

IMMUNOGLOBULIN E PLAYS AN IMPORTANT ROLE IN THE PATHOGENESIS OF BLADDER PAIN SYNDROME -- AN IMMUNOHISTOCHEMICAL STUDY OF PAINFUL BLADDERS

Hypothesis / aims of study

Recently researchers had started to use the term bladder pain syndrome (BPS) to describe cases with painful urinary symptoms in several diseases with different clinical characteristics. However, the pathogenesis difference between different diseases of BPS is still unclear. Our previous found elevated serum immunoglobulin E (IgE) in the patients with ketamine related cystitis (KC). Current study is designed to investigate the role of IgE in the pathogenesis of different BPS diseases.

Study design, materials and methods

Sixteen patients with KC, ten patients with ulcer type interstitial cystitis (IC) and twenty patients with non-ulcer IC who were admitted to our hospital for cystoscopic hydrodistention were enrolled into this study. Bladder mucosa biopsy was taken during the procedure. Immunofluorescence staining and quantification of IgE were carried out in these bladder specimens. The clinical symptoms and urodynamic study results were recorded. Blood sample obtained from these patients also had been investigated for IgE. Bladder biopsies also had been taken from the non-BPS patients who were admitted for operations (such as urolithiasis, bladder outlet obstruction or anti-incontinence surgery). Twenty-two of these patients with evidence of pyuria and bacteria in urine were considered as bacterial cystitis, and 12 patients with clean urine were considered as normal control. Double immunofluorescence staining of tryptase and IgE was also carried out.

Results

The mean ages of KC, ulcer IC, non-ulcer IC, bacterial cystitis and normal control were 26.5, 56.1, 46.0, 46.2 and 47.0 years old, respectively. The visual analogue scale (VAS) pain score was significantly higher, cystometric bladder capacity (CBC) and maximal bladder capacity (MBC) were significantly smaller in the patients with KC (Table 1). Immunofluorescence staining of bladder IgE was positive in the 14 (87.5%) patients with KC (Fig. 1A), nine (90%) patients with ulcer IC, one (5%) patients with non-ulcer IC, eight (36.4%) patients with bacterial cystitis and 2 (16.7%) normal control subjects ($p<0.001$). The immunofluorescence quantification results showed a significantly higher bladder IgE in the patients with KC than the others ($p<0.001$, Table 1). When excluded the patients with KC, the bladder IgE was significantly higher in ulcer IC than the others patients ($p<0.001$). The double immunofluorescence staining also showed a coexpression of tryptase and IgE (Fig. 1B). The bladder IgE was significantly correlated with VAS ($r^2=0.156$, $p=0.017$), CBC ($r^2=0.332$, $p<0.001$) MBC ($r^2=0.423$, $p<0.001$). The serum IgE is significantly higher in the patients with KC than ulcer IC and non-ulcer IC ($p=0.005$). The bladder IgE and serum IgE did not reach a significant correlation ($p=0.065$).

Interpretation of results

The patients with KC had more severe clinical symptoms, higher bladder IgE and serum IgE than the patients with IC or non-ulcer IC. The patient with ulcer IC also had higher bladder IgE than the patients with non-ulcer IC. The bladder IgE also correlated with clinical symptoms significantly. These data suggest IgE with mast cell might contribute to the pathophysiology of BPS. Hypersensitive reaction might be the pathogenesis in some BPS patients.

Concluding message

Bladder IgE expression is significantly abnormally increased in the patients with KC ulcer IC. IgE mediated inflammation might be participate in the pathogenesis in at least in part of BPS patients.

Table 1. clinical symptoms and immunofluorescence staining results in the patients with BPS

	KC (N=16)	Ulcer IC (N=10)	Non-ulcer IC (N=20)	Bacterial cystitis (N=22)	Normal control (N=12)	p-value
VAS	8.5±0.82	7.5±2.4	5.2±2.4	N/A	N/A	0.001
CBC (mL)	54.8±16.1	143.6±78.4	270.9±94.6	N/A	N/A	<0.001
MBC (mL)	183.3±168.3	490.0±172.9	600.0±70.7	N/A	N/A	<0.001
Bladder IgE positive	14 (87.5%)	9 (90%)	1 (5%)	8 (37.5%)	2 (16.7)	< 0.001
Bladder IgE quantification	4.97±4.27	1.83±1.68	0.05±0.21	0.47±0.68	0.20±0.48	<0.001
Serum IgE (IU/mL)	914.9±653.1	458.2±905.9	119.8±148.0	N/A	N/A	0.005

CBC: cystometric bladder capacity, IC: interstitial cystitis, KC: ketamine related cystitis, MBC: maximal bladder capacity, VAS: visual analogue scale

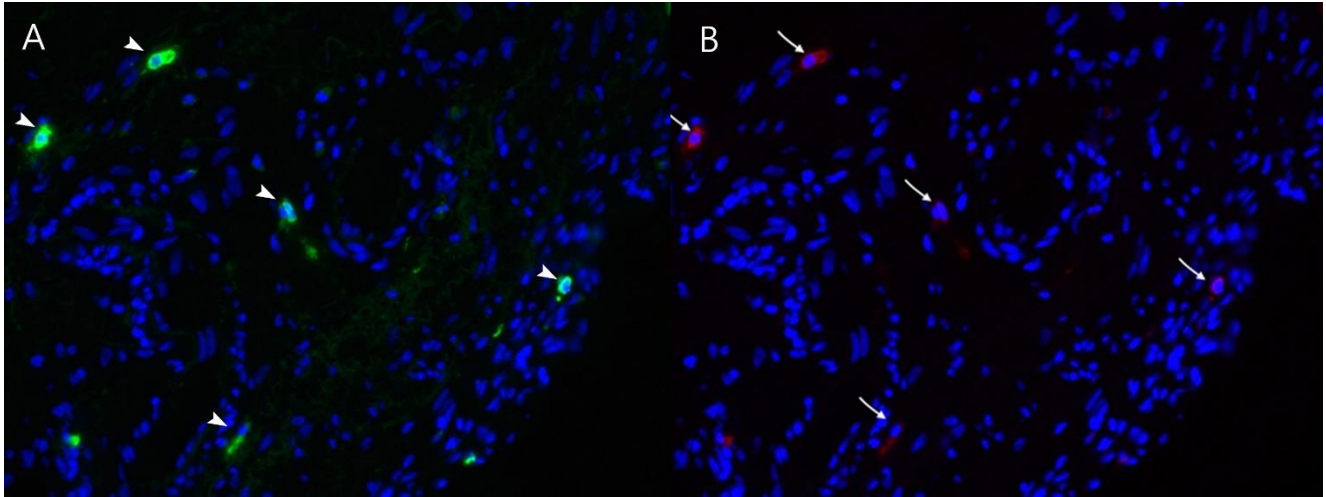


Fig. 1. Immunofluorescence double staining of bladder IgE and mast cell in the patients with KC. (A) tryptase for mast cell (white arrowhead). (B) IgE coexpression with the mast cell (white arrow).

Disclosures

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