



“Healing the Heart”: A Retrospective Analysis of Surgical Management of Chronic Constrictive Pericarditis at Tikur Anbessa Hospital, Addis Ababa, Ethiopia

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Abstract

Chronic Constrictive pericarditis is a condition that can lead to diastolic heart failure due to a thickened, scarred, and non-compliant pericardium. Surgical intervention in the form of Pericardiectomy is the mainstay of treatment. This retrospective study aims to describe the clinical characteristics, surgical management, and outcomes of patients with Chronic constrictive pericarditis treated with Pericardiectomy at Tikur Anbessa Hospital. Medical records of 49 patients who underwent Pericardiectomy for constrictive pericarditis at Tikur Anbessa Hospital from January 2012 to December 2016 were analyzed retrospectively. Data was collected using a well-structured questionnaire and analyzed using SPSS 20. The results shoes of the 49 patients, 34 were male (69.4%) and 15 were female (30.6%) with a mean age of 25.06 +/- 13.884 (range 6-80 years). The most common presenting symptoms were shortness of breath (98%), leg swelling (75.5%), abdominal swelling (65.3%), and cough (44.9%). 73.5% of the patients had a medical history of tuberculosis. Median sternotomy was performed in all patients, with 71.4% undergoing total Pericardiectomy and 28.6% undergoing partial Pericardiectomy. The most common intraoperative and immediate post-operative complications were low output syndrome (8.2%), myocardial perforation (6.1%), bleeding (6.1%), and wound infections (4.1%).

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Mortality within the same admission or within 30 days post-operative was 2%. Pericardiectomy is an effective treatment for Chronic constrictive pericarditis and associated with excellent functional outcomes. Early diagnosis and surgical intervention are crucial in reducing morbidity and mortality. Tuberculosis remains an important cause of constrictive pericarditis in our setting.

Keywords: Chronic Constrictive Pericarditis; Pericardiectomy; Surgical outcome; Tuberculosis.

1. Introduction

1.1 Background Information

Constrictive pericarditis is a rare but serious condition characterized by chronic inflammation of the pericardium and subsequent thickening, scarring, and muscle contraction. The resulting impaired diastolic ventricular filling can lead to heart failure [1].

Tuberculosis (TB) is one of the leading causes of pericarditis in some non-industrialized countries, particularly in sub-Saharan Africa, where TB is still endemic and HIV infection is pandemic [2, 3]. In industrialized countries like the United States, constrictive calcified pericarditis in association with treated pulmonary TB is rare [4]. However, TB remains a significant cause of pericarditis in developing countries [5, 6].

Pericardiectomy, or surgical removal of the pericardium, is the definitive treatment for constrictive pericarditis and has been shown to be effective in reducing morbidity and mortality [7]. Early diagnosis and prompt surgical intervention are necessary to achieve optimal outcomes [8].

Several studies have reported on the clinical characteristics, management, and outcomes of patients with constrictive pericarditis treated with Pericardiectomy [9, 10, 11, 12]. However, there is limited literature on the management of constrictive pericarditis in sub-Saharan Africa, where the burden of TB and HIV is high [13].

Therefore, the aim of this study is to describe the clinical characteristics, surgical management, and outcomes of patients with constrictive pericarditis treated with Pericardiectomy at Tikur Anbessa Hospital in Addis Ababa, Ethiopia, from 2012 to 2016

1.2 Statement of the Problem

Constrictive pericarditis is a rare but serious condition that can lead to heart failure. While outcomes after Pericardiectomy and predictors of mortality have been studied extensively in developed countries, there is limited data on the causes and outcomes of patients with constrictive pericarditis requiring Pericardiectomy in sub-Saharan Africa. Differences in disease patterns and resource availability suggest that findings from developed countries may not accurately reflect the experience of constrictive pericarditis in Africa. To date, only two reports on Pericardiectomy for constrictive pericarditis have been conducted in Ethiopia [22,23]. More data is needed to better understand the clinical characteristics, management, and outcomes of patients with constrictive pericarditis in Ethiopia.

1.3 Significance of the Study

This study has several significant contributions:

- Provides basic data and information about the causes and management of constrictive pericarditis in Ethiopia, which can inform clinical practice and resource allocation.
- Identifies presenting symptoms and diagnostic modalities of constrictive pericarditis in Ethiopia, which can aid in early diagnosis and improve patient outcomes.
- May help to develop management protocols for patients with constrictive pericarditis in Ethiopia, which can improve the quality of care and reduce morbidity and mortality.

2. Objectives

2.1 General Objective

The general objective of this study is to describe the clinical characteristics, surgical management, and outcomes of patients with constrictive pericarditis treated with Pericardiectomy at Tikur Anbessa Hospital, Addis Ababa University.

2.2 Specific Objectives

The specific objectives of this study are:

- To outline the clinical presentation of patients with constrictive pericarditis, including symptoms, physical exam findings, and laboratory results.
- To assess the etiology of constrictive pericarditis, including the prevalence of TB and other infectious causes.
- To determine the type of surgery performed for constrictive pericarditis, including Pericardiectomy and other surgical interventions.
- To determine the surgical approach and intraoperative findings of Pericardiectomy, including the extent of pericardial stripping and any complications encountered.
- To determine the intra- and post-operative complications resulting from Pericardiectomy, including bleeding, infection, and low output syndrome.
- To identify the diagnostic modalities used to diagnose constrictive pericarditis, including echocardiography, computed tomography, and magnetic resonance imaging.

3. Methods

3.1 Study Area and Period

The study was conducted at Tikur Anbessa Hospital, Addis Ababa, Ethiopia from April 1, 2017.

3.2 Study Design

This was a facility-based retrospective study using quantitative analytical methods.

3.3 Source of Study

The medical records of all patients who underwent pericardiectomy during the study period were used as the source of data.

3.4 Study Variables

The independent variables were age, sex, medical records, and region. The dependent variables were constrictive pericarditis, causes of constrictive pericarditis, medical history, severity, complications, imaging findings, intraoperative findings, and histology findings.

3.5 Questionnaires

A structured and pretested questionnaire in English language was used to retrieve data from the medical records of patients who underwent Pericardiectomy.

3.6 Data Collection and Analysis

Data was collected by trained personnel and analyzed using SPSS software version 20. Rates, ratios, and percentages were calculated, and statistical significance tests were applied to see the association between surgical outcomes of constrictive pericarditis at Tikur Anbessa Hospital and other countries.

3.7 Ethical Consideration

Permission was obtained from Addis Ababa University and the hospital's card room. The objective of the study was thoroughly explained, and confidentiality was maintained.

4. Results

A total of 49 patients underwent Pericardiectomy during the study period, including 34 men (69.4%) and 15 women (30.6%)(fig. 2). The mean age was 25.06 +/- 13.884 years (range 6-80)(fig. 1). The duration of illness prior to admission for Pericardiectomy ranged from 3 to 42 months (mean 19.0 +/- 10.9).

Based on the New York Heart Association functional class, 13 patients (26%) were in class II, 15 (30.6%) were in class III, 16 (32.7%) were in class IV, and 5 (10.2%) were not classified (fig. 4). The most common presenting symptoms were shortness of breath (98%), leg swelling (75.5%), abdominal swelling (65.3%), cough (44.9%), generalized body swelling (42.9%), and chest pain (40.8%).

On physical examination, the most common clinical signs were ascites (75.5%), pedal edema (63.3%), hepatomegaly (61.2%), and raised jugular venous pressure (55.1%).

Of the 49 patients, 34 (69.4%) had a history of pulmonary tuberculosis and received treatment, one patient (2%) had chronic renal failure, one patient (2%) had a history of radiation exposure, and 11 patients (22.4%) had no history of significant medical illness while 2 patients (4%) had pyogenic infection as etiology of the pericarditis (fig. 3).

Overall, these results indicate that constrictive pericarditis is a significant health issue in Ethiopia, with patients presenting with a variety of symptoms and medical histories. Further analysis of the data will provide insights into the etiology, surgical management, and outcomes of patients with constrictive pericarditis in Ethiopia.

Of the 49 patients who underwent Pericardiectomy, 29 had chest radiograms performed, revealing pleural effusion in 12 patients (24.5%), cardiomegaly in 5 patients (10.2%), and pericardial calcification in 2 patients (4.1%). Preoperative electrocardiograms were available for 49 patients, showing sinus rhythm in 22 patients (44.7%) and atrial fibrillation in 2 patients (4.1%).

Echocardiography was performed in all patients, revealing pericardial thickening in 29 patients (59.2%), pericardial effusion in 3 patients (6.1%), and a mean ejection fraction of 60.81 +/- 7.034% with a range of 45-76. Chest CT scanning was performed in only 17 patients (34.7%), showing pericardial thickening and calcification.

All patients underwent Pericardiectomy, with the surgical approach being median sternotomy for all patients. Total Pericardiectomy was performed in 35 patients (71.4%), and partial Pericardiectomy was performed in 14 patients (28.6%).

The most common intraoperative findings were thick and adherent pericardium in 20 patients (40.8%), thick pericardium with effusion in 14 patients (28.6%), thick and calcified pericardium in 14 patients (28.6%), and thick pericardium with pus in 1 patient (2%) (fig. 5).

Of 49 patients for whom Pericardiectomy were performed, intraoperative and early postoperative complication, myocardial perforation 3 (6.1%), surgical bleeding 3 (4.1%), low output syndrome 4 (8.2%), and wound infection 2 (4.1%), but no complication in 36 (73.5%) of patients (fig. 6).

Pathology results were in only 18 (36.7%) charts, which shows tuberculosis (granulomatous) pericarditis 7 (14.3%), non-specific chronic inflammation 5 (10.2%), suppurative pericarditis 5 (10.2%), and chronic active fibrosis (granulomatous) not characteristics of tuberculosis 1 (2%).

5. Discussion

The results of our study indicate that constrictive pericarditis commonly affects young individuals, with a mean age of 25.06 +/- 13.889 years, which is consistent with findings from previous studies by Adem Ali, O. Johnson, and others(22, 23). We also found a higher prevalence of constrictive pericarditis among males, with a male-to-female ratio of 2.3:1.

The duration of illness prior to admission for surgery in our study had a mean of 19.02 +/- 10.889 months, which is comparable to some studies such as Adem Ali and A. Bekele (mean 14 +/- 12.8 months), but different from others such as O. Johnson (mean 23 months). These findings suggest that early diagnosis and treatment of constrictive pericarditis may be important in improving patient outcomes.

The clinical features of constrictive pericarditis upon physical examination in our study included ascites (75.5%), pedal edema (63.3%), hepatomegaly (61.2%), and raised jugular venous pressure (55.1%), which is consistent with findings from other studies [14, 15].

Historically, tuberculosis was the most frequent cause of constrictive pericarditis in the US, accounting for 48% of cases in a report published in 1962 [24]. However, in the 1990s, tuberculosis became a rare cause of constrictive pericarditis in the US [3]. In contrast, tuberculous constrictive pericarditis remains common in parts of the world, especially in developing countries. In our study of 49 patients who underwent Pericardiectomy, the etiology of constrictive pericarditis was tuberculosis in 34 patients (69.4%)(fig. 3), which is comparable to a study conducted in China [25].

While echocardiography is the primary imaging modality used to examine the pericardium, CT and MR imaging provide various advantages, especially in cases of loculated or hemorrhagic effusion, constrictive pericarditis, and pericardial masses [16, 17, 18, 19]. In our study, diagnostic imaging modalities such as echocardiography, CT scan, chest radiogram, and electrocardiogram were used. Pericardial thickening and calcification were the most common findings associated with constrictive pericarditis.

All 49 patients in our study underwent Pericardiectomy, with the surgical approach being median sternotomy for all patients. Total Pericardiectomy was performed in 35 patients (71.4%), and partial Pericardiectomy was performed in 14 patients (28.6%). All patients were operated without the use of cardiopulmonary bypass. Total Pericardiectomy included removal of the anterior pericardium between the phrenic nerves on the right and left, from the level of the great arteries to the diaphragmatic surface, lateral pericardium posterior to the left phrenic nerve, inferior pericardium along the diaphragmatic surface, and posterior pericardium to the atrioventricular junction section. Subtotal Pericardiectomy was defined as decortication of the constricting pericardium from both ventricles without the removal of pericardium overlying the atria and venae cava. Pericardiectomy, involving partial or complete decortication, is the definitive therapy for constrictive pericarditis, resulting in complete relief of symptoms in many patients [20].

A small but not insignificant portion of patients with constrictive pericarditis will develop low-output syndrome after Pericardiectomy, regardless of the operative approach or the extent of pericardial resection [19]. In our review, intraoperative and early postoperative complications included low-output syndrome in 4 patients (8.2%), myocardial perforation in 3 patients (6.1%), bleeding in 3 patients (6.1%), and wound infection in 2 patients (4.1%), with no complications in 37 patients (73.5%). Mortality within the same admission and 30 days postoperatively was 1 patient (2%), which is lower than the study conducted by Adem Ali and A. Bekele, reporting in-hospital and long-term mortality of 5.6% and 10.5%, respectively [22, 23].

6. Conclusion

Constrictive pericarditis is a significant health issue in Ethiopia, with patients presenting with a variety of symptoms and medical histories. The condition commonly affects young individuals, with a higher prevalence among males. Tuberculosis remains the most frequent cause of constrictive pericarditis in Ethiopia. Early diagnosis and treatment of constrictive pericarditis may be important in improving patient outcomes. Pericardiectomy, involving partial or complete decortication, is the definitive therapy for constrictive pericarditis, resulting in complete relief of symptoms in many patients. Intraoperative and early postoperative complications were observed but were not frequent, and mortality within the same admission and 30 days postoperatively was low. Further analysis of the data will provide insights into the etiology, surgical management, and outcomes of patients with constrictive pericarditis in Ethiopia.

7. Declaration

7.1 Ethical Declaration

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki and its subsequent amendments. The study protocol was approved by the institutional review board/ethics committee of Tikur Anbessa hospital, Addis Ababa University, College of Health Sciences, School of Medicine. Informed consent was not obtained as this is a retrospective study. Patient confidentiality was maintained throughout the study, and all patient data were kept confidential and used only for research purposes. The study was conducted with the utmost care and attention to patient safety and welfare. The results of this study will be used to improve the understanding and management of constrictive pericarditis in Ethiopia, with the ultimate goal of improving patient outcomes and quality of life.

"We declare that there were no competing interests in conducting this study. All authors have no financial or personal relationships that could have influenced the study design, data interpretation, or manuscript preparation.

"We declare that this study was not funded by any external sources. The authors solely conducted this study with their own resources and time.

"The data used in this study are available upon request to the corresponding author, and the authors are willing to share the data with the publishing journal to promote transparency and reproducibility of the research

findings."

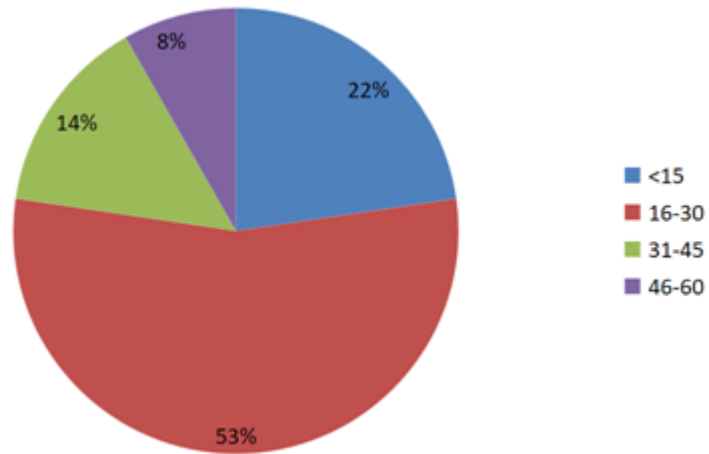


Figure 1: Age Distribution.

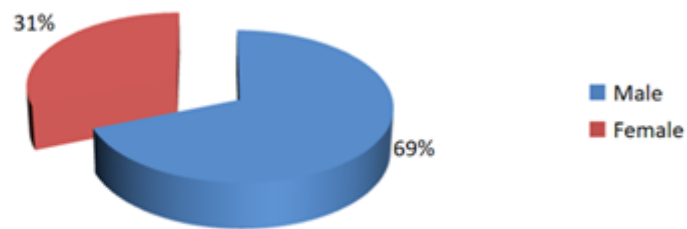


Figure 2: Sex Distribution.

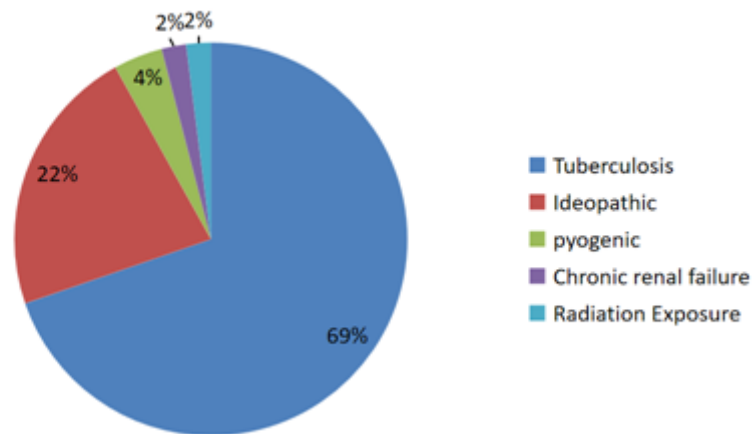


Figure 3: Etiology.

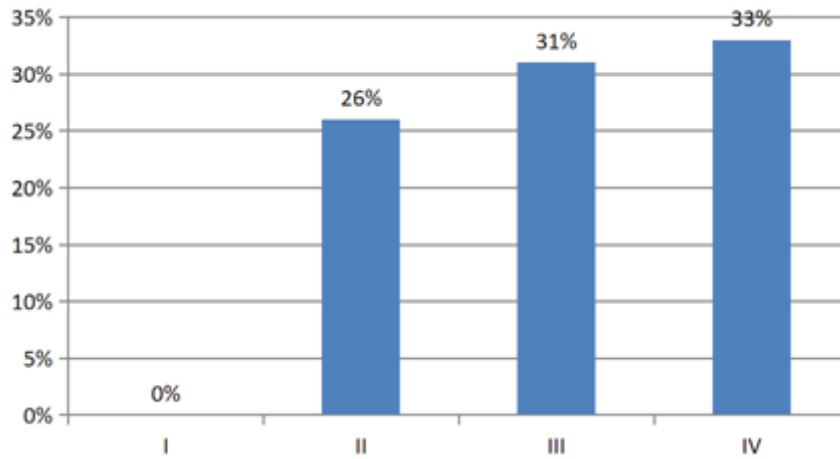


Figure 4: NYHA Classification.

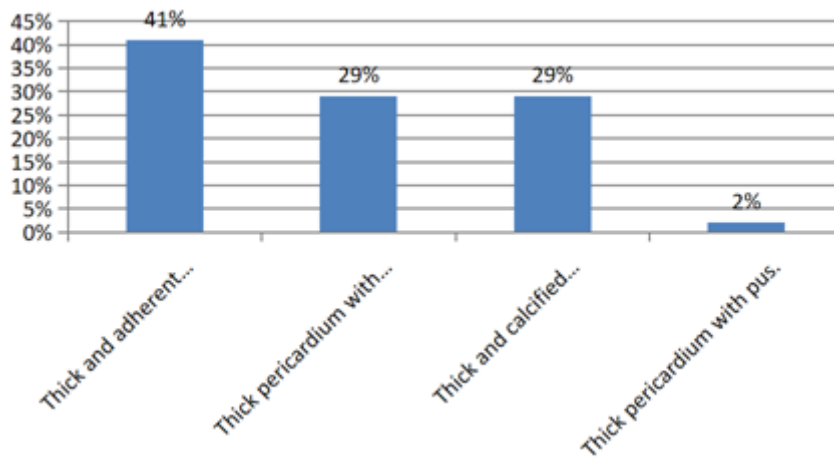


Figure 5: Operative finding.

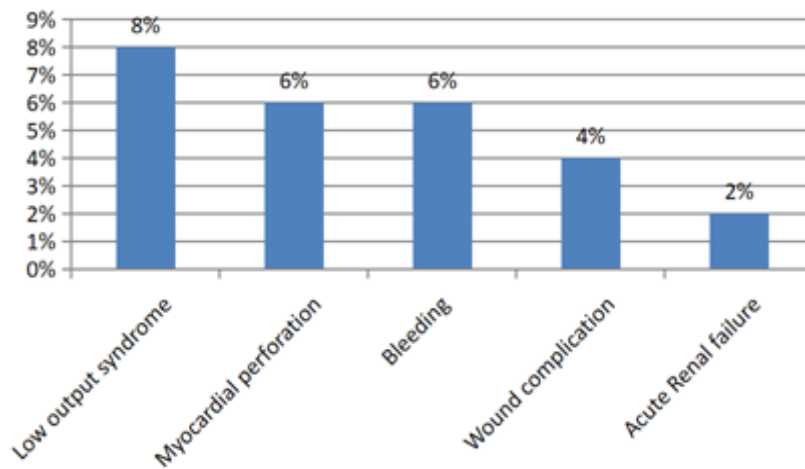


Figure 6: Complications.

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