



## Review

# Interstitial cystitis/painful bladder syndrome: epidemiology, pathophysiology and evidence-based treatment options



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## ARTICLE INFO

### Article history:

Received 18 August 2013

Received in revised form 16 December 2013

Accepted 30 December 2013

### Keywords:

Interstitial cystitis

Painful bladder syndrome

Interstitial cystitis/painful bladder syndrome (IC/PBS)

## ABSTRACT

Interstitial cystitis/painful bladder syndrome (IC/PBS) is a chronic debilitating condition that can have a severely negative impact on a patient's quality of life. Its prevalence ranges from 52 to 500/100,000 in females compared to 8–41/100,000 in males, and its incidence is increasing globally. Treatment algorithms are sub-classified into behavioural, pharmacological, intravesical, interventional and surgical therapies. Short-term (i.e. <1 year) cure rates range from 50% to 75% for non-/minimally-invasive therapies, but repeat administration of a therapeutic agent is required. Although definitive surgical intervention is associated with greater long-term cure rates ( $\geq 80\%$ ); significant short- and long-term adverse effects occur more frequently. Clinicians are likely to experience increasing numbers of patients with IC/PBS as more is understood about its pathophysiology and evolving epidemiology. Therefore urogynaecologists should familiarise themselves with appropriate diagnostic criteria and evidence based therapies to optimise clinical outcomes in this patient cohort.

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## 1. Introduction

Interstitial cystitis/painful bladder syndrome (IC/PBS) is a chronic condition characterised by pelvic pain and urinary storage symptoms such as persistent urge to void, nocturia and urinary frequency. Its aetiology is unknown and a multitude of therapies are currently available for its treatment. Although the condition was previously considered relatively uncommon, with a prevalence of 0.1%, recent evidence demonstrates that IC/PBS may be present in >2% of females [1]. Early diagnosis is difficult as its clinical presentation is similar to other urogynaecological conditions, and delays in diagnosis can have a severely negative impact on a patient's quality of life. Therefore, clinicians should be familiar with its natural history, clinical features and diagnostic criteria to facilitate appropriate and early therapy for their patients.

In this narrative review we discuss the evolving epidemiology, clinical presentation and diagnostic investigations for IC/PBS. We also place particular emphasis on describing the underlying pathophysiology of the condition. As a large number of treatments have been evaluated over long periods of time for IC/PBS our final aim is to objectively investigate recommended treatment options and to discuss levels of evidence for oral, intravesical and interventional therapies (Table 1).

## 2. Materials and methods

A literature search was undertaken using the Medline and Embase databases and the Cochrane Central Register of Controlled Trials. The following terms were entered into the search algorithm to identify peer-reviewed articles that investigated the epidemiology, clinical presentation, diagnostic investigations or treatment options for IC/PBS: "Interstitial Cystitis" AND "Painful Bladder Syndrome" OR "Interstitial Cystitis/Painful Bladder Syndrome". Studies on adult patients published in English between January 1957 and August 2013 were included. A manual search of the bibliographies of retrieved studies was also conducted. If a patient group was reported twice, the most recent publication was chosen. Case reports and case series with five or fewer cases were excluded. The latest search was performed on December 10th 2013. Two authors (N.F.D. and T.C.) independently examined the title and

**Table 1**  
Classification of levels of evidence based on type of research study performed.

Level of evidence	Type of study
1a	Meta-analysis of randomised trials
1b	At least one randomised trial
2a	One well-designed controlled study without randomisation
2b	One other type of well-designed quasi-experimental study
3	Non-experimental study (comparative study, correlation study, case reports)
4	Expert committee, expert opinion

abstract of citations and the full texts of potentially eligible articles were obtained and analysed in detail. In addition, published guidelines from the European Association of Urology (EAU) and American Urological Association (AUA) were also included in the literature search process [2–4].

Two-hundred and eleven studies published between 1938 and 2013 were retrieved, of which 44 were suitable for this narrative review, based on clinical relevance and importance of content. The epidemiology, pathophysiology, clinical features and diagnostic criteria for IC/PBS were investigated, with particular emphasis on effective treatment options. The primary data analysed included study type, sample size, type of treatment, method of administration, subjective and objective cure rates, postoperative follow-up period and any associated complications or side-effects.

## 3. Epidemiology

Epidemiological studies on IC/PBS have demonstrated a variety of results on the prevalence of the condition. This may be due to a lack of definitive diagnostic investigations, different definitions for diagnosing IC/PBS and inaccurate sampling methodologies. Traditional evidence suggests that females are 9 times more likely to be diagnosed with IC/PBS compared to males and female gender is the only definitive risk factor for developing the condition. In a managed care population, however, the female to male ratio decreases to 5:1, which suggests that the condition may be under-diagnosed among male patients [5]. The prevalence of the condition ranges from 52 to 500/100,000 in females compared to 8–41/100,000 in males, and its incidence has been conservatively estimated at 1.2/100,000 [5]. Notably, the prevalence of IC/PBS increases to 1431/100,000 among females who have a first-degree relative with the condition and this may suggest a hereditary component for the condition. Although IC/PBS is more frequently diagnosed in midlife, it may also present in paediatric patients and infants [6]. The prevalence of IC/PBS in the paediatric population is unknown, as the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) criteria exclude diagnosing IC/PBS in patients <18 years of age [6]. Anecdotal evidence suggests that approximately 25% of adults diagnosed with IC/PBS report persistence or progression of their symptoms since they were children.

In the USA, estimates of medical costs plus sick leave for IC/PBS were \$428 million in 1987 and the NIDDK has calculated that IC/PBS was responsible for at least 4137,000 outpatient visits in 2000 [4]. Furthermore, the recently developed *Google Trends* demonstrates a global increase in mean search activity for IC/PBS on an annual basis since 2004 (Fig. 1). This software is a 'search-volume' tool for providing information on Internet searches that generate a significant volume of results with data normalised to a reference population and scaled from 0% to 100% [7,8]. Although an overall global increase in search engine use may have contributed to this significant increase in 'search-volume', it is noteworthy that the greatest increase in mean search activity has occurred in the USA,

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