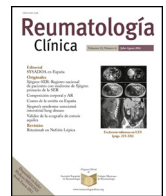




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Original Article

Cardiac Surgery in Systemic Lupus Erythematosus Patients: Clinical Characteristics and Outcomes[☆]

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ABSTRACT

Objectives: To study the clinical characteristics and outcomes in systemic lupus erythematosus (SLE) patients who underwent cardiac surgery.

Methods: Retrospective analysis of 30 SLE patients who underwent cardiac surgery at a single center. Demographics, comorbidities, clinical and serologic characteristics, cardiovascular risk scores and treatment were recorded. Type of surgery, postoperative complications, mortality and histology were analyzed.

Results: Disease duration at surgery was 2 years. Valve replacement was the procedure most frequently performed (53%), followed by pericardial window (37%). At least one postoperative complication developed in 63% (mainly infections). An aortic cross-clamp time ≥ 76 min was associated with at least one postoperative complication (OR 6.4, 95% CI 1.1–35.4, $P = .03$). Early death occurred in 5 patients (17%) and late in 3 (10%); main causes were sepsis and heart failure. Disease activity was associated with pericardial window (OR 12.6, 95% CI 1.9–79, $P = .007$); lymphopenia ≤ 1.200 (OR 10.1, 95% CI 1.05–97, $P = .04$); age ≤ 30 years (OR 7.7, 95% CI 1.2–46.3, $P = .02$); and New York Heart Association class III (OR 7.0, 95% CI 1.1–42, $P = .03$). Postoperative infection was associated with length of hospital stay ≥ 2 weeks (OR 54.9, 95% CI 5.0–602.1, $P = .001$); intensive care unit stay ≥ 10 days (OR 20, 95% CI 1.6–171.7, $P = .01$); duration of mechanical ventilation ≥ 5 days (OR 16.9, 95% CI 1.5–171.7, $P = .01$); and pulmonary artery systolic pressure ≥ 50 mmHg (OR 7.8, 95% CI 1.4–41.2, $P = .01$).

Conclusions: Cardiac surgery in SLE confers high morbidity and mortality. SLE-specific preoperative risk scores should be designed to identify prognostic factors.

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Cirugía cardíaca en pacientes con lupus eritematoso sistémico: características clínicas y desenlaces

RESUMEN

Objetivos: Estudiar las características clínicas y desenlaces de los pacientes con lupus eritematoso sistémico (LES) intervenidos de cirugía cardíaca.

Métodos: Se realizó un estudio retrospectivo de 30 pacientes con LES y cirugía cardíaca en un solo centro. Se registraron comorbilidades, características demográficas, clínicas, serológicas, riesgo cardiovascular, tratamiento, tipo de cirugía, complicaciones postoperatorias, mortalidad e histología.

Resultados: La duración de LES al momento de la cirugía fue de 2 años. El procedimiento más frecuente fue recambio valvular (53%), seguido de ventana pericárdica (37%). Al menos una complicación postoperatoria se presentó en el 63% (principalmente infecciones). Un pinzamiento aórtico ≥ 76 min se asoció con al

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menos una complicación (OR 6,4; IC 95% 1,1–35,4, $p=0,03$). La mortalidad temprana ocurrió en 5 pacientes (17%) y tardía en 3 (10%); siendo las causas principales sepsis e insuficiencia cardiaca. La actividad de la enfermedad se asoció a la realización de ventana pericárdica (OR 12,6; IC 95% 1,9–79; $p=0,007$), presencia de linfopenia ≤ 1.200 (OR 10,1; IC 95% 1,05–97; $p=0,04$), edad ≤ 30 años (OR 7,7; IC 95% 1,2–46,3; $p=0,02$) y NYHA clase III (OR 7,0; IC 95% 1,1–42, $p=0,03$). El desarrollo de infección postoperatoria se asoció con estancia hospitalaria ≥ 2 semanas (OR 54,9; IC 95% 5,0–6021; $p=0,001$), estancia en UCI ≥ 10 días (OR 20; IC 95% 1,6–171,7, $p=0,01$), duración de ventilación mecánica ≥ 5 días (OR 16,9, IC 95% 1,5–171,7, $p=0,01$) y PSAP ≥ 50 mmHg (OR 7,8; IC 95% 1,4–41,2; $p=0,01$).

Conclusiones: La cirugía cardiaca en LES se asocia a alta morbimortalidad.

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Introduction

Cardiac involvement is common in patients with systemic lupus erythematosus (SLE). It affects all the components of the heart, including the pericardium, conduction system, myocardium, valves and coronary arteries, with prevalence of 8.3% to 50% of coronary artery disease and valve defects, respectively.¹

In a multiethnic cohort of SLE patients, it was shown that the risk factors of cardiac injury are the Afro/Latin American ethnic group, the presence of primary cardiac disease and the damage index; whereas involvement of the central nervous system and antimalarial treatment are protectors.² An association has been demonstrated between the use of glucocorticoids and anticardiolipin antibodies and valve disease.^{3,4}

In all, 25% of the patients with SLE developed pericarditis at some time. Constrictive pericarditis and tamponade are infrequent in SLE. Pericardial biopsy is not indispensable for diagnosis.⁵

In these patients, there is a predominance of involvement of left heart, since the mitral valve is most frequently affected, followed by the aortic valve.⁴ Valve defect can be asymptomatic or fulminant, with heart failure and bacterial endocarditis. Echocardiography is the best imaging study for the evaluation of valve changes; aside from providing information on ventricular function and indirect estimation of pulmonary artery pressure.⁶ Echocardiographic findings include valve thickening and mitral regurgitation, with a low prevalence of pulmonary hypertension.^{7,8}

The definitive diagnosis is obtained with the histopathologic analysis of the valve. Libman-Sacks endocarditis is the most common cardiac lesion in SLE and antiphospholipid syndrome (APS), and it is characterized by clusters of sterile fibrin and platelets that can result in valve changes or serve as a niche for bacterial infections.¹ Other histopathological findings in the valves are fibrosis, neovascularization, infiltration of mononuclear cells and immune complexes.^{6,7}

Cardiac involvement in SLE is a primary cause of morbidity and mortality, with premature subclinical atherosclerosis and cardiovascular events.⁸ Cardiac surgery is not performed as a routine practice in these patients. The information on outcomes is restricted to case reports,^{1,6,7} with mixed results that limit the identification of prognostic factors, combined with the fact that there are no preoperative protocols or postoperative strategies designed for these patients.

The purpose of the present study is to analyze the characteristics and outcomes of SLE patients who underwent cardiac surgery.

Patients and Methods

A retrospective study that included all the patients diagnosed with SLE (classification criteria of the American College of Rheumatology)^{9,10} who underwent cardiac surgery between January 2004 and December 2014 in the National Institute of Medical Sciences and Nutrition Salvador Zubirán, a tertiary center

in Mexico City. The same cardiovascular surgeon performed all of the interventions. The patients were followed for 1 year after the operation or until death. We excluded patients for whom there was insufficient information, those with primary APS or another connective tissue disease, and those whose operation was carried out in another institution.

Prior to surgery, we calculated the risk score for all of the patients using the European System for Cardiac Operative Risk Evaluation (EuroSCORE) and the Society of Thoracic Surgeons score.^{11,12} Surgery was approved only if the risk of death according to the EuroSCORE was $< 20\%$.

The ethics committee of our center reviewed and approved the study.

Clinical Variables

We recorded information on comorbidities, the demographic, clinical and serological characteristics leading to the diagnosis of SLE, as well as the presence of secondary APS.¹³

At the time of surgery, we documented the following variables related to SLE: disease duration; use of immunosuppressive agents, acetylsalicylic acid or oral anticoagulants; disease activity according to the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI-2K)¹⁴; accumulated damage based on the Systemic Lupus International Collaborative Clinics/American College of Rheumatology Damage Index (SLICC/ACR SDI)¹⁵; anti-double-strand (ds) DNA; and complement C3 and C4.

The cardiovascular variables at the time of surgery included: New York Heart Association (NYHA) functional class for heart failure (class I-IV)¹⁶; EuroSCORE II¹¹; standard laboratory tests; type of surgery; emergent surgery (performed before the following work-day), urgent surgery (in patients who were not admitted electively, but required surgery during the current hospital stay for medical reasons and could not be discharged without the definitive procedure)¹¹ or elective surgery; operative time, cardiopulmonary bypass time and aortic cross-clamp time; transfusion requirements and bleeding (mL); type of valve prosthesis; days in intensive care unit (ICU); duration of mechanical ventilation; and length of hospital stay.

The following early and late complications (< 1 month and 2–12 months, respectively), aside from death and its causes in accordance with the death certificate. The histological findings in the valve were also recorded.

Statistical Analysis

The continuous variables are expressed as mean (standard deviation [SD]) or median (minimum and maximum range); the categorical variables as number and percentage. The differences between groups were analyzed by Student's *t* test or the Mann-Whitney *U* test (continuous variables), and chi-square or Fisher's exact test (categorical variables). We calculated odds ratios

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