Clinical relevance and outcome of routine endomyocardial biopsy to detect rejection after heart transplantation

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Background: After heart transplantation (HTx), endomyocardial biopsies (EMBs) are the gold standard to monitor cardiac allograft rejection. However, a clear consensus on the optimal frequency and duration of EMB monitoring is lacking.

Purpose: Since the first HTx in 1985 in our center, EMB protocols have gradually changed to a low-frequency schedule. We assessed the diagnostic yield and complication rate of the three different EMB protocols used during the past 37 years.

Methods: In this retrospective, single centre, observational study, all biopsy data of routine EMBs after HTx between 1985 and 2022 were collected for analysis. Patients with symptom-driven biopsies or follow up in another hospital were excluded. The total number of biopsies, type of rejection and complications were evaluated.

Results: In a total of 431 patients (69.6\% male, mean age at transplant 48±13 years), 6692 routine surveillance EMB procedures were performed. The average number of biopsy procedures per patient was 25.1±8.1 for protocol 1 (n=44, 1985-1994), 17.0±3.6 for protocol 2 (n=213, 1994-2009) and 11.3±2.6 for protocol 3 (n=174, 2009-2022). Cellular rejection was detected in 8.93\%, of which grade I, II and III cellular rejections were seen in 7.32\%, 1.58\% and 0.03\%, respectively. The frequency of ≥ ISHLT grade 2R requiring additional treatment was 1.61\% and decreased over time with each EMB protocol (2.80\%, 1.72\%, and 0.76\%). Complication rate was 1.63\%, mainly consisting of puncture of the carotid artery (57.9\%). Independent of the EMB protocol used, the majority of rejections occurred within the first six months after HTx (68.7\%).

Conclusion: Complications of EMB after HTx are rare. Cellular rejection mostly occurs within the first 6 months after HTx. The incidence of clinically relevant cellular rejection (≥ ISHLT grade 2) has declined over time, partly due to improved immunosuppressive therapy. A conservative approach using a low-frequency EMB schedule seems feasible and safe.