Abstracts of Outstanding Presentation (2)

The Clinicopathological Characteristics of the Kidney in Acute Graft-versus-Host Disease after Dark Agouti-to-Lewis Rat Bone Marrow Transplantation

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Introduction

Allogeneic hematopoietic and bone marrow cell transplantation causes acute and chronic graft-versus-host disease (GVHD), which is considered a severe side effect. The liver, gut, and skin are well-known primary target sites of acute and chronic GVHD. However, whether the kidney is affected by GVHD remains uncertain. In the present study, we examined the clinical and pathological characteristics of the kidney in acute GVHD in Dark Agouti-to-Lewis rat bone marrow transplantation.

Materials and Methods

Acute GVHD was induced in Lewis rats by bone marrow transplantation without immunosuppression. Dark Agouti rat (RT1a) bone marrow cells (6.0 × 107 cells) were adminstered to Lewis rats (RT1l) via tail vein injection after 10-Gy whole-body irradiation. We examined the clinical and pathological characteristics of acute GVHD in several organs, including the skin, liver, gut, and kidney, after bone marrow transplantation.

Results

Almost all white blood cells in the peripheral blood were donor cells with the Dark Agouti phenotype. From 21 to 40 days after bone marrow transplantation, acute and severe GVHD developed with decreased body weight (>20%), rash, alopecia, and diarrhea. Laboratory studies indicated liver and kidney dysfunction: asparate aminotransferase (143 ± 103 U/L), alanine aminotransferase (105.5 ± 6.5 U/L), lactate dehydrogenase (566 ± 534 U/L), and blood urea nitrogen (30.6 ± 7.0 mg/dL).

The pathologic changes in the liver, skin, and digestive tract were characterized by acute and severe GVHD. In the liver, massive infiltration of lymphocytes was noted in portal areas with phlebitis of portal veins and bile duct injuries, and was expanded into hepatic lobes with inflammation of central veins. In the skin, early separation of the epidermis from the dermis was noted with the presence of lymphocytes and eosinophilic apoptotic bodies in the besal layer of the epidermis and perivascular inflammation in the dermis. In the gut, cryptitis and exploding crypts were seen with lymphocyte infiltration and apoptotic bodies in crypts and erosion

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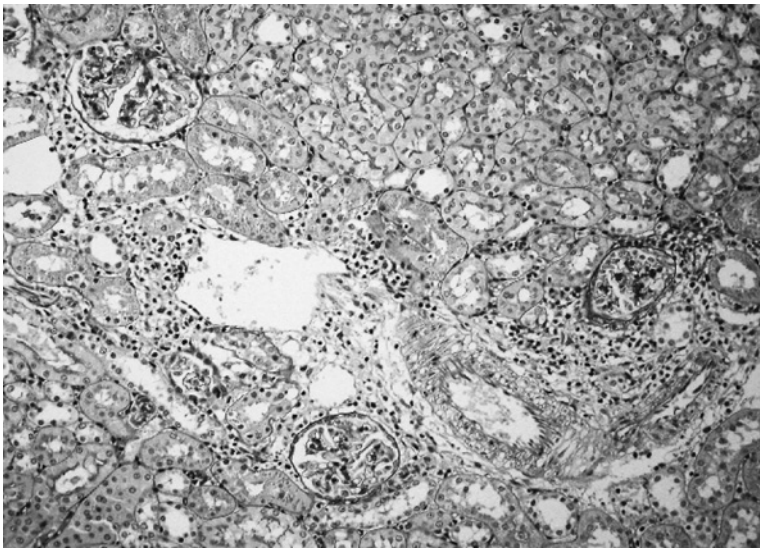

Fig. 1 Twenty-eight days after bone marrow transplantation, acute GVHD developed in the kidney. Infiltration of lymphocytes was noted in the interstitium, peritubular capillaries, glomeruli, renal tubules, and small arteries, with the formation of peritubular capillaritis, glomerulitis, tubulitis, and endarteritis.
The pathlogic changes of acute GVHD in the kidney were characteristic of the T-cell-mediated injury of the renal microvascular endothelium and renal tubules and were similar to those of acute T-cell mediated rejection in transplanted kidney grafts.

of mucosa. In addition, acute GVHD developed in the kidney. Many CD3+ T cells and CD68+ macrophages had infiltrated the interstitium around small arteries. Infliltration of CD3+ T cells and CD68+ macrophages expanded into renal glomeruli, peritubular capillaries, small arteries, and renal tubules in which acute glomerulitis, peritubular capillaritis, endarteritis, and tubulitis had developed. No obvious deposition of IgG, IgM, or C3 was detected in the kidney.

Conclusion

The kidney is a target of acute GVHD after bone marrow transplantation. The pathologic changes of acute GVHD in the kidney are characteristic of the T-cell mediated injury of renal microvascular endothelium and renal tubules, and these findings are similar to those in acute T-cell mediated rejection in transplanted kidney grafts.