
Epidemiology of Chest Pain at the University Hospital Center-Référence Nationale (CHU-RN) of N'Djamena

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Abstract: Introduction: Chest pain is a frequent reason for consultation in Internal Medicine and especially in cardiology. Few data are available on this condition in Chad. The aim of this work was to describe its epidemiological characteristics. Patients and methods: This was a descriptive and analytical cross-sectional study covering a consecutive series. Included were patients aged at least 18 years, seen in a cardiology consultation for non-traumatic chest pain and having performed an ECG and cardiac ultrasound. Results: A total of 146 patients were included in the study. The mean age was 46.1± 16.3 years. The sex ratio was 0.8 in favor of women. Arterial hypertension was the main cardiovascular risk factor found (41.9%). The pain was epigastric in 41.9% of cases and retrosternal in 23.7% of cases. Dyspnea was the most common associated sign (29.9%). Etiologies were dominated by cardiac (56.4%) and digestive (46.2%) causes. The main cardiovascular etiology was coronary insufficiency (42.4%). Regarding digestive causes, they were dominated by gastropathies and gastroduodenal ulcer disease (40.2%). In 17.1% of cases the chest pain was of pulmonary origin. Conclusion: Chest pain is a frequent reason for consultation. The etiologies are diverse. Apart from the cardiovascular causes likely to compromise the vital prognosis, we must not lose sight of the digestive and pulmonary causes.

Keywords: Chest Pain, Etiologies, Patients, N'Djamena /Chad

1. Introduction

Chest pain is described as an unpleasant sensation indicating potential or actual damage to an anatomical structure located in the chest [1]. It is a frequent reason for consultation in cardiology and gastroenterology [2, 3]. Sometimes benign, chest pain can also reflect a life-threatening condition that requires rapid and adequate treatment.

Chest pain is synonymous with anxiety for the patient and those around him. Also from the practitioner we expect in such circumstances availability, comfort and immediate technical skills [4]. It evokes for the uninformed a heart condition, thus motivating the consultation in cardiology. It is

therefore a very frequent symptom and poses an extremely varied problem of etiological diagnosis. The diagnostic approach is not easy whatever the form.

Although chest pain is a frequent reason for consultation, there are very few data in sub-Saharan Africa.

In Burkina Faso, chest pain accounted for 19.7% of reasons for consultation in cardiology. Etiologies were dominated by cardiac (37.6%) and digestive (31.9%) [5].

In Chad, requests for consultation for chest pain are increasing. However, there are no data concerning the epidemiology of chest pain to our knowledge. This is why we considered it useful to carry out this work which aims to describe the etiologies of chest pain despite the often atypical clinical pictures and the limited diagnostic means.

2. Methodology

This was a 12-month cohort, (January to December 2020). The cardiology department of the Center Hospitalier Universitaire la Référence Nationale (CHU-RN) served as a framework. Were included in the study, all consenting patients aged at least 18 years, received in consultation for acute, non-traumatic chest pain, having performed an electrocardiogram (ECG) and a cardiac Doppler ultrasound. Digestive endoscopy, a key element for digestive origin, was not systematic. This was an exhaustive type of sampling with consecutive recording of all patients meeting the inclusion criteria.

The variables retained were: socio-demographic, the various cardiovascular risk factors, thromboembolic disease, digestive and pulmonary disorders. A data collection sheet with general and specific information meeting the requirements of this study was designed. This form was completed from the first consultation and completed at the patient's next appointment with the results of the paraclinical examinations. Data were entered and analyzed using software: SPSS 18.0, Excel, Word. Chi-square test was used with significance level $p < 0.05$.

3. Results

3.1. Sociodemographic Aspects

A total of 720 patients consulted the cardiology department during the study period. Among them, 146 had consulted for non-traumatic acute chest pain, i.e. 20.3% of cases. One hundred and seventeen (117) patients met the inclusion criteria. Women were in the majority (55.6%). The sex ratio was 0.8. The average age was 46.1 ± 16.3 years [19-78 years]. The most represented age groups were that of 20 to 29 years, followed by that of 50 to 59 years with respectively 20.4% ($n=24$) and 19.7% ($n=23$) of the cases. Regarding the profession, housewives were the most represented: 38.5% of cases ($n=45$) followed by traders in 20.5% of cases ($n=24$). The patients were mostly unschooled. The socio-economic level was considered low in 74% of cases.

Table 1. Sociodemographic aspects.

Features		not	%
Age (years)	< 20	1	0.9
	20 – 29	24	20.5
	30 39	21	17.9
	40 49	18	15.4
	50 59	23	19.7
	60 69	17	14.5
	≥ 70	13	11.1
Occupation	Trader	24	20.5
	Farmer	15	12.8
	Pupil/Student	6	5.1
	Official	7	6.0
	Housewife	45	38.5
	Dressmaker	6	5.1
	Driver/ Mechanic	7	6.0
	Gold panner/painter	4	3.4
	Military	3	2.6
Marital status	widow/widower	6	5.1

Features		not	%
Educational level	Divorced/separated	6	5.1
	Married	87	74.4
	Bachelor	18	15.4
	Not solarized	54	46.2
	Primary	31	26.5
Socioeconomic level	Secondary	22	18.8
	Superior	10	8.5
	Down	87	74.0
	AVERAGE	27	23.0
	Pupil	4	3.0

3.2. Clinical Data

3.2.1. Risk Factors (RDFs)

One or more cardiovascular risk factors (FDR) were found in 91 patients, i.e. 77.8% of cases. Arterial hypertension was the most represented cardiovascular risk factor with 41.9% of cases ($n=49$), followed by age: 29.0% ($n=34$).

Regarding thromboembolic disease (VTE), one or two FDRs were found in 30 patients, i.e. 25.6% of cases. Taking estrogen-progestins was found in 11.1% of cases ($n=13$). The use of nonsteroidal anti-inflammatory drugs (NSAIDs) found in 66.7% of cases was the risk factor for gastric disorders.

3.2.2. Characteristics of Chest Pain

Most of the pain was epigastric with a proportion of 41.9% of cases ($n=49$), followed by retrosternal locations in 23.1% of cases ($n=27$). The pain was diffuse in 0.9% of cases ($n=1$).

Regarding the type, chest pain (TD) was burning in 42.7% of cases ($n=50$) followed by constrictive pain in 24.8% of cases ($n=29$). It was a type of discomfort in 11.1% of cases ($n=13$); pitting 7.7% ($n=9$); cramps in 7.7% ($n=9$) and stitches in the side in 6.0% of cases ($n=7$).

3.3. Etiologies

Chest pain was dominated by cardiac origin in a proportion of (56.4%), followed by digestive origin in (46.2%).

Table 2. Distribution of etiologies of chest pain.

Etiologies of chest pain	Workforce(n)	Percentage (%)
Cardiac	66	56.4
coronary insufficiency	28	23.9
Pericarditis	13	11.1
Pulmonary embolism	3	2.6
Heart valve disease	10	8.5
Rhythm Disorder	12	10.3
Digestive	54	46.2
GERD/esophagitis	2	1.7
MUGD/ Gastropathies	47	40.2
Hiatal hernia	5	4.3
Pleuropulmonary	20	17.0
BAP	11	9.4
TBC	2	1.7
Pleurisy	7	6.0
Parietals	1	0.9
Comorbidities Causing Chest Pain	23	19.7
Cardiac and digestive	7	6.0
Cardiac and pleuropulmonary	9	7.7
Pleuropulmonary and digestive	4	3.4
Cardiac, digestive and pleuropulmonary	3	2.6

3.4. Analytical Study

3.4.1. Cardiovascular Etiologies and Cardiovascular FDR

One or more cardiovascular risk factors were found in 32 patients (48.5%) and 12 patients had no cardiovascular risk factors. The majority of patients with coronary insufficiency (27.3%), pulmonary embolism (3.0) and TDR (10.6) had multiple CVRF, however, most of those with pericarditis (10.6%) and valvulopathy (6.1%) were without cardiovascular FDR. This association was statistically significant ($p=0.001$).

3.4.2. Digestive Etiologies

In fifty-four patients, chest pain had a digestive origin, i.e. a percentage of 46.2%, of which 20 were male, i.e. 37.0% and 34 were female, i.e. 63.0% of cases. The M/F sex ratio was: 0.6. The mean age of the fifty-four (54) patients was 44.9 ± 16.8 years [20; 72 years old]. Depending on the age MUGD/Gastrophies occurred at any age and in practically the same proportions. Hiatal hernia predominated in subjects aged 20-29 with 7.4% of cases ($n=4$). ($P=0.248$).

3.4.3. Pleuropulmonary Etiologies

In twenty patients the chest pain had a pleuropulmonary origin, i.e. a percentage of 17.1% of the cases and of which 12 were male, i.e. 60.0% of the cases. The M/F sex ratio was: 1.5. The mean age of the twenty patients was 43.3 ± 15.3 years [19, 74].

4. Discussion

Acute non-traumatic chest pain accounts for 20.3% of outpatient visits in this study. This result can be superimposed on those of Yameogo *et al.* in Burkina Faso who had found 19.7% [5]. In the Congo, on the other hand Mbolla *et al.* found 9.1% chest pain as the reason for consultation [6]. The same observation was made in Madagascar [7]. However, it was a very frequent reason for consultation in the emergency room in France [8].

The average age is 46.1 ± 16.3 with extremes of 19 and 78 years. The most represented age groups are those from 20 to 29 years and 50 to 59 years with respectively 21.4% and 19.7% of cases. In Burkina Faso, Yameogo [5] in his series had noted a greater representation in the age groups of 40 to 50 years (21.4%) and 50 to 60 years (20.2%). This shows that non-traumatic chest pain affects both young and old subjects. A female predominance is found in the present series (55.6%). This female predominance was also reported in Burkina Faso and Congo [5, 6]. However, this result is different from those of Ernestho-ghoud *et al.* in Madagascar which noted a male predominance of 61.81% [7] in accordance with data from the literature [9-12]. The female predominance in our series could be explained by the female dominance observed during the last general census of the population of Chad where women represent 53.4%. In addition, women are more prone to digestive pathologies, the second cause of chest pain in our study.

Regarding the level of education most were unschooled

(46.2%). Women were by far the least educated compared to men with a proportion of 29.9% ($n=28$) against 16.2% ($n=19$). They were the least educated at all levels except tertiary where they dominated men with a significant relationship.

Analysis of socio-demographic data We profile of patients with chest pain in Chad. These are mainly young adults in their forties, predominantly female, mostly uneducated and of low socioeconomic level.

Arterial hypertension (HTA) is the most represented cardiovascular risk factor (41.9%), followed by age in 29.0% of cases. Ernestho Ghoud in his study also noted a strong representation of hypertension with 52.73%, followed by smoking 43.64% [7]. However, our results are different of those of Yameogo who noted that high blood pressure (22.4%) came second after age (38.3%) [5]. Regarding the number of FDRs, the present study shows that hypertension is rarely isolated. This seems to be the case in several other series [13, 14].

With regard to the risk factors relating to thromboembolic disease, taking estrogen-progestogens is the most represented (11.1%) followed by a sedentary lifestyle (9.4%). Our data agree with those of the literature [15, 16]. However, the predominance of taking estrogen-progestins reported by our study testifies to the strong representation of the female gender of childbearing age as well as the impact of family planning activities in Chad. All the same, this result remains surprising given that the prevalence of contraception in Chad is 4.8% for married women and 5% for all women [17].

Among the risk factors for digestive disorders (ulcerative diseases, oesophagitis, gastrophies, etc.), the regular intake of NSAIDs is the most observed (66.7%) followed by age (23.1%) then active smoking (12.0%). This strong predominance of the regular intake of NSAIDs observed in this study would be related to the abusive use of NSAIDs by our populations in a context of self-medication. However, like high blood pressure, regular NSAID use was rarely isolated. Thus, a detailed analysis reveals that the total number of digestive and cardiovascular risk factors observed in the 117 patients is high.

Retro-sternal localizations (23.1%). However, our results are different from those of Yameogo *et al.* [5] who had found a predominantly retrosternal location in 28.7% and 46.5% respectively. The non-recommended use of NSAIDs observed in the majority of the population in this study on the one hand and the atypical localizations of coronary insufficiency on the other hand would explain this localization.

Depending on the type, chest pain is essentially burning in 42.7% followed by constrictive pain in 24.8%. This result is similar to those of de Yameogo and *para.* who noted a predominance of burning-type pain in 40.5% [5]. However, our results are different from those of Ernestho-ghoud *et al.* who had found a predominance of the constrictive type at 37.7% [7].

Paraclinically, all patients underwent a 12-lead surface electrocardiogram, of which 57.3% had a pathological ECG. This result is different from those of Sall Youma [18] and Ernestho-ghoud [7]. Among the electrical abnormalities observed, the negative T wave was the most represented with

17.0%, followed by microvoltage (15.4%) and ST segment depression (11.1%). This result is also different from that of Ernestho-ghoud who had noted a predominance of ST elevation with 52.72% (n=29) followed by the negative T wave and ST depression with respectively 45, 45% (n=25) and 7.27% (n=4) of cases [7]. This difference could be explained by the fact that Ernestho-ghoud's study concerned hospitalized patients, most of whom suffered from cardiovascular disease, which would justify the greatest number of electrical anomalies.

Upper digestive endoscopy is performed in 64 patients, ie 54.7% of the study sample. It is abnormal in 85.9% of cases. The most frequent digestive abnormalities were ulcerative diseases/ gastropathies (87.3%) followed by hiatal hernia (9.1%). The strong representation of ulcerative diseases/ gastropathies observed in this study would be the consequence of the use of gastrotoxic drugs, in particular the non-recommended intake of NSAIDs.

4.1. Etiologies

Chest pain of cardiac origin is dominant in this study (56.4%) followed by that of digestive origin in 46.2%. This result is similar to that of Yameogo in Burkina Faso, which noted a predominance of cardiac (37.6%) and digestive (31.9%) etiologies [5].

In connection with cardiovascular etiologies, coronary insufficiency is preponderant with 42.4% followed by pericarditis in 19.7% of cases.

Valvulopathies come in 4th position (15.2%). Unlike the Burkinabé series of Yaméogo where rheumatic valvulopathies came first (34.4%), followed by acute articular rheumatism (24.9%) then coronary insufficiency (19.5%) [5]. The predominance of coronary insufficiency found in our study can be explained by the fact that our study population presents many cardiovascular risk factors. In addition, a non-negligible fringe of our sample presents an ATCD of coronary artery disease. A detailed analysis shows precisely that coronary insufficiency occurs more in the age groups of 50-59; and that of ≥ 70 with 13.6% and 9.0% respectively. The risk increases from 30-39 years to reach a peak between 50-59 years old. It preferentially affects men in a non-significant association. Valvulopathies, on the other hand, occur more in young subjects, the greatest number being aged 20-29 followed by those aged 30-39 with the respective proportions of 6.1% and 4.5%. These results corroborate the literature data. Indeed, the number of Acute Coronary Syndrome (ACS) increases gradually from the age of 50, especially in women due to menopause. There is an exponential relationship between age and the risk of ACS. The probability that chest pain is due to ACS is 44% between 50 and 59 years old, 56% between 60 and 69 years old, 61% between 70 and 79 years old [19].

Patients seen for chest pain of cardiovascular origin are mostly male (54.5%) with an average age of 48.0 ± 16.3 years [19; 78 years old]. This result is consistent with data from the literature [20].

4.2. Digestive Etiologies

As for digestive etiologies, Gastropathies and ulcer disease (MUGD/Gastropathies) are dominant (87.0%) followed by hiatal hernia in 9.3% of cases. This predominance of Gastropathies / MUGD would find its explanation in the poor hygieno-dietetic conditions of our populations, in particular the recourse to self-medication by gastro-toxic drugs strongly found in our study. But also the high prevalence of *Helicobacter pylori* infection.

It emerges from this analysis that gastropathies and MUGD have no age predilection and affect both young and old subjects. The same proportion of 19.1% is found in the age groups of 20-29, 30-39, and 40-59. These digestive conditions readily affect women in a significant association. In this work, the female sex is mainly represented (63.0%) and the average age was 44.9 ± 16.8 years [20; 72 years old]. This distribution differs from that of Ibtiissam in Marrakech and Brou in Abidjan who respectively reported an average age of 51.5 years and 37 years with a male predominance in all cases [21].

5. Conclusion

Chest pain is a frequent reason for consultation in internal medicine. The etiologies are diverse and dominated by cardiovascular and digestive causes. This condition affects both women and men with a female predominance for digestive causes and a male predominance for cardiovascular causes in our context. Cardiovascular etiologies are dominated by coronary insufficiency. Gastropathies are dominant for digestive causes. All age groups are concerned. The various origins of the pain require multidisciplinary consultation meetings in case of complex etiology.

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