

Epidemiological, Diagnostic and Progressive Aspects of the Pleuropulmonary Pathology of Pregnant Women

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Abstract

Introduction: The aim of this work is to identify the main pleuropulmonary pathologies of pregnant women at the CHU Brazzaville.

Patients and Methods: We carried out a descriptive prospective study on the analysis of the files of pregnant women hospitalized in the pneumo-phtisiology department from January 1, 2017 to December 31, 2018.

Results: Thirty-nine patients were included in the study. The mean age was 17 ± 7.7001 years with extremes of 17 and 46 years. Women with secondary education, the third decade, single, Protestant and merchant women were affected in the respective proportions: 79.49%, 48.72%, 89.74% 92.31% and 33.33%. In 89.49% of the cases, the midwife was the health worker responsible for the pregnancy. Respiratory symptoms started in the second and third trimester in 43.59% of the cases for each of the periods. The pathologies involved in pleuropulmonary involvement were represented by tuberculosis (48.72%), infections with common germs (30.77%), acute edema of the cardiogenic lung (7.69%), the asthma attack (5.13%), pulmonary pneumocystosis (2.56%), acute bronchitis (2.56%), petrial pneumonia (2.56%). The HIV seropositivity rate was 25.64%. The evolution was favorable in 92.31%. Hypotrophy affected 64.10% of newborns.

Conclusion: The pleuropulmonary pathology of pregnant women in Brazzaville remains dominated by infections.

Keywords: *Pleuropneumopathies; Etiologies; Pregnant Women; Brazzaville*

Introduction

During pregnancy, several adaptations are required to meet the increased metabolic needs of the mother and fetus as a result of anatomical and functional changes in the cardiorespiratory system. This is due to hormonal factors and the progressive increase in the size of the uterus [1-3]. The resulting consequences are the basis for the decompensation of certain pre-existing pathologies, or can be the basis for other diseases, namely infectious and cardiovascular diseases [4,5]. Apart from anatomical and functional changes, certain extrinsic factors may influence the state of health of the pregnant woman, including socio-cultural behavior and the quality of care provided to the pregnant woman [6]. Among the pathologies developed by the woman during pregnancy, pleuropulmonary disorders occupy a non-negligible place.

Generally speaking, the epidemiology of respiratory diseases changes from one part of the world to another. Thus, in industrialized countries, respiratory pathology is dominated by the consequences of smoking and degenerative diseases, while in sub-Saharan Africa, infectious pathology is at the forefront [7-9].

Aim of the Study

The aim of this work is to identify the main pleuropulmonary pathologies of women during pregnancy at the University Hospital of Brazzaville.

Patients and Methods

We conducted a prospective and descriptive study over a period of 2 years from January 1st, 2017 to December 31st, 2018 focusing on the analysis of the records of pregnant women hospitalized in the pneumology department of the Brazzaville University Hospital Center (CHU-B) during this period. CHU-B is the only health center with a pneumology service in the Republic of Congo. The variables studied, which were obtained through a survey form, are represented by socio-cultural characteristics (age, level of education, religion, address, marital status), clinical characteristics (antecedents, term of pregnancy, prenatal consultations, mode of drug supply, clinical signs), para-clinical characteristics (radiological and biological), diagnosis and the fate of the mother-child couple. All pregnant women hospitalized in the department during the study period were included. Women in whom paraclinical investigations could not be performed were excluded from this study. Data analysis was based on Epi info7.1.3.3 software. The uni-varied analysis was used to present the general data. In bivariate analysis we presented the influence of the qualitative variables on each other, according to the “Khi deux” or exact Fisher test. The p threshold below 0.05 was considered significant.

Results

Overall results

During the study period, 46 pregnant women were admitted to hospital in the pneumology department of the Brazzaville University Hospital; 39 were included in the survey. The average age was 17 ± 7,7001 years old with extremes ranging from 17 to 46 years old. Patients aged between 20 and 30 years of age accounted for 48.72% of the study population. Patients with high school education and those between 20 and 30 years of age were affected in the proportions of 79.49% and 48.72% respectively. Protestants, single women and shopkeepers were affected in the proportions of 92.31%, 89.74% and 33.33% respectively (Table 1). In 76.92% of the cases, the patients had antenatal consultations and most of them were followed by a midwife (89.47%).

Socio-demographic and cultural characteristics	Effective (N = 39)	Percentage %
Level of studies		
• Primary	5	12,82
• Secondary	31	79,49
• Superior	2	5,13
• Not in school	1	2,56
Address		
• City	37	94,87
• Companion	2	5,13
Religion		
• Catholic	2	5,13
• Prostate	36	92,31
• Muslim	1	2,56
Civil status		
• Bride	2	5,13
• Single	35	89,74
• Widow	2	5,13

Age range		
• Less than 20 years old	5	12,82
• 20 - 30 years old	19	48,72
• 31 - 40 years old	12	30,77
• Over 40 years	3	7,67
Profession		
• Health worker	1	2,56
• Trader	13	33,34
• Student	13	33,34
• Cultivator	1	2,56
• Dressing table	1	2,56
• Any	10	25,64

Table 1: Distribution of patients according to socio-demographic and cultural characteristics.

Respiratory symptoms began in the second and third trimesters in 43.59% of cases in each period. Faced with these symptoms, they were prescribed medication in 41.03% of the cases (Table 2). Cough and dyspnea were the most common respiratory symptoms, 94.87% and 79.49% respectively, followed by respiratory distress in 64.10% of cases. Alcohol intoxication was found in 15.38% of the patients; 12.82% of them were known to be HIV positive. In 46.15% of cases, diagnosis of respiratory disease was made postpartum. The radiological abnormalities found were alveolar syndrome 35.90%, interstitial syndrome 15.38%, alveolo-interstitial syndrome 30.77%, bronchial dilatations 5.13%, cavitory syndrome 10.25%, pleural liquid effusion syndrome 23.08%, mediastinal adenopathy 15.38%, cardiomegaly 5.13% (Table 3). Chest X-ray was normal in 5.13%. Anemia was found in 64.10% and biological inflammatory syndrome in 69.23%. The HIV seropositivity rate was 25.64%. Infectious pathology was predominant (89.74%), the most frequent cause was tuberculosis (48.72%) followed by common germs infections (28.21%). The therapeutic outcome was favorable in 92.31%, hypotrophy had affected 64.10% of newborns. Two patients died, one from hemoptysis and the other from acute respiratory failure (Table 4).

Modalities of management	Effective (N = 39)	Percentage (%)
Prenatal consultations		
• Yes	30	76,92
• No	9	23,08
Onset of symptoms		
• First trimester	5	12,82
• Second trimester	17	43,59
• Third trimester	17	43,59
Health worker in charge of pregnancy		
• Obstetrician	2	5,26
• General practitioner	1	2,63
• Midwife	34	89,47
• Not followed	1	2,63

Type of treatment received		
• Medicated	32	82,05
• Traditional	0	0,00
• No	7	17,95
Medicine supply modality		
• Medical prescription	16	41,03
• Midwife's prescription	8	20,51
• Self-medication	8	20,51
• Advice to the pharmacy	7	17,95

Table 2: Distribution of patients according to the modalities of management before admission to pulmonology.

Clinical characteristics	Effective (N = 39)	Percentage %
History found		
• Alcohol consumption	6	15,38
• Asthma	2	5,13
• Pulmonary tuberculosis	2	5,15
• Sickle cell anemia	2	5,13
• Hepatic cirrhosis	1	2,56
• HTA	1	2,56
• HIV infection	5	12,82
Timing of respiratory disease diagnosis		
• First trimester	4	10,26
• Second trimester	8	20,51
• Third trimester	9	23,08
• Postpartum	18	46,15
• Fever	29	74,36
Respiratory functional signs		
• Cough	37	94,87
• Chest pain	17	43,59
• Dyspnea	31	79,49
• Hemoptysis	3	7,69
• Vomique	0	0,00
Physical signs:		
• Pulmonary condensation syndrome	11	28,21
• Hypoxemia	14	35,89
• Crackling groans	26	66,66
• Respiratory distress	25	64,1
• Pleurisy	7	17,94
• Left heart failure	2	5,12
• Crazy rails	4	10,25
• Normal physical examination	4	10,25

Table 3: Distribution of patients according to clinical characteristics.

	Effective (N = 39)	Percentage %
Diagnostic		
• Acute bronchitis	1	2,56
• Asthma attack	2	5,13
• Cardiogenic OAP	3	7,69
• Pleurisy with common germs	1	2,56
• Pulmonary pneumocystosis	1	2,56
• Pneumonia with common germs	9	23,08
• Petroleum pneumonitis	1	2,56
• Superinfection of pulmonary sequelae	2	5,13
• Tuberculosis and pulmonary pneumocystosis	1	2,56
• Pleural tuberculosis	2	5,13
• Pulmonary tuberculosis	16	41,03
Therapeutic outcome		
• Favorable	36	92,31
• Exit against medical advice	1	2,56
• Death	2	5,13
Weight of child at birth		
• Eutrophic	12	30,77
• Hypotrophic	25	64,10
• Not evaluated	2	5,13
Causes of maternal death		
• Hemoptysis	1	50,00
• Acute respiratory failure	1	50,00

Table 4: Distribution of patients according to diagnostic and evolutionary aspects.

Bivariate analysis (analytical results)

Education, occupation, and religion had an impact on the choice of health care providers for prenatal visits. Thus, low level of education, professional activity and prosthetic religion were strongly related to the follow-up of patients by a midwife, the differences were significant, 0.02; 0.0007 and 0.000 respectively (Table 5). However, these socio-cultural conditions did not influence the diagnosis (Table 6). Socio-cultural characteristics (address, occupation, level of education) and the time of symptom onset did not have an influence on the diagnosis found (Table 6). Being in school was associated with a high cure rate (p = 0.000). However, age, occupation, and time of symptom onset did not have a significant impact on patient outcome (Table 7).

Discussion

Pregnancy is a phenomenon experienced by the mother’s body as a temporary semi-allograft. During this event, changes in the maternal body are necessary to allow the tolerance of this allograft and the adaptation of the maternal body to this new state. At the respiratory level, the narrowing of the upper airway by congestion may induce sleep disturbance, bronchopathy or signs of rhinitis; the widening of the rib cage and the ascent of the diaphragm allow the increase in the size of the breathable uterus with a decrease in the residual functional capacity, slight diminution or no diminution at all of the total lung capacity. Maximum expiratory volume-second and vital capacity

	Health worker in charge of pregnancy				p
	Obstetrician	General practitioner	Midwife	Not followed	
Level of studies					
Primary	0,00%	0,00%	100%	0,00 %	0,02
Secondary	6,45%	3,23%	90,32%	0,00%	
Superior	0,00%	0,00%	50,00%	50,00%	
Not in school	0,00%	0,00%	100%	0,00%	
Profession					
Health worker	100%	0,00%	0,00%	0,00%	0,0007
Trader	0,00%	0,00%	100%	0,00%	
Student	0,00%	0,00%	100%	0,00%	
Cultivator	0,00%	0,00%	100%	50,00%	
Dressing table	0,00%	0,00%	100%	0,00%	
Any	10,00%	10,00%	80,00%	0,00%	
Religion					
Catholic	0,00%	0,00%	100 %	0,00%	0,000
Prostate	5,17%	0,00%	91,43%	2,86%	
Muslim	0,00%	100%	0,00%	0,00%	

Table 5: Influence of socio-cultural conditions on the choice of nursing staff.

	Diagnosis											p
	AB %	AA %	COAP %	PWCG %	PC %	PWCG %	PP %	SIPS %	TPP %	PT %	PTB %	
Address												
City	2,70	5,40	8,11	2,70	2,70	24,32	2,70	5,41	2,70	5,41	37,84	0,9807
Companion	0,00	0,00	0,00	0,00	0,00	000	0,00	0,00	0,00	0,00	100	
Profession												
Nurse	0,00	100	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,74401
Dressing table	0,00	0,00	0,00	0,00	0,00	100	0,00	0,00	0,00	0,00	0,00	
Trader	0,00	7,69	7,69	0,00	7,69	23,08	0,00	0,00	7,69	0,00	46,15	
Cultivator	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100	
Student	9,09	0,00	0,00	9,09	0,00	18,18	9,09	0,00	0,00	0,00	54,55	
Student	0,00	0,00	0,00	0,00	0,00	50,00	0,00	0,00	0,00	0,00	50,00	
Level of studies												
Primary	0,00	0,00	20,00	0,00	0,00	40,00	0,00	0,00	0,00	20,00	20,00	0,8984
Secondary	3,23	6,45	3,23	3,23	3,23	19,35	3,23	6,45	3,23	3,23	45,16	
Superior	0,00	0,00	0,00	0,00	0,00	50,00	0,00	0,00	0,00	0,00	50,00	
Not in school	0,00	0,00	100	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	

Onset of symptoms													
First trimester	0,00	0,00	0,00	0,00	0,00	40,00	0,00	20,00	0,00	0,00	40,00	0,5591	
Second trimester	5,88	5,88	0,00	0,00	0,00	11,76	5,88	5,88	0,00	5,88	5,88		
Third trimester	0,00	5,88	17,65	5,88	5,88	29,41	0,00	0,00	5,88	5,88	23,53		
Timing of respiratory disease diagnosis													
First trimester	0,00	0,00	0,00	0,00	0,00	25,00	0,00	25,00	0,00	0,00	50,00	0,5656	
Second trimester	12,50	12,50	0,00	0,00	0,00	12,50	12,50	0,00	0,00	0,00	50,00		
Third trimester	0,00	11,11	11,11	11,11	11,11	33,33	0,00	0,00	0,00	11,11	11,11		
Postpartum	0,00	0,00	11,11	0,00	0,00	22,22	0,00	5,56	5,56	5,56	50,00		

Table 6: Influence of socio-cultural characteristics on the diagnosis.

AB: Acute Bronchitis; AA: Asthma Attack; COAP: Cardiogenic OAP; PWCG: Pleurisy with Common Germs; PC: Pulmonary Pneumocystosis; PWCG: Pneumonia with Common Germs; PP: Petroleum Pneumonitis; SIPS: Superinfection of Pulmonary Sequelae; TPP: Tuberculosis and Pulmonary Pneumocystosis; PT: Pleural Tuberculosis; PTB: Pulmonary Tuberculosis.

	Therapeutic outcome			p
	Favorable	Death	EAMA	
Age range				0,8001
Less than 20 years old	100%	0,00%	0,00%	
20 - 30 years old	94,74%	5,26%	0,00%	
31 - 40 years old	83,34%	8,33%	8,33%	
Over 40 years	100%	0,00%	0,00%	
Level of studies				0,000
Primary	80,00%	20,00%	0,00%	
Secondary	96,77%	3,23%	0,00%	
Superior	100%	0,00%	0,00%	
Not in school	0,00%	0,00%	100%	
Profession				0,6663
Nurse	100%	0,00%	0,00%	
Dressing table	100%	0,00%	0,00%	
Trader	100%	0,00%	0,00%	
Cultivator	100%	0,00%	0,00%	
Student	100%	0,00%	0,00%	
Student	100%	0,00%	0,00%	
Any	70,00%	20,00%	10,00%	

Onset of symptoms				
First trimester	13,89%	0,00%	000%	0,7985
Second trimester	44,44%	50,00%	000%	
Third trimester	41,67%	50,00%	100%	
Timing of respiratory disease diagnosis				
First trimester	11,11%	0,00%	0,00%	0,8653
Second trimester	22,22%	0,00%	0,00%	
Third trimester	22,22%	50,00%	0,00%	
Postpartum	44,44%	50,00%	100%	

Table 7: Distribution of patients according to prognostic factors.

EAMA: Exit Against Medical Advice.

are normal. There is also an increase in tidal volume without a significant increase in respiratory rate, which is responsible for the increased consumption of oxygen and production of carbon dioxide, as well as hormonal factors (progesterone and estrogen). This increase in resting minute ventilation leads to an increase in arterial oxygen partial pressure and a decrease in carbon dioxide partial pressure (responsible for respiratory alkalosis), which in turn leads to oxygen transfer across the placenta [1].

Cardiovascular changes during pregnancy are numerous: an increase in cardiac output between 30 and 50% by an increase in the volume of systolic ejection and tachycardia due to placental and fetal metabolic demand, an increase in plasma volume of up to 45% and an increase in the number of red blood cells of 20 to 30% responsible for hemodilution leading to physiological anemia, an increase in myocardial labor compensated by a decrease in systemic vascular resistance secondary to the production of mediators (progesterone, prostaglandins, nitrogen dioxide), the development of low-resistance placental circulation, compression of the inferior vena cava and abdominal aorta by increasing uterine volume [1,10]. These physiological changes imposed by placental and fetal development create the conditions for the occurrence of acute decompensation of pre-existing cardiorespiratory pathologies and infectious diseases.

We have carried out a prospective and descriptive survey based on the analysis of the records of pregnant patients hospitalized in the pneumology department of the Brazzaville University Hospital. During this period, 39 patients were included in the study. Subjects aged between 20 and 30 years of age were the most affected (48.72%). The same was true for patients with a secondary school education (79.49%), Protestants (92.31%), single persons (89.74%) and patients working in the informal sector. In 76.92% of the cases, these pregnant women were followed up; the most frequent type of health worker was the midwife. In 43.59% the respiratory symptoms began in the second trimester and the diagnosis of respiratory disease was made postpartum in 46.15%. Infectious pathology was dominant.

The 20 - 30 age group is the period of time when sexual activity is most intense. The poor employment policy in the Republic of Congo generates a high unemployment rate. In 2015, this rate was estimated at 42% for the youth by the United Nations Development Program [11]. The lack of employment among the youth exposes them to risky sexual behaviors, thus leading to unwanted pregnancies. These conditions combine to create a precarious standard of living. Poor living conditions are themselves a source of environmental diseases, most often infectious. The fact that the lower airways, with a surface area of approximately 80 - 120m², are in direct and close contact with the external environment, they are the privileged target of these diseases. These infectious pathologies are dominated by tuberculosis.

According to the World Health Organization, in settings where the prevalence of tuberculosis in the general population is 100/100,000 or more, routine screening of pregnant women for active tuberculosis should be considered as part of antenatal care [12]. The midwife

was the health worker most frequently used by pregnant women. This can be explained by the high cost of pregnancy management by the obstetrician compared to that carried out by the midwife. Factors such as low education levels and poor socioeconomic status of patients are also factors that encourage pregnant women to visit midwives more often than obstetricians. The evolution was favorable in the majority of cases (92.31%).

Given that the dominant pathology was infectious, this mostly favorable evolution is linked to good compliance with the recommendations of the consensus. Two patients died. One of them died of cataclysmic hemoptysis. This patient was a carrier of hepatic cirrhosis. The association of cirrhosis of the liver and pregnancy is both rare and bad, as the risk of decompensation of cirrhosis is increased.

This decompensation is due to the increase in portal hypertension and the aggravation of hepatocellular insufficiency. Maternal and/or fetal prognosis is at stake and mortality remained high [13,14]. The other patient died in a pattern of acute respiratory failure. The HIV-positive patient was affected by pulmonary pneumocystis with diffuse bilateral invasive pneumocystis disease responsible for multiviscera failure.

Obstetric hypotrophy in 64.10% of newborns reflects intrauterine growth retardation due to the combined action of chronic hypoxemia and anemia in the mother. Indeed, the insufficient oxygen supply, because the ventilation organ is affected, leads to the alternation of the sputum between mother and fetus. This alteration is all the more exaggerated when the pregnant woman has anemia.

Conclusion

The pleuropulmonary pathology of pregnant women in Brazzaville follows the same distribution as that of the general population. It remains dominated by infections. Tuberculosis is the most frequent infection. The prognosis remains generally good.

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