CASE REPORT

Five cases of Peripartum Cardiomyopathy in Malawi

Zaithwa Matemvu[1], Harvey Likapa[2], Mary Sue Makin[2,3], Omar Hossain[2]

1.Lilongwe Central Hospital, Ministry of Health, Lilongwe, Malawi
2.Daeyang Luke Hospital, Lilongwe, Malawi
3.Ekwendeni College of Health Sciences, Malawi

***Corresponding Author: Zaithwa Matemvu**; E-mail: jayzaithwa@gmail.com

Abstract

Aim
This report of five cases of peripartum cardiomyopathy (PPCM) treated at Daeyang Luke Hospital in Lilongwe, Malawi, illustrates presentation and treatment of this increasingly commonly recognized medical condition.

Methods
Information including history, physical examination, and imaging studies were collected from five cases of peripartum women who presented to the hospital over an 18-month period.

Results
A summary of recommended treatment is included in table form, and a flow chart proposing a care pathway for managing PPCM in Malawi, beginning at the district hospital level, is presented.

Conclusion
Clinical recognition, appropriate diagnostic modalities, and informed treatment of PPCM in Malawi will improve care of peripartum woman and reduce maternal morbidity and mortality.

Key Words: Pregnancy, Peripartum Period, Cardiomyopathies, Southern Africa, Malawi, Puerperal Disorders

Introduction

Peripartum cardiomyopathy, PPCM, is an idiopathic and often dilated cardiomyopathy, marked by systolic dysfunction, usually presenting late in pregnancy or the early postpartum period[1]. A simplified definition of PPCM was proposed which specified an idiopathic cardiomyopathy frequently presenting with heart failure secondary to left ventricular systolic dysfunction (LVEF<45%) happening towards the end of pregnancy if no other cause of heart failure is found. PPCM is a diagnosis of exclusion and needs to be differentiated from an aggravation of a previously undetected heart disease[2]. The true incidence of PPCM in Africa is unknown, but hospital-based data arrives at such values as 1 in 1000 live births in South Africa, 1 in 100 deliveries in Sokoto, Nigeria, and 1 in 3,800 deliveries in Burkina Faso[3]. Data from the DRC shows this type of cardiomyopathy accounting for 12 percent of heart failures[4]. We report five cases of PPCM, with time of symptom onset ranging from late pregnancy to three months post-partum. The courses of illness vary from rapidly deteriorating left ventricular function, to moderately decreased ejection fraction responding well to conventional medication. The focus of this report is to draw attention to this condition and highlight best practices in the midst of limited diagnostic and interventional capacity.

Case 1 – MR, a 26-year-old HIV negative para 2, presented to Daeyang Luke Hospital, DLH, on 27 August 2020 with a productive cough and shortness of breath on a background of two months of experiencing swelling of her feet and abdomen. The symptoms began one month after having delivered twins by caesarian section. She had an otherwise uneventful pregnancy, her past medical history was not suggestive of pre-pregnancy cardiac disease, and she had no history of substance abuse. She was on diuretics that had been commenced without diagnostic explanation for the body swelling, but her condition deteriorated leading to this admission. Clinical examination findings were reduced breath sounds at both lung bases, features of ascites, bipedal oedema, with normal heart sounds. She was borderline normotensive with blood pressure of 106/67 mmHg and pulse 80. Her history and clinical examination suggested congestive heart failure, and intravenous diuretics, fluid restriction, oxygen and bed rest were instituted. Investigations excluded significant anaemia, malaria, nephrotic syndrome, and renal dysfunction. Echocardiography demonstrated universally dilated cardiac chambers, mild valvular regurgitation, no stenosis, no left ventricular hypertrophy and an ejection fraction of 43 percent with biventricular failure. The history and findings were consistent with a diagnosis of peripartum cardiomyopathy.

MR's clinical heart failure improved, therefore enalapril 2.5mg was introduced, and substitution to oral diuretics was made. Fluid restrictions were enforced. Hospital discharge occurred a week post admission due to both clinical improvement and financial constraints. The patient was reviewed as an outpatient for up to three weeks where she had a near absence of symptoms and edema.

Case 2 – AM HIV negative 29 year old para 2 presented with cough and shortness of breath for a month that began within a week of delivery. She had a normal vaginal delivery and no previous significant medical, surgical or obstetric history, and no history of substance abuse. Before presenting to DLH, she attended a local medical facility where she was diagnosed with heart failure but no cause was postulated. She was commenced on digoxin, furosemide, and captopril. She however attended DLH due to symptom deterioration with additional features of pedal swelling and abdominal

https://dx.doi.org/10.4314/mmj.v35i3.10

pain. Observations revealed a blood pressure of 103/85 mmHg, pulse rate of 102bpm, and no pyrexia. Examination showed normal heart sounds, reduced breath sounds with added crackles at the lung bases and bipedal edema. The impression was biventricular heart failure due to peripartum cardiomyopathy, to exclude other potential diagnoses. Investigations ruled out anaemia, malaria, renal failure or nephrotic syndrome. Management was initially intravenous diuretics, and one litre daily fluid restriction, and substitution of captopril with enalapril 5mg po od. Echocardiography showed an ejection fraction of 34%; globally reduced contractility with moderate chamber dilation; mild- moderate mitral valve regurgitation; a small pericardial effusion; and a small left pleural effusion. Congestive cardiac failure secondary to peripartum cardiomyopathy was considered the likely diagnosis. Atenolol 25mg po od was added, the diuretics and enalapril were continued, and digoxin was stopped. She was discharged less than a week later due to healthcare costs, though her symptoms had improved. Long term review was not possible due to cost and logistics of travel, though a single clinic review shortly after discharge revealed sustained clinical improvement.

Case 3 - LC, was a 35 year old HIV negative para 1 woman. She presented to a local health facility with shortness of breath and swelling of her feet three days before delivery. The antepartum course of the pregnancy was complicated by being a twin gestation pregnancy with a diagnosis of pre-eclampsia, and the development of above symptoms in the last stages of the third trimester.

She had a delivery by caesarian section, with one of the twins dying in the early neonatal period. Investigations ruled out renal dysfunction, and she was discharged 8 days post-delivery with a pulse rate of 117bpm, blood pressure of 143/94 mmHg, breath sounds normal to auscultation, and no peripheral edema, on nifedipine 10mg twice daily. LC returned to the local health facility three days later with shortness of breath, and general body swelling. Observations revealed a raised blood pressure of 132/93. Her symptoms were attributed to pre-eclampsia and possible COVID-19 infection. The dose of nifedipine was increased to 20mg bd and furosemide 20 mg od added. The patient was discharged after 8 days of admission, and presented to DLH three days post discharge with cough, shortness of breath worse on lying down, and waking her up from sleep, and joint pains. Assessment revealed tachycardia with a pulse rate of 126bpm, blood pressure of 165/105, and fine crackles in the left lung base on auscultation. The patient was initially treated for the differentials of heart failure, COVID-19 infection, and bacterial pneumonia. When COVID-19 was excluded and other tests were out of keeping with infection, the antibiotics and dexamethasone were stopped. Echocardiography demonstrated an ejection fraction of 38% with generalised reduced contractility, moderate diffuse chamber dilatation, and mild to moderate mitral and tricuspid valve regurgitation. There were also bilateral pleural effusions and hepatomegaly. These findings pointed to the diagnosis of peripartum cardiomyopathy with biventricular heart failure. Atenolol 25 mg and furosemide 80 mg bd were given. When renal function was found to be normal, including nephrotic syndrome screening, enalapril 5 mg was added. A 1 L daily fluid restriction was already in place, and nifedipine was stopped. The patient was discharged two days later due to financial costs, though her symptoms had improved. Discharge medication was furosemide 80mg od,

Table 1 Optimal Pharmacotherapy for PPCM

Drug Class	Angiotensin converting enzyme inhibitor (ACE-i)	Beta blockers	Mineralocorticoid Receptor Antagonist (MRA)	Hydralazine and Isosorbide dinitrate
Initial dose/Target dose	Enalapril 2.5mg po bd/ 10-20mg po bd Captopril 6.25mg po tid/50mg po tid Lisinopril 2.5-5mg po od/20-40mg po od	Bisoprolol 1.25mg po od/10mg po od Sustained release metoprolol 12.5-25mg po od/200mg po od Carvedilol 3.125mg po bd/25-50mg po bd	Spironolactone 25mg po od/ 50mg po od (titrated over at least one month)	20–30 mg isosorbide dinitrate and 25–50 mg hydralazine 3–4 times daily/ 120 mg isosorbide dinitrate total daily in divided doses and 300 mg hydralazine total daily in di-vided doses
Caution/ More information	*avoid angiotensin receptor blockers or Angiotensin receptor and neprilysin Inhibitor in breastfeeding mothers * avoid abrupt withdrawal * Can use any ACE-i	*avoid carvedilol in breastfeeding *the authors recommend bisoprolol as the drug of choice based on their own and other experts' clinical experience of benefit in peripartum cardiomyopathy	*contraindicated in eGFR ≤30 mL/ min/1.73 m2 or serum potassium ≥5.0 mEq/L * In eGFR 31-49 mL/ min/1.73 m2, half the dose * Use of eplerenone not well studied in breastfeeding, and not readily available locally	*use if NYHA III-IV and already on optimal medical therapy + African descent

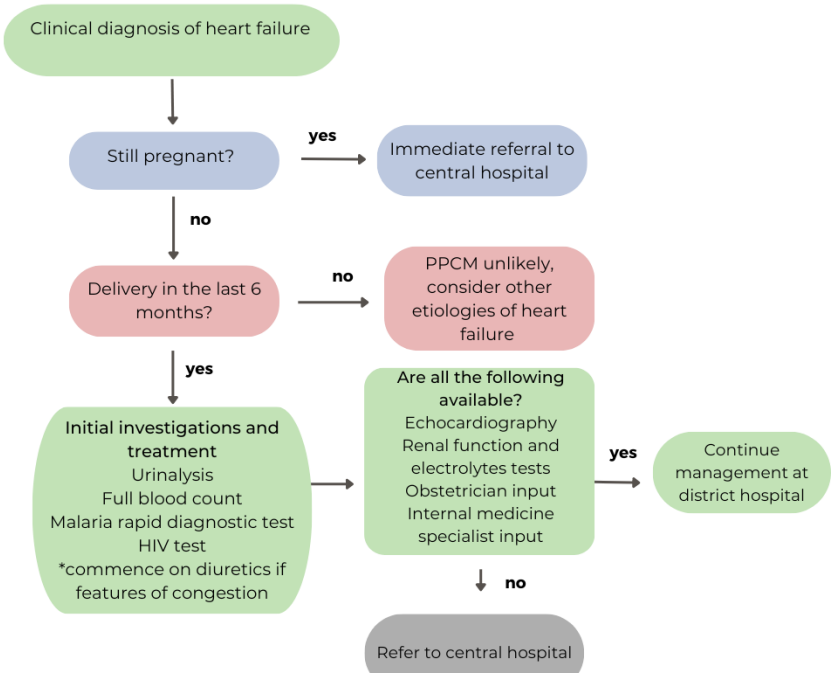

Figure 1 Flow Chart for Managing PPCM at a district hospital

atenolol 25mg od, enalapril 5 mg od, and the 1 L daily fluid restriction. A review at one week post discharge revealed sustained clinical improvement.

Case 4 – E.D., a 29-year-old HIV negative para 1, presented to DLH with a two-week history of pricking chest pain and shortness of breath on lying flat. She was two months post-delivery by cesarean section at DLH. E.D. had presented in her third trimester with blurred vision, headache, and generalized edema. After being found to have an elevated BP of 160/120, and 1+ proteinuria, a diagnosis of preeclampsia was made, and she was delivered by Caesarian section. She was thereafter discharged home on the third post-operative day.

On this presentation her blood pressure was 110/83, pulse rate 87, and normal oxygen saturation on room air. Chest examination showed a gallop rhythm and bilaterally decreased lower lung sounds. A chest x-ray revealed cardiomegaly, peri-hilar infiltrates, and bilateral pleural effusions. The ejection fraction was 39% on a cardiac echo with normal valve morphology and normal cardiac chamber sizes. Peripartum cardiomyopathy was diagnosed, and the patient was started on furosemide 80 mg IV OD and enalapril 2.5 mg PO BD. With clinical improvement she was titrated to frusemide 40 mg PO BD. On the second hospital day bisoprolol 2.5mg po od was added to the enalapril. She was discharged on her sixth hospital day on oral frusemide 20mg po od and the same dose bisoprolol and enalapril with a plan to review her in one month.

Case 5- TM, a 23-year-old HIV negative female P1, presented to DLH complaining of cough and shortness of breath for three months beginning soon after delivery. She had delivered twins by caesarean section with an otherwise unremarkable pregnancy. Following delivery she suffered worsening shortness of breath, and general body swelling, requiring referral to the local tertiary facility where she was managed for heart failure due to peripartum cardiomyopathy. During her hospitalization, echocardiography revealed an ejection fraction of 48% and bilateral pleural effusions. Her heart failure symptoms improved after almost three weeks in the hospital, and she was discharged home on furosemide, hydrochlorothiazide and nifedipine. Her symptoms however worsened and she was re-admitted to the tertiary facility two months later with worsening heart failure. Three days after re-admission she was discharged on furosemide, spironolactone and atenolol. Enalapril would have been given, but it was out of stock at the pharmacy. Two days after the second discharge she presented to DLH with worsening cough and shortness of breath. Physical examination showed signs of heart failure and pulmonary edema. A repeat cardiac echo showed an ejection fraction of 22%. Medications commenced on admission included enalapril 2.5mg po od, furosemide 80 mg IV bd and bisoprolol 2.5 mg po od and oral hydralazine.

In the initial days of her hospital stay, TM consistently ran low blood pressures with systolic blood pressures ranging from 70-90mmHg, but could not afford a dopamine infusion.

Her blood pressure and clinical status gradually improved on the stated medications, and after six days she was discharged home on Enalapril 2.5 mg po od, furosemide 40 mg po bd and bisoprolol 2.5 mg po od.

Discussion

The incidence of PPCM is strongly associated with age, with >50% of cases occurring in women >30 years of age, though the cases presented here are generally younger. Three of the five cases had a history of twin gestation, and two had a background of pre-eclampsia, which both strongly predispose a woman to PPCM. Other associated risks include African ancestry, anaemia, substance abuse, asthma and autoimmune disease[1,5–7]. Echocardiography is indicated as soon as possible to confirm the diagnosis and to exclude complications of PPCM such as a left ventricular thrombus[1,2]. An ECG should be obtained in every patient with clinical suspicion of coronary artery disease, or an arrhythmia[8]. In women who are postpartum, a chest radiograph may be helpful in excluding alternative pathologies in acutely dyspneic patients, as well as to support the diagnosis of heart failure especially when echocardiography is not readily available[9].

Current treatment guidance for such dilated cardiomyopathies causing heart failure is the same as standard heart failure with reduced ejection fraction management with treatment options tailored around drug safety in pregnancy and breastfeeding. In the cases shared, the optimal drug regimens were not always adhered to. This was due to the women not being hospitalized long enough to achieve optimal drug doses, lack of assurance of follow up, lack of availability of the drugs in the pharmacy, and clinicians not ensuring optimal pharmacotherapy during hospitalization and follow-up. A summary of the recommended treatment is given in the table below (Table 1). However, initiation and titration of medication should be individualized and optimized according to the patient's symptoms, vital signs, functional status, tolerance, renal function, electrolytes, comorbidities, and ability of follow-up[10–15].

Diuretics, either intravenous or oral, are used in patients with heart failure who have fluid retention, to relieve congestion, improve symptoms, and prevent worsening heart failure[10].

https://dx.doi.org/10.4314/mmj.v35i3.10

Angiotensin-receptor-blockers are not recommended in breastfeeding mothers. Use of bromocriptine is currently contentious and requires further evaluation[16–18]. The use of strongly negatively inotropic medications such as nifedipine may precipitate heart failure, as may have happened with case[3,10,19]. Worldwide, treatment in specialist cardiology centers is the gold standard. Though this remains an unrealistic aspiration in Malawi and other similar settings, clinical management of these patients should be undertaken in facilities with appropriate laboratory and radiology facilities, as well as under the care of an internal medicine specialist and obstetrician. Cases of PPCM that occur during late gestation such as in the third case are uncommon, and require special consideration. No published data exist to guide decision making on timing and mode of delivery. Women with diagnosed PPCM who become stable with medical treatment can continue pregnancy with close monitoring. Treatment for PPCM is based largely on clinical experience and extrapolation from data with other forms of systolic heart failure[1,20]. The flow chart below proposes a care pathway for managing PPCM in Malawi, beginning at the district hospital (Figure 1).

Besides conventional pharmacological therapy, cardiac rehabilitation has been shown to improve functional capacity and exercise tolerance, as well as reduce cardiovascular disease mortality in patients with heart failure, including PPCM. Cardiac rehabilitation programs include medical evaluation, health education, risk factor modification, and prescribed physical activity[21–23].

In terms of outcomes and prognosis, women of African descent have poorer outcomes than other races.10,20 Two studies from South Africa showed 17% mortality in 30 patients in Cape Town, and 13% mortality in 176 patients in Soweto. Left ventricular ejection fraction, LVEF, at presentation is the strongest predictor of outcomes and the studies in South Africa found that death, left ventricular assist devices, or heart transplantation occurred almost exclusively in women with LVEF < 30% at first presentation[20].

The risks associated with subsequent pregnancies is a major issue to counsel these women about, as the outcomes can be fatal when women with a history of PPCM with subsequent pregnancies do not benefit from cardiac follow-up. Repeat pregnancy is contraindicated in women with a LVEF of less than 50%, though there still remains a risk of recurrence even after normalization of LVEF[10,20,24]. The women must be counselled about the risks of a subsequent pregnancy and offered effective contraception. Ultimately, the decision for further pregnancies remains highly personal, and should be made with input from both the specialists and the patient. Follow-up with a multidisciplinary team of cardiologists, obstetricians, physical therapists, and nurses is crucial in adequately tackling this disease[20].

Acknowledgements

All authors declare that they have no conflicts of interest.

References

1.Honigberg MC, Givertz MM. Peripartum cardiomyopathy. BMJ. 2019 Jan 30;k5287.

2.Bauersachs J, Arrigo M, Hilfiker-Kleiner D, Veltmann C, Coats AJS, Crespo-Leiro MG, et al. Current management of patients with severe acute peripartum cardiomyopathy: practical guidance from the Heart Failure Association of the European Society of Cardiology Study Group on peripartum cardiomyopathy: Current management of patients with severe acute peripartum cardiomyopathy. Eur J Heart Fail. 2016 Sep;18(9):1096–105.

3.Karaye K, Habib A, Sliwa K. Epidemiology of Peripartum Cardiomyopathy in Africa. Int Cardiovasc Forum J [Internet]. 2019 Mar 12 [cited 2023 Jun 30];15. Available from: https://icfj.journals.publicknowledgeproject.org/index.php/icfj/article/view/545

4.Sliwa K, Damasceno A, Mayosi BM. Epidemiology and Etiology of Cardiomyopathy in Africa. Circulation. 2005 Dec 6;112(23):3577–83.

5.Ritchie C. Clinical Contributions to the Pathology, Diagnosis, and Treatment of Certain Chronic Diseases of the Heart. Edinb Med Surg J. 1849 Oct 1;72(181):325–39.

6.Bello N, Rendon ISH, Arany Z. The Relationship Between Pre-Eclampsia and Peripartum Cardiomyopathy. J Am Coll Cardiol. 2013 Oct;62(18):1715–23.

7.Gunderson EP, Croen LA, Chiang V, Yoshida CK, Walton D, Go AS. Epidemiology of Peripartum Cardiomyopathy: Incidence, Predictors, and Outcomes. Obstet Gynecol. 2011 Sep;118(3):583–91.

8.Stewart S, Wilkinson D, Hansen C, Vaghela V, Mvungi R, McMurray J, et al. Predominance of Heart Failure in the Heart of Soweto Study Cohort: Emerging Challenges for Urban African Communities. Circulation. 2008 Dec 2;118(23):2360–7.

9.Allen CJ, Guha K, Sharma R. How to Improve Time to Diagnosis in Acute Heart Failure - Clinical Signs and Chest X-ray. Card Fail Rev. 2015 Oct;1(2):69–74.

10.Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation [Internet]. 2022 May 3 [cited 2023 Jun 30];145(18). Available from: https://www.ahajournals.org/doi/10.1161/CIR.0000000000001063

11.Cleland JGF, Bunting KV, Flather MD, Altman DG, Holmes J, Coats AJS, et al. Beta-blockers for heart failure with reduced, mid-range, and preserved ejection fraction: an individual patient-level analysis of double-blind randomized trials. Eur Heart J. 2018 Jan 1;39(1):26–35.

12.Pitt B, Zannad F, Remme WJ, Cody R, Castaigne A, Perez A, et al. The Effect of Spironolactone on Morbidity and Mortality in Patients with Severe Heart Failure. N Engl J Med. 1999 Sep 2;341(10):709–17.

13.Garg R, Yusuf S. Overview of randomized trials of angiotensin-converting enzyme inhibitors on mortality and morbidity in patients with heart failure. Collaborative Group on ACE Inhibitor Trials. JAMA. 1995 May 10;273(18):1450–6.

14.Taylor AL, Ziesche S, Yancy C, Carson P, D'Agostino R, Ferdinand K, et al. Combination of Isosorbide Dinitrate and Hydralazine in Blacks with Heart Failure. N Engl J Med. 2004 Nov 11;351(20):2049–57.

15.Goland S, George J, Elkayam U, Shimoni S, Fugenfirov I, Vaisbuch E, et al. Contemporary outcome of subsequent pregnancies in patients with previous peripartum cardiomyopathy. ESC Heart Fail. 2022 Dec;9(6):4262–70.

16.Davis MB, Arany Z, McNamara DM, Goland S, Elkayam U. Peripartum Cardiomyopathy. J Am Coll Cardiol. 2020 Jan;75(2):207–21.

17.Bozkurt B, Colvin M, Cook J, Cooper LT, Deswal A, Fonarow GC, et al. Current Diagnostic and Treatment Strategies for Specific Dilated Cardiomyopathies: A Scientific Statement From the American Heart Association. Circulation [Internet]. 2016 Dec 6 [cited 2023 Jun 30];134(23). Available from: https://www.ahajournals.org/doi/10.1161/CIR.0000000000000455

18.Sliwa K, Blauwet L, Tibazarwa K, Libhaber E, Smedema JP, Becker A, et al. Evaluation of Bromocriptine in the Treatment of Acute Severe Peripartum Cardiomyopathy: A Proof-of-Concept Pilot Study. Circulation. 2010 Apr 6;121(13):1465–73.

19.Malamba-Lez D, Ngoy-Nkulu D, Steels P, Tshala-Katumbay D, Mullens W. Heart Failure Etiologies and Challenges to Care in the Developing World: An Observational Study in the Democratic Republic of Congo. J Card Fail. 2018 Dec;24(12):854–9.

20.Arany Z, Elkayam U. Peripartum Cardiomyopathy. Circulation. 2016 Apr 5;133(14):1397–409.

21.Keteyian SJ. Exercise Training in Congestive Heart Failure: Risks and Benefits. Prog Cardiovasc Dis. 2011 May;53(6):419–28.

22.Sagar VA, Davies EJ, Briscoe S, Coats AJS, Dalal HM, Lough F, et al. Exercise-based rehabilitation for heart failure: systematic review and meta-analysis. Open Heart. 2015 Jan;2(1):e000163.

23.Taylor RS, Walker S, Smart NA, Piepoli MF, Warren FC, Ciani O, et al. Impact of Exercise Rehabilitation on Exercise Capacity and Quality-of-Life in Heart Failure: Individual Participant Meta-Analysis. J Am Coll Cardiol. 2019 Apr 2;73(12):1430–43.

24.Yaméogo NV, Samadoulougou AK, Kagambèga LJ, Kologo KJ, Millogo GRC, Thiam A, et al. Maternal and fetal prognosis of subsequent pregnancy in black African women with peripartum cardiomyopathy. BMC Cardiovasc Disord. 2018 Dec;18(1):119.

https://dx.doi.org/10.4314/mmj.v35i3.10