%) had endometriosis and 107 (66%) had both conditions. However, similar studies showed a much lower prevalence - one with 45 women in 2002 by Clemons et al [13] showed only 17 (38%) with IC and another with 64 women in 2005 showed 7 (11%) had cystoscopic diagnosis of IC (Stanford et al)[14].

In comparison to the IC rates quoted above, the prevalence of IC in women with CPP within our Endometriosis/Pelvic Pain gynaecology unit was retrospectively assessed. A five year audit between 2002-2007 was done. One hundred and twenty six women had a cystoscopy with laparoscopy as investigation for pelvic pain, usually with urinary symptoms. Only 27/126 (21%) had glomerulations reported at cystoscopy.

This gave rise to the current prospective study which aims to measure the prevalence of IC/PBS based on questionnaire and cystoscopic findings in this population of women with CPP. For the purpose of this study, IC was defined as chronic pelvic pain with at least one urinary symptom (frequency ≥ 7, nocturia ≥ 1 or any urgency) and the presence of glomerulations at cystoscopy (grade one or more). Bladder pain syndrome was defined as per the ESSIC definition of pain related to the bladder and urinary symptoms, with cystoscopic findings and biopsy results to determine the type of BPS.

2. Material and Methods
In this prospective observational study, women aged 18-50 who were scheduled for a laparoscopy as investigation for pelvic pain of more than six months were recruited between September 2008 and January 2011. This was done within an Endometriosis/Pelvic Pain gynaecology unit of a tertiary teaching hospital. Ethical approval was sought from all relevant hospitals and the trial was registered at the Australian New Zealand Clinical Trials Registry (ANZCTR). All subjects were recruited from the preadmission clinic or private rooms of participating gynaecologists. Exclusion criteria included non English speaking women, the presence of urine infection and those who did not consent.

Recruited subjects completed pre-operative questionnaires, including demographic details, visual analogue scales (VAS) for pelvic pain symptoms, the Pelvic Pain and Urgency/Frequency (PUF) and O'Leary-Sant (OLS) Symptom and Problem Index scores. Preoperative urine culture was sent and cystoscopy added to the proposed laparoscopy.

The cystoscopy was performed in a standardised format, as described by Hanno [1] - the bladder was distended with sterile water at 80-100cm of water pressure for one to two minutes (maximum of one litre), bladder capacity measured and bladder refilled to assess for glomerulations. Glomerulations were graded according to Nordling [15] (reference used by ESSIC) - 0: normal mucosa, 1: petechiae in at least two quadrants, 2: large submucosal bleeding, 3: diffuse global mucosal bleeding, 4: mucosal disruption. Bladder biopsy was taken at the surgeon's discretion.
Laparoscopy was performed according to the individual surgeon's usual practice. Any endometriosis seen was mostly treated with surgical excision and specimens sent to histology. Operation findings were recorded including bladder capacity, glomerulation grade, presence of Hunner's lesion, visually diagnosed endometriosis and its stage (according to the modified American Fertility Society scoring system [16]) and histology results if applicable.

2.1 Sample size calculation

Sample size calculation was performed using Piface (R.V. Lenth, 2007) V. 1.65. Confidence interval of proportion was used with a 95% confidence and margin of error of 0.08. Proportions of 0.23 (from our own retrospective study), 0.38 (from Clemons et al [13]) and 0.82 (from Paulson et al [12]) were used to calculate and the largest sample size required was 142. Therefore a sample size of 150 was used.

2.2 Statistical Analysis

Data were entered on a database (Microsoft Office Access, 2007) and analysis performed on SPSS version 11.5. Data groups were compared using ANOVA for variance with normal distribution and Welch test for those with unequal variance. Post - hoc testing was performed (Tukeys HSD if variance was normal and Bennetts T3 when it was not). Correlation was performed with Pearson coefficients. Differences in proportions were assessed using chi-square testing.

3. Results
One hundred and seventy four women were recruited for this study. Twenty four subjects were excluded after recruitment (nine withdrawn from study, one fell pregnant, one did not have cystoscopy performed, nine with missing questionnaires results and four had urinary infection). Hence, 150 subjects remained for analysis.

Of the 150 subjects, 140 (93%) had one or more urinary symptoms and 50 (33%) had glomerulations (any grade) seen at cystoscopy. IC as defined by this study was present in 48/150 (32%) of subjects. Hunner's lesion and glomerulation grade 4 were not seen.

According to ESSIC ‘BPS would be diagnosed on the basis of chronic (>6 months) pelvic pain, pressure or discomfort perceived to be related to the urinary bladder, accompanied by at least one other urinary symptom’[7]. In this study, a positive answer to pain score of >3 for ‘pain with full bladder’ on the visual analogue scale in the questionnaire was used to determine pain ‘perceived to be related to the urinary bladder’ and this was found in 84 subjects. Of these 84, only four did not have urinary symptoms. Therefore, 80/150 (53%) could be classified as BPS as per ESSIC. See Table 1 for the breakdown of the BPS Types using the ESSIC definition.

According to the ESSIC criteria, glomerulations were included in this table only if they were Grade 2 or more - this comprised only 11% of those with bladder pain and urinary symptoms.
Table 2 shows the demographic characteristics between (i) the groups with and without IC as defined in this study and (ii) the groups with and without BPS as defined by ESSIC. As can be seen, this study comprises a group of young women with an overall mean age of 30 years. Smoking was found to be significantly higher in those diagnosed with BPS. Those with BPS also had a higher proportion of women who stated they drank alcohol but no significance was found when comparing the number of standard drinks taken per week. No significance was found in the demographics between those with and without IC.

In 32/50 (64%) cases with glomerulations a bladder biopsy was taken. 14/32 (44%) of these were reported as normal. The remaining 18/32 (56%) showed non specific cystitis or inflammation.

There was no significant difference in bladder capacity when comparing the groups with and without IC (688ml vs 726ml, p = 0.193) or when comparing between different glomerulation grades found at cystoscopy. There was also no significant difference in bladder capacity between the groups with and without BPS (734ml vs 688ml, p = .087).

Those with BPS has significantly higher PUF & OLS scores. The mean total PUF score for those with and without BPS was 17.2 and 12.9 (p<0.001) respectively. The mean OLS symptom score with and without BPS was 8.6 and 6.0 (p=0.001) and the mean OLS problem score was 7.5 and 4.3 (p<0.001) respectively. In contrast, none of the questionnaires results were significantly different between the groups with and without IC. See Table 3.
With regards to symptomatology, there was no significant difference in the severity of the presenting symptoms between those with and without IC. On the other hand, those with BPS have significantly more severe symptoms throughout all the other pain symptoms (see Figures 1 and 2).

Endometriosis was defined as visually proven at laparoscopy, and was found in 90/150 (60%). Histology was obtained in 85/90 (94%) of women with endometriosis and 77 of the 85 samples (91%) had histological confirmation of it. Table 4 shows the number of subjects with endometriosis diagnosed at laparoscopy, glomerulations seen at cystoscopy and BPS diagnosis. Of the 150 subjects - 33% had glomerulations, 60% had endometriosis, 18% had both glomerulations and endometriosis and 25% did not have glomerulations or endometriosis. Of those with glomerulations, 27/50 (54%) had endometriosis. Within the endometriosis group, 27/90 (30%) had glomerulations. No significant difference was found in glomerulation rates between those with endometriosis and those without. The relationship between BPS and endometriosis was as follows, 50% of those with endometriosis had BPS also and 60% of women with BPS had endometriosis. In other words, no significant difference was found in the endometriosis rate between those with BPS and those without.

4. Discussion

Endometriosis has been described as the main cause of CPP in women. Its prevalence is estimated to be 70-90% in this group [17] and was 60% in the present
study. It is also known that the severity of endometriosis does not correlate with the severity of symptoms [18] and many women (up to 40%) with endometriosis are asymptomatic [19]. Hence an alternate explanation for this pain is often sought, such as IC/BPS.

In this study, the prevalence of IC was 32% (as defined by pain with at least one urinary symptom and glomerulations seen in at least two out of four quadrants at cystoscopy). However, BPS according to ESSIC could be diagnosed in 53%. Although endometriosis is on the list of confusable diseases, it does not necessarily exclude the diagnosis of BPS. The key is to determine that the pain is attributable to the bladder, which is difficult. In this study, the symptom 'pain with full bladder' was used to make this diagnosis.

Bladder biopsy was not consistently taken with positive cystoscopy. Biopsy was not required to diagnose IC/BPS and it has not been the emphasis of this study. Biopsy result was used to grade the type of BPS. It was only taken at the discretion of the surgeon. Moreover, the pathology department in the institution does not routinely stain for mast cells, hence making the biopsy histology even less informative. Most biopsy results have shown nonspecific cystitis only.

No Hunner's lesion or Grade 4 glomerulation was seen. Given a large cohort of subjects, one may expect to see some severe cases. This is, however, a group of relatively young women with pain being the predominant symptom, hence their presentation to the Endometriosis and Pelvic Pain Unit. One of the interesting findings from this study was that even when women present with predominantly pain,
including dysmenorrhea, most of them (93%) do in fact have some urinary symptoms as well. It is likely that women with severe IC/BPS would have more significant urinary symptoms and be referred to the corresponding Urogynaecology Unit in the same institution instead. Another possibility is that Hunner's lesion is not easily recognisable. It requires experienced urogynaecologists to recognise this lesion. The majority of the surgeons performing the cystoscopy within this unit are gynaecologists specialised in endometriosis, hence they may not have the experience to recognise Hunner's lesions.

There were no presenting symptoms that correlated with positive cystoscopic findings and in this study, no correlation was found between the PUF & OLS questionnaires and IC. There have been conflicting findings in the past in regard to the validity of these questionnaires as a diagnostic tool for IC. Brewer et al [20] showed no correlation of PUF and the diagnosis of IC (as defined by cystoscopic findings). Kushner and Moldwin [21] found that the PUF was more efficient than the OLS questionnaire in detecting IC (as defined by NIDDK criteria) in a urological population with an optimal cut-off of 13. In this study, those with BPS (rather than cystoscopic findings) have higher PUF and OLS scores.

The results of this study vary quite markedly from those of Chung[11] and Paulson[12]. The prevalence studies by Chung and Paulson found an 80% rate of IC in gynaecology patients with chronic pelvic pain using cystoscopic criteria. This study had a much lower rate of IC as defined by positive cystoscopy and urinary symptoms in 32%.
There are a number of possible reasons for this. The prevalence rate will always
depend on the definition used. For example in this study if a definition of PUF greater
than 13 was used to denote IC; the prevalence rate would be 95/150 (63%). The
prevalence also depends on the population. Again, this group of patients were
referred to a Pelvic Pain and Endometriosis Clinic, those with predominantly bladder
symptoms would have been referred to the Urogynaecology Clinic. The referral
pattern and IC prevalence in a urology clinic would also be different.

Perhaps the population is inherently different as in this study the mean PUF of the IC
group was 16 and the non IC 15. In Paulson’s paper the mean PUF score was 21 in
the IC group and 20 in the endometriosis group. Geographical variation in the
prevalence of IC has been described previously in epidemiological studies but this
was thought to be largely due to differences in definitions.

Should cystoscopy be done at all in women with CPP? The newest ESSIC
classification for BPS does not require cystoscopy to diagnose BPS and in this study
group, mostly mild Grade 1-2 glomerulations were seen at cystoscopy. BPS using
ESSIC definition seems to have more clinical relevance given this group appears to
have more severe symptoms as indicated by higher scores on the questionnaires
and VAS. The main issue is differentiating bladder pain from other pelvic pain. Given
women with bladder pain (as indicated by >3 on VAS for ‘pain with full bladder’) also
have significantly more severe dysmenorrhea and other pelvic pain symptoms, and
60% of them has endometriosis as well, it is difficult to determine whether the pain is
originating from endometriosis or the bladder. Can endometriosis and BPS truly
coexist and contribute to different types of pain? Laparoscopy remains an important part of the investigation for CPP. A follow up study to assess the effect of surgical treatment of endometriosis in these two groups of women with and without BPS would be useful.

5. Conclusion

In this population of women with CPP in a Pelvic Pain/Endometriosis Unit, the prevalence of glomerulations was 33% and IC as defined by this study was 32%. This matches the reported rate of 38% by Clemons et al [13] but does not support the 82% rate reported by Paulson et al [12].

Bladder pain syndrome as defined by ESSIC could potentially be diagnosed in 53% of these women. Pain attributable to the bladder is difficult to ascertain and many of these women (60%) have concomitant endometriosis diagnosed.

The prevalence of IC/BPS in women with CPP varies greatly depending on the definition used. History and questionnaires do not appear to correlate with a positive finding on cystoscopy. Chronic pelvic pain remains a very difficult condition to manage and majority (93%) of these women have urinary symptoms as well. Interstitial cystitis / bladder pain syndrome needs to be considered in this group of women presenting with chronic pelvic pain but does not comprise 80% as described in recent studies.

Conflicts of interest
None of the authors have conflicts of interest in the publication of this paper.

**Acknowledgement**

This study was supported by a grant from the Australasian Gynaecological Endoscopy & Surgery (AGES) Research Fund.

Special thanks are given to all the staff that helped with recruitment and execution of this study. In particular, trainees of the Royal Women's Hospital within the Gynaecology 2 Unit who helped with recruitment; fellows and senior registrars who helped with data collection and performing the surgeries and all the Gynaecology 2 Unit consultants who performed or supervised the operations.
References

Figure Legends

Figure 1. Comparison of severity of symptoms between the groups with and without IC.

Figure 2. Comparison of severity of symptoms between the groups with and without BPS.
Table 1 - Subjects ESSIC Classification of BPS Types. N=80.

<table>
<thead>
<tr>
<th>Biopsy</th>
<th>Not done</th>
<th>Normal</th>
<th>Glomerulations¹</th>
<th>Hunner’s lesion²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not done</td>
<td>XX 0</td>
<td>1X 62/80 (77.5%)</td>
<td>2X 1/80 (1.3%)</td>
<td>3X 0</td>
</tr>
<tr>
<td>Normal</td>
<td>XA 0</td>
<td>1A 4/80 (5%)</td>
<td>2A 4/80 (5%)</td>
<td>3A 0</td>
</tr>
<tr>
<td>Inconclusive</td>
<td>XB 0</td>
<td>1B 0</td>
<td>2B 0</td>
<td>3B 0</td>
</tr>
<tr>
<td>Positive³</td>
<td>XC 0</td>
<td>1C 5/80 (6.3%)</td>
<td>2C 4/80 (5%)</td>
<td>3C 0</td>
</tr>
</tbody>
</table>

¹Cystoscopy: glomerulations grade 2-3

²With or without glomerulations

³Histology showing inflammatory infiltrates and/or detrusor mastocytosis and/or granulation tissue and/or intrafascicular fibrosis.
Table 2 - Demographic characteristics between (i) the groups with and without IC and (ii) the groups with and without BPS.

<table>
<thead>
<tr>
<th></th>
<th>IC (N=48)</th>
<th>No IC (N=102)</th>
<th>p value</th>
<th>BPS (N=80)</th>
<th>No BPS (N=70)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong> (mean in years)</td>
<td>29.9</td>
<td>30.4</td>
<td>0.704</td>
<td>29.6</td>
<td>30.9</td>
<td>0.328</td>
</tr>
<tr>
<td><strong>Weight</strong> (mean in kg)</td>
<td>63.5</td>
<td>68.1</td>
<td>0.110</td>
<td>67.4</td>
<td>65.7</td>
<td>0.593</td>
</tr>
<tr>
<td><strong>Height</strong> (mean in cm)</td>
<td>154.1</td>
<td>154.4</td>
<td>0.964</td>
<td>153.2</td>
<td>155.6</td>
<td>0.730</td>
</tr>
<tr>
<td><strong>Gravidity</strong></td>
<td>1.23</td>
<td>0.85</td>
<td>0.173</td>
<td>1.0</td>
<td>0.9</td>
<td>0.596</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td>0.6</td>
<td>0.52</td>
<td>0.654</td>
<td>0.5</td>
<td>0.6</td>
<td>0.911</td>
</tr>
<tr>
<td><strong>Smoking (%)</strong></td>
<td>48%</td>
<td>34%</td>
<td>0.121</td>
<td>51%</td>
<td>24%</td>
<td><strong>0.001</strong></td>
</tr>
<tr>
<td><strong>Cigarettes per day</strong></td>
<td>4.28</td>
<td>4.51</td>
<td>0.859</td>
<td>5.75</td>
<td>2.93</td>
<td><strong>0.018</strong></td>
</tr>
<tr>
<td><strong>Alcohol (%)</strong></td>
<td>63%</td>
<td>68%</td>
<td>0.538</td>
<td>59%</td>
<td>74%</td>
<td><strong>0.044</strong></td>
</tr>
<tr>
<td><strong>Standard drinks per week</strong></td>
<td>1.9</td>
<td>2.8</td>
<td>0.192</td>
<td>2.3</td>
<td>2.7</td>
<td>0.542</td>
</tr>
<tr>
<td><strong>Tea/coffee (%)</strong></td>
<td>83%</td>
<td>81%</td>
<td>0.772</td>
<td>85%</td>
<td>79%</td>
<td>0.314</td>
</tr>
<tr>
<td><strong>Cups of coffee per day</strong></td>
<td>1.5</td>
<td>1.2</td>
<td>0.341</td>
<td>1.5</td>
<td>1.1</td>
<td><strong>0.090</strong></td>
</tr>
<tr>
<td><strong>Cups of tea per day</strong></td>
<td>1.0</td>
<td>1.2</td>
<td>0.348</td>
<td>0.9</td>
<td>1.4</td>
<td>0.089</td>
</tr>
</tbody>
</table>
Table 3 - Comparison of pre operative questionnaires results between the groups (i) with and without IC and (ii) with and without BPS.

<table>
<thead>
<tr>
<th>Questionnaires (average score in numbers)</th>
<th>IC (N=48)</th>
<th>No IC (N=102)</th>
<th>p value</th>
<th>BPS (N=80)</th>
<th>No BPS (N=70)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUF Symptom Score (Maximum = 23)</td>
<td>10.3</td>
<td>9.2</td>
<td>0.116</td>
<td>11.0</td>
<td>7.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PUF Bother Score (Maximum = 12)</td>
<td>6.0</td>
<td>5.6</td>
<td>0.257</td>
<td>6.3</td>
<td>5.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PUF Total Score (Maximum = 35)</td>
<td>16.3</td>
<td>14.7</td>
<td>0.142</td>
<td>17.2</td>
<td>12.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IC Sx Total Score (Maximum = 20)</td>
<td>8.2</td>
<td>6.8</td>
<td>0.057</td>
<td>8.3</td>
<td>6.0</td>
<td>0.001</td>
</tr>
<tr>
<td>IC Prob Total Score (Maximum = 16)</td>
<td>6.5</td>
<td>5.8</td>
<td>0.340</td>
<td>7.5</td>
<td>4.3</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

PUF = Pelvic Pain and Urgency/Frequency questionnaire.
IC Sx = O'Leary-Sant Interstitial Cystitis Symptom Index.
IC Prob = O'Leary-Sant Interstitial Cystitis Problem Index.
Table 4 - Number of subjects with visually proven endometriosis at laparoscopy, glomerulations seen at cystoscopy and BPS as defined by ESSIC.

<table>
<thead>
<tr>
<th></th>
<th>Glomerulations (N = 50)</th>
<th>No Glomerulations (N = 100)</th>
<th>BPS (N = 80)</th>
<th>No BPS (N = 70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endometriosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 90)</td>
<td>27</td>
<td>63</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>No Endometriosis</td>
<td>23</td>
<td>37</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>
Comparison of severity of symptoms between the groups with and without IC.

- Overall Pain, p=0.710
- Pelvic Pain, p=0.982
- Abdominal Pain, p=0.827
- Period Pain, p=0.989
- Back Pain, p=0.627
- Rectal Pain, p=0.277
- Thigh Pain, p=0.021
- Dysuria, p=0.125
- Pain on Urination, p=0.433
- Nausea, p=0.976
- Vomiting, p=0.539
- Depression, p=0.323

Symptoms and p value
Comparison of severity of symptoms between the groups with and without BPS.
Comparison of severity of symptoms between the groups with and without IC.

Symptoms and p value:

- Overall Pain: IC p=0.010, No IC p=0.002
- Pelvic Pain: IC p=0.017, No IC p=0.027
- Abdominal Pain: IC p=0.080, No IC p=0.071
- Back Pain: IC p=0.010, No IC p=0.021
- Dysmenorrhea: IC p=0.010, No IC p=0.016
- Thigh Pain: IC p=0.125, No IC p=0.003
- Pain on Urology: IC p=0.053, No IC p=0.003
- Neurological: IC p=0.010, No IC p=0.046
- Vomiting: IC p=0.043, No IC p=0.037
Comparison of severity of symptoms between the groups with and without BPS.
Author/s: Cheng, C; Rosamilia, A; Healey, M

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Date: 2012-10-01


Persistent Link: http://hdl.handle.net/11343/218114

File Description: Accepted version