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CLINICAL RESEARCH

Severe right ventricular dysfunction is an independent predictor of pre- and post-transplant mortality among candidates for heart transplantation

La dysfonction ventriculaire droite sévère est un facteur prédictif indépendant de mortalité pré- et post-transplantation cardiaque

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KEYWORDS
Waiting-list mortality;

Summary
Background. — Heart transplantation is the gold-standard treatment for end-stage heart failure. However, the shortage of grafts has led to longer waiting times and increased mortality for candidates without priority.

Abbreviations: BNP, B-type natriuretic peptide; CI, confidence interval; ECMO, extracorporeal membrane oxygenation; HE1, high emergency 1; HLA, human leukocyte antigen; HR, hazard ratio; INTERMACS, Interagency Registry for Mechanically Assisted Circulatory Support; LVAD, left ventricular assist device; LVEF, left ventricular ejection fraction; RV, right ventricular; TAPSE, tricuspid annular plane systolic excursion; VO_{2max}, maximal oxygen consumption.

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Heart transplantation;
Heart failure;
Right ventricular function;
Post-transplant survival

Aims. — To study waiting-list and post-transplant mortality, and their risk factors among patients registered for heart transplantation without initial high emergency procedure.
Methods. — All patients registered on the heart transplantation waiting list (2004—2015) without initial high emergency procedure were included. Clinical, biological, echocardiographic and haemodynamic data were collected. Waiting list and 1-year post-transplant survival were analysed with a Kaplan-Meier model.
Results. — Of 221 patients enrolled, 168 (76.0%) were men. Mean age was 50.0 ± 12.0 years. Forty-seven patients died on the waiting list, resulting in mortality rates of 11.2 ± 2.7% at 1 year, 31.9 ± 5.4% at 2 years and 49.4 ± 7.1% at 3 years. Median survival was 36.0 ± 4.6 months. In the multivariable analysis, left ventricular ejection fraction < 30% (hazard ratio [HR]: 3.76, 95% confidence interval [CI]: 1.38—10.24; *P* = 0.010) and severe right ventricular systolic dysfunction (HR: 2.89, 95% CI: 1.41—5.92; *P* = 0.004) were associated with increased waiting-list mortality. The post-transplant survival rate was 73.1 ± 4.4% at 1 year. Pretransplant severe right ventricular dysfunction and age > 50 years were strong predictors of death after transplantation (HR: 5.38, 95% CI: 1.38—10.24 [*P* = 0.020] and HR: 6.16, 95% CI: 1.62—9.32 [*P* = 0.0130], respectively).
Conclusions. — Mortality among candidates for heart transplantation remains high. Patients at highest risk of waiting-list mortality have to be promoted, but without compromising post-transplant outcomes. For this reason, candidates with severe right ventricular dysfunction are of concern, because, for them, transplantation is hazardous.
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MOTS CLÉS
Mortalité sur liste d'attente ;
Transplantation cardiaque ;
Insuffisance cardiaque terminale ;
Dysfonction ventriculaire droite ;
Survie post-transplantation

Résumé
Contexte. — La transplantation cardiaque est le traitement de référence de l'insuffisance cardiaque terminale. La pénurie de greffons entraîne des délais d'attente trop longs et une surmortalité des candidats non prioritaires.
Objectifs. — Étudier le pronostic sur liste et en post-transplantation des candidats sans priorité initiale.
Méthodes. — De 2004 à 2015, tous les patients inscrits sur liste d'attente sans priorité initiale ont été inclus. Les caractéristiques cliniques, biologiques, échographiques et hémodynamiques ont été recueillies. Nous avons analysé la survie sur liste par la méthode de Kaplan-Meier.
Résultats. — Un total de 221 patients ont été étudiés. On retrouvait une majorité d'hommes (*n* = 168, 76,0 %). L'âge moyen était de 50,0 ± 12,0 ans. Quarante-sept patients sont décédés sur liste d'attente, soit une mortalité de 11,2 ± 2,7 % à 1 an, 31,9 ± 5,4 % à 2 ans et 49,4 ± 7,1 % à 3 ans. La médiane de survie était de 36,0 ± 4,6 mois. En analyse multivariée, une fraction d'éjection ventriculaire gauche < 30 % (3,76, IC 95 % : 1,38—10,24 ; *p* = 0,010) et une dysfonction ventriculaire droite sévère (2,89, IC 95 % : 1,41—5,92 ; *p* = 0,004) étaient indépendamment associés à une surmortalité. La survie post-transplantation était de 73,1 ± 4,4 % à un an. Une dysfonction ventriculaire droite sévère en pré-transplantation (5,38, IC 95 % : 1,38—10,24 ; *p* = 0,020) et un âge > 50 ans (6,16, IC 95 % : 1,62—9,32 ; *p* = 0,0130) étaient des facteurs prédictifs de décès post-greffe.
Conclusions. — La mortalité sur liste d'attente transplantation cardiaque demeure élevée. Les candidats les plus à risque de décès sur liste doivent être favorisés sans compromettre leur survie post-transplantation. Les patients avec dysfonction ventriculaire droite sévère ne semblent pas tirer de bénéfice de la transplantation.
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Background

Heart failure is the third major cause of cardiovascular death, after ischaemic stroke and myocardial infarction [1]. In France, 2.3% of the population have heart failure, leading to more than 20,000 deaths each year [2]. The prognosis is worse for patients with end-stage heart failure, refractory to optimal medical and instrumental therapy [3,4]. In this case, the gold-standard treatment is cardiac transplantation [5,6], which significantly improves survival and quality

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