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Case Report

Return of menses after heart failure stabilization in a woman with secondary amenorrhea: A hypothesis-generating case report

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Abstract

Background: Secondary amenorrhea, defined as the absence of menstruation for three or more consecutive months in women with previously regular cycles, has a broad differential diagnosis that includes endocrine, metabolic, psychosocial, and systemic causes. Heart failure (HF) is a multisystem syndrome that may alter neurohormonal signaling and physiologic stress responses, creating a biologically plausible context for menstrual disturbance. We report a case in which menstrual function resumed after treatment and clinical stabilization of HF. **Case Report:** A 25-year-old female with a two-year history of secondary amenorrhea presented with exertional dyspnea, orthopnea, and bilateral lower extremity edema. Physical examination showed elevated jugular venous pressure and a systolic murmur. Echocardiography demonstrated mildly reduced left ventricular ejection fraction (44%), dextrocardia, left atrial enlargement, and moderate mitral regurgitation. She was diagnosed with congestive heart failure and treated with intravenous diuretics followed by guideline-directed medical therapy (beta-blocker, angiotensin-converting enzyme inhibitor, and mineralocorticoid receptor antagonist). Her symptoms improved clinically, and by the third month of follow-up she reported return of menstruation, with continued regular cycles during 9 months of follow-up. **Conclusion:** This case demonstrates a temporal association between HF treatment/clinical improvement and resolution of secondary amenorrhea, but it does not establish causality. The observation is hypothesis-generating and should be interpreted in the context of an incomplete endocrine-gynecologic etiologic evaluation and the absence of serial hormonal measurements. Nevertheless, the case supports clinical awareness of menstrual health in women with HF and motivates prospective studies using standardized reproductive and cardiovascular assessments to clarify mechanisms and determine whether this association is reproducible.

Keywords: amenorrhea, heart failure, menstrual cycle, hypothalamic-pituitary-ovarian axis, reproductive health

Introduction

Secondary amenorrhea refers to the absence of menstruation for three or more consecutive months in women who have previously had regular menstrual cycles. It is a common clinical problem with a broad differential diagnosis, including pregnancy, hypothalamic dysfunction, pituitary disorders, thyroid disease, ovarian causes (including polycystic ovary syndrome), medication effects, nutritional deficiency, chronic systemic illness, and psychosocial stressors. A structured evaluation is therefore essential before assigning causality to any single factor [1].

Heart failure (HF), defined as a clinical syndrome caused by structural and/or functional cardiac abnormalities resulting in impaired ventricular filling and/or ejection, is associated with systemic hemodynamic, neurohormonal, inflammatory, renal, and metabolic consequences. In addition to classic symptoms such as exertional dyspnea, orthopnea, paroxysmal nocturnal dyspnea, fatigue, and edema, HF can affect endocrine regulation through sustained physiologic stress and activation of compensatory pathways. These systemic effects provide a biologically plausible mechanism by which HF could contribute to menstrual disturbance in some patients [2].

Reports specifically describing secondary amenorrhea in women with HF remain limited, and the direction and mechanism of any association are not well established. The purpose of this case report is therefore not to prove causation, but to document a clinically relevant temporal association: resumption of menses after treatment and clinical stabilization of

HF in a young woman with longstanding secondary amenorrhea. We present the case, clarify the evidentiary limits of the observation, and discuss plausible mechanisms and implications for future study.

Case Report

A 25-year-old female presented with exertional dyspnea, orthopnea, and paroxysmal nocturnal dyspnea, in addition to generalized fatigue and bilateral lower limb edema. Her medical history was otherwise unremarkable, with no prior diagnoses of hypertension, diabetes mellitus, chronic renal disease, or a smoking habit. Importantly, the patient reported amenorrhea for the past two years, although she had previously experienced regular menstrual cycles. The patient had delivered her first child five years ago and was not using any form of contraception at presentation.

On examination, her vital signs were as follows: blood pressure of 100/60 mmHg, heart rate of 125 beats per minute, and respiratory rate of 28 breaths per minute. Elevated jugular venous pressure (JVP) was observed. Cardiac auscultation revealed normal S1 and S2 heart sounds, with a systolic murmur detected at the 6th intercostal space near the right anterior axillary line. Pulmonary auscultation revealed vesicular breath sounds with bilateral rhonchi. The examination further revealed ascites and edema in both lower extremities.

Laboratory investigations revealed mild anemia, with a hemoglobin level of 9.0 g/dL, and normal renal function, as indicated by an estimated glomerular filtration rate (eGFR) of 105 mL/min/1.73 m². Thyroid function, serum protein, albumin, and globulin levels were within normal limits. Electrocardiogram findings are presented in Figure 1. A chest X-ray demonstrated dextrocardia, cardiomegaly, and evidence of pulmonary congestion (Figure 2). Echocardiographic evaluation revealed a mildly reduced left ventricular ejection fraction of 44%, left atrial enlargement, and moderate mitral regurgitation (Figure 3). In the available case record, a comprehensive gynecologic/endocrine etiologic evaluation of secondary amenorrhea (e.g., pregnancy testing, prolactin, gonadotropins/estradiol, pelvic ultrasonography, and related differential assessment) was not documented, and this limits etiologic attribution.

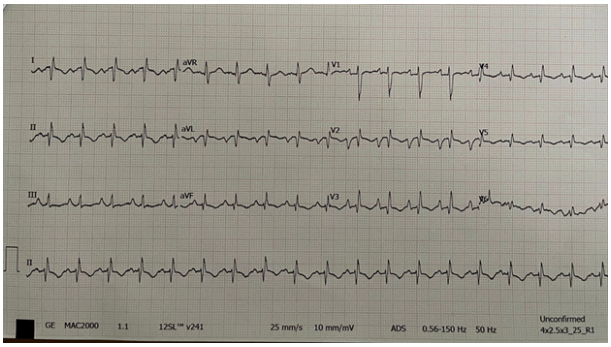

Figure 1: The electrocardiogram at presentation revealed global negativity in lead I, positive QRS with upright p wave and T wave in lead aVR, and absent R wave progression in precordial lead

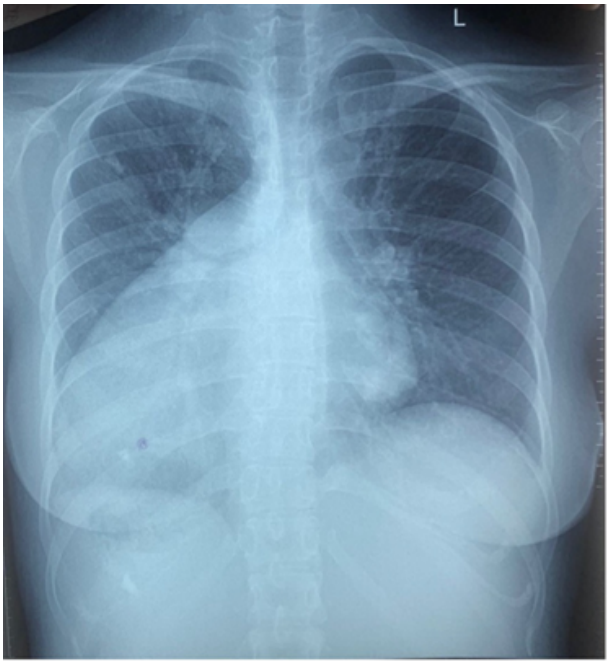

Figure 2: Chest X-ray showed dextrocardia with cardiomegaly, sign of pulmonary congestion

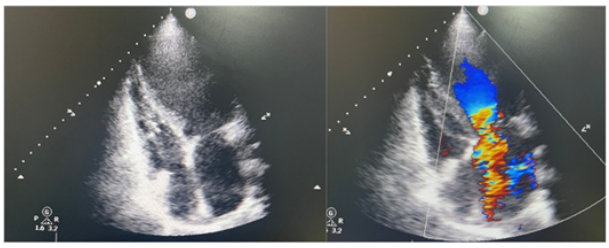

Figure 3: Echocardiography demonstrated moderate mitral regurgitation and left atrial enlargement

The patient was diagnosed with congestive heart failure (CHF) with mildly reduced ejection fraction, dextrocardia, and moderate mitral regurgitation. Initial management included intravenous furosemide at a dosage of 120 mg per day, in addition to angiotensin-converting enzyme inhibitors, mineralocorticoid receptor antagonists, and beta-blockers. The patient was treated for 5 days during hospitalization, with clinical stabilization and no reported hemodynamic

deterioration. She was then discharged with recommendations for routine outpatient follow-up. During subsequent follow-up visits, heart failure symptoms improved clinically. By the third month of treatment, the patient reported return of menstruation and subsequently reported regular cycles throughout the 9-month follow-up period. In this case report, menstrual outcome was based on longitudinal clinical history obtained during follow-up; serial endocrine laboratory testing and repeat echocardiographic quantification were not available.

Discussion

This case documents a temporal association between treatment/clinical stabilization of heart failure (HF) and the return of menses in a young woman with longstanding secondary amenorrhea. The observation is clinically interesting because it highlights a potentially under-recognized interface between cardiovascular disease and reproductive health. However, the evidentiary strength of this report is inherently limited by its single-patient design and by the incomplete etiologic workup for amenorrhea. Accordingly, the present case should be interpreted as hypothesis-generating rather than causal proof.

The conceptual framework linking HF and secondary amenorrhea is biologically plausible but multifactorial. Secondary amenorrhea frequently reflects dysregulation of the hypothalamic-pituitary-ovarian (HPO) axis, which can be influenced by metabolic stress, chronic illness, neuroendocrine activation, inflammation, and psychosocial burden [3]. HF is a systemic syndrome characterized by hemodynamic impairment and compensatory neurohormonal activation (including renin-angiotensin-aldosterone system activation), and these disturbances may alter central and peripheral endocrine signaling [4]. Under this framework, improvement in congestion and global clinical status could theoretically reduce physiologic stress and improve conditions required for normal cyclic reproductive signaling. In the present case, clinical improvement in HF symptoms coincided temporally with menstrual resumption, but no direct hormonal or mechanistic measurements were performed, so this pathway remains unconfirmed.

The available literature supports careful consideration of menstrual and cardiometabolic interactions, but it does not yet establish a direct, clinically reproducible pathway by which routine HF treatment reverses secondary amenorrhea. Prior work has described associations between menstrual disorders and cardiovascular risk or cardiometabolic outcomes, and chronic systemic illness is well known to affect menstrual function [4, 5]. In addition, hypothalamic dysfunction is a recognized mechanism of secondary amenorrhea in chronic stress and illness states [6]. Our case is therefore best positioned as a clinically relevant signal consistent with these broader concepts, rather than as definitive evidence of a new therapeutic effect. This distinction is important for both scientific rigor and clinical interpretation.

Several potential mechanisms might explain the temporal association observed in this case:

- **Improved Hemodynamic Status and Tissue Perfusion:** Reduction in congestion and improvement in effective circulation after HF therapy may improve global physiologic homeostasis, which could indirectly support recovery of cyclic reproductive signaling.
- **Reduced Neurohormonal and Inflammatory Stress:** Guideline-directed HF therapy can reduce maladaptive neurohormonal activation and symptom burden, potentially decreasing physiologic stressors that may contribute to HPO-axis suppression.
- **Improved Functional Status and Stress Burden:** Relief of dyspnea, fatigue, and sleep disruption may reduce physical and psychological stress, which can influence hypothalamic signaling and menstrual cyclicity [7].

These mechanisms are plausible but remain speculative in the absence of direct measurements. In particular, this report did not include serial reproductive hormone levels, ovulation tracking, repeat echocardiographic indices, or a standardized menstrual diary, and no statistical inference is possible in a single case. Additional uncertainty arises from potential confounding by unmeasured factors, including nutritional status, weight change, psychosocial stress, and other gynecologic/endocrine conditions. These limitations should be explicitly considered when interpreting the clinical significance of the observed outcome.

Despite these limitations, the case has practical value. It supports broader clinical history-taking in women with HF, including menstrual and reproductive health, and it suggests that improvement in systemic disease burden may coincide with improvement in menstrual symptoms in selected patients. Future research should use prospective designs with standardized amenorrhea workup, predefined reproductive endpoints, serial cardiovascular assessments,

and careful confounder measurement to determine whether this association is reproducible and mechanistically meaningful.

Conclusion

This case report describes a temporal association between clinical improvement of heart failure and the return of menstruation in a woman with longstanding secondary amenorrhea. The observation is clinically relevant and hypothesis-generating, but it does not establish causality because alternative etiologies of amenorrhea were not comprehensively excluded and mechanistic measurements were not obtained. The main contribution of this report is to highlight an underexplored cardio-reproductive interface and to support more systematic menstrual health assessment in women with HF. Prospective studies are needed to determine the prevalence, mechanisms, and clinical implications of menstrual changes during HF treatment.

Clinical trial number

Not applicable.

Informed consent

Informed consent was obtained from the participants.

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Conflict of interest

No conflicts of interest were declared by the authors.

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