

## **EFFECTS OF INTERFERON-GAMMA ON TRANSFORMING GROWTH FACTOR-BETA 1 EXPRESSION IN THE PARTIALLY OBSTRUCTED URINARY BLADDER OF RAT**

### **Aims of Study**

Change of bladder compliance in bladder outlet obstruction is closely related to collagen deposition in bladder wall (1). Transforming growth factor- $\beta$ 1 has been known as a key molecule in regulation of collagen deposition in various tissues (2, 3). The objective of this study was to investigate the alteration of transforming growth factor- $\beta$ 1 expression with interferon- $\gamma$  administration in the partially obstructed bladder.

### **Methods**

Partial bladder outlet obstruction was induced in adult female Sprague-Dawley rats (body weight 200-250gm) according to the method described by Uvelius (4). The same procedure without urethral ligation was applied to the sham control group. After 2 weeks periods of partial bladder outlet obstruction, recombinant interferon- $\gamma$  (100,000 units/day, LG chemical Co.) was administered subcutaneously once daily for another 2 weeks. After 4 weeks from initial bladder outlet obstruction, bladder tissues were evaluated for collagen deposition by Masson's trichrome staining, transforming growth factor- $\beta$ 1 activity by immunohistochemical staining, and transforming growth factor- $\beta$ 1 mRNA activity by reverse transcriptase polymerase chain reaction.

### **Results**

After 4 weeks of partial bladder outlet obstruction, there were intensified collagen staining especially in the interfascicular regions and moderate staining in the pericellular regions. After interferon- $\gamma$  administration for 2 weeks, collagen deposition was reduced; interfascicular collagen deposition to moderate degree and intercellular collagen deposition to almost undetectable level. After 4 weeks of partial bladder outlet obstruction, immunohistochemical staining for transforming growth factor- $\beta$ 1 showed moderate degree depositions in the interfascicular regions, which were decreased with interferon- $\gamma$  administration. In the partially obstructed bladders, transforming growth factor- $\beta$ 1 mRNA activity was increased 1.9 folds compared to that of sham control group. This increased transforming growth factor- $\beta$ 1 mRNA activity was decreased to 1.2 folds with interferon- $\gamma$  administration ( $p < 0.05$ ).

### **Conclusions**

Recombinant interferon- $\gamma$  administration decreased collagen deposition and transforming growth factor- $\beta$ 1 activity in the partially obstructed rat bladder. This is partially due to down regulation of transforming growth factor- $\beta$ 1 gene expression.

### **References**

1. Loss of elasticity in dysfunctional bladders; urodynamic and histochemical correlation. J Urol 1994; 152: 702-5.
2. A strategy for determining the pathogenesis of systemic sclerosis: transforming growth factor  $\beta$ , the answer? Arthritis Rheum 1989; 32: 817-25.
3. Transforming growth factor  $\beta$  in tissue fibrosis. New Engl J Med 1994; 331: 1286-92.
4. Collagen content in the rat urinary bladder subjected to infravesical outflow obstruction. J Urol 1984; 132: 587-90.