POSTPARTUM CARDIAC FAILURE IN SUDANESE-SAHELIAN AFRICA:
CLINICAL PREVALENCE IN WESTERN NIGER

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Abstract. Postpartum cardiac failure (PPCF) is the most frequent clinical form of heart failure in hospitalized women in Sudanese-Saharan Africa. We have previously studied this disease in a hospital setting. Although the incidence is relatively high in rural areas, no systematic field study has been carried out. In this report, we describe a retrospective study conducted in the western part of Niger in July–August 1991. Sixty-two villages were visited and a thorough search for patients was initiated (from a population of 79,941 inhabitants, 19,941 females 14–40 years of age, corrected census of 1988). Twenty-eight patients from 27 villages were included. The subject patients were those presenting with predefined symptoms (dyspnea and cough) and physical signs (edema of the legs) of congestive heart failure during the six-month period following delivery. Apart from arterial hypertension and previous PPCF, diagnosis of another cardiac disease was an exclusion criterion. The prevalence of PPCF was 1.40 per 1,000 females of child-bearing age. The clinical profiles of these cases were in accordance with those of a previous study in 1989 carried out at Niamey Hospital. These results were a mean ± SD age of 28 ± 7 years, multiparity (mean = 4 children), poor socioeconomic status, postpartum ablutions with hot water, and a high sodium intake. This is the first study on the clinical prevalence of PPCF in a Sudanese/Sahelian population living in a rural area.

Patients and Methods

Study area. This study took place in villages in the Dosso and the Tillabery regions, which are situated in the westernmost part of Niger (Figure 1). The villages concerned are either in the Sudanese area (savannah) or on the border between the Sahelian and Sudanese areas. This is the wettest part of the country, with a rainy season between May and October, which shortens the further north one travels. The humidity varies enormously throughout the year and can be as high as 70% in July and August. The vegetation in the southern area is herbaceous with tall trees and some forest galleries along the Sirba, Mekrou, Diamangou, and Tapoa Rivers. Further north, the vegetation is typical of a grassy savanna with thorny and Euphorbia species dominating. The most important ethnolinguistic group in these two regions is the Zarma-Songoi. However, Fulani, Hausa, and a few Tuaregs are found in the northern part of the Tera, Tillabery, and Fillingue regions. In the westernmost area, on the border with Burkina Faso, a few Gurmantche communities live with an ethnic group settled on both sides of the Niger-Burkina Faso border. Most of the villages are situated in the Niger River Valley, or within 150 km of either side of it. The villages are usually approached using tracks unsuitable for motor vehicles, and access was made more difficult during the rainy season, when these communication routes are inundated by the tropical torrential rains.

The villages in Dosso and Tillabery were chosen because of their accessibility by car on roads and tracks; 62 villages were visited on both sides of the river in the Niger River Valley. Based on the 1988 census, the population in the visited villages was 72,945 (Anonymous, Recensement General de la Population 1988, Ministere du Plan, Niamey, unpublished data). If the average population growth rate of Niger is considered to be 3.1%, then the estimated population in 1991 for the villages visited was 79,941. Twenty-five percent of the total population were women of child-bearing age (between 15 and 45 years old) i.e., 19,985 women. The majority of the people are sedentary farmers, except for the Fulani, who are nomadic. This study took place between the end of June and the end of September 1991 (rainy season).

This was a descriptive retrospective study that was based on a systematic search for and identification of clinical patients. The visits to the various villages in an area that covered part of two regions were carefully planned and knowledge of the local customs and the language was necessary to carry out clinical conversations and physical examinations. The language used was mainly Zarma, the mother tongue of one of the authors (AD), who was born in the region of Tera. On each visit, a meeting with the leaders of the village permitted the identification of the women who had just given birth, and also those who were ill. The systematic clinical examination of these patients led to the choosing of those who were subsequently included in the study.
Definition of the cases and inclusion criteria. The study was conducted according to the conditions of the Declaration of Helsinki (epidemiologic research during medical care). The priority was not the study but the diagnosis and treatment of patients with PPCF. It was anticipated that the patients without PPCF requiring medical consultation during the presence of the practitioner (AD) in the villages would be accepted for examination and treatment. The inclusion of patients with PPCF in the study was anonymous and was carried out without a specific informed consent procedure.

All patients who had developing PPCF were included in the study, i.e., any African woman who had a delivery less than nine months previously with functional (dyspnea) and physical symptoms of cardiac deficiency (resting dyspnea and/or edema in the lower limbs) and without any previous signs or symptoms that would have been indicative of cardiac disease. Table 1 shows the identification sheet used to record the clinical symptoms: dyspnea, cough, and functional discomfort during normal housework. Classification of discomfort was based on the New York Heart Association Scale. This scale defines functional discomfort into four classes: class I = patients with no limitation of activities; class II = patients with slight limitation of activities (comfortable at rest or with mild exertion); class III = patients with marked limitation of activity (comfortable only at rest); class IV = patients who should be at complete rest (any physical activity brings on discomfort). The diagnosis of cardiac deficiency was made following the results of the clinical examination: presence of crepitant rales during pulmonary auscultation, tachycardia, hepatomegaly with turgescent veins, edema of the lower limbs and/or of the lumbus, and optional modifications of the apex tap (soft and spread). The blood pressure value was not a diagnostic criteria.

When the diagnosis of PPCF was made, the patient's
name was added to a sheet that had 17 previously defined epidemiologic factors or clinical symptoms. These were carefully scrutinized (Table 1) so as to compare them (by chi-square test) with a previous study on the same disease at the hospital in Niamey, Niger. Each patient was advised to rest* and to lower their sodium intake. The mothers were questioned on the health of her last newborn child.

**Exclusion criteria.** If patients exhibited a previous postpartum cardiopathy, they were excluded from the study. Hypertension or a sudden cardiac deficiency in a member (25 of 28), was more often progressive (18 of 25, 72%) rather than sudden (7 of 25, 28%). A similar history of cardiac failure following a previous delivery was only found in 13.6% (3 of 22) of those who were multiparous. Six patients (21.4%) said that they did not breast-feed their children. Two reported that the last born baby had since died and two said that they had no milk secretion. The health of the last born child was found to be good in 74.1% (20 of 27) of the cases and mediocre in 25.9% (7 of 27). Two children (7.4%) born just prior to the start of the cardiac failure symptoms had since died at the hospital in Niamey, Niger. The exact date of delivery prior to the onset of the cardiac failure symptoms could be determined in only two cases. For the remaining 26 only the month could be determined. Delivery in the six months corresponding to the rainy season (May to October) was more frequent (17 of 27, 62.9%).

Dyspnea was found to be the initial symptom in 77.7% (21 of 27) of the cases, with edema of the lower limbs appearing in 18.5% (5 of 27) and vertigo in 3.7% (1 of 27). The initiation of the symptoms, when it could be remembered (25 of 28), was more often progressive (18 of 25, 72%) rather than sudden (7 of 25, 28%). A similar history of cardiac failure following a previous delivery was only found in 13.6% (3 of 22) of those who were multiparous. Six patients (21.4%) said that they did not breast-feed their children. Two reported that the last born baby had since died and two said that they had no milk secretion. The health of the last born child was found to be good in 74.1% (20 of 27) of the cases and mediocre in 25.9% (7 of 27). Two children (7.4%) born just prior to the start of the cardiac failure symptoms had since died at the hospital in Niamey, Niger. The exact date of delivery prior to the onset of the cardiac failure symptoms could be determined in only two cases. For the remaining 26 only the month could be determined. Delivery in the six months corresponding to the rainy season (May to October) was more frequent (17 of 27, 62.9%).

**RESULTS**

Among 60 ill women who had delivered during the last nine months, a diagnosis of PPCF was confirmed 28 times. These patients lived in 27 villages, i.e., one patient in each village except Talle (in the Tera region) where two cases were diagnosed. Table 2 shows the names of these villages, their associated regions, and the ages of the patients, while Figure 1 shows the location of the villages. The mean ± SD age of the patients was 28 ± 7 years. Only a minority had wages (5 of 28, i.e., only 17.8% had a wage-earning husband) and nearly half lived together with one or more co-spouses (10 of 24, 41.6%). Multiparity was the rule (mean = 4 deliveries per patient) although six patients were primiparous (of which one had twins). These 28 patients had 124 deliveries with only 85 (68.5%) children alive at the time of the study. The exact date of delivery prior to the onset of the cardiac failure symptoms could be determined in only two cases. For the remaining 26 only the month could be determined. Delivery in the six months corresponding to the rainy season (May to October) was more frequent (17 of 27, 62.9%).

**TABLE 1**

Clinical symptom identification for cardiac disease

<table>
<thead>
<tr>
<th>Symptom</th>
<th>NYHA* classes III and IV</th>
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<tbody>
<tr>
<td>Dyspnea</td>
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<tr>
<td>Cough</td>
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<tr>
<td>Tachycardia</td>
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<td>Hepatomegaly</td>
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<tr>
<td>Venous turgescence</td>
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<tr>
<td>Edema of legs</td>
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<tr>
<td>Abnormal apex tap (soft and spread)</td>
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</tbody>
</table>

* NYHA = New York Heart Association.
koff sounds): nine (32.1%) of 28 patients had pathologic scores and were hypertensive. Resting tachycardia was present in 96.4% (27 of 28) of the cases. Evaluation of liver size and of venous turgescence was often quite difficult because of generalized edemas (anasarca) and the patients' strong abdominal wall. Conversely, lower limb edema and dyspnea were constantly present. Characteristic modifications of the apex tap (soft and spread) were only noted in 46.4% (13 of 28) of the patients and were uncertain in all the other cases.

Seventeen behavioral and clinical observations for the 28 patients were compared (Table 3) with those of 66 other patients who had previously been examined at Niamey National Hospital and had the diagnosis confirmed by echocardiography.2 No significant difference (chi-square test) was found in the incidence of symptoms between these two groups, but interestingly, a greater number of patients in the previous study could be grouped into classes III and IV of the New York Heart Association classification.

**DISCUSSION**

In a previous study conducted in the largest health care department in Niger, we reported 66 cases2 of African women with PPCF. All of these patients had been hospitalized and on admission had obvious symptoms of cardiac failure. Echocardiography later confirmed the presence of a dilated cardiomyopathy syndrome. Thus, the previously established clinical and epidemiologic profiles were the reference for this field study in a rural area where health care is limited. The recent local population census (1988) made the evaluation of the prevalence relatively easy (Anonymous, Recensement General de la Population 1988, Ministere du Plan, Niamey, unpublished data). A diagnosis was made for each case and the prevalence was calculated using the estimated increase in population in the villages. The diagnosis had to be established using indisputable criteria since neither radiology nor echocardiography were possible.

The comparison of 17 clinical and epidemiologic observations (Table 3) with those of the previous study did not show any significant difference, apart from the intensity of functional discomfort felt by certain subjects (New York Heart Association classification). Interestingly, this functional discomfort was found to be more serious in the hospital study2 than in our field study. Delayed entry into the hospital could explain the more severe functional discomfort noted, as well as the slightly higher average age (30 instead of 28 years old). The following results were in agreement in both studies: wages (16.6% versus 14.5%), more than two spouses (38.5% versus 41.6%), dyspnea as an initial symptom (78.7% versus 77.7%), breast-feeding (86.1% versus 85.7%), number of children who died rapidly in the first three months of life (10.6% versus 7.4%), ritual ablutions (95.0% versus 92.8%), high dietary sodium intake (98.5% versus 96.4%) and, to a lesser degree, hypertension (50.8% versus 32.1%). Although other data were less similar, statistical analysis did not show any significant difference and we can therefore conclude that the two populations did not differ greatly.

The prevalence of morbidity in relation to this disease in this part of Africa is 28 cases/79,941 inhabitants (0.35/1,000) i.e., 28 cases/19,985 women of child-bearing age (1.40/1,000). However, this number does not take into account lethality i.e., dead patients cannot be taken into account in such a study.

Untreated congestive cardiac failure is probably a fatal disease, with the mother's death also threatening the infant's life. Several factors lead to an underestimation of the number of cases of PPCF: e.g., well-tolerated symptoms that the patient does not complain of, and/or the fact that patients can leave the village to go to a health care center further away that is unknown to the administrative manager or village head. Finally, the field identification criteria of the disease does not allow the inclusion of
PPCF since the delivery date is the only date that can be given with any certainty. However, cardiac failure in the third term of pregnancy is also part of the same syndrome and accounted for 7.8% (5 of 64) of the cases in our previous study. In conclusion, if all these factors are taken into account, then the number of cases of PPCF reported in the present study (1.4 per 1,000 women of child-bearing age) is likely to be an underestimation of the prevalence of this disease.

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