DOI: 10.12923/cipms-2025-0019 Curr. Issues Pharm. Med. Sci., Vol. 38, No. 2, Pages 122-124

Current Issues in Pharmacy and Medical Sciences
Formerly ANNALES UNIVERSITATIS MARIAE CURIE-SKLODOWSKA, SECTIO DDD, PHARMACIA

journal homepage: https://czasopisma.umlub.pl/curipms

Raspberry leaf infusion and fetal heart rhythm disturbances

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ARTICLE INFO

Received 19 May 2023
Accepted 23 April 2024

Keywords:
pregnancy,
fetal heart rate,
cardiac arrhythmias,
raspberry leafs.

ABSTRACT

Fetal cardiac arrhythmias and conduction disorders represent the second most commonly identified issue within the circulatory system. Extrasystoles make up 80% of all prenatal arrhythmias, whereas tachyarrhythmias account for 10% and bradyarrhythmias range from 5-10%, making them less prevalent. The diagnosis of the specific type of arrhythmia is conducted through echocardiography. A 27-year-old woman, who was in the 38th week of a normal pregnancy, was referred to the Medical University of Lublin's Department of Obstetrics and Pathology of Pregnancy for a fetal echocardiography exam. The expectant mother consumed a daily infusion of raspberry leaves, totaling 3-4 cups (330 ml). Raspberry ketone (RK) is under investigation for its potential heart protective effects; however, there is no established safe dosage prior to delivery. After discontinuing the treatment, the fetal heart rate returned to a normal rhythm. This study is the first to link raspberry consumption with occurrences of fetal arrhythmias. Effective diagnosis of fetal heart rhythm disturbances relies on comprehensive echocardiography of the fetal heart and thorough interviewing of the pregnant patient. Premature delivery due to fetal heart rhythm issues, without a detailed analysis via echocardiography, is a significant oversight.

INTRODUCTION

The conduction system of the fetal heart reaches functional maturity by 16 weeks of gestation and typically generates a steady rhythm and rate - ranging from 110 to 160 beats per minute [1]. Cardiac arrhythmias and conduction abnormalities are the second most commonly identified conditions affecting the circulatory system, impacting around 1-3% of fetuses [2]. Herein, Extrasystoles make up roughly 80% of all arrhythmias detected during prenatal assessments, while Tachyarrhythmias (10%) and bradyarrhythmias (5-10%) are less common. Cardiac arrhythmias are most often detected by obstetricians during auscultation, cardiotocography or ultrasound examination of the fetus. The final prenatal diagnosis of the type of arrhythmia is made by echocardiography using the M-mode and / or spectral Doppler techniques. Most of the fetal arrhythmias are benign, but some can lead to fetal hydrops or stillbirth.

Case report

A 27-year-old woman, a pharmacist, in the 38th week of physiological pregnancy was referred to the Department of Obstetrics and Pathology of Pregnancy, Medical University of Lublin for echocardiographic examination of the fetus due to cardiodetector assessment of arrhythmias in the fetal heart activity, the so-called "Pulse loss" during a routine maternity visit. The obstetrical interview revealed that the course of the pregnancy was unaffected and the test for TORCH and other infections was negative. The routine US scan in first and second trimester according to the recommendation of Fetal Medicine Foundation and Polish Society of Gynecologists and Obstetricians were correct – with no increased risk of chromosomal abnormalities. Echocardiography showed that the circulatory system's anatomy was normal, but there were disturbances in the fetal heart rhythm characterized by occasional retroventricular conduction accessory contractions, leading to intermittent arrhythmia reaching 100 beats/min. The baseline fetal heart rate was sinusoidal, recorded at 138 beats/min (Figure 1).

In the cardiotocography of the fetus, the baseline heart rate was appropriate for the gestational age (about 144 beats per minute). There was normal variability and cycling, the accelerations were present, no decelerations were detected. In the conducted ultrasound, the circulation system of the fetus was found to be efficient (10 points on the Cardiovascular profile score- CVPS scale) (Table 1).

The patient's obstetrical history was not significant. Nevertheless, during the interview, the patient indicated that she consumed a daily infusion of raspberry leaves, drinking 3-4 cups, each roughly 330 ml in capacity. This practice was intended to help contract the uterus and prepare the

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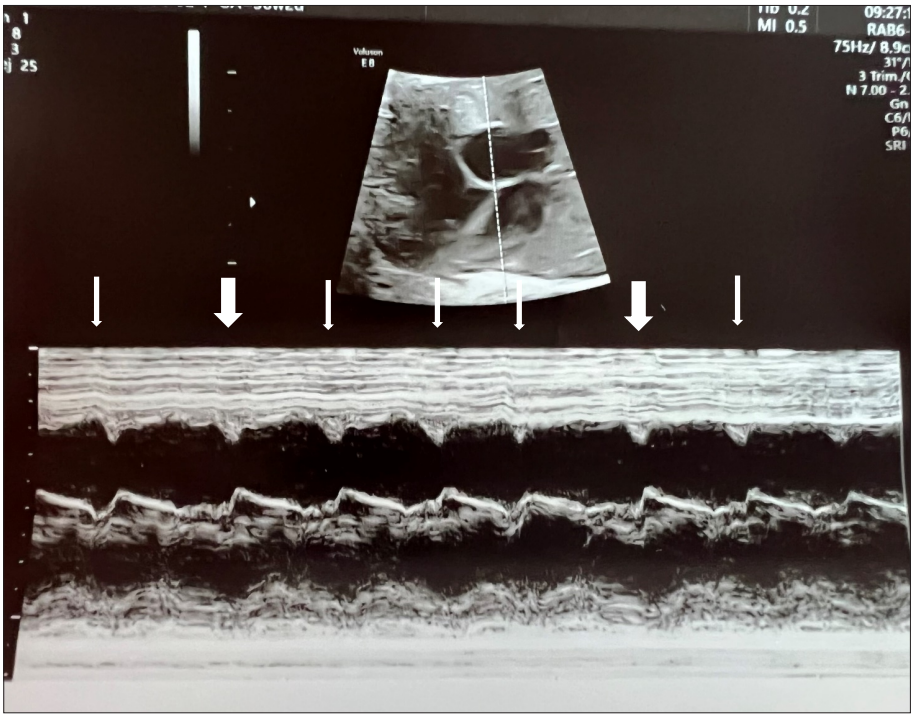


Figure 1. Retroventricular conduction accessory contractions with periodic arrhythmia up to 100 beats per minute (Wide arrows point out the arrhythmia. Thin arrows point out normal heart rate)

Table 1. Cardiovascular profile score according to JC. Huhta [3]

	NORMAL	- 1 POINT	-2 POINTS
Hydrops	None (2 pts)	Ascites or Pleural effusion or Pericardial effusion	Skin edema
Venou Doppler (Umbilical Veina) (Ductus Venosus)	UV DV atrial pulsation	UV DV atrial reversal	UV pulsations
Heat Size (Heart area/Chest area)	≤ 0.35 (2 pts)	0.35-0.50	> 0,5 < 0.2
Cardiac Function	Normal TV and MT RV/LV S.F. >0.28 Bifhasic filling (2 pts)	Holosystolic TR or RV/LV S.F. <0.28	Holosystolic MR or TR dP/dt,400 or Monophasic filling
Arterial Doppler (Umbilical Artery)	UA (2 pts)	UA (AEDV)	UA (REDV)

The heart failure score is 10 if there are no abnormal signs and reflects 2 points for each of five categories: hydrops, venous Doppler, heart size, cardiac function, and arterial Doppler. AEDV – absent end-diastolic velocity; dP/dt – change in pressure over time of TR jet; DV – ductus venosus; LV – left ventricle; MR – mitral valve regurgitation; MV – mitral valve; pts – points; S.F. – ventricular shortening fraction; TR – tricuspid valve regurgitation; TV – tricuspid valve; REDV – reversed end-diastolic velocity; RV – right ventricle; UV – umbilical vein

cervix for labor, as recommended by a Midwife at the Birth School. Once the treatment was stopped, the fetal heart rate normalized. Following delivery, an echocardiogram of the newborn confirmed that the circulatory system was functioning correctly.

DISCUSSION

The majority of fetal arrhythmias are standalone occurrences, however, some may be linked to structural or functional heart issues. Any instance of abnormal fetal heart rate necessitates additional assessment. The monitoring techniques employed include:

- 2D ultrasound scan – assesses the fetus and cardiac structure, as well as the amniotic fluid index;
- M-mode ultrasonography – identifies the motion of atrial and ventricular walls;
- Pulsed-wave Doppler – evaluates waveforms in the umbilical, cerebral, uterine vessels and in ventricular, valve and aortic flows;
- Tissue Doppler echocardiography – allows for the analysis of myocardial movement through Doppler ultrasound imaging;
- 'Cardiovascular profile score' (CVS) – which integrates ultrasonic indicators of fetal cardiovascular distress based on individual parameters linked to perinatal mortality;
- Fetal magnetocardiography and electrocardiography – specialized tests that are not widely available and used.

Blocked ectopic beats can result in prolonged low heart rates, especially in cases of bigeminy or trigeminy, although they seldom pose a risk to the fetus. In this situation, the sporadic bradycardia was not associated with any ultrasonographic findings.

The use of herbal medicines, as one element of complementary and alternative medicine, is increasing worldwide. Although the safety profile of numerous herbal treatments appears promising, existing evidence indicates significant interactions with conventional drugs, which may potentially subject individual patients to elevated risks. In 2023, a study by Sile explored the use of herbal remedies and the possible risks linked to interactions between herbal and conventional medications among the Latvian population [4]. The data collection period spanned from 2019 to 2021, during which a structured questionnaire specifically for pharmacy clients was utilized. The potential dangers of drug interactions and likely side effects linked to herbal remedies were evaluated by examining electronic databases. The survey included a total of 504 participants and the risk of drug interactions and probable side effects associated with herbal medicines was assessed by reviewing electronic databases. The survey encompassed a total of 504 participants. Among the entire cohort of individuals, a significant majority of 77.8% reported the use of herbal preparations. The majority of the people who were interviewed reported utilizing herbal treatments either upon the suggestion of a pharmacist or by their own volition. A significant proportion of the participants, namely 38.3%, expressed their perception that the utilization of herbal remedies is both safe and

devoid of harm. Conversely, a majority of the respondents, accounting for 57.3%, held the belief that the concurrent use of herbal remedies and conventional medications is associated with potential risks and is therefore risky.

Regular use of foods high in polyphenols has been shown to potentially reduce the occurrence of various health conditions, including cardiovascular illnesses, colon cancer, liver disorders, obesity and diabetes. In the realm of plant biology, these chemicals are frequently generated as defensive agents in response to physiological and environmental stimuli [5].

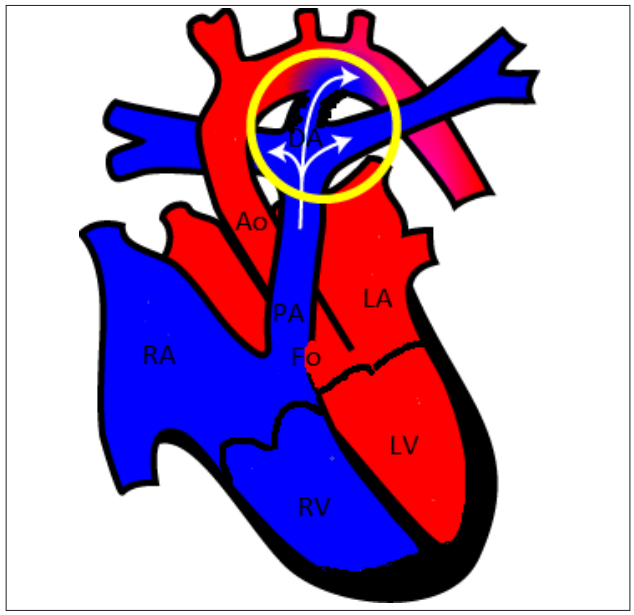
The biophysically of raspberry leaf affects animal and human smooth muscle, including the uterus. Thirteen studies about this herb were included in the review performed by Bowman [6]. Five lab investigations used animal and human tissue, two – animal experiments, and six – human studies. The human studies shown variation in the bioactivity of raspberry leaf by dosage and even geographical region. In the animal studies, high intravenous or intraperitoneal dosages showed toxicity. One study found a clinically substantial (albeit non-statistically significant) reduction in second stage and augmentation of labor in raspberry leaf-taking women. However, the raspberry leaf's efficacy in pregnancy is unproven, so more research is needed.

Research has documented instances of irregular fetal heart rhythms linked to the consumption of herbal beetroot preparations, green tea, or an excess of strawberries. Raspberry ketone (RK; 4-(4-hydroxyphenyl) butan-2-one), a compound found in raspberries, is currently under investigation for its potential cardioprotective benefits. Nevertheless, there is no established safe quantity of raspberries to consume during pregnancy. In a 2001 study conducted in Australia, 192 pregnant participants at 32 weeks gestation were given either 1.2 grams of raspberry leaf tablets twice daily or a placebo. The primary goal of this double-blind trial was to investigate its effect on reducing the duration of the second stage of labor. The findings indicated no significant differences between the groups in terms of postpartum bleeding levels, infant Apgar scores and birth weights, gestation duration, necessity for medical induction techniques (including oxytocin administration), delivery types, or any adverse effects. The researchers recommend additional studies to evaluate the effectiveness of varying dosage levels.

However, the use of foods rich in maternal polyphenols during the later stages of pregnancy has the potential to induce changes in the dynamics of fetal ducts through the suppression of prostaglandin synthesis [9] (Figure 2).

In this case, termination of the treatment resulted in immediate improvement of fetal heart rate.

To summarize, conducting an echocardiography of the fetal heart and properly interviewing the expectant mother is essential in every instance of diagnosed fetal heart rhythm issues. The highlighted case also underscores the need for caution regarding the use of over-the-counter herbal products to provoke labor. Additionally, it should be noted that based on current expertise in cardiology and perinatology, prematurely ending a pregnancy due to fetal heart rhythm issues without analysis of their type through echocardiography is a misjudgment.



RA – right atrium; LA – left atrium; RV – right venticule; LV – left ventricule; Fo – foramen ovale; DA – ducutus arteriosus; PA – pulmonary artery

Figure 2. Idiopathic premature closure of the ductus arteriosus

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