THE RELATIONSHIP BETWEEN REBOUND THYMIC HYPERPLASIA AND REJECTION RISK IN RENAL TRANSPLANT PATIENTS

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Introduction

- The thymus is a vital organ for the development of acquired immunity. Significant shrinkage of the thymus is observed after stressful conditions (1). It returns to its normal size during the healing process(2).
- However, in some cases, it can grow to more than 30% beyond its normal size after the stress event (1). This condition is called rebound thymic hyperplasia. It typically begins between 9 months to 1 year and can extend up to 4.5 years (3).
- Cases of rebound thymic hyperplasia following transplantation have been reported in the literature.
- The aim of this study is to determine the incidence of rebound thymic hyperplasia in renal transplant patients at our hospital by retrospectively screening their thoracic CT scans and to evaluate the relationship between this condition and allograft rejection.

Materials and Methods

Thoracic CT scans of renal transplant patients conducted at our hospital between January 2012 and October 2023, spanning from 9 to 54 months after the operation, were retrospectively reviewed. A total of 212 patients and 632 CT scans of these patients were evaluated within the specified time range.

Results

- In 10 patients (4.71%), significant increases in size and volume of the thymus gland, greater than 30%, were identified as thymic hyperplasia during follow-up (Figure 1). Of the 10 patients with thymic hyperplasia, 4 (40%) had biopsy-proven rejection (Table 1).

- In the 202 cases without thymic hyperplasia, rejection was observed in 50 cases (24.75%), which is lower compared to the group with thymic hyperplasia (Table 2).

- The Fisher exact chi-square test was used for statistical evaluation. The p-value was calculated as 0.262, and no statistically significant result was obtained. No significant difference was found in rejection status between the group with rebound thymic hyperplasia and the group without it. However, this may be due to the small size of the hyperplasia group, and we believe that this issue should be re evaluated in larger, multi-center studies.

Discussion

- Thymic hyperplasia is thought to be associated with an active cellular immune response due to increased native T cell production. Cases of thymic hyperplasia following treatment have been reported in patients who underwent liver, kidney, lung, and bone marrow transplantation. However, the number of studies on this topic is quite limited.

  In our study, similar to the literature, all patients with thymic hyperplasia were children and young adults. We believe this result is related to the greater residual thymic tissue in younger individuals.

- Brink et al. found thymic hyperplasia and increased FDG uptake in the thymus on PET/CT in some cancer patients after chemotherapy (4). Hara et al. identified thymic hyperplasia in 11 (11%) out of 102 patients who received high-dose chemotherapy for metastatic or high-risk breast cancer and underwent autologous bone marrow transplantation (5). They suggested that this condition could be related to increased immune response after cancer treatment and could be interpreted as a good prognostic factor.

- In our study, thymic hyperplasia was found in 10 (4.71%) out of 212 patients receiving immunosuppressive therapy after renal transplantation, and rejection occurred in 4 (40%) of these patients. Rejection was observed in 50 (24.75%) of the 202 cases without thymic hyperplasia. Based on this information, we think that thymic hyperplasia following transplantation surgery could potentially increase the risk of rejection due to possible immunological stimulation. However, due to the rarity of thymic hyperplasia development post-transplantation, further studies in larger groups are needed.

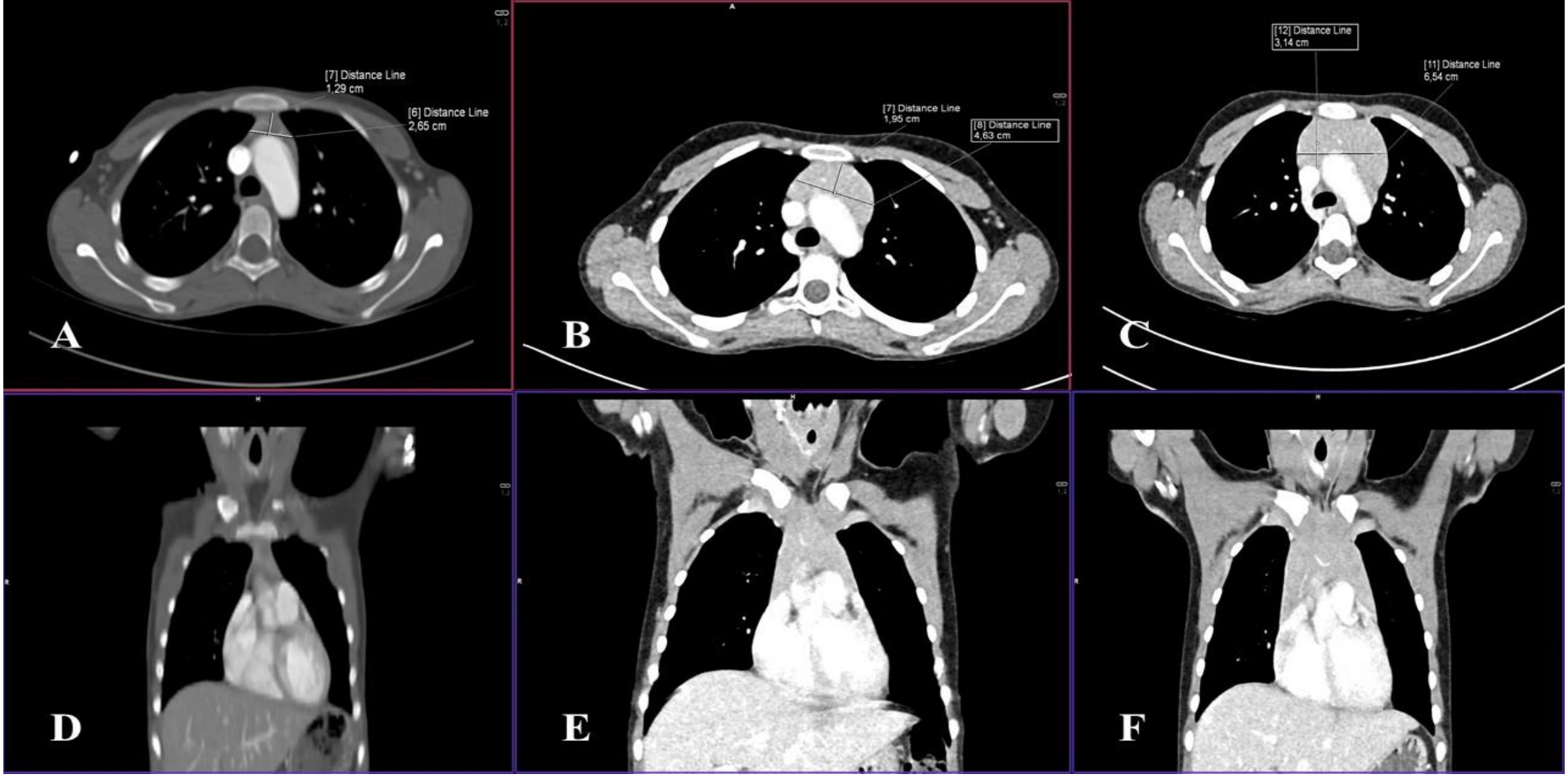

Figure 1: "Coronal CT images (A and D), axial and coronal CT images at 15 months post-operation (B and E), and axial and coronal CT images at 24 months post-operation (C and F)."

References

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