Letter to the Editor

Eosinophil blood count and anemia are associated with *Trypanosoma cruzi* infection reactivation in Chagas' heart transplant recipients

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**Abstract**

*Trypanosoma cruzi* infection reactivation is a constant threat for Chagas' heart transplant recipients. From September 2000 to September 2007, 54 patients underwent heart transplantation at our institution. Fourteen (70%) out of 20 Chagas' disease patients who survived the perioperative period were entered into the study. Mean eosinophil count and mean hemoglobin plasma levels were associated to *T. cruzi* infection reactivation.

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1. Introduction

*Trypanosoma cruzi* (*T. cruzi*) infection reactivation is a constant threat for Chagas’ heart transplant recipients. The incidence of clinical *T. cruzi* infection reactivation varies from 27% to 90% [1] and manifests by pancoatic and/or myocarditis and more rarely by intracerebral mass [2].

The histological aspect of myocardial *T. cruzi* infection reactivation on endomyocardial biopsy usually mimics acute graft rejection. This might lead to inadvertent treatment with steroid pulsotherapy, dissemination of *T. cruzi* infection, or septicemia due to opportunistic infection [3].

The aim of this study, therefore, was to look for other risk factors for *T. cruzi* infection reactivation in an attempt to provide the correct diagnosis as well as the proper treatment for Chagas’ heart transplant recipients with this infection recrudescence.

2. Methods

From September 2000 to September 2007, about 54 patients underwent 55 orthotopic heart transplantation procedures at our institution. Twenty (37%) of them had a positive serology for Chagas' disease.

Fourteen (70%) out of 20 Chagas' disease patients, who survived the perioperative period, were entered the study. Baseline characteristics of Chagas’ heart transplant recipients are illustrated in Table 1.

Continuous variables were compared with two-sample *T* test or Mann–Whitney test, whereas categorical variables were compared by the X² test or Fisher exact test.

The Kaplan–Meyer curve presented the probability of freedom from *T. cruzi* infection reactivation. A *p* value <0.05 was considered statistically significant.

3. Results

Six (43%) out of 14 patients had documented *T. cruzi* infection reactivation: 3 in the heart, and 3 in the subcutaneous tissue. Six (43%) patients had acute myocardial inflammation consistent with acute rejection graded 3A or more, which had not improved with steroid pulsotherapy, but improved after specific treatment for *T. cruzi* infection (benznidazol, 5 mg/kg, during 60 days). Such...

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**Table 1**

Baseline characteristics of Chagas’ heart transplant recipients cohort (n = 14).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>43 ± 11</td>
</tr>
<tr>
<td>Male</td>
<td>9 (64%)</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>122 ± 19</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>83 ± 11</td>
</tr>
<tr>
<td>HR (bpm)</td>
<td>92 ± 12</td>
</tr>
<tr>
<td>Cyclosporine</td>
<td>10 (71%)</td>
</tr>
<tr>
<td>Mean</td>
<td>288.5 ± 90.2 pg/ml</td>
</tr>
<tr>
<td>MMF (2–3 g/day)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Prednisone</td>
<td>9 (64%)</td>
</tr>
<tr>
<td>Median</td>
<td>(5.0 to 12.5) mg/day</td>
</tr>
<tr>
<td>Sirolimus</td>
<td>3 (22%)</td>
</tr>
<tr>
<td>Tacrolimus</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Neoplasia</td>
<td>Zero</td>
</tr>
<tr>
<td>Rejection (median episodes)</td>
<td>0.5 (0–10)</td>
</tr>
<tr>
<td>Follow-up (months)</td>
<td>40.5 ± 25.5</td>
</tr>
</tbody>
</table>

SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure; HR = heart rate; bpm = beats per minute.

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patients were considered to have *T. cruzi* infection reactivation. A total of 17 episodes of *T. cruzi* infection reactivation were detected: 8 patients had 1 episode, 3 patients had 2 episodes, and 1 patient had 3 episodes. Mean *T. cruzi* infection reactivation episodes per patient was $1.21 \pm 0.80$. Four (23%) out 17 episodes of *T. cruzi* infection reactivation occurred in the first trimester after cardiac transplantation, 3 (18%) in the second trimester, 4 (23%) in the second semester, and 6 (35%) after 1 year.

Mean eosinophil count per mm$^3$ and mean hemoglobin plasma levels were associated to Chagas' reactivation (Table 2). Six of 12 (50%) patients had increased levels of immunosuppressant. One (8%) patient died because of *T. cruzi* infection reactivation. Probability of freedom from *T. cruzi* infection reactivation was 86% at 58 days, 43% at 202 days, and 29% at 297 days after cardiac transplantation (Fig. 1). Mean time to the first episode of *T. cruzi* infection reactivation was 352 days.

### 4. Discussion

This study shows that a slight increase in eosinophil count as well as a marginal decrease in hemoglobin levels can be detected in patients with *T. cruzi* infection reactivation. A lower increase in eosinophil blood count and in bone marrow has been detected in *T. cruzi*-infected rats in comparison to non-susceptible animals [4]. Increased eosinophil count has been observed in blood circulation as well as in endomyocardial biopsy tissue during acute rejection in non-Chagas heart transplant recipients [5]. It is noteworthy that blood eosinophil count increases 3–4 days before the diagnosis of acute rejection. Thus, increased eosinophil count can be a marker of inflammation. In the context of Chagas' heart transplant recipient, it can be a marker of *T. cruzi* infection reactivation as well.

Anemia was also associated with *T. cruzi* infection reactivation. Experimentally, anemia can be observed in *T. cruzi* infected animals. Therefore, the appearance of anemia may raise the diagnostic possibility of *T. cruzi* infection reactivation [6].

Over-immunosuppression is one of the mechanisms proposed to account for recrudescence of *T. cruzi* infection in Chagas' heart transplant patients. In this study, 50% of patients were found to have increased levels of immunosuppressant. Therefore, it is conceivable that over-immunosuppression can account for the high frequency of *T. cruzi* infection reactivation observed in this study.

In conclusion, the majority of *T. cruzi* infection reactivation episodes occurs in the first year after cardiac transplantation. The appearance of anemia or eosinophilia in the follow up are associated with *T. cruzi* recrudescence in Chagas' heart transplant recipients.

### Acknowledgement

The authors of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology [7].

### References


