

# (Mast Cells)

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1, 1, 2

## Mast Cells in Renal Allografts

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**Purpose:** Chronic rejection is the enemy in the battle for long term survival after renal allografts. Interstitial fibrosis is known to be the important finding in renal allografts with chronic rejection. Mast cells secrete a large number of fibrogenic factors and have been involved in chronic inflammation and tissue fibrosis. In this study the authors evaluated the relationship between mast cells and fibrosis in renal allografts with chronic rejection.

**Methods:** The authors evaluated 42 biopsied specimens of renal allografts. Immunohistochemistry using anti-mast cell tryptase (Dako, 1 : 200) and an LSAB kit (Dako) was applied to detect mast cells. The mean number of mast cells (MNM) per 10 high power fields was counted.

**Results:** MNM of implantation biopsies was  $0.640 \pm 0.537$ , of acute rejection -  $1.969 \pm 1.216$ , of chronic rejection -  $6.0 \pm 3.133$  ( $P < 0.01$ ), of acute tubular necrosis -  $1.360 \pm 0.899$ , and of acute cyclosporine nephrotoxicity -  $1.000 \pm 0.600$ . MNM according to donor source was  $3.267 \pm 3.479$  vs.  $2.376 \pm 1.900$  (living donors vs. cadaveric donors). MNM was significantly correlated with donor sex (male : female ratio of =  $2.319 \pm 1.739 : 4.014 \pm 4.286$ ,  $P < 0.01$ ), and cholesterol (hypercholesterolemia vs. non-hypercholesterolemia,  $4.125 \pm 5.497$  vs.  $2.60 \pm 1.916$ ,  $P < 0.01$ ). However, MNM according to blood pressure was not statistically significant (hypertension : non-hypertension ratio of =  $3.189 \pm 3.05 : 1.200 \pm 1.226$ ,  $P > 0.05$ ).

**Conclusion:** Our data show that the number of mast cells

in renal allograft was significantly associated with chronic rejection, donor sex and hypercholesterolemia. (J Korean Surg Soc 2002;63:201-205)

**Key Words:** Renal transplantation, Chronic rejection, Mast cells

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가 ,  
(mast cell)  
(1)  
, histamine, heparin, serine protease  
IL-1, IL-3, IL-4, IL-5, IL-6 GM-CSF  
가  
(2,3)  
T-  
(4) T- INF- , IL-2, TNF- , IL-4, IL-5, IL-6,  
IL-10  
(5,6)  
(hyalinization)  
(Fig. 1)(7)  
가  
가 , IgA ,  
가 가 (8,9)

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Ⓢ 134-010,  
Tel: 02-2224-2212, Fax: 02-2224-2570  
E-mail: slee@hallym.or.kr  
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가  
(4,5,10,11)

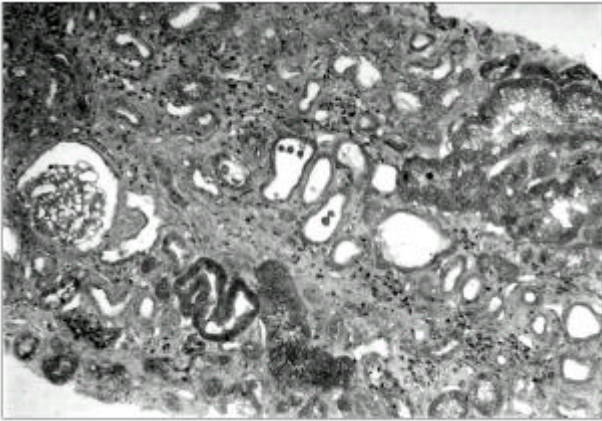
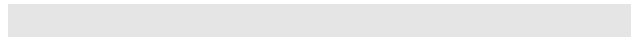


Fig. 1. Chronic renal rejection. There is extensive tubular atrophy with replacement by interstitial fibrosis (Masson-Trichrome stain, x100).



1)  
 1997 3 2001 3  
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 42 5 ,  
 13 , 14 , 5 , Cyclo-  
 sporine 5 ,  
 Banff schema

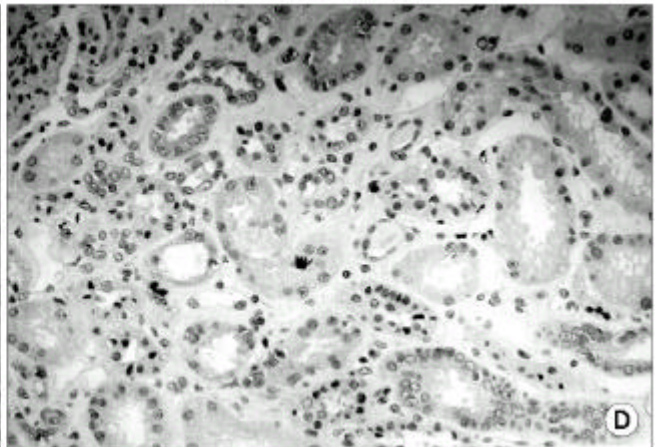
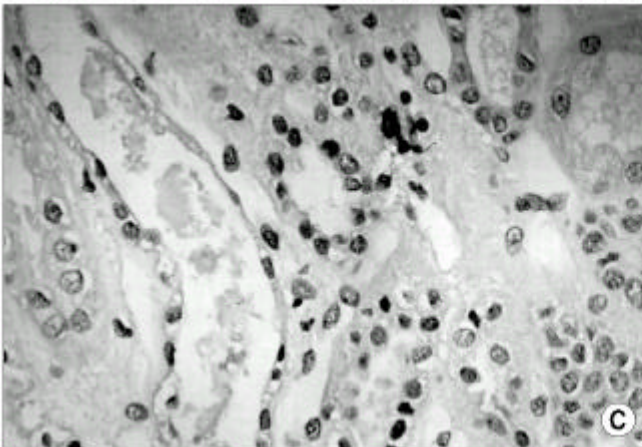
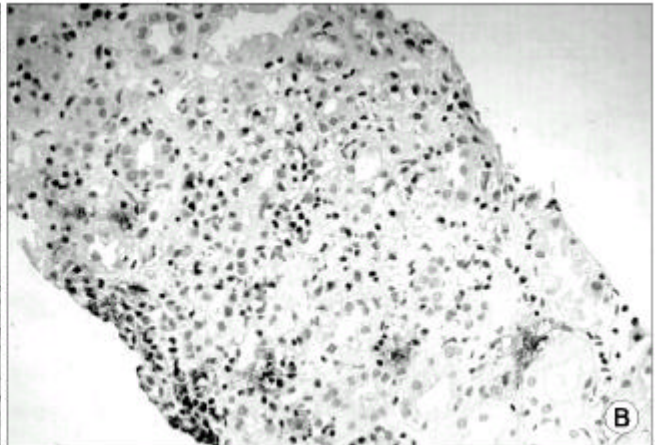
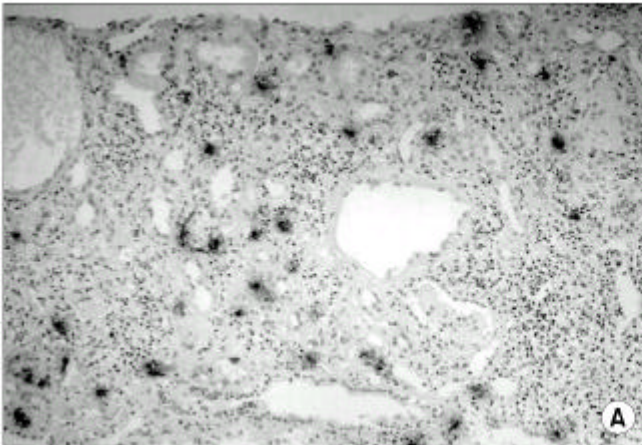


Fig. 2. Mast cells stained with anti-mast cell tryptase in (A) chronic renal rejection, (B) acute renal rejection, (C) acute tubular necrosis, and (D) cyclosporine nephrotoxicity.

**Table 1.** The mean number of mast cells (MNM) between each subgroups in allograft biopsies (n=42)

Subgroup	Number	MNM (mast cells/ 10 HPF)
Implantation biopsy	5	0.640±0.537
Acute rejection	13	1.969±1.216
Chronic rejection	14	6.000±3.133*
Acute tubular necrosis	5	1.360±0.899
Cyclosporine nephrotoxicity	5	1.000±0.600

\* = P < 0.01; HPF = high power field.

2)

Dubosq-Brazil  
Streptavidin-biotin/  
HRP (horseradish-peroxidase) detection system (DAKO)  
tryptase

(DAKO, 1 : 200) 1 µm

xylene 가

endogenous peroxidase

0.3% hydrogen peroxidase-methanol 10

가

10 (200 )

3)

Independent T test



15 64 24 ,  
38±9.2 ,  
18 가 ,  
27 , 14 .  
7.75±4.37 .

6.000±3.133, 0.640±0.537,  
1.969±1.216,  
1.360±0.899, cyclosporine 1.000±0.600  
(Fig. 2).  
가 가  
(P < 0.01)(Table 1).

grade 1 4.28, grade 2 4.95, grade 3 8.56

**Table 2.** The statistical significance of the mean number of mast cells (MNM) in multiple variables

Variables	Number	MNM (Mast cells/ 10 HPF)	P-value
Donor source			
Living donors	24	3.267±3.479	P > 0.05
Cadaveric donors	17	2.379±1.900	
Donor sex			
Male	27	2.319±1.739	P < 0.01
Female	14	4.014±4.286	
Blood pressure			
Hypertension	36	3.189±3.050	P > 0.05
Non-hypertension	6	1.200±1.226	
Cholesterol			
Hypercholesterolemia	8	4.125±5.497	P < 0.01
Non-hypercholesterolemia	34	2.600±1.916	

HPF = high power field.

grade 3 grade 1 2 가

3.267±3.473, 2.376±1.900

(P > 0.05).

4.014±4.286 ,

2.319±1.739

0.01).

3.189±3.050,

1.200±1.226

(P > 0.05).

mg/dl)

4.125±5.497,

2.600±1.916

가 가

(P < 0.01)(Table 2).



C5a, C3a, IL-5, IL-8 cytokine  
1  
(2)  
histamine, heparin, IL-1, IL-3, IL-4, IL-5, IL-6,  
tryptase, basic fibroblastic growth factor, TNF- , TGF-  
cytokine growth factor  
growth factor (myo-  
fibroblast) (12)

가 , IgA 가 , LDL 가 가 , (18) 가 , 가 (8,9,13) 가 , 가 , 가 , 가 , 가 , 가 Lajoie (4) 가 가 Javier (5) 가 가 가 , 가 가 가 , 가 가 , Odland (14) 가 , (15) (hyperfiltration)가 가 가 , 가 , 가 가 , 가 , 가 Atkinson (17) histamine (atherosclerotic plaque) 가가 , LDL 가 (xanthomas)

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