

Cryotherapy in Benign Heart Tumors

Anas Sarraj^{1*}, Antonio Rojas-Gonzalez², Corazón-Mabel Calle Valda¹, Daniel-Edgardo Munoz¹,
Nieves De Antonio Anton¹, Emilio Monguio¹, Guillermo Reyes¹

¹Department of Cardiovascular Surgery, University Hospital of La Princesa, Autonomous University of Madrid – Spain

²Department of Cardiology, University Hospital of La Princesa, Autonomous University of Madrid – Spain

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***Corresponding author:** Anas Sarraj, Associate professor of Cardiovascular Surgery, Department of Cardiovascular Surgery, Hospital Universitario de La Princesa, Madrid-Spain, Mobile: +34-669423441. Fax: 34-915202268; E-mail: anas_sarraj@hotmail.com

Abstract

Cryotherapy is currently used in the treatment of skin, digestive and prostatic lesions and tumors, as well in certain tachyarrhythmias.

Herein, we present the cryotherapy as a new idea in the treatment of benign heart tumors localized in critical areas to destruct the implantation site of the tumor with successful midterm and long-term results.

Keywords: Cryotherapy; Benign Heart Tumors

Introduction

Cryotherapy generally refers to use of cold temperature to treat a wide variety of skin conditions. Over the recent time, cryotherapy has become a well-established treatment modality for a wide variety of benign and malignant skin lesions, with novel uses continually described. Currently, cryotherapy is mainly used in the treatment of lung, digestive, prostatic lesions and tumors, and in certain tachyarrhythmias.

In this article, we used cryotherapy in the treatment of benign heart tumors localized in critical areas to destruct the implantation site of the tumor with successful midterm and long-term results.

Technique

Between April 2010 and January 2015, seven patients, four males and three females, underwent cryotherapy of benign heart tumors localized in critical areas. The mean age was 68.8 ± 9.8 years. The preoperative echocardiogram showed; a big mass in one patient affected the anterior tricuspid valve annulus, papillary fibroelastoma in another patient manifested in the posterior mitral valve, and myxomas in five patients. The procedure was explained to every patient and their consent was obtained. Full sternotomy and cardiopulmonary bypass (CPB) via ascending aorta and double venous cannulation were performed in six patients and port-access was used in one patient. When the tumor is in the left heart cavities, the ascending aorta was clamped and the myocardial protection was achieved by the administration of antegrade and retrograde interrupted cold blood cardioplegia. The tumor was resected and sent for pathological study. In one

case, we found big vegetation affected the tricuspid annulus at anteroposterior commissure closed to the right coronary artery. The papillary fibroelastoma manifested in the free border of posterior mitral valve at P2-P3. Two myxomas were localized in the right trigone area of mitral valve and three myxomas were closed to inferior vena cava. The mean size of the tumors was 29.6 ± 21 mm by 25 ± 13.7 mm. The area of implantation was scraped and cryotherapy was performed using (Cryocath 65CS1-Medtronic). The tip of Cryoflex surgical ablation probe was reformed to cover all the area of implantation, and applied at temperature -140 °C during one minute creating approximately 6 mm transmural lesion [1]. The mean time of aortic clamp was 33.3 ± 25.9 minutes and the mean time of CPB was 69 ± 27.3 minutes. Intraoperative transthoracic echocardiogram showed normal heart structures and normal valves function in all cases.

The follow-up transthoracic echocardiogram was performed by an expert cardiologist in all patients between 10 to 77 months (mean 38.14 ± 30.11 months), demonstrating no recurrence of cardiac tumors and normal heart valves function.

Comment

The prevalence of primary cardiac tumors is approximately 0.02%. About 75% of primary tumors are benign, and 50% of benign tumors are myxomas. 75% of myxomas occur in the left atrium and 25% of cases are found in the right atrium. Papillary fibroelastoma is a relative rare benign heart tumor, corresponding to approximately 8% of intracardiac tumors. They most commonly affect the heart valves [2].

Surgical treatment of benign heart tumors usually consists in resection of the tumor, removing the area of implantation, and replacing it with a pericardial patch.

Cryotherapy is a well-established treatment modality for a wide variety of benign and malignant skin lesions. Currently, it is mainly used in the treatment of trachea-bronchus-lung cancer [3], esophageal dysplastic disease and hepatobiliary tumors [4], renal, breast, and brain tumors, uterine myomas and endometrial diseases, prostatic tumors [5], and in certain tachyarrhythmias such as in surgery of atrial fibrillation [6].

Cryotherapy produces changes correlated with the presence of ice crystals observed during tissue freezing. The direct injury

is caused by ice crystal formation and the microcirculatory failure which occurs in the thawing period [7]. The progress to a stable lesion can be categorized into three phases: freeze/thaw phase, hemorrhagic and inflammatory phase, cryonecrosis and replacement fibrosis phase [6].

Benign heart tumors occasionally manifest in critical areas which may complicate the surgical procedure, or prolong the time of surgery. Certain benign heart tumors such as papillary fibroelastomas usually affect the heart valves, and the removal of the implantation area may lead to valve replacement. Cryotherapy is a simple procedure, and it does not affect the vascular and valvular functions. This limited clinical study shows the cryotherapy in benign heart tumors and may also in endocarditis of native valve is simple, save, and effective procedure. It simplifies the operation, conserves the heart valves function, and reduces the times of aortic clamp and CPB. We recently use cryotherapy in all benign heart tumors to study the result of this therapy in a larger number of patients, and we encourage cardiac surgeons to participate in this study not only in benign heart tumors localized in critical areas but also in all cases.

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