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Menstrual Disturbances in Women With Congenital Heart Diseases

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Abstract

Background: Women with congenital heart disease (CHD) may experience menstrual disturbances secondary to hemodynamic instability during the mensturation phase.
Objectives: We investigated the menstrual bleeding pattern and its relationship with certain clinical findings in adult women with CHD.
Patients and Methods: Clinical data and menstrual bleeding pattern of adult women ≥15 years old who were referred to adult CHD clinic between March and September 2014 were recorded. Patients with syndromic congenital anomalies were excluded.
Results: Data of 304 women (151 and 153 with simple and complex CHD groups, respectively) were recorded. Their mean (SD) age was 25.2 (1) years (range, 15 - 46 years). The median (IQR) age at menarche was 13 (12 - 14.25) years. Menarche was later in patients with CHD than in the normal population. Furthermore, the simple group showed earlier menarche than the complex group. The most common menstrual abnormality was menorrhagia in both groups (14.5% and 20.5% in the simple and complex groups, respectively). The incidence of menstrual abnormality was higher, though not significantly, in the complex group (40% vs. 25% in the simple group; P = 0.2). Menorrhagia was associated with the severity of oxygen desaturation (P = 0.007).
Conclusions: Menstrual abnormalities are common in women with CHD, and therefore this group of patients should be aware of the menstrual function and its abnormalities.

Keywords: Congenital Heart Disease, Cyanosis, Menstrual Cycle Abnormality, Menstruation

1. Background

Recent advances in early diagnosis and treatment of congenital heart diseases (CHDs) have made it possible for women with CHD to survive into their childbearing age (2-6). Menstrual disturbances can be chronic in patients with CHD (3). Hemodynamic parameters might not be stable during the menstrual cycle and changes can cause menstrual abnormalities, particularly in patients with complex CHD (7-10).

Menstrual patterns in acyanotic patients are similar to those in the normal population; however, cyanotic patients may experience menstrual cycle disturbances frequently (1, 4, 8, 10).

2. Objectives

In this study, we aimed to investigate the menstrual bleeding pattern in a consecutive cohort of women with and without cyanotic CHD and its relationship with some clinical findings.

3. Patients and Methods

We recorded the menstrual bleeding pattern of consecutive women with CHD who were referred to the adult CHD clinic of Rajaie Cardiovascular Medical and Research Center between March and September 2014.

The inclusion criteria comprised any female patient ≥ 15 years old with a history of congenital heart anomaly. Patients with syndromic congenital disorders were excluded.

According to the 32nd Bethesda Conference Care of the Adult with Congenital Heart Disease, patients can be classified into two groups by CHD type: simple and complex (11) (disease of moderate severity is included in the simple group). Data for the following parameters were collected: type of CHD (complex and simple), age at surgery, oxygen saturation at room air, left ventricular ejection fraction (LVEF), and some laboratory parameters such as hematocrit level, platelet count, and international normalization ratio (INR) of patients on warfarin treatment.

The definitions of menstrual bleeding abnormalities are presented in Table 1 (12).

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Table 1. Definitions of Menstrual Bleeding Abnormalities

Abnormality	Definition
Amenorrhea	Absent menstrual bleeding; no menstrual bleeding in a 90-day period
Oligomenorrhea	Infrequent menstrual bleeding; up to two bleeding episodes in a 90-day period
Polymenorrhea	Frequent menstrual bleeding; more than four bleeding episodes in a 90-day period
Menorrhagia	Heavy and prolonged menstrual bleeding
Premature Menopause	When a woman enters menopause before age 40

3.1. Statistical Analyses

IBM SPSS Statistics 19.0 for Windows (IBM Corp., Armonk, NY, USA) was used for all statistical analyses. One-sample Kolmogorov Smirnov test was used to assess normal distribution of variables. Categorical variables were expressed as number (percentage) and quantitative variables as mean (SD) or median (interquartile range [IQR]), as appropriate. Categorical data were compared using chi-square test. Student t-test or Mann–Whitney U-test was used, as appropriate, to compare quantitative variables. $P < 0.05$ was considered statistically significant.

4. Results

Of the 304 patients included, 151 had simple (acyanotic) CHD and 153 had complex CHD. In the simple group, 41 patients had a Tetralogy of Fallot total correction (TFTC) history. In the complex group, 128 patients 84% of the patients had cyanotic CHD.

The mean (SD) age was 25 (1) years (range, 15 - 46 years). A history of corrective or palliative surgery was reported by 224 (73.7%) patients. The median (IQR) age at surgery was 6 (4 - 8) years.

The median (IQR) age at menarche was 13 (12 - 14) years, with a range of 9 - 17 years.

Table 2 shows the demographic and laboratory findings of the study population.

Table 3 shows the menstrual bleeding patterns of the study population.

The age at menarche differed between the simple and complex groups. The median (IQR) age at menarche was 13 (12 - 14) years for the simple group and 14.5 years for the complex group. The age at menarche was higher, especially in the cyanotic complex patients (median [IQR], 14.5 [12-15]); this difference was statistically significant in the complex group in relation to normal population and also simple group ($P = 0.02$).

As shown in Table 2, there was no statistically significant difference in menstrual bleeding abnormalities between the simple and complex groups. The most common menstrual abnormality was menorrhagia in both groups; menorrhagia was more common in the complex group and the between-group difference was statistically significant ($P < 0.05$). There was an association between the presence of polymenorrhea and platelet count ($P < 0.001$).

The presence of menorrhagia was associated with the severity of oxygen desaturation ($P = 0.007$).

History of surgery was reported for 76.4% and 72.2% of patients with simple and complex CHD, respectively. The age at menarche was similar in patients with and without a history of surgery. The median age in both groups was 14 years. However, there was a weak but significant correlation between the age at surgery and the age at menarche ($rho = 0.2$; $P = 0.03$).

There was no difference in the menstrual patterns between patients with a history of surgery and those without surgery ($P = 0.09$).

5. Discussion

In this study, we evaluated the menstrual patterns of patients with CHD and found that menarche occurs a little later in these patients when compared with the normal population. The mean age at menarche in the normal Iranian population is 12.8 (12.6 - 13) years (13). Canobbio et al. (8) and Drenthen et al. (10) found similar results: the mean age at menarche was 13.4 and 13.3 years in their study, respectively. In our study, the median (IQR) age at menarche was 13 (12 - 14) years in the simple acyanotic group but 14.5 years in the complex group.

Previous studies have reported that women with cyanotic CHD attain menarche later than those with acyanotic CHD (13 years vs. 13.9 years) (8, 10, 14). Our study found that the age at menarche was greater in women with CHD than in the normal population, and it was greater in the complex than in the simple group. Age at menarche was significantly greater in the cyanotic patients in our study. The main cause of delayed menarche is a high prevalence of primary amenorrhea among women with CHD, particularly in those with the complex disease (2, 8, 10).

Canobbio et al. (8,10 showed that the menstrual patterns in women with cyanotic CHD are significantly different when compared with those in acyanotic patients.

Table 2. Demographic, Clinical, and Laboratory Findings of the Study Population (n = 304)

Variables	Values
Type of CHD[a]	
Simple	151 (49.5)
Complex	153 (50.5)
Age, y[b]	25.2 (6)
Age at surgery, y[c]	6 (3.7 - 8)
Age at menarche, y[c]	13.5 (12 - 14.2)
LVEF[c]	47.5 (40 - 50)
Hemoglobin, g/dl[c]	12 (10 - 13)
Platelet count, count/dl[c]	185000 (154000 - 268000)
Oxygen saturation, %[c]	94 (93 - 95)
Warfarin use, %	35 (23)
INR[c, d]	2.55 (1.27 - 3.2)

[a]Values are expressed as No. (%).
[b]Values are expressed as mean (SD).
[c]Values are expressed as median (IQR).
[d]Values of expressed receiving warfarin.

Table 3. Menstrual Bleeding Pattern of the Study Population

Menstrual Bleeding Pattern[a]	Congenital Heart Disease		P Value
	Simple, n = 151	Complex, n = 153	
Normal	113 (74.5)	91 (60)	0.2
Amenorrhea	1 (0.6)	6 (3.2)	0.1
Polymenorrhea	8 (5.5)	22 (14.3)	0.05
Menorrhagia	22 (14.5)	31 (20.2)	0.05
Oligomenorrhea	4 (2.6)	10 (6.5)	0.1
Premature Menopause	3 (1.9)	0	0.1

[a]Values are expressed as number (%).

They stated that in women with acyanotic CHD, the menstrual patterns are similar to those in the general population, but cyanotic patients may have a greater frequency of menstrual abnormalities (8, 14). The menstrual cycle may be longer or shorter in cyanotic CHD patients, and breakthrough bleeding and missed period tend to be more frequent among this group (8, 10).

In our study, abnormal menstrual bleeding patterns were more common in women with complex CHD (40% in complex group vs. 25% in the simple group; P = 0.2), but this difference was not statistically significant.

Drenthen et al. (15) reported that the most common menstrual abnormality was amenorrhea, particularly in complex CHD patients who needed multiple operations before menarche. In our study, amenorrhea was observed in 3.2% of the patients with complex CHD and in no patient with simple CHD.

The most common abnormality was menorrhagia in both the simple and complex groups in our study, with a significant between-group difference. Although long-term anticoagulation is the main cause of menorrhagia (14, 16), we found no association between anticoagulant therapy with warfarin and menorrhagia. This finding can be attributed to the small number of patients who were under anticoagulant therapy with warfarin in this study.

Women with CHD who underwent an operation may experience menstrual bleeding abnormalities. The frequency of these abnormalities is greater in patients who were operated 6 to 10 years after menarche (8, 10). Hjortdal et al. (17) showed a high incidence of menstrual abnormalities after open heart surgery in adult patients with CHD. Although we could not find any difference in menstrual abnormalities between the operated and non-operated patients, our study showed a weak positive correlation between age at surgery and age at menarche.

Thanks to medical advances, a considerable number of women with CHD reach the reproductive age; therefore, these patients should be aware of the menstrual function

and its abnormalities. These issues should be discussed at initial evaluation of a young girl who has reached the childbearing age. All adult women with CHD require long-term care for gynecologic issues including mensturation menopause, contraception, and pregnancy.

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Footnote

Authors' Contribution: Zahra Khajali: study concept and design and drafting the manuscript; Soheila Ziaei: data acquisition; and Majid Maleki: study supervision and critical revision of the manuscript for important intellectual content.

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