Eosinophilic cystitis is a rare disorder of the urinary bladder, characterized by extensive local eosinophilic infiltration of all layers of the bladder wall, probably induced by a regulatory disorder of the immune system. Many possible causes have been postulated; nevertheless, the exact mechanism of the disease still needs to be clarified. This uncommon entity was first reported almost 40 years ago and can be encountered in any age group, although it seems to be more common in adults. Eosinophilic cystitis has a broad spectrum of clinical and pathologic manifestations, ranging from mild inflammatory cystitis to severe chronic or recurrent relentless inflammation. This disorder eventually can progress to a complete fibrosis of the urinary bladder with secondary involvement of the rest of the urinary tract, resulting in obstructive nephropathy with variable degrees of renal insufficiency. We report a child who had severe progressive eosinophilic cystitis and did not respond to high-dose corticosteroid therapy and specific therapy for toxocariasis. Repeated bladder sonography suggested progressive reduction of the urinary bladder lumen with extensive fibrosis of the bladder wall. Long-term treatment with cyclosporin A resulted in clinical recovery with complete disappearance of the bladder eosinophilic infiltration.
ing with a decreased bladder capacity was observed. Periodic renal function evaluation was normal.

A new therapeutic approach was started with oral cyclosporin A, 6 mg/kg/day, with periodic monitoring of serum drug levels (kept between 100 and 300 ng/mL), complete blood counts, and liver and renal functions. Clinical improvement was observed within 1 month. Diurnal enuresis, dysuria, and frequency disappeared after 2 months.

After 2 months of treatment with cyclosporin A, bladder ultrasound revealed moderate thickening of the bladder wall, which improved to mild thickening at 7 months; computed tomography confirmed the above findings (Figs 1B and 2B). Repeat cystoscopy was performed plus transurethral bladder biopsy, which demonstrated only a mild inflammatory lymphohistiocytic infiltration of the bladder wall with isolated eosinophils. No side effects of cyclosporin A treatment were observed. Therapy was stopped 8 months after initiation. One year after cessation of the therapy, the child had no clinical complaints. Bladder ultrasound and interleukin levels were normal.

**DISCUSSION**

Eosinophilic cystitis is a rare inflammatory disorder of the urinary bladder and has an unclear cause. Several reports have been published since 1960 with only a few cases in children. The disease has been reported in patients with a history of vesical injury and chronic vesical irritation, surgery, parasitosis, allergy to food and drugs, tuberculous cystitis, malignancies, and other conditions. Our patient had serology compatible with acute visceral larva migrans infection. Although serology reversed after specific treatment within 3 months, no clinical response was noticed. Moreover, deterioration of sonographic findings was apparent.

Long-term, high-dose corticosteroid treatment was ineffective. Usually, systemic visceral toxocariasis responds to medical treatment. Dysuria, frequency of urination, diurnal and nocturnal enuresis, suprapubic pain, and recurrent hematuria are usually the clinical and laboratory presentations of eosinophilic cystitis. Our patient presented with many clinical complaints but no urinary abnormalities. Hematuria, proteinuria, pyuria, and occasionally positive urine cultures are often found in eosinophilic cystitis. Peripheral blood eosinophilia can be present but not in the range of the hypereosinophilic syndrome. High serum levels of IgE have been reported but not in the range of the hyper-IgE syndrome. Urine cultures in our patient were normal, and peripheral eosinophilia and high serum levels of IgE were not present.

Imaging studies in patients with eosinophilic cystitis can mimic an infiltrating tumoral mass, as in our patient. It is imperative to obtain adequate deep biopsies; otherwise, the diagnosis can be missed. Initial transrectal and transurethral biopsies failed to obtain adequate tissue sampling; therefore, an open biopsy was performed.

The pathogenesis of eosinophilic cystitis is unclear; one suggestion (or hypothesis) is that a dysregulation of cytokines takes place (mainly interleukin-4 and -5). Cyclosporin A is a widely known immunoregulator, which may cause abnormal cytokine production.
Many treatments have been proposed, including radical surgery for advanced cases complicated by bladder fibrosis, which could endanger renal function. We believe that cyclosporin A should be considered a new possible treatment of eosinophilic cystitis.

REFERENCES

Fig 2. Computed tomography demonstrated concentric thickening of the bladder wall (A), which improved to mild thickening 7 months later (B).
Eosinophilic Cystitis in a 4-Year-Old Boy: Successful Long-Term Treatment With Cyclosporin A

Avishalom Pomeranz, Alon Eliakim, Yosef Uziel, Giora Gottesman, Valeria Rathaus, Tanya Zehavi and Baruch Wolach

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