Multi-disciplinary Frameworks for the Treatment of Primary Cardiac Sarcoma

Randy Stevens[1], Ayaka Silverman[2], judy pascasio[3], jie sun[4], Amy Throckmorton[5], Leonardo Mulinari [6], and Robert Cusimano[7]

[1]St. Chrsitopher's Hospital for Children
[2]St.Christopher's Hospital for Children
[3]St. Christopher's Hospital for Children
[4]st.christopher's hospital for chilldren
[5]Drexel University
[6]University of Miami Miller School of Medicine
[7]Toronto General Hospital

June 8, 2021

Abstract

Multi-disciplinary teams present the framework in the increasingly challenging care provided for patients. Wang et al. present a 37 year old female who is 35 weeks pregnant when a rare cardiac angiosarcoma is diagnosed.

Title: Multi-disciplinary Frameworks for the Treatment of Primary Cardiac Sarcoma

Short Title: Invited commentary for pregnancy and primary cardiac angiosarcoma

Authors:

Randy M. Stevens, MD, FACS

Pediatric Cardiac Surgery

St. Christopher's Hospital for Children

Drexel University College of Medicine

Ayaka Silverman, MD

Department of Pathology

St. Christopher's Hospital for Children

Drexel University College of Medicine

Judy Pascasio, MD

Department of Pathology

St. Christopher's Hospital for Children

Drexel University College of Medicine

Jie Sun, MD

Pediatric Cardiology

St. Christopher's Hospital for Children

Drexel University College of Medicine

Amy Throckmorton, PhD

Associate Professor

Biomedical Engineering

Drexel University

Leonardo Mulinari, MD, PhD

Section Chief of Pediatric and Congenital Cardiac Surgery

Associate Professor of the DeWitt Daughtry Family Department of Surgery

University of Miami Leonard Miller School of Medicine

Co-Director of the Congenital Heart Center

Holtz Children's Hospital

Jackson Memorial Hospital

Robert John Cusimano, MD, FRCSC, FACS

Professor of Surgery

University of Toronto

Toronto General Hospital

Toronto, Ontario, Canada

Corresponding Author:

Randy M. Stevens, MD, FACS

Pediatric Cardiac Surgery

St. Christopher's Hospital for Children

Drexel University College of Medicine

Rstev2@gmail.com

Keywords: Primary cardiac angiosarcoma, pregnancy, right atrial tumor, fetal survival

Data Availability Statement: N/A

Funding: None

Conflict of Interest: None

IRB approval: N/A

Wang et al. present a case report of 37 year old female who is both 35 weeks pregnant and has a primary cardiac tumor. It is unusual to provide a commentary of a case report. However, The Journal of Cardiac Surgery continues to experience a surge in case submissions and case complexity as represented by this case report. The authors note that it is challenging to "cure the mother or keep the baby during surgery."(1). This report underscores the importance of a multidisciplinary approach to complex cases, in particular in the case of a patient presenting with a cardiac tumor, especially a potentially malignant one. The authors are

to be congratulated with successfully integrating multiple specialties, allowing survival of both the patient and off-spring. The framework of multidisciplinary patient care is summarized below:

Obstetrics, Neonatology, Cardiology, Cardiac Imaging, and Cardiac Surgery

A right atrial tumor, characterized by transthoracic echocardiography in image 1 appears to have a stalk like one might expect for an atrial myxoma. The authors quickly involved the obstetrical and neonatology who decided to promptly deliver a healthy baby. Involvement by other clinical services usually results in more optimal outcomes as they understand their "area" best. Given the unusual location as well as shape they quite correctly involved their imaging experts (after delivery of the child) for further delineation of structure. Collaboration with imaging specialists is crucial in the diagnosis and planning treatment of cardiac tumors, especially when question arises regarding origin or extent. Improved understanding by collaboration with the imaging experts is gained even in "simple" cases and is highly recommended. The surgical resection was "radical" but unfortunately despite this, the patient developed a local recurrence despite adjuvant chemotherapy. Additional imaging in this case continued to show features atypical for myxoma. While the authors chose primary surgical resection, biopsy and neoadjuvant chemotherapy once malignancy is diagnosed is another option. There is evidence of improved outcome with neoadjuvant chemotherapy (2) and even microscopic residual tumor is associated with reduced survival (3). However, knowledge regarding this is scarce and collaboration with colleagues, both local and international is required to answer such questions more completely (4). Interesting, early work on local tumor margins are one example of attempts to improve resection (5).

Pathology, Oncology, Palliative Care

The role of pathology and pathological examination is well illustrated in this case. The pathological examination has become quite complex but is essential for diagnosis and subsequent oncologic treatment. Only with complex diagnoses can these lesions be categorized and knowledge advanced in future trials involving treatment regimens. Oncology collaboration and follow-up are imperative when dealing with malignant tumors of the heart. While large trials of primary cardiac sarcomas are non-existent, involvement of oncologists as part of a multidisciplinary team with constant interaction will ensure that optimal care is given to the patient. Collaboration must be local and international to advance knowledge and care at each step of the diagnosis and treatment.

Following delivery of the child, the authors treated the patient with surgery, Chemotherapy and radiotherapy. There is evidence that surgery added to the treatment improves survival and visa- versa. (6). What is not known, is if recurrent surgery is beneficial to that outcome. Again, this is another question to be answered through international collaboration due to the rarity of primary cardiac tumors. Once the usual treatments are no longer viable, the role of a well -organized palliative care team is highly important to ongoing care (7).

Summary

Wang et al. present a complex cardiac case that beautifully illustrates both current medical and surgical boundaries of care along with the achievements that can be obtained with a multi-disciplinary approach and continued care. By doing so, the authors ensured the safe delivery of a child and gave more time for the mother. The continued pursuit to the understanding of current strategies both in terms of surgical approaches and medical treatments that lead to improvements in the oncologic and genetic basis of disease remain a goal for our and future generations.

References

1. Wang, Z., Lv, X., Pu, J., et al. Treatment of primary cardiac angiosarcoma in a 35 weeks pregnant woman. JOCS 2021:XX XX.
2. Abu-Saleh WK, Ramlawi B, Shapira OM, et al. Improved Outcomes with the Evolution of a Chemotherapy Approach to Right Heart Sarcoma. AnnThorac Surg 2017 104;90-97.

3. Sultan, I, Valentino, V, Habertheuer A et al. Long Term outcome of Primary Cardiac Malignancies: Multi institutional results from the national cancer database. JACC 2020 75:2338-47.
4. Cusimano RJ. International Collaboration to Improve Outcomes in Cardiac Sarcoma. Ann Thorac Surg 2020 109:1305-6.
5. Judy, R., Keating, J., DeJesus, E. *et al.* Quantification of tumor fluorescence during intraoperative optical cancer imaging.*Sci Rep* 5, 16208 (2015).
6. Hendriksen BS, Stahil KA, Hollenbeck CS et al. Postoperative chemotherapy and radiation improve survival following cardiac sarcoma resection. JTCVS 2021 161;110-119.
7. Temel, J., Greer, J., Muzikansky, A., et al. Early palliative Care for patients with metastatic non-small-cell lung cancer. N Engl J Med 2010:363:733-42.