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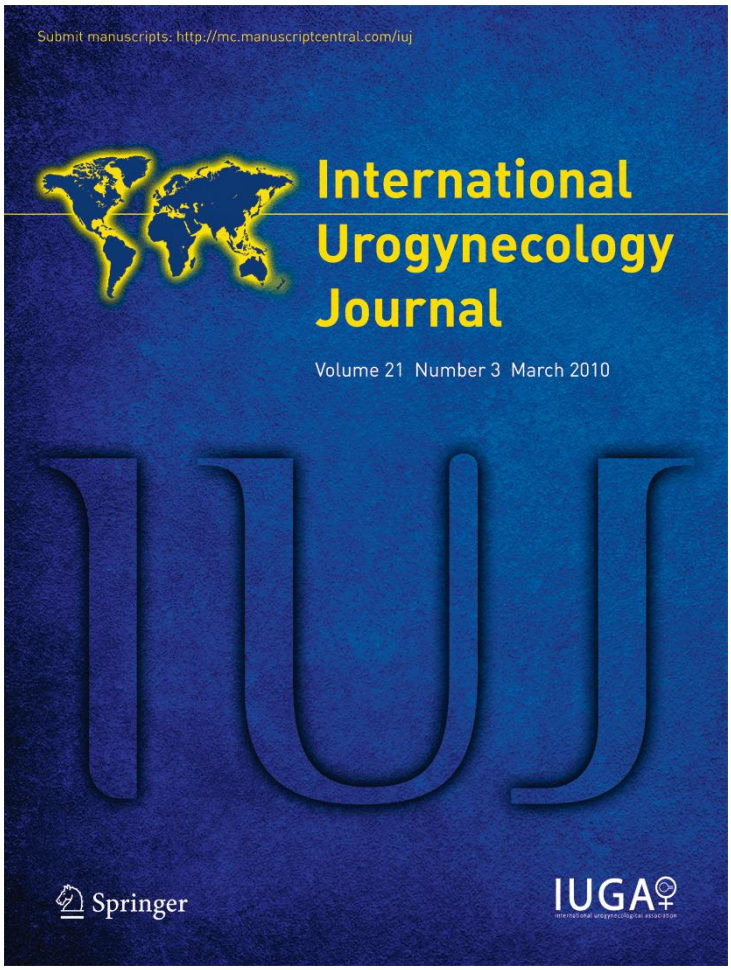

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ORIGINAL ARTICLE

Intravesical lignocaine in the diagnosis of bladder pain syndrome

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Abstract
Introduction and hypothesis To differentiate between the pain originating from urinary bladder and that due to other pelvic organs, using intravesical instillations of 2% lignocaine solution.
Methods Twenty-two women with pelvic pain received intravesical instillation of 20 ml of 2% lignocaine solution. The intensity of pain was recorded by using visual analogue scale (VAS) just before, at 2, 10 and 20 min after intravesical instillation. Women who experienced a drop in the VAS score by 50% were termed as responders. All these women underwent cystoscopy under anaesthesia.
Results Fifteen out of 22 (68.18%) women experienced a substantial reduction in the pain. Thirteen out of these 15 women had features suggestive of BPS/IC on cystoscopy. Out of the seven non-responders, two women were found to have endometriosis, four were diagnosed as pelvic inflammatory disease and one had diverticulitis.
Conclusions Intravesical lignocaine appears to be useful in excluding patients with pelvic pain originating from organs other than the urinary bladder.

Keywords Bladder pain syndrome · Intravesical lignocaine

Abbreviations

BPS	Bladder pain syndrome
IC	Interstitial cystitis
VAS	Visual analogue scale

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Introduction

Pain is one of the most distressing conditions for any human being. Bladder pain syndrome (BPS), earlier termed interstitial cystitis (IC), is characterised by pelvic pain and urinary symptoms in the form of urgency, frequency and nocturia. Women suffering from BPS/IC often find it difficult to characterise pain resulting in misdiagnosis and poor outcome of treatment. Pain originating from the layers of the urinary bladder is usually felt in the suprapubic area, perineum and around the anal canal. Pain might occur in the absence of definitive lower urinary symptoms [1], while urinary symptoms are not uncommon in patients with pelvic inflammatory disease, often compounding the difficulty in diagnosis. Pain on full bladder could occur in endometriosis, colitis or diverticulitis, while pain soon after urination could occur in vaginosis, cervicitis or pelvic inflammatory disease. Dyspareunia could also result from endometriosis or pelvic inflammatory disease in addition to BPS. Failure to consider bladder as the cause of pain often leads to misdiagnosis and ineffective treatments, sometimes even leading to unnecessary surgical procedures [2]. Since pain originating from the urinary bladder needs to be differentiated from these entities, it becomes necessary to devise a quick and effective test, which could be performed easily without adding morbidity.

It has been shown that abnormal permeability of the urothelial layer may be responsible for occurrence of symptoms. Based on this theory, various agents (e.g. Potassium chloride solution) have been used intravesically to mimic causation of pain in these patients. Even though it appears scientific and has shown good sensitivity and reasonable specificity in clinical trials, it is nonetheless too painful for the patient who is already in a miserable state due to disease process itself. Pain from the bladder appears

to originate from the submucosal plexus and is perpetuated by the inflammatory response due to irritation by the constituents of urine. Pain signals originating from the bladder could be interrupted using intravesical lignocaine. One of the earliest uses of intravesical lignocaine in reducing pain originating from urinary bladder was reported by Asklin in 1989 [3]. Neuropathic inflammation accentuates pain via the pain receptors located in the bladder mucosa and submucosa. It has been shown that these receptors could be down-regulated using alkalinized solution of lignocaine [4]. Keeping this in mind, we have used lignocaine solution intravesically in order to differentiate the pain originating from the bladder or other pelvic organs.

Materials and methods

Women reporting to the out-patient department of a tertiary care superspeciality hospital dealing with primarily gastrointestinal, urological and nephrological diseases, with lower abdominal pain of more than 3 months duration were interviewed, and detailed characteristics of the pain were noted. Description of site of maximum pain was categorised as lower abdomen, deep pelvic, suprapubic, pubic, vulvar, perineal, perianal or lower back. The relationship between pain and act of micturition was noted i.e. whether the pain was more on full bladder, during voiding or at the end of urination. A note was also made of any aggravation during a particular period of menstrual cycle and dyspareunia. Colicky pain with altered bowel habits was identified as intestinal in origin and excluded from further workup. Presence or absence of irritative urinary symptoms was recorded. Physical examination including preliminary vaginal inspection, vaginal vault tenderness and bimanual examination if permissible was carried out in the office itself, and a note was made of any abnormal vaginal discharge. Absence of any exclusion criteria as per Table 1 was confirmed at this stage. A presumptive diagnosis of pelvic pain was made, and the patients were investigated further. Laboratory investigations included urine analysis for pyuria, microscopic hematuria and culturable organisms. An ultrasound examination of pelvis was carried out to exclude any obvious pathology. Having excluded any evident cause, 22 such ladies with pelvic pain were enrolled into the trial. After obtaining informed consent, details of the procedure and visual analogue scale (VAS) of pain were explained to them. Visual analogue scale was formulated using a horizontal straight line. All these women received intravesical instillation of 20 ml of 2% lignocaine solution using a well-lubricated, soft 10 Ch size catheter after draining any residual urine in the bladder under aseptic conditions. A trained nurse, unaware of the clinical details of the patients, recorded the intensity of pain using visual analogue scale just before, at 2, 10 and 20 min after intravesical instillation. Patients were assessed for reduction of pain upon instillation of intravesical lignocaine solution. Significant reduction in pain was defined as reduction in the VAS score by 50% of the pre-procedural score as on that day. Women who had significant reduction of pain were termed as responders.

All women were then subjected to cystoscopy under anaesthesia to look for features of BPS/IC. A brief total intravenous anaesthesia was the preferred choice. Standard 21 Ch size cystopanendoscopy sheath with 30° (fore-oblique) telescope was used. Those women who responded to intravesical treatment and/or had cystoscopic features of BPS/IC were treated with standard treatment regime as per the hospital protocol [5]. This included intravesical instillation of a solution of 25,000 IU of heparin and 200 mg of hydrocortisone in 50 cm^3 of physiological saline. These instillations were done every week for 6 weeks. In addition, antimuscarinic agents (Tolterodine) were prescribed for relief in frequency of urination if required. Women who did not respond to intravesical lignocaine and did not have any features of BPS/IC on cystoscopy were referred for detailed gynaecological and gastroenterological evaluation.

Table 1 Exclusion criteria

Abdominal/pelvic surgery within 6 months
Microbiological evidence of urinary infection
History of abdominal Koch's
Active discharge per vaginum/vulval pathology
Diarrhea/constipation in last 3 months
History of urolithiasis in past
Neurogenic bladder
Radiation cystitis
Cyclophosphamide
Any other obvious pain

Results

A total of 22 women were enrolled for intravesical instillation of lignocaine solution. Their age ranged from 24 to 56 years the mean being 37.5 years. Out of the 22 women, 20 had some kind of irritative lower urinary tract symptoms. While overall, 15 out of 22 (68.18%) women reported significant reduction in pain (responders), only 11 (50%) attained near total alleviation of pain. Seven out of 22 (31.8%) had no or insignificant reduction in pain. The results have been depicted in Fig. 1. Women with improvement in pain had it soon after the instillation and persisted at least until '20-min' recording. In most women, frequency and urgency also reduced temporarily as long as

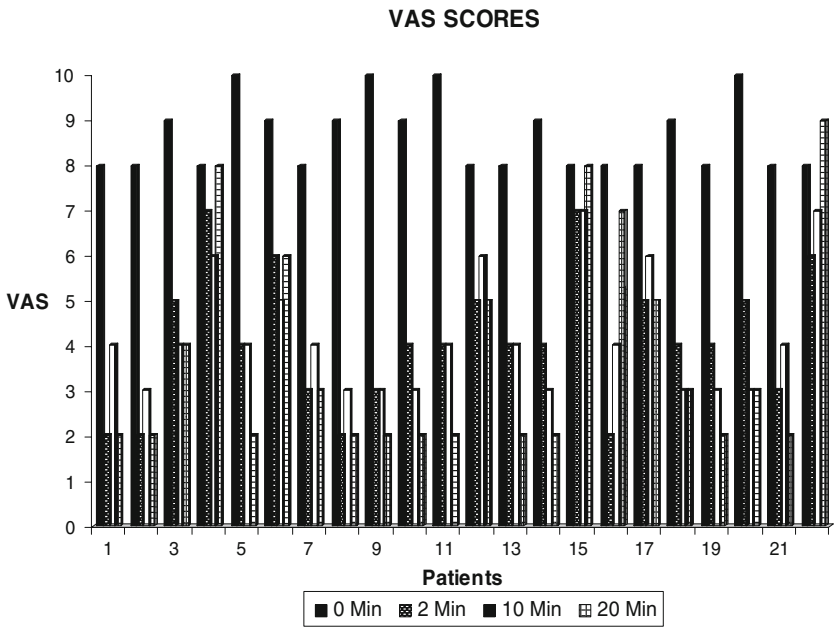

Fig. 1 Bar chart depicting the VAS scores of pain at various points in time in 22 patients

the pain was subdued. All the women were subjected to cystoscopy under anaesthesia. A note was made of any glomerulations, Hunners lesions, petecheal haemorrhages, 'raining of blood' and frank ulceration on distension of bladder. While 13 out of the 15 responders had cystoscopic findings suggestive of BPS/IC, all of the non-responders had unremarkable bladder. Out of these 13 patients, five had lesions which could be called as Hunners lesions (scars, hyperemic patches with central pale areas and frank ulcers), while eight had glomerulations and petecheal haemorrhages. As per protocol, all 15 responders were treated as BPS/IC and non-responders were referred for a detailed gynaecological and gastroenterological evaluation. Out of these seven non-responder women, two (9.0%) were found to have endometriosis, four (18.1%) were found to have pelvic inflammatory disease and one woman (4.5%) was diagnosed as diverticulitis.

Discussion

Diagnosis of BPS/IC has traditionally been that of exclusion. Questionnaires have been used to indicate the presence of pelvic pain along with urinary symptoms but they have their own limitations as far as specificity is concerned [6, 7]. While all 15 women who responded to intravesical lignocaine had irritative lower urinary tract symptoms, only two out of seven non-responders did not have any urinary symptoms.

We have chosen lignocaine as it has been used previously by various researchers [8, 9]. Lignocaine acts rapidly on the submucosal plexus and is absorbed in the blood stream reaching peak levels at about 30 min [10] and has instant result in the form of reduction in pain. This overall effect of intravesical lignocaine is likely to be mediated both via superficial local anesthetic action and reduction in the contractility of detrusor. Different local anaesthetic agents in various concentrations have been shown to reduce the contractility of human detrusor in vitro [11].

Many researchers have used an alkalized solution of lignocaine by adding sodium bicarbonate to the solution [10]. However, it is expected to aid systemic absorption and since we were primarily attempting to evaluate the topical action of lignocaine, we omitted the addition of sodium bicarbonate.

The reduction in pain usually lasts for a brief period. Since the aim of the present study was to use intravesical lignocaine only as a diagnostic test, there was no attempt made to study the duration of pain relief by this modality. Although there are many ways to quantify pain, we have used VAS scale, as this scale is easy to formulate, explain and interpret. VAS has been a validated tool for quantifying pain in various situations [12].

Although not a part of the objective of this study, it was noticed that women who experienced reduction in pain also had a transient decrease in irritative lower urinary tract symptoms.

Cystoscopy was done by the urologist soon after data collection by trained nurse after instillation of intravesical lignocaine. At the time of cystoscopy, findings of lignocaine test were known to the urologist. Even though

it may be argued that this may have created a bias in reporting cystoscopy findings, it must be emphasised that it could not have changed them drastically as all cases undergo video recording at our centre and a copy of the same is preserved for future reference and cross-referral, if required so.

Although we have done cystoscopy in all the enrolled women, retrospectively it could be argued that this could be avoided in the non-responders. This is precisely the advantage of this investigational modality. There is a high chance of non-urological cause of pain in women who do not respond to intravesical lignocaine. Appropriate referral to other specialists, without undergoing cystoscopy, could aid in arriving at a diagnosis in this group of women.

Although this study did not include any male patients, the concept may be extrapolated in future studies including men suffering from symptoms suggestive of BPS/IC.

The present study endeavours to evaluate a test with positive diagnostic significance. Pain originating from the urinary bladder only and not from other pelvic organs is expected to be numbed by intravesical lignocaine. In addition to having a positive diagnostic significance, it was also revealed during the present study that this test has a negative predictive value of 100%, i.e. there were no false negatives. However, this must be considered in the light of the small number of subjects studied.

On the other hand, a negative test after intravesical instillation of lignocaine may help in two ways. First, it can suggest who should not be treated with intravesical therapy, and second, patients may be identified for referral to another specialist for further investigation to exclude a non-urological cause of pelvic pain.

Based on this initial experience, randomised controlled trials need to be carried out to further substantiate and establish the utility of intravesical lignocaine in identifying patients with BPS/IC.

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Conflicts of interest None.

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