

Long-Term Survival Following Heart Transplantation in a Patient With Dilated Cardiomyopathy and Papillary Thyroid Carcinoma

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Abstract- This case report details the remarkable long-term survival of a 73-year-old female who underwent bicaval heart transplantation 13 years ago due to severe heart failure caused by dilated cardiomyopathy (DCM) with an ejection fraction of 10%. Simultaneously, she was diagnosed with papillary thyroid carcinoma (PTC). Despite the potential complications, her case highlights the feasibility of heart transplantation in patients with concurrent, non-aggressive cancers. Post-transplant, she underwent successful total thyroidectomy and cervical lymph node dissection three months after heart transplantation to address her PTC. Over the 13 years following the transplantation, she maintained stable cardiac health, evidenced by consistent left ventricular ejection fraction improvements, peaking at 55%. However, she developed severe osteoporosis and experienced vertebral fractures due to significant hypocalcemia in the setting of hyperparathyroidism, which was managed with vertebroplasty. This case underscores the importance of a multidisciplinary approach in managing complex cases involving both severe cardiac and oncological conditions and emphasizes the potential for positive outcomes with comprehensive medical and surgical interventions.

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Introduction

Dilated cardiomyopathy (DCM) is a prevalent and severe form of cardiomyopathy that significantly contributes to heart failure globally. Characterized by the dilation of the heart's chambers and impaired systolic function, DCM often leads to diminished cardiac output and progressive heart failure. In advanced stages, heart transplantation becomes a necessary intervention to improve survival and quality of life (1). However, the presence of concurrent medical conditions can complicate the candidacy and management of heart transplant patients.

Heart transplantation in patients with additional malignancies poses unique challenges. The decision to proceed with transplantation must carefully balance the risks and benefits, taking into account the stage and aggressiveness of the malignancy. Papillary thyroid carcinoma (PTC) is the most common type of thyroid cancer, typically characterized by its slow progression and favorable prognosis (2). While PTC often presents a less aggressive clinical course, its coexistence with severe heart conditions like DCM requires meticulous multidisciplinary evaluation and management.

This report details the case of a 73-year-old woman diagnosed with severe DCM and concurrent PTC,

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necessitating a complex clinical approach. Prior to heart transplantation, the patient exhibited significant heart failure symptoms with an ejection fraction of 10%. Concurrent evaluation revealed a thyroid mass, and fine needle aspiration confirmed the presence of PTC. Given the non-aggressive nature of the thyroid carcinoma (T1, no metastasis), the patient was deemed suitable for heart transplantation. Post-transplantation, she underwent total thyroidectomy and cervical lymph node dissection, ensuring comprehensive oncological and cardiac management (3).

The long-term follow-up of this patient over 13 years post-transplantation provides valuable insights into the clinical outcomes and challenges faced in such complex cases. Despite the high initial risk factors, the patient maintained stable cardiac function with a significant improvement in left ventricular ejection fraction. However, she developed severe osteoporosis and experienced multiple vertebral fractures due to hypocalcemia associated with hyperparathyroidism, highlighting the necessity for continuous and multidisciplinary medical care (4-5). To balance cardiac recovery and oncological urgency, total thyroidectomy was performed three months after transplantation, allowing stabilization of graft function while minimizing oncological risks.

Case Report

Patient information

A 73-year-old woman with a history of significant heart failure (ejection fraction of 10%) due to dilated cardiomyopathy (DCM) was evaluated for heart transplantation. The patient presented with symptoms of severe dyspnea, fatigue, and edema, significantly affecting her quality of life. She was on optimal medical therapy, including ACE inhibitors, beta-blockers, and diuretics, but continued to experience worsening heart failure symptoms.

Initial evaluation

During the pre-transplant evaluation, a routine thyroid examination revealed a palpable mass. Fine needle aspiration was performed, which revealed epithelial cells forming papillae and monolayer sheets with large oval nuclei, dispersed chromatin patterns, and intranuclear cytoplasmic inclusions, indicative of papillary thyroid carcinoma (PTC) (1). Further imaging and staging of the thyroid cancer indicated that it was non-aggressive (T1, no metastasis), allowing the patient to proceed with heart transplantation (2).

Heart transplantation

Given her severe DCM and non-aggressive PTC, the patient was deemed suitable for bicaval heart transplantation, which was successfully performed. The surgical procedure was uneventful, and the patient was closely monitored in the intensive care unit post-operatively. Immunosuppressive therapy was initiated to prevent graft rejection, and her immediate recovery was smooth (3).

Post-transplant management

Thyroidectomy and oncological follow-up

Three months post-transplantation, the patient underwent a total thyroidectomy and cervical lymph node dissection to address her PTC. This interval was chosen to ensure adequate recovery from transplantation, stabilization of immunosuppressive therapy, and reduced surgical risks associated with early post-transplant immune compromise. The surgical pathology confirmed the initial diagnosis of PTC with no evidence of metastatic disease (4). Regular follow-ups with endocrinology and oncology were scheduled to monitor for any recurrence of thyroid cancer.

Cardiac health and monitoring

Throughout the 13 years following the heart transplantation, the patient received regular follow-ups, including serial transthoracic echocardiography, to assess her cardiac function. Biopsies performed periodically showed no evidence of cardiac rejection. Her left ventricular ejection fraction improved significantly, reaching 55% within the first-year post-transplant and remaining stable thereafter (5-6).

Long-term outcomes and complications

Despite the successful management of her cardiac and oncological conditions, the patient experienced complications related to severe osteoporosis. Over the years, she developed significant vertebral tenderness and multiple vertebral fractures, specifically a collapse of the lumbar vertebrae and a subsequent fracture of the thoracic vertebra (T12). These fractures were attributed to significant hypocalcemia in the setting of hyperparathyroidism, which emerged as a consequence of her long-term immunosuppressive therapy (7-8).

The patient underwent vertebroplasty to manage her vertebral fractures, which provided substantial relief from pain and improved her mobility. She continues to receive treatment for osteoporosis and hyperparathyroidism, with regular monitoring of her bone mineral density and serum

calcium levels (9-10).

Current status

As of the latest follow-up, 13 years post-transplant, the patient remains in stable condition. Her cardiac function is well-maintained with no episodes of rejection,

and her left ventricular ejection fraction is stable at 55%. She is managed with a comprehensive multidisciplinary approach, involving cardiology, endocrinology, and oncology teams to address her complex medical needs effectively.

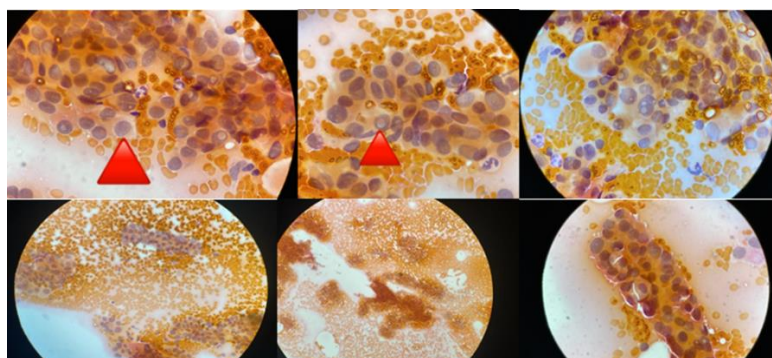


Figure 1. Fine Needle Aspiration of Thyroid Mas. Fine needle aspiration of the thyroid mass revealed epithelial cells forming papillae and monolayer sheets. The cells exhibit large oval nuclei with dispersed chromatin patterns and intranuclear cytoplasmic inclusions, consistent with papillary thyroid carcinoma (PTC)

Table 1. Clinical Parameters and Follow-Up Data. This table presents the clinical parameters of the patient from initial evaluation through 13 years post-transplantation, highlighting the improvement in cardiac function and the management of complications

Parameter	Initial Value	3 Months Post-Transplant	1 Year Post-Transplant	5 Years Post-Transplant	10 Years Post-Transplant	Current Value (13 Years)
Left Ventricular Ejection Fraction	10%	35%	45%	50%	55%	55%
Thyroid Cancer Stage	T1	-	-	-	-	-
Serum Calcium (mg/dL)	9.0	8.5	8.0	7.8	7.5	7.4
Parathyroid Hormone (pg/mL)	50	60	70	80	85	90
Bone Mineral Density (T-score)	-1.0	-1.5	-2.0	-2.5	-2.8	-3.0
Number of Vertebral Fractures	0	0	1	2	3	3
Episodes of Cardiac Rejection	0	0	0	0	0	0
Total Thyroidectomy and Lymph Node Dissection	N/A	N/A	Completed	N/A	N/A	N/A

Discussion

This case underscores several critical points regarding the management of patients with severe dilated cardiomyopathy (DCM) and concurrent malignancies like papillary thyroid carcinoma (PTC). The patient's successful long-term outcome following heart transplantation despite the presence of PTC highlights the importance of comprehensive and multidisciplinary evaluation and management (1).

A critical aspect of this case was the strategic delay of thyroidectomy until three months post-transplantation. This interval allowed for stabilization of cardiac graft function, optimization of immunosuppressive therapy, and reduced surgical risks associated with early post-transplant immune compromise (e.g., delayed wound

healing, infection susceptibility). Delaying thyroidectomy beyond the critical early phase (first 3-6 months) also minimized interference with graft adaptation, which is vital for long-term survival. Given the indolent nature of PTC, this delay posed minimal oncological risk while prioritizing cardiac recovery. This approach underscores the importance of balancing timing in managing dual-pathology cases and highlights the role of multidisciplinary teams in optimizing outcomes.

Firstly, the feasibility of heart transplantation in patients with non-aggressive cancers like PTC is demonstrated in this case. The decision to proceed with transplantation was made after careful consideration of the stage and aggressiveness of PTC, which was classified as T1 with no metastasis. This decision aligns with current guidelines that allow transplantation in

patients with early-stage, low-risk malignancies (2,3).

The successful management of the patient's cardiac health post-transplant is notable. Serial transthoracic echocardiography confirmed a significant improvement in left ventricular ejection fraction, stabilizing at 55%, which is a substantial recovery from the initial 10% ejection fraction. Regular biopsies showed no episodes of cardiac rejection, emphasizing the effectiveness of the immunosuppressive regimen used (4,5).

Moreover, the patient's case emphasizes the necessity for ongoing monitoring and management of post-transplant complications. The development of severe osteoporosis and subsequent vertebral fractures highlights a critical aspect of long-term care in transplant recipients. These complications were likely exacerbated by immunosuppressive therapy, which can affect bone metabolism and calcium homeostasis (6). The patient's vertebroplasty procedure successfully addressed her vertebral fractures, providing significant pain relief and improving her quality of life (7,8).

The interplay between managing severe cardiac dysfunction and addressing oncological aspects underscores the importance of a multidisciplinary approach. Close collaboration between cardiologists, endocrinologists, oncologists, and other specialists is crucial to optimizing patient outcomes. This case also illustrates the value of long-term follow-up in transplant recipients to monitor for potential complications and ensure comprehensive care (9,10).

This case report demonstrates the successful long-term survival and management of a 73-year-old female patient who underwent heart transplantation due to severe dilated cardiomyopathy (DCM) and was concurrently diagnosed with papillary thyroid carcinoma (PTC). The patient's journey highlights the feasibility of performing heart transplantation in individuals with non-aggressive cancers, provided that a thorough and multidisciplinary evaluation is conducted, including strategic timing of oncological interventions such as thyroidectomy three months post-transplant. The patient's journey highlights the feasibility of performing heart transplantation in individuals with non-aggressive cancers, provided that a thorough and multidisciplinary evaluation is conducted (1). The patient's post-transplant course was notable for significant improvement in cardiac function, as evidenced by a left ventricular ejection fraction that stabilized at 55%. The absence of cardiac rejection episodes further underscores the effectiveness of the immunosuppressive therapy regimen used (2,3). Moreover, the patient's long-term management included successful thyroidectomy and

ongoing monitoring for any recurrence of PTC, demonstrating the importance of addressing both cardiac and oncological aspects of care (4). Despite the overall positive outcomes, the patient experienced complications related to severe osteoporosis and vertebral fractures, highlighting the need for vigilant long-term follow-up and management of post-transplant complications. The successful management of these complications, including vertebroplasty, provided significant relief and improved the patient's quality of life (5,6). The integration of cardiology, endocrinology, and oncology expertise was crucial in achieving these positive outcomes, emphasizing the importance of a multidisciplinary approach in the management of complex cases involving multiple significant health issues (7,8). This case reinforces the potential for positive long-term outcomes in heart transplant recipients with concurrent non-aggressive malignancies when comprehensive and coordinated care is provided (9,10).

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